エジプト・アラブ共和国
電力・再生可能エネルギー省
石油省
貿易産業省・産業開発庁
国家統計局

エジプト国
エネルギー利用効率改善能力開発
プロジェクト

事業完了報告書

2023 年 3 月

独立行政法人
国際協力機構（JICA）

株式会社パデコ
株式会社三菱総合研究所
ケービーシー・プロセス・テクノロジー・リミテッド

社基
JR
23-064

エジプト・アラブ共和国
電力・再生可能エネルギー省
石油省
貿易産業省・産業開発庁
国家統計局

エジプト国
エネルギー利用効率改善能力開発プロジェクト

事業完了報告書

2023 年 3 月

独立行政法人
国際協力機構（JICA）

株式会社パデコ
株式会社三菱総合研究所
ケービーシー・プロセス・テクノロジー・リミテッド

目　　次

添付資料

添付資料 1：　Project Design Matrix (Version 1)
添付資料 2：　Project Design Matrix (Version 2)
添付資料 3：　Project Design Matrix (Version 3)
添付資料 4：　Project Design Matrix (Version 4)
添付資料 5：　Project Design Matrix (Version 5)
添付資料 6：　Project Design Matrix (Version 6)
添付資料 7：　業務フローチャート (Workflow Diagram)
添付資料 8：　Revision of Plan of Operation (Version 6)
添付資料 9：　専門家派遣実績（要員計画）
添付資料 10：　研修員受け入れ実績
添付資料 11：　供与機材・携行機材実績
添付資料 12：　第 1 回合同調整委員会議事録
添付資料 13：　第 2 回合同調整委員会議事録
添付資料 14：　第 3 回合同調整委員会議事録
添付資料 15：　第 4 回合同調整委員会議事録

技術協力成果品等

成果 1

技術協力成果品 1.1：　First Report on Energy Efficiency in Egypt
技術協力成果品 1.2：　First Report on Energy Efficiency in Egypt (Brochure)
技術協力成果品 1.3：　Standard Operating Procedures (SOP) for Utilization of Power Loggers to Promote Energy Efficiency

成果 2

技術協力成果品 2.1：　Pilot Project (Electric Power) Technical Cooperation Achievement Product
技術協力成果品 2.2：　Overview of the E-JUST Pilot Project (PPT)

成果 3

技術協力成果品 3.1：　Final EMSF RoadMap Report

成果 4

技術協力成果品 4.1：　EECU/IDA Organization Structure
技術協力成果品 4.2：　EE Checklist (English)
技術協力成果品 4.3：　EE Checklist (Arabic)
技術協力成果品 4.4：　EE&C Measures for the Industrial Sector
技術協力成果品 4.5：　Figure of Promotion of Integrated Activity in the Industrial Sector
技術協力成果品 4.6：　EECU/IDA Brochure

技術協力成果品 4.7：　Energy Consumption Analysis from Energy Balance & EEC Roadmap
技術協力成果品 4.8：　EECU/IDA Mid-term Action Plan 2023-2025
技術協力成果品 4.9：　EECU/IDA Internal Note for Data Collection
技術協力成果品 4.10：　EECU/IDA Data Collection Form (Data Management Team)
技術協力成果品 4.11：　EECU/IDA Revised Technical Inspection Report (Application Form of Industrial Registration)

成果 5

技術協力成果品 5.1：　Energy Data Management System (EDMS) Business Process Manual
技術協力成果品 5.2：　Energy Data Management System (EDMS) User Manual (Arabic)
技術協力成果品 5.3：　CAPMAS National Energy Balance Publication FY2020-21
技術協力成果品 5.4：　Energy Balance Table (Excel Version)

図

表

略　語

AC	Air Conditioner	ルームエアコン
ANRPC	Alexandria National Refining and Petrochemicals Co.	アレクサンドリア国立製油・石油化学公社
AOEE	Achieving Optimum Energy Efficiency	最適エネルギー効率
APC	Alexandria Petroleum Company	アレクサンドリア石油会社
ASORC	Assiut Oil Refining Company	アシュート石油精製会社
BAU	Business As Usual	特段の対策のない自然体ケース
BAT	Best Available Technologies	利用可能な最良の技術
BGC	Burullus Gas Company	ブルルスガス公社
BPM	Business Process Manual	業務プロセスマニュアル
BT	Bench-Top	ベンチトップ
CA	Capacity Assessment	キャパシティ・アセスメント
CAPMAS	Central Agency for Public Mobilization and Statistics	国家統計局
CDU	Crude Distillation Unit	原油蒸留装置
CoE	Center of Excellence	技術普及センター
CORC	Cairo Oil Refining Company	カイロ石油精製会社
COP	Conference of Parties	国連気候変動枠組条約締約国会議
CO_2	Carbon Dioxide	二酸化炭素
C/P	Counterpart	カウンターパート
CPA	Consumer Protection Agency	消費者保護庁
DB	Data Base	データベース
ECHEM	Egyptian Petrochemicals Holding Company	エジプト石油化学公社

ECO	The Environmental Compliance and Sustainable Development Office	環境コンプライアンス持続可能な開発オフィス
EDMS	Energy Data Management System	エネルギーデータ管理システム
EE	Energy Efficiency	省エネルギー
EEAA	Egyptian Environmental Affairs Agency	環境省環境業務庁
EECCD	Energy Efficiency Climate Change Department	（MOERE）省エネ気候変動対策部
EECD	Energy Efficiency and Climate Department	（MOP）省エネ気候変動対策室
EECU	Energy Efficiency and Conservation Unit	（IDA）省エネルギーユニット
EEHC	The Egyptian Electricity Holding Company	エジプト電力持株会社
EE&C	Energy Efficiency and Conservation	エネルギー効率と省エネルギー
EGAS	Egyptian Natural Gas Holding Company	エジプトガス公社（持株会社）
EGP	Egyptian Pound	エジプトポンド
EGPC	Egyptian General Petroleum Corporation	エジプト総合石油公社
Egypt ERA	Egyptian Electric Utility and Consumer Protection Regulatory Agency	エジプト電力規制・消費者保護庁
E-JUST	Egypt-Japan University of Science and Technology	エジプト日本科学技術大学
EMSF	Energy Management System Framework	包括的エネルギー管理システムの枠組
EMS/EnMS	Energy Management System	エネルギー管理システム
ENCPC	National Cleaner Production Center	国立クリーナープロダクションセンター
ENPPI	Engineering for the Petroleum and Process Industries	ENPPI 社

EOS	Egyptian Organization for Standards & Quality	エジプト規格品質機構
EPC	Egyptian Petrochemicals Company	エジプト石油化学会社
EPEEC	Egyptian Petroleum Sector Energy Efficiency Conference & Exhibition	エジプト石油セクター省エネ会議＆展示会
EPROM	Egyptian Projects Operation & Maintenance	エジプトプロジェクト運営管理
ER	Entity Relationship	実態関係
ERD	Entity Relationship Diagram	実態関連図
ESCO	Energy Service Company	エネルギーサービス会社
FEI	Federation of Egyptian industries	エジプト産業連盟
FY	Financial Year	会計年度
GANOPE	Ganoub El-Wadi Petroleum Holding Company	南部エジプト石油開発公社
GASCO	Egyptian Natural Gas Company	エジプトガス公社
GHG	Greenhouse Gas	温室効果ガス
GOIEC	General Organization for Export and Import Control	輸出入管理公団
GPC	General Petroleum Company	ジェネラル ペトロリアム
OSOCO	Offshore Shukeir Oil Company Co.	オフショアシュケイル石油会社
HX	Human Experience	人間としての経験
ICA	Industrial Control Authority	産業管理局
ID	identification	身分証明
IDA	Industrial Development Authority	（貿易産業省）産業開発庁
IEA	International Energy Agency	国際エネルギー機関
IMC	Industrial Modernization Center	産業近代化センター
IoT	Internet of Things	モノのインターネット

IP	Internet Protocol	インターネット通信プロトコル
IPCC	Intergovernmental Panel on Climate Change	国連気候変動に関する政府間パネル
ISES	Integrated Sustainable Energy Strategy	統合的・持続的エネルギー開発戦略
ISO	International Organization for Standardization	国際標準化機構
JCC	Joint Coordinating Committee	合同調整委員会
JCCP	Japan Cooperation Center for Petroleum and Sustainable Energy	一般財団法人 JCCP 国際石油・ガス協力機関
JICA	Japan International Cooperation Agency	国際協力機構
JICA T/C Team	JICA Technical Cooperation Project Team	JICA 技術協力プロジェクトチーム
Khalda	Khalda Petroleum Company	カルダ石油会社
KPI	Key Performance Indicators	主要性能指標
LEED	Leadership in Energy and Environmental Design	エネルギーと環境デザインのリーダシップ
MIDOR	Middle East Oil Refinery	中東製油所
MEPS	Minimum Energy Performance Standard	最低エネルギー消費効率基準
MOE	Ministry of Environment	環境省
MOERE	The Ministry of Electricity and Renewable Energy	電力・再生可能エネルギー省
MOP	The Ministry of Petroleum and Mineral Resources	石油省
MOPCO	Misr Fertilizers Production Company	ミスル肥料生産会社
MRV	Measurement, Reporting and Verification	温室効果ガス排出量の）測定、報告及び検証
MTI	Ministry of Trade and Industry	貿易産業省

NDA	Non-Disclosure Agreement	秘密保持契約
NEEAP	The National Energy Efficiency Action Plan of Egypt	国家省エネルギーエネルギー効率行動計画
NPC	National Petroleum Company	イラン国営石油化学会社
NQI	National Quality Institute	国立品質研究所
NREA	New and Renewable Energy Authority	新再生可能エネルギー庁
OGMP	Oil and Gas Modernization Program	エジプト石油・ガスセクター近代化プログラム
OJT	On-the-Job Training	実地訓練
OSOCO	Offshore Shukheir Oil Company	Shukheir 沖合石油会社
PDM	Project Design Matrix	プロジェクト・デザイン・マトリクス
PETROBEL	Belayim Petroleum Company	ベライム・ペトロリアム・カンパニー
PFD	Process Flow Diagram	プロセスフロー図
PO	Plan of Operation	活動計画表
PPT	Power Point	パワーポイント
PT	Pinch Technology	ピンチ解析
RDF	Refuse Derived Fuel	ごみ固形燃料
RECP	Resource Efficiency and Cleaner Production	資源効率化とクリーナープロダクション
R&D	Research and Development	研究開発
SCE	The Egyptian Supreme Council of Energy	エジプトエネルギー最高評議会
SDS	Sustainable Development Scenario	持続可能開発シナリオ
SER	Strategic Energy Review	戦略的エネルギーレビュー
SIDPEC	Sidi Kerir Petrochemicals Company	シディ・ケリール・ペトロケミカルズ・カンパニー

S&L	Standard and Labeling	最低エネルギー消費効率基準とラベリング制度
SOP	Standard Operating Procedure	標準業務手順書
SOPC	Suez Oil Processing Company	スエズ石油加工会社
T/C	Technical Cooperation	技術協力
TT	Task Team	タスクチーム
UAT	User Acceptance Test	ユーザー受入テスト
VRU	Vapor Recovery Unit	蒸気回収装置
WG	Working Group	ワーキンググループ
WMRA	Waste Management Regulatory Authority	環境省廃棄物管理庁
WP	White Paper	白書
WS	Workshop	ワークショップ

第1章　プロジェクトの概要

1.1　プロジェクトの背景

エジプトにおける省エネルギー（以下、「省エネ」）への取り組みは、2016 年にエネルギー最高評議会（SCE）にて承認された「統合的・持続的エネルギー開発戦略（ISES2035）」により、国家エネルギー戦略の中で重要な課題として位置づけられている。ISES2035 では、一次エネルギー及び電力等二次エネルギーの長期的な開発方針として、再生可能エネルギー、火力、原子力等経済性を確保しつつ電源多様化を進めること、2020 年までに補助金を撤廃すること、省エネをこれまで以上に推進すること等が優先シナリオ（4b）として示されている。

エジプト政府全体の省エネの取り組みは、これまでのところ電力・再生可能エネルギー省（MOERE）がリードして来ている。MOERE は、アラブ電力大臣会議（Executive Office of Arab Electricity Ministers）で決定されたアラブフレームワークに沿って、2012 年に、国家エネルギー効率行動計画（The National Energy Efficiency Action Plan of Egypt（NEEAP））を策定した。そのレビュー結果を踏まえて、2017 年に、2018 年から 2020 年までの行動計画として、NEEAP-II を発表し政府により承認された。NEEAP-II では、省エネ推進のための諸組織間の情報交換や調整を図る制度が規定されている。省エネルギー促進の監視機関として、「エネルギー効率監視委員会」を SCE の下に設置し、MOERE の省エネ気候変動対策室（EECCD）が同委員会の技術事務局的役割や関係機関との調整を担うこととしている。

今後、EECCD は、省エネ政策全体の方針・関連制度の制定や各省の省エネ対策のフォロー、統計データの整備等、NEEAP-II に規定される各種施策の実施モニタリングの責を担うことになる。EECCD の行政実務能力が NEEAP-II の実施を円滑に進める上でキーとなるが、同組織は設立後日が浅く配属職員の経験・人数も充分ではないことから、早急に次のような機能を強化することが求められている。一つ目は効果的な政策策定に不可欠なエネルギー統計データマネジメントの枠組み及び解析能力、二つ目は省エネ進捗状況のモニタリング評価及びそれを年次報告書として纏めるために必要な能力、三つ目は現行省エネ推進政策・制度や対策技術の有効性検証及びより効果的且つ実効性の高い改善策の提案・実行に必要な政策立案・執行能力、を可及的速やかに強化することである。また、エジプト政府全体で見ると、MOERE が省エネ推進の主導的役割を果たしているが、エネルギー需給構造上重要な役割を果たす石油省（MOP）の関与が充分ではないとの指摘もある。政府全体として省エネを強力に推進するためには、MOERE 及び MOP を始めとする政府機関の連携強化が極めて重要である。

このような背景により、JICA は、エジプト政府の省エネ推進能力開発を支援するため、2017 年度から三年間省エネをテーマとする国別研修を実施した。同研修では、MOERE、MOP 等省エネ推進の中心的役割を果たす政府機関との意見交換を通してニーズの確認を行った。また、省エネ型設備投資を支援するための開発金融借款の検討も進めている。本業務は、これら省エネに関する種々取り組みの一環として実施するものである。

1.2　業務の目的

(1)　プロジェクト上位目標

エジプト政府省エネ推進体制が強化され、省エネの国家目標が達成される。

(2)　プロジェクト目標

NEEAP-II や MOP が策定している「エジプト石油・ガスセクター近代化プログラム（OGMP）」等国家レベルの省エネ政策を促進するため、省エネ推進戦略・計画の作成、データマネジメント及び高効率設備導入拡大のための制度構築に必要な政府機関の能力開発を行う。

(3)　期待される成果および指標

本業務における成果とそれに対する指標は、以下および添付プロジェクト・デザイン・マトリクス（Project Design Matrix：PDM）の通り。

成果 1：　MOERE の EECCD の省エネ推進に関する行政処理能力が強化される。
成果 2：　省エネ潜在性の高い技術／製品評価が行われ推進政策が提案される。
成果 3：　MOP の省エネ気候変動対策室（EECD）の省エネ推進に関する行政処理能力が強化されるとともに省エネ推進戦略ロードマップが作成される。
成果 4：　国レベルでの統合省エネ推進政策策定に向けた提言がなされ、その原案が策定される。
成果 5：　国家統計局（CAPMAS）が発刊する国家エネルギー統計書が他のカウンターパート機関による省エネ促進政策の策定およびモニタリングのために参照される。

1.3　業務の対象地域

エジプト全域（主な活動地域はカイロ市）

1.4　本業務の相手国関係省庁・機関

電力・再生可能エネルギー省（MOERE）	エジプト政府全体の省エネ推進の主導的役割を果たしている。同省の EECCD が SCE の技術事務局的役割や関係機関との調整を担う。
石油省（MOP）	エネルギー需給構造上重要な役割を果たす。ただし MOERE の省エネ推進の取り組みへの関与が不十分。
産業開発庁（IDA）	貿易産業省（MTI）傘下の組織で、工場や工業団地の許認可、エネルギー消費を含む操業状況の監督を行う。
国家統計局（CAPMAS）	エジプトの各種統計を扱っており、エネルギー統計データは CAPMAS が関連省庁の情報を集約し、統計データベースとして纏める。

第2章　セクター概要及び新たな動き等プロジェクトを取り巻く現況概観

昨年 11 月にエジプトのシャルム・エル・シェイクで国連気候変動枠組み条約第 27 回締約国会議（COP27）が開催された。中でも注目を浴びた課題として、（1）産業革命前と比較し 1.5ºC の気温上昇回避の現実性と関連政策に係る表現、（2）途上国の温室効果ガス排出緩和と気候変動への適応に係る支援資金の提供、（3）洪水や干ばつなど極端な気象現象（extreme events）、および、海面上昇や砂漠化など緩やかに進行する現象（slow onset events）など気候変動の悪影響に伴う損失や損害に対する脆弱国支援に向けた新資金制度の確立、等が挙げられる。

省エネルギー推進に関しては、「シャルム・エル・シェイク実施計画」の緩和策条項において、「締約国に対し･･･国情に即した的を絞った支援を行い、･･･クリーン発電および省エネルギー対策の展開を急速に拡大することにより、低排出のエネルギーシステムに移行するための技術開発、展開、普及、および政策の採択を加速することを要請する。」と記されている。

さらに同計画冒頭の科学・緊急性条項において、「気候変動に関する政府間パネル（IPCC）の第 6 次評価報告書への Working Group (WG) II および WG III の貢献を歓迎。」としている。

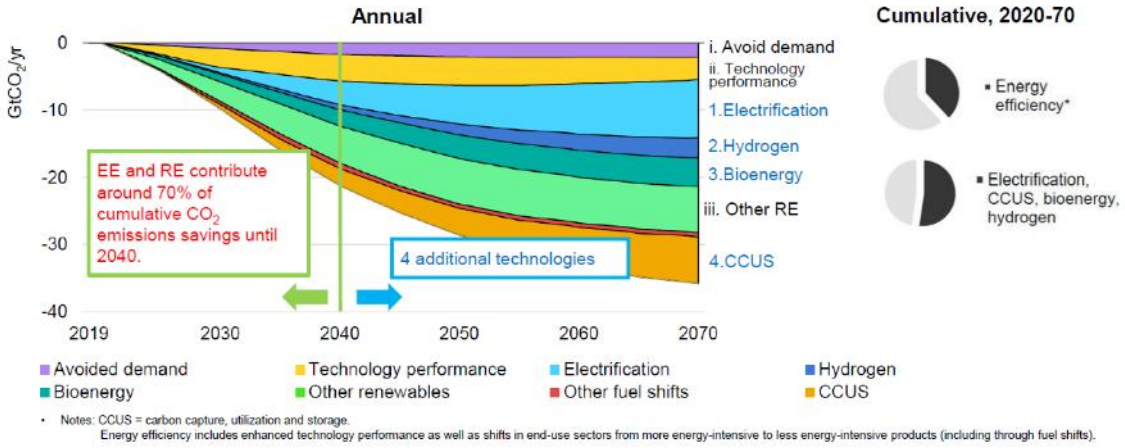
緩和策に係る技術的検討については、WG III にて専門家による議論、取りまとめがなされており、その中で省エネは重要な緩和策、と位置付けられている。IPCC 第 6 次報告書 WG III の政策決定者向けサマリーには、省エネ推進の重要性について例えば以下の通り示されている。

- 需要側緩和策は、インフラ活用、最終消費分野の技術、社会文化的・行動変容などの変化を含むものである。一部地域や社会経済グループには追加のエネルギー／資源が必要だが、需要側対策と最終消費者向け新サービスの提供を通じ、最終消費分野の GHG 排出量は（ベースラインシナリオと比し）2050 年までに 40～70%削減可能。需要側の緩和オプションは、全て人の基本的幸福につながる（高信頼性）。(次図参照)

出典：IPCC 第 6 次報告書 WG III「政策決定者向けサマリー（2022 年 4 月）」を基に JICA T/C Team 作成

図 2-1：2050 年までの需要側緩和オプションの潜在的可能性

他方、国際エネルギー機関（IEA）が描く 2070 年におけるネットゼロエミッション達成シナリオ（持続可能開発シナリオ、Sustainable Development Scenario (SDS)）によれば、省エネ技術／サービスにより、2070 年までの累積 GHG 排出量は約 40%削減される、としている。（次図参照）



出典：「Energy Technology Perspectives 2020, revised version”, IEA, Feb. 2021」を基に JICA T/C Team 作成

図 2-2：持続可能開発シナリオによるエネルギー分野の CO_2 削減量
（STEP シナリオ（ベースライン）との比較、2019-70）

このように、世界のエネルギー専門家から気候変動緩和に向けた省エネのポテンシャルは高く評価されており、政策・制度、技術、ファイナンス、普及啓発を含めソフト／ハード面にわたる多角的な省エネ実現に向けたアプローチが求められている。

当事業では、エジプトにおける省エネ推進行政執行能力強化を目指し、技術協力を進め以下の主要アウトプットを出した。

- エネルギーバランス表の作成
- 省エネ年次報告書の作成（NEEAP-II のレビュー含む）
- 高効率空調機器の省エネ性能定量評価
- （電力・石油分野における）省エネ診断
- （石油分野）EMSF ロードマップ作成
- （省エネルギー分野）CoE 設立支援
- 産業分野における省エネ部門設立支援、活動フォロー
- COP27、セミナー、ホームページ等における当事業活動内容／成果の広報

残る事業期間もわずかとなったが、引き続きカウンターパート（C/P）機関、貴機構と連携しつつ円滑に業務を進めていく。

第3章　活動内容

3.1　事業マネジメント全般に係る業務

3.1.1　タスク 1-1：ワークプランの作成・協議

2020 年 1 月に開始した本プロジェクトは、第 1 次渡航（同年 1 月末～2 月初旬）において C/P 機関へ提出したワークプランが承認された後、NDA 締結遅延状況を踏まえた改訂ワーク・プラン（案）を 2020 年 8 月に、第 1 回合同調整委員会（Joint Coordinating Committee：JCC）（2021 年 7 月）で合意された PDM を踏まえた改訂ワーク・プラン（案）を 2021 年 10 月に提出した。2022 年 2 月の第 2 回契約変更内容、CoE 設立に向けた活動業務、本邦研修予定等を反映した改訂ワークプランを策定した。

3.1.2　タスク 1-2：JCC の開催支援

2021 年 7 月、2022 年 1 月、7 月、2023 年 2 月にそれぞれ予定通り JCC を開催した。各 JCC 開催前に、C/P と PDM に係る事前協議、意見交換を行ったうえで、JCC の場で C/P から承認を得るとともに、活動成果および今後の計画に係る説明ならびにディスカッションを行った。最終 JCC では H.E. Dr. Mohamed Shaker El Markabi, MOERE 大臣、および在エジプト日本国大使館 岡 浩特命全権大使の JCC 開会のご挨拶の後、JICA エジプト事務所　加藤　健所長から MOERE 大臣へトロフィーを贈呈して頂いた。各 C/P を代表して、MOERE モヒーナ次官、MOP アブドラーボ石油中央局副局長、IDA ネグム Associate Chairman、CAPMAS サファ・サミー金融・物価統計局長より、また、加藤所長から開会のスピーチを頂いた。本 JCC の締めくくりにあたっては、JICA 本部社会基盤部資源・エネルギーグループ第一チーム　佐藤　哲課長より、閉会のご挨拶を頂いた。


出典：JICA T/C Team

図 3-1：第 1 回 JCC（2021 年 7 月、左図）と第 2 回 JCC（2022 年 1 月、右図）会場

出典：JICA T/C Team

図 3-2：第 3 回 JCC（2022 年 7 月）会場

出典：JICA T/C Team

図 3-3：第 4 回 JCC（2023 年 2 月）の様子

各 JCC の議事録は添付資料 12-15 参照。

3.1.3　タスク 1-3：タスクチームの設置

分野ごとに設置した 5 つのタスクベースにより、業務を遂行した。

表 3-1：プロジェクト成果毎の対応タスクチーム

【成果 1】MOERE の EECCD の省エネ推進に関する行政処理能力が強化される。	Task Team 3（TT3）:MOERE
【成果 2】省エネ潜在性の高い技術／製品評価が行われ推進政策が提案される。	Task Team 3（TT3）:MOERE
【成果 3】MOP の EECD の省エネ推進に関する行政処理能力が強化されるとともに省エネ推進戦略ロードマップが作成される。	Task Team 4（TT4）:MOP
【成果 4】国レベルでの統合省エネ推進政策策定に向けた提言がなされ、その原案が策定される。	Task Team 1（TT1, all C/Ps）: MOERE, MOP, IDA, CAPMAS Task Team 1 (TT1, IDA part): IDA
【成果 5】CAPMAS が発刊する国家エネルギー統計書が他のカウンターパート機関による省エネ促進政策の策定およびモニタリングのために参照される。	Task Team 2（TT2, CAPMAS, MOERE, MOP, IDA）

出典：JICA T/C Team

3.1.4　タスク 1-4：各現地渡航前の JICA との協議

各現地渡航前には、貴機構と対処方針会議を行うことを原則としつつ、渡航時の活動内容について貴機構との事前打ち合わせを行った。また、打合せ簿の取り交わし、毎月および全体渡航計画提出、契約変更に向けた技術および手続きに係る打合せ等について、貴機構と日常的にコミュニケーションを図り、円滑なプロジェクト運営に努めた。

3.1.5　タスク 1-5：キャパシティの把握・指標確認

2021 年夏期にキャパシティ・アセスメント（CA）活動を完了、CA 報告書を予定通り 2021 年 9 月に提出した。

3.1.6　タスク 1-6：各成果発現に必要な能力開発のための OJT, Off-JT の実施

事業期間を通じ実施されたトレーニング、ワークショップ等の実施実績一覧を次表に示す。

表 3-2：トレーニング/ワークショップ等の実施実績一覧（2023 年 2 月まで）

トレーニング／ワークショップ	時期、回数	参加者
成果 1 関連トレーニング（TT3）	2021 年 12 月	・MOERE（6 名）、EEHC（2 名）および Egypt ERA（2 名）より計 10 名
成果 1 関連関係者会合（TT3）	2021 年 10 月	・MOERE-EECCD、EOS、NREA、GOEIC、CPA、ECO-FEI

トレーニング／ワークショップ	時期、回数	参加者
成果 1 関連関係者会合	2021 年 12 月	・EOS-Energy Efficiency Unit
成果 1 関連トレーニング（TT3）	2022 年 1 月、3 月、7 月（計 3 回）	・MOERE、EEHC、Egypt ERA
成果 1 関連トレーニング（TT3）	2022 年 6 月（計 1 回）	・MOERE（3 名）、EEHC（2 名）、Al Mokattan Training Center
成果 1 関連関係者会合（TT3）	2022 年 2 月、3 月、6 月（計 3 回）	・MOERE、EOS、NREA、GOEIC、CPA、ECO-FEI
成果 1 関連トレーニング（TT3）	2022 年 8 月(2 回)、10 月(2 回)（計 4 回）	・MOERE、EEHC、Egypt ERA、IDA、配電会社（延べ 47 名）
成果 1 関連トレーニング（TT3）	2022 年 12 月（計 1 回）	・MOERE（6 名）、EEHC（2 名）、Egypt ERA (2 名)
成果 1 関連関係者会合（TT3）	2022 年 7 月、8 月、11 月（計 3 回）	・MOERE、EOS、NREA、GOEIC、CPA、ICA（延べ 30 名）
成果 3 関連トレーニング（TT4）	2021 年 7 月	・MOP、Petromaint Co.、EGPC、GANOPE、ECHEM、Enppi（12 名）
成果 3 関連トレーニング（TT4）	2021 年 10 月	・EGPC、CORC、Enppi、EPROM、EPC、Assiut Oil Refining Company (ASORC)、Alexandria Petroleum Company (APC)（計 15 名）
成果 3 関連トレーニング（TT4）	2022 年 2 月 20 日-2 月 24 日	・MOP 受講生、EGPC, カイロ石油精製会社（CORC）
成果 3 関連トレーニング（TT4）	2022 年 3 月 13 日-3 月 17 日	・MOP 受講生、EGPC, CORC
成果 3 関連ワークショップ（TT4）	2022 年 3 月 1 日	・MOP トップ・マネジメント
成果 3 関連ワークショップ（TT4）	2022 年 3 月 2 日	・MOP トップ・マネジメント
成果 3 関連ワークショップ（TT4）	2022 年 6 月 20 日-6 月 22 日	・MOP, EGPC, ECHEM, EGAS, GANOPE, ENPPI, EPROM
成果 3 関連トレーニング（TT4）	2022 年 10 月 9 日-12 日	・ENPPI、GASCO、OSOCO、MOPCO、Abu Qir Pet.、ECHEM(計 17 名)
成果 3 関連トレーニング（TT4）	2022 年 10 月 16 日-20 日	・ENPPI、EPROM、GPC GASCO、OSOCO、Abu Qir Pet.、ECHEM（計 24 名）
成果 3 関連ワークショップ（TT4）	2022 年 11 月 7 日-10 日	・MOP、ENPPI、EPROM ECHEM、MOPCO、Abu Qir、OSOCO、GASCO（計 18 名）
成果 4 関連関係者会合	2022 年 3 月、6 月（計 2 回）	・MOERE、MOP、IDA、CAPMAS
成果 4 関連関係者会合（TT1）	2022 年 10 月 10 日、12 月 29 日	・MOERE、MOP、IDA、CAPMAS（延べ 40 名）
成果 4 関連トレーニング（TT1、IDA パート）	2021 年 8 月	・IDA（計 24 名）
成果 4 関連トレーニング（TT1、IDA パート）	2021 年 10 月	・IDA（計 14 名）
成果 4 関連会合（TT1、IDA パート）	2021 年 10 月	・MTI、IDA、ENCPC、ECO-FEI、ICA、EOS、NQI、IMC 関係者

トレーニング／ワークショップ	時期、回数	参加者
成果 4 関連トレーニング（TT1、IDA パート）	2022 年 7 月 24 日 - 7 月 28 日	・IDA
成果 4 関連ワークショップ（TT1、IDA パート）	2022 年 2 月 28 日	・IDA
成果 4 関連トレーニング（TT1、IDA パート）	2022 年 1 月 30 日-2 月 3 日	・IDA
成果 4 関連トレーニング（TT1、IDA パート）	2021 年 8～2022 年 3 月（計 3 回）	・IDA
成果 4 関連トレーニング（TT1、IDA パート）	2021 年 12 月（計 2 回）	・MTI, IDA, ENCPC, ECO-FEI, ICA, EOS, NQI, IMC 関係者
成果 4 関連トレーニング（TT1、IDA パート）	2022 年 7 月 31 日-8 月 4 日	・IDA より計 36 名
成果 4 関連トレーニング（TT1、IDA パート）	2022 年 8 月 28 日-9 月 1 日	・IDA より計 37 名
成果 4 関連ワークショップ（TT1、IDA パート）	2022 年 10 月 31 日(オンライン)	・IDA、産業団地マネージャー等(30 名)
成果 4 関連ワークショップ（TT1、IDA パート）	2023 年 2 月 22 日	・IDA 部門長と職員、C/P、MTI 関連組織、銀行、企業他
成果 5 関連トレーニング（TT2）	2021 年 12 月 13 日-16 日	・CAPMAS、MOERE、MOP、
成果 5 関連トレーニング（TT2）	2021 年 12 月 20 日-23 日	・CAPMAS
成果 5 関連会合(TT2)	2022 年 3 月	・CAPMAS、MOERE、MOP、IDA
成果 5 関連トレーニング（TT2）	2022 年 7 月	・CAPMAS
成果 5 関連会合（TT2）	2022 年 9 月	・CAPMAS 等 30 名
成果 5 関連会合（TT2）	2022 年 11 月	・CAPMAS 等 30 名
成果 5 関連会合（TT2）	2022 年 11 月 13 -14 日	・CAPMAS 等延べ 40 名
成果 5 関連会合（TT2）	2022 年 11 月 15 日	・CAPMAS 等 30 名
成果 5 関連会合（TT2）	2022 年 12 月 28 日	・CAPMAS 等 30 名
成果 5 関連会合（TT2）	2023 年 1 月 23 日	・CAPMAS 等 20 名
成果 5 関連会合（TT2）	2023 年 2 月 23 日	・CAPMAS 等 20 名

出典：JICA T/C Team

3.1.7　業務進捗報告書（モニタリングシートの和文版）の作成

2022 年 2 月、8 月および 2023 年 3 月に提出済み。

3.1.8　事業完了報告書の作成

本報告書の作成。

3.2 特記すべき成果

本事業ではカウンターパートの省エネ推進行政の組織能力強化ならびにその定着を図るべく、多数の目に見える形の成果（アウトプット）づくりに取り組み、予定された全ての成果を達成した。その中で特記すべき成果を以下に記す。

3.2.1 第一次省エネ報告書の策定

エジプトでは初めてとなる省エネ報告書の策定を支援した。同報告書は、

- NEEAP-II が示した電力省エネ推進に係る各施策（枠組み構築、制度等）の進捗状況
- 需給両サイドからの省エネ対策による省エネ量、CO2 削減量、および、燃料消費量削減に伴う経済効果試算結果
- 国家エネルギーバランス／エネルギーフロー図（2020/21 年）
- MOERE における今後の省エネ推進活動計画

等、電力省エネに係る主要事項を網羅し、COP27 にて MOERE より公表、配布された。

今後、本報告書をテンプレートとした省エネ年次報告書の発刊が可能となった。

3.2.2 高効率ルームエアコンの実証試験

高効率エアコン（インバータエアコン）とノンインバータエアコンの一年を通じた消費電力量を実際に人が生活する環境で実測し、比較・評価した結果以下の通りであった。

- 冷房運転時の電力消費量削減率：62%
- 暖房運転時の電力消費量削減率：76%

インバータエアコンの優れた省エネ性能は、本事業セミナーで発表、また、ウェブサイトを通じ広く発信するとともに、MOERE 幹部にも報告し認識を共有した。

3.2.3 家庭消費電力量計測試験

E-JUST が開発した電力消費量計測器（スマートセンサー）を用い、家庭 5 軒の各家電機器の消費電力量を一年間にわたり計測、結果は以下の通りであった（5 軒中 3 軒の家庭にはエアコンはなく、2 軒が所有するエアコンはともにノンインバータエアコン）。

- 5 軒全体の家電別消費電力量割合：
  冷蔵庫（28%）、電気温水ヒータ（24%）、照明（7%）
- エアコン所有 2 軒でのエアコンの占める割合：
  1 軒目（36%でエアコンが最大）、2 軒目（15%でエアコンは 4 番目）

これらデータから、家庭用分野における省エネ施策は、冷蔵庫、電気温水ヒータ、エアコンの高効率化が優先されるべき、と確認された（セミナー、ウェブサイトで発信）。

3.2.4 石油分野における省エネ推進活動

石油分野での MOP への省エネ推進支援活動成果は、以下の通りである。

- カイロ市内の製油所をパイロットとし省エネ診断を実施した。その評価・分析は専用解析ソフトウェアを活用して行い、同製油所のプロセス装置、用役システム等に大きな省エネポテンシャル（170 百万 EGP／年）があることを特定した。あわせて、同製油所のエネルギー効率改善ロードマップを作成した。
- エネルギーマネジメント推進枠組み（EMSF）として、組織／ガバナンス、規制政策、ファイナンス／インセンティブ、データ収集、人材育成の 5 分野について提言するとともに、EMSF ロードマップとして取りまとめた。同ロードマップで重要課題と位置付けた石油セクターにおける省エネ戦略策定は、MOP よりエネルギー政策として発行された。

3.2.5 IDA における省エネユニットの設立および省エネ活動支援

省エネ推進、および、省エネユニット(EECU)設立準備研修会を度重ねて開催し、2022 年 1 月に EECU/IDA が正式に設立された。これにより、産業分野の省エネ推進行政は EECU/IDA の所管となった。EECU/IDA 設立後の主な成果・進捗は以下の通りである。

- EECU 中期活動計画の策定（2023 年 12 月～2025 年）
- エネルギー消費量データ収集の強化（フォーマット変更実施）
- EECU 向け省エネチェックリストおよび工場向け省エネ対策リスト策定
- 関係省庁および民間セクターを含む省エネ会合、省エネワークショップの開催

3.2.6 エネルギー統計データの整備と見える化

効果的な省エネ政策立案の礎となる国家エネルギー収支表作成に向け多数の研修会合を継続的に開催、また、各エネルギー関連データ保有者からの協力も得つつ、国家エネルギー収支統計書（2020/21 年）が完成し、2023 年 3 月に CAPMAS より同書が発刊された。

同収支表をベースとしたエネルギーフロー図も作成し、一次エネルギー供給から最終消費に至るまでのエネルギーフローが見える化され、全エネルギーを包括したエネルギー需給状況、消費動向が俯瞰出来るようになった。

さらに国家エネルギー収支表を毎年定常的に簡便に更新するためのエネルギーデータ管理システム（EDMS）を開発した。今後、データを保有する関係機関が定期的に同システム上でデータ更新を行うことで、毎年国家エネルギー収支表の作成が可能となった。同収支統計書発刊の定着に向け、EDMS ユーザーマニュアル、および、エネルギー収支表作成に向けた関係機関の役割分担を規定した業務手順書も作成、配布した。

3.2.7 COP27 開催支援

2022 年 11 月にエジプトのシャルム・エル・シェイクで COP27 が開催され、本プロジェクトも開催支援活動を行った。主な活動内容は以下の通りである。

- 本事業の活動内容／成果の発信（省エネ年次報告書／同報告書リーフレットの配布、プロジェクトウェブサイト広報含む）
- JICA ブース設立支援
- 関連イベント対応用に専門家を派遣（Decarbonization day (MOP イベント)、Energy day (MOERE イベント)）
- 当プロジェクトナショナルスタッフの長期派遣による各種対応支援

3.3　【成果 1】Task Team 3（TT3）: MOERE の EECCD の省エネ推進に関する行政処理能力が強化される。

3.3.1　活動実績

(1)　データ収集・分析手法の導入およびデータベース改築（TT2 連携）

TT2 との連携について、MOERE および EEHC の職員は TT2 開催のエネルギーバランスの研修等に積極的に参加し、データの入力および確認方法について習得した。また、電力の需要・供給それぞれの省エネ取り組み成果に関するマクロ・ミクロレベルのデータの収集・分析について、省エネ年次報告書（成果品 1.1 および 1.2）の中で分析を実施・公表を行った。

(2)　意識啓発を含む省エネ推進ロードマップの策定

省エネ推進ロードマップについて、TT1 で策定を進めるホワイトペーパーの一部として、また省エネ年次報告の中で特定した将来の優先取り組み領域等として、とりまとめた。意識啓発として、以下のような活動が行われた。

- COP27 の JICA 主催サイドイベントにおける本プロジェクトの活動発表
- COP27 における省エネ報告書の公開（レポート、リーフレットの作製、配布）
- COP27 における JICA ブースの出展支援
- プロジェクトホームページを通じた情報発信
- E-JUST への訪問者へのプロジェクト紹介
- 学会・セミナーにおけるプロジェクト成果の発表
- 電力セミナーの開催

JICA 主催セミナーでの発表

省エネ報告書公表イベント

JICA ブース

出典：JICA T/C Team

図 3-4：COP27 における活動の様子

E-JUST 学内イベント（2022 年 5 月）

MOERE 訪問時（2023 年 2 月）

出典：JICA T/C Team

図 3-5：E-JUST への訪問者へ紹介

JICA 省エネ調査でのセミナー
（2022 年 3 月）

メディアインタビュー

出典：JICA T/C Team

図 3-6：セミナーでの発表およびメディアへのインタビュー

出典：JICA T/C Team

図 3-7：省エネリーフレットの作成

(3)　省エネ年次報告書の策定

第 1 次省エネ報告書を作成し、COP27 で電力省により公開された。報告書では、NEEAP-II 実施期間中に行われた省エネ取り組みをレビューし、電力の供給側および需要側のそれ

ぞれでエネルギー削減量・CO2 削減量を試算した。また、電力部門の KPI として主要なデータの分析を行った他、エネルギーバランスを掲載した。加えて、NEEAP-II で実施が定められている事項（枠組みの構築、省エネ事業の実施、ファイナンシャルメカニズムの構築、データの収集・MRV、能力開発・意識啓発）についてのこれまでの進捗をとりまとめると共に、将来の活動計画についても掲載した。

出典：JICA T/C Team

図 3-8：省エネ報告書（レポートおよび冊子）

(4)　MOERE-EECCD の職員の政策実施能力の向上

MOERE-EECCD の職員の政策実施能力の向上について、2 つのトレーニングを企画・実施した。一つ目は、机上研修によるものであり、MOERE、EEHC およびエジプト電力規制・消費者保護庁（Egypt ERA）からの 10 名の受講生参加のもと、世界の主要な認証制度の一つである Leadership in Energy and Environmental Design（LEED）を取り上げ、エジプトにおけるビル認証制度がどうあるべきか、その政策的な推進方法について議論を行った。また LEED のエジプトにおける適用事例を学ぶべく、LEED 認証取得を目指している大学からのプレゼンを実施するとともに、LEED 認証取得済みの企業ビルを訪問し、実地で省エネ性能の高いビルを視察した。受講生のうち 2 名は、LEED への理解を有する専門家に与えられる資格である LEED Green Associate の試験を受験し、合格した。最終講義においては資格の維持方法を含む資格制度についての解説も実施した。

表 3-3：第 2-3 回エネルギー診断机上研修の概要

日時	第 1 回：2021 年 12 月 7 日・8 日　10:00-14:00 第 2 回：2022 年 1 月 25 日・26 日　10:00-14:00 第 3 回：2022 年 3 月 28 日・29 日　10:00-14:00 第 4 回：2022 年 7 月 25 日・26 日　10:00-14:00 第 5 回：2022 年 12 月 25 日・26 日　10:00-14:00
場所	Greek Campus 内セミナー室
参加者	MOERE（6 名）、EEHC（2 名）および Egypt ERA（2 名）より計 10 名
概要	第 1 回：研修の目的、研修計画、エネルギー診断の基礎、ISO50001/50002 の概要、世界およびエジプトにおけるビルの認証制度の紹介 第 2 回：エネルギーと大気、室内環境、ビル認証制度と政策推進について議論 第 3 回：イノベーション、地域優先度、立地と交通、物質と資源 第 4 回：省水システム、材料、天然資源 第 5 回：LEED Green Associate の資格制度、エジプトにおける LEED 認証取得の教訓、E-JUST における LEED 認証取得に向けた取り組み

出典：JICA T/C Team

出典：JICA T/C Team

図 3-9：LEED 取得ビル視察の様子（2022 年 3 月）

加えて、2022 年 12 月に実施した訪日研修の際には、日本におけるビル認証制度に関する講義・視察を行った。具体的には、日本における LEED 認証普及を行っている Green Building Japan より日本の認証実態について紹介すると共に、LEED 認証を取得した柏の葉アーバンデザインセンターへの見学を行った。

二つ目は、実際にエネルギー計測を行う実地レクチャーによるものであり、第 1 回の研修を 2022 年 6 月に実施したのち、同じ内容で 4 回が繰り返された。本研修では配電会社のトレーニングセンターに所在する執務室の電力消費量を、データロガーを用いて計測し、分析する研修を実施し、研修参加者自らがデータの計測・分析にあたった。これに加えて、エネルギー診断の手法およびビルにおける省エネ余地についての講義も行った。

表 3-4：エネルギー診断実地研修の概要

日時	第 1 回：2022 年 6 月 20 日・21 日　10:00-14:00 第 2 回：2022 年 8 月 7 日・8 日　10:00-14:00 第 3 回：2022 年 8 月 9 日・10 日　10:00-14:00 第 4 回：2022 年 10 月 2 日・3 日　10:00-14:00 第 5 回：2022 年 10 月 4 日・5 日　10:00-14:00
場所	南カイロ配電会社 Al Mokattan Training Center
参加者	第 1 回：MOERE3 名、EEHC2 名、Al Mokattan Training Center4 名（9 名） 第 2 回：配電会社 7 名、IDA 2 名、Egypt ERA 1 名（11 名） 第 3 回：配電会社 9 名、IDA 2 名、EEHC 1 名（13 名） 第 4 回：配電会社 9 名、電力再生可能エネルギー省 1 名、EEHC 1 名（11 名） 第 5 回：配電会社 10 名、電力再生可能エネルギー省 1 名、EEHC 1 名（12 名）
概要	エネルギー診断講義、ビル省エネ講義、データロガー据え付け実演、データロガー回収データの分析実施

出典：JICA T/C Team

出典：JICA T/C Team

図 3-10：エネルギー診断実地研修の様子

また、研修終了後に本研修において使用したデータロガーなどの機材を電力省に譲渡することになっていることから、データロガーを用いた省エネ診断の手順書（SOP）を作成した。（成果品 1.3）

出典：JICA T/C Team

図 3-11：データロガーおよびデータロガーを用いた省エネ診断の SOP

3.3.2 PDM 指標の達成度

成果 1 に係る PDM 指標それぞれに関する達成度を次表に示す。

表 3-5：成果 1 の指標達成状況

指標	達成度
1-1 マクロ・ミクロレベルのデータを収集・分析するための標準化された方法が導入され、データベースが開発される（TT2 の活動とリンク）。	MOERE および EEHC 職員が TT2 主催のエネルギーバランス研修に参加し、電力セクターのエネルギー収集・確認の方法を習得した。また省エネ年次報告書の策定に際して、データの収集・分析を行った。
1-2 意識啓発を含む省エネ促進のためのロードマップが作成される。	ホワイトペーパーおよび省エネ年次報告書に意識啓発を含むロードマップをとりまとめた。また、COP27 での情報発信、プロジェクトのホームページでの活動成果報告、E-JUST からの情報発信、電力セクターセミナーの開催などを通じて本事業の成果を活用した意識啓発を実施した。
1-3 年次報告書のテンプレートが作成される。	第 1 次年次報告書を作成し、2022 年 11 月開催の COP27 において発表した。
1-4 電力・再生可能エネルギー省の職員が何らかの省エネプログラムの資格を得る。	机上研修への参加者のうち、2 名が LEED Green Associate の資格を獲得した。また資格の維持等に関するフォローアップ研修を行った。

出典：JICA T/C Team

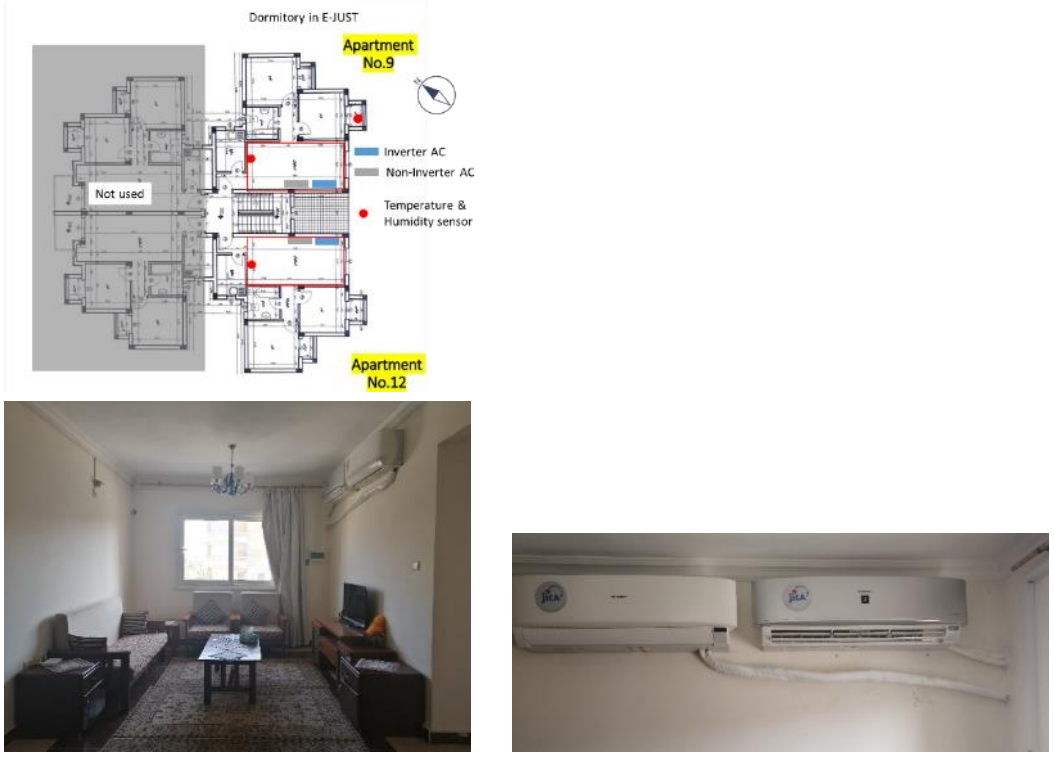
3.4　【成果 2】Task Team 3（TT3）：省エネ潜在性の高い技術／製品評価が行われ推進政策が提案される。

3.4.1　活動実績

(1)　高効率ルームエアコン実証試験

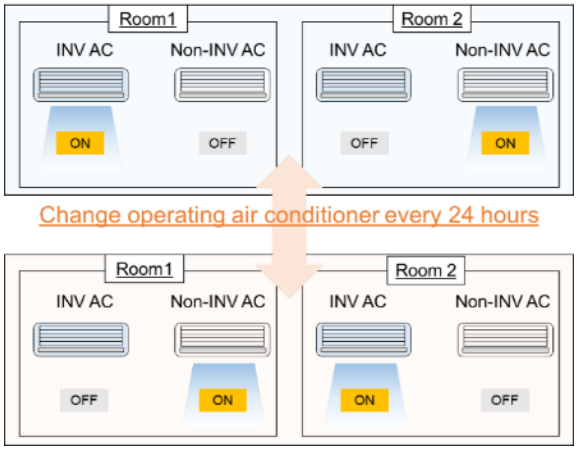
本試験では、高効率ルームエアコンであるインバータエアコンの省エネ優位性を確認するために、インバータエアコンとノンインバータエアコンの両方を試験場所に併設させて消費電力量を計測した。消費電力量に及ぼす季節変動の影響を踏まえて評価するためデータの計測期間は 1 年間とした。試験場所は E-JUST（アレクサンドリア県ボルグ・エル・アラブ市）にある南ドミトリーの 2 つの部屋である。各部屋には E-JUST 関係者が生活をしており、本関係者の協力のもとに、実際の生活環境下に設置されたエアコンを用いて試験を実施した。下図に示す通り、インバータエアコンとノンインバータエアコンを各部屋に併設し、また、室内温湿度および室外温湿度を計測するために温湿度センサーを設置した。

なお、本試験では、研究所等の試験のために用意された環境ではなく、実際の生活環境下における性能比較を行うために住民が日常生活をする環境を試験場所としている。一方で、外気温湿度の変化に加えて、滞在人数、家電の利用時間、換気回数等の住民の活動によってエアコンの消費電力に影響を及ぼす発生する熱負荷の大きさは日々変化する。そこで、24 時間ごとにインバータエアコンとノンインバータエアコンの運転を切り替えながら試験を進めることで、それぞれのエアコンが運転している期間に発生する熱負荷の合計ができるだけ平準化するように配慮した。



出典：JICA T/C Team

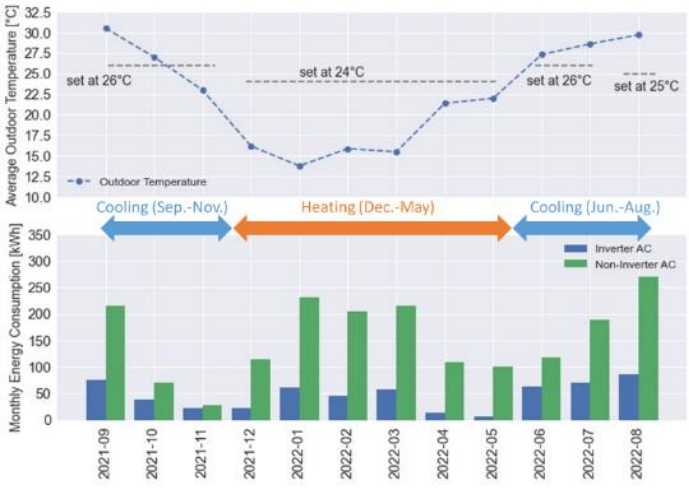
図 3-12：試験場所およびインバータエアコンとノンインバータエアコンの設置状況



出典：JICA T/C Team

図 3-13：試験方法

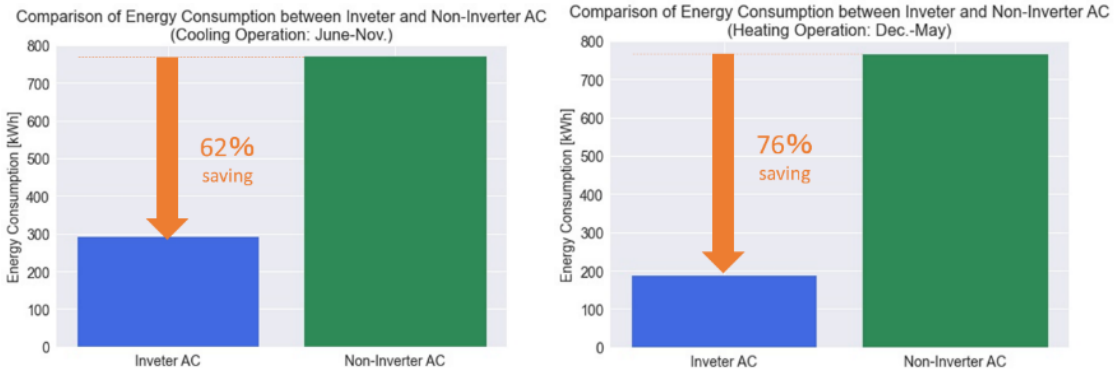
次図に示す通り、2021 年 9 月より計測を開始し、2021 年 9 月～11 月および 2022 年 6 月～8 月までは冷房運転、2021 年 12 月～2022 年 5 月までは暖房運転での試験を行った。上図は計測した平均外気温度および室内設定温度を示し、下図は計測したインバータエアコンおよびノンインバータエアコンの月間消費電力量を示している。なお、室内設定温度は居住者の希望に応じて季節により適宜変更したが、性能比較に影響が無いようにインバータエアコンおよびノンインバータエアコンの同期間におけるそれぞれの設定温度は同一としている。下図の通り、ノンインバータエアコンに対するインバータエアコンの省エネ優位性が確認できた。また、平均外気温度と室内設定温度の差が大きくなるほど、各消費電力量が大きくなるが、インバータエアコンの省エネ優位性が大きくなることがわかった。



出典：JICA T/C Team

図 3-14：インバータエアコンとノンインバータエアコンの月間消費電力量

冷房運転時および暖房運転時における消費電力量の比較を下図に示す。冷房運転時において、ノンインバータエアコンに対してインバータエアコンは 62%、暖房運転時は 76%の省エネ効果があった。



出典：JICA T/C Team

図 3-15：インバータエアコンとノンインバータエアコンの消費電力量

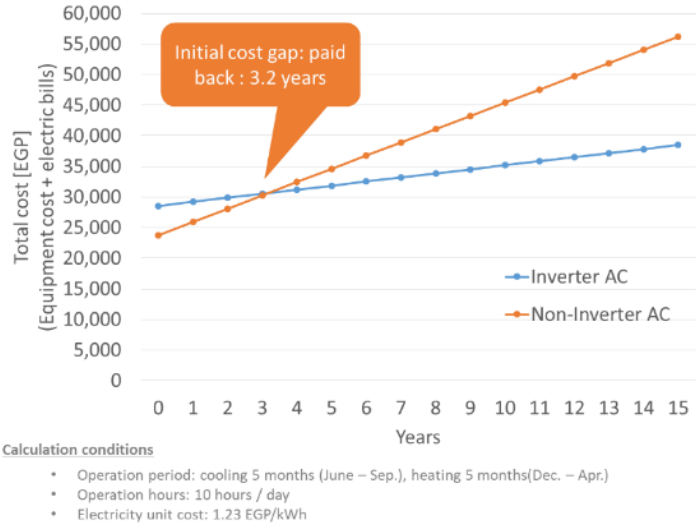
（左図、冷房運転時： 6 月～11 月　右図、暖房運転時： 12 月～5 月）

また、本実証試験で用いたインバータエアコンおよびノンインバータエアコンの製造会社である Elaraby Group の研究開発（R&D）センターの職員と 2022 年 6 月に本実証試験の結果について協議を行い、試験結果に対する妥当性の確認および試験結果に及ぼす技術的な要因についての理解を深めた。協議の結果、本実証試験で得られた結果の妥当性を確認することができた。また、インバータエアコンとノンインバータエアコンの消費電力量の違いについて、機器制御用に室内外機内に設置された温度センサーの数量の違いおよびそれに関連した制御アルゴリズムの違いに起因する等の見解を得られた。

出典：JICA T/C Team

図 3-16：試験結果に関する Elaraby R&D センターとの協議

本実証試験で得られた結果を基に、インバータエアコンとノンインバータエアコンの経済性評価を行った。次図の通り、機器購入のための初期費用はインバータエアコンの方が高いものの、インバータエアコンの省エネ優位性によりノンインバータエアコンに比べて電力料金が抑えられるため、初期費用の追加金額は 3 年程度で回収できることがわかる。



出典：JICA T/C Team

図 3-17：インバータエアコンとノンインバータエアコンの経済性評価

本試験における活動内容および成果を以下の通りまとめる（成果品 2.1 および 2.2）。

- ノンインバータエアコンに対するインバータエアコンの省エネ優位性を確認するため、1 年間のデータ計測を実施した。
- 季節の変化が消費電力に及ぼす影響および季節ごとのノンインバータエアコンに対するインバータエアコンの省エネ率の変化が確認された。
- 本試験では、ノンインバータエアコンに対するインバータエアコンの省エネ率は、冷房運転時において 62%、暖房運転時において 76%であった。
- 本試験で得られた結果を用いて経済性評価を実施し、インバータエアコンはノンインバータエアコンよりも機器費用が高いものの、機器購入時に必要となる初期費用の追加金額は、エアコン使用時の電気料金の節約分により 3 年程度で回収できることがわかった。

(2) 家庭消費電力量計測試験

上記のエアコン実証試験に加え、家庭消費電力量計測試験を実施した。本試験では効率的な省エネ対策施策立案に向けた基礎データの収集を実施する。本試験では E-JUST が開発した Internet of Things（IoT）センサー（以下、スマートセンサー）を用いて各家電の消費電力量を計測する。スマートセンサーは電力計測機能と遠隔監視機能を有しており、計測中の消費電力をブラウザ上にリアルタイム表示し、モニタリングすることができる。2021 年 12 月末に 60 台のスマートセンサーの調達が完了し、E-JUST 関係者の中から選定されたアレクサンドリア県内の 5 軒の試験場所において 2022 年 2 月～2023 年 1 月まで 1 年間のデータ計測を実施した。

表 3-6：試験場所の 5 家庭の基本情報

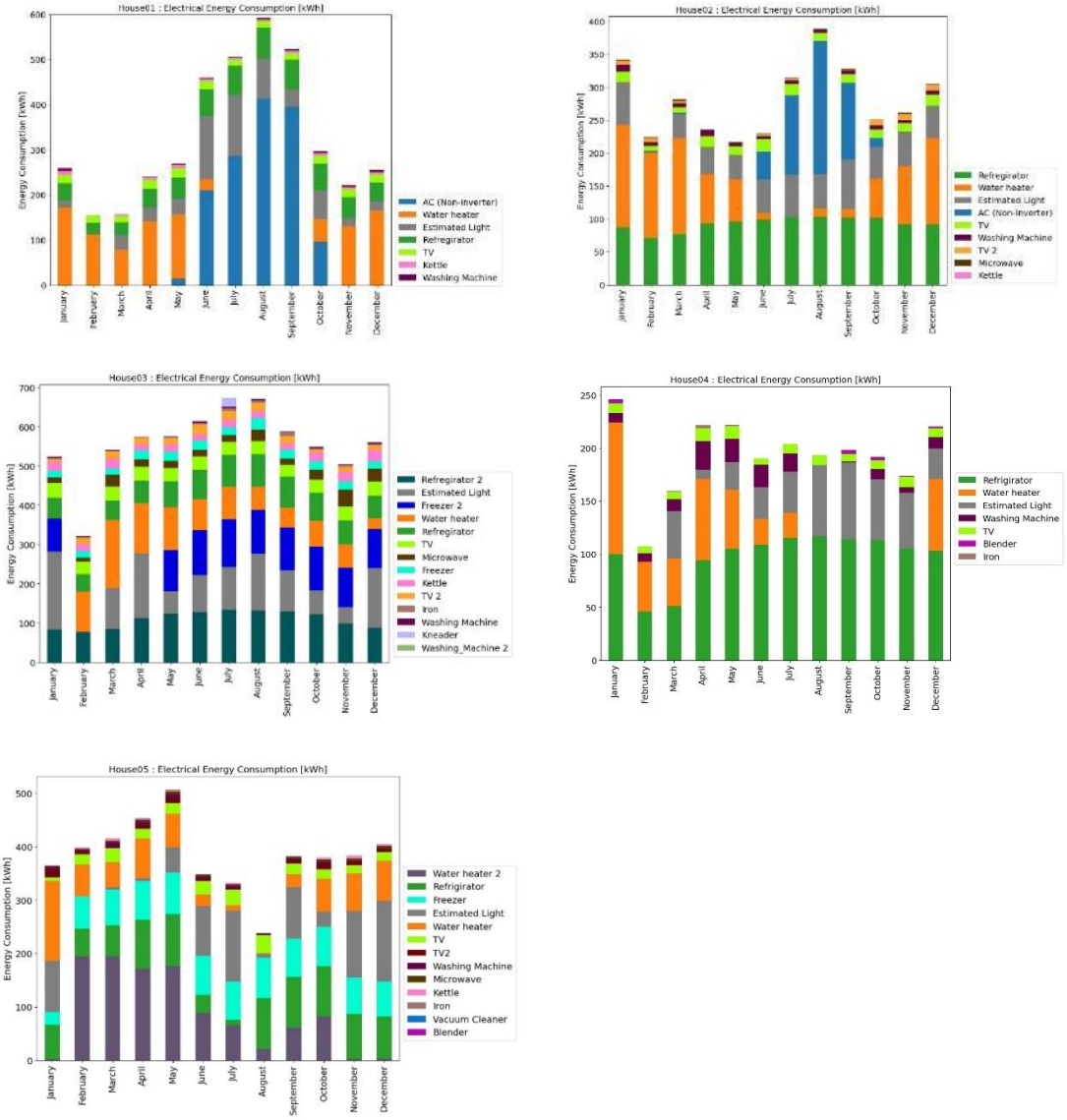
	居住者の人数	床面積 [m^2]
House 01	4 名 （大人 2 名、子供 2 名）	145
House 02	4 名 （大人 2 名、子供 2 名）	120
House 03	5 名 （大人 2 名、子供 3 名）	150
House 04	2 名 （大人 2 名、子供 0 名）	120
House 05	4 名 （大人 2 名、子供 2 名）	120

出典：JICA T/C Team

出典：JICA T/C Team

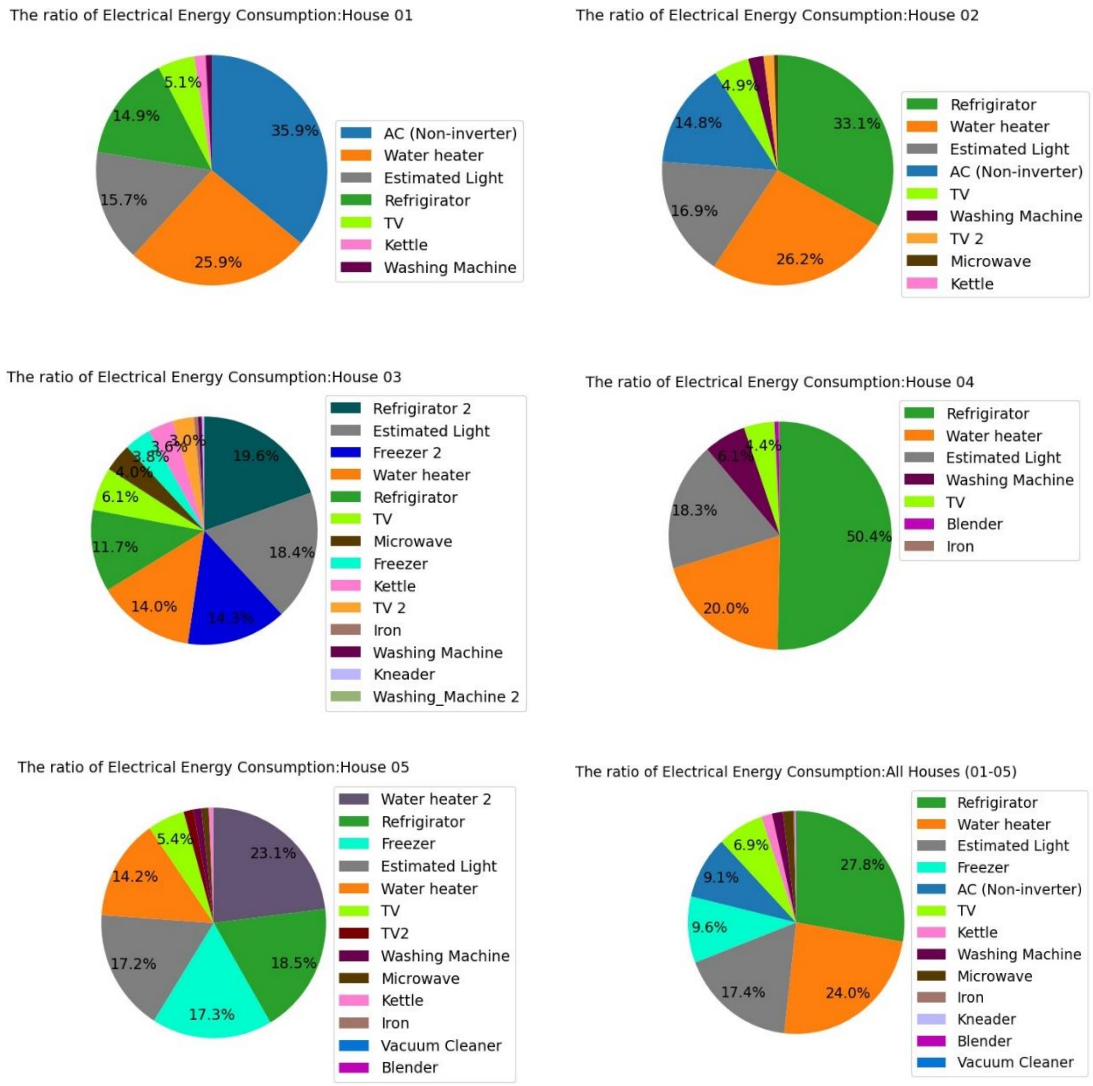
図 3-18：E-JUST が設計・開発したスマートセンサー

下図に計測結果を示す。各家庭に設置された家電の種類および台数が異なるため消費電力量の構成要素や割合は異なるものの、今回対象とした 5 軒の家庭において、温水ヒータおよび冷蔵庫が共通して大きな割合を占めることがわかった。また、AC に関して、5 軒中 2 軒の家庭（House 01, House 02）で AC（ノンインバータエアコン）を設置しているが、AC の消費電力量は冬期計測期間(1 月～4 月および 11 月～12 月)において、両家庭共にほぼゼロであり、住民へのヒアリングの結果、暖房にはほとんど AC を利用していないとのことであった。一方で、夏期計測期間（6 月～9 月）において、House 01 および House 02 の AC の消費電力量の割合は著しく大きくなることがわかる。その結果、年間を通した全体の消費電力量における AC の割合は、House 01 では最も大きく約 36%、House 02 では 4 番目に大きく約 15%を占めることがわかる。なお、計測されたデータを確認すると、8 月のそれぞれの家庭における AC の平均運転時間は House 01 において約 14 時間／日、House 02 において約 4 時間/日であることが分かった。



出典：JICA T/C Team

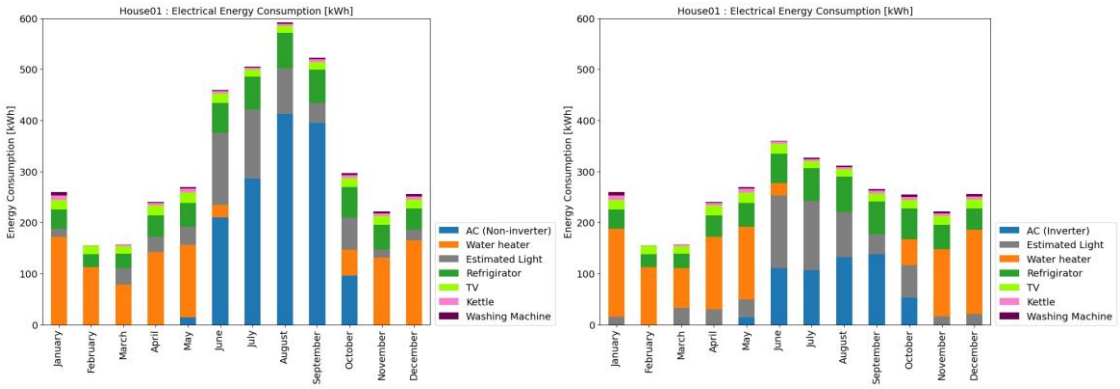
図 3-19：月別消費電力量の推移（計測期間：2022 年 2 月～2023 年 1 月）



出典：JICA T/C Team

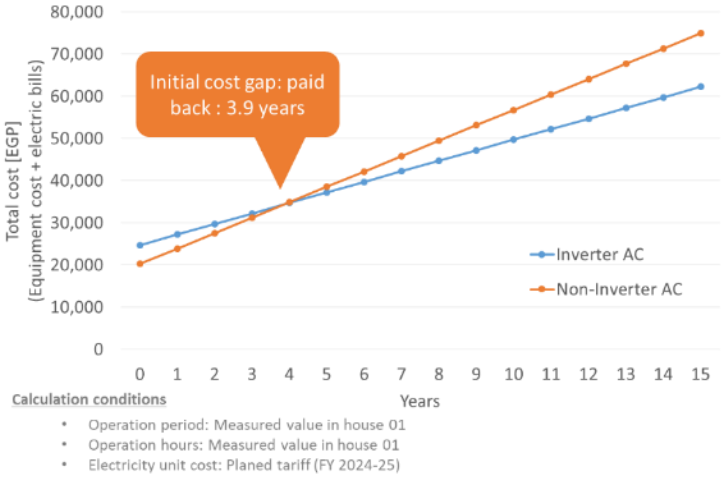
図 3-20：家電別消費電力量の構成比（計測期間：2022 年 2 月～2023 年 1 月）

House 01 において、AC の利用は夏期のみであるものの、使用時間が長いため、通年での各家電の消費電力量の割合においても AC が最も大きい結果となった。一方で、House 01 に設置された AC はノンインバータエアコンであることから、インバータエアコンに取り換えることで大きな省エネ効果を得ることが期待される。そこで、前項の「高効率エアコンルームエアコン実証試験」で得られたノンインバータエアコンに対するインバータエアコンの各月の省エネ率を用いて、House 01 のノンインバータをインバータエアコンに更新した場合の省エネ効果の確認および経済性評価を実施した。次図の通り、ノンインバータエアコンをインバータエアコンに更新することで大きな省エネ効果が期待される。また、AC の使用は夏期のみであったものの、1 日の使用時間が長く、インバータエアコン購入のためのノンインバータエアコンに対する初期コストの追加金額は 4 年以内に回収できる見込みである。



出典：JICA T/C Team

図 3-21：House 01 のノンインバータエアコンをインバータエアコンに更新した場合（左図、更新前（再掲）　右図、更新後）



出典：JICA T/C Team

図 3-22：経済性評価（House 01）

本試験における活動内容および成果を以下の通りまとめる。（成果品 2.1 および 2.2）

- E-JUST が開発したスマートセンサーを用いて 5 家庭に設置された家電の消費電力計測を約 1 年間実施した。
- 各家庭における家電別消費電力量の構成比が明らかになった。また、季節によって異なる消費電力量の合計値とその内訳が明らかになった。
- 各家庭で設置されている家電が異なるものの、共通して消費電力量の割合が大きかった家電は冷蔵庫と温水ヒータであった。また、ノンインバータエアコンが設置された家庭では、エアコンは夏期のみしか使用されなかったものの、エアコンが通年の消費電力量に占める割合は大きいことがわかった。

- ノンインバータエアコンの消費電力量の比率が高い家庭に対して、インバータエアコンに更新した場合の経済性評価を実施し、初期費用の追加金額は約 4 年で回収できることがわかった。

(3)　省エネラベル（S&L）制度に係る支援

S&L 制度に係る支援について、制度運用に携わっている関係機関（MOERE、エジプト規格品質機構（EOS）、新再生可能エネルギー庁（NREA）、輸出入管理公団（GOEIC）、消費者保護庁（CPA）、産業管理局（ICA）、エジプト産業連盟の環境コンプライアンス持続可能な開発オフィス（ECO-FEI）を招集した関係者会合を計 6 回実施し、各機関より制度運用・改善に際した課題のヒアリング、およびその解決に向けた議論を行った。実施された関係者会合の概要を次表に示す。

表 3-7：S&L 制度に関する関係者会合の概要

	第 1 回会合	第 2 回会合	第 3 回会合
日時	2022 年 2 月 8 日 10:00-12:00	2022 年 3 月 14 日 10:00-12:00	2022 年 6 月 22 日 10:00-12:00
場所	Greek Campus 会議室		
参加者	MOERE-EECCD、EOS、NREA、GOEIC、CPA、ECO-FEI		
論点	・MOERE より NEEAP-II のプレゼン ・EOS より取り組み状況についてプレゼン ・市場監視、家電検査設備、基準の更新（AC 等）について議論	・MOERE より S&L 委員会についてプレゼン ・NREA より検査設備についてプレゼン ・ICA より監査取り組みについてプレゼン ・安全性検査および ICA が果たしうる事業者監査の役割について議論	・EOS および GOEIC より検査設備についてプレゼン ・基準の統合、市場監視、事業者監査について議論 ・今後策定予定のアクションプランについて議論

	第 4 回会合	第 5 回会合	第 6 回会合
日時	2022 年 7 月 28 日 10:00-12:00	2022 年 8 月 24 日 10:00-12:00	2022 年 11 月 21 日 10:00-12:00
場所	Greek Campus 会議室		
参加者	MOERE-EECCD、EOS、NREA、GOEIC、CPA、ICA		
論点	・EOS、GOEIC、NREA より提出のあった検査設備のリストの確認・精査 ・基準の改定や市場監視の在り方について議論	・検査設備の在り方について議論 ・輸入品に関する検査の在り方について議論 ・市場監視の在り方、消費者への啓発活動について議論	・S&L 制度に関する現状の課題と提案事項について議論 ・検査設備のリストと今後の方向性について合意

出典：JICA T/C Team


出典：JICA T/C Team

図 3-23：S&L 制度に関する関係者会合の様子

本関係者会合を通じ、関係機関がお互いの検査施設について把握できていない状況を改善するため、関係機関が所有する検査施設の情報を持ち寄り、リストの作成を行った。

加えて、S&L 制度に関する現状の課題を集約すると共に、効果的なラベリング制度の構築・執行に向け今後の活動内容に係る提案事項を次表の通りとりまとめた。

表 3-8：S&L 制度に関する関係者会合において指摘された主な課題と提案

主な課題	・一部の規格では、エネルギー効率試験を実施する前に、安全性及び性能要件を満たさなければならないことに関する具体的な規定がない ・必要な試験を実施する試験所が存在しないまま発行されたエネルギー効率基準が存在する ・利害関係者間の継続的な調整が不足している ・試験所の維持運営に必要な財政支援が限られている ・エネルギー効率基準の進捗を評価するための市場調査の実施が困難 ・市場における監視機能が弱い
提案事項	・S&L 制度管理する責任を負う機関・組織の設立 ・監視当局への財政支援や民間セクターへの働きかけを通じて、認定試験所の設立を促進する ・S&L 制度に関与する機関の能力を強化する ・製造業者、流通業者、小売業者、エンドユーザーを対象とした適切な教育、意識向上、コミュニケーション・キャンペーンを展開する ・市場監視とコンプライアンス手続きへの支援 ・高効率製品の需要を喚起するための適切なインセンティブ・メカニズムの導入（例：高効率製品への補助制度、公共調達による一括購入等）

出典：JICA T/C Team

また、2022 年 12 月 8 日に本邦研修の際に訪れた日本空調冷凍研究所において、日本におけるエアコンの性能試験について学ぶと共に、試験設備の認定方法等について理解を深めた。

3.4.2 PDM 指標の達成度

成果 2 に係る PDM 指標それぞれに関する達成度を次表に示す。

表 3-9：成果 2 の指標達成状況

指標	達成度
2-1 建物におけるエアコンの効率（経済性、環境基準を含む）が検証される。	エアコンの実証試験におけるデータ計測を 2021 年 9 月から 2022 年 8 月まで実施し、冷房および暖房運転におけるインバータエアコンのノンインバータエアコンに対する省エネ優位性について検証した。また、得られた結果を基に、経済性評価を実施した。
2-2 家電（冷蔵庫、エアコン、照明を含む）の効率（S&L 制度を含む）が検証される。	スマートホームの実証試験におけるデータ計測を 2022 年 2 月から 2023 年 1 月までの 1 年間実施し、5 世帯における家電別電力消費量についてデータ収集及び分析を行った。また、消費電力比、および季節性について検証した。 S&L について関係者とのワークショップを定期的（2022 年 2 月、3 月、6 月、7 月、8 月、11 月）に開催し、S&L 制度に関する現状の課題を集約すると共に、今後の活動に向けた提案事項のとりまとめを行った。

出典：JICA T/C Team

3.5　【成果 3】Task Team 4（TT4）：MOP の EECD の省エネ推進に関する行政処理能力が強化されるとともに省エネ推進戦略ロードマップが作成される。

3.5.1　活動実績

(1)　3-1 MOP に関する EE&C 枠組みレビューと問題の整理

EMSF「現状」評価

2020 年 7 月 20 日から同年 8 月 26 日までの間に、各 1～2 時間の現状分析インタビュー調査を実施した。

これらインタビューでは、評価対象と参照事例を比較するために必要な情報を得る為、全ての対象者に事前に共有したガイドラインを使用し、評価に最も重要な情報が確実に得られるようにした。

The Project Capacity Development on Energy Efficiency and Conservation

Interviews Guidelines

CLIENT	Ministry of Petroleum
CLIENT LOCATION	Egypt
DOCUMENT NUMBER	207282-000-RPT-0001
REVISION NUMBER	0
DATE	5 July 2020

KBC
A Yokogawa Company

KBC PROCESS TECHNOLOGY LIMITED,
REGIONAL HEADQUARTERS AND REGISTERED OFFICE
42-50 Hersham Road
Walton on Thames
Surrey KT12 1RZ
UK

T: +44 (0)1932 242 424
F: +44 (0)1932 224 214
E: info@kbc.global
www.kbc.global

Registered in England number: 01807381

出典：JICA T/C Team

図 3-24：インタビュー指針発行文書

要約すると、会長、副会長、省エネルギー部門リーダー、省エネ部門スタッフおよび省エネ委員会メンバーを含む、異なる役職の人物らと 17 回のインタビューを実施した。具

体的には以下の関係者にインタビューを実施した。

- MOP 省エネ気候変動対策室（Energy Efficiency and Climate Department: EECD） 3 名 (部門長およびスタッフ)
- エジプト石油公社（Egyptian General Petroleum Corporation: EGPC）および 持株会社のレベル 5 名
  ［内訳］
  - EGPC 1 名
  - エジプト石油化学公社（Egyptian Petrochemicals Holding Company: ECHEM）1 名
  - 南部エジプト石油開発公社（Ganoub El-Wadi Petroleum Holding Co.: GANOPE）1 名
  - エジプトガス公社（Egyptian Natural Gas Holding Company: EGAS）2 名
- EGAS 関連会社 2 名（エジプト天然ガス会社（GASCO）、BGC)
- EGPC 関連会社 5 名（EPROM、NPC、MIDOR、Khalda、PETROBEL）
- ECHEM 関連会社 2 名（SIDPEC、EPC）

関連会社は以下の 3 タイプに分類される。

- 公共部門の会社（NPC/EPC）
- 投資会社（GASCO、EPROM、MIDOR、SIDPEC）
- 合弁会社（BGC、Khalda、PETROBEL）

KBC は文書およびインタビューから収集した情報を分析した。主要な所見（下記文書）は MOP に提示し、異なる組織レベル、異なる企業（MOP、EGPC および 持株会社、関係会社）毎に整理して CA 報告書に組み込んだ。

出典：JICA T/C Team

図 3-25：現状分析結果の提示

EMSF ベンチマーク・ギャップ分析

上記の「現状」分析に続いて、JICA T/C Team は、EMSF の各々の構成要素についてベンチマーキングおよびギャップ分析を行った。これは、国際的なエネルギー機関の報告書、諸外国での実績、さらに石油・ガス企業の事例調査、公的情報などから集められたベストプラクティスや推奨事項に基づいている。

「ベンチマーキング分析」と「現状評価」の比較に基づき、各構成要素に対する既存のギャップを特定した。ギャップは 3 つのカテゴリー下で評価した。

- 小：実際の状況は、特定したリーディング・ケースの状況に近い。わずかな追加作業や調整でベンチマークの水準に達することができる。
- 中：実際の状況をベンチマークと比較した場合、異なるレベル（MOP、EGPC および 持株会社、関係会社）にわたって部分的な発展段階或いはまだらな発展段階である。それなりのレベルの努力/作業が必要である。
- 大：ベンチマークと比較した場合、この分野では、その構成要素は考慮されていないか、または非常に初期段階である。大幅な作業が必要である。

(2)　3-2 エネルギー診断、改善方針、技術、手法、枠組みの検討（製油所向けパイロット）

CORC 製油所キックオフ現地訪問（2021 年 3 月 21 日～25 日）

省エネルギー診断パイロットプロジェクトのキックオフとして、JICA T/C Team は CORC との 1 週間の正式な会議に出席し、会議日程および提案する会議アジェンダを事前に通知した。（次図参照）

CORC Refinery SER
Site Visit Kick off and Roundtable Discussion Meetings Agenda

	Time	Topic	Attendees	Details
Sunday 21st	0830 - 0840	CORC Chairman Opening	CORC Chairman, Management and Project Team	
	0840 - 0930	Kick off presentation	CORC Chairman, Management and Project Team	Presentation by KBC describing the energy roadmap, work to be carried out, the data required, work plan, project schedule
	1000 - 1100	CORC Overview	EGPC – Refining Management	Presentation by EGPC describing CORC Business Development, Economics and Plans
	1100 - 1200	CORC Overview	Operations Planning Team	Explaining to KBC production planning process, tools and issues
	1200 - 1300	Break		
	1300 - 1400	Energy & Quality	Technology and Development Team	Provide KBC overview on current and historical energy performance/ initiatives / barriers / incentives
	1400 - 1500	Environmental Compliance	Safety and Environment Team	Explaining to KBC Environmental perfromance, specifications, regulations and constraints (current and future) for CORC to comply with
Monday 22nd	0830 - 1200	CDU-1/ CDU-2/ CDU-3/ CDU-4/ Turbine Caustic Treatment Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
	1200 - 1300	Break		
	1300 - 1530	CDU-1/ CDU-2/ CDU-3/ CDU-4/ Turbine Caustic Treatment Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
Tuesday 23rd	0830 - 1200	HN Splitter Re-run/ VRU-2/ VRU-3 / VRU-4/ LPG Treatment/ HN Treatment Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
	1200 - 1300	Break		
	1300 - 1530	Light Naphtha Splitter Unit 19/ HNHT Unit 20/ Platforming Unit 21/ Udex Unit/Reformer VRU Unit 22/ LPG Treatment Unit 33 Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
Wednesday 24th	0830 - 1200	LNHT Unit 29/ Penex Isomer Unit 30/ DHT Unit 11 Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
	1200 - 1300	Break		
	1300 - 1530	Steam Production and Boiler Feed Water Treatment Process Review	Units Engineers (Operation and Process)	PFD review (full team participating, KBC facilitating meeting) · Line-by-line review of process PFDs
Thursday 25th	0830 - 1200	Site Walkthrough and Closeout Meeting Preparations		
	1200 - 1300	Break		
	1300 - 1500	Closeout meeting	CORC Chairman, Management and Project Team	Conclusion of round table discussions, initial findings and next steps

出典：JICA T/C Team

図 3-26：CORC 診断キックオフ訪問アジェンダ

本会議の目的は、診断の目的、スケジュール、手法、活動プログラム、データ収集の進捗および情報要件についての理解を確実にし、共通認識を持つことであった。JICA T/C Team と CORC 事業所の主要スタッフの両者が会議に出席した。

具体的な目的は下記の通り。

- JICA T/C Team と CORC とのコミュニケーション・ラインの確立
- 調査チームメンバー間でパフォーマンス目標に対する共通認識を持つ
- 関係するすべての CORC および他の石油セクタースタッフにプロジェクト範囲と目標を伝達
- 残りの現地訪問計画を確認する

この最初の訪問時に、複数のプロセスフロー図（PFD）のレビューを実施した。PFD レビューの目的は、運転をより詳細に把握することであり、これは、潜在的なクイックウィ

ン改善機会を発掘するための重要な手法である。典型的な議論の内容としては、例えば特定の運転制約や設定値がどのように定義されたか等がある。

JICA T/C Team は CORC のエンジニア、運転担当者とともに、プロセスフロー図（PFD）を体系的に活用し、選択したプロセス装置、用役システムをレビューした。このレビューはまた、CORC が現時点で検討中のエネルギー改善アイデアを JICA T/C Team と共有する機会となった。

現場視察

最初の現地訪問の一環として、プラントのエネルギー関連のパフォーマンスをレビューするため、JICA T/C Team は現場視察による目視検査を実施した。レビューした箇所の例は下記の通り。

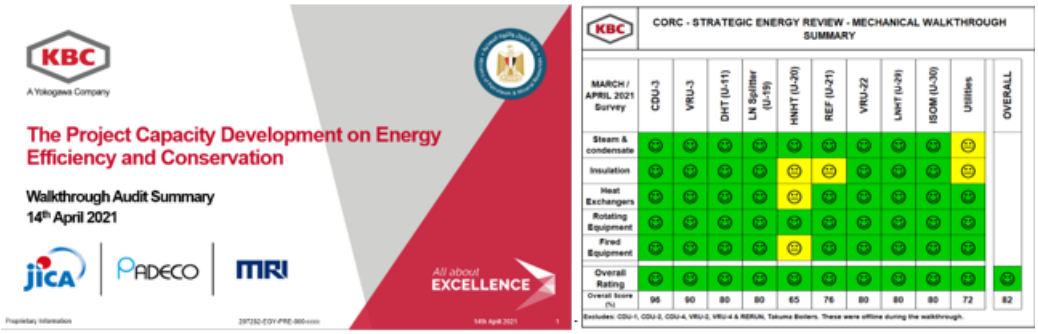
- 熱交換器洗浄の効果
- 加熱炉の運転
- 保温・断熱が完全か
- スチームトラップの運転

上記目的のため、サーマルカメラを活用した。

出典：JICA T/C Team

図 3-27：ヒーターのサーマル写真

現場視察の結果は、視察報告書を通じて CORC と共有した。



出典：JICA T/C Team

図 3-28：現場視察の診断レポート

エネルギー基本研修（2021 年 5 月 23 日～2021 年 6 月 3 日）

本パイロット診断の中で、2021 年 5 月 23 日から 2021 年 6 月 3 日まで、最初の講義形式の技術研修を下記アジェンダで実施した。

Week 1 Agenda

KBC A Yokogawa Company

Training Group	Technical Team	Training Time	0800 - 1530

AGENDA		
DATE	AM	PM
Sunday 23rd May	Achieving Optimum Energy Efficiency	
Monday 24th May	Achieving Optimum Energy Efficiency	
Tuesday 25th May	Achieving Optimum Energy Efficiency	Energy Modelling in Petro-SIM
Wednesday 26th May	Energy Modelling in Petro-SIM	
Thursday 27th May	Energy Modelling in Petro-SIM	

Week 2 Agenda

KBC A Yokogawa Company

Training Group	Technical Team	Training Time	0800 - 1530

AGENDA		
DATE	AM	PM
Sunday 30th May	Energy Modelling in Petro-SIM	
Monday 31st May	Energy Modelling in Petro-SIM	
Tuesday 1st June	Energy Modelling in Petro-SIM	Heat Integration using Pinch Technology
Wednesday 2nd June	Heat Integration using Pinch Technology	
Thursday 3rd June	Heat Integration using Pinch Technology	

出典：JICA T/C Team

図 3-29：基本研修アジェンダ

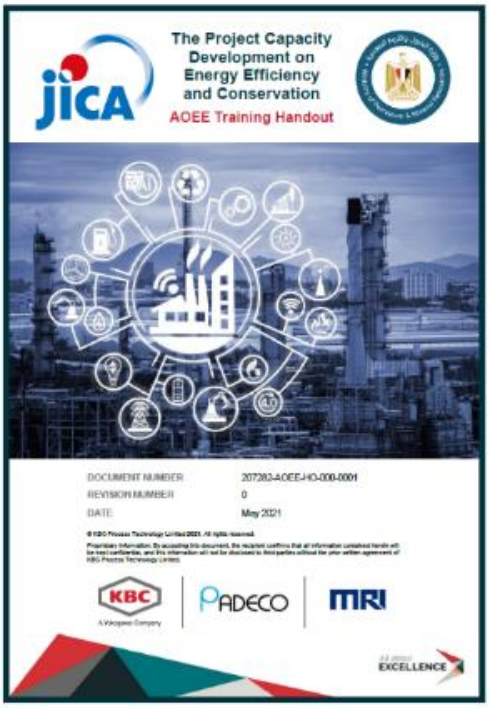
以下に示すように、研修には石油セクターの様々な団体から 18 名が参加した。

表 3-10：基本研修受講者リスト

	氏名	所属組織
1	Eslam Metwally Hassan	Alexandria Petroleum Co. (APC)
2	Mohamed Abdel Baset	Assuit Oil Refining Co. (ASORC)
3	Sherif Sayed Hasan	Engineering Co. for the Petroleum & Process Industries (ENPPI)
4	Ahmed Abd-Allah Abdel Mottalep	Egyptian Projects Operation & Maintenance (EPROM)
5	Ahmed Adel Sherief	Egyptian Petrochemical Co. (EPC)
6	Mamdouh Abd El-Khalek	Cairo Oil Refining Co. (CORC)
7	Mahran Mohamed Essawy	Cairo Oil Refining Co. (CORC)
8	Khaled Ahmed Tawfeek	Cairo Oil Refining Co. (CORC)
9	Eslam Saber El Morsy	Cairo Oil Refining Co. (CORC)
10	Mohammed Ahmed Hisham	Cairo Oil Refining Co. (CORC)
11	Ehab Mosaad Mohamady	Cairo Oil Refining Co. (CORC)
12	Muhammad Abdul Monsif	Cairo Oil Refining Co. (CORC)
13	Ahmed Tarek Mahmoud	Suez Oil Processing Co. (SOPC)
14	Dina Mohamed Hassan	Egyptian General Petroleum Corporation (EGPC)
15	Karim Ahmed Anwar	Egyptian General Petroleum Corporation (EGPC)
16	Mohamed Ahmed Hamdy	Cairo Oil Refining Co. (CORC)
17	Mohammed Rushdy Abd-Elaziz	Cairo Oil Refining Co. (CORC)
18	Mahmoud Maher	Ministry of Petroleum

出典：JICA T/C Team

研修セッションをスムーズに進めるため、すべての受講生に研修資料を提供した。



出典：JICA T/C Team

図 3-30：AOEE 研修資料

「最適エネルギー効率（AOEE）の達成」トレーニング

2021 年 7 月 25～27 日の第 1 回 JCC の後、3 日間の「最適エネルギー効率（AOEE）の達成」トレーニングを開催した。トレーニングは、カイロ石油精製会社（CORC）の従業員を除く石油セクターの従業員を対象として行われた。AOEE トレーニング参加者を次表に、また、同トレーニングの概要を表 3-12 に示す。

表 3-11：AOEE トレーニング参加者（2021 年 7 月）

番号	氏名	役職	所属組織
1	Mohamed Mostafa Hamouda	Assistant G. M. Projects	Petromaint Co.
2	Mohamed Talaat M. Kamal	Department Manager	Egyptian General Petroleum Corporation, EGPC
3	Yasser Mamdouh Nagati	Section Head	Egyptian General Petroleum Corporation, EGPC
4	Nancy Gamal El Din Azazy	Section Head	Ganope
5	Alaa Mostafa Mohamed	Section Head	Echem
6	Mohamed Mahmoud Selim	General Manager	Ganope
7	Mohamed Abdel Monem	Assistant General Manager	Ministry of Petroleum
8	Nesreen Salah El Din	Assistant General Manager	Ministry of Petroleum
9	Shimaa Hassan Mohamed	Department Manager	ENPPI
10	Hany Kamal El Rouby	General Manager	Egyptian Natural Gas Holding Company, EGAS
11	Sahar El Deeb	Assistant General Manager	Egyptian Natural Gas Holding Company, EGAS
12	Amr Magdy Abdel Fattah	Energy Management System Specialist	ENPPI

出典：JICA T/C Team

表 3-12：AOEE トレーニングの概要

モジュール	トピック	目的
1	エネルギー効率と経済性	下記を理解すること • エネルギー効率向上の価値。 • ベンチマークおよびギャップ分析。 • エネルギーの経済性。
2	蒸気発生・発電とその最適化	下記を理解すること • 熱と発電に関するエネルギーの基礎。 • 発電の熱力学的サイクルとその相対的効率。 • 発電用に利用可能な蒸気タービン及びガスタービンの範囲。 • コジェネレーションシステムを最適化するための重要な基準。
3	プロセス機器エネルギー効率の目的	設計、運転、シミュレーションの際に監視すべき、エネルギー効率の特徴を把握すること • 加熱炉、特にプロセスヒーターとボイラー。 • タービン、コンプレッサー、ポンプ、ファンなどの回転機器。 • 熱交換器。

モジュール	トピック	目的
4	ピンチ解析技術の概要紹介	下記を理解すること • ピンチ解析の基本概念の習得。 • 実用的なソフトウェアツールの使い方の習得。 • JICA T/C Team がいかにソフトウェアを活用しているかを習得。
5	エネルギー管理のデジタル化	受講者が下記を理解できるようにすること • 効果的なエネルギー管理のための組織要件。 • エネルギー性能維持に向けたエネルギー評価基準に係る分析・評価・適用方法。 • エネルギー管理に係るデジタル化推進方法。

出典：JICA T/C Team

出典：JICA T/C Team

図 3-31：AOEE トレーニング（2021 年 7 月）

CORC パイロットエネルギー診断-潜在的な改善機会レビューワークショップ

省エネ診断パイロットの一環として、CORC を対象にエネルギー効率改善リスト（案）を作成した 。同（案）を次表に示す。

表 3-13：CORC を対象に実施したエネルギー効率改善リスト（案）の概要

カテゴリー	内容	状況	省エネ(Gcal/h)	推定節減額
A	クイックウィン	4	0.98	3.2
B	少額の投資	3	4.7	11.2
C	中規模の投資	3	6.0	14.1
D	高額の投資	5	-1.3 (および 12.8 MW)	136.0 から 153.0
E	保留	25		
X	却下	28		
	合計	68		164.5 から 181.5

出典：JICA T/C Team

スクリーニングおよび優先順位付けのため、CORC チームと現地で上記の潜在的な改善機会を協議・レビューした。

改善機会評価ワークショップ（2021 年 10 月）

CORC との会議に続き、2021 年 10 月に 4 日間の省エネ対策評価トレーニングを開催、ここでは、エネルギー効率改善に向けた対策案の抽出、および、評価に必要な経験・知識の共有を図った。

なお、トレーニングをより充実、かつ、具体的な内容にすべく、CORC の省エネ対策案を実例として取り上げた。本トレーニングの参加者リストを下表に示す。

表 3-14：各省エネ対策案に係る評価トレーニング参加者（2021 年 10 月）

番号	氏名	役職	所属組織
1	Karim Ahmed Anwar	Process Engineer	EGPC.
2	Mohamed Talaat M. Kamal	Energy Efficiency Depart.	EGPC
3	Yasser Mamdouh Nagati	Energy Efficiency Depart.	EGPC
4	Khaled Ahmed Taefeek	Process Engineer	CORC
5	Ahmed Abdel Aziz Abdel Al	Elec. Department Head	CORC
6	Mohamed Ahmed Hamdy	Operation Department Head	CORC
7	Sherif Sayed Hassan	Process Engineer	Enppi
8	Ahmed Abdallah Mazen	Process Engineer	Egyptian Projects Operation & Maintenance (EPROM)
9	Ahmed Adel Sherif	Operation Engineer	Egyptian Petrochemicals Company (EPC)
10	Mohamed Abdel Baset	Operation Engineer	Assiut Oil Refining Company (ASORC)
11	Islam Metwally Hassan	Process Engineer	Alexandria Petroleum Company (APC)
12	Mohamed Talaat M. Kamal	Energy Efficiency Depart.	EGPC
13	Mohamed Ahmed Hisham	Operation Engineer	CORC
14	Eslam Saber El Morsy	Operation Engineer	CORC
15	Mohamed Abdel Monsef	Operation Engineer	CORC

出典：JICA T/C Team

出典：JICA T/C Team

図 3-32：省エネ対策評価トレーニング（2021 年 10 月）

ソフトウェアを活用した研修（2022 年 2 月～4 月）

MOP と JICA T/C Team 間のソフトウェア契約の締結に続いて、JICA T/C Team は、集中的なソフトウェア支援トレーニング計画を計画し、実施した。このトレーニングは、プロジェクト開始以来、石油セクターから指名された以下の受講生を対象とした。

表 3-15：OJT グループ分布

A チーム	チームリーダー	メンバー
	Khaled Ahmed (CORC)	Karim Ahmed (EGPC) Ehab Mosaad (CORC) Mohamed Abdel Baset (ASORC)
B チーム	チームリーダー	メンバー
	Mohamed Hisham (CORC)	Eslam Metwally (APC) Ahmed Tarek (SOPC) Muhamed Abdul Monsif (CORC)
C チーム	チームリーダー	メンバー
	Shrief Hassan (ENPPI)	Ahmed Mottalep (EPROM) Mohamed Hamdy (CORC) Mahran Mohamed (CORC)
D チーム	チームリーダー	メンバー
	Eslam Saber (CORC)	Mohammed Rushdy (CORC) Ahmed Adel (EPC) Dina Hassan (EGPC)

出典：JICA T/C Team

トレーニングは、講義形式のトレーニングと、受講生に課題を割り当てた実地訓練（OJT）との組み合わせであった。講義形式のトレーニングは、以下の計画に従って、対面およびリモートの両方で実施した。

表 3-16：MOP 研修計画（2022 年 2 月～4 月）

開始	終了	場所	詳細
1/23（水）	1/27（木）	対面	受講者へのラップトップの割り当て
1/30（日）	2/1（火）	リモート	キックオフ・トレーニングセッション
2/2（水）	2/3（木）	リモート	課題 1 の割り当て
2/6（日）	2/10（木）	リモート	課題 1 のフォローアップ 課題 2 の割り当て
2/13（日）	2/13（日）	リモート	課題 2 のフォローアップ
2/14（月）	2/14（月）	リモート	HX モニタリング・トレーニング
2/20（日）	2/21（月）	対面	SuperTarget®インターフェースツールの使用 課題 3
2/22（火）	2/24（火）		課題 4
3/7（月）	3/7（月）	リモート	これまでの課題・トレーニング全般のフォローアップ
3/13（日）	3/17（木）	対面	案件評価ワークショップ 課題 5・6 の割り当て
3/28（月）	3/28（月）	リモート	課題 5 のフォローアップ
4/4（月）	4/4（月）	リモート	課題 6 のフォローアップ
4/11（月）	4/11（月）	リモート	課題 7 の割り当て
4/18（月）	4/18（月）	リモート	課題 7 のフォローアップ

開始	終了	場所	詳細
4/24（日）	4/24（日）	リモート	技術サポート全般および懸念・課題の対応
4/27（水）	4/27（水）	リモート	技術サポート全般および懸念・課題の対応

出典：JICA T/C Team

受講生に割り当てた課題は下記リストの通り。

表 3-17：OJT 課題

課題	詳細
1	プロセス装置の BT 指数および CORC のサイト BT 指数の作成
2	Petro-SIM 上で原油の予熱系熱交換ネットワークの構築
3	SuperTarget® を使用し、原油蒸留装置（CDU） 予熱系熱交換ネットワークのヒートインテグレーション（熱統合）ギャップを計算
4	熱統合の案件発掘と評価
5	1. 排熱回収ボイラー付きガスタービンの設置（追い焚きなし） 2. 排熱回収ボイラー付きガスタービンの設置（追い焚きあり） 3. 新しい蒸気タービンを排熱回収ボイラーの下流に設置 4. 新しい復水タービンの設置（ケース 1 から開始）
6	ヒーターの加熱炉の効率ギャップの計算。排ガスを使用して、空気を予熱する（適用可能な場合）。
7	プロセス/運転のギャップの計算

出典：JICA T/C Team

案件評価ワークショップでは、下記の特定および評価に注力した。

表 3-18：案件評価ワークショップ

項目	案件評価ワークショップ
1	加熱炉のギャップ
2	プロセス/運転のギャップ

出典：JICA T/C Team

OJT で割り当てた課題は下記の通りであった。

表 3-19：研修課題の分布詳細

装置/プラント	ギャップ領域	内容	割り当て
CDU-1	熱統合	Petro-SIM にて CDU-1 の原油の予熱系熱交換ネットワークを構築し、熱統合のギャップを計算する	A チーム
CDU-2	熱統合	Petro-SIM にて CDU-2 の原油の予熱系熱交換ネットワークを構築し、熱統合のギャップを計算する	B チーム
CDU-3	熱統合	Petro-SIM にて CDU-3 の原油の予熱系熱交換ネットワークを構築し、熱統合のギャップを計算する	C チーム

装置/プラント	ギャップ領域	内容	割り当て
CDU-4	熱統合	Petro-SIM にて CDU-4 の原油の予熱系熱交換ネットワークを構築し、熱統合のギャップを計算する	D チーム
CDU-1 / リラン / Unit 20 / Takuma ボイラー	加熱炉／ヒーター	Petro-SIM にてヒーター（加熱炉）のギャップを計算する	B チーム
CDU-2 / Unit 21 / Unit 11	加熱炉／ヒーター	Petro-SIM にてヒーター（加熱炉）のギャップを計算する	D チーム
CDU-3 / Unit 19 / Unit 29 / Unit 30	加熱炉／ヒーター	Petro-SIM にてヒーター（加熱炉）のギャップを計算する	C チーム
CDU-4 / VRU-2 / Nasr ボイラー	加熱炉／ヒーター	Petro-SIM にてヒーター（加熱炉）のギャップを計算する	A チーム

出典：JICA T/C Team

全てのリモートトレーニング・セッションは録画し、受講生の継続的なトレーニング、練習のため、受講生と共有した。下記は対面での講習中に撮影した写真の一部である。

出典：JICA T/C Team

図 3-33：案件評価ワークショップの写真 – パート 2（2022 年 3 月 13 日～17 日）

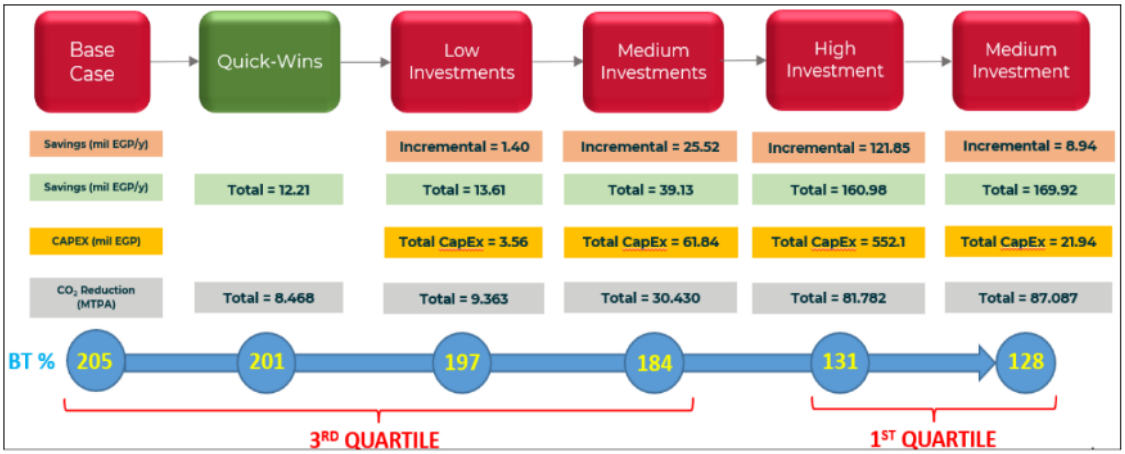
CORC Pilot Energy Audit –ロードマップ・ワークショップ　（2022 年 2 月 16-17 日）

JICA T/C Team は 2 月 16 日から 2 月 17 日までの 2 日間、CORC、MOP との対面形式のワークショップを実施し、すべての実現可能なエネルギー改善案件を組み込んだ CORC 製油所のエネルギー改善ロードマップを提示した。

出典：JICA T/C Team

図 3-34：CORC ロードマップ・ワークショップ（2022 年 2 月）プレゼンテーション

ワークショップに続いて、JICA T/C Team は CORC および MOP より受けたコメントに基づきロードマップを改訂し、MOP に最終的な CORC エネルギー診断報告書を発行した。最終ロードマップは、年間 CO2 削減量は推定 87 千トンであり、潜在的に年間 170 百万 EGP の節減を示した。



出典：JICA T/C Team

図 3-35：CORC 製油所の最終エネルギー改善ロードマップ概要

2022 年 6 月に CORC 省エネルギーパイロット診断で実施した全ての活動を文書化した最終報告書を発行した。


The Project Capacity Development on Energy Efficiency and Conservation

Pilot Plant (CORC) Strategic Energy Review Report

CLIENT	Ministry of Petroleum
CLIENT LOCATION	Egypt
DOCUMENT NUMBER	207282-EGY-RPT-000-0004
REVISION NUMBER	0
DATE	8 June 2022

KBC
A Yokogawa Company

KBC PROCESS TECHNOLOGY LIMITED
REGIONAL HEADQUARTERS AND REGISTERED OFFICE
42-50 Hersham Road
Walton on Thames
Surrey KT12 1RZ
UK

T: +44 (0)1932 242 424
F: +44 (0)1932 224 214
E: info@kbc.global
www.kbc.global

Registered in England number: 01807381

JICA PADECO MRI

出典：JICA T/C Team

図 3-36：CORC SER 最終報告書

(3)　3-3 EE&C 戦略・ロードマップ策定支援

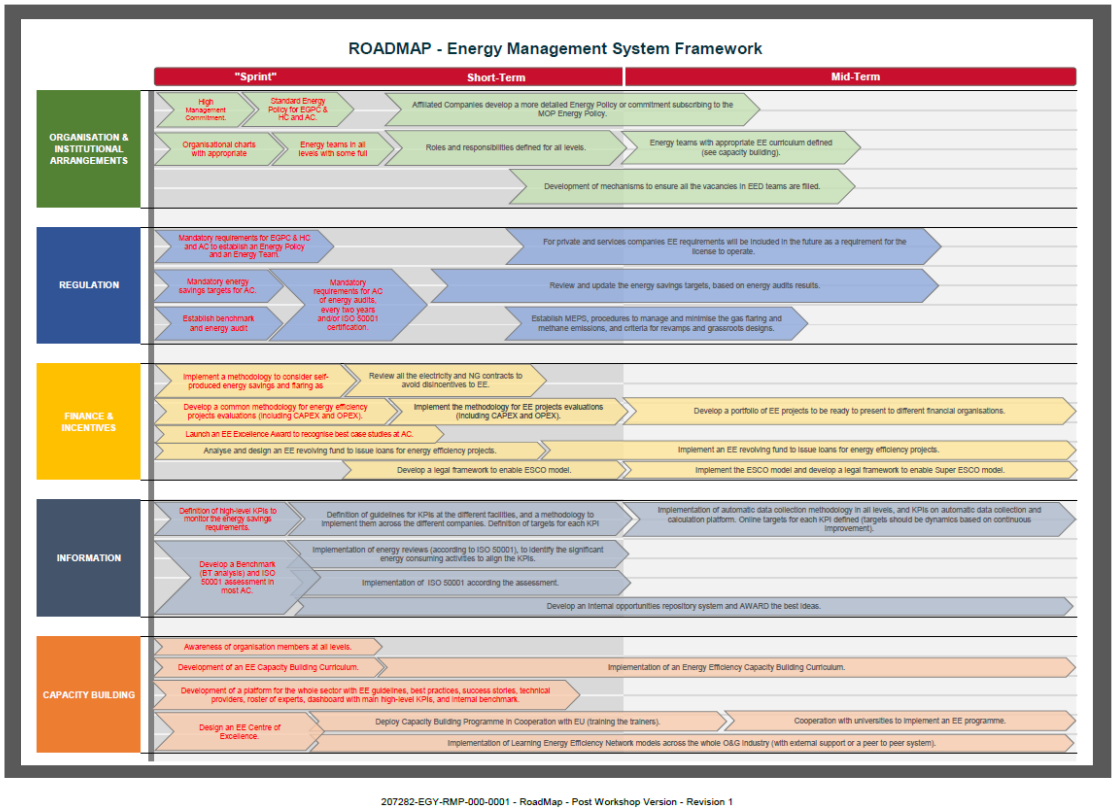
石油セクターのための包括的エネルギー管理システム(Energy Management System Framework, EMSF)ロードマップ（原案）の策定

CA で特定されたギャップを埋めるべく、EMSF ロードマップ（原案）を策定した。

同ロードマップ（原案）は 5 つの主要 EMSF 要素（組織とガバナンス、規制、財務、情報および能力構築）をカバーしたものであり、先ずロードマップへの提言内容について MOP と議論を行い、その後 2021 年 11 月 23～24 日に行われた 2 日間のワークショップにて、石油セクターの全ての利害関係者と議論を行った。

このワークショップには、石油セクター内の様々なレベルを代表する 23 の主要利害関係者（省庁 - 持株会社 - 関連会社 - サービス会社）が参加、また、参加者を 4 グループに分けたうえで EMSF の各要素について議論を行い、ロードマップへの提言事項についてディスカッション／検証し、実施前提条件／リソース／障壁を特定した。

本ワークショップを踏まえた検証済みロードマップを次図に示す。



出典：JICA T/C Team

図 3-37：EMSF ロードマップ（ワークショップ後の取りまとめ原案）

出典：JICA T/C Team

図 3-38：EMSF ロードマップ・ワークショップ（2021 年 11 月）

石油セクターのための EMSF ロードマップ策定（成果品 3.1）

JICA T/C Team は、2022 年 2 月に EMSF ロードマップ報告書案のドラフトを MOP に発行し、2023 年上半期に最終報告書を発行した。


Ministry of Petroleum and Mineral Resources
The Arab Republic of Egypt

THE PROJECT FOR CAPACITY
DEVELOPMENT ON ENERGY EFFICIENCY
AND CONSERVATION

Final EMSF RoadMap Report

01 May 2023

JAPAN INTERNATIONAL COOPERATION AGENCY

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

出典：JICA T/C Team

図 3-39：EMSF ロードマップ最終報告書

本報告書には、以下の文書一覧に裏付けされた改訂 EMSF ロードマップ・マトリックスが記載されている。

表 3-20：別添資料リスト

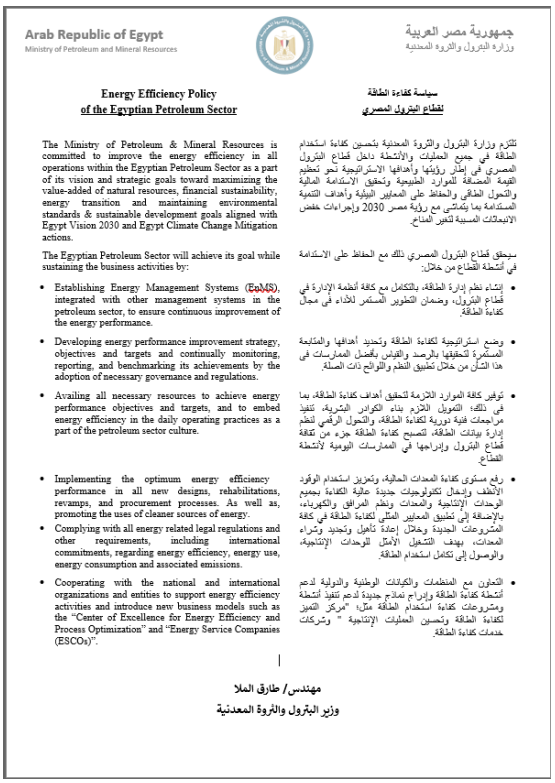
別添 A	ロードマップ・マトリックス
別添 B	ロードマップ 取り組みのデータシート
別添 C	石油セクターのエネルギー政策案
別添 D	制度上の取り決めおよび組織の指針
別添 E	エネルギー診断の指針
別添 F	エネルギー効率リボルビングファンドの指針
別添 G	エネルギー効率リボルビングファンドの設立と運用
別添 H	エネルギー効率のための Energy Service Company（ESCO）市場の育成の促進
別添 I	メキシコにおける EE プロジェクトを実施するための革新的な経済メカニズム
別添 J	エネルギーパフォーマンス指標に関する指針
別添 K	エネルギー効率検討ネットワーク網の実施のための指針

出典：JICA T/C Team

MOP への報告書（案）提出後、JICA T/C Team は MOP と協業して、EMSF ロードマップの SPRINT フェーズの実施に着手した。ロードマップ実施支援の一環として、以下の活動が行われた。

石油セクターエネルギー政策の改定

JICA T/C Team は、石油省が石油セクターのエネルギー政策を検討し、最終決定することを支援して来た。これは後に石油省長官大臣が承認し、このセクターの EE 戦略の一環としてすべての企業が取り組むものとして発行された。



Arab Republic of Egypt
Ministry of Petroleum and Mineral Resources

جمهورية مصر العربية
وزارة البترول والثروة المعدنية

Energy Efficiency Policy
of the Egyptian Petroleum Sector

The Ministry of Petroleum & Mineral Resources is committed to improve the energy efficiency in all operations within the Egyptian Petroleum Sector as a part of its vision and strategic goals toward maximizing the value-added of natural resources, financial sustainability, energy transition and maintaining environmental standards & sustainable development goals aligned with Egypt Vision 2030 and Egypt Climate Change Mitigation actions.

The Egyptian Petroleum Sector will achieve its goal while sustaining the business activities by:

- Establishing Energy Management Systems (EnMS), integrated with other management systems in the petroleum sector, to ensure continuous improvement of the energy performance.
- Developing energy performance improvement strategy, objectives and targets and continually monitoring, reporting, and benchmarking its achievements by the adoption of necessary governance and regulations.
- Availing all necessary resources to achieve energy performance objectives and targets, and to embed energy efficiency in the daily operating practices as a part of the petroleum sector culture.
- Implementing the optimum energy efficiency performance in all new designs, rehabilitations, revamps, and procurement processes. As well as, promoting the uses of cleaner sources of energy.
- Complying with all energy related legal regulations and other requirements, including international commitments, regarding energy efficiency, energy use, energy consumption and associated emissions.
- Cooperating with the national and international organizations and entities to support energy efficiency activities and introduce new business models such as the "Center of Excellence for Energy Efficiency and Process Optimization" and "Energy Service Companies (ESCOs)".

سياسة كفاءة الطاقة
لقطاع البترول المصري

تلتزم وزارة البترول والثروة المعدنية بتحسين كفاءة استخدام الطاقة في جميع العمليات والأنشطة داخل قطاع البترول المصري في إطار رؤيتها وأهدافها الاستراتيجية نحو تعظيم القيمة المضافة للموارد الطبيعية وتحقيق الاستدامة المالية والتحول الطاقي والحفاظ على المعايير البيئية وأهداف التنمية المستدامة بما يتماشى مع رؤية مصر 2030 وإجراءات خفض الانبعاثات المسببة لتغير المناخ.

سيحقق قطاع البترول المصري ذلك مع الحفاظ على الاستدامة في أنشطة القطاع من خلال:

- إنشاء نظم إدارة الطاقة، بالتكامل مع كافة أنظمة الإدارة في قطاع البترول، وضمان التطوير المستمر للأداء في مجال كفاءة الطاقة.
- وضع استراتيجية لكفاءة الطاقة وتحديد أهدافها والمتابعة المستمرة لتحقيقها بالرصد والقياس بأفضل الممارسات في هذا الشأن من خلال تطبيق النظم واللوائح ذات الصلة.
- توفير كافة الموارد اللازمة لتحقيق أهداف كفاءة الطاقة، بما في ذلك؛ التمويل اللازم بناء الكوادر البشرية، تنفيذ مراجعات فنية دورية لكفاءة الطاقة، والتحول الرقمي لنظم إدارة بيانات الطاقة، لتصبح كفاءة الطاقة جزء من ثقافة قطاع البترول وإدراجها في الممارسات اليومية لأنشطة القطاع.
- رفع مستوى كفاءة المعدات الحالية، وتعزيز استخدام الوقود الأنظف وإدخال تكنولوجيات جديدة عالية الكفاءة بجميع الوحدات الإنتاجية والمعدات ونظم المرافق والكهرباء، بالإضافة إلى تطبيق المعايير المثلى لكفاءة الطاقة في كافة المشروعات الجديدة وخلال إعادة تأهيل وتجديد وشراء المعدات، بهدف التشغيل الأمثل للوحدات الإنتاجية، والوصول إلى تكامل استخدام الطاقة.
- التعاون مع المنظمات والكيانات الوطنية والدولية لدعم أنشطة كفاءة الطاقة وإدراج نماذج جديدة لدعم تنفيذ أنشطة ومشروعات كفاءة استخدام الطاقة مثل؛ "مركز التميز لكفاءة الطاقة وتحسين العمليات الإنتاجية " وشركات خدمات كفاءة الطاقة.

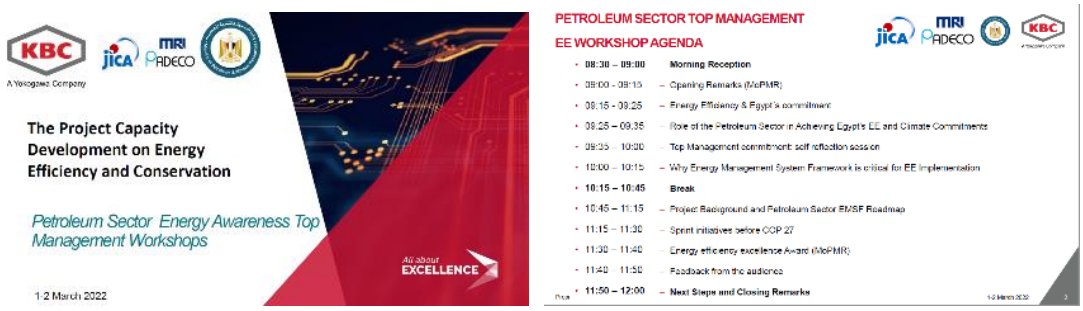
مهندس/ طارق الملا
وزير البترول والثروة المعدنية

出典：JICA T/C Team

図 3-40：改定した石油セクターエネルギー政策

石油セクターのトップ・マネジメントを対象とした啓発会議の実施

JICA T/C Team は、2022 年 3 月 1 日から 3 月 2 日まで、石油セクターのトップ・マネジメントに対して 2 回の啓発会議を開催した。ワークショップはカイロとアレクサンドリアで開催された。ワークショップの目的は、石油セクター内の意思決定者に EMSF ロードマップの取り組みを周知させ、セクター内のロードマップ実施に対する支援を得ることであった。このワークショップには、トップ・マネジメントレベルの 40 名以上の参加者があった。



出典：JICA T/C Team

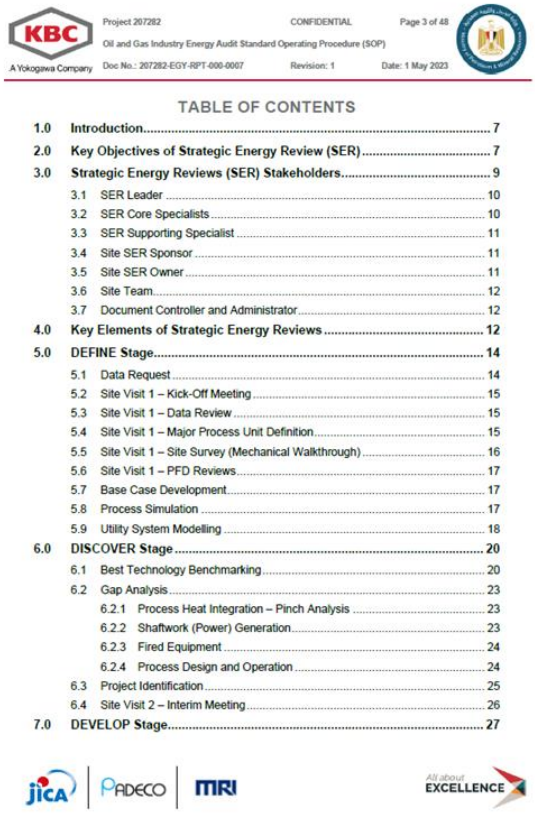
図 3-41：石油セクター・トップマネジメント・ワークショップ・アジェンダ

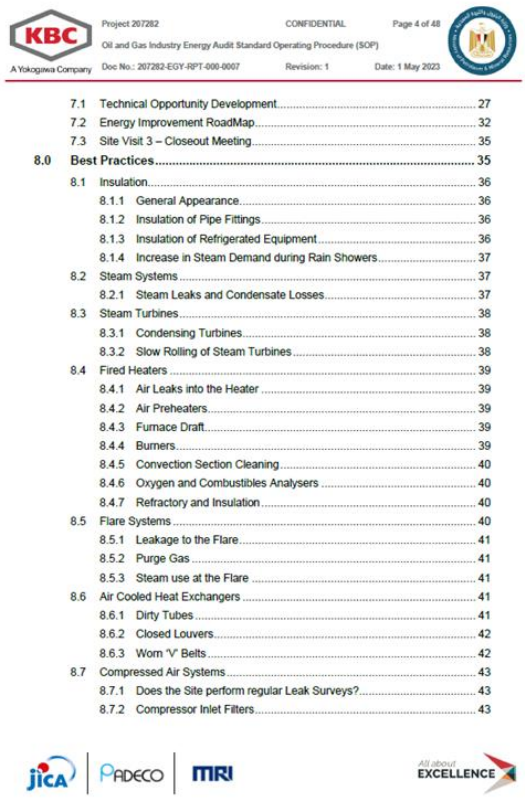
(4)　3-4 EE&C 活動強化のためのマニュアル・SOP の作成

JICA T/C Team は、2023 年上半期までに戦略的エネルギーレビュー（SER）のための標準業務手順書(SOP)を策定し、MOP に提出した。SOP 文書は、SER の鍵となる以下の要素を定義した。

- SER の関係者とその役割
- SER の各ステージおよび各ステージで実施すべき重要な活動
- SER の現場視察中に従うべきベスト・プラクティス

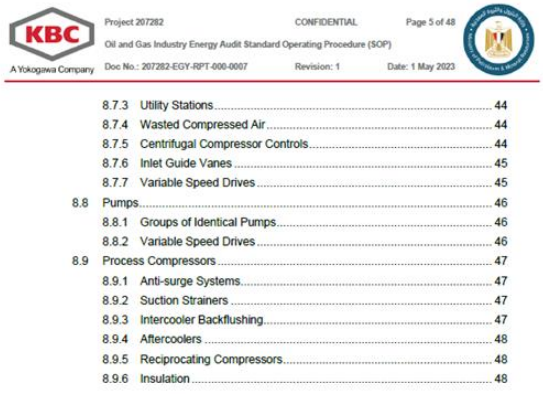
SOP の目次を以下に示す。





Project 207282 CONFIDENTIAL Page 4 of 48
Oil and Gas Industry Energy Audit Standard Operating Procedure (SOP)
A Yokogawa Company Doc No.: 207282-EGY-RPT-000-0007 Revision: 1 Date: 1 May 2023

JICA ADECO MRI All about EXCELLENCE



Project 207282 CONFIDENTIAL Page 5 of 48
Oil and Gas Industry Energy Audit Standard Operating Procedure (SOP)
A Yokogawa Company Doc No.: 207282-EGY-RPT-000-0007 Revision: 1 Date: 1 May 2023

出典：JICA T/C Team

図 3-42：SOP 文書目次

(5)　3-5 CoE 設立準備

CoE 関係者戦略ワークショップ報告書の発行

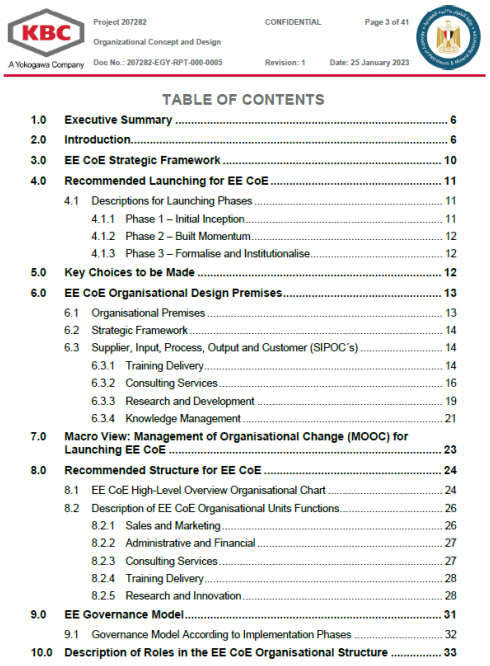
JICA T/C Team は、ワークショップの成果を文書化した CoE 関係者戦略ワークショップ報告書を MOP に対し発行した。

出典：JICA T/C Team

図 3-43：CoE 戦略ワークショップの報告書及び写真

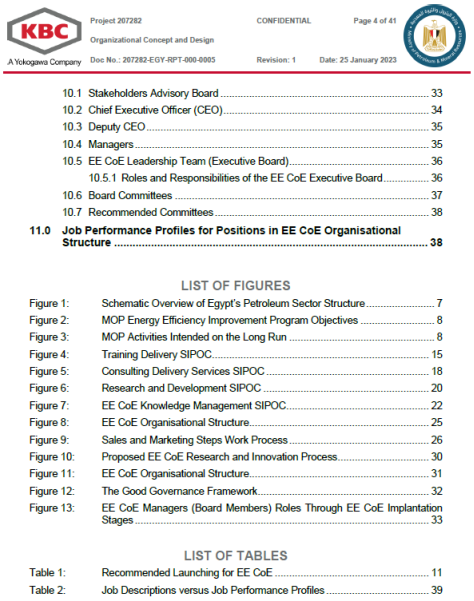
CoE 組織コンセプトと設計文書の発行

JICA T/C Team は 2023 年 1 月 25 日に、MOP に対して CoE の「組織コンセプトとデザイン」に関する文書を発行した。この文書は MOP が様々な段階を経て EE CoE を立ち上げるのに役立ち、CoE の組織の適切な構造を提案するという点で、戦略ワークショップの成果に基づいており、主な役職の役割を説明している。また、それら重要な役職の業務内容を記載している。



KBC A Yokogawa Company　Project 207282　CONFIDENTIAL　Page 3 of 41
Organizational Concept and Design
Doc No.: 207282-EGY-RPT-000-0005　Revision: 1　Date: 25 January 2023

TABLE OF CONTENTS



KBC A Yokogawa Company　Project 207282　CONFIDENTIAL　Page 4 of 41
Organizational Concept and Design
Doc No.: 207282-EGY-RPT-000-0005　Revision: 1　Date: 25 January 2023

LIST OF FIGURES

LIST OF TABLES

出典：JICA T/C Team

図 3-44：「組織コンセプトとデザイン」文書の目次

CoE 立ち上げ研修

JICA T/C Team は CoE 立ち上げの一環として、MOP が任命した最初の講師陣に一連の研修を実施した。実施した研修内容の要約を次表にまとめる。

表 3-21：JICA T/C Team が実施提供した CoE 研修

番号	日程	題目	講師
1	2022 年 10 月 9 日－12 日	最適エネルギー効率の達成（AOEE）	Azhari Dafaalla
2	2022 年 10 月 16 日－20 日	トレーナー研修	Dave Loubser
3	2022 年 11 月 7 日－10 日	ピンチ解析の紹介	Azhari Dafaalla

出典：JICA T/C Team

最適エネルギー効率(AOEE)達成研修コース

出典：JICA T/C Team

図 3-45：AOEE 研修グループ写真

石油精製産業においてエネルギーは多くの場合最大の管理運転コストである。最適エネルギー効率達成ワークショップは、我々の実証されたベスト・プラクティスと技術を基礎にしており、顧客がより効果的なエネルギー管理システム（EMS）を導入し、収益性を高めるのに役立つ。

本研修にて下記を習得する。

- エネルギー効率および経済性
- 蒸気発生と発電、およびそれらの最適化
- プロセスおよび機器の効率
- 熱統合の基礎とピンチ解析（PT）
- 効果的なエネルギー管理

表 3-22：AOEE 研修参加者

番号	名前	役職	所属組織
1	Waleed Mohamed Hanafi	Cost Engineer	ENPPI
2	Tarek Zein El Deen	Process Engineer	ENPPI
3	Mohamed Magdy Fathy El Eishy	Process Engineer	GPC (General Petroleum Company)
4	Mohamed Emad Lashin	Process Engineer	ENPPI
5	Islam Adel Tantawy	Senior Process Eng.	ENPPI
6	Gasser Samir El Faham	EE Team Leader	GASCO
7	Hamdy Ahmed Mahmoud Faraoun	Production Mgr.	OSOCO
8	Ahmed Hussien Soliman	Energy Manager	MOPCO
9	Ahmed Abdel Rahman Zahran	EE Assistant G.M	Abu Qir Pet.
10	Amr Magdy Abdel Fattah	Energy MS Section Head	ENPPI
11	Wagih Hassan Mohamed Nada	Mech. G.M	ENPPI
12	Mohamed Atia	Process Engineer	ENPPI
13	Shaimaa Hassan Mohamed	Energy Dep. Mgr.	ENPPI
14	Mohamed Hussein Saeed	EE Projects G.M	ECHEM
15	Amr Tawfik	G.M	ENPPI
16	Kareem Maged Hegab	Process Engineer	ENPPI
17	Manal Naguib	Refining & petrochemical Dep. Mgr.	ENPPI

出典：JICA T/C Team

出典：JICA T/C Team

図 3-46：AOEE 研修の様子（2022 年 10 月 9 日～12 日）

トレーナー研修プログラム

出典：JICA T/C Team

図 3-47：トレーナー研修グループ写真

「トレーナー研修」という表題のワークショップは、石油省が起用した講師候補者に対する双方向のワークショップで、講習の原則、手法、準備、講習のテクニックについて研修を行った。

本研修の目的は、受講者が効果的に講習を実施するためのツールを提供することであった。

受講者は、これら講習の原則、手法、テクニックを使用して研修の目的を達成するのに必要なツールの講習を受けた。

双方向の研修ワークショップの一環として受講生は、ワークショップ中に習得した手法、テクニックを活用した短いプレゼンテーションを準備、実行した。

研修プログラムにて個々の受講生は、コースを通して学習した手法に従って、15 分のプレゼンテーションを行うよう求められた。

表 3-23：トレーナー研修コース出席者

番号	名前	役職	所属組織
1	Waleed Mohamed Hanafi	Cost Engineer	ENPPI
2	Tarek Zein El Deen	Process Engineer	ENPPI
3	Mohamed Magdy Fathy	Process Engineer	GPC
4	Mohamed Emad Lashin	Process Engineer	ENPPI
5	Islam Adel Tantawy	Senior Process Engineer	ENPPI
6	Gasser Samir Elfaham	Energy Efficiency Team Lead	GASCO
7	Hamdy Ahmed Mahmoud Faroun	Production Manager	OSOCO
8	Ahmed Abd El Rahman Zahran	Energy Efficiency Assistant G. M.	ABU QIR PET.
9	Amr Magdy Abdelfattah	Energy MS Section Head	ENPPI
10	Wagih Hassan M. Nada	Mech. General Manager	ENPPI
11	Mohamed Atia	Process Engineer	ENPPI
12	Shaimaa Hassan Mohamed	Energy Department Manager	ENPPI
13	Mohamed Hussein Saeed	Energy Efficiency Projects G. M.	ECHEM
14	Amr Tawfik	General Manager QHSE	ENPPI
15	Kareem Maged Hegab	Process Engineer	ENPPI
16	Manal Naguib	Refining & Petrochemical Depart. Magr.	ENPPI
17	Ahmed El Sayed Ahmed	Department Manager	ENPPI
18	Ahmed Abd Allah Abdel Mottaleb	Process Engineer	EPROM
19	Mahmoud Mohamed Metwally	Process Engineer	EPROM
20	Hosam Hamdy Ibrahim Hussein	Process Engineer	EPROM
21	Rami Abdellatif Ahmed	Energy Eff. Department Manager	EPROM
22	Hassan Abdel Wahab Hassan	QEHS – G.M	EPROM
23	Ehab Nadi Abdel Tawab	Process Engineer	EPROM
24	Emad Magdy Hamaya	Assist. G.M	ENPPI

出典：JICA T/C Team










出典：JICA T/C Team

図 3-48：トレーナー研修コースの様子（2022 年 10 月 16 日～20 日）

ピンチ解析及び SuperTarget®の導入研修

出典：JICA T/C Team

図 3-49：ピンチ解析と SuperTarget®の紹介グループ写真

ピンチ解析は、プロセスおよび事業所全体における省エネルギーのための体系的な方法論である。この手法は熱力学的原理に基づいている。この研修プログラムの目的は、ピンチ解析及びその為のツールである SuperTarget®の基礎的概要を受講者に伝えることである。

- 熱複合線図の作成によるエネルギー目標の求め方
- エネルギー効率の良い熱交換器ネットワークを設計する為のピンチ解析の原則
- 新設および改造の設計の際の投資とエネルギーのトレードオフについて
- プロセスをより省エネなプロセスに改造する際の最善な方法
- 複数の用役設備の適切な配置方法
- 事業所全体の検討に適用された技術例
- ピンチ解析の基本概念を学ぶ
- 実用的なソフトウェアツールの使い方を理解
- KBC がどのように活用しているかについて学ぶ

表 3-24：ピンチ解析及び SuperTarget®導入研修受講者

番号	名前	役職	所属組織
1	Hamdy Ahmed Faraoun	Production Manager	OSOCO
2	Mohamed Magdy Fathy	Energy Efficiency	MOP
3	Mohamed Hussien Saeed	Energy Efficiency P.M	ECHEM
4	Ahmed Hussien Soliman	Process optimization EE Manag.	MOPCO
5	Ahmed El Sayed Ahmed	Department Manager	EPROM
6	Hosam Hamdy Ibrahim	Process Engineer	EPROM
7	Mahmoud Mohamed Metwally	Process Engineer	EPROM
8	Ahmed Abdel Rahman Zahran	EE Assisst. G.M	ABU QIR
9	Mohamed Ali El medany	Process Engineer	ENPPI
10	Mohamed Alaa mohamed	Process Engineer	ENPPI
11	Ehab Nadi	Process Engineer	EPROM
12	Rami Abdellatif Ahmed	Energy efficiency Dep. Mang.	EPROM
13	Hassan Abdel Wahab Fakhr El Deen	Sr. Process Engineer	EPROM
14	Ahmed Abdel Hameed Abdel Gelil	Sr. Process Engineer	EPROM
15	Abdel Rahman Mokhtar	Sr. Process Engineer	ENPPI
16	Tarek Zein El Deen	Process Engineer	ENPPI
17	Kareem Maged Hegab	Process Engineer	ENPPI
18	Gasser Samir El Faham	Energy efficiency team leader	GASCO

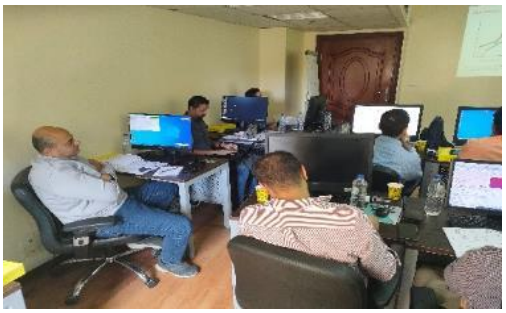
出典：JICA T/C Team

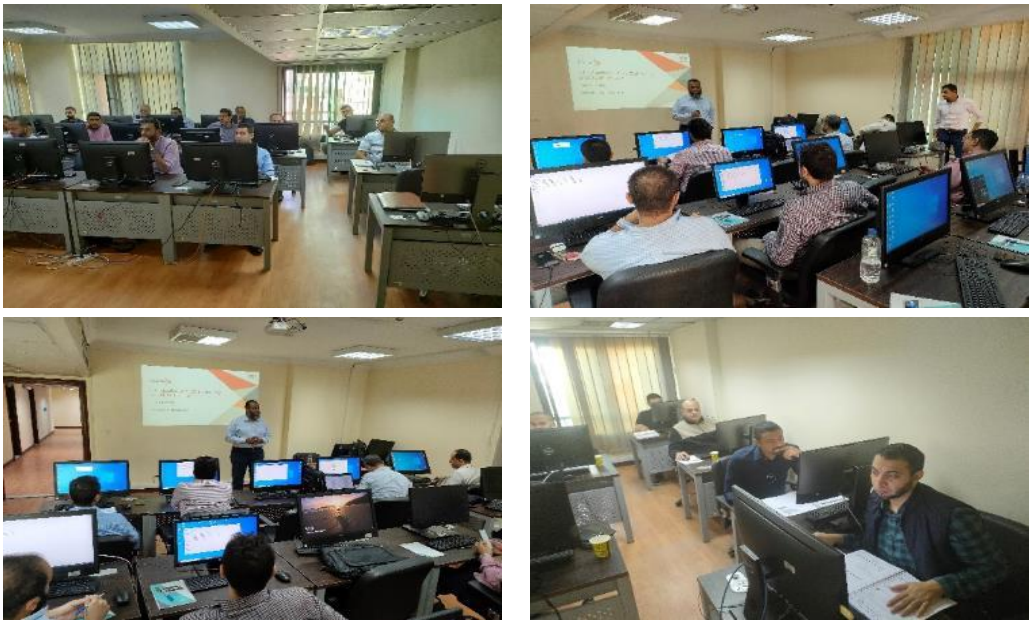










出典：JICA T/C Team

図 3-50：ピンチ解析及び SuperTarget®の導入研修の様子（2022 年 11 月 7 日～10 日）

3.5.2 PDM 指標の達成度

成果 3 に係る PDM 指標それぞれに関する達成度を次表に示す

表 3-25：成果 3 の指標達成状況

指標	達成度
3-1-1 省エネ枠組み「ベンチマーク/現状/ギャップ分析」報告書	完全達成
3-2-1 以下を含むプラントのパイロット診断報告書の発行:（プラント・ベンチマーク - ギャップ分析 - ギャップを埋める改善機会のリスト - エネルギーギャップを埋めるロードマップ - 事業所（製油所）全体のユーティリティモデル）	完全達成。
3-2-2 MOP スタッフ 15 名に対する OJT 及び講義（5 つの研修）	完全達成。リモートおよび対面での集中的なトレーニングを通じ、5 つのワークショップを全て実施。 達成項目: AOEE ワークショップ(2) Petro-SIM 上で用役のモデル構築およびピンチ解析を用いた熱統合に関するワークショップ 改善機会の評価に関するワークショップ ソフトウェアを活用した、BT インデックス/ギャップ分析のワークショップ ソフトウェアを活用した、改善機会の評価に関するワークショップ
3-3-1 EE の枠組みに近づく為のロードマップをまとめた、エネルギー効率枠組みの「あるべき姿」の報告書	完全達成。MOP に対し、EMSF ロードマップ報告を発行。
3-3-2 データ収集のための標準化したフォーマット、媒体を紹介（TT2 と連携）	TT2 との調整で 100%達成
3-3-3 COE ミッション、活動および目的の発行	完全達成。ワークショップを成功裏に実施し、MOP に報告書（ワークショップ成果物）を発行。
3-3-4 CoE ハイレベル組織文書の発行	完全達成。報告書を MOP に発行済
3-3-5 CoE トレーニング管理ガイド文書の発行	完全達成。報告書を MOP に発行済
3-3-6 CoE 組織設立支援文書の発行	完全達成（組織文書内に記載）
3-3-7 COE スタッフに対し、数日間（現場で）研修を実施	完全達成（現場で 3 回の研修を実施）
3-4-1 標準業務手順書（SOP）の発行	完全達成（報告書を MOP に発行済）

出典：JICA T/C Team

3.6　【成果 4】Task Team 1（TT1）：国レベルでの統合省エネ推進政策策定に向けた提言がなされ、その原案が策定される。

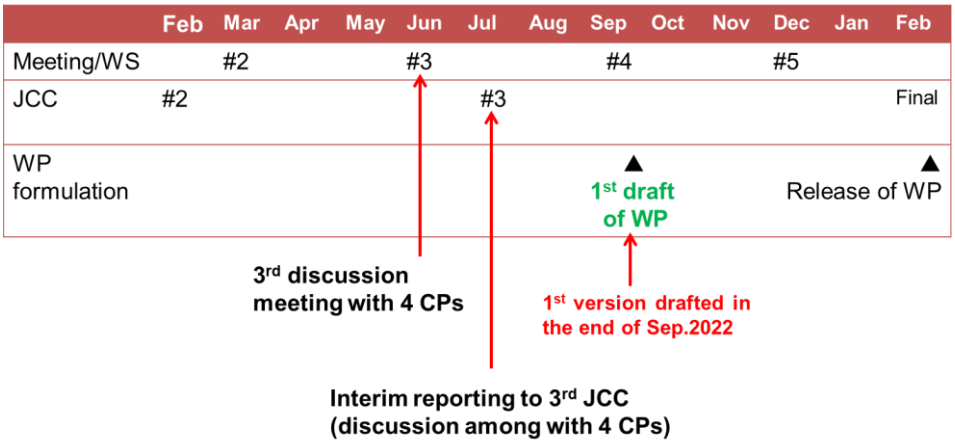
3.6.1　活動実績

(1)　将来の（統合）国家省エネ政策および実行計画の概要（例：ホワイトペーパー）を策定、取りまとめ、JCC（最終回）にて発表する。

電力分野の省エネ実行計画を示した NEEAP-II は 2022 年に完了することを踏まえ、NEEAP-II 後の省エネ推進政策／実行計画策定に向けた提言を含むホワイトペーパー（WP）策定作業を開始した。2022 年 2 月より計 7 回（JCC 含む）全カウンターパート参加による WP 策定に向けた情報交換、意見交換会合を行った。この中で、WP 策定に向け関係機関間で共有したコンセンサスは以下の通りである。

- WP 策定に向けた主要コンセンサス
  - 本技術協力活動を通じて確認された、次のステップとして必要なアクションプランのエッセンスを要約すること。
  - 省エネ目標＋その他設定の検討。
    （例：省エネ、エネルギー原単位、CO2 削減？）
  - WP の分量：各カウンターパートで最大 10 ページ。

次図に示す通り、JCC の機会も含め計 7 回、全カウンターパート参加による WP 策定に向けた情報共有、意見交換を行った。



出典：JICA T/C Team

図 3-51：WP 策定までの全体工程

表 3-26：第 4 回 TT1（全 C/Ps）検討会合の概要

日時	2022 年 10 月 10 日 10:00-14:00
場所	カイロ市内ホテル会議室
参加者	MOERE, MOP, IDA, CAPMAS より計 19 名
概要	各 C/P グループごとにグループディスカッションを行い、以下を発表。 ● MOERE NEEAP-II のアップデート、将来のプロジェクトにおける新技術の方向性、太陽熱温水器の普及（IDA、観光省と連携）、S&L プログラム強化および非効率機器排除に向けたインセンティブ・プログラムの提供、ESCO 制度開発における MOP との調整、エネルギーマネージャー／エネルギーマネジメントシステムの推進（IDA と連携）、エネルギーバランスを利用した省エネ活動の KPI 策定（CAPMAS と連携）。 ● MOP 上流（探査、掘削、ガス・油・水一次分離）、中流（パイプラインやガスポンプ場、分離プラント）、下流（製油所や石油化学工場）における EE&C 対策推進。 EMSF 強化に向けた取り組み（セクター横断）、および、エンドユーザー分野における EE&C 対策推進（他機関と協力）。 ● CAPMAS 国家エネルギーバランス表の完成、産業サブセクターのデータ増加による国家エネルギーバランス表の強化、バイオエネルギーのデータ／その他の新技術の追加によるエネルギーバランス表の改善。 ● IDA 全工場への意識付けとアウトリーチ活動の強化、データ収集／分析（EE&C 技術導入前後の比較）、 特定の産業／工場の目標値を設定するアクションプラン策定、工場への「エネルギー管理士」、「エネルギー台帳」導入を推進（MOERE と連携）、1 工場での EE 技術の実証実験など、省エネパイロット事業の実施、産業界の EE&C 政策・規制の提言。 ＜ナレッジシェアリング＞ ・エネルギーバランスに基づくエネルー消費構造分析と省エネロードマップ（2036 年までの省エネポテンシャル試算結果）の説明（成果品 4.7）： 家庭用分野（冷蔵庫、AC、照明[1]、電気温水器）、業務用（AC）、産業用（モータ）を対象→2036 年 BAU シナリオに対して 25%電力省エネ（EE シナリオ）。

出典：JICA T/C Team

[1] 注：照明機器の高効率化（例：白熱球→LED）に伴う冷房負荷削減による副次的省エネ効果が得られる。エジプトの汎用的建物データをストックしている IFC の EDGE アプリ（カイロ市の気候情報がデフォルト）を使用し、照明器具高効率化（65 lm/W→90 lm/W）に伴う冷暖房用消費エネルギー比較を行った。試算結果は、冷房時：省エネ率 11%、暖房時：4%増エネ、通年ベース：省エネ率 9%となった（想定建物は、内部総面積：10,000m2、地上階数：10 階、地下階数：2 階）。ただし、これはソフト試算結果の一例であることに鑑み、ロードマップへの反映は差し控えた。

表 3-27：第 6 回 TT1（全 C/Ps）検討会合の概要

日時	2022 年 12 月 29 日 10:00-14:15
場所	カイロ市内ホテル会議室
参加者	MOERE, MOP, IDA, CAPMAS より計 22 名
概要	C/P 毎にグループディスカッションを行い、以下を発表。 ● MOERE 全 C/P を全て満たし、政府戦略に合致するプロジェクトに焦点を当てることの重要性を指摘しつつ、国家エネルギーバランスに基づき優先すべき省エネ分野の特定が必要、と説明。以下は、本 WP における主要 EE&C トピック。 1. NEEAP-II をレビューし、関連プログラムおよび推奨事項を提案する。 2. E-モビリティ等、将来プロジェクトの新技術の方向性（可能性、応用性など）。 3. 観光省：ホテル向け太陽熱温水器、IDA：産業用アプリケーションでの協力。 4. S&L プログラムの強化、非効率家電製品排除に向けたインセンティブの提供。 5. エネルギー部門（電力・石油）の COE の開発、スーパーESCO 制度の開発において、MOP と調整。 6. IDA と連携したエネルギーマネージャーやエネルギーマネジメントシステムの導入。 7. エネルギーバランスを活用した省エネ活動の KPI 策定／評価。 ● MOP WP における EE&C のトピックを以下のように特定した。 1. 上流／中流／下流領域それぞれにおける省エネ化計画。 2. セクター全体で様々な EMSF の実践強化。 3. エンドユーザー領域における省エネ対策は、他機関と協力し、化石燃料需要の削減／最適化にコミット。 ● CAPMAS 1. 改善途上にある国家エネルギーバランス表の完成。 2. 産業サブセクターのデータ追加による国のエネルギーバランス表の強化。 3. バイオエネルギー、および、新技術の追加への対応も考慮した国家エネルギーバランス表の策定。 ● IDA EECU/IDA は、産業部門における省エネ推進活動を通じ、持続可能な開発目標を達成するための戦略として、以下を掲げている。 1. 産業分野のエネルギー効率を向上させるための政策や規制の立案。 2. 各産業部門におけるエネルギー消費に係るベンチマークの開発。 3. エネルギーマネジメント政策（エネルギー登録、エネルギー管理者、EnMS など）の活性化、および、投資家への啓発活動。

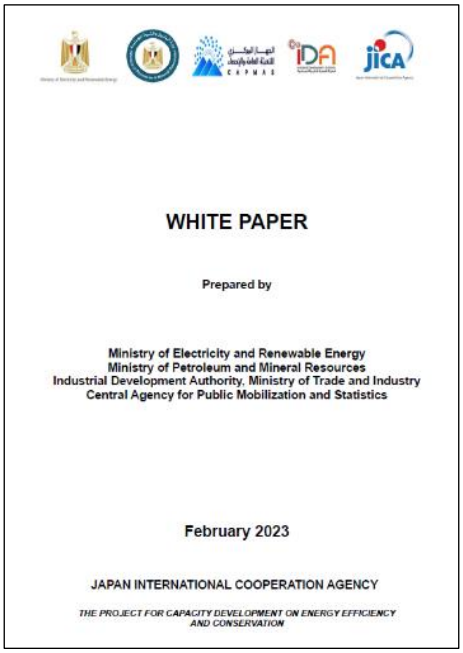
出典：JICA T/C Team

出典：JICA T/C Team

図 3-52：第 6 回 TT1（全 C/Ps）での全体ディスカッション

(2) 上記省エネ政策および実行計画が現実に発行されるための必須要素を明示する（例: 発行主体、時期、発出方法）。

これまでの全カウンターパート参加による会合にて、4 カウンターパート連名による発刊物として発出することを決定し、2023 年 3 月に発刊済み（150 部）。



出典：JICA T/C Team

図 3-53：White Paper の表紙

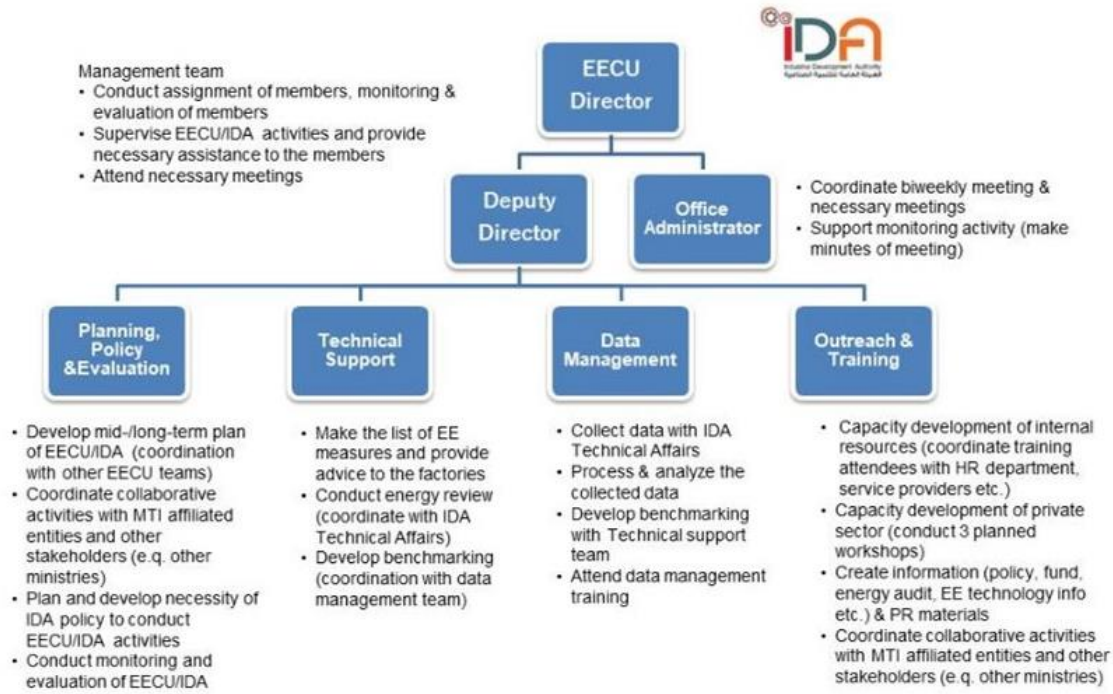
(3)　経済社会開発の一環として、産業セクターにおける省エネ活動が強化される。

JICA T/C Team は IDA との面談、およびキャパシティ・アセスメントの実施を経て、IDA から要望のあった省エネユニットの新設、産業セクターにおける省エネの推進、IDA 職員の能力開発をプロジェクト活動として実施することとした。IDA に対する技術協力活動の詳細は以下に記す。

1) EECU 設立準備

IDA 省エネユニット（Energy Efficiency and Conservation Unit （EECU/IDA））は JICA T/C Team の IDA 研修の実施を経て、2022 年 1 月 1 日に新設され、現在まで活動を実施している。また JICA T/C Team は 2022 年 3 月に EECU のキャパシティ・アセスメント（CA）を実施した。

EECU は 6 か月毎にモニタリング活動を実施することとし、適宜ユニットの実施体制および役割分担を見直すこととしている。下図は現在までに最終化された EECU の実施体制と役割分担である。（成果品 4.1）



出典：JICA T/C Team

図 3-54：EECU / IDA の実施体制と役割分担（最新版）

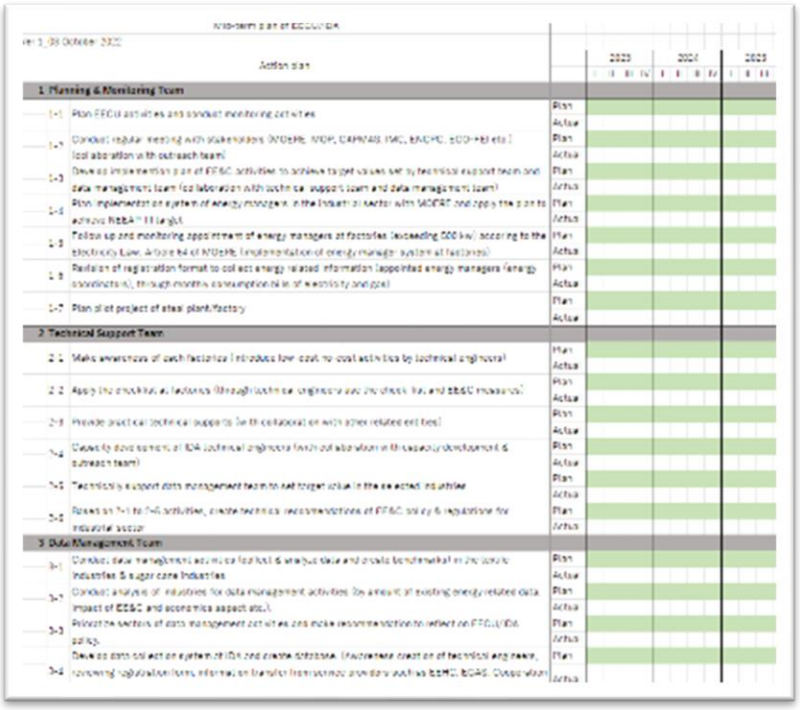
- **EECU のモニタリング活動**

EECU は 2022 年 9～10 月に 2023 年 3 月までの短期計画のモニタリング活動を実施し、結果をユニット内で共有した。併せて活動計画の見直しを行った。また 2022 年 4 月～2023 年 3 月に定例会議を 9 回実施し、メンバー間で活動の進捗や課題を共有した。

2) 省エネ政策・規制の検討

- **Planning, Policy & Evaluation Team の活動**

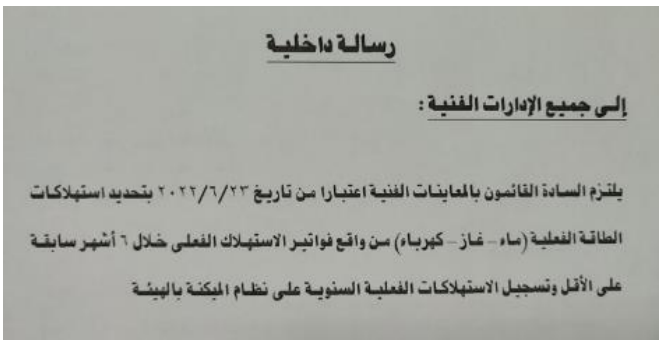
Planning, Policy & Evaluation Team は Planning, Policy & Evaluation Team、Technical Support Team、Data Management Team、Outreach & Training Team の活動計画を取りまとめ、2023 年～2025 年までの中期計画を作成した。（成果品 4.8）



出典：JICA T/C Team

図 3-55：EECU / IDA の中期活動計画

IDA では工場の検査を Technical Department のエンジニアが実施しており、その際にエネルギー関連情報を収集している。収集状況は地域ごとにバラつきがあり、すぐにデータ分析に使える状況ではない場合が多い。そのため、IDA Chairman 名の内部文書にて改めて Technical Department の各プロジェクトにエネルギー関連データを収集するよう通知した。



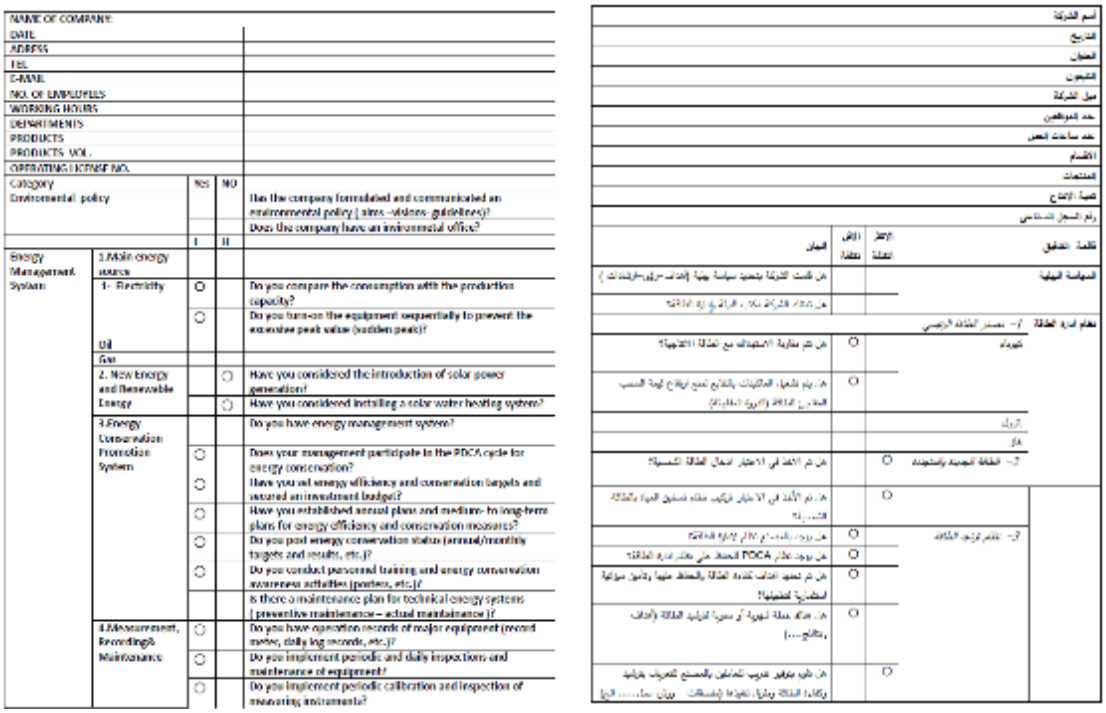
出典：IDA

図 3-56：データ収集に係る IDA 内の布告文書

IDA では Industrial Registration と Industrial license を取り扱っている。Industrial license は毎年更新の必要があり、年に 1 回 IDA の Technical Department のエンジニアが工場を訪問し、申請登録された工場の生産量や機材等の状況を確認しているが、Planning, Policy & Evaluation Team は Industrial license の申請書の更新、および公共料金の請求書添付を追加で求めることとした。（成果品 4.9、4.10、4.11）

- **Technical Support Team の活動**

Technical Support Team では工場における省エネ活動推進を目的とした EE チェックリストを作成した。リストは Technical Department のエンジニアが工場訪問を行う際に活用、省エネ活動の推進にあたる。（成果品 4.2 および 4.3）

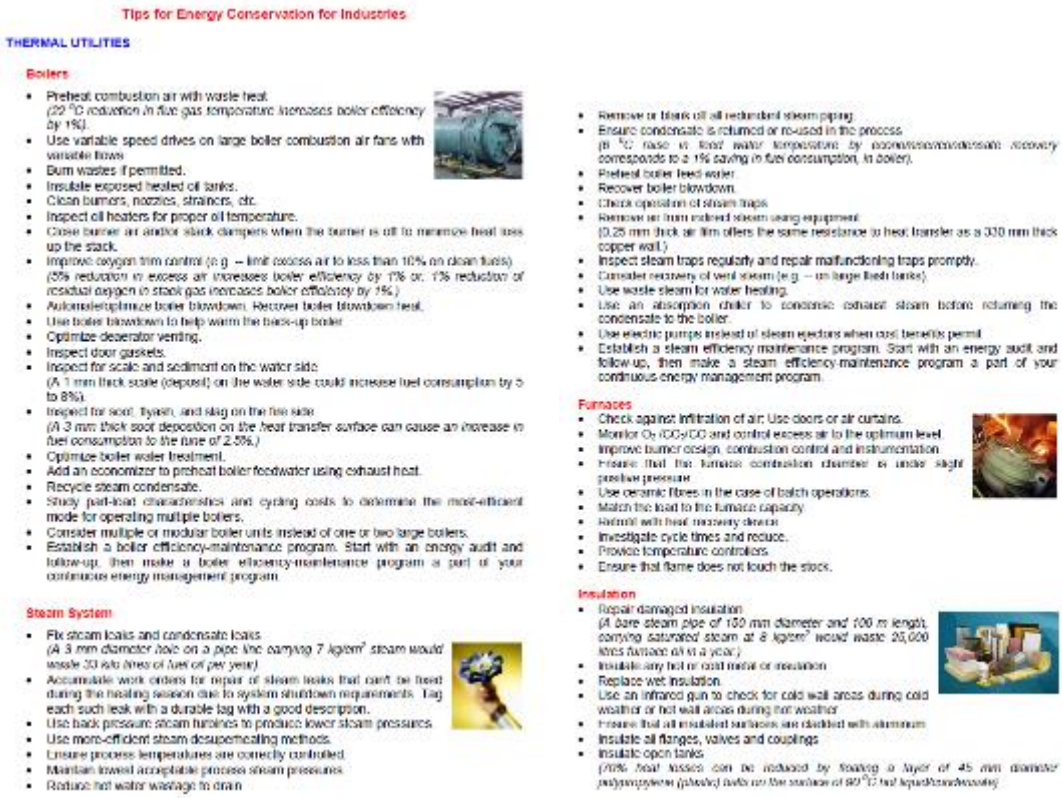


NAME OF COMPANY:				
DATE				
ADDRES				
TEL				
E-MAIL				
NO. OF EMPLOYEES				
WORKING HOURS				
DEPARTMENTS				
PRODUCTS				
PRODUCTS VOL.				
OPERATING LICENSE NO.				
Category		Yes	NO	
Environmental policy				Has the company formulated and communicated an environmental policy (aims -visions- guidelines)?
				Does the company have an environmental office?
		I	II	
Energy Management System	1.Main energy source			
	1- Electricity	○		Do you compare the consumption with the production capacity?
		○		Do you turn-on the equipment sequentially to prevent the excessive peak value (sudden peak)?
	Oil			
	Gas			
	2. New Energy and Renewable Energy		○	Have you considered the introduction of solar power generation?
			○	Have you considered installing a solar water heating system?
	3.Energy Conservation Promotion System			Do you have energy management system?
		○		Does your management participate in the PDCA cycle for energy conservation?
		○		Have you set energy efficiency and conservation targets and secured an investment budget?
		○		Have you established annual plans and medium- to long-term plans for energy efficiency and conservation measures?
		○		Do you post energy conservation status (annual/monthly targets and results, etc.)?
		○		Do you conduct personnel training and energy conservation awareness activities (posters, etc.)?
				Is there a maintenance plan for technical energy systems (preventive maintenance – actual maintainance)?
	4.Measurement, Recordings& Maintenance	○		Do you have operation records of major equipment (record meter, daily log records, etc.)?
		○		Do you implement periodic and daily inspections and maintenance of equipment?
		○		Do you implement periodic calibration and inspection of measuring instruments?

出典：JICA T/C Team

図 3-57：省エネチェックリスト

また工場機器（ボイラー、蒸気機器他）に対する省エネ手法の紹介を行うリストを作成した。このリストでは特にコストなし、もしくは低コストで導入可能な手法を紹介している。このリストも Technical Department のエンジニアが工場訪問を行う際に工場のエネルギー担当者に紹介し、省エネ活動の推進を行う。（成果品 4.4）



Tips for Energy Conservation for Industries

THERMAL UTILITIES

Boilers

- Preheat combustion air with waste heat.
  (20 °C reduction in flue gas temperature increases boiler efficiency by 1%).
- Use variable speed drives on large boiler combustion air fans with variable flows
- Burn wastes if permitted.
- Insulate exposed heated oil tanks.
- Clean burners, nozzles, strainers, etc.
- Inspect oil heaters for proper oil temperature.
- Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.
- Improve oxygen trim control (e.g. – limit excess air to less than 10% on clean fuels)
  (5% reduction in excess air increases boiler efficiency by 1% or, 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)
- Automate/optimize boiler blowdown. Recover boiler blowdown heat.
- Use boiler blowdown to help warm the back-up boiler
- Optimize deaerator venting.
- Inspect door gaskets.
- Inspect for scale and sediment on the water side
  (A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).
- Inspect for soot, fly-ash, and slag on the fire side
  (A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)
- Optimize boiler water treatment.
- Add an economizer to preheat boiler feedwater using exhaust heat.
- Recycle steam condensate.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.
- Consider multiple or modular boiler units instead of one or two large boilers.
- Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

Steam System

- Fix steam leaks and condensate leaks
  (A 3 mm diameter hole on a pipe line carrying 7 kg/cm² steam would waste 33 kilo litres of fuel oil per year)
- Accumulate work orders for repair of steam leaks that can't be fixed during the heating season due to system shutdown requirements. Tag each such leak with a durable tag with a good description.
- Use back pressure steam turbines to produce lower steam pressures.
- Use more-efficient steam desuperheating methods.
- Ensure process temperatures are correctly controlled.
- Maintain lowest acceptable process steam pressures.
- Reduce hot water wastage to drain.
- Remove or blank off redundant steam piping.
- Ensure condensate is returned or re-used in the process.
  (8 °C rise in feed water temperature by economizer/condensate recovery corresponds to a 1% saving in fuel consumption, in boiler).
- Preheat boiler feed water.
- Recover boiler blowdown.
- Check operation of steam traps.
- Remove air from indirect steam using equipment.
  (0.25 mm thick air film offers the same resistance to heat transfer as a 330 mm thick copper wall.)
- Inspect steam traps regularly and repair malfunctioning traps promptly.
- Consider recovery of vent steam (e.g. – on large fresh tanks).
- Use waste steam for water heating.
- Use an absorption chiller to condense exhaust steam before returning the condensate to the boiler.
- Use electric pumps instead of steam ejectors when cost benefits permit.
- Establish a steam efficiency maintenance program. Start with an energy audit and follow-up, then make a steam efficiency maintenance program a part of your continuous energy management program.

Furnaces

- Check against infiltration of air. Use doors or air curtains.
- Monitor O_2 (CO-)/CO and control excess air to the optimum level.
- Improve burner design, combustion control and instrumentation.
- Ensure that the furnace combustion chamber is under slight positive pressure.
- Use ceramic fibres in the case of batch operations.
- Match the load to the furnace capacity.
- Retrofit with heat recovery device.
- Investigate cycle times and reduce.
- Provide temperature controllers.
- Ensure that flame does not touch the stock.

Insulation

- Repair damaged insulation
  (A bare steam pipe of 150 mm diameter and 100 m length, carrying saturated steam at 8 kg/cm² would waste 25,000 litres furnace oil in a year.)
- Insulate any hot or cold metal or insulation.
- Replace wet insulation.
- Use an infrared gun to check for cold wall areas during cold weather or hot wall areas during hot weather.
- Ensure that all insulated surfaces are cladded with aluminum.
- Insulate all flanges, valves and couplings.
- Insulate open tanks.
  (70% heat losses can be reduced by floating a layer of 45 mm diameter polypropylene (plastic) balls on the surface of 80 °C hot liquid/condensate)

出典：JICA T/C Team

図 3-58：工場機器の省エネ手法リスト

- **Data Management Team の活動（TT-2 との協力）**　（成果品 4.7）

Data Management Team ではエネルギーと生産量データを収集するためのフォーマットを作成し、繊維産業と食品加工産業におけるデータ解析を開始した。データは染色部門の 80 工場分（全工場数は 200）、および砂糖製造部門の 18 工場のデータ解析を実施した。

出典：JICA T/C Team

図 3-59：TT-2 Workshop に参加する EECU メンバー

- **Outreach & Training Team の活動**

Outreach & Training Team の活動は以降で纏める。

3) 産業部門における包括的な活動 （成果品 4.5）

＜MTI および MTI 関連機関との活動＞

- **Integrated meeting**

2021 年 10 月 13 日、IDA 主催の第 1 回 Integrated meeting を行った。Integrated meeting には MTI、および省エネ活動を行う MTI 傘下の 7 組織（IDA 含む）の計 8 機関が参加し、産業部門における省エネの取り組みについての情報交換、および議論を行った。

表 3-28：第 1 回 Integrated meeting の概要

日時	2021 年 10 月 13 日 10:00-15:00
場所	IDA 内会議室
参加者	MTI, IDA, ENCPC, ECO-FEI, ICA, EOS, NQI, IMC 関係者
概要	・ 本技プロについて、IDA の取り組み ・ 各組織における省エネの取り組み（各機関登壇者より） ・ ENCPC、ECO-FEI、EOS、NQI、IMC ・ パデルディスカッション（IDA との連携可能性について） ・ 今後の活動について

出典：JICA T/C Team

出典：JICA T/C Team

図 3-60：第 1 回 Integrated meeting の様子

- **ECO-FEI との活動：簡易省エネ診断研修**

2022 年 1 月、ECO-FEI による第 1 回簡易省エネ診断研修を実施した。本研修では、エジプトにおける省エネの位置づけ、省エネ技術やインセンティブ、省エネ診断等についての座学と、工場見学、およびグループワークを実施した。研修詳細は 5）IDA 職員の能力開発にて述べる。

- **ENCPC との活動：RECP 研修**

Outreach & Training Team では MTI 傘下の ENCPC との調整を重ね、第 1 回～第 3 回 RECP 研修を 2022 年 7 月、8 月および 9 月に実施した。研修詳細は 5）IDA 職員の能力開発にて述べる。

＜C/P 機関との活動＞

- **MOERE との活動**

2022 年 3 月、EECU/IDA は E-JUST パイロットプロジェクトの現地視察を実施し、工場におけるインバータシステムの導入と省エネ効果についての考察を行った。

また 2022 年 3 月、5 月、10 月には MOERE との会合を 3 回実施した。会合の中ではエネルギー登録およびエネルギーマネージャー制度の実施プロセスに関する検討を行っており、今後も協調して産業セクターにおける省エネ活動を実施していくこととしている。

出典：JICA T/C Team

図 3-61：E-JUST パイロットサイトの視察（左）と MOERE との会合の様子（右）

- **MOP との活動**

2022 年 2 月には、TT4 専門家によるワークショップを実施し、産業部門におけるベンチマークや MOP の経験を共有した。

表 3-29：ワークショップ概要

日時	2022 年 2 月 28 日（1 日間）
場所	IDA 内会議室
参加者	IDA より計 11 名
概要	・ 産業分野におけるエネルギーマネジメントシステムフレームワーク(EMSF) ・ 産業部門におけるエネルギーマネジメントシステム（EnMS） ・ エネルギーレビュー ・ グループ討議

出典：JICA T/C Team

2022 月 5 月には MOP が主催した Egyptian Petroleum Sector Energy Efficiency Conference & Exhibition（EPEEC 2022）にて本プロジェクトの紹介、及び産業セクターにおける能力開発活動についての発表を実施した。

出典：JICA T/C Team

図 3-62：EPEEC2022 での発表スライド（左）と会場の様子（右）

- **CAPMAS との活動**

第 2 回 IDA 研修において、TT-2 専門家は CAPMAS の活動紹介を行った。また Data Management Team は TT-2 と協力して IDA が保有するエネルギーデータの整理と分析を実施した。

4) 民間セクター向けワークショップ

- **第 1 回 IDA Workshop**

Outreach & Training Team は産業団地のマネージャーを対象とした第 1 回 IDA Workshop を 2022 年 10 月にオンラインにて実施した。

表 3-30：第 1 回 IDA Workshop の概要

日時	2022 年 10 月 31 日 10:00-11:00
場所	オンライン（Zoom）
対象者	産業団地のマネージャー30 名
概要	・ JICA プロジェクトの紹介 ・ EECU/IDA の設立について ・ EECU/IDA 各チームの活動紹介（Planning, Policy & Evaluation Team、Technical Support Team、Data Management Team、Outreach & Training Team） ・ 質疑応答

出典：JICA T/C Team

参加者からは EECU/IDA の活動に対する高い関心が寄せられ、今後どのように EECU と連携を図れば良いのか、オンラインによるワークショップのみならず、対面でのワークショップや省エネ活動支援の実施が望まれた。Workshop 終了後、EECU/IDA では今後の連携促進に向け WhatsApp グループを作成した。

- **第 2 回 IDA Workshop**

Outreach & Training Team は C/P、MTI 関連組織、銀行、企業を対象とした第 2 回 IDA Workshop を 2023 年 2 月に実施した。

表 3-31：第 2 回 IDA Workshop の概要

日時	2023 年 2 月 22 日 10:00-12:00
場所	IDA カンファレンスルーム
対象者	IDA 部門長と職員、C/P、MTI 関連組織、銀行、企業他
概要	・ 開会のことば ・ JICA プロジェクトの紹介 ・ EECU/IDA の設立について ・ EECU/IDA 各チームの活動紹介（Planning, Policy & Evaluation Team、Technical Support Team、Data Management Team、Outreach & Training Team） ・ 日本の省エネ技術の紹介（横河電機） ・ 質疑応答 ・ 閉会のことば

出典：JICA T/C Team

民間セクターからの参加者は限られていたものの、本プロジェクトにおける EECU/IDA 各チームの活動を総括するとともに、完成した省エネ活動ツールの紹介や工場で導入することが可能な日本の省エネ技術を紹介した。

尚、第 2 回 IDA Workshop では Outreach & Training Team が作成した EECU のパンフレットが配布された。（成果品 4.6）

出典：JICA T/C Team

図 3-63：EECU パンフレット

5) IDA 職員の能力開発

- **IDA 研修**

JICA T/C Team は 1)EECU 設立準備の支援として、IDA 職員への研修を 2021 年 8 月～2022 年 3 月までに 3 回実施した。第 1 回および第 2 回研修にて EECU の設立準備を行い、2022 年 1 月 1 日 EECU/IDA が新設された。また第 3 回研修にて EECU の活動計画策定を支援した。

表 3-32：IDA 研修の概要

	第 1 回	第 2 回	第 3 回
日時	2021 年 8 月 17～22 日（4 日間）9:00-13:00	2021 年 10 月 11～17 日（4 日間）9:00-13:00	2022 年 3 月 16 日（1 日間）9:00-14:30
場所	IDA 内会議室	IDA 内会議室	Greek Campus 内会議室
参加者	IDA より計 16 名	IDA より計 14 名	IDA より計 16 名
概要	・ 本技プロについて ・ キャパシティ・アセスメント調査の結果報告（IDA 部分のみ） ・ 研修の目的、全体の研修計画 ・ 講師、参加者の自己紹介 ・ 日本の省エネトレンドとエネルギー自給率 ・ 資源エネルギー庁の組織と役割 ・ 資源エネルギー庁の政策、変遷、分野別取り組み ・ 東京都環境局の概要、省エネ分野の取り組み ・ 東京都環境局の組織と役割 ・ 東京都環境局と政策、変遷、企業規模別の取り組み ・ 貿易産業省（Ministry of Trade and Industry, MTI）傘下の組織における省エネの取り組み ・ グループワーク、発表（EECU の役割、政策策定、他組織との役割分担について） ・ 次回研修までの課題	・ 本技プロについて、第 1 回研修の復習 ・ 第 1 回研修時の課題：事例研究（トルコ、スペイン、インド、韓国の省エネ政策と取り組み）の発表会 ・ 南アフリカの省エネ政策と取り組み ・ エジプトにおけるベンチマークの取り組み ・ C/P 3 省（MOERE、MOP、CAPMAS）の省エネ活動、および IDA との連携可能性に関する議論（MOERE 担当者、MOP 担当者、CAPMAS 担当専門家からのプレゼンテーション、IDA 受講者とのディスカッション） ・ グループワーク、発表（EECU 設立準備（EECU の目的、権限、組織体制）） ・ 今後のスケジュール	・ EECU 活動計画（グループワークとプレゼンテーション） ・ 民間企業の視点からのビジネスマインド開発（企業の経営効率化、利益率アップのための EE&C 活動、行政サービスの提供）

出典：JICA T/C Team

出典：JICA T/C Team

図 3-64：IDA 研修の様子

- **簡易省エネ診断研修**

表 3-33：簡易省エネ診断研修の概要

日時	2022 年 1 月 30 日～2 月 1 日（3 日間）9:00-15:00
場所	Greek Campus 内会議室他
参加者	IDA より計 14 名
概要	・ 産業界における省エネの概念 ・ 省エネ法、電気料金（2021 年）、エネルギー料金削減のために必要な対策 ・ 省エネ導入障壁を克服するための技術と解決策 ・ インセンティブ ・ エネルギー診断（目的、手順と評価、データ分析、エネルギー消費、アクションプラン、レポート作成） ・ Robbiki 工業団地での現地視察 ・ グループワーク ・ エネルギー診断の事例紹介

出典：JICA T/C Team

出典：JICA T/C Team

図 3-65：簡易省エネ診断研修の様子

- **RECP 研修**

IDA は 2022 年 7～9 月にかけて ENCPC による RECP 研修を 3 回実施。本研修では、IDA Technical Department のエンジニアを対象に、環境経済、資源効率、ベンチマーク、データ分析、データ計測機器、省エネ技術についての座学やグループワークを実施した。3 回の RECEP 研修にて合計 107 名の IDA エンジニアの能力開発を行った。

表 3-34：RECP 研修の概要

	第 1 回	第 2 回	第 3 回
日時	2022 年 7 月 24 日～28 日（5 日間）9:00-15:00	2022 年 7 月 31 日～8 月 4 日（5 日間）9:00-15:00	2022 年 8 月 28 日～9 月 1 日（5 日間）9:00-15:00
場所	IDA 内会議室	IDA 内会議室	IDA 内会議室
参加者	IDA より計 34 名	IDA より計 36 名	IDA より計 37 名
概要	・ 環境経済について ・ 資源効率とは ・ ベンチマークの設定 ・ データ分析手法と計測機器 ・ 省エネ技術の事例紹介		

出典：JICA T/C Team

出典：JICA T/C Team

図 3-66：RECP 研修の様子

3.6.2 PDM 指標の達成度

成果 4 に係る PDM 指標それぞれに関する達成度を次表に示す。

表 3-35：成果 4 の指標達成状況

指標	達成度
全 C/P に関する活動	
4-1 カウンターパート 4 機関参加による定期会合を計 7 回開催し（JCC 含む）、エネルギー関連データ収集に係る標準フォーマット／媒体導入を伴いつつ、将来の省エネ政策/実行計画のホワイトペーパーを策定する。ホワイトペーパーには国の CO_2 削減目標も考慮に入れる。	第 2 回 JCC のナレッジシェアリングイベント（NEEAP-II 関連）にて、情報共有を兼ねた最初の活動をキックオフ。 JCC も含め計 7 回全カウンターパート参加によるホワイトペーパー策定に向けたディスカッションを行った。
4-2 上記省エネ政策/実行計画が現実に発行されるための必須要素を検討、明示する（例: 発行主体、時期、発出方法）。	全カウンターパート作成によるホワイトペーパー校了（3 月中に発刊済）。
IDA に関する活動	
4-3-1 IDA・EECU の機能について、案を作成する。	2022 年 1 月 1 日に EECU/IDA が新設された。EECU/IDA の実施体制、機能が見直され最終化された。EECU の短期計画のモニタリングを 2022 年 9～10 月にかけて実施した。定例会議は 2022 年 4 月～2023 年 2 月にかけて 9 回開催された。
4-3-2 産業セクターにおいて省エネ関連の政策・規制の導入案を IDA にて作成する。	EECU 各チームの活動が実施された。EECU の短期計画と中期計画、データ収集に関する内部文書、産業登録申請書の更新、データ収集表の作成とデータ分析、EE チェックリストおよび EE 手法（機材別）の作成が行われた。
4-3-3 関連組織との会合を開催し、産業セクターにおける統合的な省エネ活動案を作成する。	（産業セクター） MTI 関連組織との Integrated Meeting（2021 年 10 月）、2022 年 1 月 ECO-FEI の簡易省エネ診断研修、2022 年 7～9 月 ENCPC の RECP 研修 3 回の実施を行った。 （C/P） 2022 年 3 月 E-JUST パイロットプロジェクトの現地視察、MOERE との EnMS に係る会合を 3 回（2022 年 3 月、5 月、10 月）実施した。また 2022 年 2 月 TT-4 専門家のワークショップの実施、2022 月 5 月 MOP が主催の EPEEC 2022 に参加した。第 2 回 IDA Training における TT-2 専門家の CAPMAS 活動紹介、Data Management Team と TT-2 の協力による IDA エネルギーデータの整理・分析。

指標	達成度
4-3-4 民間セクターへの省エネワークショップを開催する。	第 1 回 IDA ワークショップ（2022 年 10 月）、第 2 回IDA ワークショップ（2023 年 2 月）を実施した。また省エネモデル工場導入に向けた議論、必要なツールの開発とリソース（IDA エンジニア）への研修が実施された。
4-3-5 IDA 職員に対し、エジプト及び日本で研修を行う。	2021 年 8 月～2022 年 3 月 IDA 研修（3 回）、2022 年 1 月 ECO-FEI の簡易省エネ診断研修の実施。加えて 2022 年 7～9 月 ENCPC RECP 研修（3 回）では合計 107 名の IDA エンジニアを育成した。

出典：JICA T/C Team

3.7 【成果 5】Task Team 2（TT2）：CAPMAS が発刊する国家エネルギー統計書が他のカウンターパート機関による省エネ促進政策の策定およびモニタリングのために参照される。

3.7.1 活動実績

(1) 国家エネルギー収支表に係る全カウンターパート機関との理解共有会合の開催

現行、エジプトでは電力、ガス、石油製品などエネルギーの種類別の統計は揃っているものの、これら相互の比較や国全体として、すべてのエネルギーを包括したエネルギーの需給状況、利用可能な形への転換状況、そして消費の状況を把握できる情報は整備されていない。そこでエジプトの国全体としてのエネルギー需給、消費動向を俯瞰するために国家エネルギー収支表の継続的な作成が必要である。このような国家エネルギー収支表は、一度作成するだけでは十分ではなく、毎年、永続的に作成されることが望ましい。本技プロ活動では、エジプト側が国家エネルギー収支表を毎年、永続的に作成する能力が備わるように、収支表作成手順のマニュアル化（業務手順書の作成）と、同業務手順のシステム化（エネルギー統計データ管理システム：EDMS）を整備することが規定されている。かかる理解が本タスクチーム（TT2）の活動の原点となっている。

このような本技プロ活動の背景および目的については既に全 C/P 機関との間で了解を得て、共有されているが、詳細については未だ十分な理解が浸透していないと考えられる。また国家エネルギー収支表を活用して国全体として省エネルギーを推進するためにどのような形で改善、強化を図ることが望ましいかを検討する方法についての理解共有が必要と考えられる。このような状況下、本活動の一環として一連の会合を開催した（全カウンターパートが集まる会合を Joint meeting と称し合計 10 回、延べ 40 セッションを開催）。

2022 年 7 月には、環境省（MOE）が本技プロ活動に高い関心を示し、石炭・コークス、廃棄物およびバイオマスエネルギーに関する統計データの提供意向を示すと同時に、技プロ活動への参加を要請してきた。本技プロ活動カウンターパートの代表組織である MOERE が MOE の参加を歓迎し、CAPMAS および他省庁もこれに賛同したところ、2022 年 8 月以降は、本技プロの会合や、EDMS 開発検討など全ての活動に MOE も参加することとなった。

関係省庁を集めた会合では、まずは検討材料となる国家エネルギー収支表について、Microsoft Excel シートベースで作成した 2017-18 年度試行版を題材として理解共有会合を開催した。表から読み取れる各種数値に関する解説、効率性を見る指標の計算、さらには表の簡略化、視覚化（チャート化）などの演習を行った。さらには日本をはじめ、先進各国や国際機関等におけるエネルギー収支表の作成、活用状況、これら情報を活用した将来推計などの事例紹介も行った。このような情報共有会合では、各種知識の共有化が図られたのみならず、技術協力プロジェクトチームとしてもエジプト政府関係者にとってどのような図表化方法がわかりやすいのか、理解を阻害し得る要因がどこにあるのか、など重要な示唆を得るに至った。

また、EDMS の開発に関しては、2022 年 9 月以降ほぼ毎月 1 回のペースに頻度を上げ、システムの機能に関するテスト、ユーザーからの改善意見の聴取、操作習熟、業務手順の

確認、刊行物の内容確認などの目的で関係省庁を集めて会合を開催した。以下の表にこれまでに開催したJoint meeting（ワークショップ、研修、テストなどの会合）の一覧を示す。

表 3-36：国家エネルギー収支表の理解浸透および EDMS 開発に関する会合

開催日	件名	セッション	参加者数
2021 年 12 月 13 ～16 日	国家エネルギー収支表に関連するデータの管理状況確認と改善に向けた OJT	5	20
2021 年 12 月 20 ～22 日	国家エネルギー収支表に関する基礎研修会合	6	30
2022 年 3 月 31 日	国家エネルギー収支表理解浸透、視覚化ワークショップ	6	30
2022 年 7 月 3 日	CAPMAS におけるエネルギー統計管理優良事例に係る OJT	1	4
2022 年 9 月 25 ～26 日	EDMS 第 1 回デモと操作研修、エネルギー収支表完成共有会合	7	30
2022 年 11 月 7 日	EDMS 第 2 回デモ会合と操作研修	3	30
2022 年 11 月 13 ～14 日	EDMS ユーザー受入テスト（UAT）	-	延べ 40
2022 年 11 月 15 日	EDMS ユーザー受入テスト（UAT I）フィードバック会合と操作研修ワークショップ	4	30
2022 年 12 月 28 日	EDMS ユーザー受入テスト（UAT II）操作研修と収支表の図式化ワークショップ	5	30
2023 年 1 月 23 日	TT2 成果確認および国家エネルギー収支統計書作成 2021-22 年度サイクル開始ワークショップ	5	20
2023 年 2 月 23 日	国家エネルギー収支統計書レビューおよび EDMS 運用手順確認ワークショップ	5	20

出典：JICA T/C Team

出典：JICA T/C Team

図 3-67：TT2 Joint meetings の様子

(2)　エネルギー統計管理に係る優良事例検討研修（OJT）

技術協力プロジェクトチームのエネルギーデータ管理 1 担当として、日本経済研究所計量分析ユニット主任研究員が現地業務に赴いた機会を利用し、同研究所における事例を参考にエネルギーデータの収集、集計、分析ならびに将来推計結果をもとにした脱炭素化シナリオ作成に係るレクチャー研修会を開催した。対象は、データ管理手法向上を意識した内容として CAPMAS 職員に絞り、OJT に挟む形で開催した。その結果、エネルギーデータを利活用することによって、効果的な省エネルギー推進の対象分野の絞り込みまでも可能となる具体事例をわかりやすく披露することが可能であった。以下の表に同 OJT の概要を示す。

表 3-37：CAPMAS におけるエネルギー統計管理優良事例に係る OJT

日時	内容	参加者
2022 年 7 月 3 日 <10:00 - 14:00>	- 日本エネルギー経済研究所概要 - 計量分析ユニット概要 - 全世界 2050 年エネルギー供給見通し - 将来見通しシナリオ設定 - 計量分析手法概要 - 各国の脱炭素化声明の最新動向 - 新興国の動向 - 電力セクターとその他のセクター - 非化石燃料の利活用促進 - シナリオ別将来推計例	CAPMAS 統計官 JICA コンサルタント

出典：JICA T/C Team

上記 OJT は CAPMAS の反応に鑑み統計管理の視点よりもむしろエネルギー政策立案関係者に向けて重要な示唆を含んでいることみなされたことが把握できた。この反応を踏まえ、MOP、MOERE、IDA 関係者に対してもエネルギー統計管理手法を幅広く披露し、エネルギーデータを積極的に利活用する動機形成に結びつけることも有益と理解された。

(3)　国家エネルギー収支表の充実化に向けた追加的統計データ捜索

当初、MOP、MOERE、CAPMAS が保有する統計データを元に国家エネルギー収支表の試行版を作成したが、石炭、コークスに関するデータが網羅性に欠けるものであること、バイオマス関連データが不在であること、製造業の中分類レベルのデータが不在という状況下、網羅的かつ詳細におよぶ国家エネルギー収支表を作成するために必要とされる統計データが十分ではないという課題に直面した。そこで追加的データを捜索した結果、2022 年 6〜7 月にかけて環境省および電力持株公社において捜索データの多くが管理されていることを把握するに至り、交渉の結果、必要なデータを確保するに至った。

この機会に国家エネルギー収支表の作成にかかる共同作業にこれらデータ管理者である環境省ならびに電力持株公社にも積極的参加を呼びかけた。その結果、以下の表に示した機関が必要とされる統計データを保有しており、これらデータが利用可能な状態である模様につき、早急に入手した上で国家エネルギー収支表のさらなる充実化を図ることとする方針を CAPMAS とも確認した。

表 3-38：今次新たに確認できた追加的統計データ

統計データ保有機関	統計データの内容	備考
環境省環境業務庁（EEAA）	石炭、コークス貿易、生産、消費データ（非エネルギー利用データも含む）	石炭、コークス輸出入者に課された報告義務、セメント業者に課されたバイオマスおよび廃棄物エネルギー混焼義務規定に基づき環境省が収集している統計データ。
環境省廃棄物管理庁（WMRA）	バイオマス（薪木、木炭）・廃棄物（RDF）生産、消費データ	
電力持株公社（EEHC）	製造業中分類別の電力販売量データ	全国の配電会社が管理しているが公表されていない統計データ。

出典：JICA T/C Team

(4)　CAPMAS に対する国家エネルギー収支表作成業務に関する技術協力活動

エネルギー関連データの提供元である関係省庁（MOP、MOERE、MOE、IDA）を集めた Joint meeting とは別途、CAPMAS に対しては収集統計データを元に国家エネルギー収支表を作成し、毎年刊行するための手順について技術協力活動を進めてきた。まずは国家エネルギー収支表作成のための必要統計データの収集方法の確認、CAPMAS の既存統計データに関する不明点の確認、欠損統計データに関する対応検討、他省庁への協力依頼方法などについて検討を行った。会合は、CAPMAS 側の要望もあり基本的にはリモート会合とした。このように、まずは基礎的なデータ収集方法についての議論を進める中で、統計データ自体の説明、留意点などについても意識の共有を図った。

2022 年 7 月以降は、専ら EDMS 開発に関する協議を、開発ベンダーである SmartTech 社も参加する形で開発進捗の確認、必要要件の確認、さらにはCAPMAS からの必要情報収集などの目的で、基本的には対面会合を中心に開催した。これら会合には、特に運用環境に係る協議においては CAPMAS の IT 部門も積極的に参加することが多くなり、2022 年末時点では議論の中心はIT 部門関係者とのやりとりに移行した。2023 年に入り、協議内容は刊行物が中心となった。

表 3-39：CAPMAS 向け技術協力会合開催記録

統計データ保有機関	統計データの内容	主な内容
2021 年 4 月 19 日（リモート）	リモート研修（1）	TT2 の活動計画、目標、作業項目に係る情報共有
2021 年 4 月 28 日（リモート）	リモート研修（2）	Capacity assessment に係る説明
2021 年 5 月 6 日（リモート）	リモート研修（3）	収支表作成に係る計画の共有
2021 年 5 月 20 日（リモート）	リモート研修（4）	CAPMAS 産業エネルギー統計課に係る照会
2021 年 6 月 3 日（リモート）	リモート研修（5）	CAPMAS エネルギー収支表に係る質疑
―2021 年 6 月 16 日（リモート）	リモート研修（6）	エジプトにおけるエネルギー統計管理の必要性協議
2021 年 7 月 03 日（リモート）	リモート研修（7）	第一回現地技術移転活動の振り返りと今後の活動計画策定
2022 年 1 月 11 日（リモート）	リモート研修（8）	石油製品関連統計データおよび出典に係る質疑（1）
2022 年 1 月 19 日（リモート）	リモート研修（8）フォローアップ	石油製品関連統計データおよび出典に係る質疑（2）
2022 年 2 月 7 日（リモート）	リモート研修（9）	貿易統計に係るデータ共有の可能性検討および質疑
2022 年 2 月 28 日（リモート）	リモート研修（10）	石炭、コークス等の統計データに係る質疑
2022 年 3 月 17 日（リモート）	リモート研修（11）	図表類作成の必要性検討、CAPMAS 側の意向確認
2022 年 7 月 4 日	EDMS 開発方針検討会議	調達完了報告、ベンダー紹介と開発スケジュールの共有
2022 年 8 月 11 日	EDMS 開発進捗会議（1）	基本設計内容の共有。開発スケジュール検討
2022 年 8 月 23 日	EDMS 開発進捗会議（2）	インタフェースデザインの確認。基本機能一覧の確認
2022 年 9 月 6 日	EDMS 開発進捗会議（3）	入力機能の確認、ユーザーの種類と権限の確認
2022 年 9 月 19 日	EDMS 開発進捗会議（4）	出力デザイン検討、図表一覧の作成、結合テスト検討
2022 年 10 月 5 日（リモート）	EDMS 開発進捗会議（5）	UAT 計画検討、シナリオ確認、ホスティング要件の確認

統計データ保有機関	統計データの内容	主な内容
2022 年 10 月 25 日（リモート）	EDMS 開発進捗会議（6）	対外発信サイトの機能確認、ホスティング要件の再確認
2022 年 11 月 6 日	EDMS 開発進捗会議（7）	CAPMAS サーバにおけるホスティング環境確認
2022 年 11 月 16 日（中断）	EDMS 開発進捗会議（8）	EDMS 機能テスト方針の検討、テストシナリオ作成（1）
2022 年 12 月 19 日	EDMS 開発進捗会議（9）	EDMS 機能テスト方針の検討、テストシナリオ作成（2）
2023 年 1 月 24 日	エネルギー収支図作成研修会議	FY 2020-21 国家エネルギー収支表統計書（案）の内容確認
2023 年 2 月 21 日	刊行物進捗状況確認会議	FY 2020-21 国家エネルギー収支表統計書の刊行に向けた状況共有

出典：JICA T/C Team

(5)　エネルギーデータ管理システム（EDMS）の開発

国家エネルギー収支表を毎年定常的に簡便に作成するための関係機関がそれぞれアクセス、利活用できるウェブベースのデータ収集、分析、プレゼン機能つきシステムを EDMS と称し、開発を進めた。2022 年 3〜5 月にかけて EDMS の要求仕様を文書化し、CAPMAS とも共有した。これと並行して開発納入能力が見込まれる 3 社のベンダー候補企業を特定した。2022 年 6 月にはこれら情報をもとに 3 社の価格競争に 1 社のベンダーを選定した。選定企業は、Nasr City に拠点を置く SmartTech 社であり、価格面の優位性に加えて技術面でも政府向けシステム納入実績が多い点、アジャイル開発重視の姿勢などが高得点につながり、選定に至った。

出典：https://www.smarttechsys.com/

図 3-68：EDMS 開発企業 SmartTech 社

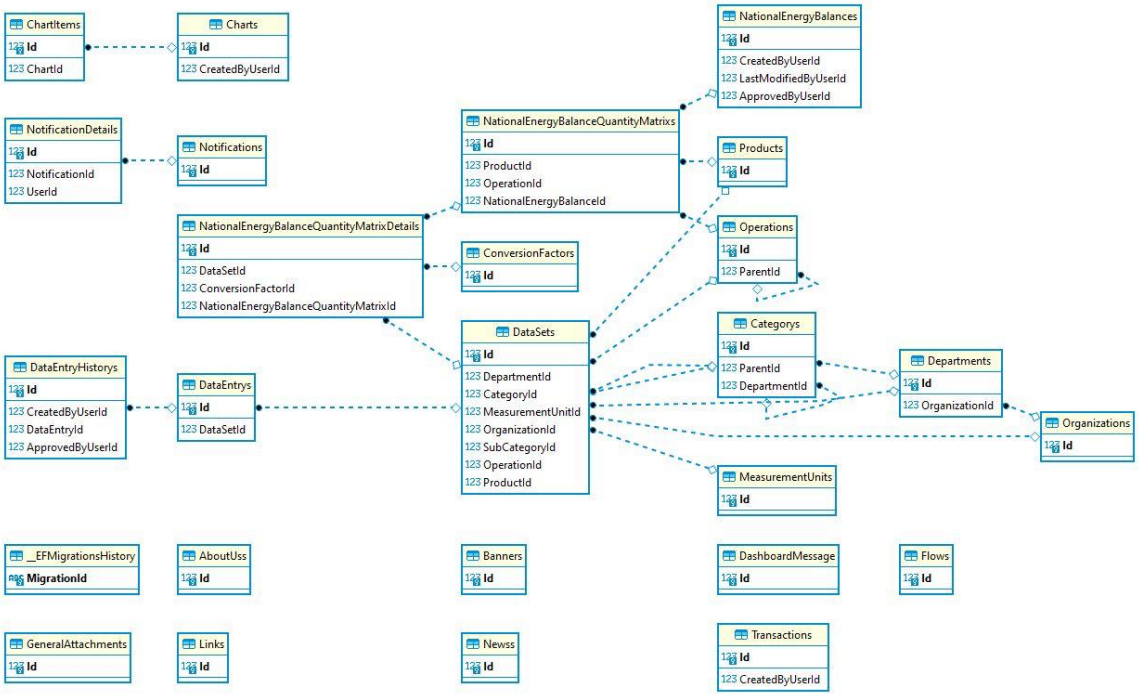
同社の選定、発注を経て EDMS の開発は 7 月から本格的に開発を開始した。開発は正味 4 か月を費やし、2022 年 11 月中に最終製品が納入される予定であったが、各省庁からの要望に基づく組織承認ワークフローの導入、アラビア語インタフェースの準備、データ一覧（Data inventory）を参照してエネルギー収支表を構築する参照機能にデータセット名をもとに類推・提案が可能な新基軸の導入、自動作成されるグラフのデザイン性重視など、開発に際し当初想定以上の追加機能開発を伴った結果、以下表に示す通り EDMS 開発のスケジュールは当初予定よりも 4 か月長く時間を要す結果となった。

表 3-40：EDMS 開発スケジュール （計画と実績）

Event	計画	実績
契約署名	2022 年 7 月上旬	同左
基本設計書（DB 設計、枠組設計、インタフェースデザインを含む）提出 (*1)	2022 年 7 月中旬	同左
第一回支払い	2022 年 8 月上旬	2022 年 8 月下旬
第 1 モックデモ （インタフェース画面遷移も含む）	2022 年 8 月中旬	2022 年 9 月下旬
第 1 モックデモのフィードバック内容を勘案した第 2 モックデモ（データ処理機能も含む）	2022 年 8 月下旬	2022 年 10 月
第 2 モックデモのフィードバック内容を勘案 システム統合テスト	2022 年 9 月上旬	2022 年 11 月上旬
ユーザー受入テスト（UAT）、運用テスト、ユーザー研修会	2022 年 9 月	2022 年 11～12 月
ユーザーマニュアル 提出 引き渡し 第二回支払い	2022 年 10 月	2023 年 1～2 月
サービス運用およびオンコールサポート （CAPMAS のシスアド向けサービス） 注：エジプト政府側の受入準備が整い次第システムをエジプト政府側のホスティング環境上に移植	2022 年 10 月～	2023 年 2 月
最終支払い	2022 年 12 月	2023 年 3 月

出典：JICA T/C Team

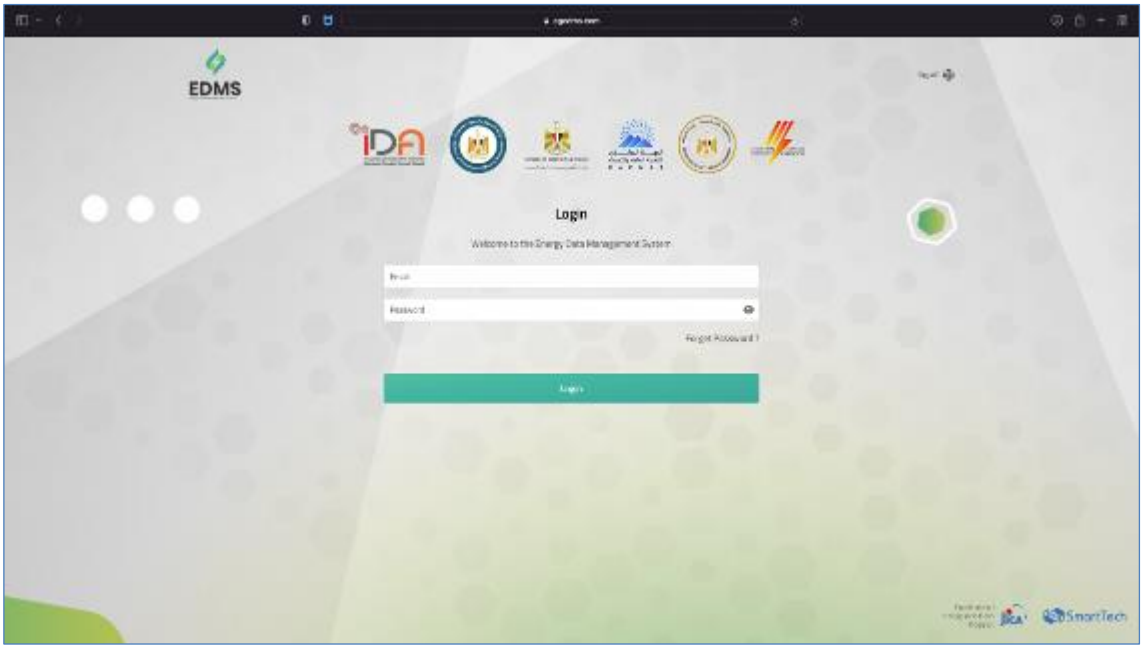
EDMS はデータベースとワークフローを統合した情報システムであり、インターネットのウェブブラウザを介して操作が可能なオンラインウェブアプリをインタフェースとしたシステムとして開発された。EDMS の主な構成要素は、国家エネルギー収支表を作成するためのデータセット一覧（Data inventory）、収支表作成のための演算式、収支表、図表生成・管理機能である。これら構成要素を更新・管理するためのデータセット一覧管理、演算式管理、収支表構成管理、ユーザーおよび権限管理、データ入力承認・提出手順管理、メッセージ管理などの補助機能も備わっており、将来的なカスタマイズにも対応した柔軟性の高い情報システムである。以下に EDMS の ER（Entity Relationship）図（実体関連図）を示す。



出典：SmartTech

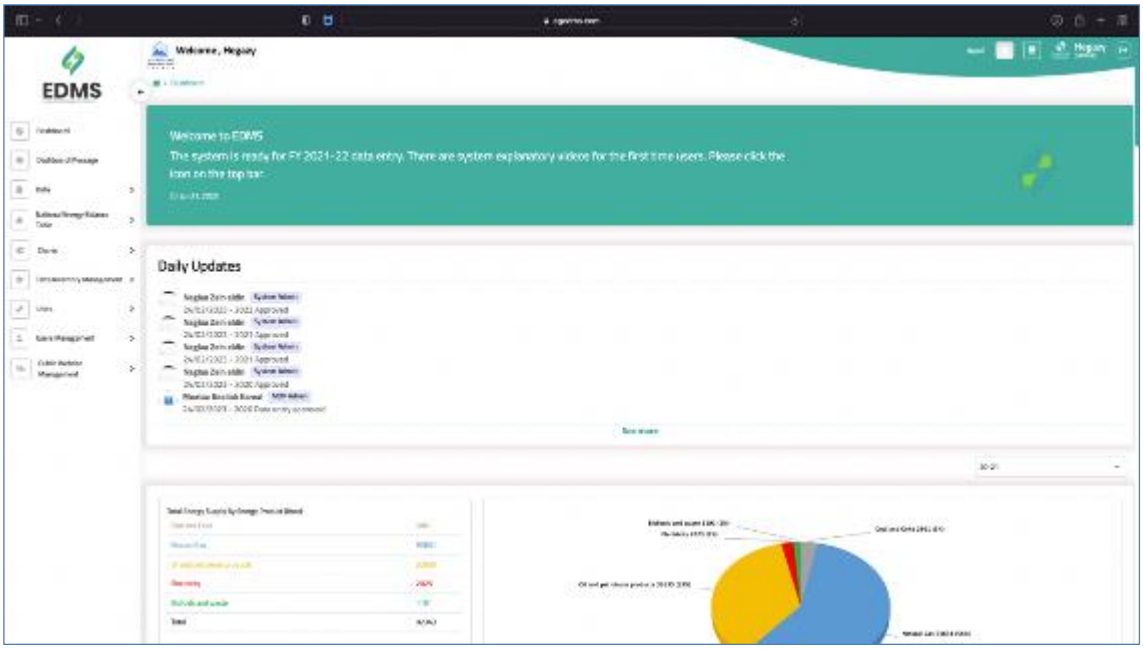
図 3-69：EDMS ER 図（Entity Relationship Diagram）

EDMS のユーザーインタフェースは、ログイン画面から Dashboard を経て主要機能へのアクセスが可能な構造とし、ユーザーに付与された権限に応じた機能メニューが表示されるものとなっている。なお、CAPMAS からの強い要望に従い、全てのページで英語とアラビア語との間で切り替えが可能な完全バイリンガル構成のユーザーインタフェースが開発された。以下にログイン画面、Dashboard、データセット一覧（Data inventory）、収支表、さらにはアウトプットの一例として収支図を示す（いずれも Pre-production 環境のものであるが、同一のものが CAPMAS サーバ上に移植されている）。



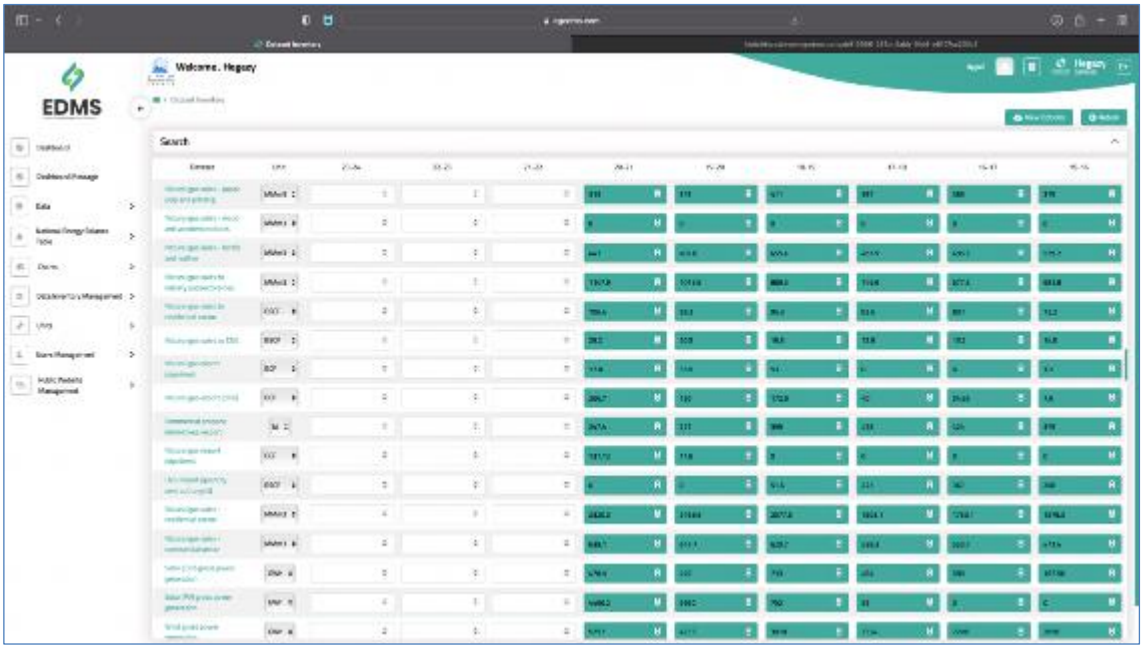
出典：EDMS pre-production site (https//www.egedms.com)

図 3-70：EDMS ログイン画面（英語版）



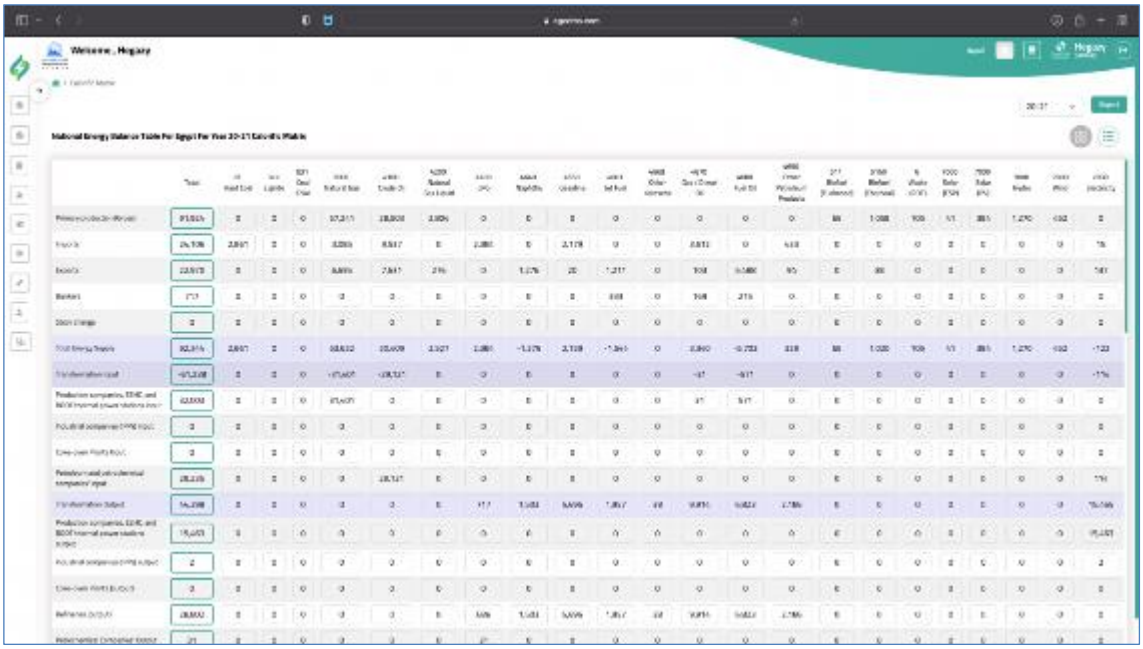
出典：EDMS pre-production site (https//www.egedms.com)

図 3-71：EDMS Dashboard 画面（英語版）



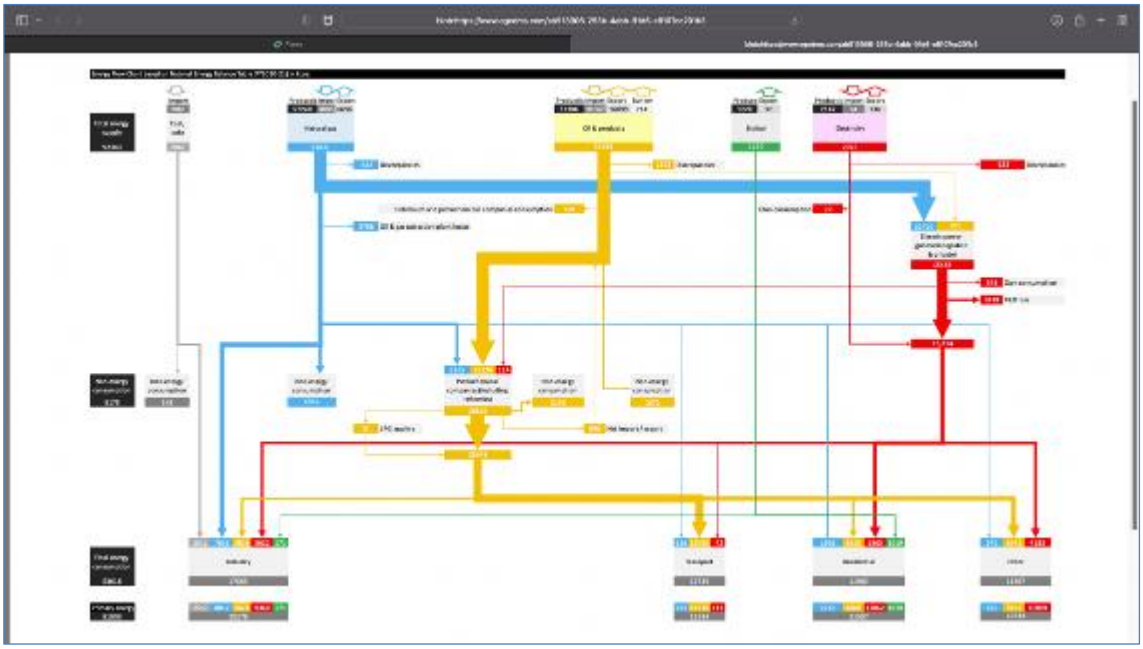
出典：EDMS pre-production site (https//www.egedms.com)

図 3-72：EDMS データセット一覧（Data inventory）画面（英語版）



出典：EDMS pre-production site (https//www.egedms.com)

図 3-73：EDMS エネルギー収支表（英語版）

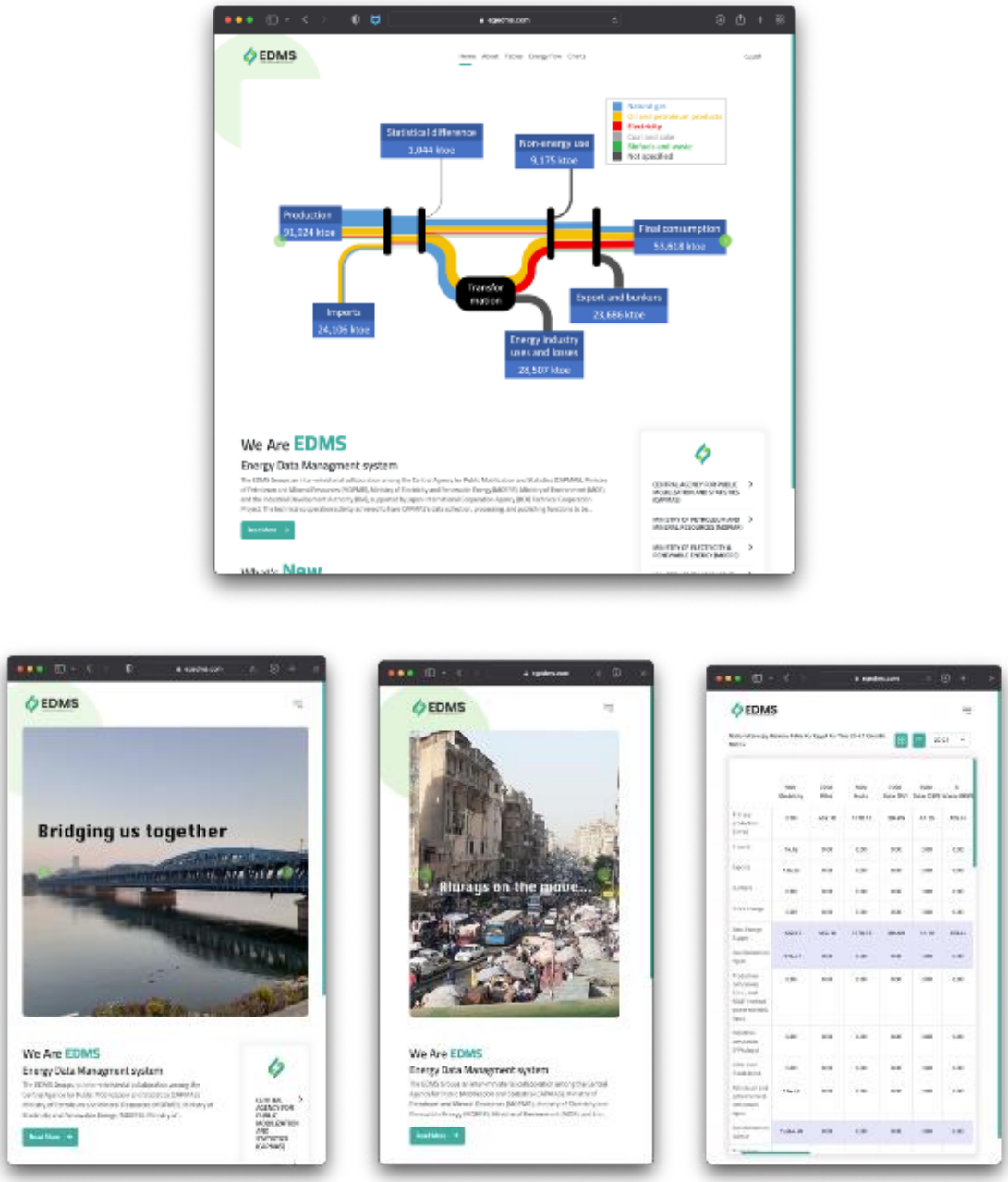


出典：EDMS pre-production site (https//www.egedms.com)

図 3-74：EDMS エネルギー収支図

EDMS は、エネルギー関連データを提供する各省庁ならびに CAPMAS のみがアクセス可能な、いわば政府内の情報システムであるが、国家エネルギー収支表および同表から生成される各種図表の有用性に鑑み、EDMS からのアプトプットの一部を一般にも広く公開するための公開サイトも並行して開発された。開発にあたっては、広く一般からのアクセスを勘案し、スマートフォンやタブレットでも見やすい Responsive 画面構成を重視して設計がなされた。この公開サイトでは、アウトプットのみならず国家エネルギー収支表を作成する取り組みや、参加省庁に関する紹介も含めた情報開示と意識啓発を目的としたものとして有益となることが期待された。

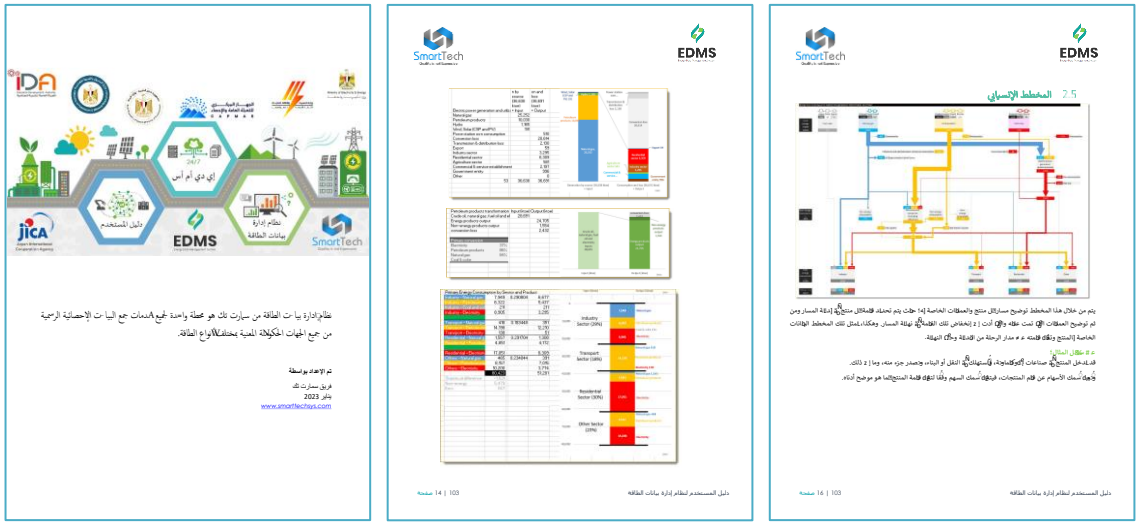
開発後、情報の積極開示に関し、参加省庁から歓迎または異論がない旨が表明されたものの、CAPMAS に関しては、すべての情報開示は CAPMAS の公式ウェブサイト上での出版物に集約する方針を堅持すべきとの主張がなされ、同主張は開発完了に至っても変わることはなかった。その結果、公開サイトは活用されるには至っていない。



出典：EDMS public site

図 3-75：EDMS 公開サイト（Responsive 画面）

EDMS 開発の一環として重視したのが、システムに関するわかりやすい取扱説明書（User manual）の作成であり、開発会社である SmartTech 社においても取扱説明書専任担当者が対応する体制がとられた。取扱説明書の作成にあたっては、システムに備わる各種機能が開発された経緯にも触れることで、システム操作の背景にある意義も解説として簡単に説明した、初心者にも理解しやすいものとなった。取扱説明書は、ユーザーにわかりやすい、読みやすいものとするために当初からアラビア語で作成が進められた。（成果品 5.2）



出典：SmartTech

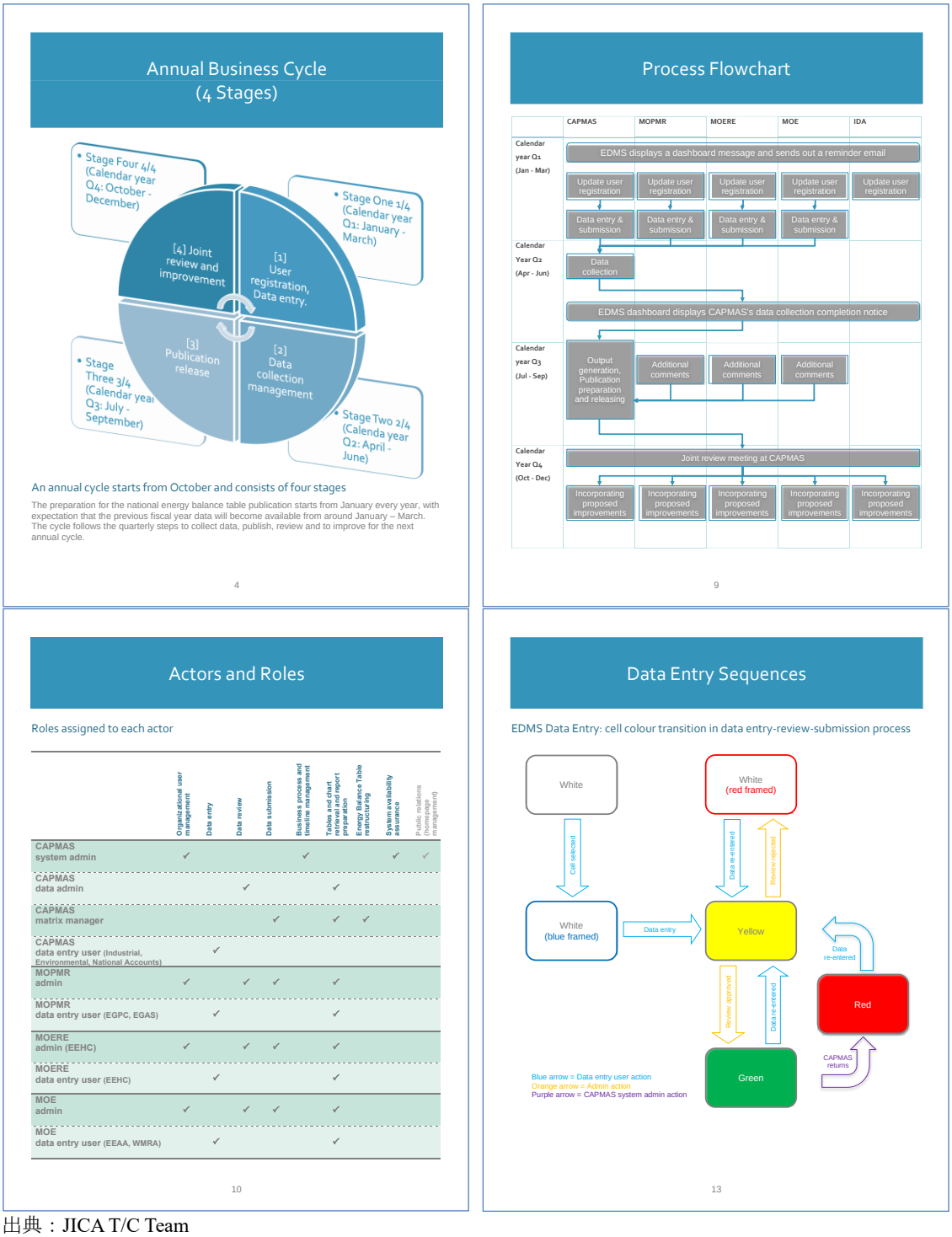
図 3-76：EDMS 取扱説明書（User manual）解説部分

取扱説明書は、EDMS 上のアイコンからオンラインで呼び出す形で参照できる形とし、紙面での配布による紛失、更新版管理上の問題などを回避する努力がなされている。また、取扱説明書に付随する資料として、解説ビデオ（Tutorial video clips）も作成され、ユーザー管理、付与権限の管理、エネルギー収支表から収支図の作成方法、カスタム図表作成方法、データセット一覧管理などについてわかりやすい解説が EDMS Dashboard から容易にアクセスできる形で提供されている。

(6)　業務手順書の作成

EDMS を活用した年一回の国家エネルギー収支表作成業務が本技術協力プロジェクト完了後も永続的に実施され続けることを可能とすべく、国家エネルギー収支表作成の手順の全体像と各担当省庁の役割分担ならびに作業タイミングを規定した業務手順書（Business Process Manual: BPM）を作成した。本業務手順書は、各担当省庁が果たすべき役割を簡潔に列挙したものであり、「誰が、いつ、何を」に絞り作成したものである。本文は図版入りで 4 ページ、付録等を含めた冊子全体でも 15 ページという最小限の構成とした。

本業務手順書では、EDMS を活用した毎年の国家エネルギー収支表作成業務を 4 ステージ（四半期ごと）から構成される一年サイクルとし、全体サイクル図を示した上で各ステージでの作業を 1 ページに収め、これを本文としている。業務手順書の本文は、EDMS 操作に関する記載を EDMS の取扱説明書（User manual）の該当箇所を参照することで EDMS 取扱説明書と連携が取れた文書とした。付録は、省庁ごとの作業を時系列で示したフローチャート、責任分担表（星取表）、データ入力時の留意点などの情報を含むものとした。（成果品 5.1）



出典：JICA T/C Team

図 3-77：業務手順書（Business Process Manual: BPM）の付録資料

なお、本業務手順書は EDMS の各ユーザーの Dashboard からオンラインでアクセス可能なものとし、紙面での配布は行っていない。これも取扱説明書同様に、CAPMAS による更新版（バージョン）管理の便宜、ユーザーによる参照のしやすさを重視したための対応である。

(7)　EDMS の運用

EDMS は開発の完了とエクセル表からのデータ移行の完了の後、2023 年 3 月 1 日からパブリック・クラウド上の Production site（https://www.egedms.com）で本格運用を開始した。同サイトへのアクセスは、ユーザーID とパスワードによる管理であり、ユーザーは場所を選ばず EDMS へのアクセスが可能な環境を提供している。当面このサイトでの運用が続く予定である。なお、Production site 運用開始とともに 2021-22 年度版国家エネルギー収支表作成作業も開始し、各省庁が必要な統計データを EDMS 上に実際に入力を始めた。2023 年 3 月中旬現在では、MOP は既に同年度の統計データ入力を完了している。

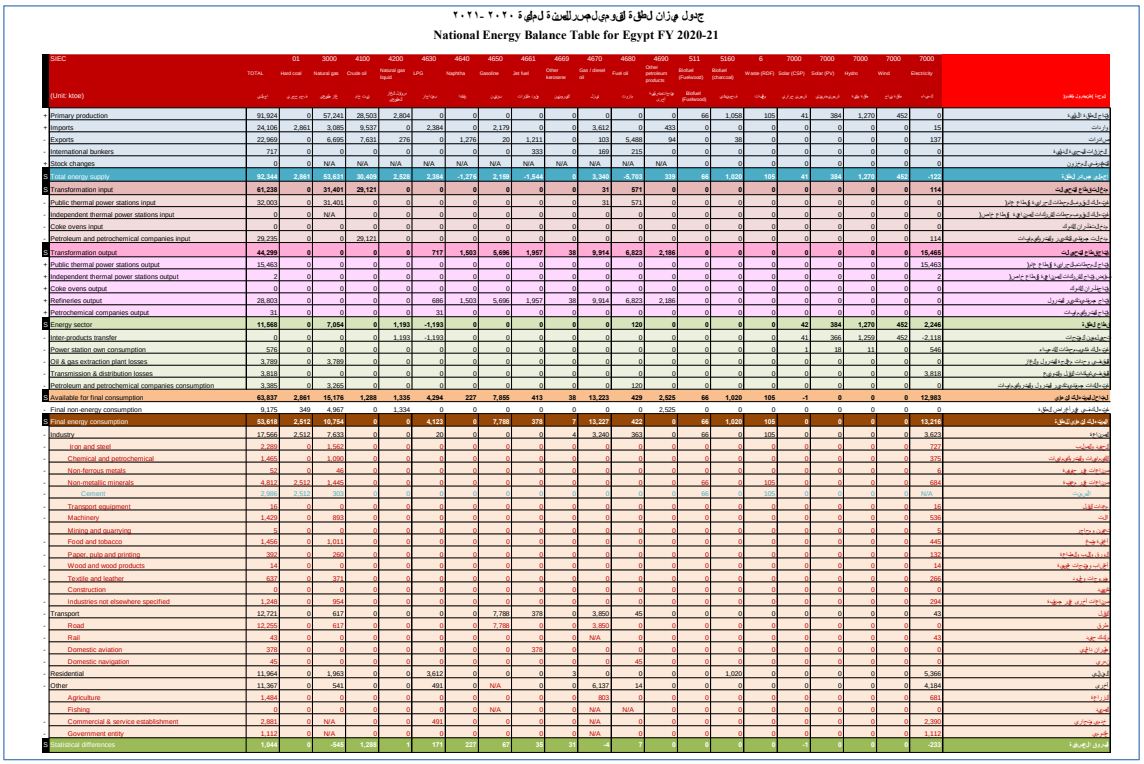
CAPMAS としては今後、自らが物理的に庁内に設置しているサーバ上でのホスティングに移行する方針を打ち出している。この方針を受け、SmartTech 社は既に同庁内サーバ上に EDMS のインストールおよび動作確認を済ませ、庁内サーバ上にホストされたサイト（http://edms.capmas.gov.eg ＝CAPMAS サイト）が整備された。但し、同サーバへは基本的には庁外からのアクセスができない設定のため、関係省庁からのデータ入力が未だ行える状況にない。CAPMAS としては今後、各省庁の固定 IP アドレスに限定したアクセスの許容、または指定 VPN による限定アクセスによる CAPMAS サイトでの EDMS 運用を実現すべく検討を進めている。

(8)　2020-21 年度版 国家エネルギー収支統計書の刊行

EDMS を活用した年一回の国家エネルギー収支表作成業務の定着をめざし、第一回目の試みとして 2020-21 年度（2020 年 7 月～2021 年 6 月）のデータを使った国家エネルギー収支表の作成および CAPMAS の統計書として刊行を進めた。EDMS のアウトプットとして得られた収支表ならびに図表類を中心にデータの視覚化も進め、解説データも加え、国家エネルギー統計表としてふさわしい内容の統計書として作成されていることが確認できた。

出典：CAPMAS

図 3-78：2020-21 年度版 国家エネルギー収支統計書（扉）

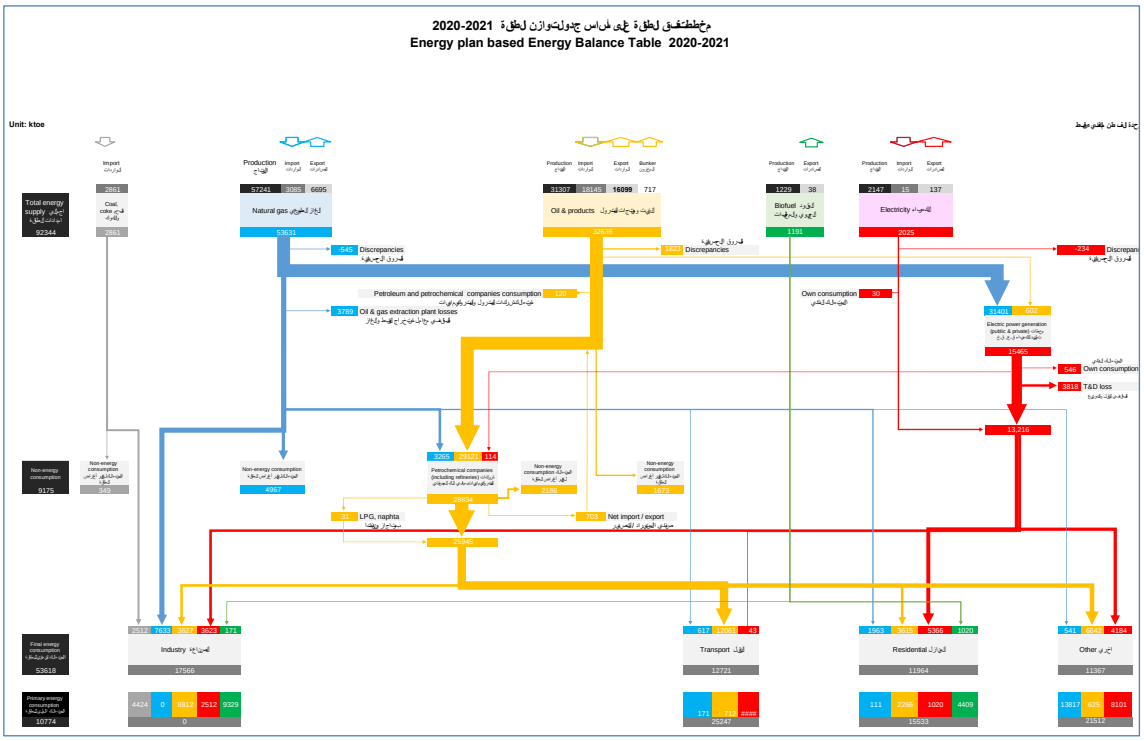


جدول ميزان الطاقة الوحيد للعام المالي ٢٠٢٠ - ٢٠٢١
National Energy Balance Table for Egypt FY 2020-21

SIEC (Unit: ktoe)	TOTAL إجمالي	01 Hard coal فحم حجري	3000 Natural gas غاز طبيعي	4100 Crude oil زيت خام	4200 Natural gas liquid سوائل الغاز الطبيعي	4630 LPG بروبان/بوتان	4640 Naphtha بنافا	4650 Gasoline بنزين	4661 Jet fuel وقود طائرات	4669 Other kerosene كيروسين	4670 Gas / diesel oil سولار	4680 Fuel oil مازوت	4690 Other petroleum products منتجات بترولية أخرى	511 Biofuel (Fuelwood) حطب	5160 Biofuel (charcoal) فحم نباتي	6 Waste (RDF) مخلفات	7000 Solar (CSP) الطاقة الشمسية المركزة	7000 Solar (PV) الطاقة الشمسية الضوئية	7000 Hydro طاقة مائية	7000 Wind طاقة رياح	7000 Electricity كهرباء	
+ Primary production	91,924	0	57,241	28,503	2,804	0	0	0	0	0	0	0	0	66	1,058	105	41	384	1,270	452	0	إنتاج الطاقة الأولية
+ Imports	24,106	2,861	3,085	9,537	0	2,384	0	2,179	0	0	3,612	0	433	0	0	0	0	0	0	0	15	واردات
- Exports	22,969	0	6,695	7,631	276	0	1,276	20	1,211	0	103	5,488	94	0	38	0	0	0	0	0	137	صادرات
- International bunkers	717	0	0	0	0	0	0	0	333	0	169	215	0	0	0	0	0	0	0	0	0	أرصدة بحرية دولية
+/- Stock changes	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	التغير في المخزون
S Total energy supply	92,344	2,861	53,631	30,409	2,528	2,384	-1,276	2,159	-1,544	0	3,340	-5,703	339	66	1,020	105	41	384	1,270	452	-122	إجمالي عرض الطاقة
S Transformation input	61,238	0	31,401	29,121	0	0	0	0	0	0	31	571	0	0	0	0	0	0	0	0	114	مدخلات التحويل
Public thermal power stations input	32,003	0	31,401	0	0	0	0	0	0	0	31	571	0	0	0	0	0	0	0	0	0	محطات توليد حرارية عامة
Independent thermal power stations input	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	محطات توليد حرارية للقطاع الخاص
Coke ovens input	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	مدخلات أفران الكوك
Petroleum and petrochemical companies input	29,235	0	0	29,121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	مدخلات مصافي البترول والبتروكيماويات
S Transformation output	44,299	0	0	0	0	717	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	15,465	مخرجات التحويل
+ Public thermal power stations output	15,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,463	مخرجات محطات توليد حرارية عامة
+ Independent thermal power stations output	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	مخرجات محطات توليد حرارية للقطاع الخاص
+ Coke ovens output	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	مخرجات أفران الكوك
+ Refineries output	28,803	0	0	0	0	686	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	0	مخرجات مصافي البترول
+ Petrochemical companies output	31	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	مخرجات البتروكيماويات
S Energy sector	11,568	0	7,054	0	1,193	-1,193	0	0	0	0	0	120	0	0	0	0	42	384	1,270	452	2,246	قطاع الطاقة
- Inter-products transfer	0	0	0	0	1,193	-1,193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	تحويلات بين المنتجات
- Power station own consumption	576	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18	11	0	546	استهلاك محطات توليد الكهرباء
- Oil & gas extraction plant losses	3,789	0	0	3,789	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	فاقد في عمليات استخراج وإنتاج البترول والغاز
- Transmission & distribution losses	3,818	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,818	فاقد في عمليات نقل وتوزيع
- Petroleum and petrochemical companies consumption	3,385	0	3,265	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	0	مدخلات مصافي البترول والبتروكيماويات
S Available for final consumption	63,837	2,861	15,176	1,288	1,335	4,294	227	7,855	413	38	13,223	429	2,525	66	1,020	105	-1	0	0	0	12,983	إجمالي الطاقة المتاحة للاستهلاك
- Final non-energy consumption	9,175	349	4,967	0	1,334	0	0	0	0	0	0	0	2,525	0	0	0	0	0	0	0	0	غير المستخدم في أغراض الطاقة
S Final energy consumption	53,618	2,512	10,754	0	0	4,123	0	7,788	378	7	13,227	422	0	66	1,020	105	0	0	0	0	13,216	الطلب النهائي على الطاقة
+ Industry	17,566	2,512	7,633	0	0	20	0	0	0	4	3,240	363	0	66	0	105	0	0	0	0	3,623	الصناعة
- Iron and steel	2,289	0	1,562	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	727	الحديد والصلب
- Chemical and petrochemical	1,465	0	1,090	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375	الكيماويات والبتروكيماويات
- Non-ferrous metals	52	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	صناعات المعادن غير الحديدية
- Non-metallic minerals	4,812	2,512	1,445	0	0	0	0	0	0	0	0	0	0	66	0	105	0	0	0	0	684	صناعات المعادن غير المعدنية
- Cement	2,986	2,512	353	0	0	0	0	0	0	0	0	0	0	66	0	105	0	0	0	0	N/A	الأسمنت
- Transport equipment	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	معدات النقل
- Machinery	1,429	0	893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	536	الآلات
- Mining and quarrying	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	التعدين والمحاجر
- Food and tobacco	1,456	0	1,011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	445	الغذاء والتبغ
- Paper, pulp and printing	392	0	260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	الورق واللب والطباعة
- Wood and wood products	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	الخشب ومنتجات الخشب
- Textile and leather	637	0	371	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	266	المنسوجات والجلود
- Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	البناء
- Industries not elsewhere specified	1,248	0	954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	294	صناعات أخرى غير مصنفة
- Transport	12,721	0	617	0	0	0	0	7,788	378	0	3,850	45	0	0	0	0	0	0	0	0	43	النقل
- Road	12,255	0	617	0	0	0	0	7,788	0	0	3,850	0	0	0	0	0	0	0	0	0	0	طرق
- Rail	43	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	43	السكك الحديدية
- Domestic aviation	378	0	0	0	0	0	0	0	378	0	0	0	0	0	0	0	0	0	0	0	0	الطيران المدني
- Domestic navigation	45	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	الملاحة
- Residential	11,964	0	1,963	0	0	3,612	0	0	0	3	0	0	0	0	1,020	0	0	0	0	0	5,366	السكني
- Other	11,367	0	541	0	0	491	0	N/A	0	0	6,137	14	0	0	0	0	0	0	0	0	4,184	الخدمي
- Agriculture	1,484	0	0	0	0	0	0	0	0	0	803	0	0	0	0	0	0	0	0	0	681	الزراعة
- Fishing	0	0	0	0	0	0	0	N/A	0	0	N/A	N/A	0	0	0	0	0	0	0	0	0	الصيد
- Commercial & service establishment	2,881	0	N/A	0	0	491	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	2,390	التجاري والخدمي
- Government entity	1,112	0	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	1,112	الحكومي
S Statistical differences	1,044	1	-845	1,288	1	171	227	67	35	31	-4	7	1	1	0	0	-1	1	1	0	-23	الفروق الإحصائية

出典：CAPMAS

図 3-79：2020-21 年度版 国家エネルギー収支統計書（収支表）

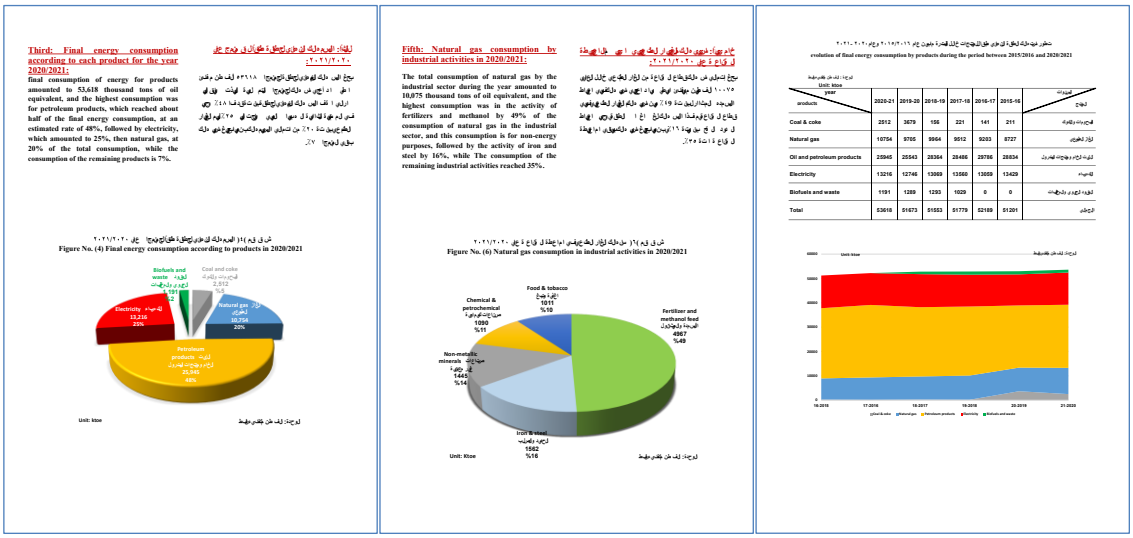


مخطط توازن الطاقة على أساس الطاقة المخططة 2020-2021
Energy plan based Energy Balance Table 2020-2021

Unit: ktoe

出典：CAPMAS

図 3-80：2020-21 年度版 国家エネルギー収支統計書（収支図）



出典：CAPMAS

図 3-81：2020-21 年度版 国家エネルギー収支統計書（データ解説）

本統計書は、2023 年 3 月中に発刊された。（成果品 5.3 および 5.4）

(9) 2020-21 年度版 国家エネルギー収支統計書の政策への反映

CAPMAS が刊行した 2020-21 年度国家エネルギー収支統計書は、MOERE、MOP、MOE、そして IDA にとってもエネルギー利活用政策立案の参考となる情報として期待されている。これは、本技プロ活動中数回にわたり開催した国家エネルギー収支表のレビュー会合を通じて、同表の有用性に係る理解が関係者において浸透した結果でもあろう。一例として、統合的・持続的エネルギー開発戦略（ISES 2035）の改定に際し、これまで IEA の統計データが使われてきているものをこの機会に本事業で作成された CAPMAS 刊行統計書のものに置き換える方針が MOERE から示されている。このように、本技プロの活動の成果として制作された刊行物が、エジプト政府のエネルギー関連政策に実際に活用される事例が既に実現している[2]。

3.7.2 PDM 指標の達成度

成果 5 に係る PDM 指標それぞれに関する達成度を次表に示す。5 つの指標はいずれも十分に達成されている。なお、指標 5-1 に関しては、記載されたもの以外に多くのリモート研修も実施されている点、指標 5-2 に関しては情報システムが整備され、全データがシステム内に完備されている点などを勘案すると、指標で設定された目標以上の成果が実現している。

[2] 省エネに係る主な指標（KPI）としては、1) National energy intensity 2) Petroleum transformation efficiency 3) Electricity transformation efficiency を含む。

表 3-41：成果 5 の指標達成状況

指標	達成度
5-1 カウンターパート計 4 省庁に対し現地研修（通算 16 コマ）ならびに訪日研修が実施される。	2022 年中に CAPMAS に対する統計データ収集に係るリモート OJT 会合を 9 回、国家エネルギー収支表に係る発表会合（ワークショップ）を 2022 年 3 月に、CAPMAS を中心に諸外国優良事例研修（2 コマ）を 2022 年 7 月に開催済み。 さらに EDMS デモ研修を 2022 年 9 月と 11 月に、EDMS 受け入れテストおよび操作研修を 2022 年 12 月と 2023 年 1 月に開催した。
5-2 指定様式に基づく統計データが電力・再生可能エネルギー省、MOP、貿易産業省・産業開発庁から CAPMAS に提出される（例えば MOP からの各種エネルギー係数や KPI など）。	エネルギーデータを入力しデータセット一覧を作成し、収支表に加工し、図表類を生成するエネルギーデータ管理システム（EDMS）の開発が完了し、CAPMAS のサーバ上に移植された。EDMS の取扱説明書が CAPMAS、MOERE、MOE、IDA とも共有された。2015-16 年度から 2020-21 年度までの全年度に関し、国家エネルギー収支表に必要とされるデータが EDMS 内に完備された。
5-3 CAPMAS にて上記 2-2 を通じて受領した統計データを使いエネルギー関連統計書が作成される。	CAPMAS において 2020-21 年度版の国家エネルギー収支表統計書が作成された。これは、EDMS のアウトプットを活用して作成されたものである。
5-4 CAPMAS が電力・再生可能エネルギー省、MOP、貿易産業省・産業開発庁を招集してエネルギー関連統計書のフィードバック・フォローアップ会合が開催される（計 4 回）。	CAPMAS の刊行物として作成された 2020-21 年度版国家エネルギー収支表統計書に関し、MOERE、MOP、MOE および IDA が参加する検討会合を 2022 年 11 月、12 月、さらには 2023 年 1 月と 2 月に開催し、刊行物の各種政策への反映可能性につき検討を行った。

出典：JICA T/C Team

3.8　【上記成果 1～5 共通事項】

3.8.1　活動実績

(1)　セミナーおよびウェブサイトを通じた省エネ普及促進

- セミナーによる省エネ普及促進

プロジェクトの活動および成果を報告するとともに、エジプト国内の省エネに対する理解を深め、エジプトでの今後の省エネ普及促進を目的としたセミナーをカイロで開催した。

両セミナーの概要を表 3-42 に示す。C/P 機関およびエジプト国内の団体・企業を主な対象者として、石油セクター向けのセミナーを 2022 年 7 月 21 日、電力セクター向けのセミナーを 2023 年 2 月 27 日に開催した。

石油セクター向けのセミナーは、MOP 関係者だけではなく、MOERE を始めとする他 C/P 機関も参加した初めてのセミナーとなり、参加者間で活発な議論が見られ非常に有意気な活動となった。電力セクター向けセミナーは、セクターをまたいでプロジェクトの成果を広く報告、また共有する機会となった。

表 3-42：セミナー概要

項目	第1回セミナー	第2回セミナー
対象セクター	石油セクター	電力セクター
開催日時	2022年7月21日	2023年2月27日
参加者数	41名 ・ C/P機関：11名 ・ その他機関・団体・企業：19名 ・ JICA／JICA T/C Team：11名	71名 ・ C/P機関：10名 ・ その他機関・団体・企業：44名 ・ JICA／JICA T/C Team：17名
主な参加者	・ MOP / MOERE / CAPMAS / IDA ・ Egyptian Natural Gas Company (GASCO) ・ Alexandria National Refining and Petrochemicals Co. (ANRPC) ・ Misr Fertilizers Production Co. (MOPCO)	・ MOERE / MOP / CAPMAS / IDA ・ Ministry of Environment, Ministry of Education, Ministry of Transport ・ Egyptian Electricity Holding Company (EEHC) ・ Egyptian Organization for Standardization & Quality (EOS)
主なプログラム	・ 各事業での省エネ活動の事例紹介 － ガス輸送・処理事業 － 製油事業 － 石油・化学事業 ・ ISO50001への対応に係る討論	・ プロジェクト活動・成果の報告 ・ エジプト省エネ報告書の報告 ・ エネルギーバランスの紹介 ・ ラベリング制度の紹介 ・ E-JUSTパイロットプロジェクト活動の報告

出典：JICA T/C Team

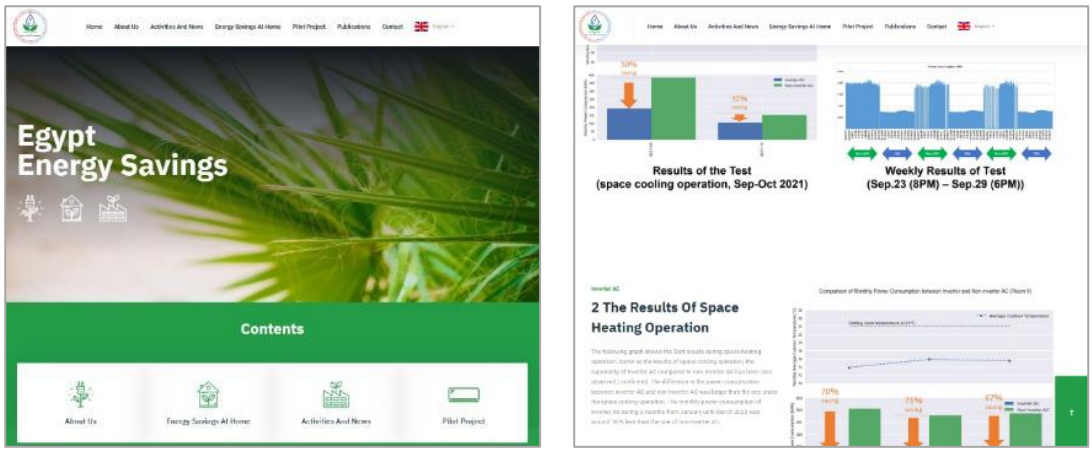
- ウェブサイトを通じた広報活動・省エネ普及促進

プロジェクト活動および省エネに係る情報を広く周知するため、英語とアラビア語の 2 言語でウェブサイトを立ち上げた（図 3-82）。ウェブサイトでは、主に以下について情報を発信した。

- プロジェクト概要
- プロジェクト活動に係る最新ニュース

- 一般家庭でできる省エネ活動
- E-JUST パイロットプロジェクト
- プロジェクトで作成した報告書

なお、2022 年 11 月にエジプトのシャルム・エル・シェイクで開催された COP27 のサイドイベントに参加し、プロジェクト活動と併せてウェブサイトについても広報した。



出典：JICA T/C Team（http://egypt-energysaving.com/）

図 3-82：プロジェクトで立ち上げたウェブサイト

(2)　本邦研修の実施

エ国政府関係者を日本へ招聘し、日本の省エネ政策・サービス・技術について理解を深め、本邦企業等との関係構築を図ることを目的に訪日研修を行った。

表 3-43：本邦研修の概要

対象	MOERE、MOP、IDA、CAPMAS の意思決定者および実務者（エンジニア等）
人数	28 名
日程	2022 年 12 月 1 日～13 日（13 日間）×1 回
場所	東京、および関東圏

出典：JICA T/C Team

研修の企画においては、下記の点に留意した。

- 日本の省エネ技術の素晴らしさを体感できる場とし、省エネ技術が実際に導入されているもしくは高い製造技術により製造されている現場への訪問を行った。
- 本件業務の関係者は MOERE、MOP、IDA、CAPMAS と多岐にわたっている。プログラムを（a）共通（全員受講）と、（b）テーマ別（電気班と石油班の 2 チームを編成）に分けた。
- 日本人専門家が研修に同行し、講義・見学により得られた知見・情報について随時議論できる体制を整えた。

本邦研修の参加者28名のリストは以下の通りである。

表 3-44：本邦研修の参加者リスト

氏名	役職
Mr. Saber Abdelhamed Abdelhamed Elhadary	General Manager (tent), EECCD, MoERE
Ms. Rehab Beder Hassan Ahmed	Team Leader, EECCD-MoERE
Ms. Marwa Mahmoud Elsayed Mahmoud	Senior Engineer, EECCD-MoERE
Ms. Noura Saad Abdelfattah Abouelsaad	Senior Engineer, EECCD-MoERE
Mr. Mohamed Ahmed Abdelmola Elsayed	Senior Energy Engineer, EECCD-MoERE
Ms. Elmallhy Rehab Mohamed Anwar Hafez Ali	Department Head of Technical Office, Project Planning, MOP
Mr. Wael Mohamed MohamedRezk Eish	Distillation General Manager, Operation Department, Cairo Oil Refining Company (CORC)
Mr. Wael Essameldin Ahmed Ahmed Bakr	Ceo Deputy Assistance for Energy Efficiency, Egyptian General Petroleum Corporation (EGPC)
Mr. Mohamed Mahmoud Selim Elewa	Energy Efficiency General Manager, Energy Efficiency Department, South Valley Egyptian Holding Petroleum Co. (GANOPE)
Ms. Nesreen Mohamed Salaheldeen Ahmad ElKanadeely	Assistant General Manager, HSE Affairs, MOP
Mr. Mohamaed Magdy Fathy Eleishy	Section Head of Preparing Studies and Procedures for Energy Efficiency, Energy Efficiency, General Petroleum Company
Mr. Almoatazbellah Mohamed Kamal Ibrahem AbdelKader	Undersecretary Assistant for Strategic Department, MOP
Mr. Hany Kamal Hassan Elrouby	Energy Conservation General Manager, Energy Conservation Department, Egyptian Natural Gas Holding Company (EGAS)
Ms. Allaa Mostafa Mohamed Safwat	Department Head for Energy Efficiency Studies and Projects, Egyptian Holding Petrochemical Company (ECHEM)
Mr. Mohamed Ahmed Fouad Ahmed Mohamed	Chairman Associate, Chairman Office, IDA
Ms. Duaa Muhammed Mustafa Hussein Badreldean	General Manager of the Administration, Pharmaceutical Project Administration/Central Administration of Technical Affairs, IDA
Ms. Noha Mohammed Saber Amin	General Manager, Power, Electrical and Electronic Project Department
Ms. Amira Hassan Said Hassan	Third Specialist Spinning and Weaving Engineer, Spinning and Weaving Department, IDA
Ms. Ebtesam Shehata Shaaban Omar	IT Operation and Applications Manager, Systems and Information Technology, IDA
Ms. Omaima Mohamed Kamal Yassin Hussein	Director, Department of Waste Treatment and Environmental Pollution, IDA
Ms. Noha Mohammed Abbass Yahia	Second Chemical Project Specialist, Environmental Protection Department, IDA
Ms. Marwa Mansour Hamed Said	Second Specialist Mechanical Engineer, General Department of Engineering Project, IDA
Ms. Naglaa Zeineldin Moussa Ali Hegab	General Manager for Construction and Industry Software, Construction and Industry Software Department, CAPMAS
Mr. Mohamed Ahmed Mohamed Osman	Project Coordinator, General Department for International Cooperation Department, CAPMAS
Ms. Marwa Ibrahim Hashem Sayed Ibrahim	Statistician, Electricity and Energy Department, CAPMAS
Mr. Ibrahim Sobhy Ahmed Hassan Elaraby	Head of Electricity and Energy Section, General Department for Industry and Energy, CAPMAS
Mr. Amenhoteb Amin Mikhail	Advisor to president, Economic Sector, CAPMAS
Mr. Ahmed Kamal Abdelaziz Ibrahim Alsaid	Advisor to president, President Office, CAPMAS

出典：JICA T/C Team

本邦研修のスケジュール表は以下の通りである。

表 3-45：本邦研修のスケジュール

日時		電力班		石油班	
12月1日	木	17:20	成田空港着		
12月2日	金	9:30-11:45	JICAブリーフィング		
		12:00-12:30	プログラムオリエンテーション（by JICA T/C Team）		
		12:30-13:00	コロナ感染対策の説明、食事アンケート回収ほか		
		15:00-16:30	（講義）ビル省エネ講義	15:00-16:30	（講義）ピンチテクノロジーによる省エネ
12月3日	土	休日			
12月4日	日	休日			
12月5日	月	10:00-12:00	（講義）脱炭素・省エネに向けた世界の動向		
		14:00-16:00	（講義と視察）省エネビル認証制度	14:00-16:00	（講義）日本の低炭素化技術（カーボンリサイクル技術を中心に）
12月6日	火	9:30-11:00	（視察）ダイキンの省エネ技術		
		14:30-16:00	（見学）日立省エネ工場見学	13:00-14:30	（講義）日本の省エネ（石油分野を中心に）
12月7日	水	9:30-11:30	（視察）Azbilの省エネ技術	10:00-11:30	（講義）JCCPの人材開発事業、技術協力事業
		14:30-16:30	（視察）柏の葉アーバンデザインセンター	14:30-17:00	（視察）富士石油袖ヶ浦製油所
12月8日	木	10:30-12:00	（視察）家電の省エネ性能試験	09:30-12:00	（視察）横河電機の省エネ技術
		15:00-16:30	（講義）日本の省エネ政策・技術		
12月9日	金	10:00-11:00	（視察）山王熱供給の省エネ技術	10:00-12:00	（視察）積水ハウス エコ・ファースト パーク
		14:00-15:00	（視察）パナソニックの省エネ技術	16:00-17:00	（視察）パナソニックの省エネ技術
12月10日	土	休日			
12月11日	日	休日			
12月12日	月	10:30-12:00	（視察）東洋ライスサイタマ工場		
		13:30-15:00	（視察）家電ラベル制度の運用改善および日本文化体験		
12月13日	火	10:00-12:00	（講義）日本のエネルギー統計		
		12:00-14:00	（討議）グループディスカッション （修了式）研修振り返り・修了式		
		22:30	成田空港発		

出典：JICA T/C Team

また、研修最終日には研修管理員によるアンケート調査が実施され、研修員からのフィードバックを得た。5 段階評価（1～5）と記述式の質問項目によるアンケート用紙を配布し、回収した。次表は調査結果より該当部分を抽出し、アンケート結果を纏めたものである。

表 3-46：本邦研修のモニタリング結果

質問項目概要	電力班	石油班
1. 研修成果 1) 趣旨の理解 2) 研修目標の達成 3) 研修成果の活用 4) 記述式	3.53	4.16
2. 研修の全体デザイン 1) カリキュラムの構成 2) 研修期間（*） 3) 参加者人数の適正（*） 4) 記述式	3.69	3.96
3. プログラム内容の詳細と運営 1) 記述式 2) 講師の発表・説明 3) 講師の専門性 4) 教材の質 5) 参加者間の知見共有 6) コースリーダー/ファシリテーターの介入 7) 通訳の質	3.88	3.73

出典：JICA T/C Team
（*）は 3 段階評価で、評価 3 を 5、評価 2 を 3、評価 1 を 1 に換算した。

記述式の質問に対する主な回答は、行政府や工場の現場で具体的にどのような省エネ活動を行っているのかを知りたかった、研修期間が短かった、グループを細かく分けてそれぞれの分野に特化した内容を扱って欲しかった等が主なものであった。

今回はコロナ禍での本邦研修実施となり、研修回数と日数の減少、受け入れ先の制約、衛生面での対応等がある中、研修員からは概ね満足との結果が得られた。

図 3-83：本邦研修の写真

第4章　プロジェクトマネジメント上の課題・工夫・教訓

4.1　業務実施方法

3 年間以上にわたるプロジェクト期間を通じ、各タスクとも計画通り進むことができた。4C/P を対象とする本事業の中でも、各 C/P 単独で遂行できるものと、C/P 間の協力、共同作業が必要なものとがあるが、実施した検討会合、ワークショップ等において、意見交換、情報共有を進め、JICA T/C Team と C/P 間の相互連携・協力の関係が構築出来た。

結果として、当事業に求められている目に見える形の成果（アウトプット）を出すことができた。

2022 年 4 月と 11 月、次表に示す有識者 3 名参加による有識者会合を 2 回開催した。

同会合では、JICA T/C Team より本事業のこれまでの活動状況、今後の計画を説明しつつ、有識者から頂いた貴重な助言を踏まえ、関連タスクを進めた。

［有識者からの主なコメント（第 1 回会合）］

- 日本の中央官庁と同様に、省エネ担当部署が連携する仕組みが必要ではないか。
- エネルギー消費定期報告書提出の徹底が重要、また、「電力」と「熱」双方の報告／管理が必要である。
- （産業別など）エネルギー統計をきちんと整備することが非常に重要である。
- 家電機器（エアコン）のエネルギー性能試験は、他国の試験施設を活用する例もある。

［有識者からの主なコメント（第 2 回会合）］

- ラベリング制度は 3 年程度で見直しが必要。家電のみならずビルのガラス、断熱性能についての S&L も考えられる。
- 家庭用電力需要の用途別分析を進める際には、家族構成、年収、地域などのデータも調べると分析が有用である。
- （COE 設立に関して）ASEAN の省エネ研修をタイの省エネセンターで実施している例もあり参考になるのではないか。
- エジプトでは表彰制度がない。製品部門、省エネ事例部門の表彰が良いのではないか。ECCJ では政府資金で補助金を出し、中小企業向けの無料診断制度（最適化診断に変更）を行っている。低額の費用負担で診断を行っている。
- 省エネへ補助金を出す資金が無ければ減税策も一案である。
- 省庁間をまたぐ活動を行う際には、各省庁の幹部に集まってもらい、枠組みを構築することも有効。各省をまたぐ委員会（合同委員会）を立ち上げ、そこに各省から参加いただく、という形式が日本では採られている。

表 4-1：有識者会合の参加有識者

座長	千葉大学名誉教授　川瀬　貴晴先生
電力分野	一般財団法人省エネルギーセンター　国際協力本部　国際調査・連携部長 鷲見　元宏様
石油分野	一般財団法人エネルギー総合工学研究所　プロジェクト試験研究部参事 松田　一夫様

出典：JICA T/C Team

11 月には予定通り COP27 が開催され、当プロジェクトからも活動内容／成果の発信し（省エネ年次報告書、および、同報告書リーフレットの配布含む）、JICA ブース設立を支援しつつ、関係団員を派遣するとともに（11 月 11 日 Decarbonization day (MOP イベント)、11 月 15 日 Energy day (MOERE イベント)）、当プロジェクトナショナルスタッフを長期支援要員として派遣した。また、カイロでのセミナー（2 回実施）および本邦研修（1 回実施）の開催等多数イベントが計画されていた中、貴機構との協議、情報連絡／共有等継続的なコミュニケーションを図りつつ円滑にプロジェクト運営を進めた。

4.2　運営体制

プロジェクトチーム運営体制に変更はなかった。

第5章　プロジェクト目標の達成度

● プロジェクト目標

NEEAP-II や MOP が策定している「エジプト石油・ガスセクター近代化プログラム（OGMP）」等国家レベルの省エネ政策を推進するため、省エネ推進戦略・計画の作成、データマネジメント及び高効率設備導入拡大のための制度構築に必要な政府機関の能力開発を行う。

● これまでの達成度

［電力分野］

- 第一次省エネルギー年次報告書を策定、COP27 にて公表（2022 年 11 月）。
- ホワイトペーパー策定準備の一環として、電力分野省エネロードマップを策定、ワークショップにて共有。
- E-JUST 事業については、ルームエアコンの性能比較試験を 2021 年 9 月～2022 年 8 月まで実施、また、2022 年 2 月～2023 年 1 月までスマートホーム試験を実施。

［石油分野］

- パイロット製油所（CORC）の省エネ診断最終報告書策定。
- EMSF ロードマップ報告書を発行。
- CoE 設立に係る関連書類の策定、および、支援活動の実施。
  - CoE のミッション、活動内容、目的、（ハイレベル）組織設立支援文書、トレーニング管理ガイド、CoE スタッフへのオンサイトトレーニング等

［エネルギーデータマネジメント分野］

- エネルギー収支表、および、データインベントリ用標準データ収集フォーマット作成。
- エネルギーデータマネジメントシステム（EDMS）を作成。

［産業分野］

- EECU/IDA を設立（2022 年 1 月）。EECU 内には、Planning, Policy & Evaluation、Technical Support、Data Management、Outreach & Training の 4 チームが設立された。
- EECU の中期計画、データ収集関連内部文書整備、産業登録申請書の更新、データ収集表作成とデータ分析、EE チェックリストおよび EE 手法（機材別）等を作成。

［共通分野］

- 将来の国レベルの省エネ政策／計画策定に向けたホワイトペーパーを作成、発刊。
- 省エネ普及啓発活動として当プロジェクトのホームページを開設。

第6章　上位目標達成に向けた提言

● プロジェクト上位目標

エジプト政府省エネ推進体制が強化され、省エネの国家目標が達成される。

● 上位目標達成に向けた提言

本プロジェクトの各分野に共通する基本方針はデータに基づく省エネ推進施策立案に向けた技術協力の推進である。

電力分野に関しては、国全体のエネルギーデータ収集、至近年の産業分野サブセクター別電力消費量のデータ収集が完了、さらに、過去数年間のデータ収集も実施した。家庭用／業務用分野に関しては、E-JUST での家電機器別電力消費データ、省エネ診断実地研修でのオフィス機器別電力消費データの収集も完了した。

これら活動により収集された電力消費に係るデータ、ならびに、Best Available Technologies (BAT)等関連資料を参照しつつ、電力需要種別／用途別に省エネ技術の普及・導入促進による国家目標達成に向けた 2036 年までの省エネ（脱炭素）化ロードマップを策定しカウンターパートと共有した。

NEEAP-II のレビュー、ならびに、本事業を通じ発掘された課題克服に向けて、第一次省エネ年次報告書、ならびに、ホワイトペーパーにおいて今後の省エネ推進に向けた各種アクションプランを具体的に提示した。

石油／ガス分野に関しては、本事業開始当初に実施したパイロット製油所における省エネ診断において、約 38%（経済効果：170 mil EGP/年、CO2 削減効果：87 million tonnes/年）の省エネポテンシャルが確認された。また、MOP は本事業で策定した EMSF ロードマップに則り省エネ推進に向けた取り組みを強化、2022 年 10 月に CoE 設立（ソフトスタート）、さらに、同省より第一次 Energy Efficiency Strategy（2022 年 11 月）がリリースされた。

国全体の石油／ガス関連データ収集、および、至近年の産業分野サブセクター別ガス消費量のデータ収集が完了した。

上流～エンドユーザーまでカバーする省エネ（脱炭素）促進計画立案に向け、MOP は国家省エネ目標達成へコミットしたうえで、具体的アクションプラン（エンドユーザー分野）において、自動車の MEPS 導入方針をホワイトペーパーにおいて示した。

電力／石油・ガス分野（産業分野含む）ともに、本事業を通じ作成された各種刊行物・資料・採録データを今後の省エネ行政執行における技術参考資料として活用しつつ（アップデートも含む）、省エネ目標達成に向けた各種施策をタイムリーに打ち出していくことが肝要である。

併せて、各カウンターパート合同でディスカッションを重ね発刊した省エネ推進活動計画骨子（ホワイトペーパー）には、共通のキーワード（エネルギーレジストリ、エネルギ

ーマネジメント、KPI、ベンチマーク、MEPS、データマネジメント、能力強化等）が散見される。これはカウンターパートが共通の認識に立ち、ゴールが共有化されたことの証左とも言え、互いに連携／情報共有しつつ省エネ活動を継続していくことが国家目標実現＝省エネ実績の結実につながると提言する。

添付資料

添付資料 1

Project Design Matrix (Version 1)

Project Design Matrix

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Version 1

Dated 23 May 2019

Implementing Agency: Ministry of Electricity and Renewable Energy, Ministry of Petroleum and Ministry of Trade and Industry (IDA), Central Agency for Public Mobilization and Statistics (CAPMAS)

Target Group: Relevant institutions of above agencies

Period of Project: XX 2019- XX 2021 (Two years)

Project Site: Cairo

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal National target of Energy Efficiency are achieved	Percentage change in energy intensity is -14% by 2030 (SDS target)	Energy Efficiency Annual Report			
Project Purpose Institutional capacity of EECCD/EECD and energy efficiency promotion roadmap is developed to facilitate implementation of the National Plan such as NEEAP 2 and MoP modernization program	1. Data Management system is established 2. Implementation of Energy Efficiency Roadmap is promoted	Energy Efficiency Annual Report Project monitoring report	Government policy for energy efficiency and energy subsidies is maintained		
Outputs (Electricity) 1. Organizational and personal capacity for energy efficiency promotion of EECCD in MoERE is strengthend 2. Potential technology for energy efficiency is examined and promotion policy is proposed (Petoleum) 3. Organizational and personal capacity for governance of EECD in MoP and relevant agencies is enhanced and strategic roadmap is developed	1-1 Standard method for collecting and analysing macro and micro data is introduced and data base is developed 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of industrial boiler is verified including economic efficiency, water and environmental standard, and safety is verified 2-3 Effectiveness of home appliances including labeling system such as fridge, AC and lighting is verified 3-1 Basic energy efficiency methods and specification including bench mark and standard KPIs for petroleum sector facilities are developed 3-2 On-Job-Training energy audits in one or two pilot facilities are implemented 3-3 Strategic roadmap for petroleum sector facilities is developed	Energy Efficiency Annual Report Project monitring report	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group		

Activities	Inputs		Important Assumption
	The Japanese Side	**The Egyptian Side**	
1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback (Organizational) 1-2 Updating EE methods, drafting EE roadmap and template of annual report (Organizational) 1-3 Implementation capacity of EECCD staff is developed including data management and policy making (personal) 1-4 Developing evaluation method of EE technology and calculation method of EE potential (personal) 1-5 Development of awaness raising program and support for implementation 2-1 EE demonstration for air-conditioner in small-scale government building 2-2 Validation analysis of high efficient and safe industrial equipment 2-3 Validation analysis of home appliances including refridgerator, room air-conditioner and lighting etc. 3-1 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-2 Energy auditing for pilot facilities 3-3 Drafting strategic roadmap for petroleum sector	1. Dispatch of the Japanese experts - Team Leader/ Energy Efficiency Policy and administration - Data Management - Energy Efficiency Technology - Energy Efficiency promotion (finance and awareness program) - Process Management for Refineries - Refinery Data Analysis - Process Technology for Refineries 2. Training in Japan and Egypt 3. Equipment - In accordance with necessity of activities	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity - Task Manager for Petroleum 2. Facilities and equipment - Project office 3. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt **Pre-Conditions** Contents of the current relevant policies on promotion of energy efficiency are not largely changed. **<Issues and countermesures>**

添付資料 2

Project Design Matrix (Version 2)

Project Design Matrix

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Version 2

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS)

Dated 20 July 2021

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report			
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established.	- Energy Efficiency Annual Report - JICA Project monitoring Report	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*		
Outputs					
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 1-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 1-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE, MOP, IDA, CAPMAS) 1-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 1-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 1-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 1-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 1-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 1-3-4 1) IDA holds EE&C workshops 3 times. 2) Targeted companies prepare its EEC roadmap. 1-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA project monitoring report - Minutes of Meetings			
2. TT2 (MOERE, MOP, IDA, CAPMAS) CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 2-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 2-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 2-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 2-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project monitoring report - Meeting minutes of feedback / follow-up meetings among the four executing agencies.			
3. TT3 (MOERE) 3-1 Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened. 3-2 Potential technology for energy efficiency is examined and promotion policy is proposed.	3-1-1 Standard method for collecting and analyzing macro and micro data is introduced and data base is developed (linking to TT2) 3-1-2 Energy efficiency promotion roadmap including awareness raising is developed 3-1-3 Annual report template is introduced 3-1-4MOERE officers are certified against EE&C related programs 3-2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 3-2-2 Effectiveness of home appliances including energy efficiency standards and labeling program such as fridge, AC and lighting is verified	- Energy Efficiency Annual Report - JICA Project monitoring report	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group		
4. TT4 (MOP) 4-1 Review of EE&C Framework Related to MOP and Organizing its issues 4-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 4-3 Support for Development of EE&C Strategy and Roadmap 4-4 Development of Manuals and SOPs to strengthen EE&C Activities	4-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 4-2-1Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 4-2-2 On job and class room training of 15 MOP personnel (5 workshops) 4-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 4-3-2 Standardised format and media for data collection is introduced (linking to TT2) 4-4-1 Issuance of SOP describing the key energy auditing activities in the petroleum sector	* Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) *Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) * Training lists * JICA Project monitoring report * Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) * Petroleum sector SOPs			

Activities	Inputs		Important Assumption
	The Japanese Side	The Egyptian Side	
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 1-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 1-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 1-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 1-3-3 Integrated activities are organized in the industrial sector. 1-3-4 Workshops for private sector of EE&C are held. 1-3-5 Training are held for IDA personnel.	1. Dispatch of the Japanese experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit・Technology (Electric Power) 1 - Energy Audit・Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil) - Energy Audit (Oil) 1 - Energy Audit (Oil) 2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Public Awareness/Coordinator1 - Capacity Development/Private Sector Collaboration/Coordinator2 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (3 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
2. TT2 (MOERE, MOP, IDA, CAPMAS) 2.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 2.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 2.3 In-house trainings for 4 C/Ps on international standard energy data management. 2.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 2.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA. 2.6 Overseas training in Japan for CAPMAS on energy data management.			
3. TT3 (MOERE) 3-1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 3-1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 3-1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 3-1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 3-1-5 Development of awareness raising program and support for implementation. 3-2-1 EE demonstration for air-conditioner in residential places. 3-2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			Pre-Conditions
TT4 (MOP) 4-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 4-1-2 Benchmarking against international practices 4-1-3 Conduct workshops to share outcome of analysis 4-2-1 Site visit to Pilot refinery (energy auditing) 4-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 4-2-3 Develop sitewide utility model for pilot refinery 4-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 4-2-5 Conduct 4 training workshops (5 days per each workshop) 4-2-6 Energy efficiency framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 4-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 4-3-1 Drafting strategic roadmap for petroleum sector 4-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 4-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 4-4-1 Develop EE audit SOP 4-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures>

添付資料 3

Project Design Matrix (Version 3)

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Version 3

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS)

Dated 18 February 2022

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

February 2022 (Monitoring period: Jan 2020-Dec 2021)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		Preparation phase: listing up contents and identifying key data to be included in the report	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Initial review of implemented projects in NEEAP-II was reported in CA report. (Energy Efficiency Annual Report is on the preparation phase) 2. No progress yet	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analyzing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 No progress yet 1-2 No progress yet 1-3 Worked on activity schedule. Started preliminary discussions on reporting format. 1-4 - 2 day training (lecture) in Dec.2021: for 10 participants (MOERE, EEHC and Egypt ERA) on energy audit and building certification - On-site training preparation conducted: procurement of energy audit equipment and selection of training site	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labeling program such as fridge, AC and lighting is verified			2-1 Data collection is ongoing from Sep.2021 to Aug.2022. Initial result analyzed. 2-2- Smart home sensor being developed and manufactured. Data collection to be started from Jan.2022. - Discussions started to improve standards and labeling system participated by MOERE, EOS, NREA, GOIEC and CPA.	
TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-4-1 Issuance of SOP describing the key energy auditing activities in the petroleum sector	* Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) *Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) * Training lists * JICA Project Monitoring Sheet * Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) * Petroleum sector SOPs		3-1-1 Report issued as part of revised CA report 3-2-1 Under progress 3-2-2 5 trainings and 1 additional workshop were conducted. 3-3-1 Issued preliminary roadmap and validated with main stakeholders. Final roadmap is under development 3-3-2 Working with MOP and CAPMAS under TT-2 to revise energy balance data collection process and report 3-4-1 No progress yet	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 No progress yet 4-2 No progress yet 4-3-1 Training in Aug 2021: Studied Japanese example. Training in Oct 2021: Studied 5 countries examples. Discussed（Objectives, Mandate, Org. structure) of EECU and recommendations from JICA team. IDA decided to assign Eng. Mohamed as a EECU Director. 4-3-2 Training in Aug 2021: Studied Japanese example. Training in Oct 2021: Studied 5 countries examples. Discussed recommendations from JICA team and agreed basic concept with IDA. 4-3-3 Training in Oct 2021: Studied 3C/Ps EEC activities. 1st integrated meeting was conducted in Oct 2021 and shared EE activities with 8 MTI affiliated entities. 4-3-4 1) & 2)No progress yet 4-3-5 2 trainings was conducted in Aug and Oct 2021.Total number of participants was 38.	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 OJT (4 sessions), and group training (6 sessions) held in Dec 2021. 5-2 Standardised national energy balance table prepared. Data inventory as the standardised data collection format created. 5-3 Contents of the upcoming national energy balance publication being considered at CAPMAS. 5-4 No achievement yet.	

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit · Technology (Electric Power) 1 - Energy Audit · Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (3 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop EE audit SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			**<Issues and countermeasures>** Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel.			
TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

添付資料 4

Project Design Matrix (Version 4)

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation — **Version 4**

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) — **Dated 18 August 2022**

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	August 2022 (Monitoring period: Jan 2022-Jul 2022) Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		Preparation phase: listing up contents and identifying key data to be included in the report	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established. 3. Roadmap for EMSF (Energy Management System Framework) in petroleum sector is formulated.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Initial review of implemented projects in NEEAP-II was reported in CA report. (Energy Efficiency Annual Report is on the preparation phase) 2. Energy Data Management system (EDMS) has started its development. 3. EMSF (Energy Management System Framework) roadmap in petroleum sector has been developed.	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analysing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 MOERE officials participated in energy data management training (TT2). As part of annual report preparation, some programs in NEEAP-II were reviewed (check process of PDCA). 1-2 Awareness raising activities were conducted through project website and media prepared by E-JUST (on AC and smart home demonstration). Roadmap started to be discussed as part of white paper preparation (TT1). 1-3 The first draft annual report was developed in May/2022, and targets to be published in COP27. 1-4 2 day training (lecture) in Jan/2022, Mar/2022 and Jul/2022: for 10 participants (MOERE, EEHC and Egypt ERA) on energy audit and building certification. 2-day training (on-site) in Jun/2022 by utilizing procured energy audit equipment	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labelling program such as fridge, AC and lighting is verified			2-1 (AC demonstration test) Data collection is ongoing from Sep/2021 to Aug/2022. Both cooling and heating result has been analyzed. 2-2 (Smart home test) Data collection to be started from Feb/2022, and is ongoing through summer/2022. 3 Workshops were held in Feb, Mar and Jun/2022 to improve standards and labelling system participated by MOERE, EOS, NREA, GOIEC and CPA.	
TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation) 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-3-3 Issuance COE Mission, activities and Objectives 3-3-4 Issuance of CoE high level organization document 3-3-5 Issuance of CoE Training Management Guide document 3-3-6 Issuance of COE organization building support document 3-3-7 Conducting several days (on-site) training for COE staffs 3-4-1 Issuance of SOP	- Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) - Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) - Training lists - JICA Project Monitoring Sheet - Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) - Petroleum sector SOPs - CoE Mission, activities and objectives report - CoE Organization document - CoE Training management guide document - Attached Matrix about COE Support List. - COE Training records		3-1-1 Report issued as part of revised CA report. 3-2-1 Final report issued. 3-2-2 Five trainings were conducted. 3-3-1 Final roadmap report draft issued to MOP 3-3-2 Working with MOP and CAPMAS under TT-2 to revise energy balance data collection process and report 3-3-3 Workshop successfully conducted and its report was issued and accepted. Preliminary list of models for the simulation software and the virtual reality (VR) to be prepared. 3-3-4 Under progress 3-3-5 Under progress 3-3-6 Under progress 3-3-7 No progress yet 3-4-1 No progress yet	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 General introduction was made as to TT1 activities and NEEAP-II at #2 JCC. Discussion in Mar.2022 and Jun.2022 among 4 C/Ps. Headlines of white paper has been discussed and drafted. Discussion meeting were held 3 times among 4 C/Ps. 4-2 No progress yet 4-3-1 EECU was established in Jan/2022. Implementation structure and assigned members of EECU were decided. Monitoring system of EECU was developed, and regular meetings were conducted 6 times including kick-off meeting (Apr-Jul/2022). 4-3-2 Short-term plan of EECU was developed. Activities of each team including planning, technical support, data management, outreach & training were conducted. 4-3-3 Preliminary energy audit training was conducted in Jan/2022 by ECO-FEI. RECP training was conducted in Jul/2022 by ENCPC. Meetings were conducted with MOERE (in Mar/2022 & May/2022) and MOP (in Mar/2022) . 4-3-1 1) Details of 1st workshop was planned. 2) EE&C checklist at factories was prepared and EE&C related information was collected. 4-3-5 1 workshop (Feb/2022) and 3 trainings were conducted (Jan, Mar, Jul/ 2022).Total number of participants was 72 from IDA.	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 Five remote collaborative meetings were conducted with CAPMAS on data collection practices (Jan/2022 – Apr/2022). A workshop (presentation meeting) on National Energy Balance Table was held (Mar/2022). One training session for CAPMAS on the best practices of energy data management conducted (Jul/2022). 5-2 Sub-sector electricity sales datasets were identified by CAPMAS. Existence of biofuel (RDF and charcoal) and coal / coke related datasets was identified at the Ministry of Environment. National energy balance table (trial version on Microsoft Excel) was revised. EDMS RFP (including specifications) was drafted and confirmed with CAPMAS. EDMS vendor was selected through competitive bidding procedure. 5-3 Preparation for a tentative, COP27 version national energy balance table publication was agreed with CAPMAS. 5-4 No achievement yet.	

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	The Egyptian Side	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit · Technology (Electric Power) 1 - Energy Audit · Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (2 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, benchmarking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures> Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel. TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

添付資料 5

Project Design Matrix (Version 5)

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation — **Version 5**

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) — **Dated 10 March 2023**

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	**March 2023** (Monitoring period: **Aug 2022-Feb 2023**) Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs. The National Energy Balance (EB) was developed with 4 C/P and other relevant cooperation.	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established. 3. Roadmap for EMSF (Energy Management System Framework) in petroleum sector is formulated.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Review of implemented projects in NEEAP-II was completed and reported in the First Energy Efficiency Report. 2. Development of EDMS (Energy Data Management System) was completed. 3. Development of EMSF roadmap was completed.	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analysing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 MOERE officials participated in energy data management training (TT2). MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs and energy balance. 1-2 - Future plan is developed as a part of the white paper (TT1). - Energy saving potential roadmap (up to 2036) was prepared/shared in TT1 workshop. - Awareness raising activities were conducted through COP27 (seminars and booth), project website, and through E-JUST (on AC and smart home demonstration). 1-3 The first annual report was developed and published in Nov/2022 at COP27. 1-4 2 participants obtained LEED Green Associate certification. Follow up training was conducted in Dec/2022.	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labelling program such as fridge, AC and lighting is verified			2-1 (AC demonstration) Data collection was conducted from Jun/2021 to Aug/2022. Both cooling and heating result has been analyzed. 2-2 (Smart home test) Data collection was conducted from Feb/2022 to Jan/2023. Data analysis of power consumption in 5 households was conducted. (S&L system) 3 Workshops were held to improve Standards and Labeling system participated by MOERE, EOS, NREA, GOIEC ICA, and CPA. List of laboratories was developed. Key issues were identified, and next actions were summarized.	
TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation) 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-3-3 Issuance COE Mission, activities and Objectives 3-3-4 Issuance of CoE high level organization document 3-3-5 Issuance of CoE Training Management Guide document 3-3-6 Issuance of COE organization building support document 3-3-7 Conducting several days (on-site) training for COE staffs 3-4-1 Issuance of SOP	- Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) - Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) - Training lists - JICA Project Monitoring Sheet - Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) - Petroleum sector SOPs - CoE Mission, activities and objectives report - CoE Organization document - CoE Training management guide document - Attached Matrix about COE Support List. - COE Training records		3-1-1 Report issued as part of revised CA report. 3-2-1 Final report issued. 3-2-2 Total of 7 trainings and 2 additional workshops held onsite. 3-3-1 Issued roadmap and validated with main stakeholders. 3-3-2 Worked with MOP and CAPMAS under TT2 to revise energy balance data collection process and report. 3-3-3 Workshop successfully conducted and its report was issued and accepted. Preliminary list of models for the simulation software and the virtual reality (VR) was prepared to MOP. 3-3-4 CoE Organizational Concept and Design Document Issued. 3-3-5 CoE Competency Development and Training Management Guide Document Issued. 3-3-6 CoE Organizational Concept and Design Document Issued. 3-3-7 3 training sessions conducted onsite. **3-4-1 SOP FINAL to be issued on Mar.16.**	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated. 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 Knowledge sharing event was held at #2 JCC relating to NEEAP-II. 7 times discussion including JCC among all C/Ps have been conducted. 4-2 White Paper has been prepared by all counterparts. 4-3-1 Implementation structure and functions of EECU were finalized. Monitoring system of EECU was conducted in Sep-Oct/2022. Regular meetings were conducted 9 times in total (Apr/2022-Jan/2023). 4-3-2 Activities of each team of EECU/IDA were conducted - Mid-term plan of EECU was developed, internal note was issued , application form of industrial registration was updated and data collection form was developed to collect energy related data, EE checklist and list of EE measures were developed, 4-3-3 2 RECP trainings were conducted in Aug and Sep/2022 by ENCPC. Preliminary discussion with MOERE was conducted in Oct/2022 to discuss the implementation procedures of Energy Register and Energy Manager in the industrial sector. 4-3-4 1) 1st IDA workshop targeted industrial zone managers was prepared & conducted in Oct/2022 via online. 2nd IDA workshop was prepared & conducted at IDA in Feb/2023. 4-3-4 2) Discussions were made for selection of potential companies. Necessary tools (EE checklist / list of EE measures) and IDA engineers was trained to support roadmap development of targeted companies. 4-3-5 120 IDA engineers were trained at 3 RECP workshops (Jul-Sep/2022).	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 Nine remote collaborative meetings were conducted with CAPMAS on data collection practices (Jan – Dec 2022). A workshop (presentation meeting) on National EB Table was held (Mar/2022). One day training (two sessions) for CAPMAS on the best practices of energy data management conducted (Jul/2022). Two EDMS demonstration trainings (Sep, Nov 2022), and two EDMS UAT & trainings (Dec 2022, Jan 2023) conducted. 5-2 EDMS with input format, data processing, and presentation output generation functions developed and delivered. The user manuals are shared with the participation of 4 C/Ps and MOE . Complete national EB data on data inventory for FY 2015/16 - FY 2020/21) collected and recorded on EDMS, ready for publication purpose. 5-3 National EB Table FY 2020-21 publication drafted based on EDMS output. 5-4 CAPMAS's National EB Table publication FY2020-21 reviewing meetings convened with the participation of MOERE, MOP, IDA and MOE in Nov, Dec 2022, and Jan, Feb 2023.	

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit · Technology (Electric Power) 1 - Energy Audit · Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Oil and Gas (Technology) - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (1 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures> Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel. TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

添付資料 6

Project Design Matrix (Version 6)

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation — **Version 6**

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) — **Dated 9 May 2023**

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

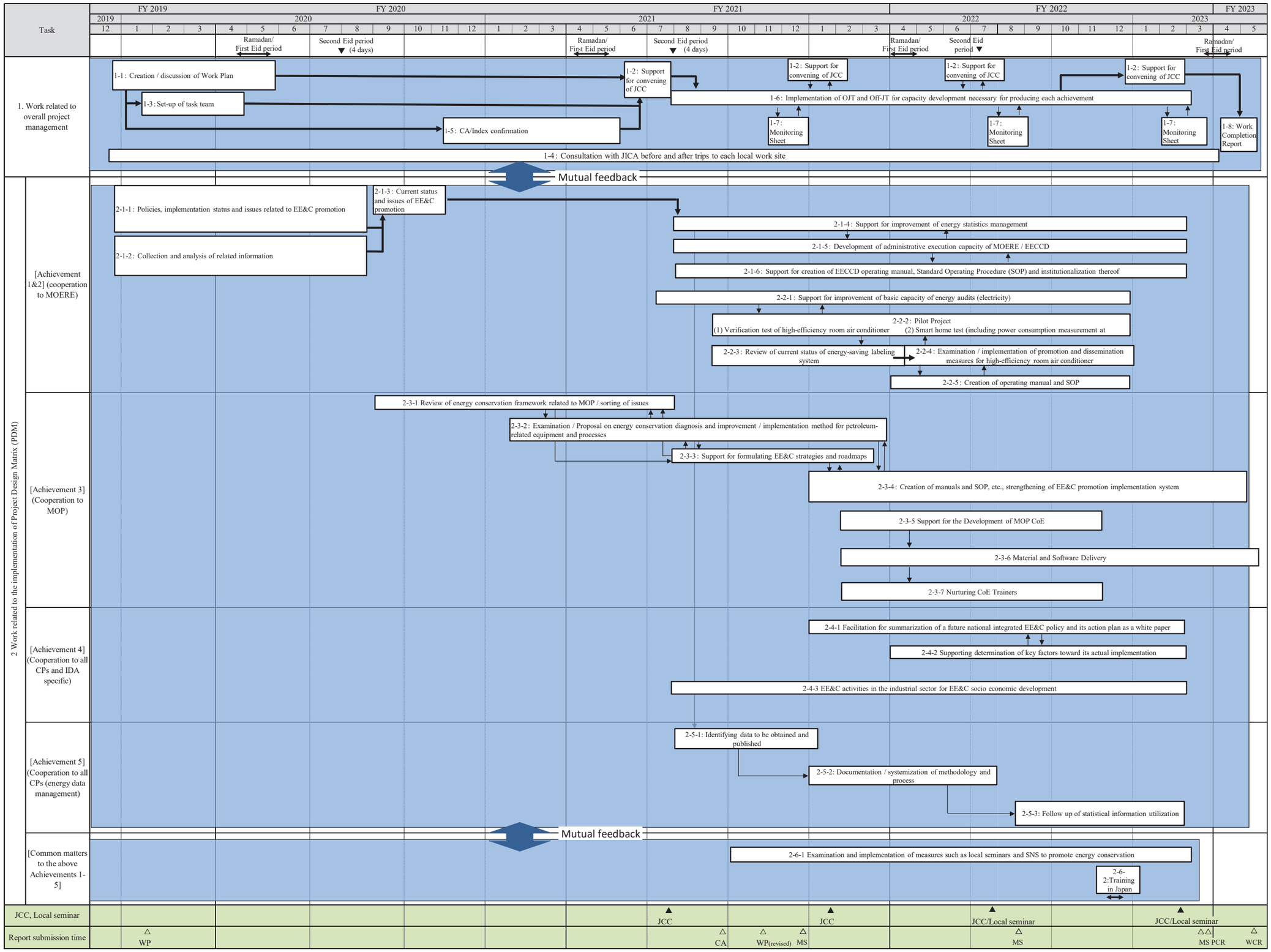
Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	**May 2023 (Monitoring period: Aug 2022-May 2023)** Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs. The National Energy Balance (EB) was developed with 4 C/P and other relevant cooperation.	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established. 3. Roadmap for EMSF (Energy Management System Framework) in petroleum sector is formulated.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Review of implemented projects in NEEAP-II was completed and reported in the First Energy Efficiency Report. 2. Development of EDMS (Energy Data Management System) was completed. 3. Development of EMSF roadmap was completed.	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analysing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 MOERE officials participated in energy data management training (TT2). MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs and energy balance. 1-2 - Future plan is developed as a part of the white paper (TT1). - Energy saving potential roadmap (up to 2036) was prepared/shared in TT1 workshop. - Awareness raising activities were conducted through COP27 (seminars and booth), project website, and through E-JUST (on AC and smart home demonstration). 1-3 The first annual report was developed and published in Nov/2022 at COP27. 1-4 2 participants obtained LEED Green Associate certification. Follow up training was conducted in Dec/2022.	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labelling program such as fridge, AC and lighting is verified			2-1 (AC demonstration) Data collection was conducted from Jun/2021 to Aug/2022. Both cooling and heating result has been analyzed. 2-2 (Smart home test) Data collection was conducted from Feb/2022 to Jan/2023. Data analysis of power consumption in 5 households was conducted. (S&L system) 3 Workshops were held to improve Standards and Labeling system participated by MOERE, EOS, NREA, GOIEC ICA, and CPA. List of laboratories was developed. Key issues were identified, and next actions were summarized.	
TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation) 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-3-3 Issuance COE Mission, activities and Objectives 3-3-4 Issuance of CoE high level organization document 3-3-5 Issuance of CoE Training Management Guide document 3-3-6 Issuance of COE organization building support document 3-3-7 Conducting several days (on-site) training for COE staffs 3-4-1 Issuance of SOP	- Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) - Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) - Training lists - JICA Project Monitoring Sheet - Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) - Petroleum sector SOPs - CoE Mission, activities and objectives report - CoE Organization document - CoE Training management guide document - Attached Matrix about COE Support List. - COE Training records		3-1-1 Report issued as part of revised CA report. 3-2-1 Final report issued. 3-2-2 Total of 7 trainings and 2 additional workshops held onsite. 3-3-1 Issued roadmap and validated with main stakeholders. 3-3-2 Worked with MOP and CAPMAS under TT2 to revise energy balance data collection process and report. 3-3-3 Workshop successfully conducted and its report was issued and accepted. Preliminary list of models for the simulation software and the virtual reality (VR) was prepared to MOP. 3-3-4 CoE Organizational Concept and Design Document Issued. 3-3-5 CoE Competency Development and Training Management Guide Document Issued. 3-3-6 CoE Organizational Concept and Design Document Issued. 3-3-7 3 training sessions conducted onsite. **3-4-1 SOP FINAL was issued/accepted on May.8.**	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated. 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 Knowledge sharing event was held at #2 JCC relating to NEEAP-II. 7 times discussion including JCC among all C/Ps have been conducted. 4-2 White Paper has been prepared by all counterparts. 4-3-1 Implementation structure and functions of EECU were finalized. Monitoring system of EECU was conducted in Sep-Oct/2022. Regular meetings were conducted 9 times in total (Apr/2022-Jan/2023). 4-3-2 Activities of each team of EECU/IDA were conducted - Mid-term plan of EECU was developed, internal note was issued , application form of industrial registration was updated and data collection form was developed to collect energy related data, EE checklist and list of EE measures were developed, 4-3-3 2 RECP trainings were conducted in Aug and Sep/2022 by ENCPC. Preliminary discussion with MOERE was conducted in Oct/2022 to discuss the implementation procedures of Energy Register and Energy Manager in the industrial sector. 4-3-4 1) 1st IDA workshop targeted industrial zone managers was prepared & conducted in Oct/2022 via online. 2nd IDA workshop was prepared & conducted at IDA in Feb/2023. 4-3-4 2) Discussions were made for selection of potential companies. Necessary tools (EE checklist / list of EE measures) and IDA engineers was trained to support roadmap development of targeted companies. 4-3-5 120 IDA engineers were trained at 3 RECP workshops (Jul-Sep/2022).	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 Nine remote collaborative meetings were conducted with CAPMAS on data collection practices (Jan – Dec 2022). A workshop (presentation meeting) on National EB Table was held (Mar/2022). One day training (two sessions) for CAPMAS on the best practices of energy data management conducted (Jul/2022). Two EDMS demonstration trainings (Sep, Nov 2022), and two EDMS UAT & trainings (Dec 2022, Jan 2023) conducted. 5-2 EDMS with input format, data processing, and presentation output generation functions developed and delivered. The user manuals are shared with the participation of 4 C/Ps and MOE . Complete national EB data on data inventory for FY 2015/16 - FY 2020/21) collected and recorded on EDMS, ready for publication purpose. 5-3 National EB Table FY 2020-21 publication drafted based on EDMS output. 5-4 CAPMAS's National EB Table publication FY2020-21 reviewing meetings convened with the participation of MOERE, MOP, IDA and MOE in Nov, Dec 2022, and Jan, Feb 2023.	

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit · Technology (Electric Power) 1 - Energy Audit · Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Oil and Gas (Technology) - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (1 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures> Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel. TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

添付資料 7

業務フローチャート
（Workflow Diagram）

Workflow Diagram



WP: Work Plan　CA: Capacity Assessment Report　MS：Monitoring Sheet　PCR: Project Completion Report　WCR: Work Completion Report

添付資料 8

Revision of Plan of Operation (Version 6)

Project Monitoring Sheet II (Revision of Plan of Operation)

Version 6
Dated 9 May 2023

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Inputs	Year	2020												2021												2022												2023						Remarks
		I			II			III			IV			I			II			III			IV			I			II			III			IV			I			II			
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	
Expert																																											
Team Leader/Energy Efficiency Policy 1 (Leader)	Plan																																										
	Actual																																										
Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader)	Plan																																										
	Actual																																										
Energy Data Management 1	Plan																																										
	Actual																																										
Energy Data Management 2	Plan																																										
	Actual																																										
Energy Efficiency Strategy/Program (Electric Power)	Plan																																										
	Actual																																										
Energy Audit・Technology (Electric Power) 1	Plan																																										
	Actual																																										
Energy Audit・Technology (Electric Power) 2	Plan																																										
	Actual																																										
Pilot Project (Electric Power)	Plan																																										
	Actual																																										
Energy Efficiency Strategy (Oil) 1	Plan																																										
	Actual																																										
Energy Efficiency Strategy (Oil) 2	Plan																																										Energy Efficiency Strategy (Oil) 3, Energy Audit 3, Energy Audit 5 home assignment only.
	Actual																																										
Energy Efficiency Strategy (Oil) 3	Plan																																										
	Actual																																										
Energy Efficient Technology (Oil)/Energy Audit (Oil) 1,2	Plan																																										
	Actual																																										
Energy Audit (Oil) 3	Plan																																										
	Actual																																										
Energy Audit (Oil) 4	Plan																																										
	Actual																																										
Energy Audit (Oil) 5	Plan																																										
	Actual																																										
Energy Audit (Oil) 6	Plan																																										
	Actual																																										
Oil and Gas (Technology)	Plan																																										
	Actual																																										
Public Awareness/Coordinator 1	Plan																																									
	Actual																																										
Public Awareness 2/Coordinator 3	Plan																																									
	Actual																																										
Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration	Plan																																										
	Actual																																										
Equipment																																											
Achievement 1: Energy data management software and web hosting	Plan																																									EDMS development launched in Jul.2022.
	Actual																																										
Achievement 2: Energy audits device	Plan																																									Inspection completed in May 2022.
	Actual																																									
Achievement 3: Refinery Process Simulator Software Provision	Plan																																									Usage of 4 software is completed in Apr.2022. 1 year 1 license provision launched in Jul.2022.
	Actual																																									
Notebook PCs	Plan																																									
	Actual																																									
Training in Japan																																										
	Plan																																									
	Actual																																									
In-country Training/workshop																																										
	Plan																																									
	Actual																																									

Activities / Sub-Activities	Year	2020				2021				2022				2023		Responsible Organization	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Japan	GOE
TT3 (MOERE)																	
Output 1: Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.																	
1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy)	Plan															○	○
	Actual															○	○
1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy)	Plan															○	○
	Actual															○	○
1-3 Implementation capacity of EECCD staff is developed including data management and policy making. (personal, training)	Plan															○	○
	Actual															○	○
1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training)	Plan															○	○
	Actual															○	○
1-5 Development of awareness raising program and support for implementation.	Plan															○	○
	Actual															○	○
TT3 (MOERE)																	
Output 2: Potential technology for energy efficiency is examined and promotion policy is proposed.																	
2-1 EE demonstration for air-conditioner in residential places.	Plan															○	○
	Actual															○	○
2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.	Plan															○	○
	Actual															○	○
TT4 (MOP)																	
Output 3: The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created.																	
3-1 Organizational and personal capacity for governance of EECD in MOP and relevant agencies is enhanced and strategic roadmap is developed.																	
3-1 Review of EE&C Framework Related to MOP and Organizing its issues (Activities 3-1-1 to 3-1-3)	Plan															○	○
	Actual															○	○
3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)																	
3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) (Activities 3-2-1 to 3-2-7)	Plan															○	○
	Actual															○	○
3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation)																	
3-3 Support for Development of EE&C Strategy and Roadmap (Activities 3-3-1 to 3-3-7)	Plan															○	○
	Actual															○	○
3-4 Development of Manuals and SOPs to strengthen EE&C Activities																	
3-4 Development of Manuals and SOPs to strengthen EE&C Activities (Activities 3-4-1 to 3-4-2)	Plan															○	○
	Actual															○	○
3-5 COE establishment preparation																	
3-5 COE establishment preparation (Activities 3-5-1 to 3-5-5)	Plan															○	○
	Actual															○	○
TT1(MOERE, MOP, IDA, CAPMAS)																	
Output 4: Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated.																	
Output 4-1: Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC.																	
4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed.	Plan															○	○
	Actual															○	○
Output 4-2: Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how).																	
4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps.	Plan															○	○
	Actual															○	○

(IDA)
Output 4-3: EE&C activities in the industrial sector is strengthened for EE&C socio economic development.

4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed.	Plan	○	○
	Actual	○	○
4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined.	Plan	○	○
	Actual	○	○
4-3-3 Integrated activities are organized in the industrial sector.	Plan	○	○
	Actual	○	○
4-3-4 Workshops for private sector of EE&C are held.	Plan	○	○
	Actual	○	○
4-3-5 Training are held for IDA personnel.	Plan	○	○
	Actual	○	○

TT2 (MOERE, MOP, IDA, CAPMAS)
Output 5: CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.

5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion.	Plan	○	○
	Actual	○	○
5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting.	Plan	○	○
	Actual	○	○
5.3 In-house trainings for 4 C/Ps on international standard energy data management.	Plan	○	○
	Actual	○	○
5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM).	Plan	○	○
	Actual	○	○
5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.	Plan	○	○
	Actual	○	○

		Remarks
Monitoring Plan		
Joint Coordinating Committee	Plan	
	Actual	
Set-up the Detailed Plan of Operation	Plan	
	Actual	
Reports/Documents		
Work plan	Plan	Revised workplan was submitted in October 2021.
	Actual	
Capacity assessment report	Plan	CA report was finalized in September 2021.
	Actual	
Monitoring sheet	Plan	Final monitoring sheet was submitted on 10 March 2023
	Actual	
Final report	Plan	Final report was submitted on 24 March 2023
	Actual	
Work Completion Report	Plan	Work completion report was submitted on 24 May 2023
	Actual	
Public Relations		
Seminars in Egypt	Plan	
	Actual	

添付資料 9

専門家派遣実績（要員計画）

専門家派遣実績（要員計画）

契約案件名： エジプト国エネルギー利用効率改善能力開発プロジェクト

	担当業務	格付		全渡航回数	2020年												2021年												2022年												2023年						日数合計	人月合計
					1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6		
現地業務	坂本 康弘 業務主任者/ 省エネルギー政策1	2	計画	10																																											125	4.17
			実績	10	25 (10)	3																	23 (15)	6	17-24 (16)	2-9			15 (19)	2	19 (14)	1		17-29 (13)	15-23 (9)			1-13 (13)		24-30 (7)		19 (10)	1 (1)				127	4.23
	岩田 まり 副業務主任者/ 省エネルギー政策2	3	計画	8																																											105	3.50
			実績	9	25 (10)	3															21 (15)	4		1-6 (6)				2-8 (7)	22 (6)	27	12-18 24-25, 28-31 (14)	1			15-29 (15)	6-12 17-18 (9)			11-23 (13)		8-20 (13)	17 (12)	2 (2)				122	4.07
	江藤 諒 エネルギーデータ マネジメント1	3	計画	4																																											46	1.53
			実績	1																															1-7 (7)												7	0.23
	加藤 義彦 エネルギーデータ マネジメント2	3	計画	10																																											133	4.43
			実績	12																		25 (9)	3 22 (10)	31	11-17 (7)			11-24 (14)	22-29 (8)		23-25 29- (11)	5		15-17 21-24 (7)	2-4 (3)	10-11 (2)	2-8, 19 24-26 (11)		4-18 (15)	17-31 (15)	15-25 (11)	19-28 (10)					133	4.43
	広瀬 智昭 省エネルギー戦略・制度 （電力） （2021年11月に伊藤 充洋に交代）	3	計画	2																																											14	0.47
			実績	2																	28 (8)	4		1 6 (6)																							14	0.47
	伊藤 充洋 省エネルギー戦略・制度 （電力）	4	計画	4																																											41	1.36
			実績	4																								1-10 (10)		4-12 (9)				18-24 (7)								18 (11)	4 (4)				41	1.37
	向野 能里子 エネルギー診断・技術 （電力）1	3	計画	6																																											54	1.80
			実績	5																			23 (10)	1				3-10 (8)	21-31 (10)		25 (8)	1			20-29 (10)												46	1.53
	高木 節雄 エネルギー診断・技術 （電力）2	4	計画	7																																											75	2.50
			実績	6																			23 (15)	6	17-25 (9)								8-13 (6)	8-23 (16)		5-11 (7)	30 (1)	6 (6)									60	2.00
	鍬守 康平 パイロットプロジェクト （電力）	4	計画	9																																											108	3.60
			実績	9														27	13 (15)					6 14 (9)		23-30 (8)		3-10 (8)	22 (12)	2	19-25 (7)			13-24 (12)		12-26 (15)						14 (15)	4 (4)				105	3.50
	圓井 道也 省エネルギー戦略（石油）1	3	計画	3																																											33	1.10
			実績	1																															17 (3)	3 (2)											5	0.17
	アンドレア・ヘインズ 省エネルギー戦略（石油）2	3	計画	2																																											23	0.77
			実績	2																							19 (13)	1		23 (9)	3																22	0.73
	アズハリ・ダハラ 省エネルギー技術（石油）/ エネルギー診断（石油）1, 2	3	計画	16																																											108	3.60
			実績	15	26 (6)	31													20 26 (7)		22 (14)	4	24 (7)	30		9-15 (7)	20-26 (7)	12-17 (6)	22-27 (6)	26-4 (7)	24-25 (2)			19-24 (6)	19-22 (4)			8-14 (7)	6-12 (7)			26-28 (3)					96	3.20
現地業務	ラケッシュ・シーロチャン エネルギー診断（石油）4	4	計画	5																																											50	1.67
			実績	6															20 (14)	2	22 (13)	3	24 29 (6)			9-14 (6)				19 (11)	1 12-18 (7)																57	1.90
	ホセ・ゴンザッティ エネルギー診断（石油）6	3	計画	1																																											9	0.30
			実績	1																														18-23 (6)													6	0.20
	デイブ・ロブサー 石油・ガス（技術）	3	計画	1																																											7	0.23
			実績	1																																		15-21 (7)									7	0.23
	下村 剛史 普及啓発/業務調整1	4	計画	7																																											120	4.00
			実績	7														27	9 (11)											11 (19)	1			20 (18)	7	22 (16)	6		29 (2)	15 (15)		12-22 (11)	22-31 (10)				102	3.40
	田原 彩 普及啓発 2/業務調整3	4	計画	0																																											0	0.00
			実績	0																																											0	0.00
	宮浦 杏那 省エネルギー推進（産業分野）/ 能力開発/民間連携支援	4	計画	9																																											126	4.20
			実績	9																	14-29 (16)			13-24 (12)		9-22 (14)			22 (14)	4	12-25 (14)		16-27 (12)		18-29 (12)		20-21 27- (6)	6 (6)				20 (9)	1 (1)				116	3.87

小計	計画	1,177	39.23
	実績	1066	35.53

	担当業務	格付			2020年 1	2	3	4	5	6	7	8	9	10	11	12	2021年 1	2	3	4	5	6	7	8	9	10	11	12	2022年 1	2	3	4	5	6	7	8	9	10	11	12	2023年 1	2	3	4	5	6	日数合計	人月合計
国内業務	坂本　康弘 業務主任者/ 省エネルギー政策1	2	計画		(3)			(3)	(4)	(6)	(6)	(5)	(5)	(1)	(2)	(3)	(4)	(3)	(3)	(2)	(5)	(4)	(5)	(3)	(3)	(2)	(3)	3,10,16,20,22,24,28									(32)											109	5.45
			実績		15–17 (3)			24,27,28 (3)	19–22 (4)	3,8,15,16,24,30 (6)	13–14,28–31 (6)	4,7,11,25,28 (5)	2,10,16,17,23 (5)	28 (1)	10,27 (2)	8,9,15 (3)	12,14,21,26 (4)	5,10,17 (3)	3,24,28 (3)	22,28 (2)	6,7,11,12,27 (5)	7,15,28,30 (4)	6,8,10,16,17 (5)	18,26,30 (3)	2,8,14 (3)	13,29 (2)	2,9,25 (3)	(7)	12 (1)			7,22,26 (3)	12 (1)	14 (1)	6,26 (2)	9,16,23 (3)	1,20,24,28 (4)	18 (1)	2 (1)	13 (1)	6 (1)		7,16,24 (3)	6,24 (2)					106	5.30
	岩田　まり 副業務主任者/ 省エネルギー政策2	3	計画		(1)	(1)		(2)		(2)	(4)	(1)	(1)	(1)	(1)		(1)	(1)		(1)	(2)	(1)	(2)	(1)	(1)	(1)	(1)									(40)											68	3.40
			実績		20 (1)	7 (1)		21,28 (2)	29 (1)	24,30 (2)	6,15,17,20 (4)	25 (1)	24 (1)	22 (1)	17 (1)		27 (1)	9 (1)		19 (1)	6, 10 (2)	22 (1)	19 28 (2)	17,18 (2)	13 (1)	5 (1)	2 (1)				7,13,22 (3)	24,26 (2)		8 (1)	31 (1)	13 (1)	12,17,21,28 (4)	9, 29 30 (3)	1,2, 5–9, 12,13 (9)		24,31 (2)	2, 6 (2)	6–9 13,28 30 (7)	4, 5, 28 (3)			66	3.30
	江藤　諒 エネルギーデータ マネジメント1	3	計画								(2)		(1)											(1)		(2)	(4)									(15)											25	1.25
			実績								16,17 (2)		2 (1)											26 (1)		21, 22 (2)	12,24 25,26 (4)	3, 6, 15,21 (4)	14,17 (2)	2,8 9,10 (4)			17,20 22,24 (4)		5,16,17 (3)	1, 2 5, 8 (4)		1,4,10 11,15 17,21 22,24 (9)	5,6 19 (3)								43	2.15
	加藤　義彦 エネルギーデータ マネジメント2	3	計画										(4)	(4)	(2)			(2)	(2)	(1)				(1)													(13)											29	1.45
			実績										1,2 16,23 (4)	14,19 22,29 (4)	4, 11 (2)			9, 22 (2)	15,19 (2)	19 (1)				10 (1)									29,30 (2)		1,15 (2)	19 (1)			14,28 (2)	12–14 16–18 (6)						29	1.45
	広瀬 智昭 省エネルギー戦略・制度 （電力） (2021年11月に伊藤 充洋に交代)	3	計画								(2)	(2)				(1)		(1)		(8)	(2)																											16	0.80
			実績								2,17 (2)	3, 4 (2)				9 (1)		17 (1)		(8)	11,15 (2)																											16	0.80
	伊藤 充洋 省エネルギー戦略・制度 （電力）	4	計画																																	(18)											18	0.90
			実績																										6,27 (2)	3 (1)	7 (1)		31 (1)	1 (1)					2,5,6 8,9 (5)				27, 28 (2)				13	0.65
	向野 能里子 エネルギー診断・技術 （電力）1	3	計画							(2)	(1)					(5)		(1)					(2)	(1)	(3)	(6)	(6)									(24)											51	2.55
			実績							1,8 (2)	17 (1)					21–25 (5)		22 (1)					2, 22 (2)	2 (1)	10,16, 23 (3)	6,12, 20,21 27,28 (6)	1,2, 4,5 13,26 (6)	13, 21, 24 (3)	13–16 18,19 (6)	28 (1)	14,15 17,23 24 (5)	4,7 8,25 (4)	10 (1)		19 (1)	16 (1)	20,21, 26 (3)	5, 6, 12,13 17,18 (4.4)										56	2.82
	髙木 節雄 エネルギー診断・技術 （電力）2	4	計画															(2)					(1)		(1)	(3)	(2)									(1)											10	0.50
			実績															10, 31 (2)					19 (1)		30 (1)	20,25 30 (3)	18, 20 (2)					26, 28–30 (4)	30,31 (2)	2,3,6 (3)	30,31 (2)											20	1.00
	鍬守 康平 パイロットプロジェクト （電力）	4	計画			(1)	(1)	(2)	(2)	(1)				(1)	(2)	(2)	(3)	(4)	(1)	(1)	(1)	(2)	(1)	(1)	(2)	(1)	(1)									(44)											74	3.70
			実績			7 (1)	23 (1)	21,28 (2)	20,29 (2)	24 (1)				22 (1)	9,24 (2)	4, 9 (2)	6,25,28 (3)	9,19, 22,24 (4)	25 (1)	22 (1)	17 (1)	22,24 (2)	27 (1)	5 (1)	9, 30 (2)	14 (1)	17 (1)			14,24 (2)	16 (1)	7,20 (2)	13,23 (2)	27 28 (2)	13,19 20,27 (4)	4,5,8 (3)	15,16 (2)	7, 11 14, 24 (4)	11,14 (2)	5, 6 (2)	5,6,10 13,17–20,23 (9)	13 (1)	9,10 13–17 22–24 (10)				76	3.80
	圓井 道也 省エネルギー戦略（石油）1	3	計画								(1)						(1)																													8	0.40
			実績								1 (1)						24 (1)													9 (1)					4,12, 14 (3)				7 (1)							7	0.35
	アンドレア・ヘインズ 省エネルギー戦略（石油）2	3	計画		(1)					(1)		(10)	(10)	(7)	(4)	(3)						(4)	(7)		(5)	(14)	(11)									(35)											112	5.60
			実績		28 (1)					16 (1)		17–21 24–28 (10)	14–18 21–25 (10)	7–9, 13–16 (7)	13–16 (4)	28–30 (3)						21–24 (4)	1–3 10,11 17,18 (7)		6–8, 12,13 (5)	11,12 17–21 25–27 (14)	3–5, 8–11, 15–18 (11)	15–17 21–23 27–30 (10)	3–6 24–27 (8)	1,2,11 15,17 19,21 (7)	14–16 (3)			21 (1)				24, 25 (2)				19–22 (4)	3, 6, 7 (3)					115	5.75
	リック・ルーカス 省エネルギー戦略（石油）3	3	計画							(2)											(3)	(3)	(3)																								11	0.55
			実績							24,25 (2)										27 –29 (3)	20,21 26 (3)	21–23 (3)																								11	0.55
	アズハリ・ダハラ 省エネルギー技術（石油）/ エネルギー診断（石油）1, 2	3	計画		(1)	(1)		(1)	(1)	(5)	(10)	(5)	(2)	(2)	(2)	(1)	(1)	(1)	(2)	(2)	(1)	(3)	(4)	(1)		(19)	(10)	(11)									(46)											139	6.95
			実績		21 (1)	21 (1)		23 (1)	18 (1)	1, 16–24 25,28 (5)	19–23 26–30 (10)	17–19 23–24 (5)	20,22 (2)	5, 7 (2)	12,24 (2)	20 (1)	20 (1)	15,28 (2)	4, 11 (2)	18 (1)	3, 18–19 (3)	6,10 13,17 (4)	8 (1)	1–2,5–9, 12–14,16 20–22, 26–30 (19)	4–7, 17 19–21 26,27 (10)	1–4,7 8,10, 11,17 18,28 (11)	1–2, 29–31 (5)	4–6 16–20 30 (8)	2–4 12–15 19–21 (10)	14,17 20,21 27 (5)	6,11,12 14,19, 24,27, 28 (8)	10,22 (2)	6, 8 13,14 (4)	13,14 25,26 (4)	1 (1)	8, 30 (2)	3–6 23–26 (8)			2–5, 8, 9 (6)	14,15 19–21 (5)	1,13,16 (3)	26,27 30 (3)			159	7.95
	アラン・ルッドマン エネルギー診断（石油）1 （アズハリ・ダハラに交代予定）	3	計画							(2)	(1)	(1)		(1)				(3)			(1)			(1)		(1)	(1)		(2)																		13	0.65
			実績							24,25 (2)	6 (1)	27 (1)		7 (1)				22–24 (3)			15 (1)			10 (1)		14 (1)																				11	0.55

	担当業務	格付		2020年 1	2	3	4	5	6	7	8	9	10	11	12
国内業務	木下 博之 エネルギー診断(石油)3	4	計画												
			実績												
	ラケッシュ・シーロチャン エネルギー診断(石油)4	4	計画								(6)	(2)	(1)	(1)	
			実績								10 -14 27 (6)	15,22 (2)	11 (1)	24 (1)	
	ランディ・ナルバエズ エネルギー診断(石油)5	3	計画												
			実績												
	ホセ・ゴンザッティ エネルギー診断(石油)6	3	計画												
			実績												
	デイブ・ロブサー 石油・ガス(技術)	3	計画												
			実績												
	長岡 真也 普及啓発/業務調整1 ※2020年5月に下村 剛史へ交代	4	計画	(5)											
			実績	14,15,17,29,30 (5)											
	下村 剛史 普及啓発/業務調整1	4	計画						(4)	(3)	(5)	(3)	(3)	(2)	(3)
			実績						15-18 (4)	20-22 (3)	17-21 (5)	23-25 (3)	21-23 (3)	24-25 (2)	8,9,21 (3)
	田原 彩 普及啓発2/業務調整3	4	計画												
			実績												
	宮浦 杏那 省エネルギー推進(産業分野)/ 能力開発/民間連携支援	4	計画	(2)	(2)	(1)	(5)	(3)	(6)	(2)	(7)	(4)	(2)	(2)	(5)
			実績	24,27 (2)	4,7 (2)	31 (1)	9,16 21,23 28 (5)	19,20 21 (3)	3,12 16,17 22,23 (6)	13, 14 (2)	11-13 25-28 (7)	1,3,4,7 (4)	9,15 (2)	5,17 (2)	5,9 10,16 17 (5)
	JCC, 現地セミナー														
	報告書等提出時期			▲ 業務計画書							▲ ワーク・プラン				

担当業務		2021年 1	2	3	4	5	6	7	8	9	10	11	12
木下 博之	計画	(2)											- - -
	実績	7,26 (2)											
ラケッシュ・シーロチャン	計画	(5)		(1)	(8)	(2)	(6)	(7)	(4)	(18)	(12)	(10)	- - -
	実績	4-7 11 (5)		18 (1)	5-8, 11 -14 (8)	19,20 (2)	6,7 10,13 17,20 (6)	5-7 11- 13,15 (7)	8-10 20 (4)	2,5-9 12-16 19-23 26,27 (18)	4-7, 17-20, 25-28 (12)	1-4, 7-11, 14 (10)	5-8, 13-15 (7)
ランディ・ナルバエズ	計画												- - -
	実績												
ホセ・ゴンザッティ	計画												- - -
	実績												
デイブ・ロブサー	計画												
	実績												
長岡 真也	計画												
	実績												
下村 剛史	計画	(4)	(4)	(4)		(2)		(2)		(2)	(2)		- - -
	実績	12-15 (4)	15-18 (4)	22-25 (4)		6-7 (2)		26-27 (2)		21-22 (2)	29,31 (2)		
田原 彩	計画												- - -
	実績												
宮浦 杏那	計画	(3)	(3)	(4)	(5)	(2)	(6)	(3)	(2)	(1)	(3)	(2)	- - -
	実績	21,25 ,27 (3)	1,2,9 (3)	9,10 17,31 (4)	19-23 (5)	11-12 (2)	7,8 14,15 28,30 (6)	26, 27,28 (3)	6 30 (2)	13 (1)	4, 5, 26 (3)	2, 24 (2)	21-24 (4)
JCC, 現地セミナー								▲ JCC					
報告書等提出時期										▲ CA報告書			

担当業務		2022年 1	2	3	4	5	6	7	8	9	10	11	12
木下 博之	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(32)	- - -	- - -	- - -
	実績	2, 6 (2)						11 (1)				24,25 28-30 (5)	1,2 7,8,9 (5)
ラケッシュ・シーロチャン	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(50)	- - -	- - -
	実績	14 17-22 24-27 (11)	2-5 8,9, 1112, 15-17 (11)	3,4 7-11 25 (8)	4,6,8 12-15 18 (8)	2-6, 23,24 (7)							
ランディ・ナルバエズ	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(13)	- - -	- - -	- - -	- - -
	実績												
ホセ・ゴンザッティ	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(64)	- - -	- - -	- - -	- - -
	実績			4, 7-11 14-18 21-25 (16)			6-8 12-15 26-30 (12)	4-8, 11-15, 18-22, 25-29, 31 (21)	1-4 (4)	8. 27-30 (5)			
デイブ・ロブサー	計画										- - -	- - -	- - -
	実績										3-7, 10-12 (8)		
長岡 真也	計画												
	実績												
下村 剛史	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(4)	- - -	- - -
	実績				4-7, 27,28 (6)	2, 6 (2)	8-10 (3)	11-12 (2)	3 (1)	13 (1)	4, 5 (2)	21,22 (2)	16 (1)
田原 彩	計画	- - -	- - -	- - -	- - -	- - -	(24)	- - -	- - -	- - -	- - -	- - -	- - -
	実績												
宮浦 杏那	計画	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	(40)	- - -	- - -	- - -
	実績	11,14 17-19 (5)	8, 9 10,16 (4)	7,8,31 (3)	7,8, 18,26 (4)	9 (1)	7, 14 15 (3)		9, 25, 30 (3)	15,16 (2)	7,13,14 17-19, 26 (7)	7, 8 29,30 (4)	1,5-9 12-14 19 (10)
JCC, 現地セミナー		▲ JCC						▲ JCC・セミナー					
報告書等提出時期			▲ MS/PRR						▲ MS/PRR				

担当業務		2023年 1	2	3	4	5	6	日数合計	人月合計
木下 博之	計画	- - -	- - -	- - -	- - -	- - -	- - -	34	1.70
	実績		15 (1)	7 (1)				17	0.85
ラケッシュ・シーロチャン	計画	- - -	- - -	- - -	- - -	- - -	- - -	133	6.65
	実績							135	6.75
ランディ・ナルバエズ	計画	- - -	- - -	- - -	- - -	- - -	- - -	13	0.65
	実績	2-6,9 (6)	13-17 (5)	13-17 (5)				16	0.80
ホセ・ゴンザッティ	計画	- - -	- - -	- - -	- - -	- - -	- - -	64	3.20
	実績		3, 6-10 (6)					64	3.20
デイブ・ロブサー	計画	- - -	(8)	- - -	- - -	- - -	- - -	8	0.40
	実績							8	0.40
長岡 真也	計画							5	0.25
	実績							5	0.25
下村 剛史	計画	- - -	- - -	- - -	- - -	- - -	- - -	49	2.45
	実績	10,11 (2)	7-9, 24 (4)	1, 3 7, 8 (4)				73	3.65
田原 彩	計画	- - -	- - -	- - -	- - -	- - -	- - -	24	1.20
	実績							0	0.00
宮浦 杏那	計画	- - -	- - -	- - -	- - -	- - -	- - -	115	5.75
	実績							125	6.25
小計	計画							1,128	56.40
	実績							1,171	58.57
合計	計画							−	95.63
	実績							−	94.10
JCC, 現地セミナー			▲ JCC・セミナー						
報告書等提出時期				▲ MS/PRR/FR			△ 完了報告書		

業務従事計画

業務従事実績

往復航空賃
別案件負担

添付資料 10

研修員受け入れ実績

エジプト・アラブ共和国
電力・再生可能エネルギー省
石油省
貿易産業省・産業開発庁
国家統計局

エジプト国
エネルギー利用効率改善能力開発
プロジェクト

本邦研修
業務完了報告書

2022 年 12 月

独立行政法人
国際協力機構（JICA）

株式会社パデコ
株式会社三菱総合研究所
ケービーシー・プロセス・テクノロジー・リミテッド

目　　次

図

表

添付資料

第1章　研修の概要

1.1　目的

エ国政府関係者を日本の招聘し、日本の省エネ政策・サービス・技術について理解を深め、本邦企業等との関係構築を図ることを目的に訪日研修を行った。

1.2　日程

本邦研修の日程は以下のとおりである。

表 1-1：研修の概要

対象	MOERE、MOP、IDA、CAPMAS の意思決定者および実務者（エンジニア等）
人数	28 名
日程	2022 年 12 月 1 日～13 日（13 日間）×1 回
場所	東京、および関東圏

出典：JICA T/C Team

研修の企画においては、下記の点に留意した。

- 日本の省エネ技術の素晴らしさを体感できる場とし、省エネ技術が実際に導入されているもしくは高い製造技術により製造されている現場への訪問を行った。
- 本件業務の関係者は MOERE、MOP、IDA、CAPMAS と多岐にわたっている。プログラムを（a）共通（全員受講）と、（b）テーマ別（電気班と石油班の2チームを編成）に分けた。
- 日本人専門家が研修に同行し、講義・見学により得られた知見・情報について随時議論できる体制を整えた。

1.3　参加者

本邦研修の参加者は28名であり、概要は以下のとおりである。

表 1-2：参加者の内訳

C/P	参加者数（名）
MOERE	5
MOP	9
IDA	8
CAPMAS	6
合計	28

出典：JICA T/C Team

1.4　内容（概要）

本邦研修の内容（概要）とスケジュールは以下のとおりである。

表 1-3：研修の内容（概要）とスケジュール

日時		電力班		石油班	
12月1日	木	17:20	成田空港着		
12月2日	金	9:30-11:45	JICAブリーフィング		
		12:00-12:30	プログラムオリエンテーション（by JICA T/C Team）		
		12:30-13:00	コロナ感染対策の説明、食事アンケート回収ほか		
		15:00-16:30	（講義）ビル省エネ講義	15:00-16:30	（講義）ピンチテクノロジーによる省エネ
12月3日	土	休日			
12月4日	日	休日			
12月5日	月	10:00-12:00	（講義）脱炭素・省エネに向けた世界の動向		
		14:00-16:00	（講義と視察）省エネビル認証制度	14:00-16:00	（講義）日本の低炭素化技術（カーボンリサイクル技術を中心に）
12月6日	火	9:30-11:00	（視察）ダイキンの省エネ技術		
		14:30-16:00	（見学）日立省エネ工場見学	13:00-14:30	（講義）日本の省エネ（石油分野を中心に）
12月7日	水	9:30-11:30	（視察）Azbilの省エネ技術	10:00-11:30	（講義）JCCPの人材開発事業、技術協力事業
		14:30-16:30	（視察）柏の葉アーバンデザインセンター	14:30-17:00	（視察）富士石油袖ヶ浦製油所
12月8日	木	10:30-12:00	（視察）家電の省エネ性能試験	09:30-12:00	（視察）横河電機の省エネ技術
		15:00-16:30	（講義）日本の省エネ政策・技術		
12月9日	金	10:00-11:00	（視察）山王熱供給の省エネ技術	10:00-12:00	（視察）積水ハウス エコ・ファースト パーク
		14:00-15:00	（視察）パナソニックの省エネ技術	16:00-17:00	（視察）パナソニックの省エネ技術
12月10日	土	休日			

12月11日	日	休日	
12月12日	月	10:30-12:00	（視察）東洋ライスサイタマ工場
		13:30-15:00	（視察）家電ラベル制度の運用改善および日本文化体験
12月13日	火	10:00-12:00	（講義）日本のエネルギー統計
		12:00-14:00	（討議）グループディスカッション （修了式）研修振り返り・修了式
		22:30	成田空港発

出典：JICA T/C Team

第2章　実施結果についての所見

研修最終日には研修管理員によるアンケート調査が実施され、研修員からフィードバックを得た。5段階評価（1～5）と記述式の質問項目によるアンケート用紙を配布し、回収した。下表は調査結果より該当部分を抽出し、アンケート結果を纏めたものである。

表 2-1：研修のモニタリング結果

質問項目概要	電力班	石油班
1. 研修成果 1）趣旨の理解 2）研修目標の達成 3）研修成果の活用 4) 記述式	3.53	4.16
2. 研修の全体デザイン 1）カリキュラムの構成 2）研修期間（*） 3）参加者人数の適正（*） 4) 記述式	3.69	3.96
3. プログラム内容の詳細と運営 1）記述式 2）講師の発表・説明 3）講師の専門性 4) 教材の質 5）参加者間の知見共有 6）コースリーダー/ファシリテーターの介入 7）通訳の質	3.88	3.73

出典：JICA T/C Team

（*）は 3 段階評価で、評価 3 を 5、評価 2 を 3、評価 1 を 1 に換算した。

記述式の質問に対する主な回答は、行政府や工場の現場で具体的にどのような省エネ活動を行っているのかを知りたかった、研修期間が短かった、グループを細かく分けてそれぞれの分野に特化した内容を扱って欲しかった等が主なものであった。

今回はコロナ禍での本邦研修実施となり、研修回数と日数の減少、受け入れ先の制約、衛生面での対応等がある中、研修員からは概ね満足の結果が得られた。

図 2-1：本邦研修の写真

研修コース名　省エネルギー推進（エジプト国エネルギー利用効率改善能力開発プロジェクト）
研修コース番号　E22111587
研修期間　2022/12/1　～　2022/12/13

添付資料１：研修詳細計画書（実績版）

研修プログラム名　省エネルギー推進に向けた知見・経験共有研修
研修プログラム番号　201900226J005
受入形態
研修員数　28　人

日付	時刻			形態	研修内容		講師又は見学先担当者等		講師使用言語	都道府県	研修場所	備考	連絡事項	強調
					電力	石油	氏名（敬称略）	所属先及び職位名						
12/1(木)	17:20	～		－	(EK0318 17:20成田着)日本入国⇒来日後待機施設へ移動		京成旅行会社	JICA東京	英語	東京都	－			
12/2(金)	9:30	～	11:45	講義	JICAブリーフィング		JICA担当者	JICA東京	英語	東京都	JICA東京			
	12:00	～	12:30	講義	プログラムオリエンテーション		JICA T/C Team	JICAプロジェクト	英語	東京都	JICA東京			
	12:30	～	13:00	講義	コロナ感染対策の説明、食事アンケート回収ほか		JICA担当者	JICA東京	英語	東京都	JICA東京			
	15:00	～	16:00	講義	ビル省エネ講義	－	川瀬　貴春	千葉大学名誉教授	日本語	東京都	JICA東京			
	15:00	～	16:30	講義	－	石油関連講義(ピンチテクノロジーによる省エネ)	松田　一夫	一般財団法人エネルギー総合工学研究所 プロジェクト試験研究部参事	日本語	東京都	JICA東京			
12/3(土)		～		－	休日		－	－	－	東京都	－	－	－	
12/4(日)		～		－	休日		－	－	－	東京都	－	－	－	
12/5(月)	10:00	～	12:00	講義	脱炭素・省エネに向けた世界の動向		吉田　公夫	JICA省エネ専門家	英語	東京都	JICA東京			
	12:00	～	13:00	－	昼食		－	－	－	東京都	JICA東京			
	14:00	～	16:30	講義	（講義と視察）省エネビル認証制度	－	幸田　淳貴	Green Building Japan	日本語	東京都	丸ビル　ROOM３			
	14:00	～	16:00	講義	－	日本の低炭素化技術（カーボンリサイクル技術を中心に）	酒井　奨	一般財団法人エネルギー総合工学研究所（IAE）炭素循環エネルギーグループ　部長	日本語	東京都	JICA東京			
12/6(火)	9:30	～	11:00	見学	ダイキンの省エネ技術		井上　究	ダイキン工業　東京支社渉外室	英語	東京都	ダイキンショールーム（新宿）			
	14:30	～	16:00	見学	日立省エネ工場見学	－	石川　仁	日立パワーソリューションズ 人事総務本部総務部地区総務統括センター 日立第二総務グループ	日本語	茨城県	日立パワーソリューションズ大沼工場 日立市東大沼町1-15-1			
	14:00	～	16:00	講義	－	日本の省エネ（石油分野を中心に）	圓井 道也	JICAプロジェクト　省エネルギー戦略（石油）1/ 三菱総合研究所(MRI)主任研究員	日本語	東京都	MRI（大会議室A）			
12/7(水)	9:30	～	11:30	見学	Azbilの省エネ技術	－	南　龍哉	Azbil	英語	神奈川県	Azbil藤沢テクノセクター			
	14:30	～	16:30	見学	柏の葉アーバンデザインセンター	－	黒澤　寿彦	柏の葉アーバンデザインセンターディレクター	日本語	千葉県	柏の葉			
	10:00	～	11:30	講義	－	JCCPの人材開発事業、技術協力事業	宮崎　英輝	一般財団法人国際石油・ガス・持続可能エネルギー協力機関(JCCP)　人材開発部　総務部ＤＸ推進グループジェネラルマネージャー	日本語	東京都	一般財団法人国際石油・ガス・持続可能エネルギー協力機関(JCCP)			
	14:30	～	17:00	見学	－	富士石油袖ヶ浦製油所	永田英記	富士石油株式会社　袖ヶ浦製油所　技術部長	日本語	千葉県	富士石油袖ヶ浦製油所			
12/8(木)	10:30	～	12:00	見学	家電の省エネ性能試験	－	平田亮太	日本空調冷凍研究所	日本語	神奈川県	日冷工（厚木）			
	9:30	～	12:00	見学	－	横河電機の省エネ技術	太田淳司	横河電機株式会社　エネルギー＆サステナビリティ事業本部 メジャーアカウント＆エネルギービジネスセンター営業部	英語	東京都	横河電機株式会社本社(三鷹)			
	15:00	～	16:30	講義	日本の省エネ政策・技術		鷲見　元宏	省エネルギーセンター国際協力本部	英語	東京都	JICA東京			
12/9(金)	10:00	～	11:00	講義	山王熱供給の省エネ技術	－	田中　雄次	山王熱供給株式会社　専務取締役	日本語	東京都	MRI会議室（CR-D）			
	14:00	～	15:00	見学	パナソニックの省エネ技術	－	森本 眞奈美	パナソニックセンター受付担当	日本語	東京都	パナソニックセンター東京未来区（お台場）			
	10:00	～	12:00	見学		積水ハウス　エコ・ファーストパーク	福島、市川	積水ハウス株式会社　エコ・ファーストパーク受付担当	日本語	茨城県	積水ハウス　エコ・ファースト パーク			
	16:00	～	17:00	見学	－	パナソニックの省エネ技術	森本 眞奈美	パナソニックセンター受付担当	日本語	東京都	パナソニックセンター東京未来区（お台場）			
12/10(土)		～		－	休日		－	－	－	東京都	－	－	－	
12/11(日)		～		－	休日		－	－	－	東京都	－	－	－	
12/12(月)	10:30	～	12:00	見学	東洋ライスサイタマ工場（精米施設）見学		牲川 秋生 (Niekawa Akio)	東洋ライス株式会社	英語	埼玉県	東洋ライスサイタマ工場 埼玉県坂戸市にっさい花みず木7-5 （坂戸西インターで降りてすぐ）			
	13:30		15:00	見学	家電ラベル制度の運用改善および日本文化体験		－	新宿		東京都	秋葉原			
12/13(火)	10:00	～	12:00	講義	日本のエネルギー統計		江藤諒	JICAプロジェクト　エネルギーデータマネジメント1 /一般財団法人 日本エネルギー経済研究所(IEEJ)	英語	東京都	JICA東京			
	12:00	～	13:30	討議	ディスカッション		JICA T/C Team	JICAプロジェクト	英語	東京都	JICA東京			
	13:30	～	14:00	発表	研修振り返り・修了式		JICA T/C Team	JICAプロジェクト	英語	東京都	JICA東京			
		～	22:30	－	TIC⇒成田・羽田空港、日本出国(EK0319 22:30成田着)			JICA東京	英語	東京都	－			

添付資料２：研修員／被招へい者リスト

氏名	役職
Mr. Saber Abdelhamed Abdelhamed Elhadary	General Manager (tent), EECCD, MoERE
Ms. Rehab Beder Hassan Ahmed	Team Leader, EECCD-MoERE
Ms. Marwa Mahmoud Elsayed Mahmoud	Senior Engineer, EECCD-MoERE
Ms. Noura Saad Abdelfattah Abouelsaad	Senior Engineer, EECCD-MoERE
Mr. Mohamed Ahmed Abdelmola Elsayed	Senior Energy Engineer, EECCD-MoERE
Ms. Elmallhy Rehab Mohamed Anwar Hafez Ali	Department Head of Technical Office, Project Planning, MOP
Mr. Wael Mohamed MohamedRezk Eish	Distillation General Manager, Operation Department, Cairo Oil Refining Company (CORC)
Mr. Wael Essameldin Ahmed Ahmed Bakr	Ceo Deputy Assistance for Energy Efficiency, Egyptian General Petroleum Corporation (EGPC)
Mr. Mohamed Mahmoud Selim Elewa	Energy Efficiency General Manager, Energy Efficiency Department, South Valley Egyptian Holding Petroleum Co. (GANOPE)
Ms. Nesreen Mohamed Salaheldeen Ahmad ElKanadeely	Assistant General Manager, HSE Affairs, MOP
Mr. Mohamaed Magdy Fathy Eleishy	Section Head of Preparing Studies and Procedures for Energy Efficiency, Energy Efficiency, General Petroleum Company
Mr. Almoatazbellah Mohamed Kamal Ibrahem AbdelKader	Undersecretary Assistant for Strategic Department, MOP
Mr. Hany Kamal Hassan Elrouby	Energy Conservation General Manager, Energy Conservation Department, Egyptian Natural Gas Holding Company (EGAS)
Ms. Allaa Mostafa Mohamed Safwat	Department Head for Energy Efficiency Studies and Projects, Egyptian Holding Petrochemical Company (ECHEM)
Mr. Mohamed Ahmed Fouad Ahmed Mohamed	Chairman Associate, Chairman Office, IDA
Ms. Duaa Muhammed Mustafa Hussein Badreldean	General Manager of the Administration, Pharmaceutical Project Administration/Central Administration of Technical Affairs, IDA
Ms. Noha Mohammed Saber Amin	General Manager, Power, Electrical and Electronic Project Department
Ms. Amira Hassan Said Hassan	Third Specialist Spinning and Weaving Engineer, Spinning and Weaving Department, IDA
Ms. Ebtesam Shehata Shaaban Omar	IT Operation and Applications Manager, Systems and Information Technology, IDA
Ms. Omaima Mohamed Kamal Yassin Hussein	Director, Department of Waste Treatment and Environmental Pollution, IDA
Ms. Noha Mohammed Abbass Yahia	Second Chemical Project Specialist, Environmental

	Protection Department, IDA
Ms. Marwa Mansour Hamed Said	Second Specialist Mechanical Engineer, General Department of Engineering Project, IDA
Ms. Naglaa Zeineldin Moussa Ali Hegab	General Manager for Construction and Industry Software, Construction and Industry Software Department, CAPMAS
Mr. Mohamed Ahmed Mohamed Osman	Project Coordinator, General Department for International Cooperation Department, CAPMAS
Ms. Marwa Ibrahim Hashem Sayed Ibrahim	Statistician, Electricity and Energy Department, CAPMAS
Mr. Ibrahim Sobhy Ahmed Hassan Elaraby	Head of Electricity and Energy Section, General Department for Industry and Energy, CAPMAS
Mr. Amenhoteb Amin Mikhail	Advisor to president, Economic Sector, CAPMAS
Mr. Ahmed Kamal Abdelaziz Ibrahim Alsaid	Advisor to president, President Office, CAPMAS

出典：JICA T/C Team

添付資料 11

供与機材・携行機材実績

貸与物品リスト
List of Property Lending

業務名称 (Name of Project)：エネルギー利用効率改善能力開発プロジェクト
対象国 (Country)：エジプト国
事業担当部課 (Division in Charge)：社会基盤部　資源・エネルギー課

（2023年5月現在）
(As of May 2023)

物品名称 (Name of Property)	規格・品番 (Standard, Part Number)	個数 (Quantity)	取得価格 (Purchase Price)			検査合格日 (Date of Inspection Passed)	配置場所 (Location)	現況 (Current State)	備考 (Remarks)	事業終了後の取扱い (After Completion of Project: Handover/Return)
			取得価格 (Purchase Price)	通貨 (Currency)	日本円換算取得価格 (In Japanese Yen)					
ノートパソコン	Dell Inspiron 5593 i7	8	8,962	USD	944,398	2020年9月23日	MOERE(2), MOP(2) IDA(2), CAPMAS(2)	稼働中	-	2023年6月8日までに実施機関に譲与予定
GfKエアコン及び冷蔵庫関連データ	Market size reports for Egypt for the years 2011 - 2019	1	24,392	USD	2,570,380	2020年9月14日	電子データ	稼働中	-	社会基盤部に提出済
ノートパソコン	HP Pavilion Laptop 15-eg0xxx SN:5CD053862K SN:5CD0516X90 SN:5CD053861S SN:5CD0516X9R	4	79,450	EGP	558,833.82	2021年6月27日	現地スタッフ（4人）	稼働中	-	2023年6月8日までに実施機関に譲与予定
パワーロガー本体(英語版200V級対応モデル、バックアップバッテリー内臓)	-CLAMP ON POWER LOGGER PW3360-21 -BATTERY SET PW9002	8	13,680	USD	1,667,892.96	2022年5月12日	プロジェクトオフィス	稼働中	-	2023年6月8日までに実施機関に譲与予定
データマネジメントソフト・ウェブホスティング	-	1	66,000	USD	8,941,000.00	2023年3月5日	CAPMAS	稼働中	-	2023年6月8日までに実施機関に譲与予定
【以下、JICAから貸与されている物品 (Property Lent by JICA)】										

添付資料 12

第 1 回合同調整委員会議事録

The Project for Capacity Development on
Energy Efficiency and Conservation

Minutes of 1st JCC Meeting in Cairo, Egypt

Date:
28th July 2021, 9:00 AM – 12:00 PM

Venue:
The main Conference Hall, Ministry of Electricity & Renewable Energy (MOERE)

Meeting Objectives:
The objective of the meeting is to present the key findings of the Capacity Assessment (CA) report and to collect comments from the Counterparts (C/Ps). Then to discuss and agree on the proposed Project Design Matrix (PDM) and the Plan of Operation (PO) of the project.

Key Participating Organizations:
Representatives of the C/Ps namely; MOERE, MOP, IDA and CAPMAS in addition to JICA Egypt Office and the JICA Technical cooperation Team (JTT). A list of participants is in Annex (1). Also, a lot of relevant persons participated remotely including JICA headquarters.

A. Meeting Objectives:

The objective of the meeting is to present the key findings of the Capacity Assessment (CA) carried out as the initial stage of this technical cooperation project (hereinafter referred to as "TC Project") and to collect comments from the C/Ps. Then to discuss and agree on the proposed Project Design Matrix (PDM) and the Plan of Operation (PO) of the project.

B. Opening

The meeting started with opening remarks introduced by C/Ps representatives as follows:

- **Dr. Eng. Ahmed Mohamed Mohina, First Under Secretary of State for Research, Planning, Authorities follow-up, MOERE**
  Dr. Mohina opened the meeting by welcoming the representatives of C/Ps and JICA Office team. Then, he expressed the appreciation to JTT for the conducted efforts. Then, Dr. Mohina noted to the Integrated Sustainable Energy Strategy to 2035 (ISES 2035), approved by the Supreme Energy Council (SCE) in 2016 since EE&C is considered as a key important issue in the national energy strategy.
  Dr. Mohina summarized the different EE&C programs developed in NEEAP-II to cover all sectors. In addition, it was mentioned the role of Energy Efficiency and Climate Change Directorate (EECCD) of MOERE in coordinating the different related EE&C programs in different organizations.
  He acknowledged the cooperation with JICA and showed the MOERE' full support to facilitate the smooth implementation of the JICA project activities to achieve the targets.

- **Mr. Ahmed Abdrabo, Assistance Chief of Petroleum Central Department, MOP**
  Mr. Abdrabo expressed the MOP interest in cooperation with JICA in the EE&C projects. He noted to the EE&C program conducted by Oil sector, since MOP has established the Energy Efficiency & Climate Division (EECD) within the ministry to support such leadership roles through creating the appropriate overarching governance processes and systems along with a world-class EnMS within the oil & gas sector. In addition, MOP also heads up the High Energy Efficiency Committee (HEEC) which was formed for approving the energy efficiency strategies, as well as setting up the policies, programmes and projects necessary for implementation in the petroleum sector. Mr.

Abdrabo expressed his appreciation to the effort of JTT in cooperation with Oil & Gas sector.

- **Dr. Heba Elnasharty - IDA chairman advisor for economic affairs, IDA, MOTI**
  Dr. Heba noted that the ministry of Trade & Industry as well as IDA target supporting energy efficiency in industrial sector. Therefore, IDA is willing to establish the 'EE&C unit' inside of IDA to expand EE&C activities in the industrial sector by utilizing its mandates and to create a unit system in cooperation with other project C/Ps (MOERE, MOP and CAPMAS) as well as IDA related entities.
  Dr. Heba expressed the interest of IDA in maintaining the good cooperation with JICA T/C project to achieve the optimum utilization of energy in industrial sector.

- **Mr. Mostafa Saad Badawi, First Under Secretary for Economic, CAPMAS**
  Mr. Mostafa noted to the interest of the cooperation between CAPMAS and JICA to implement the EE&C project, which is done through cooperating with the national C/Ps. He, mentioned that in spite of COVID 19 which postponed the project stages, the meetings held between the CAPMAS employees and JICA experts helped in developing an overview on the stages of submitting the annual statement of the electricity and energy statistics in CAPMAS, and then knowing the strength and weakness points in the electricity and energy statistics.
  Finally, he expressed the strong continue cooperation in order to improve the employees' capacities in all the C/Ps in the area of energy data management.

- **Ms. Mayada Magdy Ragheb, Country Senior Representative, JICA Egypt Office**
  Ms. Mayada started by thanking all C/Ps for their effective participation and strong cooperation with JTT. She showed the interest of JICA to continuously provide the support to all projects that serve the sustainability development goals including the T/C project for promoting EE&C on the national level.

C. Presentation

1. **Mr. Yasuhiro Sakamoto, Team Leader, (PADECO)** made a presentation explaining project profile as follows:

- The objective of the project is strengthen the institutional capacities of Government of Egypt toward further promotion of EE&C.
- The project structure includes four Task Teams;
  - TT-1 Energy Efficiency Policy/Program
  - TT-2 Energy Data Management
    All C/Ps (MOP, MOERE, IDA & CAPMAS) are involved in the first two tasks
  - TT-3 Electric Power Energy Efficient Technology/Equipment, with MOERE
  - TT-4 Oil Energy Efficient Technology/Equipment, with MOP.
- As the current status of the project, it was explained the draft report of CA for the four C/Ps has been developed based on benchmark, As-is assessment and Gap identification, To-Be Analysis & achievement scenario, and "Project Design Matrix (PDM) & Plan of Operation (PO)" have been updated.

2. **Ms. Mari Iwata, Sub Team Leader, (Mitsubishi Research Institute)**, reported CA outcomes relating to MOERE as follows *(remote participation)*:

- Key Findings:
  - EECCD is the central unit to promote EE&C. The department is led by strong leadership of general manager.
    Even though the number of officers is as small as five, it seems not to be realistic to expect the increase of manpower in the near future. Therefore it is important for EECCD to coordinate with other relevant authorities and companies such as Egypt ERA, NREA, EEHC and distribution companies.
  - Electricity Law stipulates basic EE&C measures in demand side including appointment of energy managers and development of energy registry.

To actually implement the law, capacity building is required in MOERE and other relevant organizations (Egypt ERA, EEHC and distribution companies), as well as in the industry.

- The challenge is that financial source has not yet been identified for MOERE-EECCD to implement EE&C initiatives and programs.
  It is essential to coordinate among development partners, and more sustainable source of financing will be required in the future.
- The data have not been fully collected nor analysed.
  It will be important for MOERE-EECCD to collaborate with other ministries which might possess energy and industry related data such as MOTI and CAPMAS. Such area of collaboration will need to be identified.
- The needs for two types of capacity building were identified, the first targets MOERE-EECCD in particular. It will be mainly by OJT and by closely working with the T/C team that capacity of each MOERE-EECCD member should be strengthened.

– The main activities that will be developed with MOERE:
  - EE&C policy PDCA system development
  - Preparing annual report for EE&C.
  - Operating manual, Standard Operating Procedure (SOP) and institutionalization in EECCD
  - Verification test of efficient ACs and home appliances
  - Support for improvement of energy audit capacity
  - Review of standards and labelling program
  - Awareness raising for EE&C
  - Trainings in Japan

3. Mr. Azhari Dafaalla, Energy Efficient Technology, (KBC Process Technology), reported CA outcomes relating to MOP as follows:

– **Energy Policy**
  - There are energy policies at most of the organisation levels. However, implementation and awareness of such policies needs to be reinforced.
  - Energy policies should be defined (and aligned with ISO 50001) for those organisations that don't have one yet, especially some affiliated companies.

– **Institutional Arrangements**
  - The energy efficiency organisation is well-defined at the MOP level and well supported with the HEEC, but the MOP needs to be equipped with more resources and tools to strengthen the team and help EECD to act as the regulatory arm for the petroleum sector.
  - At EGPC & Holding Companies' level, they have an Energy Efficiency Department, with uneven reporting lines, organisational structure, and staff numbers.
  - Affiliated companies have a very dispersed and varied organisation of teams in charge of energy efficiency.
  - At all levels there are several positions defined but not all of them yet filled. It is important to strengthen the efforts to fill vacancies.

– **Regulations**
  - The Energy Efficiency and Climate Department (EECD) in the MOP was established by the Ministerial Decree, as of 28 August 2018.
  - There is a lack of internal procedures and mandatory requirements to be implemented by EGPC & Holding Companies and affiliated companies in terms of MEPS, data collection and technical procedures, among others.
  - In addition, energy efficiency is not included in the design basis for new projects (grassroot facilities) or revamps, losing energy efficiency opportunities at early stages.
  - Recommendation is to develop a regulation including different mandatory requirements, such as:
    - Energy audits, annually or every two years depending on the facilities' energy consumption;
    - EnMS implementation and ISO 50001 certification, with a plan to include all the facilities in a timeframe of five to ten years;
    - MEPS for new equipment (electric motors, heaters, boilers, pumps, compressors, etc);

    - Energy efficiency criteria included for revamps and grassroots designs; and
    - Procedures to manage and minimise the gas flaring and methane emissions.
- **Finance & Incentives**
  - The energy source pricing mechanism has changed in the last few years where it has been connected to the Brent international price along with USD/EGP conversion factor. This has led to energy source prices increasing compared to the past fixed and subsidised prices.
  - Currently, there are no clear financial incentives to promote energy efficiency initiatives. Also, the energy self-produced and consumed is not considered as an operational cost, nor the flaring.
  - Recommendations are:
    - Develop a methodology to consider the self-produced consumptions and flaring in the operating costs of facilities;
    - Develop and implement a common methodology for energy efficiency projects evaluations, as well as to include an energy efficiency dimension in the new green field and brownfield projects;
    - Develop an energy efficiency projects portfolio to present to different international financial organisations when different calls are open;
    - Develop a legal framework to enable the ESCO models; and
    - Analyse the development of an energy efficiency revolving fund with an initial contribution from national budget and/or international funding to issue loans for energy efficiency projects
- **Information and Data Collection**
  - Although there is a data collection procedure for most of the companies, it is completed monthly and manually; and it takes a lot of time and KPIs are not useful to analyse operations and optimise them accordingly.
  - Recommendations are:
    - KPIs need to be better defined for corporate, sites and operational levels and should be based on energy intensity not absolute consumptions;
    - Define and establish guidelines for KPIs at the different facilities (upstream midstream, downstream, etc), and ensure the consistent implementation across the different companies;
    - Set clear and dynamic targets for each KPI defined; and
    - Develop automatic data collection, on a real-time, or at least daily basis, to give the energy efficiency teams a tool to identify deviations and take corrective measures in a timely manner
- **Capacity Building**
  - Although in the last five years different training activities were organised at all organisation levels, there is a lack of specific knowledge on energy efficiency topics and capacity building needs to be strengthened and deployed with a systematic approach, with clear KPIs to measure and control output values from training and improve the whole process.
  - Recommendations are:
    - A Comprehensive Energy Efficiency Capacity Building program should be developed with clear KPIs and measures;
    - The plan should include activities like CEM certification for those promoted by UNIDO and training on digitalized data collection and databases;
    - Development of energy efficiency manuals, best practices, and guides to build a platform of share content available for the whole organisation and companies;
    - Implement Learning Energy Efficiency Network models across the O&G industry, with the participation of different companies from the sector; and
    - Awareness of organisation members at all levels needs to be enhanced.

4. **Ms. Anna Miyaura, Capacity Development/Private Sector Coordinator (PADECO),** reported CA outcomes relating to IDA as follows *(remote participation)*:

- **The key CA findings of IDA**
  - IDA is executing body of MOTI polies and responsible for industrial land development & provision, industrial registry & issuing operational licenses, industrial zone management.

- Promoting EE&C activities
  - IDA reviews the expected quantity of energy consumption in the submitted proposal for industrial registration & licensing and checks the energy requirements of each sector.
  - IDA identify energy intensive factories.
- There is no strategy and policy focused on EE&C but IDA is willing to establish the Energy Efficiency & Conservation Unit (EECU)
- Some of the strategic pillars' projects emphasize and focus on energy efficiency, renewable energies and the green economy in (Industry and Trade Development Strategy, 2016-2020)
- There are seven entities (IDA, EOS, IMC, ENCPC, NQI, ICA and ECO-FEI) deeply related to EE&C activities in the industrial sector and willing to collaborate with this JICA project.

– **The gap analysis**
  - IDA has no department or unit dedicated for EE&C, but IDA has the intention to establish EECU.
    IDA needs an internal proposal for the (organization, mandate, objective, policies).
  - There are different entities under MOTI that perform EE&C activities in the industrial sector, but each activity is not totally organized.
    Necessary to link and coordinate all the EE&C activities in the industrial sector for integrated and effective EE&C promotion.
  - IDA has the mandate in granting the operation licenses and permissions of land use to industries.
    EECU has great potential to promote EE&C in the industrial sector because IDA can set energy efficiency measures in license applications and can coordinate EE&C activities in the industrial sector
  - There is a lack of specific experiences on energy efficiency topics.
    The capacity building needs to be strengthened at EECU of IDA. It is necessary to plan training programs for IDA in Egypt and Japan.
  - There are different trainings, consultation activities and financial support to the private sector by IDA related entities under MOTI.

– **The main activities that will be conducted with IDA**
  - As EECU of IDA will be newly established unit, IDA can firstly make a concept of EECU and manuals of EE&C activities.
  - Though there are no policies and regulations related to EE&C in IDA, it is considered that IDA can propose new policies and regulations under its mandates – land use and registration of industries as well as industrial zones.
  - Integrated EE&C activities in industrial sector through regular meetings with project counterparts to share the EE&C activities. In addition, EECU can take a central role of collaborative activities to link all the EE&C related activities in the industrial sector with other IDA related entities.

5. **Mr. Yoshihiko Kato, Energy Data Management, (PADECO),** reported CA outcomes relating to CAPMAS as follows:

– **Key Findings**
  - Publication Process is well-designed, with a good collaboration of many departments sharing their functional roles. It is with this good collaboration that energy statistics publications are published only with a limited number or personnel.
  - CAPMAS has a strong data collection capacity, especially the regional offices who are capable of reaching out to the whole nation.
  - Publication of some of the regular statistics are delayed.
  - There is only a limited communication opportunities with the beneficiaries of the statistical publications.

– **CAPMAS's Energy Statistics Management Capacity in Three Categories**
  - **Technical capacity**
    - Energy data management knowledge and skills are well-established and already exhibited through the past publications.
    - Statistics skills are institutionally embedded, supported by many of the senior experts in the Agency.

- International exposures and interactions on energy data management are practiced with various international organisations.

- **Core Capacity**
  - Data collection, checking, analysis, compilation and publishing skills are collectively (institutionally) being exhibited and practiced in a systematic way.
  - Managerial capacity to clearly indicate the orientation for improvement and goal achievement requires to be reinforced.
- **Enabling Environment**
  - Institutional infrastructure for data submission (inter-ministerial agreements) is yet to be established.
  - Technical infrastructure for data collection needs to be established in response to the institutional infrastructure establishment.
  - The constraints not to release subordinate statistics before superior statistics is hampering the timely publication of products.

– **Activities with CAPMAS**

Actual activities to be conducted by TT2 for CAPMAS after CA include;

- In-house trainings for CAPMAS on international standard energy data management
- Overseas training (Japan) for CAPMAS on energy data management.
- Documentation of the standard business process including inter-organizational coordination as MOU and BPM.
- Development of prototype energy data management system (EDMS) at CAPMAS

6. Mr. Yasuhiro Sakamoto

The updated PDM and PO are presented. Due to the delay of full-scale implementation of the project and to fulfil the activities of the PDM, the necessity of project period extension has been explained. That is, the project completion report shall be submitted in May 2023. There was no objection from all C/Ps on this regard.

7. Mr. Susumu Yuzurio, Senior Director, (Energy and Mining Group, Infrastructure Management Department, JICA),

As the world heads towards a zero emissions society, the role of energy efficiency and conservation gains critical importance. JICA appreciates the dedicated cooperation among C/Ps especially during the difficult time of the COVID-19 global pandemic. At the same time, it should be reminded that each C/P has ownership over this project.

D. Summary of Discussions

– Dr. Ahmed Mohina (MOERE), suggested that the evaluation and analysis must depend on the same criteria. Also he asked for providing more EE&C success stories in different countries like Japan.

– Regarding the lack in the manpower of EECCD, Dr. Mohina illustrated that, if there are more activities and tasks, MOERE will added staff to work on these activities.

– Mr. Abdrabo (MOP), emphasized on developing EE standard and enhance the EE fund. Moreover, He asked for developing continues training programs to sustain the project outputs especially with technical, practical and simulation activities.

– Dr. Haba Elnasharty (IDA), asked to develop audits and benchmarking studies for each type of industrial sector, because this will help in developing the necessary EE&C policies in industrial sector based on actual EE&C measures impacts.
In addition the results of the studies will be shared among other industries to be aware about the best technologies.

E. Follow-up Actions and Conclusions

The meeting was closed with the indicative timeline of the next steps as below:

– JTT will prepare a CA report to C/Ps after incorporating the comments; and
– All C/Ps and JTT are agreed on the updated PDM and the PO.

End of Document

Attachments:

Annex 1: List of Key Participants
Annex 2: Updated Project Design Matrix (PDM)
Annex 3: Updated Plan of Operation (PO)

Dr. Eng. Ahmed Mohamed Mohina, First Under Secretary of State for Research, Planning, Authorities follow-up, MOERE	Mr. Ahmed Abdrabo, Assistance Chief of Petroleum Central Department, MOP
Dr. Heba Elnasharty, IDA Chairman Advisor for Economic Affairs, IDA, MOTI	Mr. Mostafa Saad Badawi, First Under Secretary for Economic, CAPMAS
Yasuhiro Sakamoto, JICA T/C Project Team Leader, (PADECO)	

Annex 1

List of Participants

No.	Name	Title	Authority
Ministry of Electricity & Renewable Energy (MOERE)			
1	Dr. Ahmed Mohamed Mohina,	First Under Secretary for Research, Planning, Authorities Follow-up	MOERE
2	Ms. Taghrid El-Ayatie	General Manager	EECCD/MOERE
3	Ms. Azza Shaban	GM of Energy Rationalization	EEHC
4	Ms. Azza Ali Abdou	Senior Planning Engineer	Egypt ERA
5	Ms. Nora Saad	Engineer	EECCD/MOERE
6	Mr. Mohamed Abd-El-Mawla	Engineer	EECCD/MOERE
7	Ms. Marwa Konsowa	Engineer	EECCD/MOERE
8	Ms. Rehab Beder Hassan	Engineer	EECCD/MOERE
9	Ms. Sohad Mahmoud	Testing Engineer	NREA
Ministry of Petroleum & Mineral Resources (MOP)			
10	Mr. Ahmaed AbdRabou	Assistance Chief of Petroleum Central Dept.	MOP
11	Mr. Wael Essam	Assistant vice chairman for EE	EGPC
12	Mr. Mohamed Abd- ELMoneam	Assistant General Manager	EECCU/MOP
13	Ms. Sahar Nabil ElDeeb	EE General Manager	EGAS
14	Mr. Mahmoud Maher	Department manager	EECCU/MOP
Industrial Development Authority (IDA)			
15	Dr. Heba El-Nasharty	Chairman Economic Advisor	IDA
16	Ms. Zainab Nasr Hosny	Economic Researcher	IDA
17	Mr. Mohamed Fouad Negm	Chairman Associate	IDA
Central Authority for Population, Mobilization and Statistics (CAPMAS)			
18	Mr. Mostafa Saad	First Under Secretary for Economic	CAPMAS
19	Dr. Amenhoteb Amin	General Manager	CAPMAS
20	Ms. Yasmin Ahmed Mahmoud	Responsible for Asian Cooperation/ JICA Project	CAPMAS
JICA Egypt Office			
21	Ms. Mayada Magdy Ragheb	Country Senior Representative	JICA Egypt Office
22	Mr. Hikaru Takahashi	Representative	JICA Egypt Office
23	Ms. Neven ZakyGhaly Salaem	Chief Program Officer	JICA Egypt Office

Annex 2

Project Design Matrix

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS)

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

Version 2

Dated 20 July 2021

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report			
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established.	- Energy Efficiency Annual Report - JICA Project monitoring Report	Government policy for energy efficiency and energy subsidies is maintained ***Note: electricity subsidies are to be completed in 2024/25***		
Outputs					
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 1-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 1-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE, MOP, IDA, CAPMAS) 1-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 1-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 1-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 1-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 1-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 1-3-4 1) IDA holds EE&C workshops 3 times. 2) Targeted companies prepare its EEC roadmap. 1-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA project monitoring report - Minutes of Meetings			
2. TT2 (MOERE, MOP, IDA, CAPMAS) CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 2-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 2-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 2-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 2-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project monitoring report - Meeting minutes of feedback / follow-up meetings among the four executing agencies.			

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
3. TT3 (MOERE) 3-1 Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	3-1-1 Standard method for collecting and analyzing macro and micro data is introduced and data base is developed (linking to TT2) 3-1-2 Energy efficiency promotion roadmap including awareness raising is developed 3-1-3 Annual report template is introduced 3-1-4MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project monitoring report	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group		
3-2 Potential technology for energy efficiency is examined and promotion policy is proposed.	3-2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 3-2-2 Effectiveness of home appliances including energy efficiency standards and labeling program such as fridge, AC and lighting is verified				
4. TT4 (MOP) 4-1 Review of EE&C Framework Related to MOP and Organizing its issues	4-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report	* Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap)			
4-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)	4-2-1Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 4-2-2 On job and class room training of 15 MOP personnel (5 workshops)	*Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) * Training lists * JICA Project monitoring report			
4-3 Support for Development of EE&C Strategy and Roadmap	4-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 4-3-2 Standardised format and media for data collection is introduced (linking to TT2)	* Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap)			
4-4 Development of Manuals and SOPs to strengthen EE&C Activities	4-4-1 Issuance of SOP describing the key energy auditing activities in the petroleum sector	* Petroleum sector SOPs			

Activities	Inputs		Important Assumption
	The Japanese Side	The Egyptian Side	
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 1-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 1-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 1-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 1-3-3 Integrated activities are organized in the industrial sector. 1-3-4 Workshops for private sector of EE&C are held. 1-3-5 Training are held for IDA personnel.	1. Dispatch of the Japanese experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit・Technology (Electric Power) 1 - Energy Audit・Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil) - Energy Audit (Oil) 1 - Energy Audit (Oil) 2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Public Awareness Coordinator1 - Capacity Development/Private Sector Collaboration Coordinator2 2. Trainings & seminars - Trainings in Egypt - Trainings in Japan (3 times) - Seminars in Egypt (2 times) 3. Facilities and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (PD) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/Ps wages and allowances - C/Ps domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
2. TT2 (MOERE, MOP, IDA, CAPMAS) 2-1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 2-2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 2-3 In-house trainings for 4 C/Ps on international standard energy data management. 2-4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 2-5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA. 2-6 Overseas training in Japan for CAPMAS on energy data management.			
3. TT3 (MOERE) 3-1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 3-1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 3-1-3 Implementation capacity of EECCO staff is developed including data management and policy making. (personal, training) 3-1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 3-1-5 Development of awareness raising program and support for implementation. 3-2-1 EE demonstration for air-conditioner in residential places. 3-2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			Pre-Conditions
TT4 (MOP) 4-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 4-1-2 Benchmarking against international practices 4-1-3 Conduct workshops to share outcome of analysis 4-2-1 Site visit to Pilot refinery (energy auditing) 4-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 4-2-3 Develop site-wide utility model for pilot refinery 4-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 4-2-5 Conduct 4 training workshops (5 days per each workshop) 4-2-6 Energy efficiency framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 4-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, benchmarking, gap analysis and KPI management etc. 4-3-1 Drafting strategic roadmap for petroleum sector 4-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 4-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 4-4-1 Develop EE audit SOP 4-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures>

Annex 3

Plan of Operation (draft)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Version 2
Dated 20 July 2021

Inputs	Year	2020				2021				2022				2023		Remarks	Monitoring	
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II		Issue	Solution
		1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6	7 8 9	10 11 12	1 2 3	4 5 6			
Expert																		
Note: Ten non-Experts after Aug 2021 is yet confirmed																		
Team Leader/Energy Efficiency Policy 1 (Leader)	Plan																	
	Actual																	
Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader)	Plan																	
	Actual																	
Energy Data Management 1	Plan																	
	Actual																	
Energy Data Management 2	Plan																	
	Actual																	
Energy Efficiency Strategy/Program (Electric Power)	Plan																	
	Actual																	
Energy Audit・Technology (Electric Power) 1	Plan																	
	Actual																	
Energy Audit・Technology (Electric Power) 2	Plan																	
	Actual																	
Pilot Project (Electric Power)	Plan																	
	Actual																	
Energy Efficiency Strategy (Oil) 1	Plan																	
	Actual																	
Energy Efficiency Strategy (Oil) 2	Plan																	
	Actual																	
Energy Efficiency Strategy (Oil) 3	Plan																	
	Actual																	
Energy Efficient Technology (Oil)	Plan																	
	Actual																	
Energy Audit (Oil) 1	Plan																	
	Actual																	
Energy Audit (Oil) 2	Plan																	
	Actual																	
Energy Audit (Oil) 3	Plan																	
	Actual																	
Energy Audit (Oil) 4	Plan																	
	Actual																	
Energy Audit (Oil) 5	Plan																	
	Actual																	
Public Awareness/Coordinator1	Plan																	
	Actual																	
Capacity Development/Private Sector Collaboration/Coord	Plan																	
	Actual																	
Equipment																		
Pilot Project (AC)	Plan																	
	Actual																	
Pilot Project (Smart home)	Plan																	
	Actual																	
Software (petroleum sector) Note: Agreement to be concluded between MOP and KRC by Aug 2021	Plan																	
	Actual																	
Training in Japan																		
	Plan																	
	Actual																	
In-country Training/workshop																		
Note: (TT2) Data experts to each C/P (4x4=16 times)	Plan																	
	Actual																	

Activities / Sub-Activities	Year	2020				2021				2022				2023		Responsible Organization		Achievements	Issue & Countermeasures
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	Japan	GOE		
Output 1: TT1																			
(MOERE, MOP, IDA, CAPMAS)																			
Output 1-1: Examination /preparation for national integrated EE&C policy formulation is encouraged.																			
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-1 Summarization of a future national integrated EE&C policy and its action plan.	Plan																		
	Actual																		
1. TT1 (MOERE, MOP, IDA, CAPMAS) 1-2 EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, how).	Plan																		
	Actual																		
(IDA)																			
Note: CA activities of IDA have been concluded in Jul.2021.																			
Output 1-2: EE&C activities in the industrial sector is strengthened for EE&C socio economic development.																			
1-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed.	Plan																		
	Actual																		
1-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined.	Plan																		
	Actual																		
1-3-3 Integrated activities are organized in the industrial sector.	Plan																		
	Actual																		
1-3-4 Workshops for private sector of EE&C are held.	Plan																		
	Actual																		
1-3-5 Training are held for IDA personnel.	Plan																		
	Actual																		
Output 2:TT2 (MOERE, MOP, IDA, CAPMAS)																			
Note: CA activities of CAPMAS have been concluded in Jul.2021.																			
CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.																			
2. TT2 (MOERE, MOP, IDA, CAPMAS) 2.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion.	Plan																		
	Actual																		
2.2 Gap analysis of 4 C/Ps' data collection capacity and target setting.	Plan																		
	Actual																		
2.3 In-house trainings for 4 C/Ps on international standard energy data management.	Plan																		
	Actual																		
2.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (SPM).	Plan																		
	Actual																		
2.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.	Plan																		
	Actual																		
2.6 Overseas training in Japan for CAPMAS on energy data management.	Plan																		
	Actual																		

Output 3: TT3 (MOERE)

Note: CA activities of MOERE have been concluded in Jul.2021

3-1 Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.

3 -TT3 (MOERE) 3-1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy)	Plan	
	Actual	
3-1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy)	Plan	
	Actual	
3-1-3 Implementation capacity of EECCD staff is developed including data management and policy making. (personal, training)	Plan	
	Actual	
3-1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training)	Plan	
	Actual	
3-1-5 Development of awareness raising program and support for implementation.	Plan	
	Actual	

3-2 Potential technology for energy efficiency is examined and promotion policy is proposed.

3-2-1 EE demonstration for air-conditioner in residential places.	Plan	
	Actual	
3-2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.	Plan	
	Actual	

Output 4: TT4 (MOP)

Note: CA activities of MOP have been concluded in Jul.2021

4-1 Organizational and personal capacity for governance of EECD in MOP and relevant agencies is enhanced and strategic roadmap is developed.

4-1 Review of EE&C Framework Related to MOP and Organizing its issues (Activities 4-1-1 to 4-1-3)	Plan	
	Actual	

4-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)

4-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) (Activities 4-2-1 to 4-2-7)	Plan	
	Actual	Follow up for software utilization

4-3 Support for Development of EE&C Strategy and Roadmap

4-3 Support for Development of EE&C Strategy and Roadmap (Activities 4-3-1 to 4-3-3)	Plan	
	Actual	

4-4 Development of Manuals and SOPs to strengthen EE&C Activities

4-4 Development of Manuals and SOPs to strengthen EE&C Activities (Activities 4-4-1 to 4-4-2)	Plan	
	Actual	

		Remarks	Issue	Solution
Joint Coordinating Committee	Plan			
	Actual			
Set-up the Detailed Plan of Operation	Plan			
	Actual			
Submission of Monitoring Sheet	Plan			
	Actual			
Reports/Documents				
Work plan (revised)	Plan			
	Actual			
Capacity assessment report	Plan			
	Actual			
Monitoring sheet	Plan			
	Actual			
Work completion report	Plan			
	Actual			
Project Completion Report	Plan			
	Actual			
Public Relations				
Seminars in Egypt	Plan			
	Actual			

添付資料 13

第 2 回合同調整委員会議事録

The Project for Capacity Development on Energy Efficiency and Conservation

Minutes of 2nd Joint Coordinating Committee (JCC) Meeting in Cairo, Egypt

Date & Time:
24th January 2022, 9:00 AM – 12:30 PM

Venue:
Teeba Ballroom in Intercontinental Semiramis hotel

Meeting Objectives:
The objective of the meeting is to present the overall project progress of the activities/outputs to date and issues to be tackled at the next step from each task team. Then discuss and collect comments from the Counterparts (C/Ps) and agree on the proposed Project Design Matrix (PDM) version 3 of the project.

Key Participating Organizations:
Representatives of the C/Ps namely, Ministry of Electricity & Renewable Energy (MOERE), Ministry of Petroleum & Mineral Resources (MOP), Industrial Development Authority (IDA) and Central Agency for Public Mobilization and Statistics (CAPMAS). Officials at JICA headquarters and Egypt Office participated through remote communication and JICA Technical Cooperation Team (JTT) members participated at the venue. A list of the key participants is attached in Annex (1).

A. Meeting Objectives

The objectives of the meeting are to present the project progress of the activities/outputs to date and issues to be tackled at the next step from each task team. Then discuss and collect comments from the C/Ps and agree on the proposed PDM of the project.

B. Opening remarks

The meeting started with opening remarks introduced by C/Ps representatives and Chief Representative of JICA Egypt Office as follows;

- **Dr. Eng. Ahmed Mohamed Mohina, First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE**

  Dr. Mohina expressed his great appreciation to the Japanese Government and JICA for their efforts in supporting the Egyptian electricity sector. In addition, he thanked the C/Ps representatives for their cooperation and effective participation in the Technical Cooperation (T/C) project.

  Dr. Mohina pointed out the importance of the JICA T/C project in determining the needs for improving energy efficiency, strengthening the institutional and personal capacities of the Energy Efficiency Unit not only at MOERE but also at MOP & IDA, in cooperation with the data management system at CAPMAS.

  Dr. Mohina summarized National Energy Efficiency Action Plan (NEEAP)-II for electricity consumption in Egypt which includes a lot of important programs to be done for achieving green growth and sustainability in accordance with Egypt's 2030 Vision & Energy Strategy 2035 to achieve 42% Renewable Energy share till 2035 and consider energy efficiency measures with the target of 18% energy reduction.

  Finally, Dr. Mohina hoped that the 2nd JCC to be a base stone for achieving a successful mission for supporting the sustainable development plans in Egypt.

- **Mr. Mohamed M. Abd El-Monem, Assistant General Manager, Energy Efficiency and Climate Department (EECD), MOP**

Mr. Abd El-Monem expressed the MOP's sincere appreciation to the JICA for its efforts in supporting the energy sector. He also expressed the importance of the 2nd JCC to overlook the activities of the different components of the project and to coordinate the C/Ps to maximize the project output.

Mr. Abd El-Monem addressed the MOP efforts during the last six months since the 1st JCC; such as the final stage of developing the Energy Management System Framework (EMSF) roadmap for the oil sector and the energy efficiency audit at Cairo Refining Co. (CORC).

Mr. Abd El-Monem referred to the Conference of the Parties (COP)-27 in Egypt this year and mentioned the keenness of MOP to present some of the outputs of the T/C project in this international event. In this regard, MOP asked the consultant to present the EMSF roadmap to the High Energy Committee at MOP. The Committee approved the roadmap and issued its instructions to start the implementation of the sprint initiatives immediately.

Finally, Mr. Abd El-Monem invited JICA and C/Ps to the next Egyptian Petroleum Sector Energy Efficiency Conference & Exhibition (EPEEC 2022) which is scheduled on 17 & 18 of May.

- **Dr. Heba Elnasharty - IDA chairman advisor for economic affairs, IDA, Ministry of Trade and Industry (MOTI)**

Dr. Heba expressed the pleasure to join the 2nd JCC meeting to recognize the achievements of the JICA T/C project. She added that IDA has received good supports from the JICA project as well as the C/Ps during the last six months since the 1st JCC. Then, Dr. Heba announced the establishment of the Energy Efficiency & Conservation Unit (EECU) at IDA which represents a significant achievement of the JICA T/C project.

Finally, Dr. Heba expressed the interests of IDA in maintaining good cooperation with the JICA T/C project to develop the capacity of the EECU to achieve the optimum utilization of energy in the industrial sector.

- **Mr. Mostafa Saad Badawy, First Undersecretary, Head of Economic Statistics Sector, CAPMAS**

Mr. Mostafa expressed the pleasure to meet again in the framework of this project with the JICA, JTT and C/Ps. In this regard, he revealed that coordination of joint efforts is the only way to achieve success in supporting the development of energy efficiency policies in Egypt and seeking to sustainability in the future.

Mr. Mostafa pointed out the eagerness of CAPMAS to cooperate with all partners in implementing activities related to developing and improving the Annual Energy Bulletin and the National Energy Data Balance in accordance with international practices and standards.

Mr. Mostafa highlighted the importance of conducting group work training in the framework of the JICA T/C project with the participation of representatives from the C/Ps like the first batch training that was implemented last December.

Mr. Mostafa stated that, given the current circumstances of COVID-19, which delayed the implementation of some activities, CAPMAS agreed on extending the project until mid-2023, and looking forward to implementing the planned activities in a timely manner.

Finally, Mr. Mostafa noted the willingness of CAPMAS to continue cooperation, and exert more effort to achieve the project's objective to ensure its future effectiveness to serve the economic and environmental development in Egypt.

- **Mr. OMURA Yoshifumi, Chief Representative, JICA Egypt Office**

Mr. OMURA expressed his pleasure to join the 2nd JCC with all C/Ps and to see many of the JICA T/C project's achievements through fruitful cooperation such as energy audit in refinery, energy data management, the establishment of EECU at IDA, and the Pilot Project at E-JUST (Egypt-Japan University of Science and Technology) for Air Conditioner (AC) demonstration test.

On the other hand, he took this opportunity to congratulate Egypt for hosting COP-27 this year and request the JTT and C/Ps to continue their cooperation for building more concrete achievements that can be presented in COP-27.

Finally, Mr. OMURA expressed the interests of JICA to continuously provide supports to the T/C project for promoting EE&C at the national level of Egypt.

C. Presentations

1. **Mr. Yasuhiro Sakamoto, Team Leader,** made a presentation explaining the overall project progress based on PDM as follows:

- **Overall Goal and Project Purpose**
  - The goal of the T/C project is to strengthen the institutional capacities of the Government of Egypt toward the further promotion of EE&C.
  - The project purpose is to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas sector Modernization Program (OGMP). JTT will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies, plans, data management, and expansion of the introduction of high-efficiency equipment.
- **Achievement 1: The administrative capacity of Energy Efficiency and Climate Change Department (EECCD) of MOERE for EE&C promotion is strengthened (Task Team 3 (TT3)- MOERE)**
  - EE&C PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy)
  - Updating EE&C methods, drafting EE&C roadmap and template of EE&C annual report. (Organizational, policy)
  - Implementation capacity of EECCD staff is developed including data management and policy making. (Personal, training)
  - Developing evaluation method of energy efficient technology and calculation method of EE&C potential. (Personal, training)
  - Development of awareness raising program and support for implementation.
- **Achievement 2: Evaluation of technologies and products with high energy saving potential is conducted, and promotion policies are proposed (TT3- MOERE)**
  - Effectiveness of efficient air-conditioner in building is verified including economic efficiency, environmental standard. The data collection is underway and the initial results have been analyzed.
  - Effectiveness of home appliances including energy efficiency standards and labelling program such as refrigerator, AC and lighting is verified. In addition, smart home sensor is being developed and manufactured while the data collection is planned to be started from Jan.2022.
- **Achievement 3: The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created (TT4- MOP)**
  - Review of EE&C Framework Related to MOP and Organizing its issues, and its report was prepared as part of the Capacity Assessment (CA) report.
  - Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery). Work under progress for pilot plant audit report (already issued benchmark/gap analysis / preliminary list of opportunities). 5 trainings and 2 additional workshops held onsite.
  - Support for Development of EE&C Strategy and Roadmap. Preliminary roadmap was prepared and validated with main stakeholders. The final roadmap is currently under development. On the other hand, cooperation activities with MOP and CAPMAS under TT2 to revise energy balance data collection process/report was conducted.
- **Achievement 4: Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. (TT1 - MOERE, MOP, IDA, CAPMAS)**

- Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. With regard to this, the presentation will be made later.
- Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g., when, who, what, how).
- Some trainings have been carried out to IDA regarding EE&C activities in the industrial sector and the EECU in IDA is established.

- **Achievement 5: CAPMAS publishes national energy statistics, which are referred to by 3 C/Ps for making and monitoring EE&C promotion policies. (TT2- CAPMAS, MOERE, MOP, IDA)**
  - On-the-Job Training (OJT) for 4 sessions, and group training for 6 sessions held in Dec 2021.
  - Standardized national energy balance table prepared. Data inventory as the standardised data collection format created.
  - Contents of the upcoming national energy balance publication being considered at CAPMAS.

Then Project Schedule (as of January 2022) is presented and its material is attached in ANNEX 3-1.

2. Ms. Mari Iwata, Sub-Team Leader, made a presentation on the activities/outputs to date regarding TT3 as follows;

- **Supports for the improvement of energy audit capacity where:**
  - Lecture-based training to qualify MOERE officers to be LEED-certified against EE&C-related program (= Leadership in Energy and Environmental Design, LEED). The 1st two-day lecture was conducted and attended by 10 participants from MOERE, Egyptian Electricity Holding Company (EEHC), and Egyptian Electric Utility and Consumer Protection Regulatory Agency (Egypt ERA).
  - On the other hand, an on-site energy audit training will be conducted at the Training Center of South Cairo Distribution Company and energy audit equipment (power loggers) are being procured.

- **Standard and labelling program**
  - Revision of standards and labelling program where a kick-off stakeholder meeting was held, participated by MOERE, Egyptian Organization for Standards and Quality[1] (EOS), General Organization for Import & Export Control (GOEIC), Consumer Protection Agency (CPA), Environmental Compliance and Sustainable Development Office of the Federation of Egyptian Industries (ECO-FEI). They shared about their activities and challenges faced to improve the system implementation.
  - In addition, a training (Workshop) is being prepared, based on discussions with EOS, to learn lessons from the Japanese system.

- **Development of the EE&C annual report format of MOERE**
  - The data collection and format preparation are in progress.

- **The pilot project at E-JUST**
  - A pilot project was conducted in collaboration with E-JUST in one of their dormitories. The data collected during the summer season confirms the clear superiority of inverter technology. It saves 50% of power consumption. From December.2021, AC has been used for the space heating and the data collection will cover seasonal changes.

[1] EOS is one pf the affiliates of MOTI and is the competent and official body responsible for standardization activities, quality and industrial metrology aiming at increasing the competitiveness of the Egyptian products in the international and regional markets along with consumer's and environment protection. The efficiency related standards have been discussed in technical committee under EOS participated by all the stakeholders including manufacturers and importers.

- In addition, another pilot project is conducted in collaboration with E-JUST in 5 houses, where power consumption of major appliances will be measured over six months by locally manufactured power sensors.

– **Issues to be tackled at the next step**

- Development of "feasible" data analysis and reporting methodologies, in collaboration with other stakeholders, to prepare annual EE&C Report.
- To conduct the on-site training as scheduled, it is important to check the procurement / delivery time of the energy audit equipment.
- The collaboration with certain selected families for a smart home test, especially at the initial data collection stage is very important to conduct the AC test and smart home test.
- More discussions with stakeholders to identify the expected outcomes from the energy efficiency Standard & labelling program.

Then the timetable for 2022 was presented and its material is attached in ANNEX 3-2.

3. **Mr. Mohamed M. Abd El-Monem, Assistant General Manager, EECD, MOP** and **Mr. Azhari Dafaalla, TT4 Leader,** made presentations / discussions on the activities/outputs to date regarding TT4 as follows;

– **Technology / Capability development**

- Three days of training for "Achieving Optimum Energy Efficiency, AOEE "was conducted attended by 12 participants from Oil & Gas Sector.
- Issuance of the preliminary list of energy-saving opportunities as part of the CORC refinery pilot energy audit in which 68 "preliminary" opportunities were identified with potential annual energy savings equivalent to about EGP160 million examined. According to CORC request, JTT is updating and finalizing the opportunities list and the accepted opportunities will qualify to the final roadmap
- Four days of lecture-based "Identifying and Evaluating Energy Savings" training was conducted targeting CORC and other sister companies' employees, attended by 15 participants from oil & gas sector. Hands-on software wasn't provided as planned due to the delay in signing the software agreement between MOP and KBC. This will be compensated for in the upcoming planned training.

– **Roadmap for Energy Management System Framework for petroleum sector**

- JTT has developed the preliminary EMSF roadmap that covered the five key EMSF elements (Organisation and governance, regulations, finance, information, and capacity building).
- A preliminary roadmap validation workshop has been conducted with participation from 23 key stakeholders dividing into 4 groups to discuss each of the EMSF elements, validate the roadmap recommendations and identify implementation prerequisites/resources/barriers.

– **Issues to be tackled at the next step**

- Software hands-on training, where smooth distribution and collection of laptops to avoid any inconvenience and onsite & offsite close monitoring of training.
- To gain the leadership and ownership for EMSF Roadmap, high level management commitment is required. A plan for conducting two awareness workshops for Petroleum sector Chairmen in Cairo and Alexandria.
- For marketing the SPRINT phase in the Roadmap Initiatives, continuing work with MOP is needed to market as much as possible the initiatives that are classified as "High Priority" or "SPRINT" phase.

Then, the timetable for 2022 was presented and its material is attached in ANNEX 3-3.

4. **Mr. Yoshihiko Kato, TT2 Leader,** made a presentation on the activities/outputs to date regarding TT2 as follows;

– **Assessing CAPMAS's institutional capacity on energy data management**

- Capacity assessment conducted, where CAPMAS has a good institutional capacity to publish energy-related statistics.
- CAPMAS needs a mechanism to continuously improve its products, and Improvement in energy data management is suggested.

– **Gap analysis of 4 C/Ps' data collection capacity, and target setting**

- OJT conducted at CAPMAS to identify the gaps between the proposed national energy balance table and the existing examples.
- A good Egyptian national energy balance table will be prepared.

– **In-house training for 4 C/Ps on international standard energy data management**

- First batch group training on energy data management is conducted, since definition, consistency, comprehensiveness, continuity, and explanatory information are required.
- International standard shall be reflected on the upcoming National Energy Balance Table publication.

– **Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM)**

- To be performed after identifying and agreeing on the data collection format and process.
- Next step is the finalization of Data inventory, Data ownership identification. Process defining then drafting BPM.

– **Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP, and IDA**

- System requirement document is being pre-drafted.
- Next step is sharing with CAPMAS and other data owners for review and procurement arrangements to be taken.

– **Issues to be tackled at the next step**

- TT2, in close consultation with CAPMAS, should now draft an adequate specification for EDMS development.
- TT2, in close collaboration with all the participating organizations, should set appropriate calorific value conversion factors for some of the energy products.
- TT2 must draft a business process manual that will create a favourable collaboration environment for energy data sharing and utilization among CAPMAS, MOERE, MOP, and MOIT-IDA.

Then the timetable for 2022 was presented and its material is attached in ANNEX 3-4.

5. Ms. Anna Miyaura, TT1 (IDA part) Leader, made a presentation on the activities/outputs to date regarding TT1 (IDA part) as follows;

– **Preparation for establishment of EECU of IDA**

- Two Training are held to study Japanese example and other five countries regarding EE&C in industrial sector.
- The objectives, mandate, and organization structure of EECU are studied with IDA staffs and updated by recommendations from JICA team.
- EECU was launched in January 2022.

– **Integrated activities are organized including the industrial sector**

- Introduced of EE&C activities and discussed cross-sector approach of EE&C from C/Ps (MOP &MOERE) and JTT.
- First integrated meeting was conducted with 8 MTI affiliated entities and EECU to discuss the cooperation in implementing EE&C activities in industrial sector.

– **Issues to be tackled at the next step**

- Additional capacity building of newly established EECU is planned and the activity plan of EECU will be made after CA of EECU.

- Foster the integration with MTI affiliated entities, where continuous integrated activities are expected. IDA requested for detailed/full scope audit training for measuring factories energy efficiency and determining the required actions to improve the energy efficiency to ensure the sustainability and efficiency of the newly established EECU. Energy audit trainings of ECO-FEI and Egyptian National Cleaner Production Center (ENCPC) are planned through further discussions with IDA.
- Three times workshops (EE&C awareness raising for factories) are planned and targeted companies will prepare for EE&C roadmaps.

Then the timetable for 2022 was presented and its material is attached in ANNEX 3-5.

6. **Mr. Sakamoto** made a presentation on explanation regarding NEEAP-II and activities plan in TT1 (all C/Ps part) as follows;

- **Overview of National Energy Efficiency Action Plan (NEEAP) -II**
  - NEEAP-II committed to Egypt's Integrated and Sustainable Energy Strategy (ISES) for 2035 and complies with the objective of Egypt Sustainable Development Strategy (SDS) 2030. It is supported with legislations.
  - NEEAP-II aims at activating the articles of the Electricity Law No. 87 and its executive regulations regarding energy efficiency improvement requirements.
  - The Institutional framework of NEEAP-II is supervised Supreme Council of Energy and EE&C Units from different ministries are coordinated in its implementation.
- **Overview of the TT1 achievement for all C/Ps regarding the recommendations for the formulation of integrated EE&C policies at the national level, and its white paper**
  - Discussion on future integrated national EE&C national policy and action plan with the introduction of standardized format and media for energy-related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops.
  - Key factors to realize the future policy and its action plan (e.g., when, who, what, how) shall be discussed and confirmed among 4 C/Ps.

Then the timetable for 2022 was presented and its material is attached in ANNEX 3-6.

D. Explanation and confirmation on monitoring sheets and the next step of the overall project

Mr. Sakamoto explained that monitoring sheet which includes the revised PDM was accepted from all C/Ps through briefing by remote communication / face to face meetings to each C/P prior to 2nd JCC and its acceptance has been confirmed from all C/Ps at 2nd JCC.

E. Summary of Discussions

- Eng. Taghrid (MOERE) looked forward to reflecting all these achievements in COP-27.
- Eng. Mohamed Negm (IDA) asked to share the experiences of MOERE and MOP in the area of EE&C to the newly established EECU at IDA.
- Eng. Taghrid expressed her pleasures in joining the energy balance training in CAPMAS and the willingness in provide the supports to the EECU at IDA.
- Eng.Taghrid mentioned that MOERE is currently assessing the progress of NEEAP-II projects' implementation to evaluate the potential of the environmental impact reduction, then identify the attractive feasible ones to be presented in COP-27.
- Dr. Amenhoteb (CAPMAS) clarified that CAPMAS publications are developed based on international standards, but he asked for more supports for improvements in the energy data publications.
- Eng. Mohamed Abd El Monem (MOP) asked the technical supports for developing an ESCO model in oil and gas sector as well as establishing Center of Excellence (COE) in petroleum sector for EE&C in Egypt. MOP and JTT will continue further discussion how JTT would cooperate toward COE establishment.

F. Overall Summary

Mr. YUZURIO Susumu, Senior Director, Energy and Mining Group, Infrastructure Management Department, JICA, summarized the 2nd JCC as follows;

– Mr. YUZURIO mentioned he was impressed by all C/Ps participations in one place to facilitate the cooperation in achieving the project's objectives.

– He pointed out the recognized different actual achievements and he asked the participants to continue in achieving more progress.

– He also noted to the COP-27 in Egypt and expressed his expectation that the significant achievements of this project would be presented in this important event.

End of Document

Attachments:

ANNEX 1: List of Key Participants
ANNEX 2: Project Design Matrix (PDM) revised (version 3)
ANNEX 3: Schedule related materials

Dr. Eng. Ahmed Mohamed Mohina, First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE	Mr. Ahmed Abd Rabou, Assistance Chief of Petroleum Central Department, MOP
Dr. Heba Elnasharty, IDA Chairman Advisor for Economic Affairs	Mr. Mostafa Saad Badawy, First Undersecretary, Head of Economic Statistics Sector, CAPMAS
Yasuhiro Sakamoto, JICA T/C Project Team Leader, (PADECO)	Mar. 31. 2022

List of Key Participants

No.	Name	Title	Authority
Ministry of Electricity & Renewable Energy (MOERE)			
1	Dr. Ahmed Mohamed Mohina,	First Undersecretary for Strategic Planning and Electrical Performance Follow-up	
2	Ms. Taghrid El-Ayatie	General Manager EECCD	
3	Ms. Nora Saad	Engineer EECCD	
4	Ms. Marwa Konsowa	Engineer EECCD	
Ministry of Petroleum & Mineral Resources (MOP)			
5	Eng. Al Moataz Bellah M. Kamal	Under Secretary Assistant for planning	MOP
6	Mr. Wael Essam	CED Deputy Ass. For EE projects	EGPC
7	Mr. Mohamed Abd- ELMoneam	Assistant General Manager	EECCU/MOP
8	Mr. Hany El Rouby	EE General Manager	EGAS
9	Mr. Mohamed Slem	EE General manager	GANOP
10	Mr. Mahmoud Maher	Department manager	EECCU/MOP
11	Ms. Nancy Gamal El Din Azazy	Section Head	GANOP
Industrial Development Authority (IDA)			
12	Dr. Heba El-Nasharty	Chairman Economic Advisor	
13	Mr. Mohamed Fouad Negm	Chairman Associate for Technical Affairs	
14	Eng. Duaa Badeeldin	Acting Manager of pharmaceutical projects directorate	
15	Ms. Zainab Nasr Hosny	Economic Researcher	
Central Authority for Population, Mobilization and Statistics (CAPMAS)			
16	Mr. Mostafa Saad	First Undersecretary, Head of Economic Statistics Sector	
17	Dr. Amenhoteb Amin	General Manager for Economic Studies & Research dept	
18	Ms. Rehab Mustafa Mansour	G. Director for energy & industrial department	
19	Ms. Yasmin Ahmed Mahmoud	Responsible for Asian Cooperation/ JICA Project	
20	Mr. Mohamed Othman	Statistician at International cooperation department	
21	Mrs. Marwa Ibrahim hashem	Statistician at Energy & Industrial Statistics Dept	
Japan International Cooperation Agency (JICA), Headquarters			
22	Mr. YUZURIO Susumu	Senior Director, Energy and Mining Group, Infrastructure Management Department	
23	Mr. Naohiro Ojima	Officer, Energy and Mining Group, Infrastructure Management Department	
24	Dr. Kimio Yoshida	In house consultant	
Japan International Cooperation Agency (JICA), Egypt office			
25	Mr. OMURA Yoshifumi	Chief Representative	
26	Ms. Mayada Magdy Ragheb	Country Senior Representative	
27	Mr. IWAI Yuta	Representative	
28	Ms. Nevine Zaky Ghaly SALEM	Chief Program Officer	
29	Ms. Yasmin Afifi	Program Officer	
JICA Technical Cooperation Team (Consultants)			
30	Mr. Yasuhiro Sakamoto	Team Leader, PADECO	
31	Ms. Mari Iwata	Sub-Team Leader, TT3 leader, Mitsubishi Research Institute	
32	Mr. Yoshihiko Kato	TT2 Leader, PADECO	
33	Mr. Azhari Dafaalla	TT4 Leader, KBC Process Technology	
34	Ms. Anna Miyaura	TT1 Leader (IDA part), PADECO	
35	Ms. Noriko Kono	Energy audit (electricity) expert, PADECO	

ANNEX 2

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation — **Version 3**

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) — **Dated 18 February 2022**

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

				February 2022 (Monitoring period: Jan 2020-Dec 2021)	
Narrative Summary	**Objectively Verifiable Indicators**	**Means of Verification**	**Important Assumption**	**Achievement**	**Remarks**
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		Preparation phase: listing up contents and identifying key data to be included in the report	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Initial review of implemented projects in NEEAP-II was reported in CA report. (Energy Efficiency Annual Report is on the preparation phase) 2. No progress yet	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analyzing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 No progress yet 1-2 No progress yet 1-3 Worked on activity schedule. Started preliminary discussions on reporting format. 1-4 - 2 day training (lecture) in Dec.2021: for 10 participants (MOERE, EEHC and Egypt ERA) on energy audit and building certification - On-site training preparation conducted: procurement of energy audit equipment and selection of training site	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labeling program such as fridge, AC and lighting is verified			2-1 Data collection is ongoing from Sep.2021 to Aug.2022. Initial result analyzed. 2-2- Smart home sensor being developed and manufactured. Data collection to be started from Jan.2022. - Discussions started to improve standards and labeling system participated by MOERE, EOS, NREA, GOIEC and CPA.	

ANNEX 2

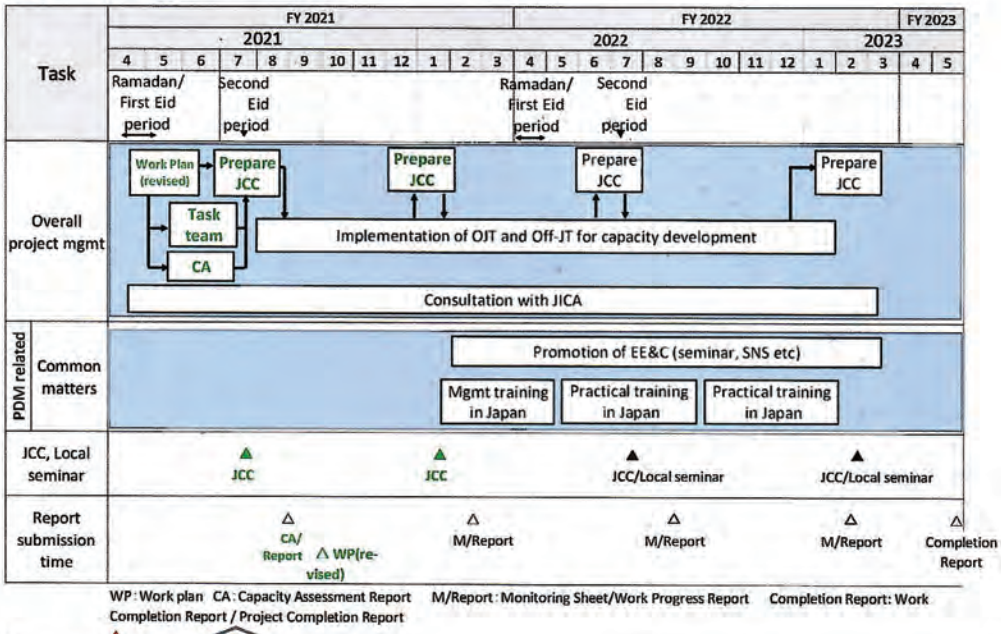
Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Outputs					
TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-4-1 Issuance of SOP describing the key energy auditing activities in the petroleum sector	* Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) *Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) * Training lists * JICA Project Monitoring Sheet * Petroleum sector"To be" Report (EE&C Strategic (EMSF) Roadmap) * Petroleum sector SOPs		3-1-1 Report issued as part of revised CA report 3-2-1 Under progress 3-2-2 5 trainings and 1 additional workshop were conducted. 3-3-1 Issued preliminary roadmap and validated with main stakeholders. Final roadmap is under development 3-3-2 Working with MOP and CAPMAS under TT-2 to revise energy balance data collection process and report 3-4-1 No progress yet	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 No progress yet 4-2 No progress yet 4-3-1 Training in Aug 2021: Studied Japanese example. Training in Oct 2021: Studied 5 countries examples. Discussed (Objectives, Mandate, Org. structure) of EECU and recommendations from JICA team. IDA decided to assign Eng. Mohamed as a EECU Director. 4-3-2 Training in Aug 2021: Studied Japanese example. Training in Oct 2021: Studied 5 countries examples. Discussed recommendations from JICA team and agreed basic concept with IDA.. 4-3-3 Training in Oct 2021: Studied 3C/Ps EEC activities. 1st integrated meeting was conducted in Oct 2021 and shared EE activities with 8 MTI affiliated entities. 4-3-4 1) & 2)No progress yet 4-3-5 2 trainings was conducted in Aug and Oct 2021.Total number of participants was 38.	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 OJT (4 sessions), and group training (6 sessions) held in Dec 2021. 5-2 Standardised national energy balance table prepared. Data inventory as the standardised data collection format created. 5-3 Contents of the upcoming national energy balance publication being considered at CAPMAS. 5-4 No achievement yet.	

ANNEX 2

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit · Technology (Electric Power) 1 - Energy Audit · Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (3 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop EE audit SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			**<Issues and countermeasures>** Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel.			
TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

- ANNEX 3-1: Project Schedule (as of January 2022)

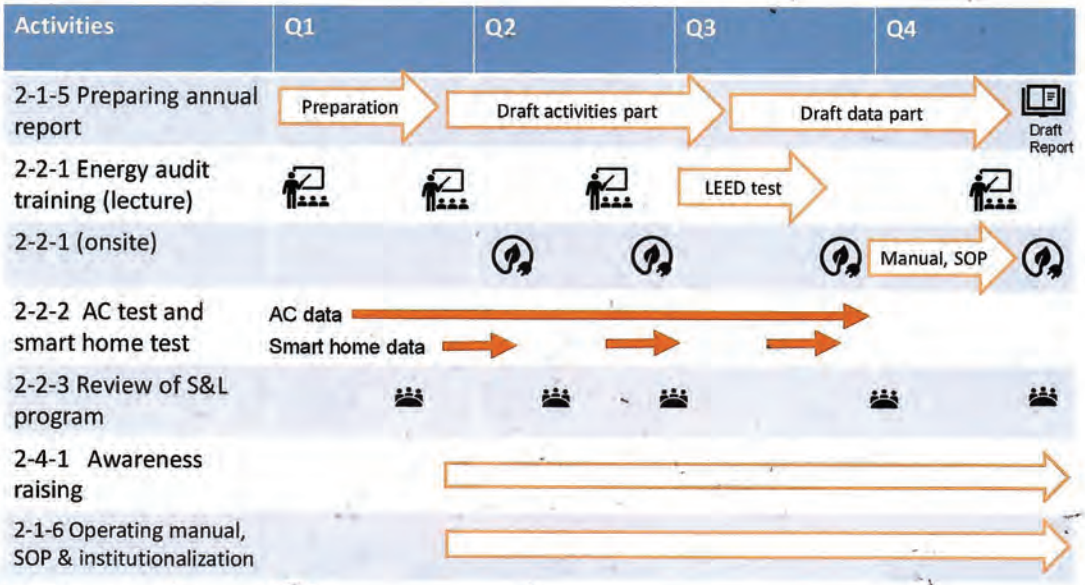
Project Schedule (as of January 2022)



WP: Work plan CA: Capacity Assessment Report M/Report: Monitoring Sheet/Work Progress Report Completion Report: Work Completion Report / Project Completion Report

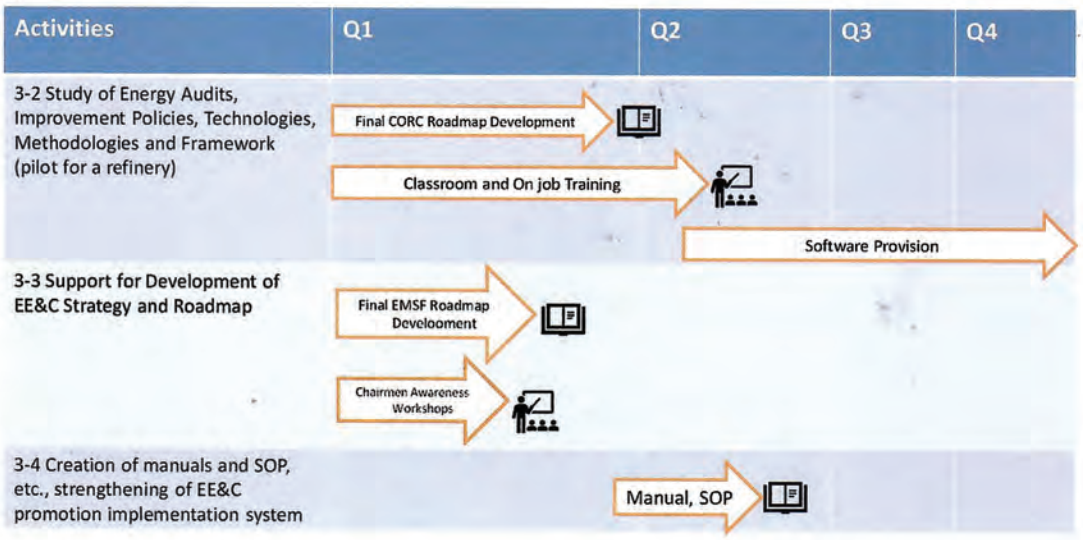
- ANNEX 3-2: Timeline for 2022 (TT3)

Timeline for 2022

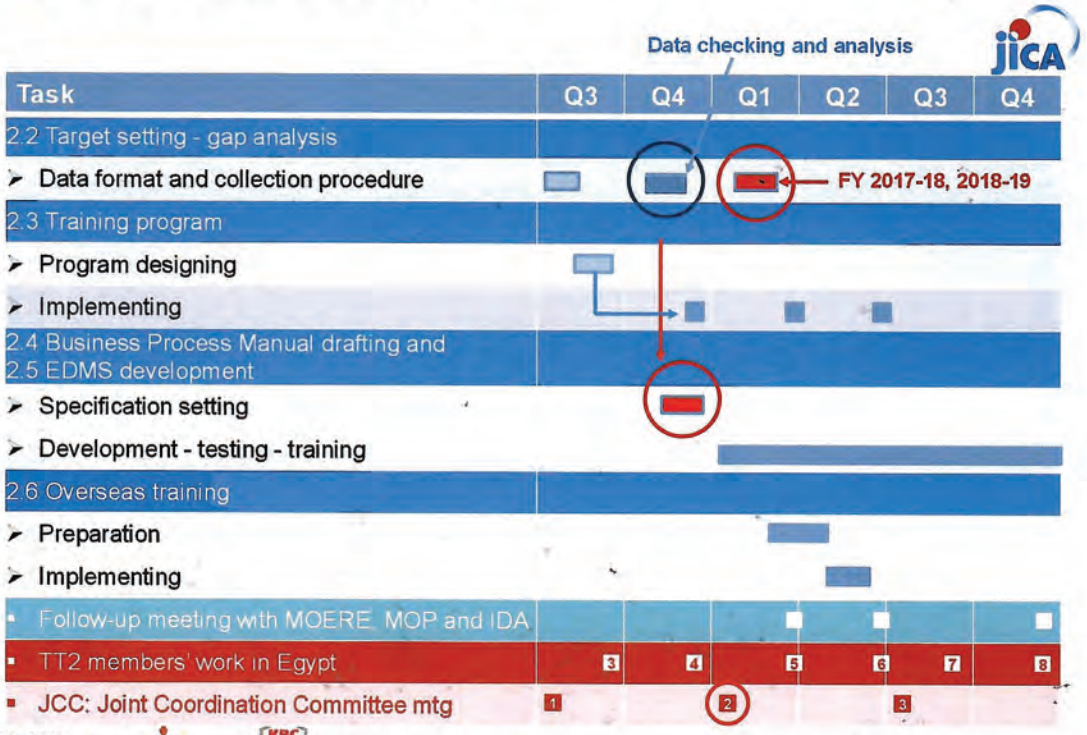


- ANNEX 3-3: Timeline for 2022 (TT4)

Timeline for 2022

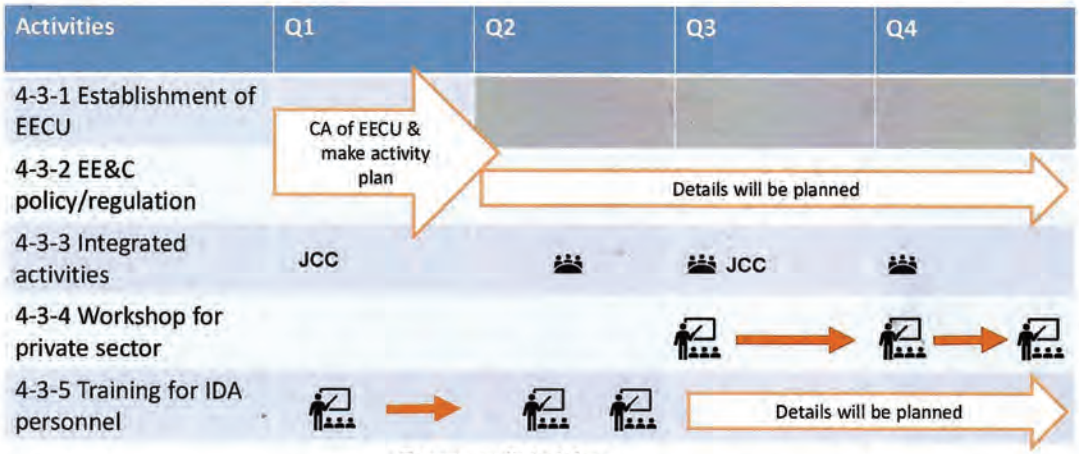


- ANNEX 3-4: Timeline for 2022 (TT2)



- ANNEX 3-5: Timeline for 2022 (TT1, IDA part)

Timeline for 2022



Energy audit training
+ α (detailed plan will be discussed after CA of EECU)

- ANNEX 3-6: Timeline for 2022 (TT1, all C/Ps part)

4. Achievement in TT1 (MOERE,MOP,IDA,CAPMAS)

Activities	Activity Plan
1-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops	➢ A kick-off meeting with all CPs will be held at the timing of the 2nd JCC to be held in January 2022. •STEP 1: Information sharing on NEEAP-II •STEP2: **NEEAP-III frame for energy conservation measures** •STEP3: **Examining the contents of NEEAP-III** • (discussion with all CPs by 3. 2022) ➢ From 4.2022, EE measures discussion. •Policy updates (S&L, energy managers, additional measures) •Consider policy targets (CO2 reduction, energy saving, energy intensity) •**Develop a white paper** for NEEAP-III based on the STEP3 decision ➢ Holding **periodical meetings and discuss among 4 C/Ps** (7 times) including JCC.
1-2 Key factors to realize future policy and its action plan (5W, 1H) shall be discussed among 4 C/Ps.	**Agree with determined items at the timing of the final JCC meeting** (scheduled for February 2023)

添付資料 14

第 3 回合同調整委員会議事録

The Project for Capacity Development on Energy Efficiency and Conservation

Minutes of the 3rd Joint Coordinating Committee (JCC) Meeting in Cairo, Egypt

Date & Time:
21th of July 2022, 9:00 AM – 12:30 PM

Venue:
Steigenberger Hotel El-Tahrir, Cairo (Diamond Room)

Meeting Objectives:

- Present the overall project progress,
- Implementation status of activities and outputs to date,
- Issues to be tackled as next step by each task team,
- Discuss and collect comments from the Counterparts (C/Ps) and agree on the proposed Project Design Matrix (PDM) of the project.

Key Participating Organizations:

- Representatives of the C/Ps namely:
- Ministry of Electricity & Renewable Energy (MOERE),
- Ministry of Petroleum & Mineral Resources (MOP),
- Industrial Development Authority (IDA)
- Central Agency for Public Mobilization and Statistics (CAPMAS).
- JICA headquarters and Egypt Office representatives (through remote communication)
- JICA Technical Cooperation Team (JTT) members.

A list of the key participants is attached in Annex (1).

A. Opening remarks

The meeting started with opening remarks introduced by C/Ps representatives and Chief Representative of JICA Egypt Office as follows:

- **Dr. Eng. Ahmed Mohamed Mohina, First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE**

  Dr. Mohina expressed his great appreciation to the Japanese Government and JICA for their efforts and thanked the C/Ps representatives for their cooperation in the Technical Cooperation (T/C) project. Then he emphasized the role of the cooperation between electricity sector and JICA in forming a unique project for energy efficiency technologies which pave the way for better understanding and sharing the knowledge about energy.

  Dr. Mohina pointed out the need to move the electricity sector to a new sustainable development phase. This includes: ensuring security of supply, strengthening financial sustainability, improving power sector institutional framework and developing the electricity and renewable energy sector.

  Dr. Mohina summarized the purpose of JICA T/C project in determining the needs for improving energy efficiency, strengthening the institutional and personal capacities of the Energy Efficiency Units. In the same context, the project demonstrated the second phase of the National Energy Efficiency Action Plan for electricity consumption in Egypt (NEEAPII), which includes group of important programs to be done for achieving the green growth and sustainability with accordance to Egypt's 2030 vision & energy strategy 2035.

Dr. Mohina pointed to the importance of 3rd JCC meeting to demonstrate the current status, challenges and opportunities for enhancing the energy efficiency and conservation from this meeting which has been held with all stakeholders for discussing how to strengthen coordination and contribution of stakeholders based on their various interests in this project.

Finally, Dr. Mohina expressed his great pleasure to cooperate with JICA in a new project “Preparation of the third phase of the National Energy Efficiency Action Plan for electricity consumption in Egypt (NEEAP III)”, this cooperation will enrich the (NEEAP III) with the expertise and efficiency of Japanese experts, which will push forward energy efficiency operational agenda in Egypt.

- **Mr. Mohamed M. Abd El-Monem, Assistant General Manager, Energy Efficiency and Climate Department (EECD), MOP**

  Mr. Abd El-Monem expressed the MOP’s sincere appreciation to the JICA for its efforts in supporting the energy sector in Egypt. He pointed out the importance of improving energy efficiency and energy utilization to de-couple energy consumption from economic growth and assure optimum use of energy, in line with the current global objective of emission reduction and energy transition. Such Energy Efficiency activities are important to support Egypt’s efforts for lowering its petroleum industry’s carbon footprint and complement other initiatives such as Carbon Capture, Utilization and Storage, Gas & Methane Flaring Recovery, Blue & Green Hydrogen and Renewable Energy development.

  Mr. Abd El-Monem highlighted the efforts and achievements of the project with the Energy Management System Framework (EMSF) developed and the roadmap for the petroleum sector, which was approved by Minister MOP and currently under implementation. In addition, he highlighted the completion of the energy efficiency audit at the Cairo Oil Refining Company (CORC) which came out with very promising regarding possible energy savings and GHG reductions and could be replicated in other facilities. Some of the audit findings are already currently under implementation.

  Finally, Mr. Abd El-Monem outlined the MOP knowledge sharing session where different case studies for the implementation of ISO 50001 within the petroleum sector companies in different fields of activities are presented.

- **Eng. Mohamed Negm - IDA Chairman Associate for Technical Affairs, Ministry of Trade and Industry (MOTI)**

  Mr. Negm expressed the gratitude to JICA team for their valuable efforts. Since IDA started its journey in EE&C with JICA T/C’s support, it is seeking to make it a continuous project as objectives needs a long trip along a way paved with challenges.

  Mr. Negm explained the strong involvement of IDA team to double their efforts in building a sustainable system to spread EE&C awareness and techniques throughout the industrial sector in Egypt, inspired by the Japanese experience and aiming at reaching more efficient, green, sustainable, and competitive industrial sector.

  Finally, Mr. Negm wished successful work and outcomes to all C/Ps members and the meeting to size and take the opportunity to work toward a more cooperative, integrated, and sustainable effort to fulfill the national targets.

- **Mr. Mostafa Saad Badawy, First Undersecretary, Head of Economic Statistics Sector, CAPMAS**

  Mr. Mostafa expressed his pleasure to meet all C/Ps and JICA team at the third meeting of the JCC for this important project with the aim of following up on project activities and monitoring progress, reviewing the remaining activities and timetable. He outlined that CAPMAS team worked during the last period in cooperation with JICA experts to complete the specific activities of the TT2 team, which included three items related to the project, as follows:

  Updating the management of energy data at CAPMAS by developing the energy balance, which provide a brief and comprehensive picture of the energy situation in

Egypt, where some detailed data (sub-sectors) on the consumption of electricity by the industrial sector have been added, and some detailed data on the consumption of natural gas, biofuels and railways are still needed.

Establishing a unified electronic system for energy data management in a way that facilitates the process of collecting and exchanging data between C/Ps. It is important to accelerate establishing this system, which will save time and efforts and will enhance the quality of energy data. It is also needed to prepare a unified business process manual (BPM) defining the tasks and responsibilities of CAPMAS counterparts, as CAPMAS is relying on them to produce energy data and analysis, such as the annual bulletin of electricity and energy statistics or the preparation of the energy balance, both key elements of decision making toward energy efficiency strategies and profitable investments.

Finally Mr. Mostafa mentioned the role of CAPMAS team in the preparation of the integrated national framework and action plan for the energy policy in Egypt. He reminded that CAPMAS participated in all the meetings held to agree on the main items related to the initial draft of this framework.

- **Ms. Mayada Magdy Ragheb, Country Senior Representative, JICA Egypt Office**

  Ms. Mayada participated online and expressed her pleasure to join the 3rd JCC with all C/Ps to discuss the great achievements since the 2nd JCC, including preparing EE Annual report, energy data management, and the establishment of EECU at IDA.

  She outlined the support provided to EE activities by the MOP and the establishment of a Centre of Excellency (CoE) to provide technical support of EE activities to all African countries.

  Ms. Mayada also outlined JICA further cooperation role where the Government of Japan has been leading Tokyo International Conference on African Development (TICAD) to be held next month in Tunisia, also participating after few months in COP27.

B. Presentations

1. Mr. Yasuhiro Sakamoto, JICA T/C Project Team Leader, PADECO, made a presentation explaining the overall project progress based on PDM as follows:

- **Overall Goal and Project Purpose**
  - The goal of the T/C project is to strengthen the institutional capacities of the Government of Egypt toward the further improvement of EE&C measures in Egypt.
  - The project purpose is to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas sector Modernization Program (OGMP). JTT will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies, plans, data management, and expansion of the introduction of high-efficiency equipment.
- **Achievement 1: The capacity of the Energy Efficiency and Climate Change Department (EECCD) of MOERE is strengthened for EE&C promotion (Task Team 3 (TT3)- MOERE)**
  - EE&C PDCA system is developed, including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy). As part of annual report preparation, some programs in NEEAP-II were reviewed (check process of PDCA).
  - EE&C methods is updated, EE&C roadmap drafted and template of EE&C annual report. (Organizational, policy). Roadmap started to be discussed as part of white paper preparation (TT1). A first draft annual report was developed in May/2022, and targets should be published in view of the COP27 in Egypt (November 2022).
  - Implementation capacity of EECCD staff is developed, including data management and policy making. (Personal, training). MOERE officials participated in energy data management training (TT2). In addition, 2 day training (lecture) in both for 10

participants (MOERE, EEHC and Egypt ERA) on building certification and 2-day training (on-site) utilizing procured energy audit equipment

- Development of awareness raising program and support for implementation. Awareness raising activities were conducted through project website and media prepared by E-JUST (on AC and smart home demonstration).

– **Achievement 2: Evaluation of technologies and products with high energy saving potential is conducted, and promotion policies are proposed (TT3- MOERE)**

- Effectiveness of efficient air-conditioner in building is verified including economic efficiency, environmental standard. Data collection is ongoing from Sep/2021 to Aug/2022. Both cooling and heating result has been analysed.
- Effectiveness of home appliances including energy efficiency standards and labelling program such as refrigerator, AC and lighting is verified. In addition, smart home sensor is being developed and manufactured while the data collection to be started from Feb/2022 is ongoing up to Jul/2022.
- Three Workshops were held in Feb, Mar and Jun/2022 to improve standards and labelling system participated by MOERE, EOS, NREA, GOIEC and CPA.

– **Achievement 3: The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created (TT4- MOP)**

- Review of EE&C Framework Related to MOP and Organizing its issues, and its report was prepared as part of the Capacity Assessment (CA) report.
- Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery). Work **concluded** for pilot plant audit report, since the **final report issued to MOP**). In addition: Total of **7 trainings and 2 additional workshops** held onsite (2 trainings held since #2 JCC utilizing KBC software).
- Support for Development of EE&C Strategy and Roadmap. Preliminary roadmap was prepared and validated with main stakeholders. **The final roadmap report draft issued and is under review by MOP.** On the other hand, cooperation activities with MOP and CAPMAS under TT2 to revise energy balance data collection process/report was conducted.
- **Centre of Excellency (COE)** establishment preparation: COE Stakeholders strategic workshop was held. Report will be issued soon.

– **Achievement 4: Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. (TT1 - MOERE, MOP, IDA, CAPMAS)**

- Summary of a future national integrated EE&C policy and action plan as a white paper, etc. is developed and it will be released in the final JCC.
  - ✓ General introduction was made as TT1 activities and NEEAP-II at #2 JCC.
  - ✓ Further discussions in Mar.2022 and Jun.2022 among 4 C/Ps and the headlines of white paper has been discussed and drafted.
- Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g., when, who, what, how). All will be discussed in future meetings among 4 C/Ps.
- **EE&C activities in the industrial sector is strengthened for EE&C socio economic development.**
  - ✓ Energy Efficiency & Conservation Unit (EECU/IDA) was established at IDA in Jan.2022.
  - ✓ Short-term plan of EECU was developed.
  - ✓ Trainings were conducted twice, and meetings were conducted with MOP and MOERE for 3 times.

– **Achievement 5: CAPMAS publishes national energy statistics, which are referred to by 3 C/Ps for making and monitoring EE&C promotion policies. (TT2- CAPMAS, MOERE, MOP, IDA).**

- ✓ EDMS preparation workshop (March 2022), and one training session (July 2022) held, steadily progressing toward full achievement.
- ✓ Trial version of national energy balance table almost complete. Data submission and analysis process is being transplanted to newly developed EDMS.
- ✓ Tentative COP27 version now being prepared.

Project Schedule (as of July 2022) was presented, materials are attached in ANNEX 3-1.

2. Ms. Taghrid El-Ayouti, General Manager EECCD and Mari Iwata, Sub-Team Leader, made a presentation on the activities/outputs to date regarding TT3 as follows:

– **Preparation of annual energy efficiency report**

- MOERE-EECCD collected necessary data & documents, and a preliminary draft was developed in May/2022 as joint efforts between MOERE-EECCD and the T/C team.
- Some data (especially on energy balance) are still missing.
- After refining the draft, the report will be published in COP27.

– **Supports for the improvement of energy audit capacity where:**

- Lecture-based training to qualify MOERE officers to be LEED-certified against EE&C-related program (= Leadership in Energy and Environmental Design, LEED). The 2nd and 3rd two-day lectures were conducted in Jan/2022 and Mar/2022, attended by10 participants from MOERE, Egyptian Electricity Holding Company (EEHC), and Egyptian Electric Utility and Consumer Protection Regulatory Agency (Egypt ERA).
- In addition, Participants experienced actual cases of LEED application in Schneider Electric Building in Cairo, which awarded (LEED ID+C Gold certified building) and presentation from E-Just explaining its efforts aiming to LEED Certification.

– **The pilot project at E-JUST**

- A pilot project was conducted in collaboration with E-JUST in one of their dormitories. Data collection started in Sep/2021 and still on-going for one year. The data collected during the summer season confirms the clear superiority of inverter technology by saving 50% of power consumption. The result of AC demonstration will be widely used for awareness raising.
- In addition, another pilot project is conducted in collaboration with E-JUST for Smart home test in 5 houses. The meters started to collect actual power consumption of home appliances from Feb/2022 and will continue for 6 months. Smart home sensors have been developed by E-JUST.

– **Standard and labelling program**

- Revision of standards and labelling program where a kick-off stakeholder meeting was held, participated by all S&L stakeholders namely: MOERE, Egyptian Organization for Standards and Quality[1] (EOS), General Organization for Import & Export Control (GOEIC), Consumer Protection Agency (CPA), Environmental Compliance and Sustainable Development Office of the Federation of Egyptian Industries (ECO-FEI). They shared about their activities and challenges faced to improve the system implementation. Three meetings are conducted since the second JCC to discuss the challenges and preparing for action plan.

– **Issues to be tackled at the next step**

- Energy balance data yet to be received and to be utilized as key performance indicator in the annual report to be presented at COP27
- Expanding scope of participants in the on-site training to include IDA staff.

[1] EOS is one of the affiliates of MOTI and is the competent and official body responsible for standardization activities, quality and industrial metrology aiming at increasing the competitiveness of the Egyptian products in the international and regional markets along with consumer's and environment protection. The efficiency related standards have been discussed in technical committee under EOS participated by all the stakeholders including manufacturers and importers.

- More awareness raising activities are needed for the AC test results and more detailed analysis on smart home test result are required.
- More discussions with stakeholders to identify the expected outcomes from S&L Program, in addition continuity of activities secured under guidance of MOERE is important.

The timetable for 2022 was presented, materials are attached in ANNEX 3-2.

3. Mr. Mohamed M. Abd El-Monem, Assistant General Manager, EECD, MOP and **Mr. Azhari Dafaalla, TT4 Leader,** made presentations / discussions on the activities/outputs to date regarding TT4 as follows:

– **Technology / Capability development**

- Software Aided Comprehensive Training (Feb – April 2022), blend of lecture-based training and on the job training where tasks were assigned to the trainees.
- Issuance of CORC Pilot Refinery Energy Audit Report, two days on site workshop (16-17 Feb.) was conducted with CORC and MOP to present the energy improvement roadmap for CORC refinery incorporating all feasible CORC energy improvement opportunities. Following the workshop, T/C revised the roadmap based on CORC and MOP comments received and issued the final CORC energy audit report to MOP in June 2022. The final roadmap confirmed a potential energy savings of 170 mil EGP/y with an estimated CO2 reduction of 87 MTPA.

– **Roadmap for Energy Management System Framework for petroleum sector**

- JTT has developed and issued the final EMSF roadmap draft report to MOP on Feb 2022. It covers five key EMSF elements (Organisation and governance, regulations, finance, information, and capacity building). The report contained the revised EMSF roadmap matrix supported with a list of documents.
- Following the submission of the report to MOP, JICA T/C worked with MOP in the initiation of implementation of the SPRINT phase of the EMSF roadmap.
- JICA T/C held two awareness sessions to the Petroleum sector top management in March 2022 in Cairo and Alexandria.

– **CoE Stakeholders Strategic Workshop**

- JICA T/C has held the CoE Stakeholders Strategic Workshop in Cairo in June 2022, with objective to align the key stakeholder's vision for the CoE, its mission, objectives, and main business processes. The workshop was attended by over 15 personnel of the Petroleum representing: MOP, EGPC, ECHEM, GANOUPE, EGAS, ENPPI and EPROM.

– **Issues to be tackled at the next step**

- To extend one year Software License Installation, the server details not yet defined to be provided by MOP.

The timetable for 2022 was presented, material are attached in ANNEX 3-3.

4. Mrs. Marwa Ibrahim, Statistician at Energy & Industrial Statistics Dept and **Mr. Yoshihiko Kato, TT2 Leader,** made a presentation on the activities/outputs to date regarding TT2 as follows:

– **The activity of Assessing CAPMAS's institutional capacity on energy data management** has been completed.

– **The activity of Gap analysis for the C/Ps' data collection capacity, and target setting** has almost been completed and the capacity will be strengthened through cooperation in developing the energy data management system usage.

– **In-house training for 4 C/Ps on international standard energy data management**

  - Energy balance table workshop was held in March 2022 and a training session on the best practices in energy data management was conducted in July 2022.
  - CAPMAS and JICA agreed to prepare the national energy balance for year 2020/2021 to be disclosed at the COP27.

– **Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM)**

  - BPM for national energy balance table preparation is going to be a simple document collectively owned by the four C/Ps. It will identify the role of each organisation, what to do and when, making use of the newly developed EDMS. When everyone does his/her part, the national energy balance table will be ready annually.

– **Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP, and IDA**

  - A local system vendor was selected and EDMS development has started. By the end of October 2022, we hope that EDMS will be ready for practical use.
  - It is made of a number of "individual components". These simple components are brought together to make it look as one. There are:
    - ✓ Data conversion matrix management component,
    - ✓ Dashboard, charts, reports and analysis component,
    - ✓ Data entry component,
    - ✓ Workflow management component,
    - ✓ User management component,
    - ✓ Data quality management component, and finally,
    - ✓ Validate management component.

– **Issues to be tackled at the next step**

  - Lacking data must be collected as soon as possible from the Ministry of Environment. EEHC electricity sub-sector breakdown data are the most urgently required data.
  - Tests and trainings to be conducted within the EDMS development process. These tests and trainings are a golden opportunity for the four C/Ps to familiarise themselves with the system.
  - The drafting of business process manual needs to be expedited.

The timetable for 2022 was presented, material are attached in ANNEX 3-4.

5. Ms. Duaa Badr El Deen, GM of Pharmaceutical Projects Directorate and **Ms. Anna Miyaura, TT1 (IDA part) Leader,** made a presentation on the activities/outputs to date regarding TT1 (IDA part) as follows:

– **Preparation for establishment of EECU of IDA**

  - EECU was established in Jan/2022.
  - Organization structure, functions, assigned members of EECU were decided based on discussion at trainings and recommendation of the project.
  - Capacity assessment of EECU was conducted.
  - Monitoring system of EECU was developed.
  - Regular meetings were conducted 6 times (including kick-off meeting) and shared progresses of each team's activities.

– **EE&C Policies/Regulations of IDA to be formulated for the industrial sector**

  - Short-term plan of EECU (action plan of EECU by Dec/2022) was developed.

- Activities of policy and planning: Collaborative activities of energy review and energy audit with ENCPC at factories were discussed. Preliminary discussion with MOERE about the energy managers' system was conducted.
- Technical support activities: EE checklist was created by the Technical support team.
- Activities of data management: Data collection sheets of 94 factories in the food-processing industries was created by the Data management team (with TT-2).
- Activities of awareness creation: details of workshops for the private sector were discussed and RECP training of ENCPC was planned by the Outreach & Training team.

– **Integrated activities are organized including the industrial sector**

- Preliminary energy audit training was conducted by ECO-FEI (Jan, 2022).
- Meetings to discuss collaboration of MTI related entities was held between IDA/EECU and ENCPC.
- RECP training was planned by ENCPC (Jul, 2022).
- Site visit of E-JUST pilot project was conducted to consider application of inverter system at factories. (Mar, 2022)
- Meetings were conducted between EECU/IDA and MOERE to discuss energy manager system. (Mar & May, 2022)
- Meeting was conducted between EECU/IDA and MOP to share management system of EECD/MOP. (Mar, 2022)

– **Workshops for Private Sector of EE&C are held**

- Details of 1st awareness creation workshop was planned.
- EE&C related information of EE technology, governmental funds, private funds was collected.
- EE checklist at factories was prepared.

– **Trainings are held for IDA personnel**

- 2 trainings were conducted in Jan and Mar/2022 for 30 participants.
  - ✓ Preliminary energy audit training by ECO-FEI was conducted (Jan, 2022).
  - ✓ Business mind development and planning (by the Project. Awareness creation of business mind of EECU members and planning of EECU activities).
- A workshop on sharing experience of international benchmark of industrial sector and MOP was conducted by the Project (Feb, 2022).
- Coming trainings of ENCPC and training of TT-3 (energy audit training with measurement equipment) are planned.

– **Issues to be tackled at the next step**

- Continuous monitoring & evaluation activities of EECU/IDA are necessary that EE&C activities take root in IDA.
- Conduct EE&C activities at each team of EECU/IDA as well as development of mid-/long-term plan linking to existing systems are necessary to sustain EE&C activities in the industrial sector.
- Continuous discussions are expected to develop model factory/industrial park/zone.
- EE&C awareness creation workshops are planned targeting factories, MTI affiliated entities, technology suppliers, IDA branch managers, and industrial park/zone managers etc.
- All 4-3-1 to 4-3-5 activities will be conducted together with JICA project team as on-the-job training (OJT). Also, off the job trainings (off-JT) of ENCPC & TT-3 to IDA engineers are planned to develop capacity of IDA personnel.

The timetable for 2022 was presented, material are attached in ANNEX 3-5.

6. Mr. Yasuhiro Sakamoto, JICA T/C Project Team Leader, PADECO made a presentation on explanation regarding NEEAP-II and activities plan in TT1 (all C/Ps part) as follows:

– **Overview of National Energy Efficiency Action Plan (NEEAP-II)**

- NEEAP-II committed to Egypt's Integrated and Sustainable Energy Strategy (ISES) for 2035 and complies with the objective of Egypt Sustainable Development Strategy (SDS) 2030, supported with legislations.
- NEEAP-II aims at activating the articles of the Electricity Law No. 87 and its executive regulations regarding energy efficiency improvement requirements.
- The Institutional framework of NEEAP-II is supervised by the Supreme Council of Energy and EE&C Units from different ministries are coordinated in its implementation.

– **Overview of the TT1 achievement for all C/Ps regarding the recommendations for the formulation of integrated EE&C policies at the national level, and its White Paper**

- Discussion on future integrated national EE&C national policy and action plan with the introduction of standardized format and media for energy-related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings/workshops.
- Key factors to realize the future policy and its action plan (e.g., when, who, what, how) shall be discussed and confirmed among 4 C/Ps.

The timetable for 2022 was presented, materials are attached in ANNEX 3-6.

C. Explanation and confirmation on monitoring sheets and the next step of the overall project

Mr. Yasuhiro Sakamoto explained that the monitoring sheet, which includes the revised PDM, was accepted from all C/Ps through briefing by remote communication / face to face meetings to each C/P prior to 3rd JCC and its acceptance has been confirmed from all C/Ps at 3rd JCC.

D. Discussions summary

– Eng. Rehab (MOERE) provided her thanks to IDA for their efforts and asked if they can share the technical checklist with MOERE.

IDA expressed their interest in cooperation with all C/Ps to gain more experiences and mentioned that the checklist will be published after completing the coming training and finalize it. Also, IDA added that the prepared checklist for general industrial sector.

MOP also asked IDA to share their experience in updating the checklist.

– MS. Neven (JICA Office) asked about the status of data collection at IDA.

IDA pointed to the internal decree which obligatory asked all technical department staff to collect the required data during their inspection visits. Currently, the data are collected for 94 factories from the food industry.

– Dr, Amenhoteb (CAPMAS) asked if those data are for all industrial activities or limited to one sector.

IDA explained that the data are for food industries in Cairo and Giza only for now with a plan to cover all.

– Mr. Mohamed Abd El Menem (MOP) asked who will be responsible for issuing the first draft of the White Paper (WP) in September 2022.

Mr. Sakamoto explained that this issue will be discussed internally since it was not decided yet.

– Finally, Ms. Rehab (MOERE) expressed the great thanks to JICA team for their efforts and to all C/Ps.

E. Conclusion and thanks by JICA

Mr. Akira Sato, Director, Energy and Mining Group, Infrastructure Management Department, JICA, summarized his take away on what was presented during the 3rd JCC as follows:

- He expressed his pleasure to attend 3rd JCC meeting and appreciated the good cooperation among C/Ps (MOERE, MOP, CAPMAS and IDA) in achieving the project's activities.
- He pointed out to the utmost importance of cooperation between MOP with MOERE in view of the CoE establishment.
- He appreciated the significant efforts of the project members and expressed his thanks to all for their fruitful contribution in the project.

End of Document

Attachments:

ANNEX 1: List of Key Participants
ANNEX 2: Project Design Matrix (PDM) revised
ANNEX 3: Schedule related materials

Dr. Eng. Ahmed Mohamed Mohina, First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE	Mr. Ahmed Abd Rabou, Energy and Environment Consultant, MOP
Dr. Heba Elnasharty, IDA Chairman Advisor for Economic Affairs	Mr. Mostafa Saad Bedway, First Undersecretary, Head of Economic Statistics Sector, CAPMAS
Mr. Yasuhiro Sakamoto JICA T/C Project Team Leader, PADECO	Oct. 9. 2022

ANNEX 1

List of participants

No.	Name	Title	Organization
Ministry of Electricity & Renewable Energy (MOERE)			
1	Dr. Ahmed Mohamed Mohina,	First Undersecretary for Strategic Planning and Electrical Performance Follow-up	
2	Ms. Taghrid El-Ayatie	General Manager EECCD	
3	Ms. Rehab Beder Hassan	Engineer EECCD	
4	Ms. Nora Saad	Engineer EECCD	
5	Ms. Mohamed Abd El Mowla	Engineer EECCD	
Ministry of Petroleum & Mineral Resources (MOP)			
6	Eng. Al Moataz Bellah M. Kamal	Under Secretary Assistant for planning	MOP
7	Mr. Wael Essam	CED Deputy Ass. For EE projects	EGPC
8	Mr. Mohamed Abd-ELMoneam	Assistant General Manager	EECCU/MOP
9	Mr. Hany El Rouby	EE General Manager	EGAS
10	Ms. Nesreen Mohamed Salh	Assisstant General Manager	MOP
11	Mr. Mohamed Slem	EE General manager	GANOP
12	Ms. Rehab Ahmed Salem	General manager	MOP
12	Mr. Mahmoud Maher	Department manager	EECCU/MOP
13	Ms. Nancy Gamal El Din Azazy	Section Head	GANOP
14	Ms. Alaa Mostafa Safwat	Section Head	ECHEM
Industrial Development Authority (IDA)			
15	Mr. Mohamed Fouad Negm	Chairman Associate for Technical Affairs	
16	Eng. Duaa Badeeldin	G.M of pharmaceutical projects directorate	
17	Eng. Noha Mohamed saber	G.M of Electrical project Dept.	
18	Ms. Amira Raslan	Textile Engineer	
19	Ms. Lugin Hassam	Economic Researcher	
Central Authority for Population, Mobilization and Statistics (CAPMAS)			
20	Mr. Mostafa Saad	First Undersecretary, Head of Economic Statistics Sector	
21	Dr. Amenhoteb Amin	General Manager for Economic Studies & Research Dept.	
22	Ms. Yasmin Ahmed Mahmoud	Responsible for Asian Cooperation/ JICA Project	
23	Mrs. Marwa Ibrahim Hashem	Statistician at Energy & Industrial Statistics Dept.	
Japan International Cooperation Agency (JICA), Headquarters			
24	Mr. Akira Sato	Director, Energy and Mining Group, Infrastructure Management Dept.	
23	Mr. Naohiro Ojima	Officer, Energy and Mining Group, Infrastructure Management Department	
24	Dr. Kimio Yoshida	In house consultant	
Japan International Cooperation Agency (JICA), Egypt office			
26	Ms. Mayada Magdy Ragheb	Country Senior Representative (online participation)	
28	Ms. Nevine Zaky Ghaly SALEM	Chief Program Officer	
JICA Technical Cooperation Team (Consultants)			
30	Mr. Yasuhiro Sakamoto	Team Leader, PADECO	
31	Ms. Mari Iwata	Sub-Team Leader, TT3 leader, Mitsubishi Research Institute	
32	Mr. Yoshihiko Kato	TT2 Leader, PADECO	
33	Mr. Azhari Dafaalla	TT4 Leader, KBC Process Technology	
34	Ms. Anna Miyaura	TT1 Leader (IDA part), PADECO	
35	Ms. Noriko Kono	Energy audit (electricity) expert, PADECO	
36	Ms. Aya Tahara	Project Coordinator	
37	Mr. Moustafa Alsammany	Energy Advisor	
38	Dr. Ahmed Ginidi	Energy Efficiency Expert	
39	Mr. Raouf Abd Alhamid	Monitoring Advisor	
40	Ms. Mirna Naguib	Project Coordinator	

ANNEX 2

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation — **Version 4**

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) — **Dated 21 July 2022**

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

				August 2022 (Monitoring period: Jan 2022-Jul 2022)	
Narrative Summary	**Objectively Verifiable Indicators**	**Means of Verification**	**Important Assumption**	**Achievement**	**Remarks**
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		Preparation phase: listing up contents and identifying key data to be included in the report	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Initial review of implemented projects in NEEAP-II was reported in CA report. (Energy Efficiency Annual Report is on the preparation phase) 2. Energy Data Management system (EDMS) has started its development.	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analyzing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 - MOERE officials participated in energy data management training (TT2). - As part of annual report preparation, some programs in NEEAP-II were reviewed (check process of PDCA). 1-2 - Awareness raising activities were conducted through project website and media prepared by E-JUST (on AC and smart home demonstration). - Roadmap started to be discussed as part of white paper preparation (TT1). 1-3 - The first draft annual report was developed in May/2022, and targets to be published in COP27. 1-4 - 2 day training (lecture) in both Jan/2022 and Mar/2022: for 10 participants (MOERE, EEHC and Egypt ERA) on energy audit and building certification - 2-day training (on-site) in Jun/2022 by utilizing procured energy audit equipment	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labeling program such as fridge, AC and lighting is verified			2-1 (AC demonstration test) Data collection is ongoing from Sep/2021 to Aug/2022. Both cooling and heating result has been analyzed. 2-2 - (Smart home test) Data collection started from Feb/2022, and is ongoing up to Jul/2022. - 3 Workshops were held in Feb, Mar and Jun/2022 to improve standards and labeling system participated by MOERE, EOS, NREA, GOIEC and CPA.	

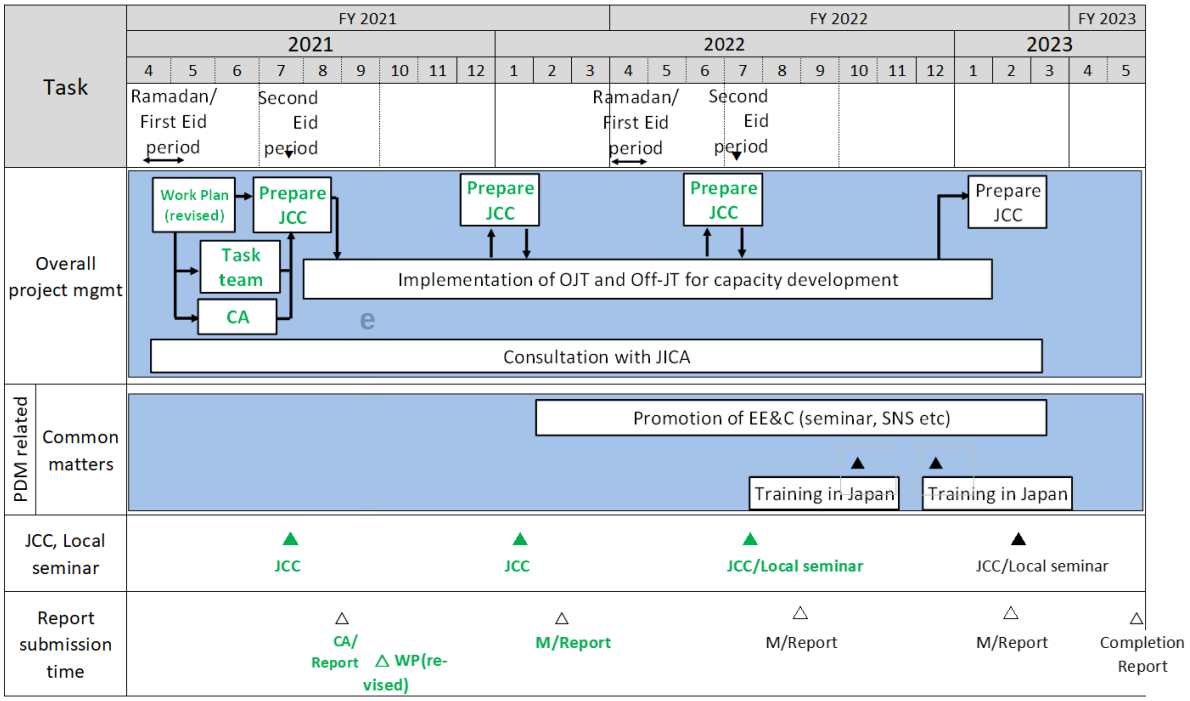
ANNEX 2

TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap 3-4 Development of Manuals and SOPs to strengthen EE&C Activities 3-5 COE establishment preparation	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-4-1 Issuance of SOP describing the key energy auditing activities in the petroleum sector 3-5-1 CoE Stakeholders Strategic Workshop 3-5-2 Issuance of CoE high level organization document 3-5-3 Issuance of CoE Training Management Guide document	* Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) *Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) * Training lists * JICA Project Monitoring Sheet * Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) * Petroleum sector SOPs * CoE Strategic workshop report * CoE Organization document * CoE Training management guide document		3-1-1 Report issued as part of revised CA report 3-2-1 Final report issued 3-2-2 5 trainings and 1 additional workshop were conducted. 3-3-1 Final roadmap report draft issued to MOP 3-3-2 Working with MOP and CAPMAS under TT-2 to revise energy balance data collection process and report 3-4-1 No progress yet 3-5-1 Workshop conducted and its report issued 3-5-2 Under progress 3-5-3 Under progress	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated (examines lesson learned from the past experiences). 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and draft of integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt and in Japan.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - Draft of EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings		4-1 General introduction was made as to TT1 activities and NEEAP-II at #2 JCC. Discussion in Mar.2022 and Jun.2022 among 4 C/Ps. Headlines of white paper has been discussed and drafted.Discussion meeting were held 3 times among 4 C/Ps. 4-2 No progress yet 4-3-1 EECU was established in Jan/2022. Implementation structure and assigned members of EECU were decided. Monitoring system of EECU was developed, and regular meetings were conducted 4 times (Apr-Jul/2022). 4-3-2 Short-term plan of EECU was developed. Activities of each team including planning, technical support, data management, outreach & training were conducted. 4-3-3 Preliminary energy audit training was conducted in Jan/2022 by ECO-FEI. RECP training was conducted in Jul/2022 by ENCPC. Meetings were conducted with MOERE (in Mar/2022 & May/2022) and MOP (in Mar/2022) . 4-3-1 1) Details of 1st workshop was planned. 2) EE&C checklist at factories was prepared and EE&C related information was collected. 4-3-5 1 workshop (Feb/2022) and 3 trainings were conducted (Jan, Mar, Jul/ 2022).Total number of participants was **.	
TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 Five remote collaborative meetings were conducted with CAPMAS on data collection practices (Jan/2022 – Apr/2022). A workshop (presentation meeting) on National Energy Balance Table was held (Mar/2022). One training session for CAPMAS on the best practices of energy data management conducted (Jul/2022). 5-2 Sub-sector electricity sales datasets were identified by CAPMAS. Existence of biofuel (RDF and charcoal) and coal / coke related datasets was identified at the Ministry of Environment. National energy balance table (trial version on Microsoft Excel) was revised. EDMS RFP (including specifications) was drafted and confirmed with CAPMAS. EDMS vendor was selected through competitive bidding procedure. 5-3 Preparation for a tentative, COP27 version national energy balance table publication was agreed with CAPMAS. 5-4 No achievement yet.	

ANNEX 2

Activities	Inputs		Important Assumption
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit・Technology (Electric Power) 1 - Energy Audit・Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (2 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc. 3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop EE audit SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2) 3-5-1 Support for formulating COE Mission Statement 3-5-2 Support for formulating COE Objectives 3-5-3 Support for examination of COE basic policy and design 3-5-4 COE organization building support 3-5-5 COE work process management and rule formulation support			**<Issues and countermeasures>** Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel.			
TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			

- **ANNEX 3-1: Project Schedule (as of July 2022)**

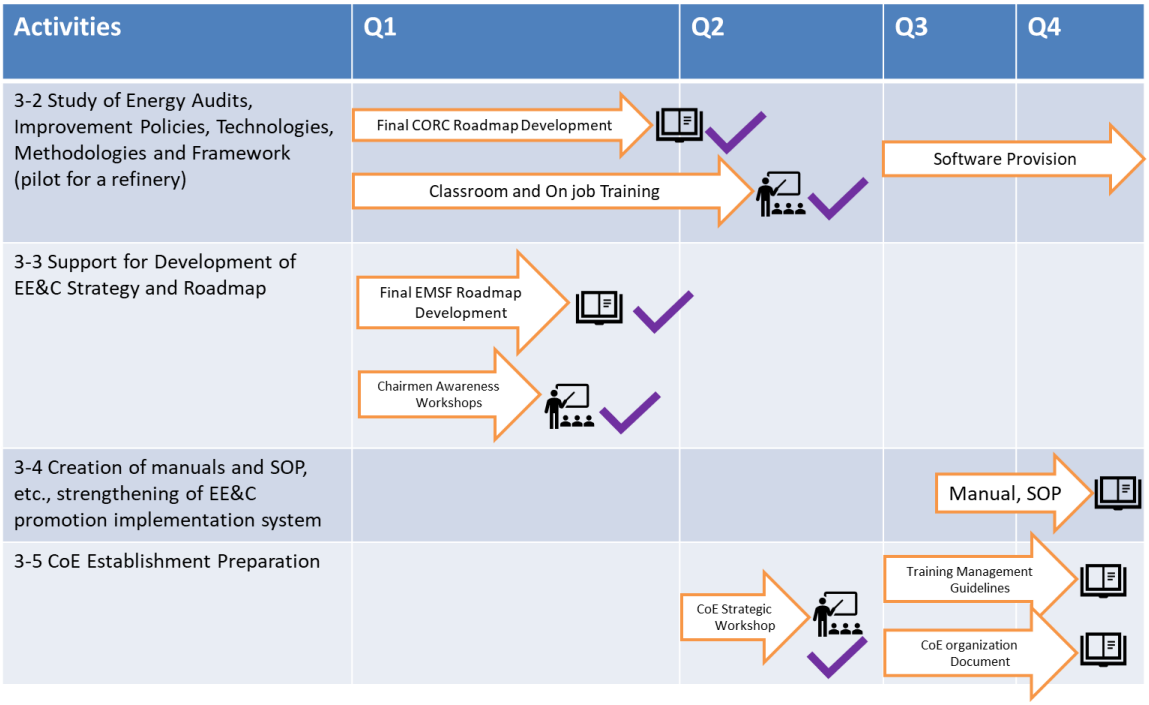


WP: Work plan CA: Capacity Assessment Report M/Report: Monitoring Sheet/Work Progress Report Completion Report: Work Completion Report / Project Completion Report

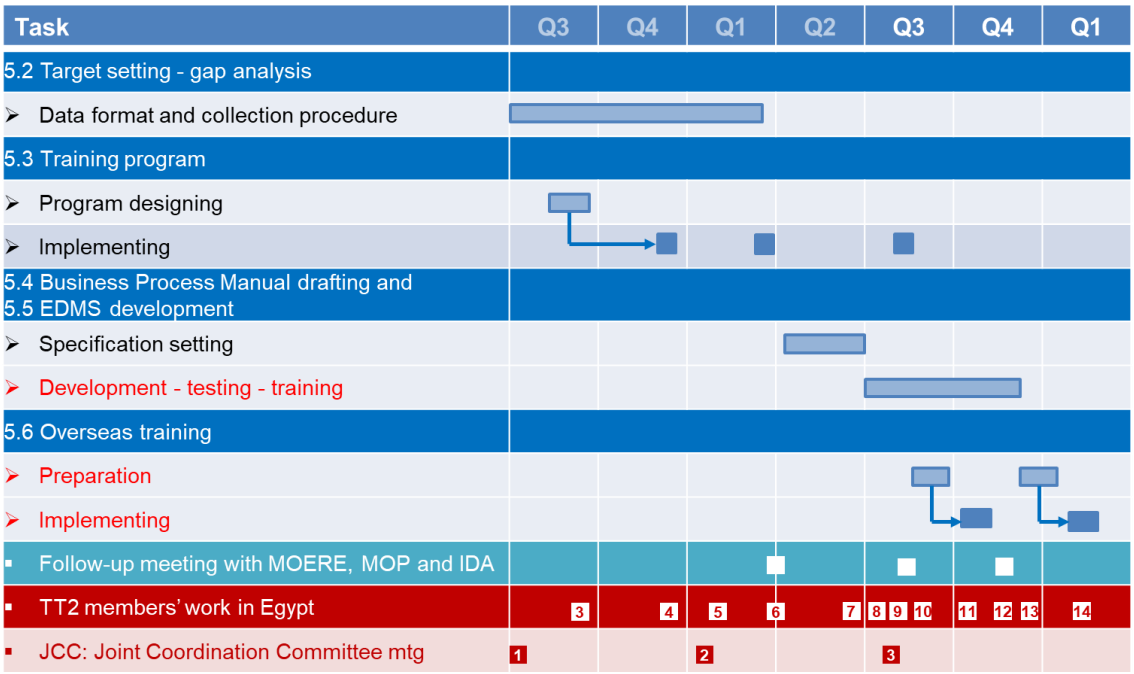
- **ANNEX 3-2: Timeline for 2022 (TT3)**

Activities	2022 Q3 (Jul-Sep)	2022 Q4 (Oct-Dec)	2023 Q1 (Jan-Mar)
2-1-5 Preparing annual report	Draft Report → Report finalization	COP27	
2-2-1 Energy audit training (lecture)	LEED test		
2-2-1 (onsite)		Manual, SOP	
2-2-2 AC test and smart home test	AC, Smart home		
2-2-3 Review of S&L program			
2-4-1 Awareness raising			
2-4-2 Training in Japan		Preparation	
2-1-6 Operating manual, SOP & institutionalization			

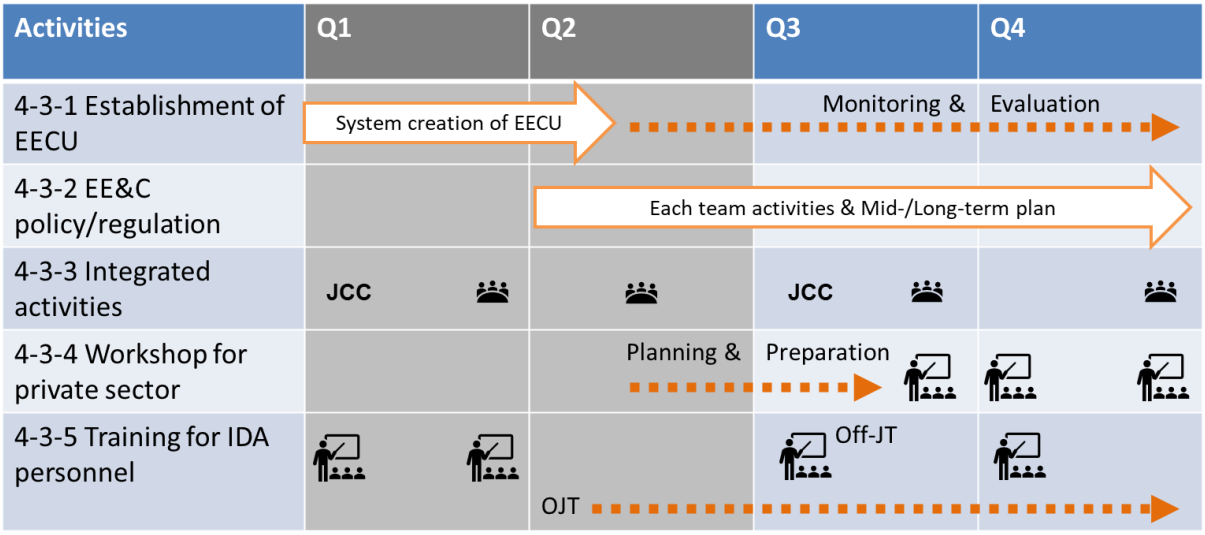
- **ANNEX 3-3: Timeline for 2022 (TT4)**



- **ANNEX 3-4: Overall Timetable (TT2)**



- **ANNEX 3-5: Timeline for 2022 (TT1, IDA part)**



- **ANNEX 3-6: Schedule of TT1 (all C/Ps part)**

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Meeting/WS	#2			#3			#4			#5		
JCC					#3							Final
WP formulation							▲ 1st draft of WP					▲ Finalize agreed items on WP

3rd discussion meeting with 4 CPs

1st version shall be drafted in the end of Sep.2022

Interim reporting to 3rd JCC (discussion among with 4 CPs)

添付資料 15

第 4 回合同調整委員会議事録

The Project for Capacity Development on Energy Efficiency and Conservation

Minutes of the Final (4th) Joint Coordinating Committee (JCC) Meeting

Date & Time:
27th of February 2023, 9:30 AM – 12:15 PM

Venue:
Intercontinental Semiramis hotel (Room: Teeba)

Meeting Objectives:

- Present the overall Project progress;
- Report the implementation status of activities and outputs to date by each task team; and
- Discuss and collect comments from the Counterparts (C/Ps) and agree on the proposed Project Design Matrix (PDM) of the Project.

Key Participating Organizations:

Representatives of the C/Ps namely:

- Ministry of Electricity & Renewable Energy (MOERE),
- Ministry of Petroleum & Mineral Resources (MOPMR),
- Industrial Development Authority (IDA),
- Central Agency for Public Mobilization and Statistics (CAPMAS),
- JICA Egypt Office Team,
- JICA Headquarters representatives (through remote communication),
- JICA Technical Cooperation Team (JTT) members.

A list of the key participants is attached in ANNEX (1).

I. Ceremony Session

The final JCC meeting organized a side event to celebrate the successful completion of JICA T/C project, the Project for Capacity Development on Energy Efficiency and Conservation, (the Project). The event witnessed the participation of:

- H.E Dr. Mohamed Shaker, Minister of Electricity and Renewable Energy (MOERE); and
- H.E Amb. OKA Hiroshi, Ambassador Extraordinary and Plenipotentiary of Japan to Egypt (Embassy of Japan)

The ceremony session was organized to highlight the achievements of the Project in light of its successful completion. During this short event, the following speeches were introduced.

– **Opening remarks, H.E. Dr. Mohamed Shaker El Markabi, Minister of Electricity & Renewable Energy**

H.E. Dr. Shaker expressed his pleasure to participate in the ceremony of finalizing the JICA T/C project and extended his appreciation to all C/P teams at MOERE, MOPMR, IDA and CAPMAS for their great efforts and their beneficial cooperation in the Project.

Dr. Shaker emphasized the depth of relations between Egypt and Japan in various fields, pointing to the existing cooperation represented in the Egyptian electricity sector's implementation of a number of projects and programs in collaboration with the Japanese side in order to benefit from their expertise and technological progress.

The Minister pointed to the Egyptian “Integrated Sustainable Energy Strategy for 2035" which targets increasing the share of Renewable Energy (RE) in the energy mix to reach 42% and reducing energy consumption by about 18 % by 2035 compared to that in 2010.

On the other hand, Dr. Shaker referred to the electricity sector strategy, which relies on innovative technologies such as the transition to smart grids, waste to energy, E-mobility, water desalination using renewable energies, and energy storage. In particular, the Minister demonstrated the significant actions taken to develop the National Hydrogen Strategy, since most of the strategy issues have been finished and many international & local alliances have submitted requests for cooperation in the field of green hydrogen where MoUs were signed during COP27 activities.

Dr. Shaker highlighted the importance of energy efficiency (EE) where the electricity sector took many measures to enhance EE on supply-side such as building three-mega power plant projects of 14.4 GW high-efficiency Combined Cycle Power Plants (60.5%). In addition, upgrading and converting the simple cycle power plants into combined cycle, usage of supercritical steam technology and applying programmed maintenance systems led to adding 1850 MW to the production capacity.

Due to these measures, the fuel consumption has been reduced from 214 gm/kWh in 2016/2017 to 172 gm/kWh currently.

Again, the Minister praised the distinguished relations between the two countries and the fruitful cooperation between the two sides during the previous period.

Dr. Shaker welcomed the potential future cooperation with JICA in some interested areas including; creating an effective ESCO model, preparation of NEEAP-III with the National Energy Balance and energy efficiency KPIs, and suggested revolving loans for EE projects, and development of accreditation mechanism for certified energy managers.

Finally, Dr. Shaker presented his sincere thanks to all participants specially JICA for its continuous efforts in EE projects to achieve sustainable development and environmental conservation.

– **Opening remarks, H.E. Amb. OKA Hiroshi, Ambassador of Japan to Egypt**

His Excellency Ambassador Oka expressed his great pleasure in joining this event of listening to the reports of the results and achievements of the JICA T/C project on improving EE.

Ambassador OKA acknowledged the importance of the Project, which is a significant step in the energy transition and reduction of carbon emissions and embodies the constructive cooperation between Egypt and Japan to achieve the optimum benefit from the natural resources that Egypt enjoys by improving the efficiency of energy.

Meanwhile, Ambassador OKA referred to achievements of the Project such as publishing the “First Energy Efficiency Report” during the COP27, developing of “National Energy Balance” using Energy Data Management System (EDMS), and establishing the Center of Excellence for Energy Efficiency (CoE) in the petroleum sector which is expected to become the hub for improving and promoting EE in Africa.

His Excellency Ambassador OKA emphasized the depth of relations between Egypt and Japan in various fields, pointing to the existing cooperation represented in the Egyptian electricity sector's implementation of several projects of RE (wind & PV), in addition to MoUs regarding Hydrogen, RE, and Green Ammonia.

Finally, His Excellency wished great success to all participants in future projects and stressed that Japan will continue its contribution to the rationalization of energy and the optimal and effective use of it in Egypt in the future as well.

– **Overall achievement of JICA Technical Cooperation Project (Mr. Yasuhiro Sakamoto, Team Leader, (PADECO)**

Mr. Sakamoto reported on the overall achievements of the Project where all tasks have been completed as follows:

- Publishing “the First Report on Energy Efficiency in Egypt”. The report officially released in COP27 covers the period of the National Energy Efficiency Action Plan-II (2018/2019 -2021/2022).

A demonstration project was conducted in collaboration with E-JUST where the actual power consumption of inverter AC and non-inverter AC under living conditions were compared. The results showed that 62% energy savings for space cooling and 76% energy savings for space heating were observed.

Minimum Energy Performance Standards (MEPS) Program has been reviewed with the Energy Efficiency Standards & Labeling Committee (EESLC) members and shared challenges and discussed solutions. The outputs of EESLC included a preliminary survey on lab facilities, key challenges, and recommendations to be followed up and guided by MOERE.

A series of on-site Energy Audit training were conducted at Al Mokattam Training Center for EEHC and Distribution Companies on power consumption data collection and analysis in the office buildings.

A series of lectures were conducted on building EE and environment based on the materials by "Leadership in Energy and Environmental Design (LEED)". Some participants received certifications of LEED Green Associate.

A Side Event at COP27 on Energy Efficiency and Conservation (EE&C) was organized to demonstrate the Cooperation programs between Egypt and Japan.

- EDMS was developed with supportive User Manual & Tutorial Videos. EDMS contributes to improving accuracy and efficiency in developing national energy balance.

  National Energy Balance Table (NEBT, 2020/2021) incorporating all energy products from the primary energy supply to the final energy consumption was prepared with a visualized Energy Flow Charts.

  A Business Process Manual (BPM) for national energy balance creation was also prepared to identify the role and responsibility of each organization at the predefined time.

- A comprehensive energy audit was conducted on a pilot basis. Engineers from the petroleum sector were trained on the job. The final roadmap confirmed a potential energy savings of EGP170 million/y, with an estimated CO2 reduction of 87 MTPA.

  Energy Management System Framework (EMSF) roadmap was developed. The roadmap has covered the five key EMSF elements (Organization & governance, Regulations, Finance, Information, and Capacity building).

  Regarding the establishment of CoE, JICA T/C has developed the vision, mission, objectives, and main business processes of the center.

- Energy Efficiency & Conservation Unit (EECU/IDA) was established in January 2022 to promote EE&C in the industrial and to coordinate EE&C activities with MTI related entities and to cooperate with other C/Ps.

  EE&C checklist was developed to help identify the EE opportunities during the inspection visit to the factories.

  List of no/low cost EE&C measures was prepared which can be easily implemented within industrial sector.

  An awareness raising brochure was designed to be distributed to manufacturers.

The presentation material is attached in ANNEX (2).

At the end of this session, Mr. KATO Ken, JICA Chief Representative, appreciated the Minister for his continuous support and handed him the JICA Trophy.

II. Proceeding of the 4th JCC meeting

The next session of JCC meeting resumed to present the overall Project progress and implementation status of activities and outputs to date.
The meeting started with remarks introduced by the C/Ps representatives and the Chief Representative of JICA Egypt Office as follows:

A. Opening remarks

- **Dr. Eng. Ahmed Mohamed Mohina, First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE**

  Dr. Mohina expressed his great pleasure to participate in this ceremony on finalizing the JICA T/C Project and appreciated the cooperation and efforts of the Japanese Government and JICA. Then he thanked the C/Ps representatives for their great efforts and their cooperation in the Project.

  Dr. Mohina summarized the purpose of the Project in determining the needs for improving EE, strengthening the institutional and personal capacities of the Energy Efficiency Units. He also added the needs of securing financial mechanisms, data gathering and MRV system, Capacity building... etc.

  Dr. Mohina underlined the importance role of the private sector including JICA's engagement in EE projects as private investments will play a major role in achieving the ambitious vision of utilizing renewable resources.

  Dr. Mohina summarized the key results of JICA T/C Project in electricity sector as follows;

  - Developing and releasing the First EE report in COP 27.
  - Activating the role of the EESLC.
  - Pilot Project at (E-JUST): to compare actual power consumption of inverter-controlled AC and non-inverter-controlled AC under the same living conditions.
  - Intensive training courses to support capacity building such as: on-site energy audit as well as lectures of energy audit with LEED Certification programs.

  Finally, Dr. Mohina addressed the needs for sustainable EE such as adequate resource mobilization, technology transfer, and qualified youth cadres to lead the integrated development projects. Then he thanked all C/Ps and JICA for their continuous efforts in EE projects to achieve sustainable development and environmental conservation.

- **Eng. Ahmed Abd Rabou, Energy and Environment Consultant, MOPMR**

  Eng. Ahmed Abd Rabou expressed the MOPMR's sincere appreciation to the country of Japan and JICA for their efforts in supporting the energy sector in Egypt. In addition, he thanked the Project C/Ps; MOERE, IDA, and CAPMAS.

  Eng. Abd Rabou demonstrated the vision of MOPMR to decarbonize all the sector activities and operations to reduce emissions and mitigate global climate change. Eng. Abd Rabou addressed that the demand for fossil fuels is expected to remain for the next 30 years, and natural gas will play an important role in the future to balance the sources of renewable energy. Therefore, there are many challenges facing hard-to-abate sectors including oil & gas and heavy industries to achieve their decarbonization targets. Based on today's technologies decarbonization of the oil and gas industry could be achieved in a cost-effective way through improving EE, eliminating flaring and methane emissions, and electrification by renewable energy.

  Eng. Abd Rabou summarized the outcomes and achievements of MOPMR since COP27. At the first Decarbonization Day in COP 27, all stakeholders presented their ambitious commitments to improve the climate change situation in the world. MOPMR also announced the EE strategy of the petroleum sector. In addition, a dedicated session for EE was organized, where MOPMR and C/Ps partners including JICA

presented the achievements accomplished in improving EE and ambitions to mitigate climate change.

Eng. Abd Rabou highlighted the achievement of MOPMR in the JICA T/C Project as active participation in all components of the Project including energy data management, and the White Paper development. He also emphasized establishment of CoE for EE is considered as a key milestone to support capacity building and energy services in a sustainable manner to all energy sectors in Egypt and Africa.

Moreover, he mentioned that members of the oil and gas sector attended the "Knowledge and Experience Sharing training in Japan for EE&C".

Finally, Eng. Abd Rabou announced that all deliverables and outcomes of the Project are successfully completed. Then he praised the effort and dedication of the Project consultants and expressed his wishes for continued collaboration with JICA.

- **Mr. Mohamed Ahmed Foad Negm, Associate Chairman, IDA, MTI.**

Mr. Mohamed Negm expressed his pleasure to join the final JCC meeting, since it has been hard working for the last two years to achieve the dream of establishing an EECU. IDA is now moving forward toward playing a vital role in saving the environment by guiding the industrial sector to reduce energy consumption and carbon emissions.

Mr. Negm explained the strong involvement of IDA in achieving the goals of Egypt Strategy 2030 as part of achieving the whole picture by reaching the SDGs. Therefore, practicing industrial activities under the EE umbrella is one of the top priorities of IDA to enhance the industrial sector's competitiveness and market accessibility.

Mr. Negm highlighted the importance of establishing EECU inside the IDA, to become the key player in changing the culture of the industrial sector. This will be implemented by combining all efforts made by MTI-affiliated entities working in the same field including IMC, ENCPC, and ECO FEI resulting in replication avoidance and doubled efforts. EECU/IDA started from now to build its own capacity, spreading awareness across the different industrial sectors with regards to EE concepts and measures.

Finally, Mr. Negm expressed his great appreciation to the distinguished Project team, C/Ps members, and JICA for their persistent support and encouragement to build the unit.

- **Ms. Safaa Samy, Head of Central Department for Financial and Price Statistics, CAMPAS**

Ms. Safaa expressed her honor to meet all C/Ps and JICA team at the conclusion JCC meeting of the JICA T/C Project with the aim of continuous cooperation to serve economic development in other projects during the coming period.

Ms. Safaa pointed out that the energy balance is one of the important outcomes of the CAPMAS, as it integrates various energy information in one table that includes all the energy forms from production to consumption. It clarifies the energy situation in Egypt and the extent of its dependence on export and import (for various forms of energy) and helps to identify alternatives for new and renewable energy.

Ms. Safaa outlined that CAPMAS team worked during the last period in cooperation with JICA experts to complete the specific activities of the TT2, which included three items related to the Project, as follows:

Updating the management of energy data at CAPMAS by developing the energy balance which provides a brief and comprehensive picture of the energy situation in Egypt. Detailed data (sub-sectors) on the consumption of electricity by the industrial sector has been added.

Development EDMS which facilitated the process of collecting and exchanging data between C/Ps as well as enhancing the quality of energy data has been completed.

Finally, Ms. Safaa expressed her appreciation to all members in charge of this Project for the effort made during the last period, especially the TT2 team, and JICA experts

for their proposals for developing the energy balance and their contribution to adding many detailed classification data in electricity, natural gas, and biofuels. She wished all partners success to improve and raise EE in Egypt.

- **Mr. KATO Ken, Chief Representative, JICA Egypt Office**

  Mr. KATO ken expressed his pleasure to join the final JCC with all C/Ps and his sincere gratitude to all C/Ps for their efforts and coordination in completing the fruitful achievements and results of the JICA T/C project.

  Mr. KATO appreciated the contribution of C/Ps in cooperation with JICA in presenting the Project activities at COP27. Since the great outcomes of this cooperation were demonstrated including the First EE Report, National Energy Balance, CoE establishment, E-JUST demonstration project and EECU/IDA establishment.

  Mr. KATO congratulated the C/P representatives who went to Japan for the site visit-training program.

  Finally, Mr. KATO expressed his hopes that all findings and recommendations to continue in improving EE and Egypt economy.

B. Presentations

1. Mr. Yasuhiro Sakamoto, JICA T/C Project Team Leader, PADECO, made a presentation explaining the overall Project progress based on PDM. Mr. Sakamoto highlighted that all activities have been completed as follows:

- **Overall Goal and Project Purpose**
  - The Project aims to strengthen institutional capacities of Government of Egypt toward further promotion of EE&C with following achievements:
    - ✓ First Energy Efficiency Report was published including analysis of energy savings from supply/demand sides as well as evaluation of key KPIs.
    - ✓ National Energy Balance Table (NEBT) was developed in cooperation of 4 C/Ps and other relevant organizations.
  - The Project purpose is to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas sector Modernization Program (OGMP). The Project has completed the following outcomes:
    - ✓ Review of implemented projects in NEEAP-II was completed and reported in the First Energy Efficiency Report.
    - ✓ Development of EDMS was completed.
    - ✓ Development of EMSF roadmap was completed.

- **Achievement 1: The capacity of the Energy Efficiency and Climate Change Department (EECCD) of MOERE is strengthened for EE&C promotion (Task Team 3 (TT3)- MOERE)**
  - All activities of MOERE are completed as follows:
    - ✓ MOERE officials participated in energy data management training.
    - ✓ MOERE published the First Energy Efficiency Report at COP27 which included energy saving evaluation from supply/demand sides, some key KPIs and the national energy balance.
    - ✓ Future action plan has been developed and incorporated in the white paper.
    - ✓ Energy saving potential roadmap (up to 2036) was prepared and shared in TT1 workshop; and
    - ✓ Awareness raising activities were conducted through COP27 (seminars and booth), the Project website and through E-JUST (on AC and smart home demonstration).
    - ✓ Two participants obtained LEED Green Associate certification. Followed up with practical & case study training was conducted in Dec/2022.

– **Achievement 2: Evaluation of technologies and products with high energy saving potential is conducted, and promotion policies are proposed (TT3- MOERE)**

  - AC Demonstration Test: The effectiveness of efficient air-conditioner in building has been verified. Since the data was collected over a year, both cooling and heating results have been analyzed.
  - Smart Home Test: The data collection and analysis of power consumption by each appliance in 5 households over a year was conducted.
  - Three workshops were held to improve standards and labeling program participated by MOERE, EOS, NREA, GOIEC ICA, and CPA. List of existing laboratories was developed. Key issues were identified, and next actions were summarized.

– **Achievement 3: The administrative capacity of MOPMR/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created (TT4- MOPMR)**

  - EE&C framework related to MOPMR was reviewed and its issues were organized.
  - Pilot plant (refinery) audit report was prepared. In addition, 7 trainings and 2 additional workshops were held onsite.
  - The EE&C roadmap was prepared and validated with main stakeholders. Cooperation activities with MOPMR and CAPMAS for data collection was conducted.
  - Centre of Excellency (CoE) for EE establishment preparation: the following activities are completed;
    - ✓ Stakeholders Strategic Workshop successfully conducted, and its report was issued and accepted. Preliminary list of models for the simulation software and the virtual reality (VR) were prepared;
    - ✓ CoE Competency Development and Training Management Guide Document was issued;
    - ✓ CoE Organizational Concept and Design Document were issued;
    - ✓ 3 training sessions conducted onsite; and
    - ✓ SOP Final to be issued by 16th March 2023.

– **Achievement 4: Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. (TT1 - MOERE, MOPMR, IDA, CAPMAS)**

  - Summarization of a future national integrated EE&C policy and its action plan, the White Paper has been prepared by all C/Ps.
  - EE&C activities in the industrial sector is strengthened for EE&C socio economic development, where the followings were achieved:
    - ✓ Energy Efficiency & Conservation Unit (EECU/IDA) was established at IDA in Jan. 2022;
    - ✓ Implementation structure and functions of EECU were finalized. Monitoring system of EECU was conducted;
    - ✓ “Mid-term plan of EECU” was developed;
    - ✓ “Application form of industrial registration” was updated and “data collection form” was developed to collect energy related data. In addition, “EE checklist” and “list of no/low cost of EE measures” were developed;
    - ✓ 1st IDA workshop targeted industrial zone managers was conducted via online. 2nd workshop was conducted at IDA in Feb/2023; and
    - ✓ 120 IDA engineers were trained through three Resource Efficiency and Cleaner Production (RECP) workshops (Jul-Sep/2022) conducted by ENCPC.

– **Achievement 5: CAPMAS publishes national energy statistics, which are referred to by 3 C/Ps for making and monitoring EE&C promotion policies. (TT2- CAPMAS, MOERE, MOPMR, IDA).**

  - 9 remote collaborative meetings were conducted with CAPMAS on data collection practices.
  - A workshop on National Energy Balance Table was held. One day training (two sessions) for CAPMAS on the best practices of energy data management was conducted. 2 EDMS demonstration trainings and 2 EDMS UAT & trainings were conducted.
  - EDMS with input format, data processing, and presentation output generation functions were developed and delivered. The user manuals were shared with the participation of CAPMAS, MOERE, MOPMR, IDA and MOE.
  - Completed national energy balance data on data inventory for "FY 2015/16 until FY 2020/21" collected and recorded on EDMS. It is ready for publication purpose.
  - NEBT FY 2020-21 publication was prepared based on EDMS output.
  - CAPMAS's NEBT publication FY2020-21 reviewing meetings convened with the participation of MOERE, MOPMR, IDA and MOE.

The presentation material is attached in ANNEX (3).

Eng. Taghrid El-Ayouti, General Manager EECCPD, MOERE, made a presentation on the activities/outputs to date regarding TT3 as follows:

– **Preparation of annual energy efficiency report**

  - MOERE-EECCPD developed "the First Report on Energy Efficiency in Egypt" and it was officially released in COP27. The report covered the period of the National Energy Efficiency Action Plan-II (2018/2019 - 2021/2022). The report included energy saving evaluation from supply/demand sides, key KPIs and national energy balance.

– **Demonstration test of efficient ACs and home appliances**

  - In collaboration with E-JUST, actual power consumption of inverter-controlled AC and non-inverter-controlled AC under the same conditions were compared for one year which indicated that the saving is about 62% for cooling and 76% for heating.
  - In addition, another pilot project is conducted in collaboration with E-JUST for Smart home test. The actual power consumption breakdown for home appliances in 5 households was collected by smart sensor for 1 year. It was found out that:
    - ✓ AC consumed more than half of annual power consumption (furthermore it was only used for cooling); and
    - ✓ More efficient use of power can be proposed (such as changing non-inverter AC to inverter AC, shortening AC operation hours during nighttime).

– **Review of standard and labelling program**

  - JICA T/C Project activated the functions of Standard & Label committee, since a series of meetings were held to review the current status of MEPS Program. The committee's stakeholders are MOERE, EOS, NREA, GOIEC, ICA and CPA. As a result of these meetings the following were developed;
    - ✓ List of existing EE testing labs was prepared including the location, function and capability.
    - ✓ Key challenges were identified, such as lack of institutional coordination and weakness of market surveillance.
    - ✓ Recommended actions were summarized including; support institutional framework for managing the program, enhance the capacity of stakeholders

involved in the program and strengthen market surveillance & compliance procedures.

– **Supports for the improvement of energy audit capacity where:**
  - A series of lectures were conducted on building EE and its certification scheme including LEED. Some participants were certified as LEED Green Associate and others are in progress.
  - A series of on-site training sessions were conducted on power consumption data collection and analysis in office building using power loggers. The Standard Operating Procedures (SOP) was prepared.

– **Way Forward**
  - NEEAP-III preparation based on national energy balance and energy efficiency KPIs.
  - Development of accreditation mechanism for certified energy manager and facilitation of energy manager and energy register stipulated under Electricity Law.
  - Continued and institutionalized cooperation among stakeholders to enhance standard and labelling program under EESLC.
  - Awareness raising on efficient AC based on findings from demonstration project.

The presentation material is attached in ANNEX (4).

2. Eng. Mahmoud Maher, Department Manager, EECD, MOPMR, made a presentation on the activities/outputs to date regarding TT4.

– **In cooperation with JICA, TT4 main achievements were accomplished as follows:**
  - Energy Management System Framework (EMSF) Roadmap for the Petroleum Sector.
  - On-job Training through energy audit in CORC resulted in a potential energy savings of 170 million EGP/y with an estimated CO2 reduction of 87 KTPA.
  - The Knowledge Cooperation Program on Energy Efficiency and Conservation in Japan was organized, and 9 participants from MOPMR attended in classroom-style lectures and related site-visits where they could experience Japan's energy-saving technologies.

– **In October 2022, launching the "Center of Excellence for Energy Efficiency & Conservation (COE)" as the first center in providing innovative and up-to-date EE services, knowledge and trainings to all energy sectors in Egypt and Africa.**

  H.E the Minister of Petroleum and Mineral Resources, **H.E the Ambassador of Japan to Egypt and Chief Representative of JICA in Egypt** attended the Launching Ceremony.

The following activities were conducted for EE CoE establishment:

  - CoE Stakeholders Strategic Workshop was held and the report was issued to MOPMR documenting the outcomes of the workshop.
  - CoE Organizational Concept and Design document was issued to MOPMR.
  - CoE "Competency Development and Training Management Guide" document was issued to MOPMR. These guidelines are designed to serve as the foundation for a successful EE training program.
  - Achieving Optimum Energy Efficiency (AOEE) Training was held. The course covered; EE and economics, steam and power generation & optimization, process and equipment efficiency, basic heat integration & pinch technology, and effective energy management.

- "Train the Trainers" training was organized. The program witnessed interactive workshop discussing a number of training principles, methods, and training preparation and techniques delivery.
- Introduction to pinch technology and "Super Target" training with aims to give an overview of the fundamentals of pinch technology to be familiar with the practical software tools.

– **Issues to be tackled at the next step**

Creation of manuals and SOP, etc., strengthening of EE&C promotion implementation system, where the Final SOP will be issued after JCC.

The presentation material is attached in ANNEX (5).

3. Mr. Ibrahim Sobhy, Head of Electricity and Energy Statistics Dept., CAPMAS, made a presentation on the activities/outputs to date regarding TT2 as follows:

– **Capacity development**

The activity of assessing CAPMAS's institutional capacity on energy data management has been completed while the capacity of C/Ps' data collection capacity and target setting was strengthened through cooperation in developing the energy data management system usage.

– **In-house training for 4 C/Ps on international standard energy data management**

- Energy balance table workshop was held and a training session on the best practices in energy data management was conducted.
- CAPMAS and JICA agreed to prepare the national energy balance for year 2020/2021 to be disclosed at the COP27.
- EDMS output demonstration workshop was held.
- EDMS User Manual confirmation and output customization workshop was held.
- Two workshops were held for reviewing the National Energy Balance Publication FY 2020-21 and for the Confirmation of EDMS Operation.

– **Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM)**

- A simple Business Process Manual (BPM) for NEBT preparation has been developed. It identified the role of each organisation, what to do and when, making use of the newly developed EDMS. When everyone does his/her part, the NEBT will be ready annually.

– **Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOPMR, and IDA**

- System requirement document was prepared.
- A local system vendor (SmartTech) was appointed.
- The development has been completed and tested.
- Trainings were conducted.
- Functions are proven with the creation of FY 2020-21 balance table and charts.
- User manual and tutorial videos have been developed.

– **Issues to be followed up**

- EDMS is functional, ready for FY 2021-22 NEBT preparation. CAPMAS is expected to communicate and collaborate with the other organisations for the completion of the table, then, onto publication.

- If unanticipated structural change in energy supply, transformation, consumption occurs, the participating organisations are expected to support CAPMAS to incorporate the change into the NEBT.

– **Evaluation**

- TT2 activities contributed to uniting the energy data owner organisations.
- With EDMS and the Business Process Manual, a collaborative and sustainable mechanism for National Energy Balance development was created.
- The government authorities for energy, environment, and industries are now making use of the National Energy Balance created with EDMS as a tool for their policy making.

The presentation material is attached in ANNEX (6).

4. Mr. Mohamed Negm, Associate Chairman, IDA, MTI, made a presentation on the activities/outputs to date regarding TT1 (IDA part) as follows:

– **Preparation for establishment of EECU of IDA**

- EECU was established in Jan/2022.
- Organization structure and functions of EECU were finalized.
- Monitoring of EECU activities was conducted in Sep – Oct/2022.
- Regular meetings of EECU were conducted 9 times in total and shared progress of each team activities.
- Organizational reform is under consideration (new chairman at IDA was assigned in Sep/2022).

– **EE&C Policies/Regulations of IDA formulated for the industrial sector**

- **Planning & Monitoring Team**
  - ✓ Mid-term plan of EECU (action plan by Dec/2025) was developed;
  - ✓ Internal note was issued to collect energy related data at factories by IDA technical department during conducting site visits; and
  - ✓ Application form of industrial registration was updated to be used by investors.
- **Technical Support Team**
  - ✓ EE checklist was developed to promote EE activities at factories and used by the IDA technical department during their sites visits; and
  - ✓ List of EE (No/ Low-Cost) measures was developed to facilitate the implementation of EE activities at factories.
- **Data Management Team (in cooperation with TT-2)**
  - ✓ Developed the energy and production data collection forms; and
  - ✓ Launched data processing of the textile industry and food processing industry. Data of 80/200 factories in dying sector and 18 factories of sugar industry was processed and analysed.

– **Integrated activities are organized including the industrial sector**

- 2nd and 3rd RECP trainings were prepared by the Capacity Development and Outreach Team & conducted in cooperation with ENCPC.
- Preliminary discussion with MOERE was conducted to discuss the implementation procedures of Energy Register and Workshops for Private Sector of EE&C.

– **Trainings were held for IDA personnel**

- **Capacity Development and Outreach Team**

- ✓ 1st IDA workshop targeted industrial zone managers was prepared & conducted via online;
- ✓ 2nd IDA workshop was prepared & conducted at IDA; and
- ✓ About 120 IDA engineers were trained through 3 RECP workshops.

– **Issues to be tackled at the next step**

- Strengthening the sustainable cooperation with MTI affiliates including IMC, ECO FEI and ENCPC to provide energy services to all industrial sectors.
- Continuing and increasing cooperation with the Project counterparts (MOERE - MOPMR - CAPMAS) to reach the Project objectives.
- Creating our industrial database for the energy usage in the industrial sector reaching our local Benchmarks for each product.
- Reviewing laws and regulations that regulate energy use in the industrial sector and identifying legislative gaps for preparation of a proposing MEMOS to be submitted to the higher level of decision makers.

– **Evaluation**

- IDA has newly established EECU/IDA to promote EE&C activities in the industrial sector.
- Awareness creation was successfully made through various trainings targeted IDA personnel by the Project.
- Basic policies & tools to promote EE&C activities in the industrial sector were prepared through the Project activities.
- EECU/IDA has organized meetings and workshops in the industrial sector in cooperation with other related entities.
- Continued efforts is expected to be made by EECU/IDA to promote further EE&C activities in the industrial sector.

The presentation material is attached in ANNEX (7).

5. Mr. Yasuhiro Sakamoto, JICA T/C Project Team Leader, PADECO, made a presentation on action plan discussed in TT1 (all C/Ps part) as follows:

Through seven times discussions/information sharing event among all C/Ps, the White Paper (WP) was prepared. In the past discussions, all C/Ps agreed that the WP would be developed based on the following points:

- Summarization of essence and key points of necessary next steps/action plan confirmed through this JICA's Technical Cooperation activities.
- Consideration of energy saving targets + other setting. (e.g. Energy savings, energy intensity, CO2 reductions)
- Volume of WP: 10 pages for each entity at maximum.

The key points of each counterpart's action plan are summarized below.

– **MOERE, Future Goals & Action Plans**

- Projects which EECCPD/MOERE will be mainly responsible for, and has potential for future cooperation with JICA are expected in particular to be reflected in the white paper. In addition, cooperation between 4 C/Ps organizations (MOERE/MOPMR/IDA/CAPMAS) will be sought for the proposed projects.

- Preparation of NEEAP-III based on national energy balance and energy efficiency KPIs.
- As 4 sectorial EE units are in the process of establishment, MOERE will further support establishment and activation of 4 units.
- Institutionalized cooperation among stakeholders to enhance the Standard and Labelling program under EESLC will be continued.
- Accreditation mechanism for certified energy manager will be developed and energy manager and energy register system will be facilitated.
- Cooperation can be developed with MOPMR /COE, especially in efforts to develop ESCOs, Super ESCOs, and energy managers.
- Some new ("quick win" programs) can be identified and added to NEEAP-III
- Cooperation with Ministry of Tourism and IDA in solar water heater promotion will be made.
- MOERE's focusing areas on New Technology will include Hydrogen, E-mobility, Waste to energy and Water desalination
- Energy efficiency KPIs & Benchmarks can be developed and linked to energy balance.
- An action manual for EE indicators will be developed which can be used as a handbook. (e.g. with EEHC, CAPMAS)

– **MOPMR, Future Goals & Action Plans**

- The output measures of "The Strategic Vision of the EE Strategy 2022-2035 master plan" have been reflected in the White paper.
- MOPMR has been actively working to reinforce the EE Strategy as well as the Energy Management System Framework (EMSF) roadmap across the whole sector.
- Developing a harmonized methodology for economic and financial evaluation of EE investments.
- Feasibility assessment of establishing Sector's EE revolving fund, creating super ESCO and ESCO model to help in implementing and deploying a carbon credit for the EE and RE projects.
- Implementing a pilot project to validate the ESCO business model under local circumstances.
- Digital Transformation (data digitalization) and implementation of energy management programs for the heavy consumers.
- Monitoring and improving the energy performance through EE Indicators set up (e.g. Energy Intensity) and benchmarking major energy consumers against Industry Standards, and Set Minimum Energy Performance Standards (MEPS) for major equipment
- Improve awareness and knowledge sharing by developing an EE knowledge management system to serve as a one-stop shop for knowledge dissemination.
- Energy system optimization and integration to integrate the energy systems of adjacent companies, utilizing of excess hydrogen from petrochemical/refining plants, and/or expanding the implementation of co-generation.
- Renewable Energy, hydrogen and decarbonization technologies through introducing Renewables Energy, low carbon hydrogen production, CUS/CCS Technologies and/or biofuels and green petrochemicals.
- Improving EE in the end users by introducing EE Labels / Fuel Economy Standards for passengers' cars.

– **IDA, Future Goals & Action Plans**

- EECU/IDA identified awareness creation & outreach as the key priority to realize benefits to introduce EE&C activities on manufacturers' business operations.

Data Management Field

- Data analysis (textile industry): Data classification, energy intensity calculation, benchmark development.
- Development of new automated industrial energy data management system for data collection and analysis in IDA.
- Data integration in updating the National Energy Balance in collaboration with CAPMAS and other stakeholders.
- Extension of the data management activities to other sub-sectors within the textile sector (e.g. dyeing, spinning field)

Energy Manager and Registration (Collaboration with MOERE)

- Creation of an EECU/IDA action plan for the application of the energy manager system at factories.
- Awareness raising for the potential factories:
- Preparation of EE technical lists / check lists for EE solutions at factories.

Integrated Activities

- Participation / organizing EE related conferences with other entities (cross sector).
  - ✓ Organizing integrated meetings in industrial sector;
  - ✓ Organizing meetings with each MTI affiliated entity about integrated activities; and
  - ✓ Holding workshops to the private sector & the public institutions.

Capacity Development & Outreach Field

- Holding awareness raising EE&C workshops for the private sector and for public sector.
- Materials preparation for workshops.

– **CAPMAS, Future Goals & Action Plans**

- The NEBT is considered a mirror which reflects the energy situation in Egypt. It shows the status of supply and consumption and also with considerations on foreign trade of all kinds of energy.
- The fiscal year 2020/21 NEBT was prepared and analysed using the EDMS which is an information system newly introduced under the Project.

Further Improvements / Developments in Energy Statistics

- Each ministry / agency will enter the data that pertains to it according to specific timelines (which will be determined by agreement among parties concerned).
- After the data entry stage, CAPMAS will review the data and its quality and logicality by comparing it with a long-term time series and after reviewing and checking the data, it will be presented for ratification by the head of the sector and the head of CAPMAS on the outputs of the energy balance.
- Publishing the data on CAPMAS's website.

Reinforcing the National Energy Balance Table (NEBT)

- Sub-sector wise electricity and natural gas sales data have been identified and obtained from MOERE and MOPMR respectively.
- Further collection of sub-sector wise petroleum products sales data as well as identification of the actual consumption data with IDA will have to be pursued.

Further Improvements in the NEBT

- Adding more comprehensive RE (with focus on biofuels and waste) supply data in response to the expectations for low emissions society. This step is currently being carried out in coordination with the Ministry of Environment which has cooperated with the Project.
- In the event that Egypt will enters the era of using innovative energy such as hydrogen, the data relating to hydrogen utilization needs to be reflected / included in national energy statistics / balance.

The presentation material is attached in ANNEX (8).

C. Explanation and confirmation on monitoring sheets and the next step of the overall Project

Mr. Yasuhiro Sakamoto explained that the essence of the monitoring sheets is PDM which was explained in earlier session and the activities have been achieved except one task in the petroleum sector. This is considered to be completed in the middle of March 2023.

Then Mr. Sakamoto announced that, the Project Team will hand over equipment purchased for the Project activities to each counterpart. The process will start early March and ended by June. 2023 when the Project office at the GrEEK Campus is scheduled to be closed.

The presentation material is attached in ANNEX (9).

D. Overall summary from JICA

Mr. SATO Akira, Director, Energy and Mining Group, Infrastructure Management Department, JICA, presented overall summary on what was reported / presented during the final JCC as follows:

– First, Mr. SATO expressed his pleasure to attend the final JCC meeting and appreciated the good cooperation among C/Ps (MOERE, MOPMR, CAPMAS and IDA).
– He appreciated the significant efforts of the Project members and expressed his thanks to all for their efforts in achieving the Project's activities.
– He highlighted the participation in COP27 to present the Project outcomes such as the first EE Annual Report, E-JUST demonstration experiments (Inverter AC performance evaluation as well as Smart home test).
– Finally, Mr. SATO expressed his great pleasure to hear about the successful results and recommendations for the next step, and he assured that JICA will always provide the support to the C/P's in Egypt.

End of Document

Attachments:

ANNEX 1: List of Key Participants
ANNEX 2: 1st presentation material from JTT
ANNEX 3: 2nd presentation material from JTT
ANNEX 4: Presentation material from MOERE

ANNEX 5: Presentation material from MOPMR
ANNEX 6: Presentation material from CAPMAS
ANNEX 7: Presentation material from IDA
ANNEX 8: 3rd presentation material from JTT
ANNEX 9: 4th presentation material from JTT
ANNEX 10: Project Design Matrix (PDM) revised

Dr. Eng. Ahmed Mohamed Mohina, For First Undersecretary for Strategic Planning and Electrical Performance Follow-up, MOERE	Mr. Ahmed Abd Rabou Energy and Environment Consultant, , MOP
Eng. Mohamed Ahmed Foad Negm, Chairman Associate, IDA.	Mr. Mostafa Saad Badawy, First Undersecretary, Head of Economic Statistics Sector, CAPMAS
Yasuhiro Sakamoto, JICA T/C Project Team Leader, (PADECO)	Mar. 15. 2023

List of participants

No.	Name	Title	Organization
Ministry of Electricity & Renewable Energy (MOERE)			
1	Dr. Ahmed Mohamed Mohina,	First Undersecretary for Strategic Planning and Electrical Performance Follow-up	
2	Ms. Taghrid El-Ayatie	General Manager EECCPD	
3	Ms. Rehab Beder Hassan	Team Leader EECCPD	
4	Ms. Nora Saad	Senior Engineer EECCPD	
5	Ms. Marwa Konswa	Engineer EECCPD	
6	Mr. Mohamed Abd El Mowla	Engineer EECCPD	
Ministry of Petroleum & Mineral Resources (MOPMR)			
7	Eng. Ahmed Abd Rabo	Energy & Environment Consultant	MOPMR
8	Eng. Al Moataz Bellah M. Kamal	Under Secretary Assistant for planning	MOPMR
9	Mr. Mohamed Abd- ELMoneam	General Manager	EECCU/MOPMR
10	Mr. Hany El Rouby	EE General Manager	EGAS
11	Mr. Mohamed Selim	EE General manager	GANOP
12	Ms. Nesreen Mohamed Salh	Assistant General Manager	MOPMR
13	Mr. Mohamed Talaat	GM of EE projects	EGPC
14	Mr. Mahmoud Maher	Department manager	EECCU/MOPMR
15	Ms. Nancy Gamal El Din Azazy	Department Head	EECCU/MOPMR
16	Ms. Alaa Mostafa Safwat	Section Head	ECHEM
17	Mr. Mohamed Magdy	EE Engineer	EECCU/MOPMR
Industrial Development Authority (IDA)			
18	Mr. Mohamed Fouad Negm	Chairman Associate	
19	Eng. Duaa Badreldin	G.M of pharmaceutical projects directorate	
20	Eng. Noha Mohamed saber	G.M of Electrical project Dept.	
21	Ms. Amira Raslan	Textile Engineer	
Central Authority for Population, Mobilization and Statistics (CAPMAS)			
22	Ms. Safaa Samy	Head of Central Department for Financial and Price Statistics	
23	Ms. Rehab Mostafa	G.M of Industry & Energy Statistics Dept.	
24	Ms. Manal Mostafa	International Cooperation Dept.	
25	Ms. Naglaa Zain El Deen	IT General Manager	
26	Mr. Ibrahim Sobhy	Head of Electricity and Energy Statistics Dept.	
27	Mr. Mohamed Osman	International Cooperation Dept	
Japan International Cooperation Agency (JICA), Headquarters (Online)			
28	Mr. Akira Sato	Director, Team1, Energy and Mining Group, Infrastructure Management Dept.	
29	Ms. Keiko Sakamoto	Officer, Team1, Energy and Mining Group, Infrastructure Management Department	
30	Dr. Kimio Yoshida	In house consultant	
Japan International Cooperation Agency (JICA), Egypt Office			
31	Mr. Ken Kato	Chief Representative	
32	Ms. Mayada Magdy Ragheb	Country Senior Representative	
33	Ms. Nevine Zaky Ghaly SALEM	Chief Program Officer	
34	Ms. Yasmin Afifi	Program Officer	
35	Ms. Yoshiko Sano	Project Formulation Advisor	
JICA Technical Cooperation Team (Consultants)			
36	Mr. Yasuhiro Sakamoto	Team Leader, PADECO	
37	Ms. Mari Iwata	Sub-Team Leader, TT3 leader, Mitsubishi Research Institute	
38	Mr. Yoshihiko Kato	TT2 Leader, PADECO	
39	Mr. Azhari Dafaalla	TT4 Leader, KBC Process Technology	
40	Ms. Anna Miyaura	TT1 Leader (IDA part), PADECO	
41	Mr. Moustafa Alsammany	Energy Advisor	
42	Dr. Ahmed Ginidi	Energy Efficiency Expert	
43	Mr. Raouf Abd Alhamid	Monitoring Advisor	
44	Ms. Aya Tahara	Project Coordinator	
45	Ms. Mirna Naguib	Project Coordinator	

The Project for Capacity Development on Energy Efficiency and Conservation

Overall Achievements in JICA Technical Cooperation Project

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

Energy Efficiency Report

Energy Efficiency Report

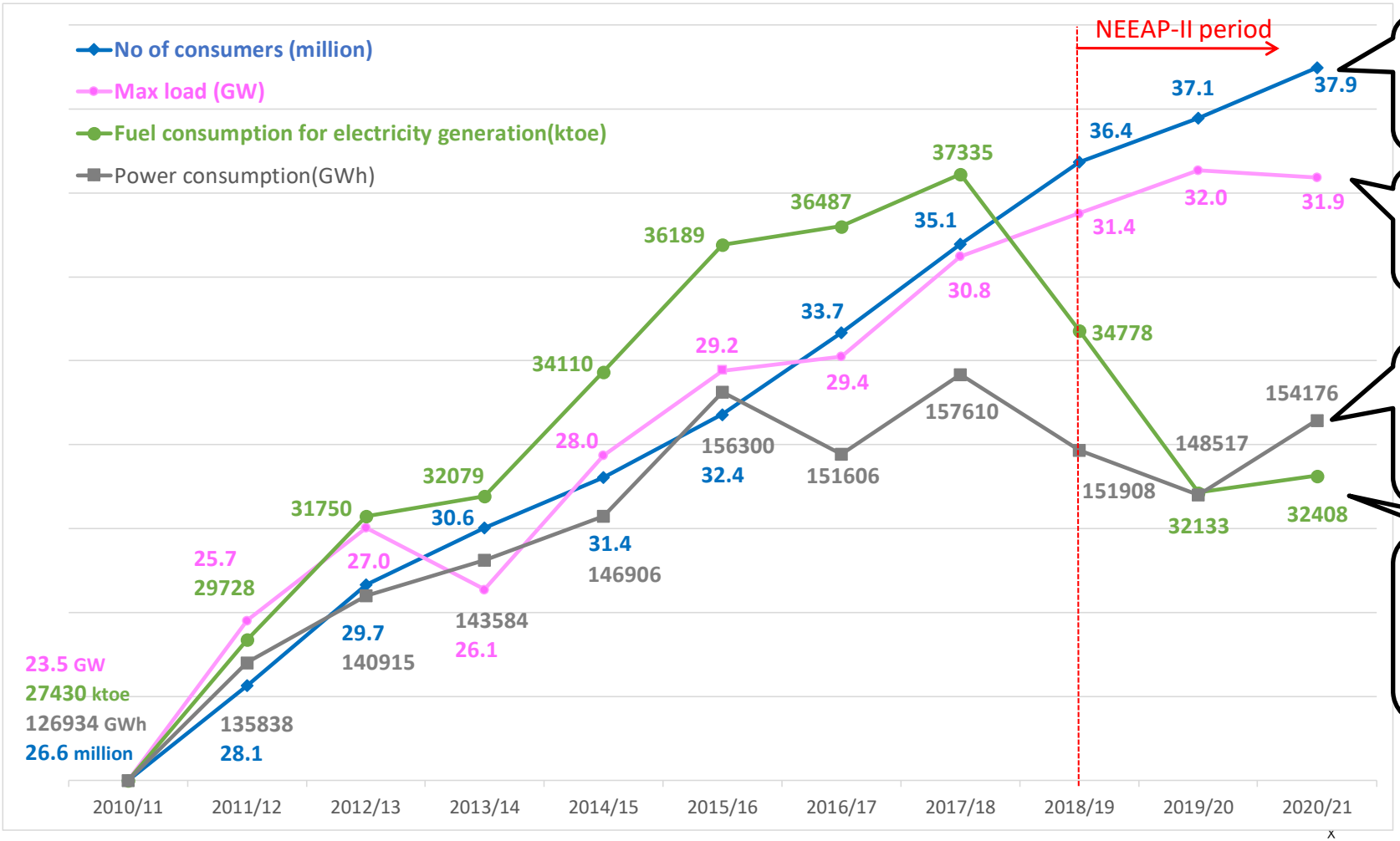
- "The First Report on Energy Efficiency in Egypt" was published.
- It was officially released in Sharm El Sheikh in COP27.

- It is the **first energy efficiency report** of Egypt covering the period of the **National Energy Efficiency Action Plan-II** (2018/2019 - 2021/2022).

Chap 1	National Context
Chap 2	**Actions taken for NEEAP-II** (Institutional Framework, EE Projects, Financial Mechanism, Data Gathering and MRV, Capacity Building, Awareness)
Chap 3	**Climate Change**
Chap 4	Green Sharm El Sheikh
Chap 5	Future Projects

Energy Efficiency Report

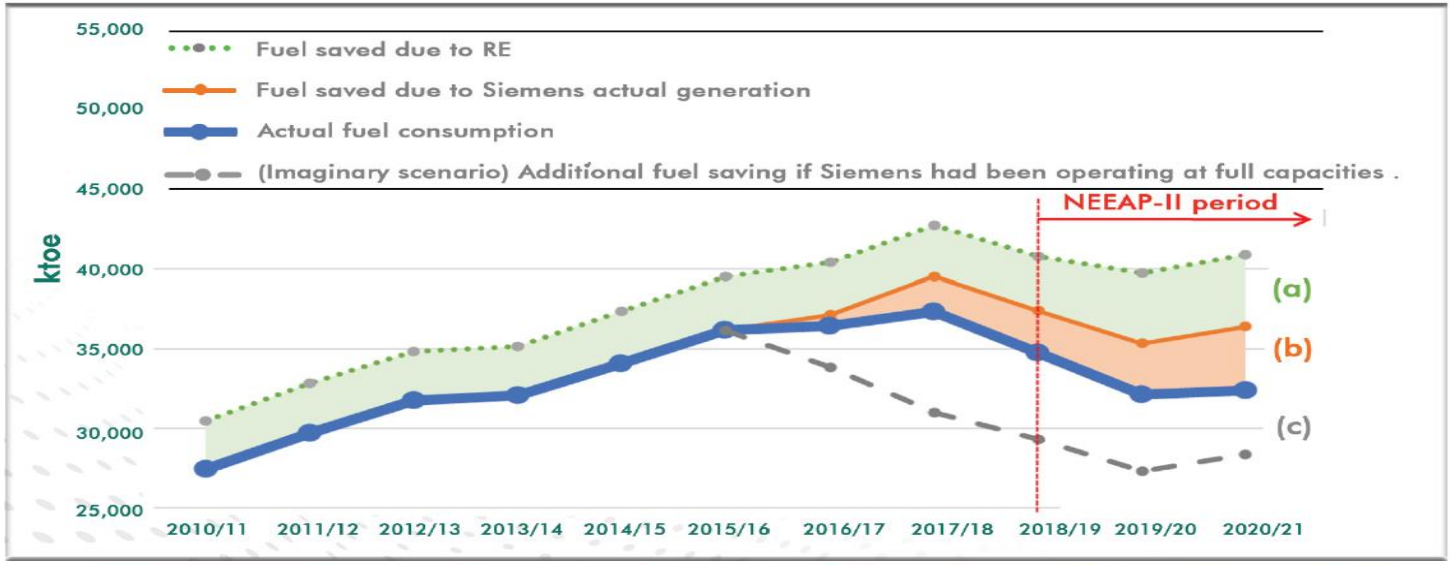
Key content (1): KPIs of energy efficiency in electricity sector



- Number of customers steadily grew
- Max load did not grow as much
- Power consumption did not grow as much
- Fuel consumption significantly reduced

Energy Efficiency Report

Key content (2): Energy savings achieved in electricity supply



+ **Renewable Energy**
+ **Efficient power plants**

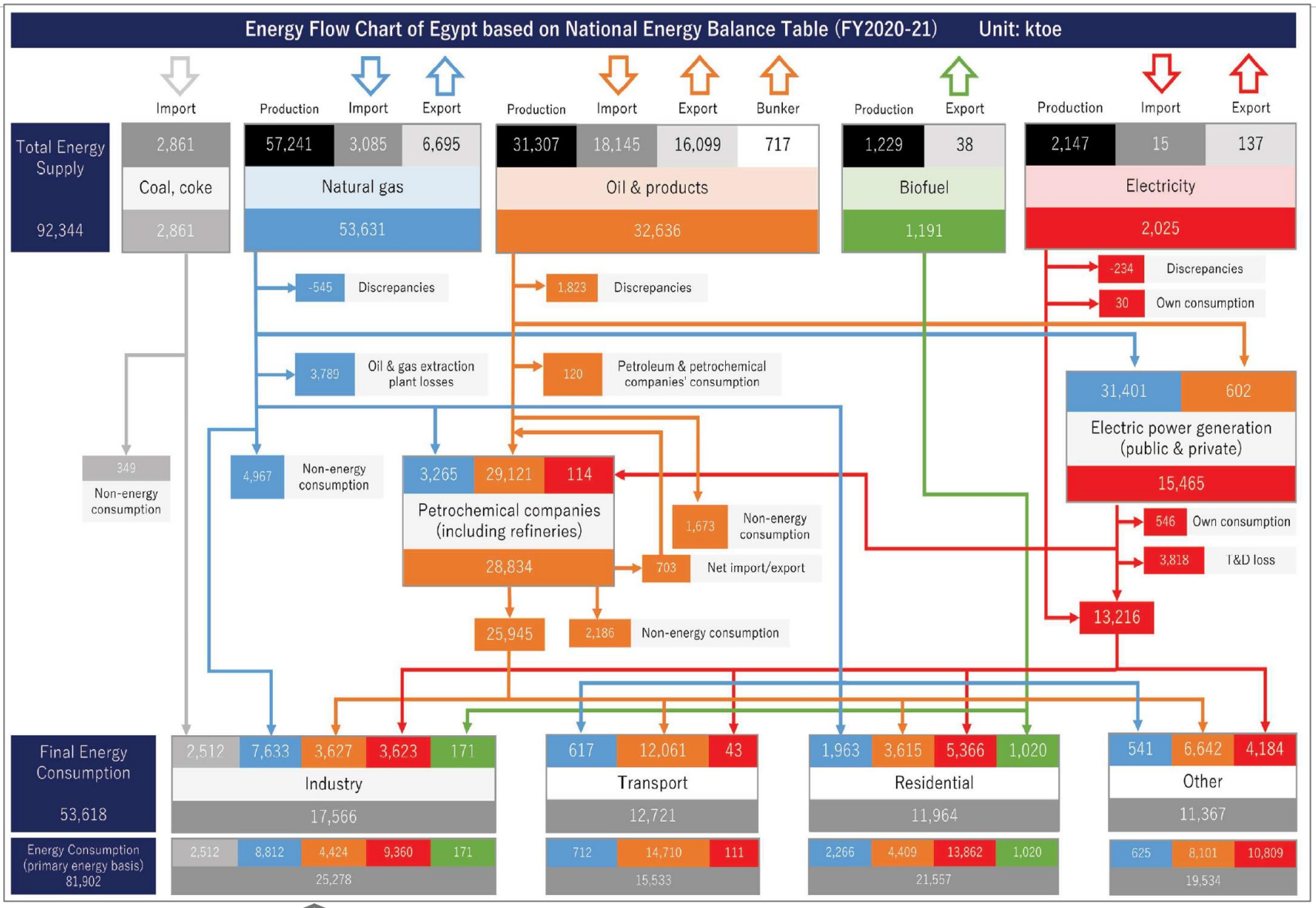
⇩

8,525 ktons of oil equivalent
3,239 million USD
(=**0.7%** of GDP)
20 million t-CO_2
savings in year 2020/21

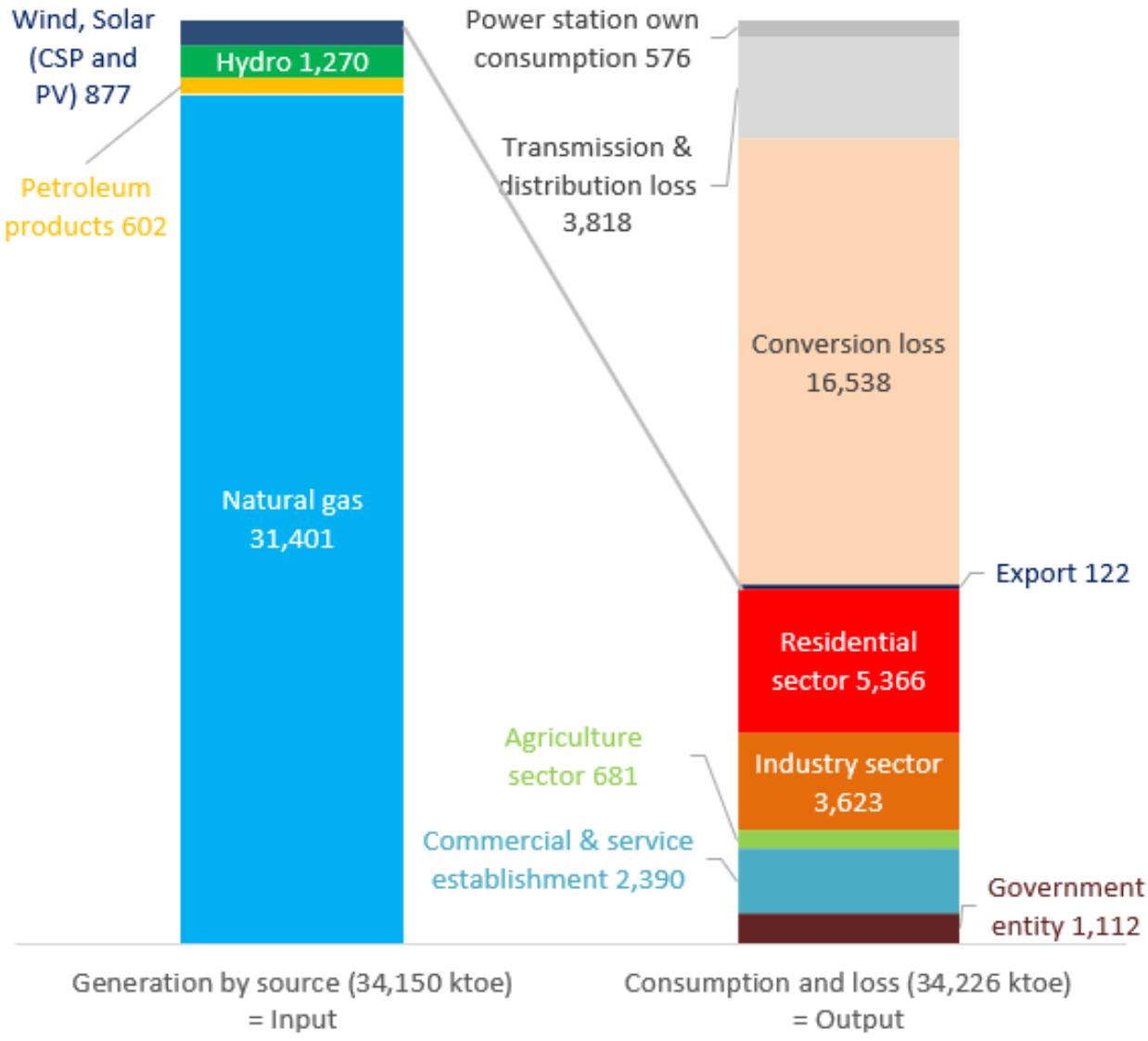
Fuel saved due to	Energy saving (ktoe)			Financial saving (Million USD)			CO_2 emissions saving (t-CO_2)		
	2018/19	2019/20	2020/21	2018/19	2019/20	2020/21	2018/19	2019/20	2020/21
(a) Renewable energy	3,372	4,386	4,500	838	675	1,710	7,920,656	10,301,346	10,570,822
(b) Siemens (Actual generation)	2,641	3,247	4,024	657	500	1,529	6,203,275	7,627,077	9,453,100
Total	6,013	7,633	8,525	1,495	1,175	3,239	14,123,932	17,928,423	20,023,922

Energy Data Management

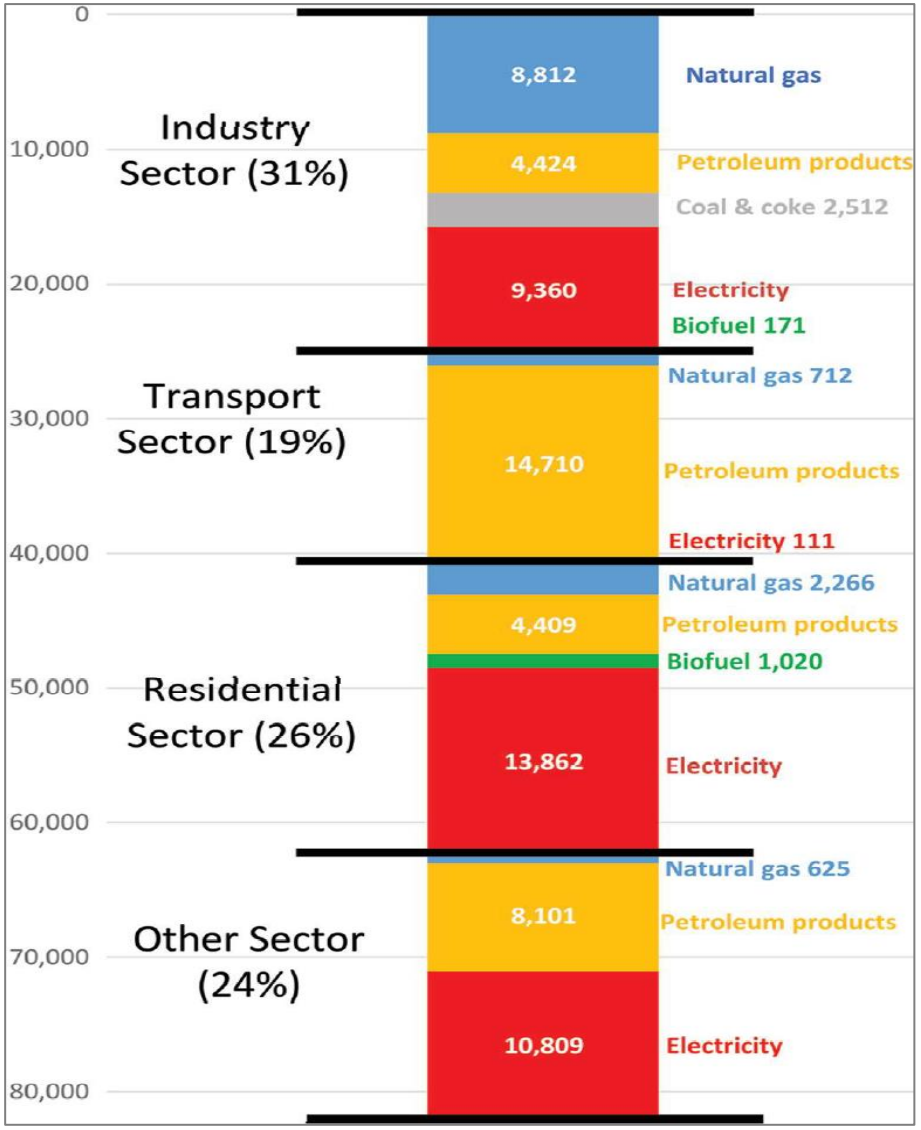
Energy Flow based on Energy Balance Table 2020/21



Electric Energy Generation and Utilization

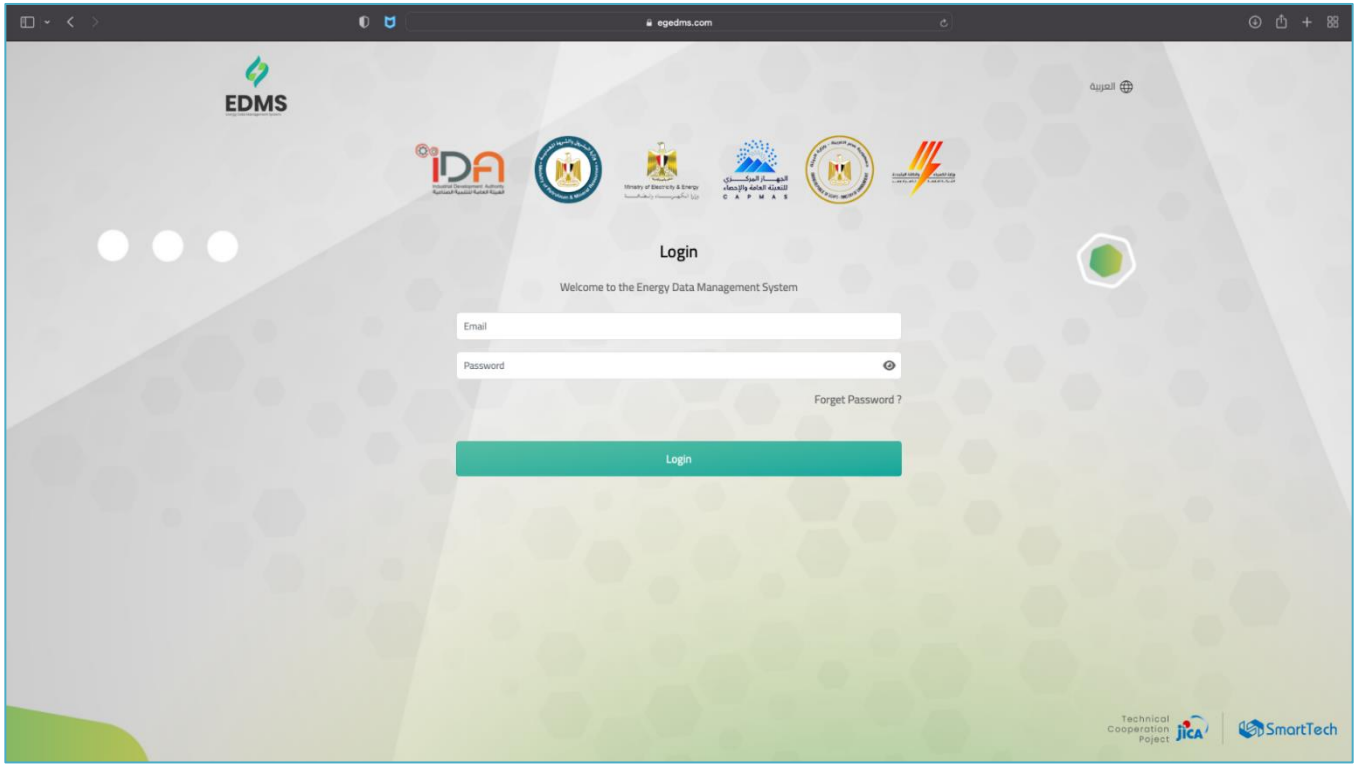


Primary Energy Consumption by Sector and Energy Product



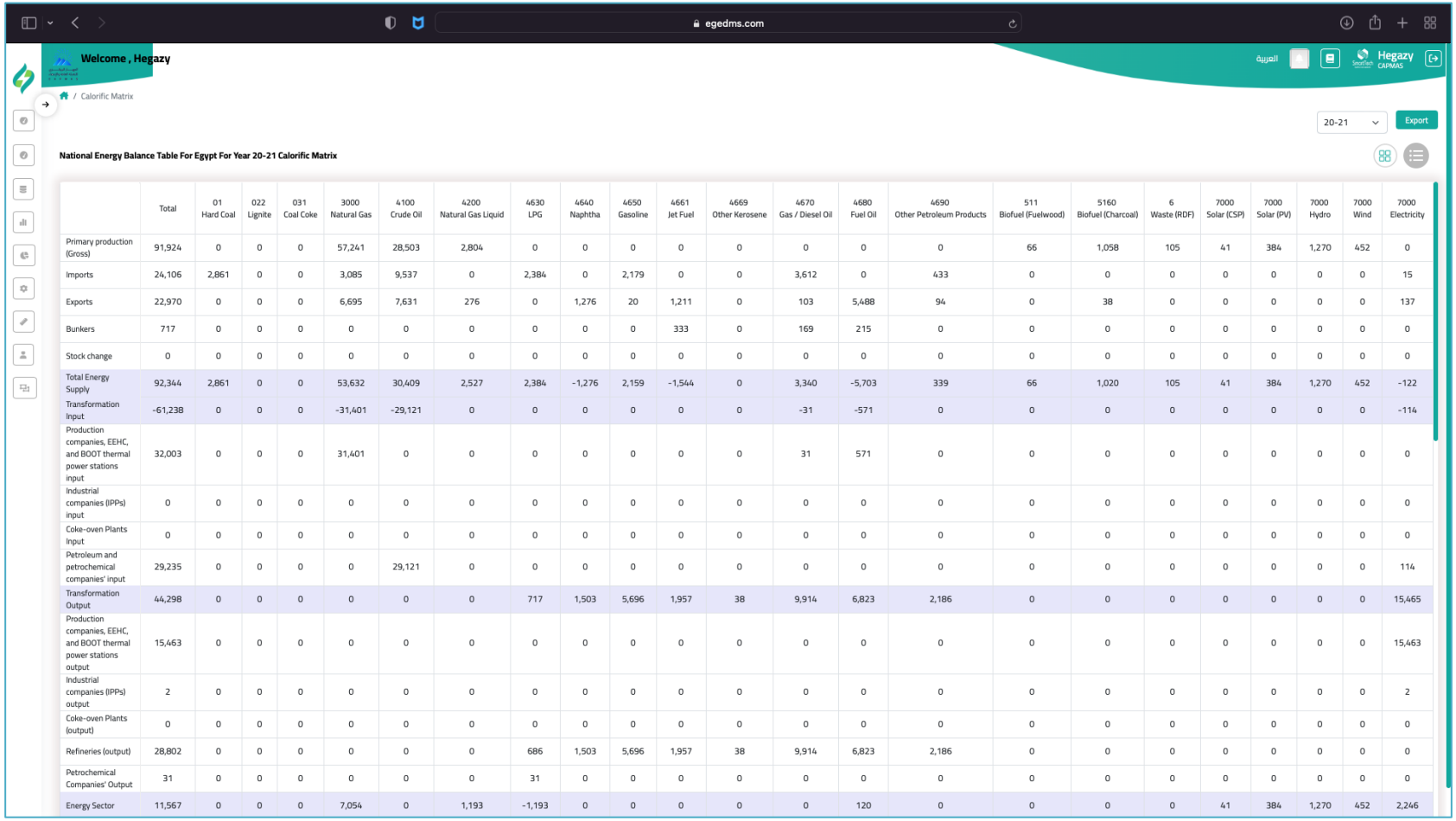
Development of EDMS (Energy Data Management System)

- Login screen with the logos of the concerned organisations to encourage the data transferring from each entity to EDMS.
- EDMS contributes to improving accuracy and efficiency in developing energy balance table.



Development of EDMS (Energy Data Management System)

- **National Energy Balance Table** (Calorific Matrix) incorporates all energy products from primary energy supply to final energy consumption.

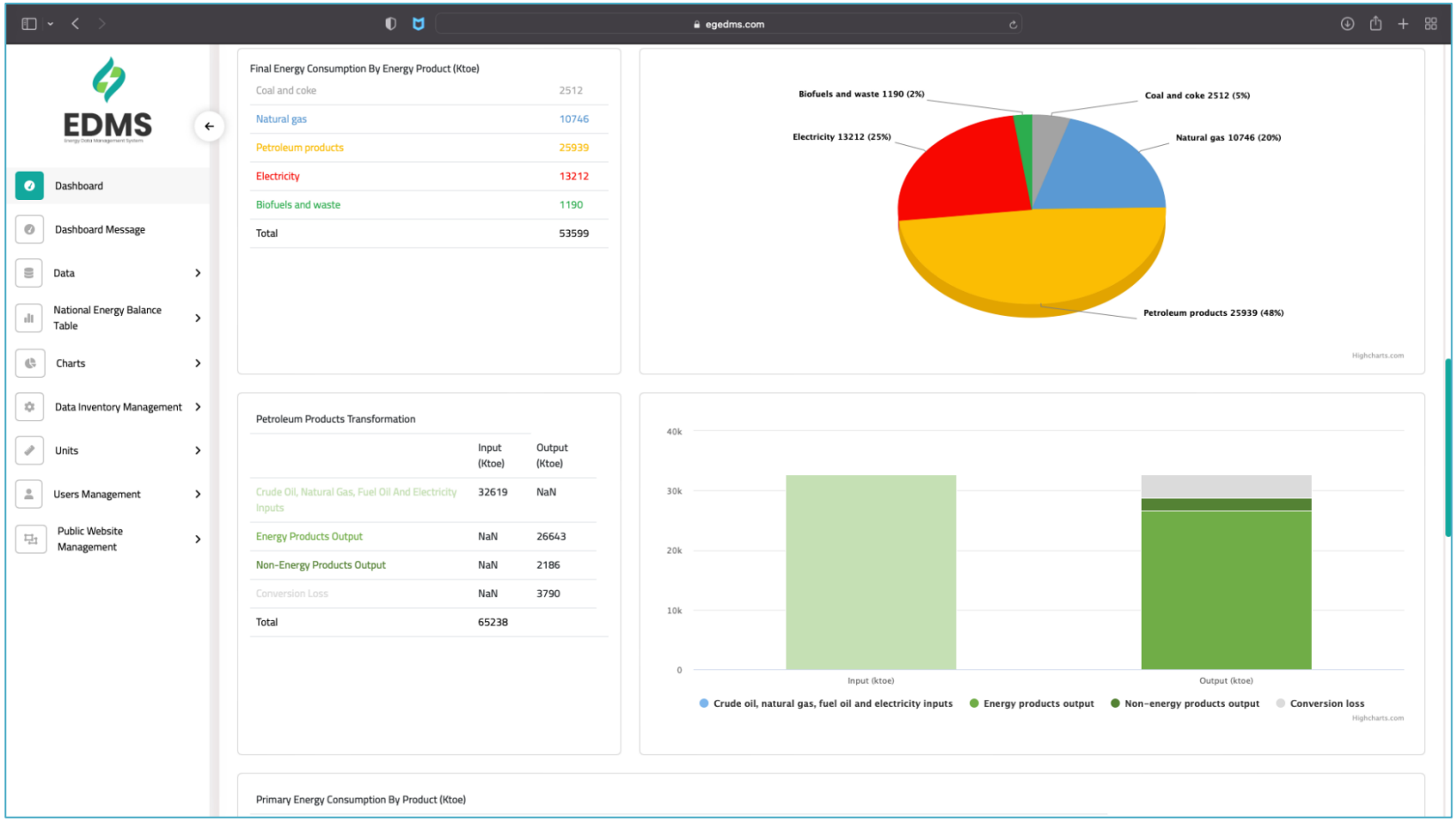


	Total	01 Hard Coal	022 Lignite	031 Coal Coke	3000 Natural Gas	4100 Crude Oil	4200 Natural Gas Liquid	4630 LPG	4640 Naphtha	4650 Gasoline	4661 Jet Fuel	4669 Other Kerosene	4670 Gas / Diesel Oil	4680 Fuel Oil	4690 Other Petroleum Products	511 Biofuel (Fuelwood)	5160 Biofuel (Charcoal)	6 Waste (RDF)	7000 Solar (CSP)	7000 Solar (PV)	7000 Hydro	7000 Wind	7000 Electricity
Primary production (Gross)	91,924	0	0	0	57,241	28,503	2,804	0	0	0	0	0	0	0	0	66	1,058	105	41	384	1,270	452	0
Imports	24,106	2,861	0	0	3,085	9,537	0	2,384	0	2,179	0	0	3,612	0	433	0	0	0	0	0	0	0	15
Exports	22,970	0	0	0	6,695	7,631	276	0	1,276	20	1,211	0	103	5,488	94	0	38	0	0	0	0	0	137
Bunkers	717	0	0	0	0	0	0	0	0	0	333	0	169	215	0	0	0	0	0	0	0	0	0
Stock change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Energy Supply	92,344	2,861	0	0	53,632	30,409	2,527	2,384	-1,276	2,159	-1,544	0	3,340	-5,703	339	66	1,020	105	41	384	1,270	452	-122
Transformation Input	-61,238	0	0	0	-31,401	-29,121	0	0	0	0	0	0	-31	-571	0	0	0	0	0	0	0	0	-114
Production companies, EEHC, and BOOT thermal power stations input	32,003	0	0	0	31,401	0	0	0	0	0	0	0	31	571	0	0	0	0	0	0	0	0	0
Industrial companies (IPPs) input	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coke-oven Plants Input	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum and petrochemical companies' input	29,235	0	0	0	0	29,121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114
Transformation Output	44,298	0	0	0	0	0	0	717	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	15,465
Production companies, EEHC, and BOOT thermal power stations output	15,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,463
Industrial companies (IPPs) output	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Coke-oven Plants (output)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refineries (output)	28,802	0	0	0	0	0	0	686	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	0
Petrochemical Companies' Output	31	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Sector	11,567	0	0	0	7,054	0	1,193	-1,193	0	0	0	0	0	120	0	0	0	0	41	384	1,270	452	2,246

Development of EDMS (Energy Data Management System)

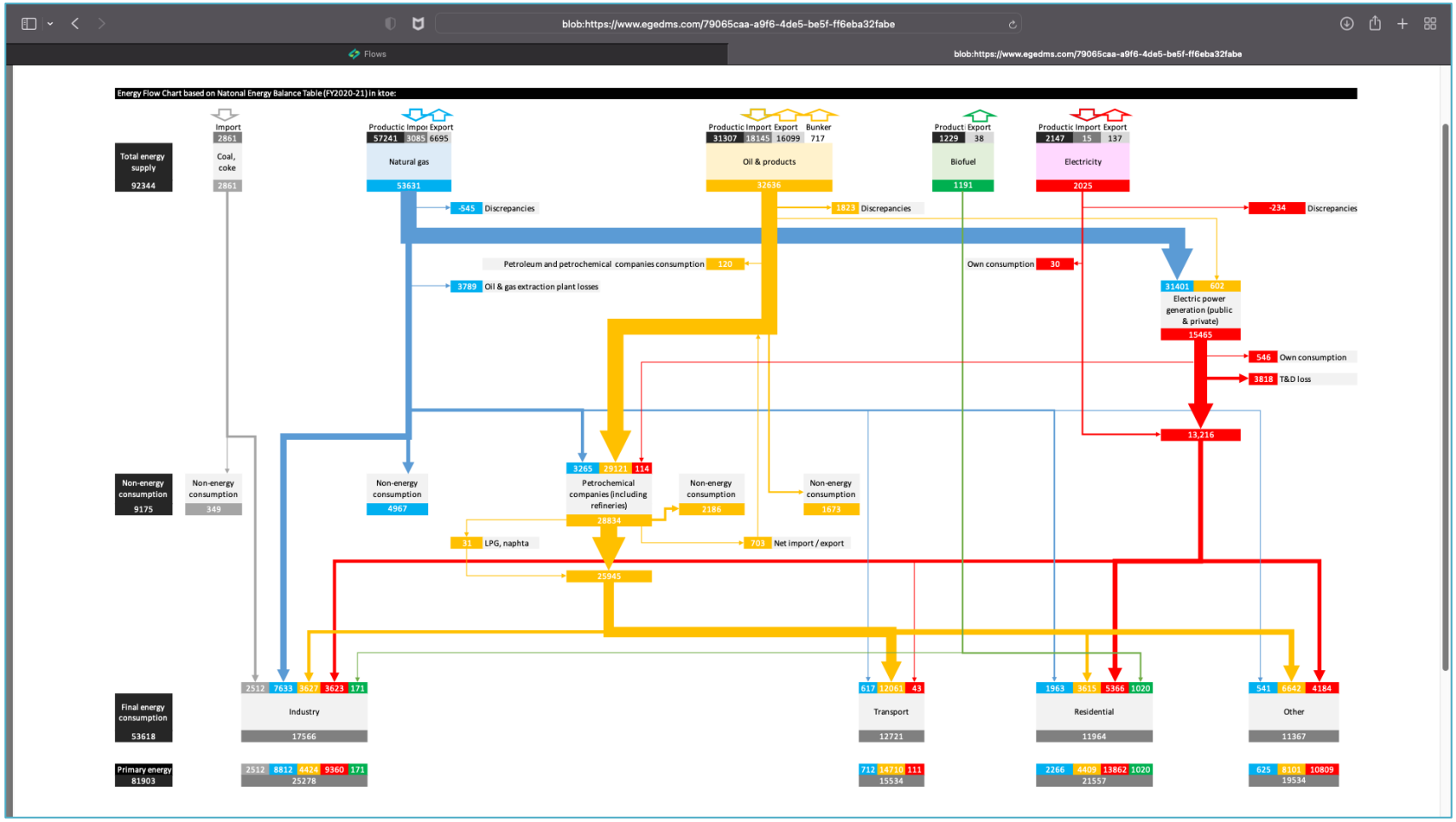
- Visualisation - charts and tables -

  EDMS can create the requested charts automatically.



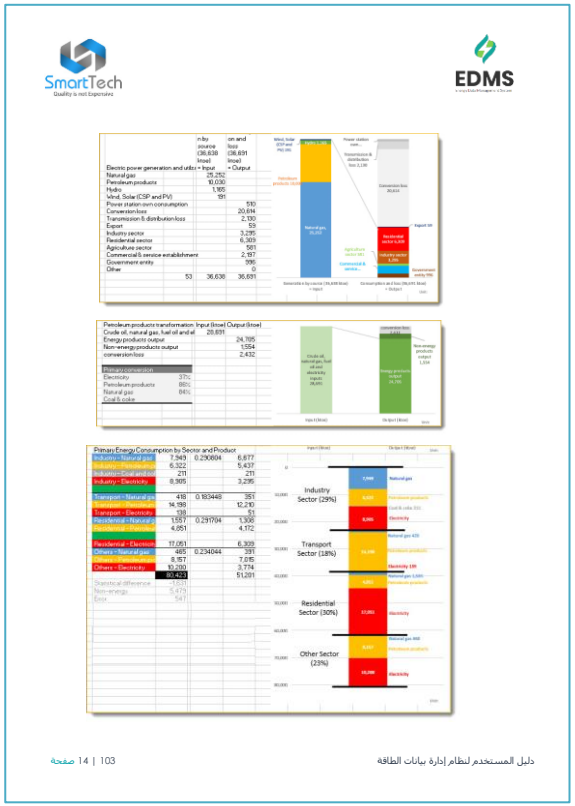
Development of EDMS (Energy Data Management System)

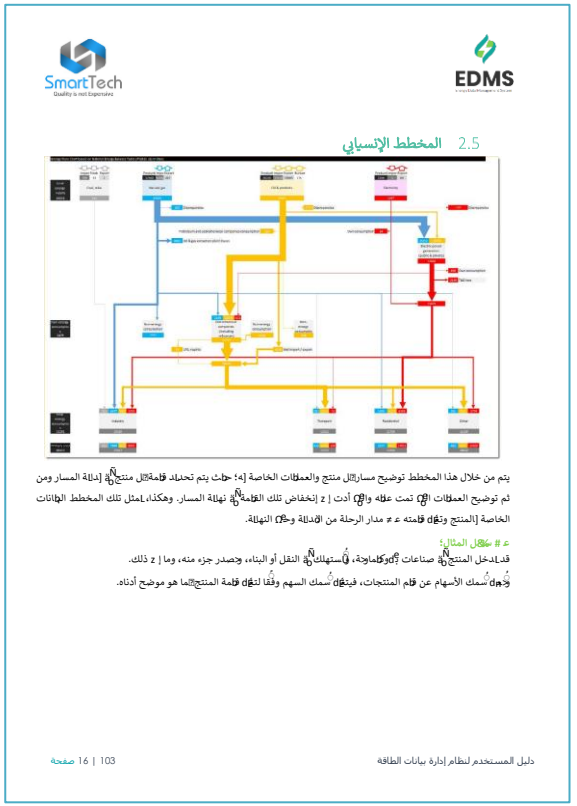
- Visualisation - **national energy balance** with Energy Flow Chart -



Development of EDMS (Energy Data Management System)

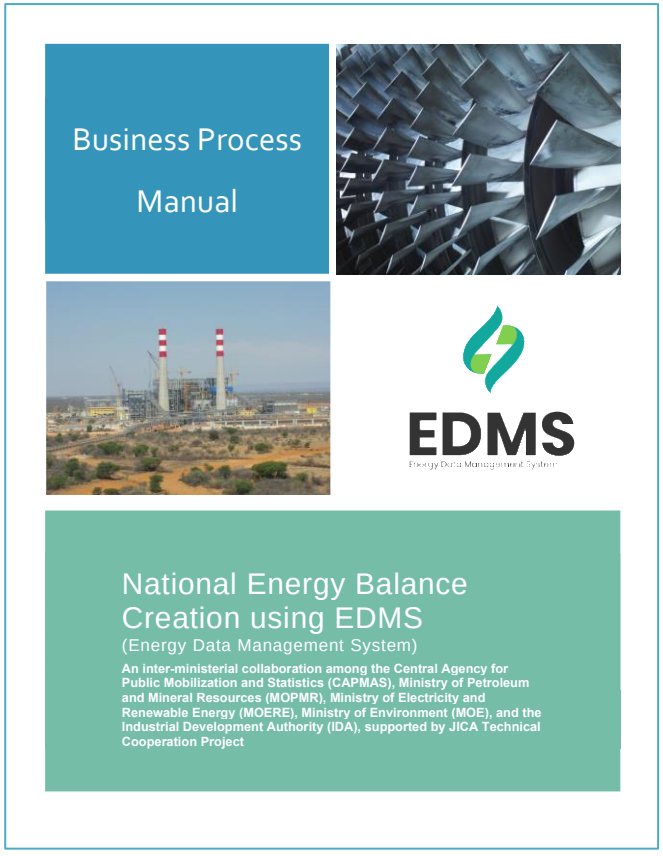
- User Manual and Tutorial Videos prepared to provide the necessary support for the users (counterparts).

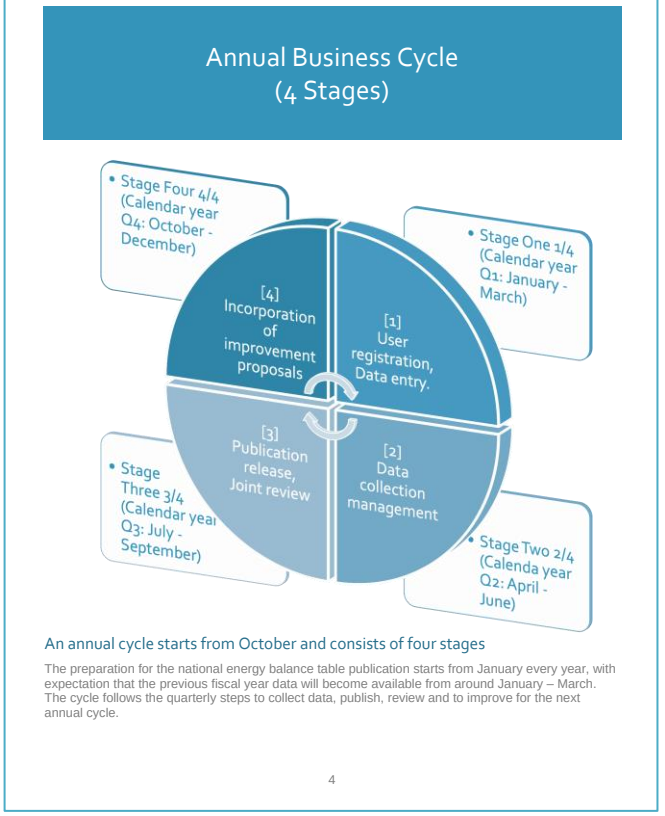


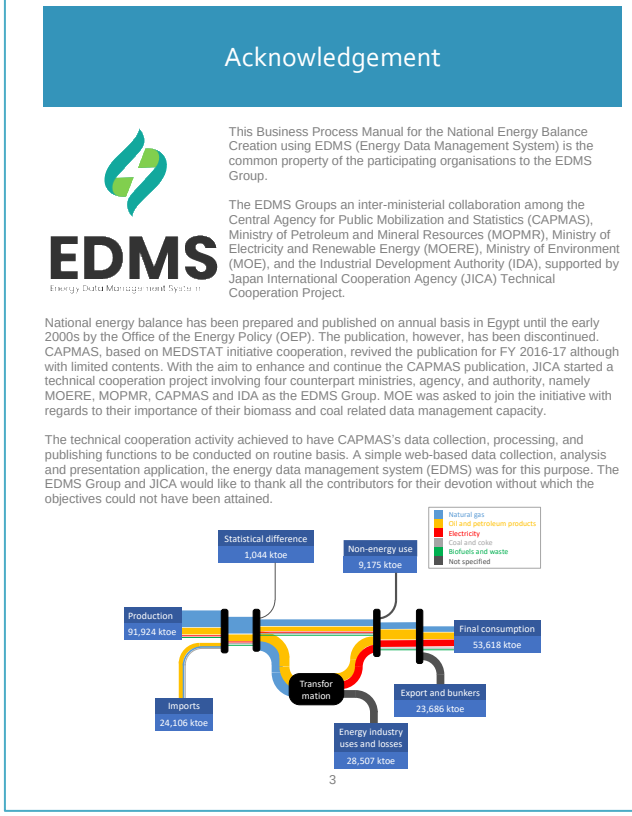


For Continuous Publishing of National Energy Balance

- Prepared Business Process Manual for National Energy Balance Creation to identify the responsibility & role of each organization in the predefined time.





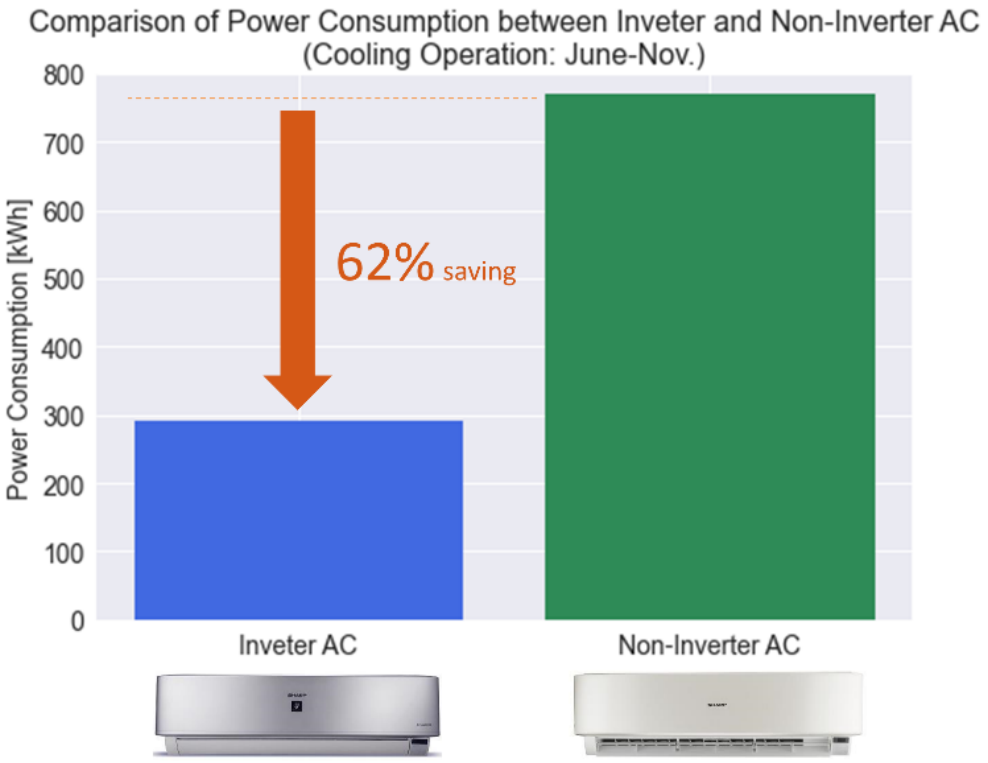


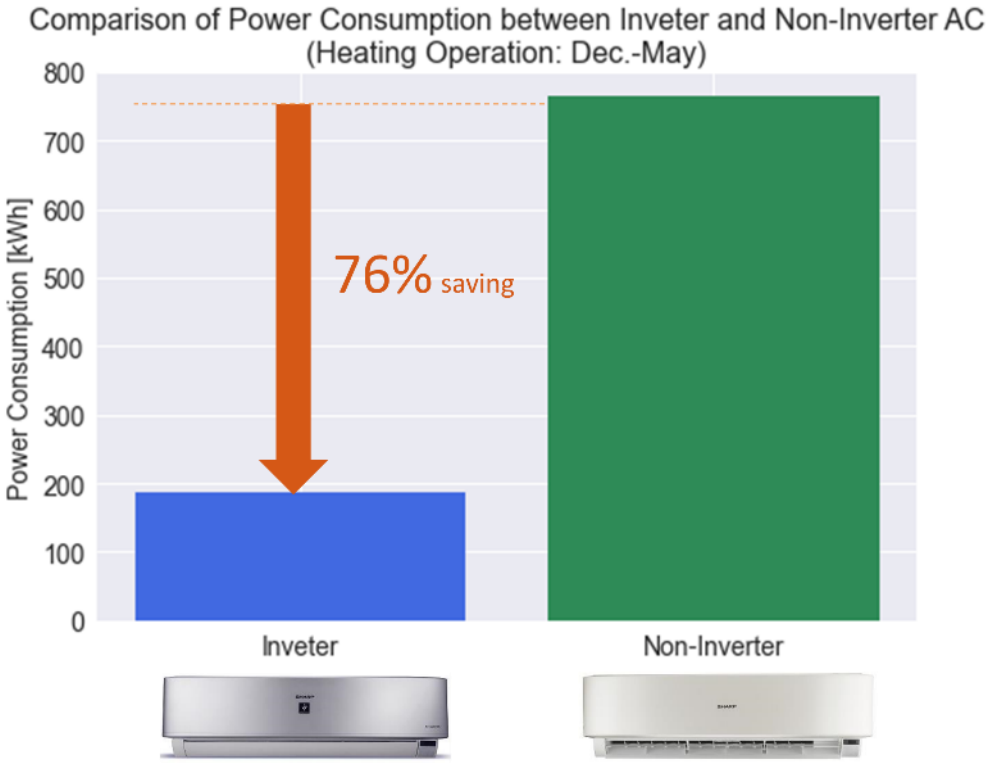
Energy Balance & EDMS Development Workshops (10 times)

Other Activities in Electricity Field

Demonstration of Inverter ACs Energy Savings Effects

- In collaboration with E-JUST (Egypt-Japan University of Science and Technology), actual power consumption of inverter AC and non-inverter AC under living conditions were compared.
- 62% energy savings for space cooling and 76% energy savings for space heating were observed.



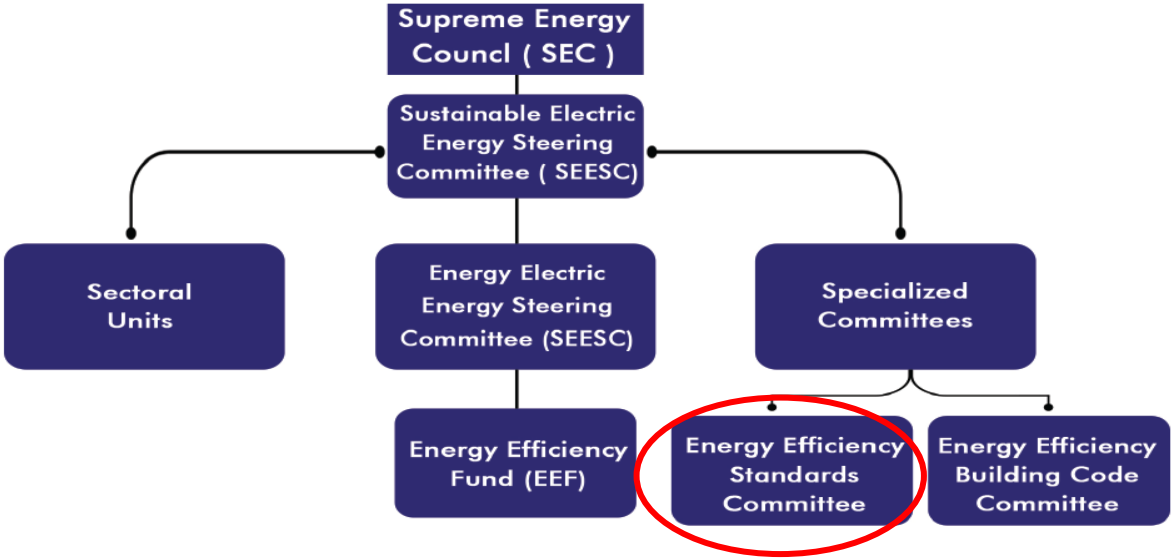


Review of Standards and Labeling Program

All the stakeholders shared challenges and discussed solutions regarding the Standards and Labeling program.

◆ **Objective**

Collaborate among all the stakeholders with aim to activate the Energy Efficiency Standards & Labeling committee (EESLC) that is stipulated in NEEAP-II.



◆ **Stakeholders**

1) MOERE
2) NREA (New and Renewable Energy Authority
3) Egyptian Organization for Standards and Quality
4) General Organization for Export and Import Control
5) Industrial Control Authority
6) Consumer Protection Agency

◆ **Output**

- Laboratory List (Preliminary survey on lab facilities)
- Key challenges identified
- Recommendations to be followed up and guided by MOERE.

Support for Improvements in Energy Audits Capacity (on-site)

- Series of on-site E/A trainings have been conducted at Al Mokattam Training Center for EEHC and all distribution companies on power consumption data collection and analysis in office building.
- The training utilized power loggers. The SOP was prepared for further training.

◆ **On-site energy audits (5 times, 45 engineers)**




◆ **Standard Operating Procedures (SOP)**

◆ **Power logger**

Support for Improvements in Energy Audits Capacity (lecture)

- Series of lectures have been conducted on building energy efficiency and environment based on the materials by “Leadership in Energy and Environmental Design (LEED)”.
- Some participants received certifications of LEED Green Associate.

◆ **Lecture**

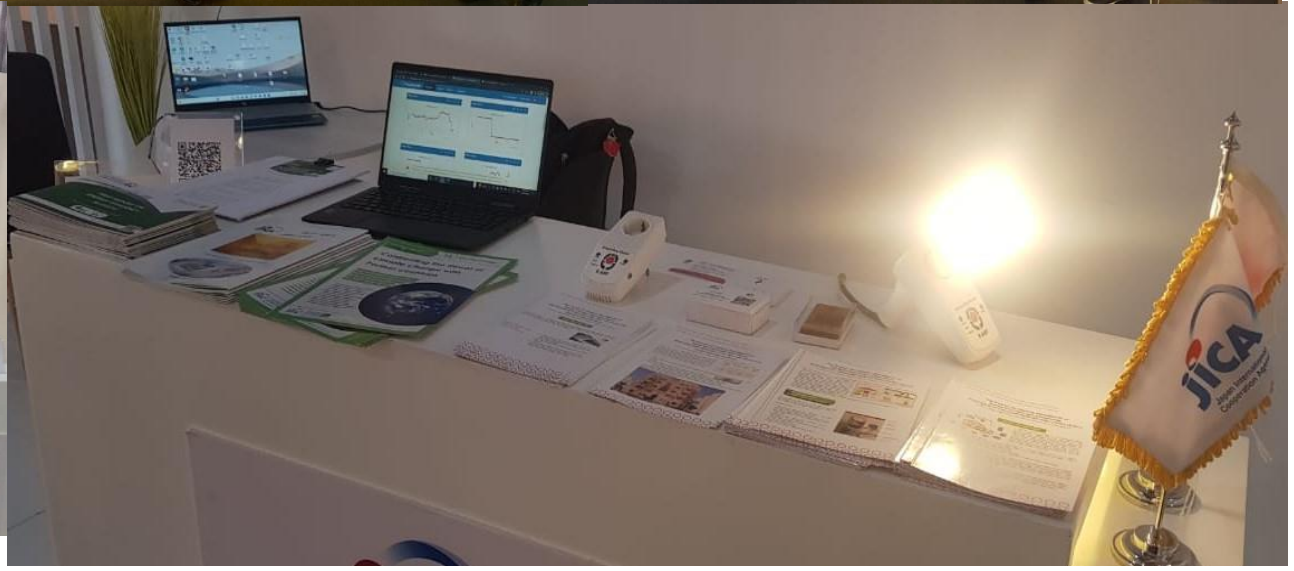
◆ **Visit to E-JUST aiming for LEED certification**

◆ **Visit to LEED certified building (New Cairo)**

Energy Day at COP27

Side Event at COP27 on Energy Efficiency and Conservation (Introduction of Cooperation between Egypt and Japan)

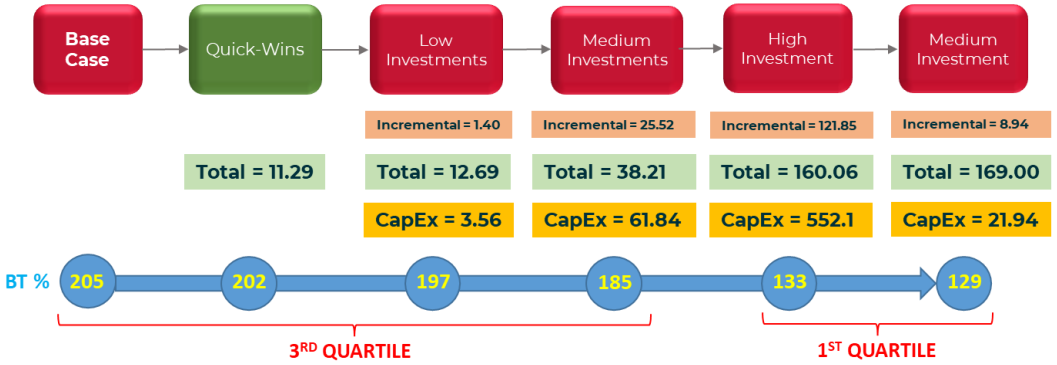
JICA Booth Prepared in COP27 Exhibiting this Project Activities



Petroleum Field

CORC Pilot Refinery Energy Audits

- JICA T/C have conducted a comprehensive energy audits on a pilot basis.
- More than 15 people from Petroleum sector were trained on the job.
- The final roadmap confirmed a potential energy savings of 170 mil EGP/y with an estimated CO2 reduction of 87 MTPA.



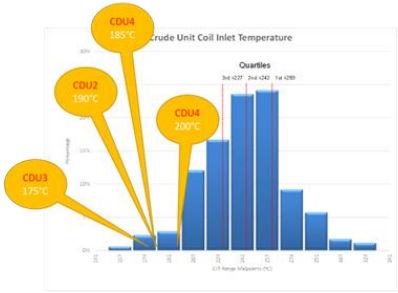
Roadmap Outline
Savings in mil EGP/y
CapEx in mil EGP

CORC Energy Improvement Roadmap

Category	Description	Statistics	Estimated Savings (mil EGP/yr)
A	Quick Wins	8	11.3
B	Low Investment	2	1.4
C	Medium Investment	8	35.3
D	High Investment	1	122.4
E	Pending	2	~
X	Rejected	51	~
	TOTAL	72	~ 170

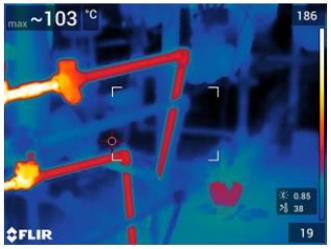
CORC Pilot Refinery Energy Audits

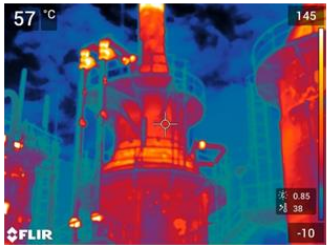
Benchmarking



PFD Reviews
(Process Flow Diagram)

Mechanical Walkthrough



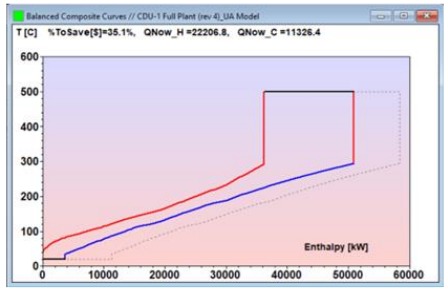


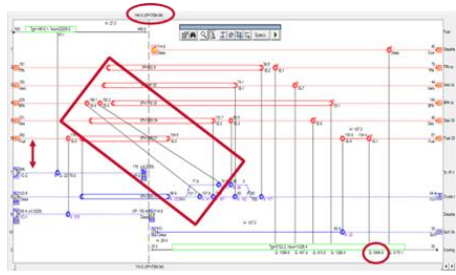
KBC — CORC - STRATEGIC ENERGY REVIEW - MECHANICAL WALKTHROUGH SUMMARY

MARCH / APRIL 2021 Survey	CDU-3	VRU-3	DHT (U-11)	LN Splitter (U-19)	HNHT (U-20)	REF (U-21)	VRU-22	LNHT (U-29)	ISOM (U-30)	Utilities	OVERALL
Steam & condensate	☺	☺	☺	☺	☺	☺	☺	☺	☺	😐	
Insulation	☺	☺	☺	☺	😐	😐	☺	☺	☺	😐	
Heat Exchangers	☺	☺	☺	☺	😐	☺	☺	☺	☺	☺	
Rotating Equipment	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	
Fired Equipment	☺	☺	☺	☺	😐	☺	☺	☺	☺	☺	
Overall Rating	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
Overall Score (%)	96	90	80	80	65	76	80	80	80	72	82

Excludes: CDU-1, CDU-2, CDU-4, VRU-2, VRU-4 & RERUN, Takuma Boilers. These were offline during the walkthrough.

Pinch Analysis

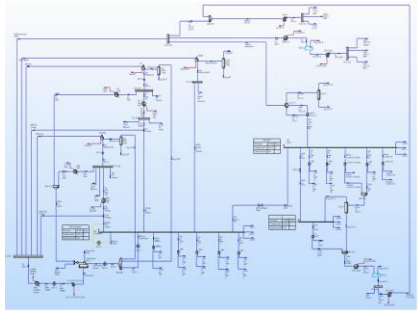




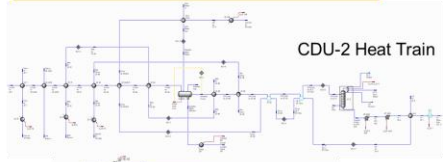
	Hot Utility	Cold Utility
Current (Gcal/h)	19.1	9.7
Target (Gcal/h)	12.6	3.2
Saving (Gcal/h)	6.5	6.5

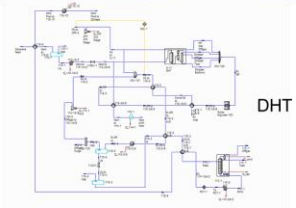
Modeling and Simulation with Software

CORC site-wide utility model in Petro-SIM®



CORC process models in Petro-SIM®



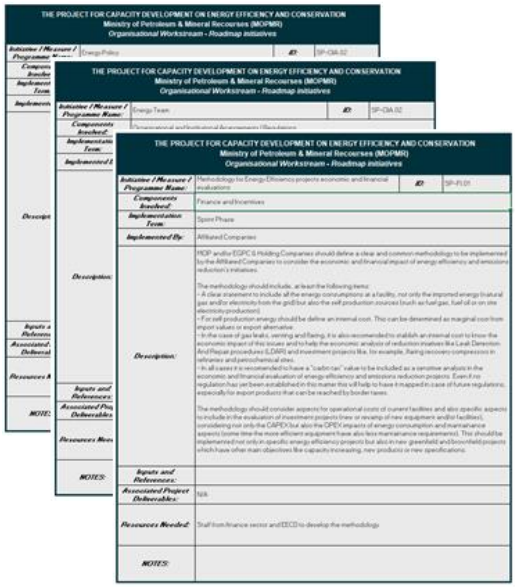


PADECO Mitsubishi Research Institute, Inc. KBC A Yokogawa Company

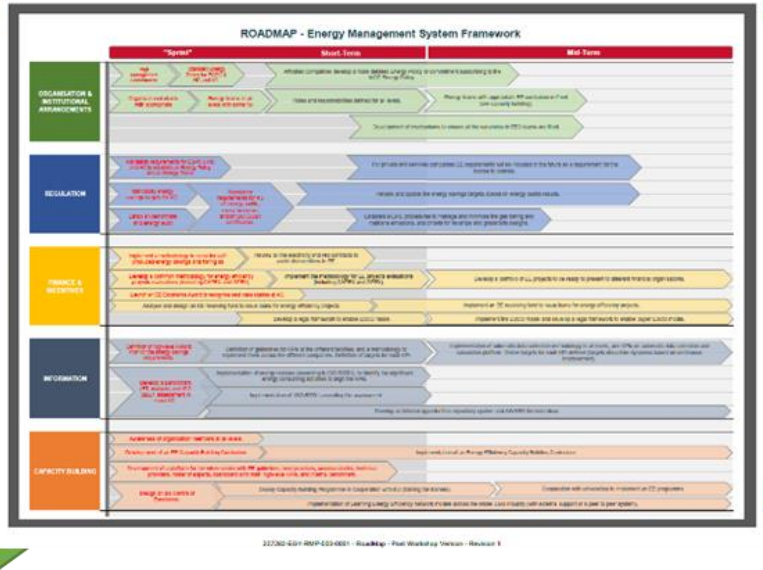
Energy Management System Framework (EMSF) Roadmap Development

- JICA T/C have developed the EMSF roadmap.
- The roadmap have covered the five key EMSF elements.
  (Organisation & governance, Regulations, Finance, Information, Capacity building).

Projects Datasheets



EMSF Roadmap Development Workshop



EE Policy

EE Award

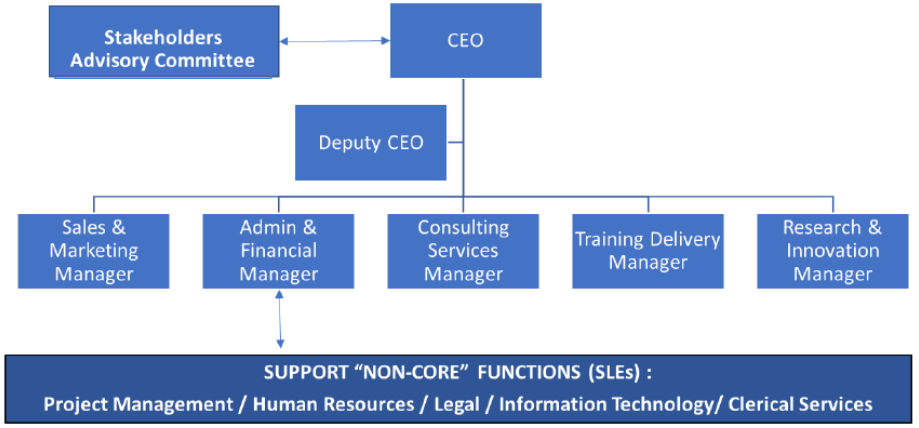
CoE Establishment

EE&C CoE (Center of Excellence) Establishment

- JICA T/C have developed CoE vision, mission, objectives and main business processes.

Strategic CoE Workshop

Proposed Organisational Structure



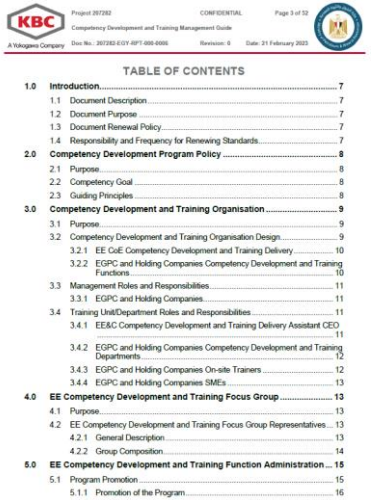


TABLE OF CONTENTS

Training Management Guide Document

EE&C CoE Establishment (3 Training Sessions)





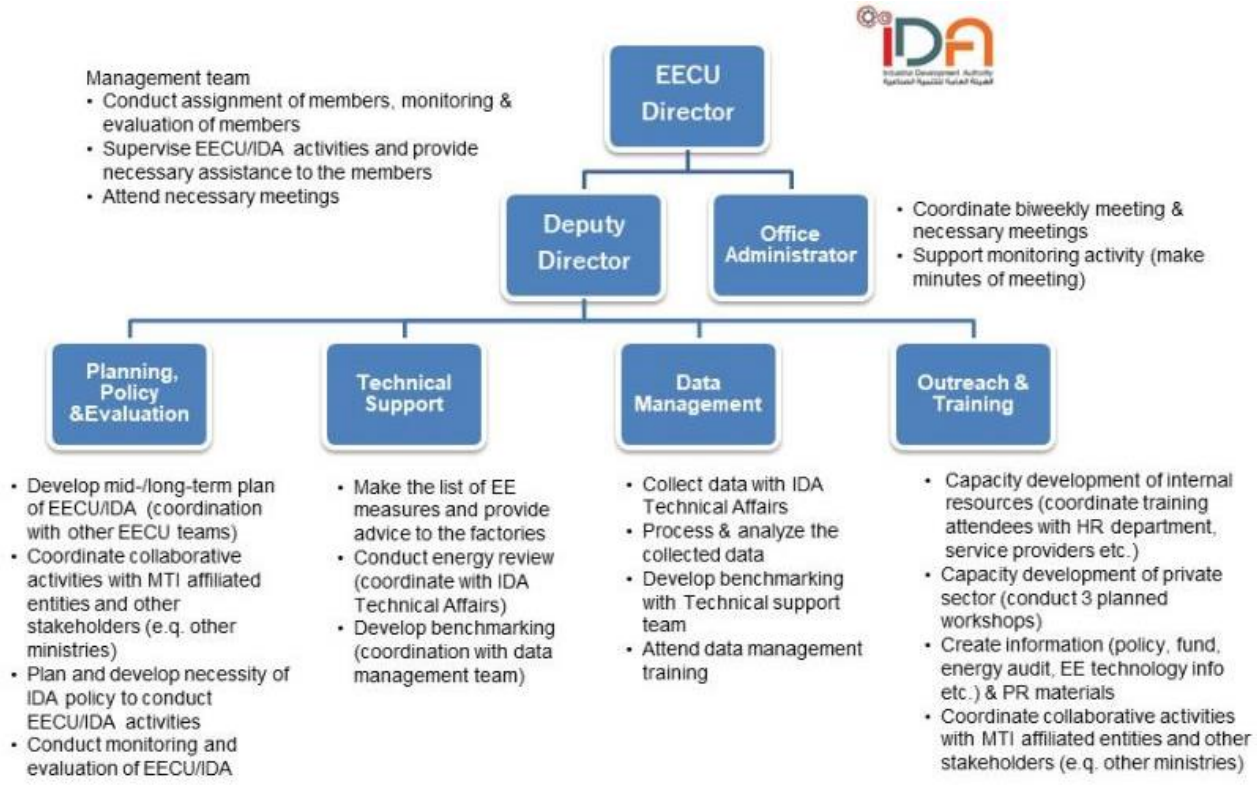




Industrial Field

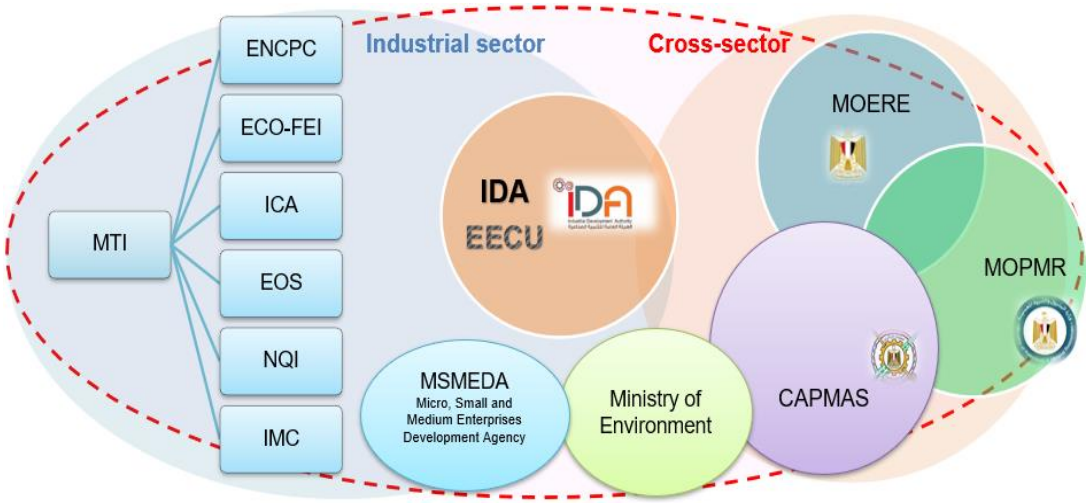
Organization Structure of EECU/IDA

- Establishment of Energy Efficiency & Conservation Unit (EECU/IDA) in January 2022, to promote EE&C in the industrial sector.



Promotion of EE&C Integrated Activities

- The key role of EECU/IDA is to coordinate EE&C activities with MTI related entities and cooperate with other counterparts.



EE&C Checklist Developed for Factories

- EECU/IDA developed EE&C checklist for factories to help identify the EE opportunities and used during the site visit.

NAME OF COMPANY:				
DATE				
ADRESS				
TEL				
E-MAIL				
NO. OF EMPLOYEES				
WORKING HOURS				
DEPARTMENTS				
PRODUCTS				
PRODUCTS VOL.				
OPERATING LICENSE NO.				
Category		Yes	NO	
Enviromental policy				Has the company formulated and communicated an environmental policy (aims –visions- guidelines)?
				Does the company have an invironmetal office?
		I	H	
Energy Management System	1.Main energy source			
	1- Electricity	○		Do you compare the consumption with the production capacity?
		○		Do you turn-on the equipment sequentially to prevent the excessive peak value (sudden peak)?
	Oil			
	Gas			
	2. New Energy and Renewable Energy		○	Have you considered the introduction of solar power generation?
			○	Have you considered installing a solar water heating system?
	3.Energy Conservation Promotion System			Do you have energy management system?
		○		Does your management participate in the PDCA cycle for energy conservation?
		○		Have you set energy efficiency and conservation targets and secured an investment budget?
		○		Have you established annual plans and medium- to long-term plans for energy efficiency and conservation measures?
		○		Do you post energy conservation status (annual/monthly targets and results, etc.)?
		○		Do you conduct personnel training and energy conservation awareness activities (posters, etc.)?
				Is there a maintenance plan for technical energy systems (preventive maintenance – actual maintainance)?
	4.Measurement, Recording& Maintenance	○		Do you have operation records of major equipment (record meter, daily log records, etc.)?
		○		Do you implement periodic and daily inspections and maintenance of equipment?
		○		Do you implement periodic calibration and inspection of measuring instruments?

English version

أسم الشركة				
التاريخ				
العنوان				
التليفون				
ميل الشركة				
عدد الموظفين				
عدد ساعات العمل				
الاقسام				
المنتجات				
كمية الانتاج				
رقم السجل الصناعى				
قائمة التدقيق		الاكثر اتكلفة	الاقل تكلفة	البيان
السياسة البيئية				هل قامت الشركة بتحديد سياسة بيئية (أهداف–رؤى–ارشادات)
				هل تمتلك الشركة مكتب للبيئة وإدارة الطاقة؟
نظام ادارة الطاقة	1– مصدر الطاقة الرئيسي			
	كهرباء		○	هل تتم مقارنة الاستهلاك مع الطاقة الانتاجية؟
			○	هل يتم تشغيل الماكينات بالتتابع لمنع ارتفاع قيمة السحب المفاجئ للطاقة (الذروة المفاجئة)
	بترول			
	غاز			
	2– الطاقة الجديدة والمتجددة	○		هل تم الأخذ في الاعتبار ادخال الطاقة الشمسية؟
		○		هل تم الأخذ في الاعتبار تركيب نظام تسخين المياه بالطاقة الشمسية؟
	3– نظام ترشيد الطاقة		○	هل يوجد بالمصنع نظام لادارة الطاقة؟
			○	هل يوجد نظام PDCA للحفاظ على نظام ادارة الطاقة؟
			○	هل تم تحديد اهداف كفاءة الطاقة والحفاظ عليها وتأمين ميزانية استثمارية لتطبيقها؟
			○	هل هناك خطة شهرية أو سنوية لترشيد الطاقة (أهداف ونتائج....)
		○		هل تقوم بتوفير تدريب للعاملين بالمصنع للتعريف بترشيد وكفاءة الطاقة وطرق تنفيذها (ملصقات – ورش عمل..... الخ)

Arabic version

EE&C Measures Tips Prepared for Factories

- EECU/IDA prepared a list of EE measures tips which can be easily implemented with no/low cost.

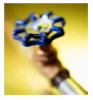
Tips for Energy Conservation for Industries

THERMAL UTILITIES

Boilers

- Preheat combustion air with waste heat
  (22 ^{0}C reduction in flue gas temperature increases boiler efficiency by 1%).
- Use variable speed drives on large boiler combustion air fans with variable flows.
- Burn wastes if permitted.
- Insulate exposed heated oil tanks.
- Clean burners, nozzles, strainers, etc.
- Inspect oil heaters for proper oil temperature.
- Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.
- Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels).
  (5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)
- Automate/optimize boiler blowdown. Recover boiler blowdown heat.
- Use boiler blowdown to help warm the back-up boiler.
- Optimize deaerator venting.
- Inspect door gaskets.
- Inspect for scale and sediment on the water side
  (A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).
- Inspect for soot, flyash, and slag on the fire side
  (A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)
- Optimize boiler water treatment.
- Add an economizer to preheat boiler feedwater using exhaust heat.
- Recycle steam condensate.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.
- Consider multiple or modular boiler units instead of one or two large boilers.
- Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

Steam System



- Fix steam leaks and condensate leaks
  (A 3 mm diameter hole on a pipe line carrying 7 kg/cm^2 steam would waste 33 kilo litres of fuel oil per year).
- Accumulate work orders for repair of steam leaks that can't be fixed during the heating season due to system shutdown requirements. Tag each such leak with a durable tag with a good description.
- Use back pressure steam turbines to produce lower steam pressures.
- Use more-efficient steam desuperheating methods.
- Ensure process temperatures are correctly controlled.
- Maintain lowest acceptable process steam pressures.
- Reduce hot water wastage to drain.
- Remove or blank off all redundant steam piping.
- Ensure condensate is returned or re-used in the process
  (6 ^{0}C raise in feed water temperature by economiser/condensate recovery corresponds to a 1% saving in fuel consumption, in boiler).
- Preheat boiler feed-water.
- Recover boiler blowdown.
- Check operation of steam traps.
- Remove air from indirect steam using equipment
  (0.25 mm thick air film offers the same resistance to heat transfer as a 330 mm thick copper wall.)
- Inspect steam traps regularly and repair malfunctioning traps promptly.
- Consider recovery of vent steam (e.g. -- on large flash tanks).
- Use waste steam for water heating.
- Use an absorption chiller to condense exhaust steam before returning the condensate to the boiler.
- Use electric pumps instead of steam ejectors when cost benefits permit
- Establish a steam efficiency-maintenance program. Start with an energy audit and follow-up, then make a steam efficiency-maintenance program a part of your continuous energy management program.

Furnaces

- Check against infiltration of air: Use doors or air curtains.
- Monitor O_2 /CO_2/CO and control excess air to the optimum level.
- Improve burner design, combustion control and instrumentation.
- Ensure that the furnace combustion chamber is under slight positive pressure.
- Use ceramic fibres in the case of batch operations.
- Match the load to the furnace capacity.
- Retrofit with heat recovery device.
- Investigate cycle times and reduce.
- Provide temperature controllers.
- Ensure that flame does not touch the stock.

Insulation

- Repair damaged insulation
  (A bare steam pipe of 150 mm diameter and 100 m length, carrying saturated steam at 8 kg/cm^2 would waste 25,000 litres furnace oil in a year.)
- Insulate any hot or cold metal or insulation.
- Replace wet insulation.
- Use an infrared gun to check for cold wall areas during cold weather or hot wall areas during hot weather.
- Ensure that all insulated surfaces are cladded with aluminum
- Insulate all flanges, valves and couplings
- Insulate open tanks
  (70% heat losses can be reduced by floating a layer of 45 mm diameter polypropylene (plastic) balls on the surface of 90 ^{0}C hot liquid/condensate).

EECU Awareness Brochure

- EECU/IDA prepared an Awareness Raising Brochure for EE&C in industries and will be distributed to manufacturers.

شكرا جزيلا

The Project for Capacity Development on Energy Efficiency and Conservation

Overall Project Progress based on PDM (prepared for final JCC)

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

Contents

1. Overall Goal and Project Purpose

Overall Goal

This T/C aims to strengthen institutional capacities of Government of Egypt toward further promotion of EE&C.

Overall Goal	Objectively Verifiable Indicators	Achievement
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035).	• **First Energy Efficiency Report** was published based on data and includes energy saving evaluation from supply/demand sides, key KPIs . • **National Energy Balance Table** was developed with 4 C/P and other relevant cooperation.

Project Purpose

To promote EE&C policies at the national level, such as **NEEAP-II** and the **Egypt OGMP**, T/C team will **develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies, plans, data management, and expansion of the introduction of high-efficiency equipment**.

Objectively Verifiable Indicators	Achievement
1. Review of implemented projects in NEEAP-II is conducted.	1. Review of implemented projects in NEEAP-II was completed and reported in the **First Energy Efficiency Report**.
2. Data Management System is established.	2. Development of **EDMS was completed.**
3. Roadmap for EMSF (Energy Management System Framework) in petroleum sector is formulated.	3. Development of **EMSF roadmap was completed.**

2. Achievement 1: TT3

Achievement 1: TT3 (MOERE)

Achievement 1: The administrative capacity of EECCD of MOERE for EE&C promotion is strengthened.

- ***Output 1***

  Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.

- ***Output 2***

  Potential technology for energy efficiency is examined and promotion policy is proposed.

Achievement 1: TT3 (MOERE)

◆ *Activities 1*

1-1: EE&C PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (organizational, policy)

1-2: Updating EE methods, drafting EE roadmap and **template of EE&C annual report**. (organizational, policy)

1-3: Implementation capacity of EECCD staff is developed including **data management and policy making**. (personal, training)

1-4: Developing evaluation method of EE technology and calculation method of EE potential. (personal, training)

1-5: Development of **awareness raising program** and support for implementation.

Achievement 1: TT3 (MOERE)

Output 1	Indicator	Achievement
1 Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	1-1 Standard method for collecting and analyzing **macro and micro data** is introduced and data base is developed **(linking to TT2)**	1-1 • MOERE officials participated in energy data management training (TT2). • MOERE published the **First Energy Efficiency Report** which is based on data and includes **energy saving evaluation from supply/demand sides, key KPIs and energy balance**.
	1-2 **Energy efficiency promotion roadmap** including awareness raising is developed	1-2 • **Future action plan** is developed as a part of the white paper (TT1). • **Energy saving potential roadmap** (up to 2036) was prepared/shared in TT1 workshop. • Awareness raising activities were conducted through **COP27** (seminars and booth), **project website**, and through **E-JUST** (on AC and smart home demonstration).
	1-3 **Annual report** template is introduced	1-3 • **The first draft annual report** was developed and published in Nov/2022 at COP27.
	1-4 MOERE officers are **certified** against EE&C related programs	1-4 • **2 participants** obtained **LEED Green Associate certification**. Follow up training was conducted in Dec/2022.

3. Achievement 2: TT3

Achievement 2: TT3 (MOERE)

Achievement 2: Evaluation of technologies and products with high energy saving potential is conducted, and promotion policies are proposed.

➢ ***Output 2***

Potential technology for energy efficiency is examined and promotion policy is proposed.

◆ ***Activities 2***

2-1: EE demonstration for air-conditioner in residential places.

2-2: Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc. (Smart Home Test)

Achievement 2: TT3 (MOERE)

Output 2	Indicator	Achievement
2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of **air-conditioner** in building is verified including economic efficiency, environmental standard.	2-1 • Data collection is ongoing from Sep/2021 to Aug/2022. **Both cooling and heating result has been analyzed**. (AC demonstration test)
	2-2 Effectiveness of **home appliances including energy efficiency standards and labeling program** such as fridge, AC and lighting is verified.	2-2 • Data collection to be started from Feb/2022 to Jan/2023. **Data analysis of power consumption in 5 households** was conducted. (smart home test) • 3 Workshops were held to improve Standards and Labeling system participated by MOERE, EOS, NREA, GOIEC ICA, and CPA. **List of laboratories** was developed. **Key issues** were identified, and **next actions** were summarized.

4. Achievement 3: TT4

Achievement 3: TT4 (MOP)

Achievement 3: The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created.

- ***Output 3-1***
  Review of EE&C Framework Related to MOP and Organizing its issues
- ***Output 3-2***
  Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (**pilot for a refinery**)
- ***Output 3-3***
  Support for Development of **EE&C Strategy and Roadmap (including CoE establishment preparation)**
- ***Output 3-4***
  Development of Manuals and SOPs to strengthen EE&C Activities

Achievement 3: TT4 (MOP)

◆ *Activities 3-1*

3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies

3-1-2 Benchmarking against international practices

3-1-3 Conduct workshops to share outcome of analysis

◆ *Activities 3-2*

3-2-1 Site visit to Pilot refinery (energy auditing)

3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel

3-2-3 Develop sitewide utility model for pilot refinery

3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance

Achievement 3: TT4 (MOP)

◆ *Activities 3-2*

3-2-5 Conduct 5 training workshops (5 days per each workshop)

3-2-6 Energy efficiency framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices

3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc.

Achievement 3: TT4 (MOP)

◆ *Activities 3-3*

3-3-1 Drafting strategic roadmap for petroleum sector

3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1)

3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1)

◆ *Activities 3-4*

3-4-1 Develop SOP

3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)

Achievement 3: TT4 (MOP)

Output 3	Indicator	Achievement
3-1 Review of EE&C Framework Related to MOP and Organizing its issues	3-1-1 Energy efficiency framework **"Benchmarking/As is/ Gap Analysis"** report	3-1-1 • Report issued as part of revised CA report.
3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)	3-2-1 Issuance of **pilot plant audit report** comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model)	3-2-1 • Work concluded for **pilot plant audit report** (final report issued to MOP).
	3-2-2 **On job and classroom training** of 15 MOP personnel (5 trainings)	3-2-2 • Total of 7 trainings and 2 additional workshops held onsite.

Achievement 3: TT4 (MOP)

Output 3	Indicator	Achievement
3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation)	3-3-1 Energy efficiency **framework "To be" report** summarizing roadmap to close EE framework	3-3-1 • **Issued roadmap** and validated with main stakeholders.
	3-3-2 Standardized format and media for **data collection** is introduced (linking to TT2)	3-3-2 • Worked with MOP and CAPMAS under TT2 to revise **energy balance data** collection process and report.
	3-3-3 Issuance **CoE Mission, activities and Objectives**	3-3-3 • Workshop successfully conducted and its report was issued and accepted. Preliminary list of models for the **simulation software and the virtual reality (VR)** prepared.

Achievement 3: TT4 (MOP)

Output 3	Indicator	Achievement
3-3 Support for Development of EE&C Strategy and Roadmap	3-3-4 Issuance of **CoE high level organization** document	3-3-4 • CoE **Organizational Concept and Design Document** Issued.
	3-3-5 Issuance of **CoE Training Management Guide** document	3-3-5 • CoE **Competency Development and Training Management Guide Document** Issued.
	3-3-6 Issuance of CoE organization building support document	3-3-6 • CoE **Organizational Concept and Design Document** Issued.
	3-3-7 **Conducting several days (on-site) training for CoE staffs**	3-3-7 • 3 training sessions conducted online.
3-4 Development of Manuals and SOPs to strengthen EE&C Activities	3-4-1 Issuance of **SOP describing the key energy auditing activities** in the petroleum sector	3-4-1 • SOP Final to be Issued (Mar.16)

Achievement 3: TT4 (MOP)

Output 3	Indicator	Achievement
3-4 Development of Manuals and SOPs to strengthen EE&C Activities	3-4-1 Issuance of **SOP describing the key energy auditing activities** in the petroleum sector	3-4-1 • SOP Final to be Issued (Mar.16)

5. Achievement 4: TT1

4. Achievement in TT1 (MOERE,MOP,IDA,CAPMAS)

Achievement 4: Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated.

- ***Output 4-1***

  Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC.

- ***Output 4-2***

  Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how).

4. Achievement in TT1 (MOERE,MOP,IDA,CAPMAS)

◆ *Activities 4-1*

Discussion on **future integrated national EE&C national policy and action plan** with introduction of standardised format and media for energy related **data collection (linking to TT2)** among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points:

- Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP.
- **MOP energy consumption reductions commitment** would be confirmed.

◆ *Activities 4-2*

Key factors to realize the future policy and its **action plan (e.g. when, who, what, how)** shall be discussed and confirmed among 4 C/Ps.

4. Achievement in TT1 (MOERE,MOP,IDA,CAPMAS)

Output 3	Indicator	Achievement
4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC.	4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft **white paper of future policy and action plan** with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well.	4-1 • General introduction was made as to TT1 activities and NEEAP-II at #2 JCC. • **7 times discussion including JCC among all C/Ps** have been conducted.
4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how).	4-2 Key factors necessary to realize **future policy & action plan** are clarified and included in the white paper, etc.	4-2 • **White Paper has been prepared by all counterparts.**

Achievement 4: TT1 (IDA)

➢ *Output 4-3*

EE&C activities in the industrial sector is strengthened for EE&C socio economic development.

◆ *Activities 4-3*

4-3-1: Preparation for establishment of EECU of IDA to promote EE&C in the industrial sector (functions of the EECU) are studied and planed.

4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined.

4-3-3 Integrated activities are organized in the industrial sector.

4-3-4 Workshops for private sector of EE&C are held.

4-3-5 Training are held for IDA personnel.

Achievement 4: TT1 (IDA)

Output 4	Indicator	Achievement
4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	4-3-1 Draft of **EECU functions at IDA** is formulated.	4-3-1 • **Implementation structure and functions of EECU were finalized. Monitoring system of EECU was conducted.** Regular meetings were conducted 9 times in total.
	4-3-2 Draft of **EE&C policies/regulations** to be introduced in the industrial sector is formulated in IDA.	4-3-2 • Activities of each team of EECU/IDA were conducted: "Mid-term plan of EECU" was developed, internal note was issued , "**application form of industrial registration**" was updated and "**data collection form**" was developed to collect energy related data, "**EE checklist**" and "**list of EE measures**" were developed.

Achievement 4: TT1 (IDA)

Output 4	Indicator	Achievement
4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	4-3-3 IDA organizes meetings with IDA related entities and integrated **EE&C activities in the industrial sector** is formulated.	4-3-3 • **2 RECP (Resource Efficiency and Cleaner Production) trainings** were conducted by **ENCPC**. Discussion with **MOERE** as to the implementation procedures of **Energy Register and Energy Manager** in the industrial sector.
	4-3-4 IDA holds **EE&C workshops** 3 times.	4-3-4 • 1st IDA workshop targeted industrial zone managers was conducted via online. 2nd workshop was conducted at IDA in Feb/2023.
	4-3-5 IDA personnel participate in trainings in Egypt.	4-3-5 • **120 IDA engineers were trained** through 3 RECP workshops (Jul-Sep/2022).

6. Achievement 5: TT2

Achievement 5: TT2 (CAPMAS,MOERE,MOP,IDA)

Achievement 5: CAPMAS publishes national energy statistics, which are referred to by 3 C/Ps for making and monitoring EE&C promotion policies.

◆ *Output 5*

CAPMAS publishes national energy statistics, which are referred to by 3 C/Ps for making and monitoring EE&C promotion policies.

◆ *Activities 5*

5-1: Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion.

5-2: Gap analysis of 4 C/Ps' data collection capacity and target setting.

Achievement 5: TT2 (CAPMAS,MOERE,MOP,IDA)

◆ *Activities 5*

5-3: In-house trainings for 4 C/Ps on international standard energy data management.

5-4: Establishing an **inter-organizational data collection** process, a standard data collection format, and a business process manual (BPM).

5-5: Development of prototype **Energy Data Management System (EDMS, software)** to be shared by CAPMAS, MOERE, MOP and IDA.

Achievement 5: TT2 (CAPMAS,MOERE,MOP,IDA)

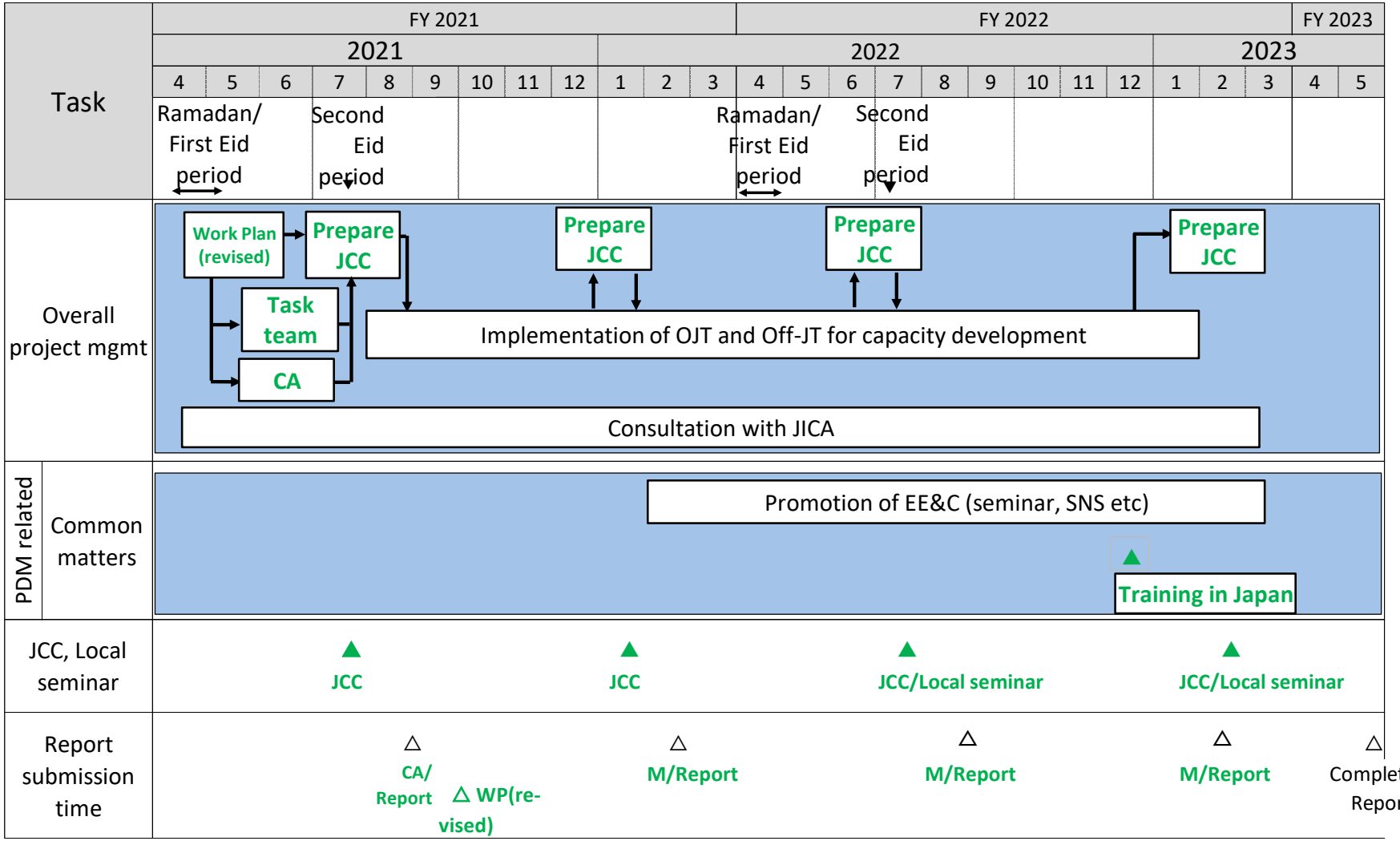
Output 5	Indicator	Achievement
5 CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan	5-1 • 9 remote collaborative meetings were conducted with CAPMAS on data collection practices. • A workshop on **National Energy Balance Table** was held (Mar 2022). One day training (two sessions) for CAPMAS on the best practices of **energy data management** conducted. 2 **EDMS demonstration** trainings, and 2 **EDMS UAT & trainings** (Dec 2022, Jan 2023) conducted.
	5-2 **Data submission from MOERE, MOP and IDA to CAPMAS on a standardized format and media**. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS)	5-2 • **EDMS with input format, data processing, and presentation output generation functions developed and delivered. The user manuals** are shared with the participation of CAPMAS, MOERE, MOP, IDA and MOE . • Complete **national energy balance data on data inventory for "FY 2015/16 - FY 2020/21"** collected and recorded on EDMS, ready for publication purpose.

Achievement 5: TT2 (CAPMAS,MOERE,MOP,IDA)

Output 5	Indicator	Achievement
5 CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	5-3 **Publication of CAPMAS's energy statistics** based on standardized format data obtained from MOERE, MOP and IDA.	5-3 • **National Energy Balance Table FY 2020-21 publication** drafted based on EDMS output.
	5-4 Convening of a **feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA** (4 times).	5-4 • **CAPMAS's National Energy Balance Table publication FY2020-21 reviewing meetings convened with the participation of MOERE, MOP, IDA and MOE** in November, December 2022, and January, February 2023.

7. Project Schedule

Project Schedule (as of February 2023)



WP : Work plan CA : Capacity Assessment Report M/Report : Monitoring Sheet/Work Progress Report Completion Report: Work Completion Report / Project Completion Report

شكرا جزيلا

The Project for Capacity Development on Energy Efficiency and Conservation

Report on TT3 activities (prepared for 4th JCC)

February/2023

Eng. Taghrid Elayouti,
Head of Energy Efficiency and Climate Change
Projects Department, Ministry of Electricity and Renewable Energy

In collaboration with : PADECO Co., Ltd.

Mitsubishi Research Institute, Inc.

KBC Process Technology Ltd.

Contents

1. Activities/Outputs
2. Next Steps

1. Activities/Outputs

Activities to be reported today

■ Policy

1 Preparing annual report.

■ Technology

2 demonstration test of efficient ACs and home appliances

4 Support for improvement of energy audit capacity

3 Review of standards and labeling program

1 Awareness raising for EE&C

■ Capacity

Trainings in Japan

1. Energy Efficiency report

1. Energy Efficiency report

- "The First Report on Energy Efficiency in Egypt" was published.
- It was officially launched in Sharm El Sheikh in COP27.

- It is the **first energy efficiency report** of Egypt for the period of the **National Energy Efficiency Action Plan-II** (2018/2019 - 2021/2022).

Chap 1	National Context
Chap 2	**Actions taken for NEEAP-II** (Institutional Framework, EE Projects, Financial Mechanism, Data Gathering and MRV, Capacity Building, Awareness)
Chap 3	**Climate Change**
Chap 4	Green Sharm El Sheikh
Chap 5	Future Projects (**National Energy Balance**)

The Second National Energy Efficiency Action Plan (NEEAP-II)

The plan issued guided by EU directive in accordance with the requirements of the Arab Energy Efficiency guidelines.

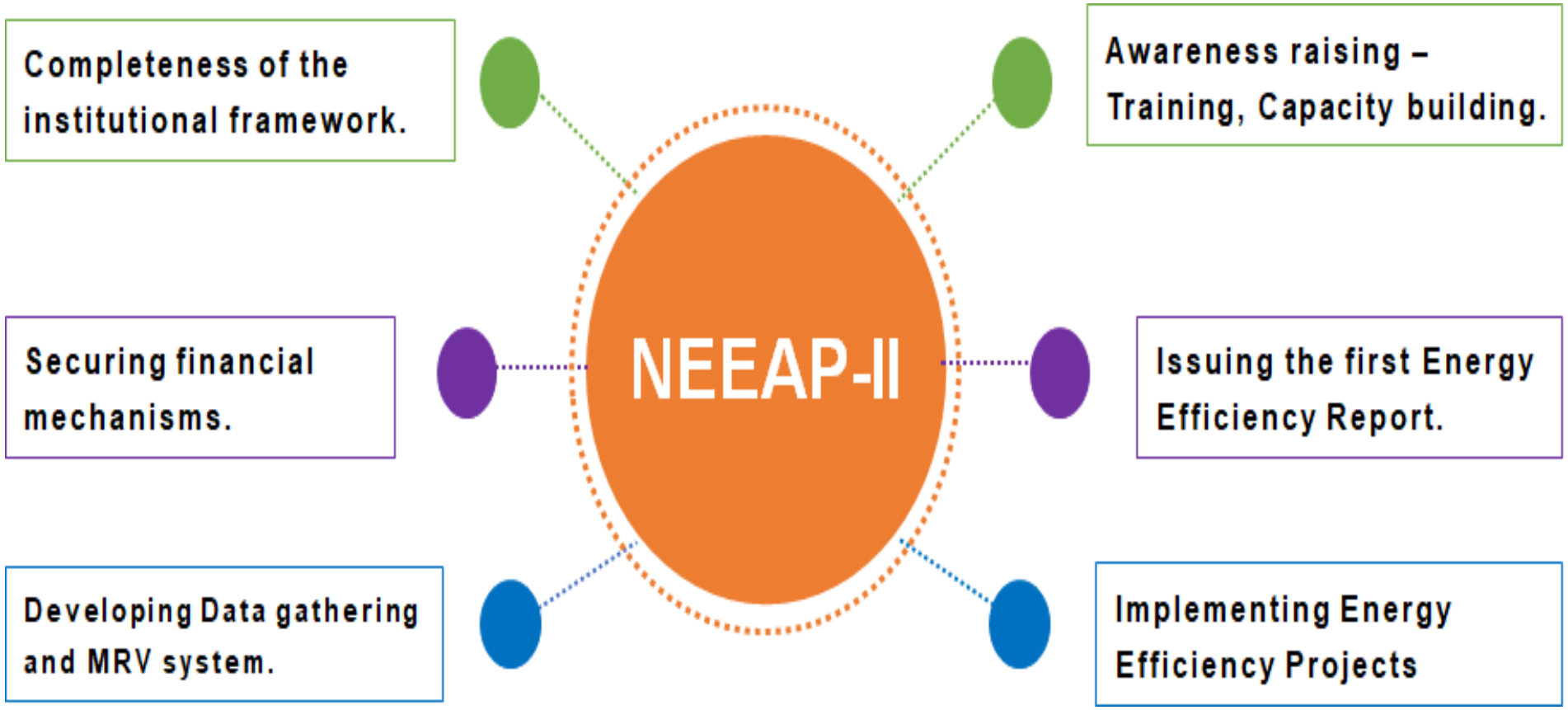
The plan complies with the objective of Egypt SDS 2030.

It also committed to Egypt's Integrated and Sustainable Energy strategy for 2035, which aims to diversify energy mix in addition to saving in energy by about 18%.

The plan aims at activating the articles of the Electricity Law No. 87 and its executive regulations issued in May 2016 regarding energy efficiency improvement requirements requested by law.

Decree of a Prime Minister for year 2019 to form the Steering Committee for Sustainable Electrical Energy headed by the First Undersecretary of the MOERE and membership of the First Undersecretaries in another ministers whom concerned with sustainable energy

The Second National Energy Efficiency Action Plan (NEEAP-II)



Mega Project Power Plants

The Egyptian Electricity and Renewable energy Sector succeeded with SIEMENS company to establish 3 Mega Power Plants high - efficiency compound cycle (60.5%).

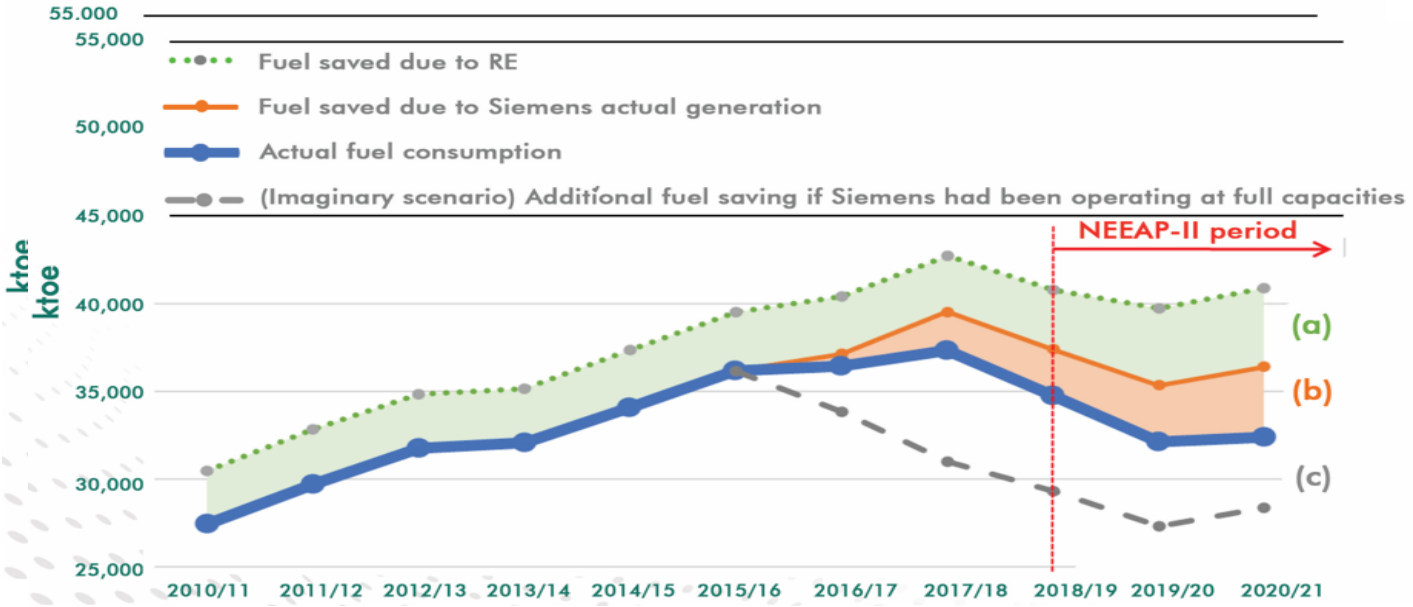
With total capacity of 14400 MW installed in 2.5 years (45% of the installed capacities in 2015).

New Capital P.P

Burullus P.P

Beni- Suef P.P

EPC + Finance Cost of 6 Billion Euro.



Renewable Energy
+ Efficient power plants

8,525k ton of oil equivalent
3,239 million USD
(=0.7% of GDP)
20 million t-CO_2
saving in year 2020/21

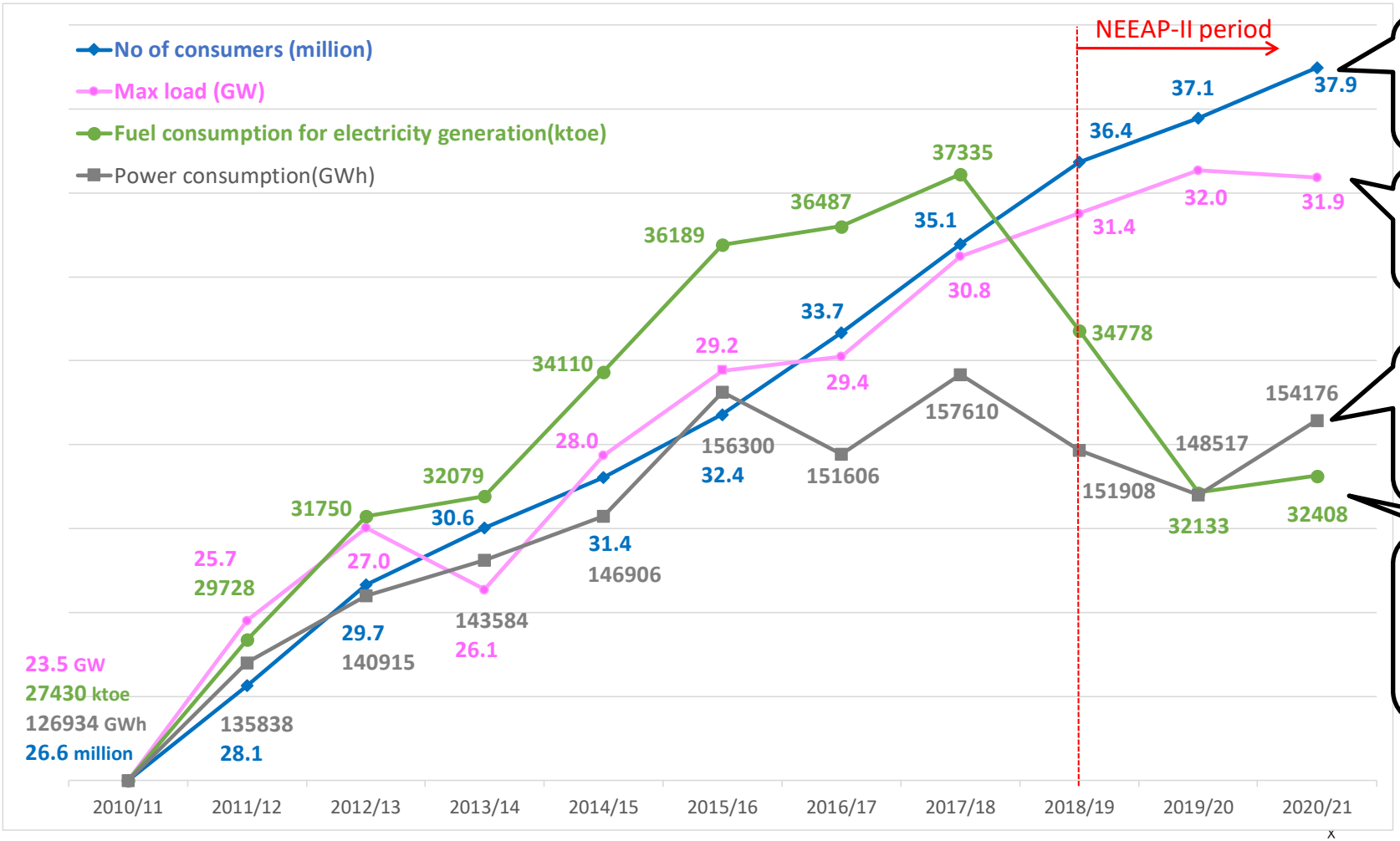
Fuel saved due to	Energy saving (ktoe)			Financial saving (Million USD)			CO_2 emissions saving (t-CO_2)		
	2018/19	2019/20	2020/21	2018/19	2019/20	2020/21	2018/19	2019/20	2020/21
(a) Renewable energy	3,372	4,386	4,500	838	675	1,710	7,920,656	10,301,346	10,570,822
(b) Siemens (Actual generation)	2,641	3,247	4,024	657	500	1,529	6,203,275	7,627,077	9,453,100
Total	6,013	7,633	8,525	1,495	1,175	3,239	14,123,932	17,928,423	20,023,922

Source: EEHC annual reports,

Natural gas price as USD 6.2/MBtu for FY2018/19, USD 3.9/MBtu for FY2019/20, USD 9.5/MBtu for FY 2020/21 from IEA gas report (TTF annual average)

1. Energy Efficiency report

Key content (2) KPIs of energy efficiency in demand side



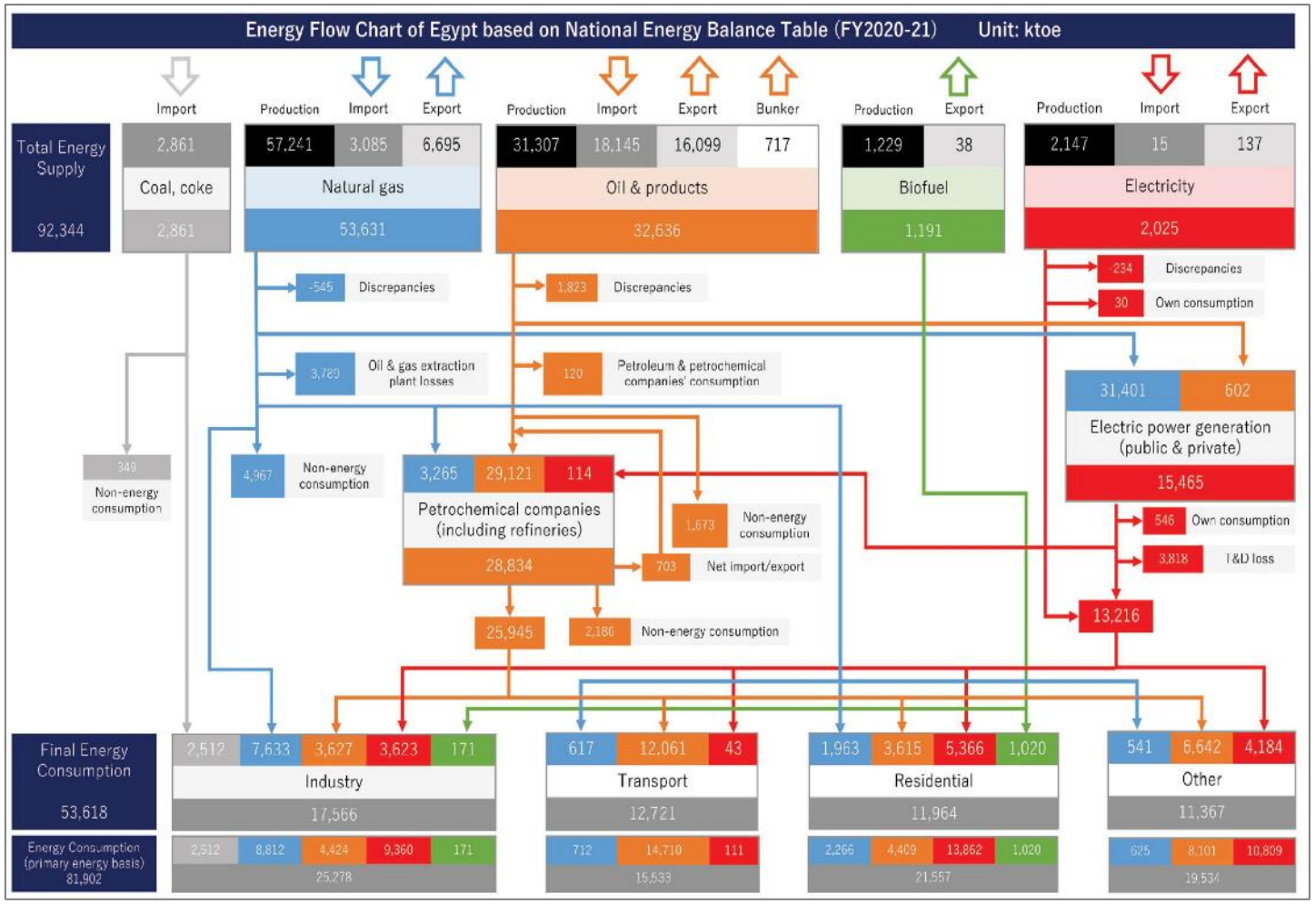
- Number of customers steadily grew
- Max load did not grow as much
- Power consumption did not grow as much
- Fuel consumption significantly reduced

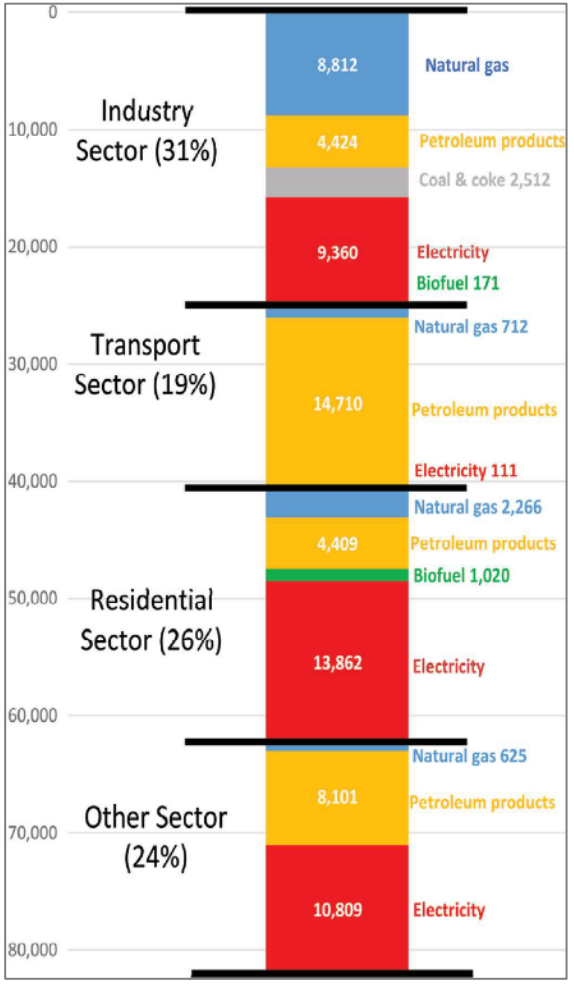
Energy balance

- **The energy balance is the most complete statistical accounting of energy products**
- **it offers a complete view on the energy situation of a country in a compact format**
- **Express all forms of energy in a common accounting unit ,and show the relationship between the inputs to and the outputs from the energy transformation processes**
- **this allows users to see the total amount of energy used and the relative contribution of each different source, for the whole economy, and for each individual consumption sector. In addition, it allows users to compute the various energy transformation efficiencies".**

1. Energy Efficiency report

Key content (3) National Energy Balance => Future Policy Planning

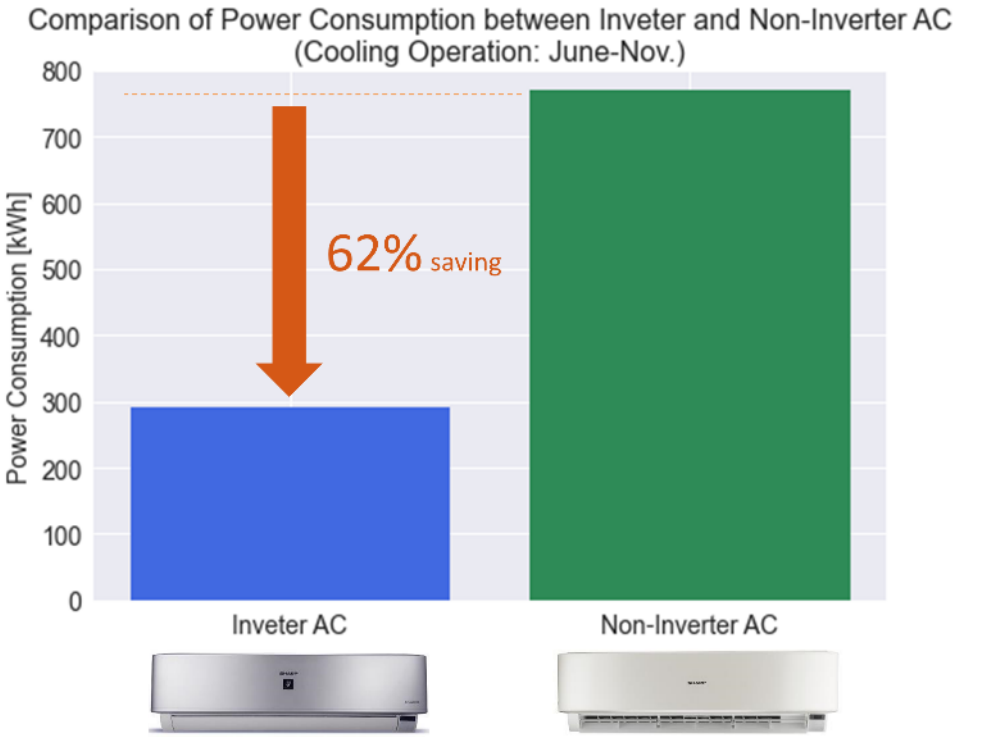


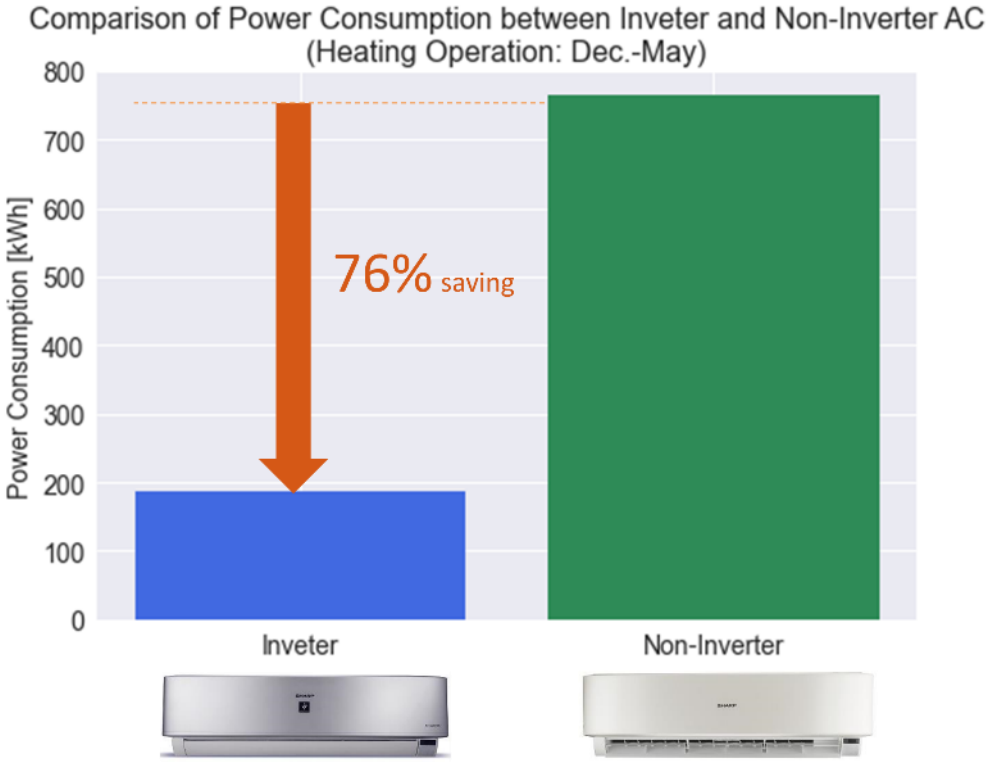


2 - demonstration test of efficient ACs and home appliances

2. Demonstration test of efficient ACs and home appliances

In collaboration with E-JUST, actual power consumption of inverter-controlled AC and non-inverter-controlled AC under the same conditions were compared for one year which indicate that the saving is about 62% for cooling and 76% for heating.





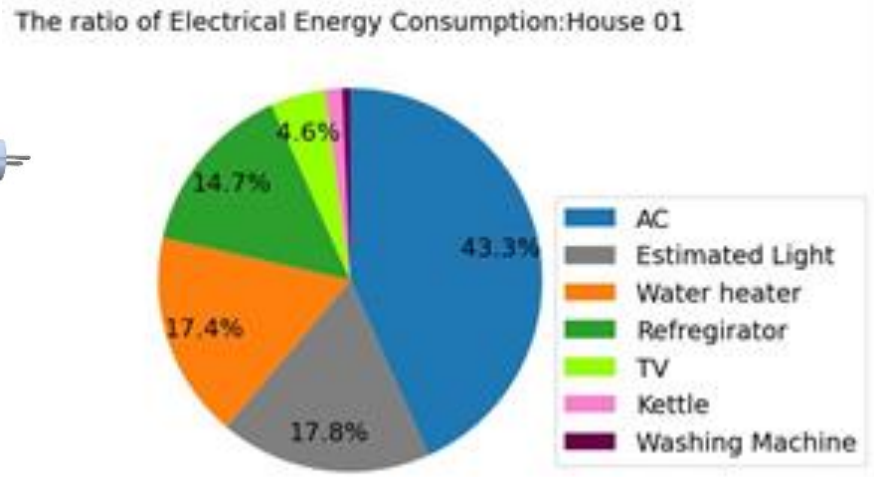
2. Demonstration test of efficient ACs and home appliances

In collaboration with E-JUST, actual power consumption breakdown for home appliances in 5 households was collected by smart sensor for 1 year, It was found out that:

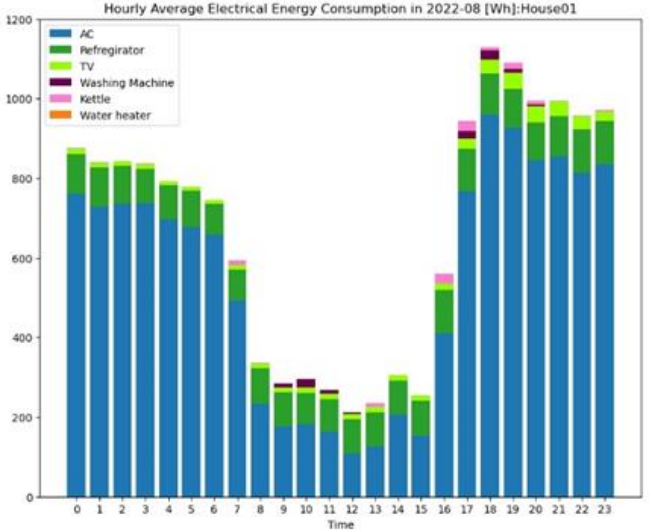
- AC consumed more than half of annual power consumption (furthermore it was only used for cooling).
- More efficient use of power can be proposed (such as changing non-inverter AC to inverter AC, shortening AC operation hours during nighttime).

◆ Smart sensor

◆ Example of power consumption of household



◆ Hourly breakdown



3. Review of standards and labeling program

3. Review of standards and labeling program

Energy Efficiency Specifications and labeling Committee

- **eliminate non-efficient appliances.**
- **Coordinate stakeholder roles & responsibilities,**
- **Conduct market analysis & set targets**
- **Monitor & evaluate the program impacts**
- **Information sharing among the stakeholders.**

So far, All the stakeholders related to standards and labelling program met regularly to discuss about issues and challenges they are facing, they concluded that further actions will be required especially in the following issues.

- **Guidebook will be developed to clearly define each stakeholder's role and activities.**
- **If there is a need for support, concept note requesting for further cooperation will be developed**

- **Some MEPS will be reviewed. Support will be provided for Egyptian Organization for Standardization & Quality (EOS) technical committee for updating standards.**
- **Standards will be revised so that all the labels shall be unified with the same format for all appliances (i.e. A-- to--E).**
- **Updating testing laboratories will be necessary, including capacity expansion.**
- **Granting licenses to more laboratories to conduct the required test on energy efficiency is another possible option to explore.**
- **Policy and financial mechanisms to replace non-energy efficient appliances will be explored.**
- **A fund to replace non-energy efficient appliances was not secured until now, and it requires financing for this policy component to move forward, Major power consuming appliances (such as AC, refrigerator) are examples.**
- **Incentives and programs for encouraging replacement will need to be proposed, such as rebate system for high efficient products and bulk purchasing of high efficient products through public procurement.**
- **Capabilities of manufacturers to execute the standard will be checked.**
- **Appropriate education, awareness and communication campaigns targeting manufacturers, distributors, retailers and end-users will be planned and conducted.**

3. Review of standards and labeling program

- Gathered information about testing lab facilities among all the stakeholders to identify which facilities need to be upgraded and to facilitate the ministries and entities to know about the capabilities of each lab.

Appliance Name	Entity	Test Type and the standard			The updated year of the testing labs
		Efficiency	Safety	Performance	
TV	EOS	ES 9773/2018 EU 1062/2010	-	-	2016
Refrigerators and Deep freezer	EOS	ES 3794/2018 ES 6000/3/2018	ES 3793/2019	ES 6000/1/2016 ES 6000/2/2016	2014
	NREA	ES 3794/2018 ES 6000/3/2018	-	-	2005
Washing Machines	EOS	ES 4100/2006	ES 378/ 2005	ES 4751/2016 IEC 60456	2015
	GOIEC	ES 4100/2006	ES 378/ 2005	ES 4751/2016 IEC 60456	2020
	NREA	ES 4100/2006	-	-	2005
Electric Ovens	EOS	ES 8058/2017	ES 5290 / 2006 IEC60335-2/2021	IEC 60350-1/2021	2018
	GOIEC	ES 8058/2017	ES 5290/2006	IEC 60350-1/2021	2016
Dish Washer	GOIEC	ES 7820/2014	ES 6575/2008	ES 2093/2016	2020
	NREA	ES 7820/2014	-	-	2017
AC/Non-inverter	NREA	ES1/2017-3795	-	-	2008
AC/ Inverter	NREA	ES2017/2-3795	-	-	2020

4. improvement of energy audit capacity

4. Support for improvement of energy audit capacity (lecture)

- A series of lectures was conducted on building energy efficiency and its certification scheme including Leadership in Energy and Environmental Design (LEED). A some participants were certified as LEED Green Associate and others are in progress

◆ Lecture

◆ Visit to E-JUST aiming for LEED certification

◆ Visit to LEED certified building

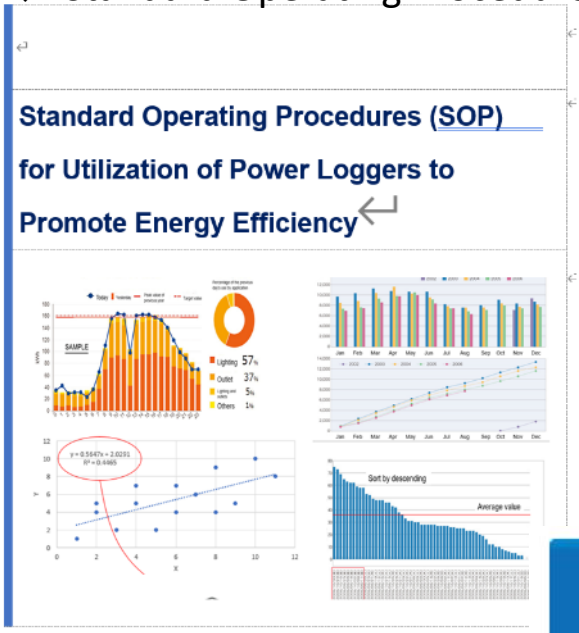
4. Support for improvement of energy audit capacity (on-site)

- A series of on-site training was conducted on power consumption data collection and analysis in office building.
- The training utilized power loggers. The SOP was prepared for further training.

◆ 2-day training of on-site energy audit (5 times)




◆ Standard Operating Procedures (SOP)



◆ Power logger

2. Next steps

Way forward

- NEEAP-III preparation based on national energy balance and energy efficiency KPIs.
- Development of accreditation mechanism for certified energy manager and facilitation of energy manager and energy register stipulated under Electricity Law.
- Continued and institutionalized cooperation among stakeholders to enhance Standard and Labeling program under EESLC.
- Awareness raising on high efficient AC based on findings from demonstration project.

شكرا جزيلا

ANNEX-5

JCC#4 Final Meeting
TT4 Activities

Energy Efficiency and Climate Department
Ministry of Petroleum

2023

Content

01 Participation in COP 27

Energy Efficiency to Achieve Decarbonization Targets

Petroleum Sector Energy Efficiency Overview

- A prosperous global community needs energy that is **secure, sustainable, and affordable**.
- Demand on the oil and gas is expected to remain for the next 30 years.
- The gas will play an important role in the future to balance the sources of the renewable energy.
- The O&G sector can be positioned as a role model with its de-carbonization ambition as it contributes to ~25% of the GDP in Egypt.
- For the very first time in COP history, the MoPMR arranged the decarbonization day in COP27.

Energy Efficiency is an opportunity to achieve De-carbonization

Oil & Gas De-carbonization Journey;

✓No/ Low-Cost measures

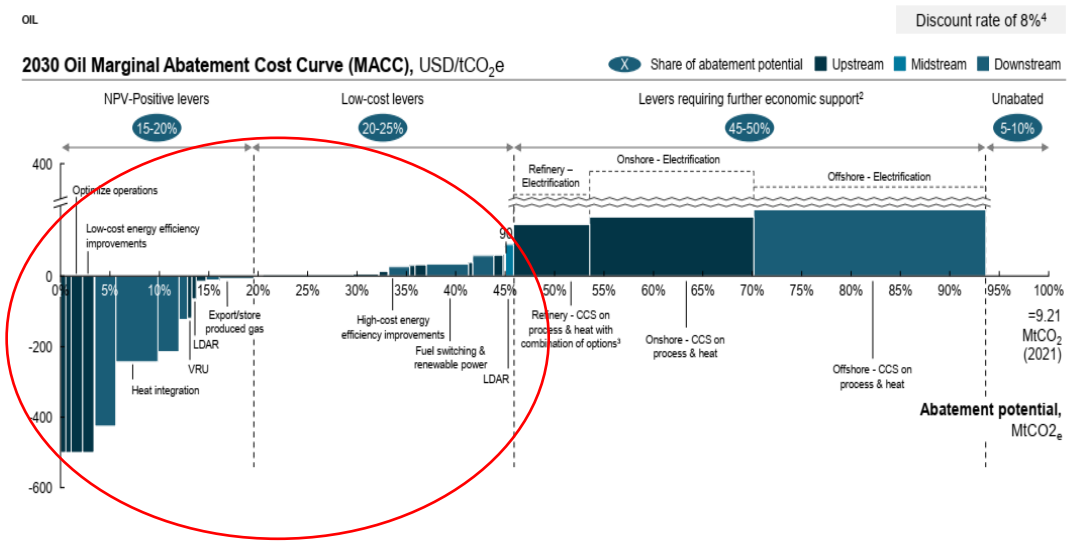
1. Process Optimization & Improving Energy Efficiency
2. Heat Integration
3. Eliminating Flaring and Venting

✓Requiring Further Economic Support

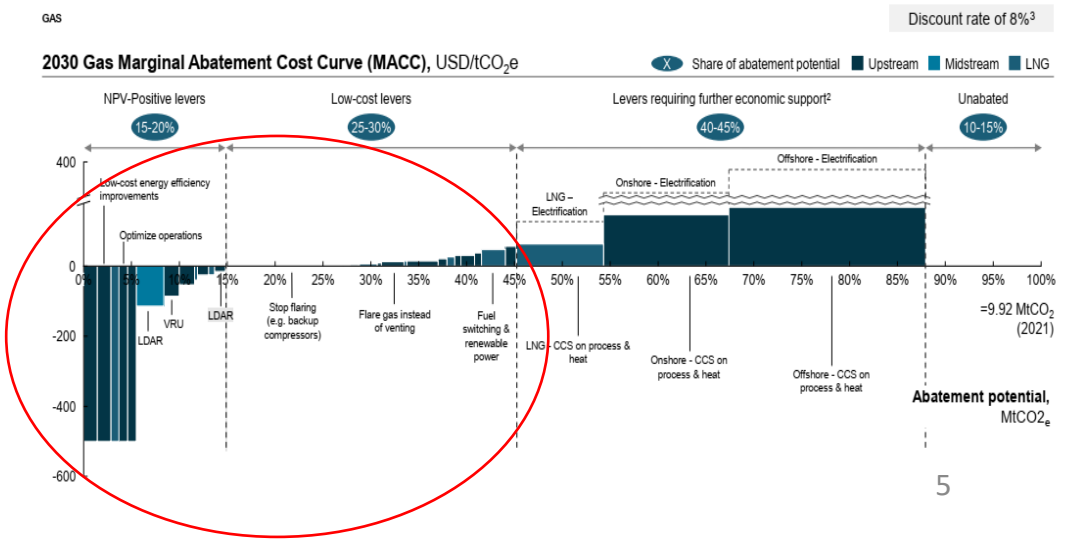
1. Electrifications
2. CCS of process heat

Energy efficiency with eliminating venting and flaring can reduce the emissions in the petroleum sector by **35% to 45%.**

MACC for Oil with levers grouped by value chain related emissions1



MACC for Gas with levers grouped by value chain related emissions1



Petroleum Sector Decarbonization Day Announcements

- Announcement of the Energy efficiency strategy of the petroleum sector.
- Sharm Elsheikh Methane Reduction Roadmap for the oil and gas.
- The decarbonization road map of the east Mediterranean Gas Forum (EMGF) to improve the collaborative work in the region.

02 EMSF Roadmap
2023 year of sustaining the success

Energy Efficiency Achievements in the Egyptian Petroleum Sector

Short-Term

Achievement 1
Energy Efficiency Institutional Setup in Petroleum Sector

Achievement 2
Awareness & Capacity Building

Achievement 3
Energy consumption Database and reporting system

Achievement 4
No/Low Cost Energy efficiency improvement Measures

Achievements

Long-Term

Achievement 1
Introduce EE New/Oriented Technologies

Achievement 2
System performance Optimization & Integration

Achievement 3
Energy Efficiency Legal & Administrative Framework

Achievements – No/Low-cost Energy Efficiency Measures

From 2018 to 2021

126 Projects and Measure
470 KTPA CO2 Annual Emissions Reduction
50 Million USD Annual savings

2022

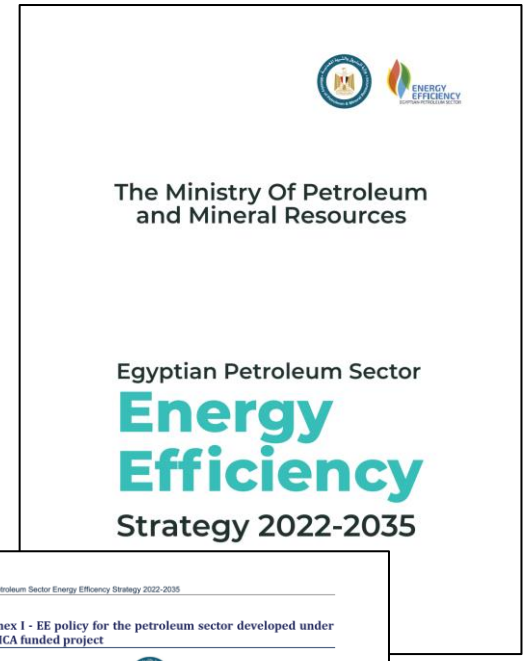
151 Projects and Measure
626 KTPA CO2 Annual Emissions Reduction
80.8 Million USD Annual savings

Total
From 2018 to 2022

277 Projects and Measure
1.11 Million Ton CO2 Annual Emissions Reduction
130.8 Million USD Annual savings

Drivers of the Success

- Set annual voluntary **Target** to reduce the energy consumption in the petroleum sector.
- **Capacity Building** of 247 of the energy efficiency staff in sector companies. (The First EE Middle management Program).
- Training on Process Simulation **Software** (Petro-sim and Super-target)
- Implement five **Technical Energy Audits** in the intensive energy consuming companies.



Development of the **Energy Management System Framework** (EMSF).

Feb 2022

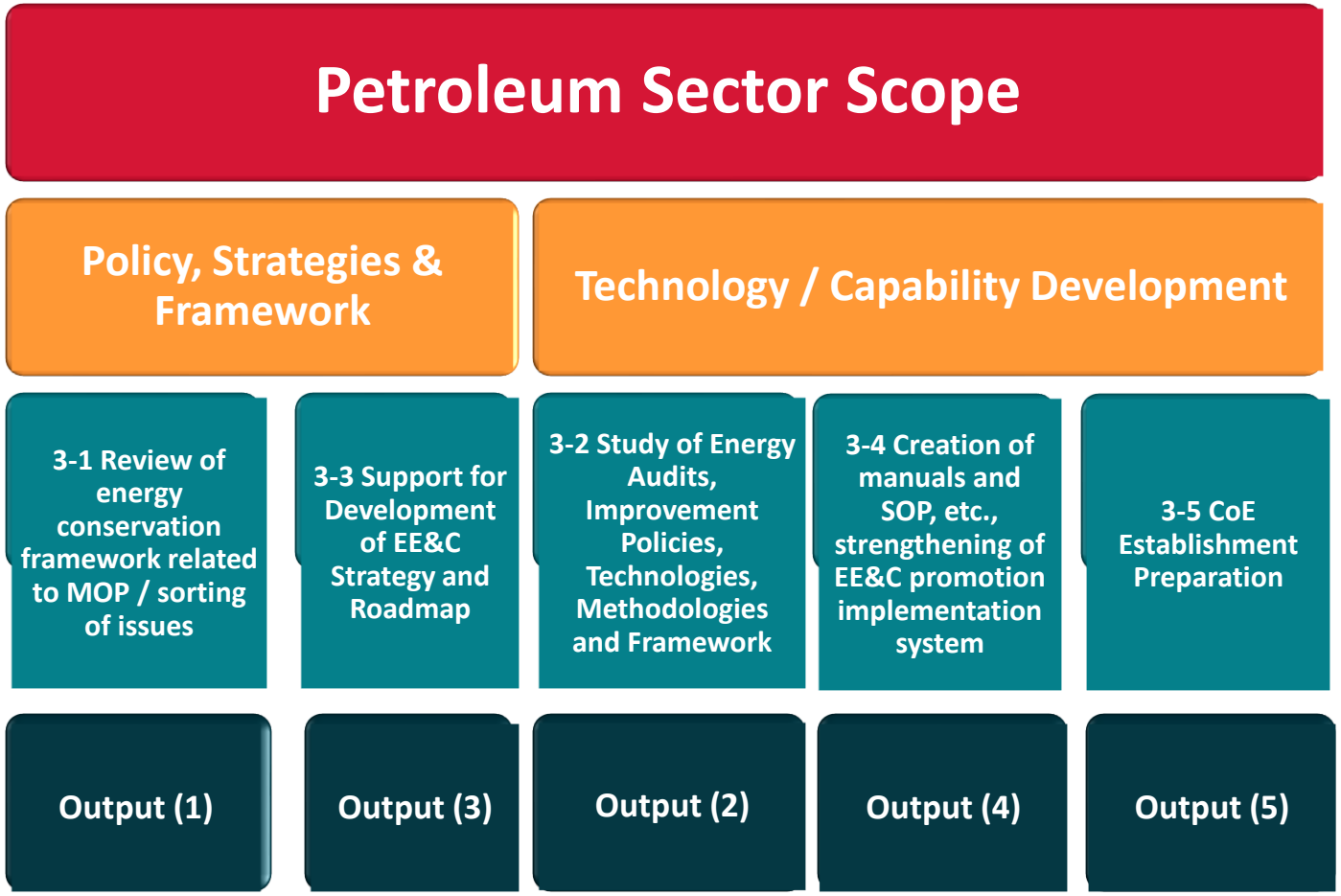
Under organizational workstream activities, Developing the **Energy Efficiency Policy.**

May 2022

Announcement of the first **Energy Efficiency Strategy**.

Nov 2022

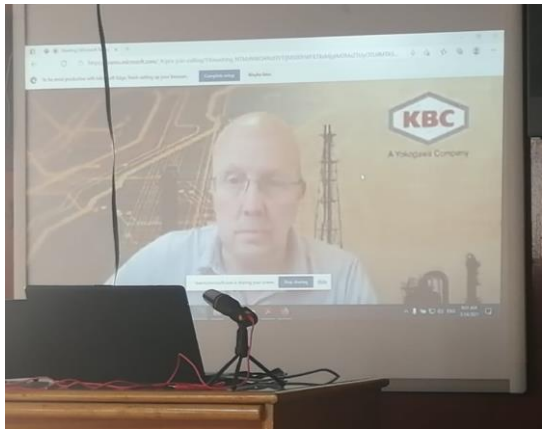
Drivers of the Success



Drivers of the Success

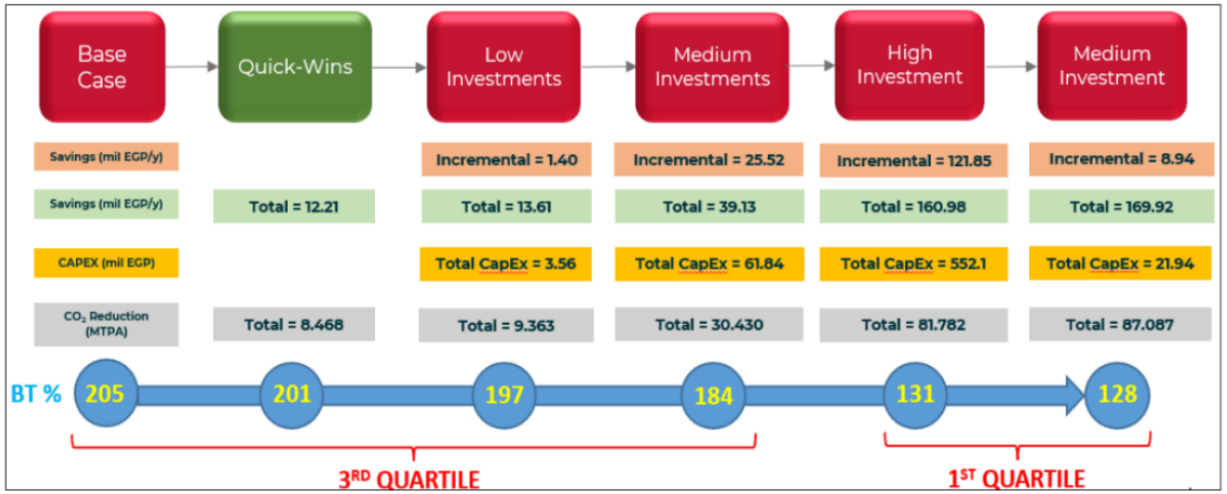
In cooperation with JICA, TT4 main achievements were accomplished

- Energy Management System Framework (EMSF) Roadmap for the Petroleum Sector.
- On-job Training through energy audit in Cairo Oil refining Company resulted in a potential **energy savings of 170 mil EGP/y** with an estimated **CO2 reduction of 87 MTPA**.



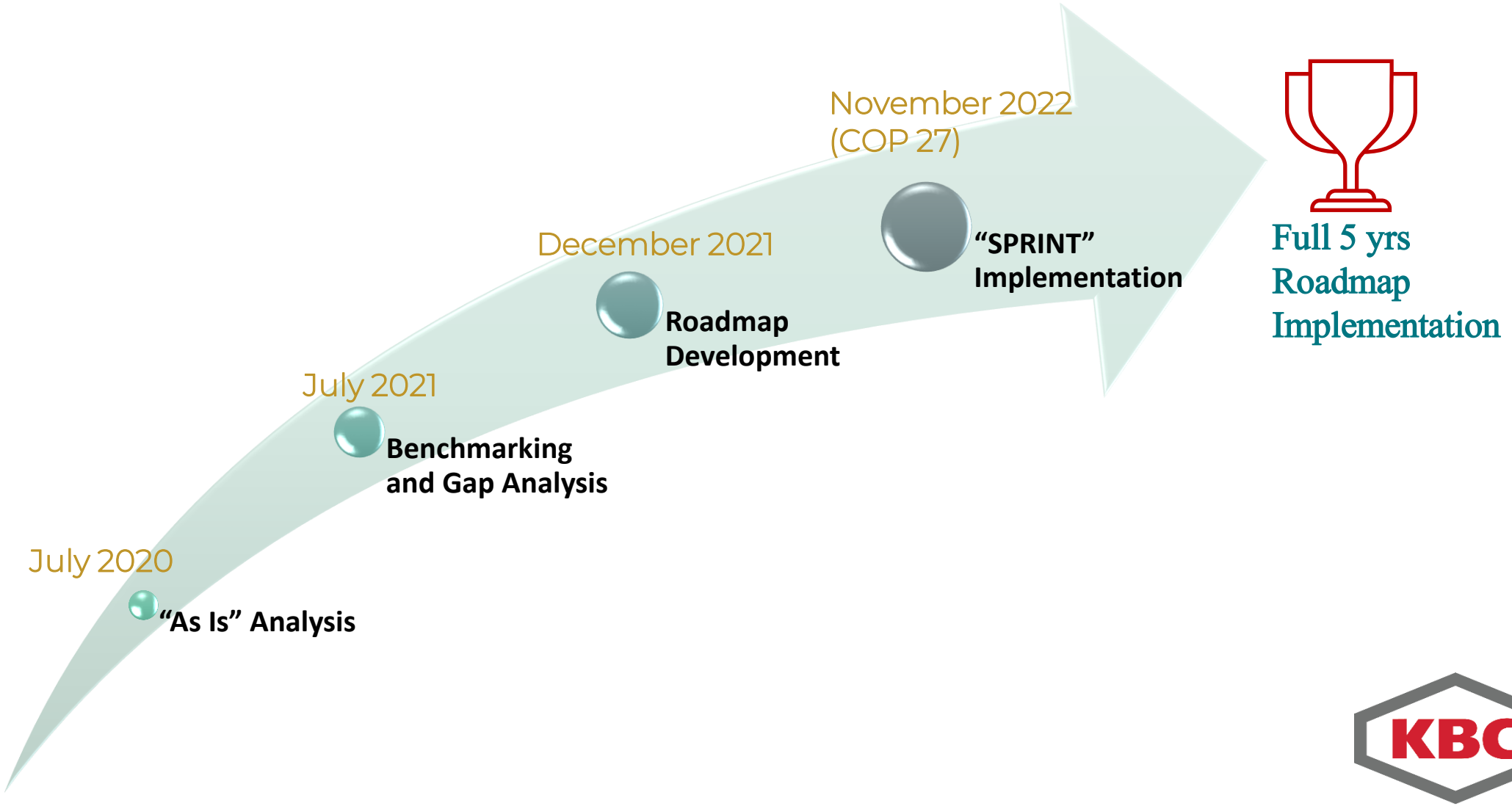
KBC
A Yokogawa Company

JICA



CORC Energy Improvement Roadmap

Petroleum Sector “EMSF” Timeline



A Yokogawa Company

"As Is" Summary

- 17 interviews (1-2 hrs each)
  - 3 with MOP EECD (head and staff)
  - 5 at EGPC and Holding companies' level
  - 9 at affiliated (operating) companies level:
    - Two (2) from EGAS affiliates (GASCO and BGC)
    - Five (5) from EGPC affiliates (EPROM, NPC, MIDOR, Khalda and PETROBEL)
    - Two (2) from ECHEM affiliates (SIDPEC and EPC)

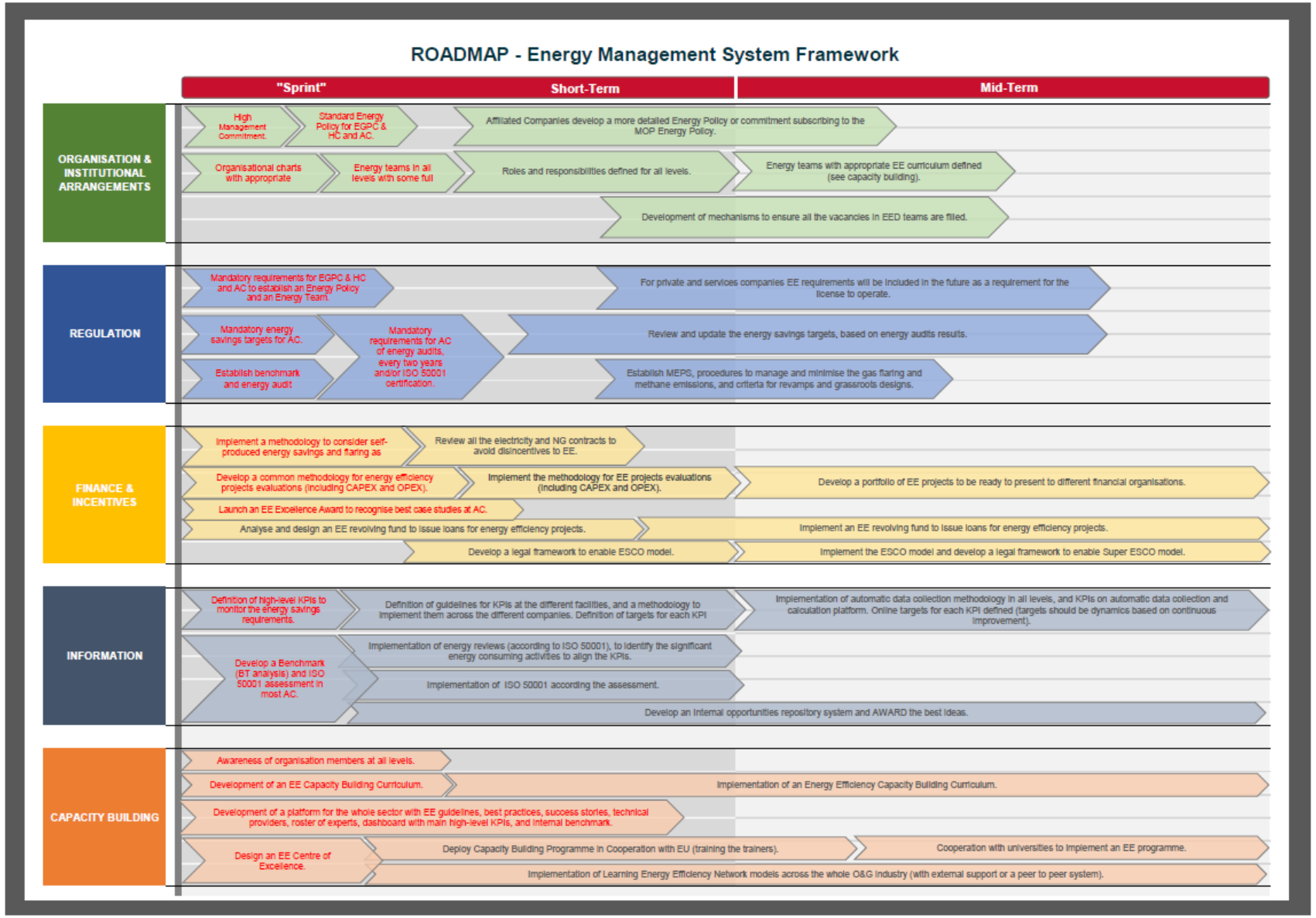
- Different profiles: Chairman, Vice-chairman, EE department leaders, EECD staff, EE committee's members

- No technical issues faced and, over 90% on time presence of invitees

Roadmap Strategic Workshop

- ~23 Stakeholder attended
- JICA T/C presented the EMSF gap analysis and the preliminary roadmap to close all gaps
- The invited stakeholders were subdivided into 4 groups to discuss the proposed preliminary roadmap and provide their views on each suggested action
- Almost all the preliminary roadmap proposed by J/C was approved.

Roadmap Summary



A Yokogawa Company

Key “SPRINT” Phase Elements

1. Define and Apply an EMS across the whole sector
2. Mandate an ISO 50001 EMS across all sector affiliated companies
3. Mandate an Energy Savings Targets to be achieved, reported and presented by all affiliated companies by Nov 2022
4. Develop and implement an ESCO model within the petroleum sector
5. Establishing Petroleum Sector Energy Centre of Excellence (CoE)
6. Awareness sessions across all levels starting with Chairmen (2 workshops for 3 hours each)

Sustaining of the Success

- The MoPMR is integrating the Sprint Elements and the EE Strategy Objectives to set 2023 priorities.
- Accordingly, defined 8 priorities to sustain the improvement of energy efficiency in the petroleum sector.
- The MoPMR had formulated **8 working groups** to develop action plan for each objective.
- The MoPMR will formulate teams to implement these objectives.

Category	Selected measures	Assigned Team
EE KPIs	5. EE indicators such as energy intensity (e.g. TOE consumed /ton of output) become one of the Key Performance Indicators (KPI) for all entities.	Hany El rouby Mohamed Selim Yasser nagaty Mohamed Magdy
	12. Develop system of EE indicators at all levels (sector, sub-sector, company)	
MEPS	8.Set Minimum Energy Performance Standards (MEPS)	Mahmoud Maher Khalid Hassan Mohamed Hamouda Alla safwat Shaimaa Hassan
	36. Adopt Best Available Technologies (BAT)(achaving high EE) for new plants design and/or during rehabilitation, revamping and expansions of existing plants	
	37. Use of efficient motors, pumps, and compressors (using the BATs)	
	3. Update of procurement regulations to foster EE	
Financing	22. Develop a harmonized methodology for economic and financial evaluation of EE investments	Mohamed Selim Nancy Azazy Alaa Safwat Iman Mekawy
legal/regulatory and institutional framework	21. EE to be part of the Annual Reports of EGPC, Holding Companies and affiliated companies	Mahmoud Maher (Done just follow up implmentation)
	11. EE harmonized information system	Nesreen Salah Mohamed Abdallah Nancy Azazy Amr Tawfik
	9. Establish EE Departments at affiliated companies	EGPC and Holding Companies
Flare	41. Implement the Egypt-Flare Gases Monetization Program (E-FGMP)	Hany Elrouby Khalid Hassan Mohamed Hamouda Mohamed Magdy
Training	13. Implement sector-wide EE training programmes	Nesreen Salah Mohamed Talaat Amr Tawfeik Iman Mekawi
Identify Energy Saving Potential	30. Implement sector-wide energy audits for major consuming processes/technologies to identify potential for energy savings	Mohamed Abd Elmonem Mohamed Salah Allaa Safwat Amr Magdy shady osama
Energy Management System	4. Implement a mandatory Energy Management System for heavy consuming companies	Mohamed Abd Elmonem Mohamed Salah Alla Safwat Amr Magdy Shaimaa Hassan

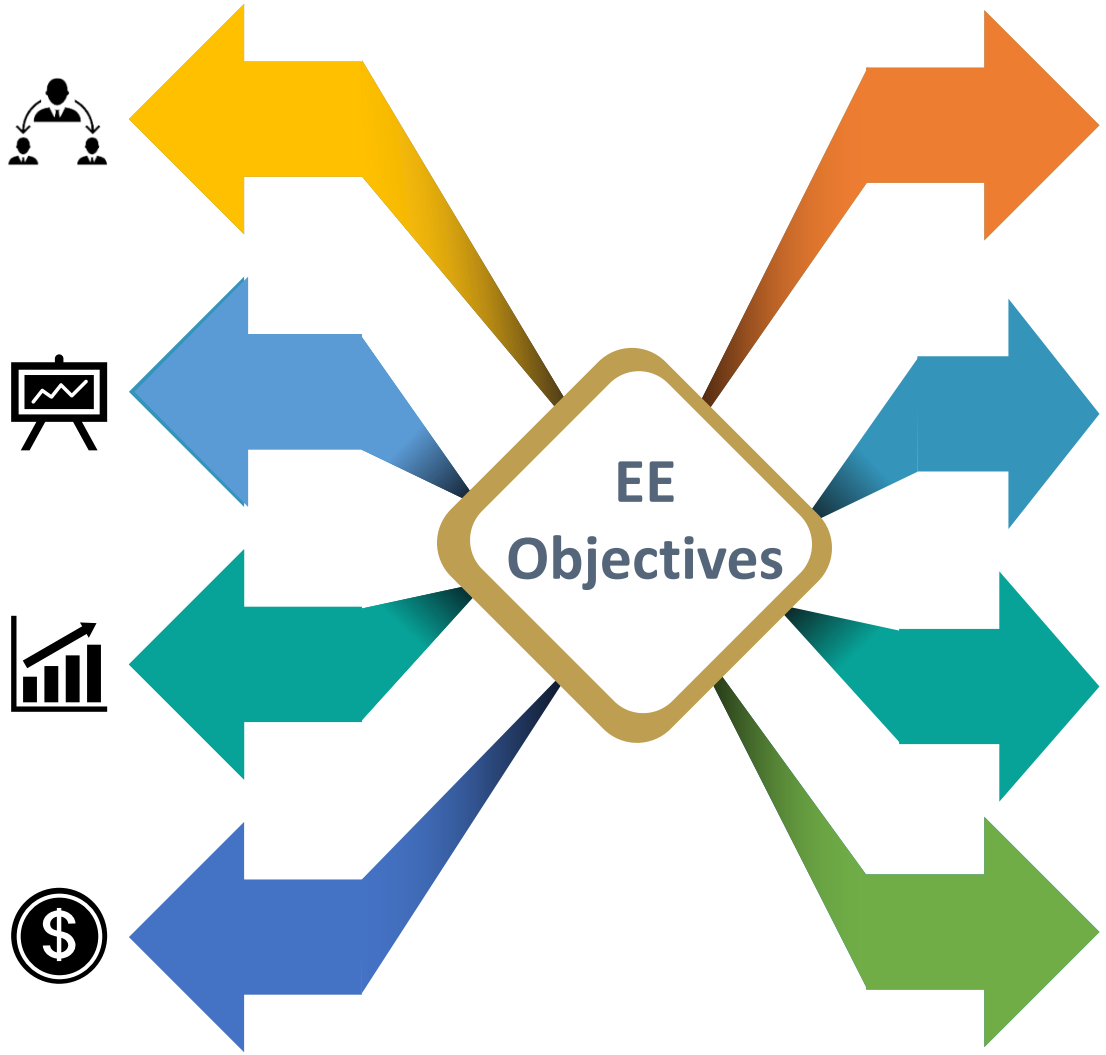
New Energy Efficiency Improvement Objectives

Objective 1
Implement sector-wide EE training programs.

Objective 2
Minimum Energy Performance Standards (MEPS) and BATS

Objective 3
sector-wide energy audits and benchmarking

Objective 4
Develop sustainable Financing Mechanism for EE



Objective 5
Establish EE Information System

Objective 6
Implement a Energy Management System.

Objective 7
Develop EE KPIs and System

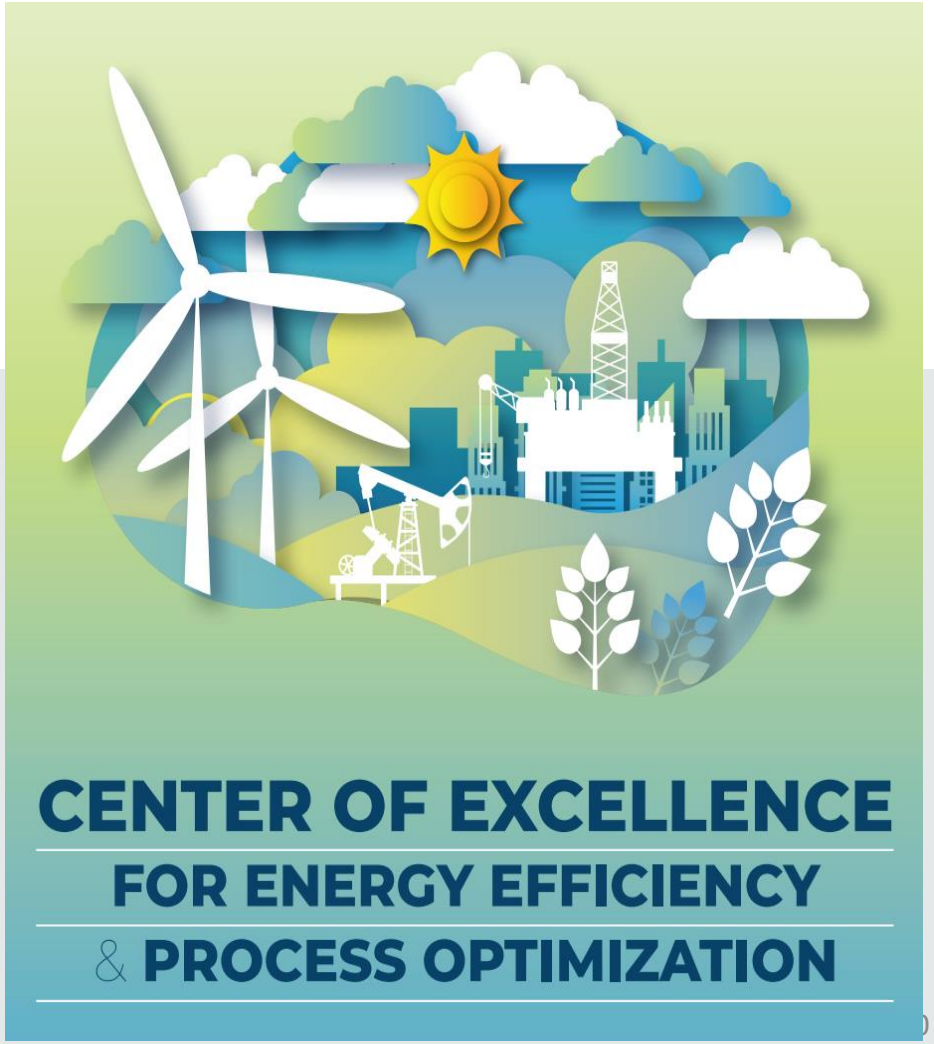
Objective 8
Implement the Egypt-Flare Gases Monetization Program (E-FGMP)

ENERGY EFFICIENCY
EGYPTIAN PETROLEUM SECTOR

وزارة البترول والثروة المعدنية
Ministry of Petroleum & Mineral Resources

03

Center of Excellence for Energy Efficiency & Conservation



CoE Stakeholders Strategic Workshop

- JICA T/C has held the CoE Stakeholders Strategic Workshop in Cairo from 20-22 June 2022
- It was attended by over 15 of Petroleum sector personnel representing: MOP, EGPC, ECHEM, GANOUPE, EGAS, ENPPI and EPROM.

Development of :

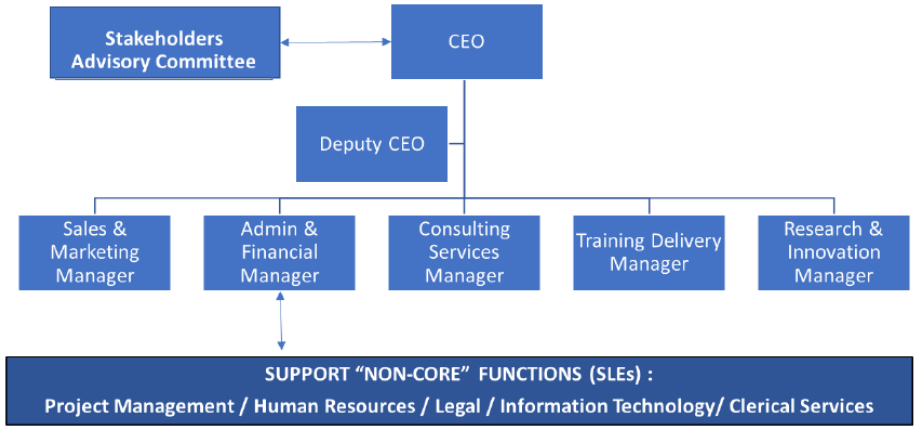
- ✓ Strategic Goals and Objectives.
- ✓ Business Philosophy.
- ✓ Value Proposition.
- ✓ Using the SIPOC methodology, identify the COE services.
- ✓ COE Organizational Concept and Design Report.
- ✓ Competency Development and Training Management Guidelines

CoE Organizational Concept and Design Document Issuance

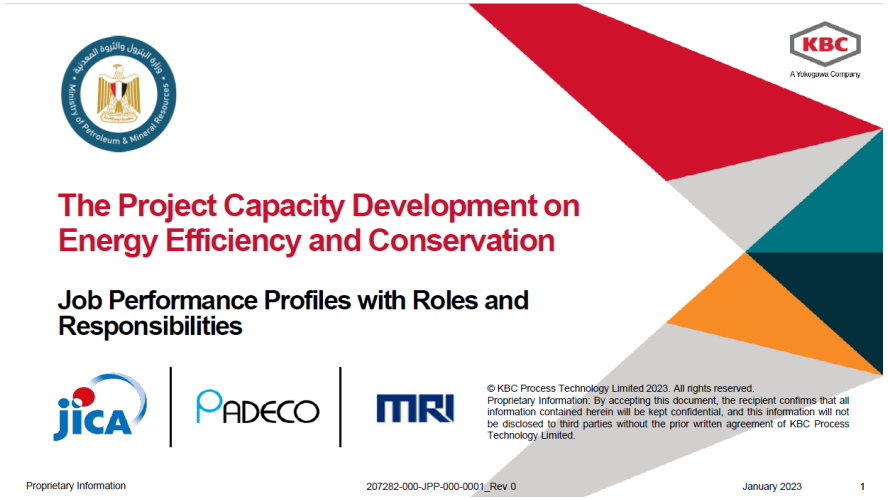
JICA T/C has issued the CoE “Organizational Concept and Design” document to MOP

CoE Orgaizational Concept and Design Report Table of Contents

TABLE OF CONTENTS

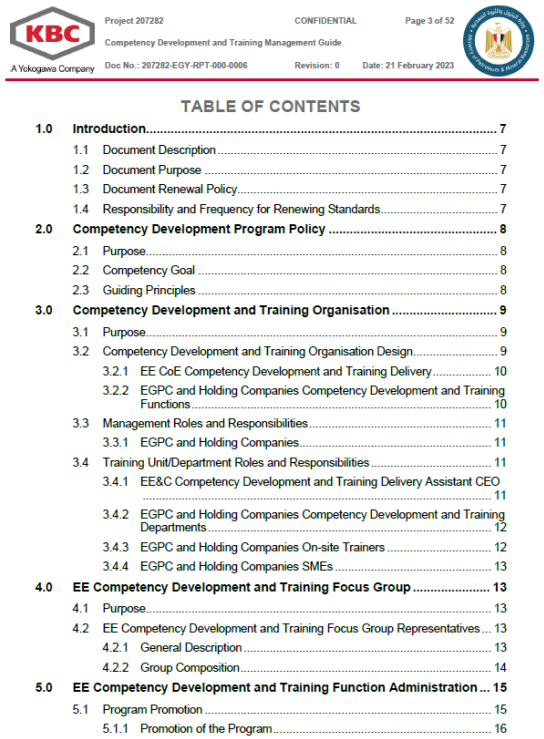


EE CoE Proposed Organisational Structure



CoE Competency Development and Training Management Guide Document Issuance

- JICA T/C has issued the CoE “Competency Development and Training Management Guide” document to MOP.
- These guidelines are designed to serve as the foundation for a successful EE training program.



KBC — A Yokogawa Company

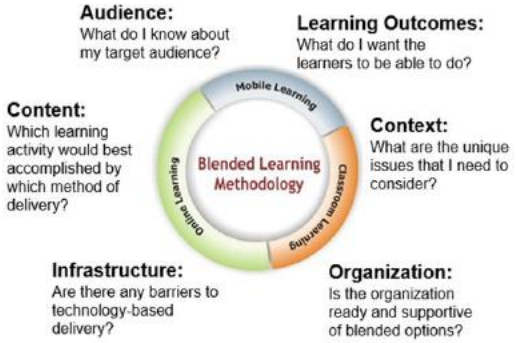
Project 207282 | CONFIDENTIAL | Page 3 of 52

Competency Development and Training Management Guide

Doc No.: 207282-EGY-RPT-000-0006 | Revision: 0 | Date: 21 February 2023

TABLE OF CONTENTS

CoE Competency Development and Training Management Guide Table of Contents



Blended Learning Approach

Name of Instructor:		
Name of Auditor:	Workshop:	Date of Audit:

INSTRUCTIONS: Check (√) each item in Section I as: O – Outstanding; S – Satisfactory; NI – Needs Improvement. Items which are not applicable to the type of lesson presented will be (NA). Ratings of "Needs Improvement" and "Outstanding" require written justification in Section I. Ratings of "Needs Improvement" require a follow-up evaluation in Section V.

SECTION I AUDIT CHECKLIST

ITEMS	RATING O	S	NI	NA	COMMENTS
A. PREPARATION					
1. Classroom neat and orderly. Seating arrangements appropriate.	□	□	□	□	
2. Training materials, aids, and equipment available prior to the start of class.	□	□	□	□	
3. Necessary materials distributed effectively.	□	□	□	□	
4. Lesson Plan evident and utilised.	□	□	□	□	
5. Instructor introduction carried out in an effective manner.	□	□	□	□	
6. Agenda set for the day and presented.	□	□	□	□	
7. Overall objectives for the workshop as a whole and the day in particular clearly stated.	□	□	□	□	
8. Participant introductions carried out in an effective manner.	□	□	□	□	
9. Any abnormalities within classroom set up identified and addressed.	□	□	□	□	
B. CONTENT/STRUCTURE OF PRESENTATION					
1. Lesson title clearly stated.	□	□	□	□	
2. Lesson objectives clearly stated.	□	□	□	□	
3. Lesson introduction logical and informative.	□	□	□	□	
4. Assigned reading and feedback exercise.	□	□	□	□	
5. All objectives covered. Presented with a mix of lecture and discussion	□	□	□	□	

Instructor Audit

Center of Excellence for Energy Efficiency & Conservation

- In October 2022, Launching the “Center of Excellence for in Energy Efficiency & Conservation (COE)” as the first center in providing innovative and up-to-date energy efficiency services, knowledges and trainings to all energy sectors in Egypt and Africa.
- **H.E the Minister of Petroleum and Mineral Resources**, **H.E The ambassador of Japan in Egypt and Chief Representative of JICA in Egypt** attended the Launching Ceremony.
- Implement the firs training programs by JICA, PADECO and KBC Experts

Services of the COE :

- **Training Services**
- **Consultancy Services**
- **Research & Development and Standardization**

Training Services of the COE :

HANDS-ON TRAININGS IN MINI-PLANT.

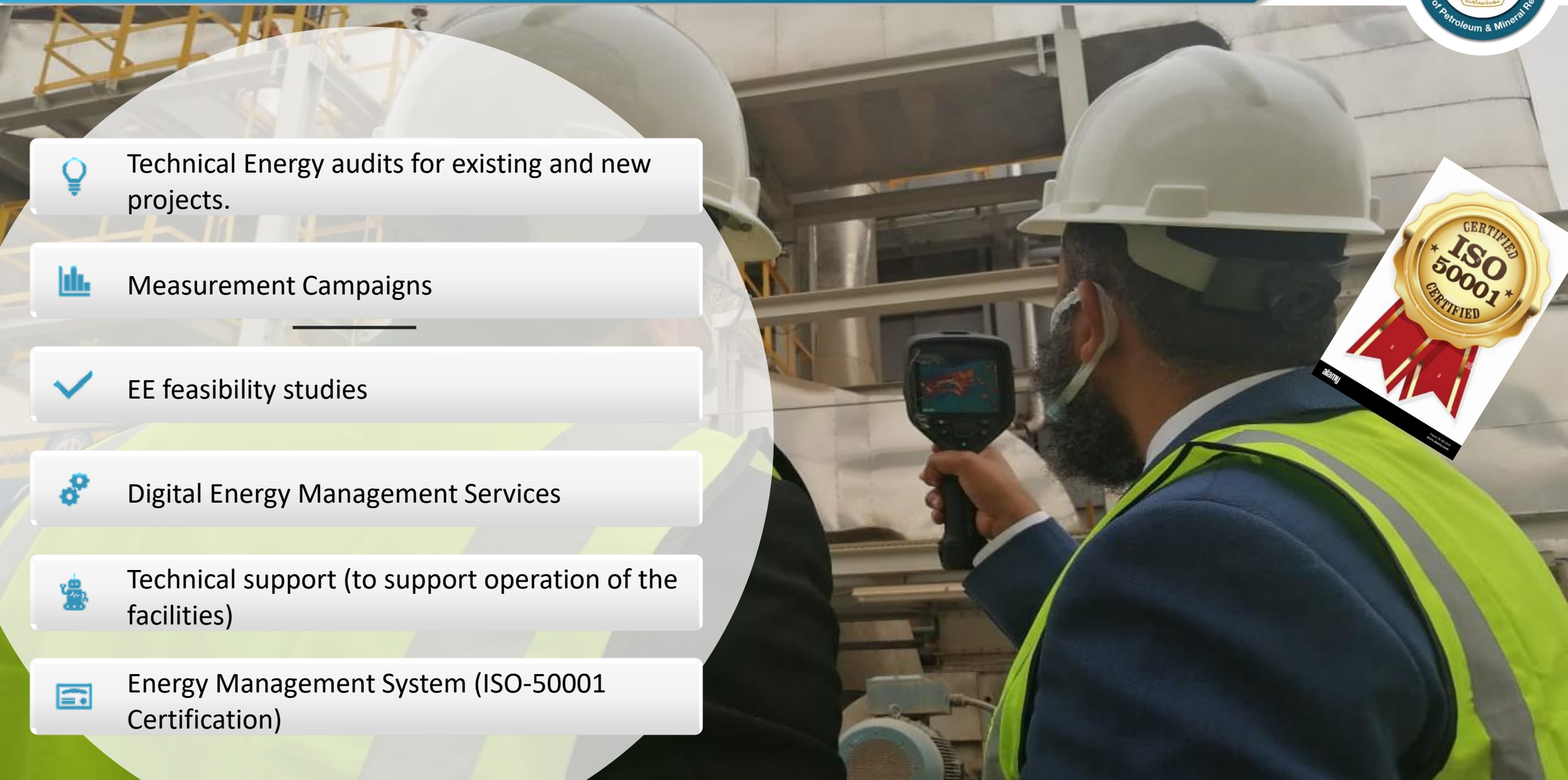
SIMULATION MODULES.

VIRTUAL REALITY SIMULATOR.

THEORETICAL TECHNICAL TRAININGS.

Consultancy Services of the COE :

- Technical Energy audits for existing and new projects.
- Measurement Campaigns
- EE feasibility studies
- Digital Energy Management Services
- Technical support (to support operation of the facilities)
- Energy Management System (ISO-50001 Certification)



Research & Development and Standardization:

EE KPIs and Benchmarking

EE Standards /Codes/ Best Practices

EE Research

Alternative Energy & Clean Energy

EE Emerging Technologies

EE data analysis

ENERGY EFFICIENCY
EGYPTIAN PETROLEUM SECTOR

وزارة البترول والثروة المعدنية
Ministry of Petroleum & Mineral Resources

04

Capacity Building

Software Aided Comprehensive Training (Feb – April 2022)

Blend of lecture based training and on the job training where tasks were assigned to the trainees.

The classroom trainings were conduced both onsite and remotely.

Blend of Participants; CORC, Three Refineries, one Petrochemicals and Two service and engineering companies.

Task	Description
1	Develop BT Index for Units and Site BT Index for CORC
2	Build out crude preheat HEN in Petro-SIM
3	Calculate Heat Integration Gap for CDU Preheat HEN using SuperTarget
4	Heat Integration Opportunity Identification and Evaluation
5	1. Install GT with HRSG (without supplementary firing) 2. Install GT with HRSG (with supplementary firing) 3. Install a new Steam Turbogenerator downstream HRSG 4. Install a new CT (starting from Case 1)
6	Calculate Furnace Gap for Heaters. Use flue gas to preheat air (where applicable
7	Calculate Process/Operating Gap

Onsite training in Feb/2022




START	END	LOCATION	DESCRIPTION
Sun Jan 23rd	Thur 27th Jan	On Site	Assignment of Laptops to Trainees
Sun 30th Jan	Tue 1st Feb	Remote	Kick-off Training Session Refresher (recap of past training material)
Wed 2nd Feb	Thur 3rd Feb	Remote	Assignment of Task 1
Sun 6th Feb	Thur 10th Feb	Remote	Follow up on Task 1 Assignment of Task 2
Sun 13th Feb	Sun 13th Feb	Remote	Follow up on Task 2
Mon 14th Feb	Mon 14th Feb	Remote	HX Monitoring Training
Sun 20th Feb	Mon 21st Feb	On Site	Using SuperTarget Interface Tool Task 3
Tue 22nd Feb	Thur 24th Feb	On Site	Task 4
Mon 7th Mar	Mon 7th Mar	Remote	General follow up on past Tasks and Training
Sun 13th Mar	Thur 17th Mar	On Site	Opportunity Evaluation Workshop Assignment ofTasks 5 & 6
Mon 28th Mar	Mon 28th Mar	Remote	Follow up on Task 5
Mon 4th Apr	Mon 4th Apr	Remote	Follow up on Task 6
Mon 11th Apr	Mon 11th Apr	Remote	Assignment of Task 7
Mon 18th Apr	Mon 18th Apr	Remote	Follow up on Task 7
Sun 24th Apr	Sun 24th Apr	Remote	General technical support and addressing any concerns/issues
Wed 27th Apr	Wed 27th Apr	Remote	General technical support and addressing any concerns/issues

COE - Achieving Optimum Energy Efficiency Training, AOEE (9 Oct – 12 Oct)

- Energy Efficiency and Economics.
- Steam and power generation& optimization.
- Process and equipment efficiency.
- Basic heat integration & Pinch Technology, PT.
- Effective energy management

Photos for AOEE Training Course (9-12 October 2022)

Ser	Name	Position	Entity	Email
1	Waleed Mohamed Hanafi	Cost Engineer	Enppi	Waleed hanafi@enppi.
2	Tarek Zein El Deen	Process Engineer	Enppi	Tarek_zein@enppi.com
3	Mohamed Magdy Fathy El Eishy	Process Engineer		Mohamed.alaeshy@gr
4	Mohamed Emad Lashin	Process Engineer	Enppi	Mohamed.lashin@enp
5	Islam Adel Tantawy	Senior Process Eng.	Enppi	Islam.tantawy@enppi.
6	Gasser Samir El Faham	EE Team Leader	Gasco	Gasser_elfaham@gasc
7	Hamdy Ahmed Mahmoud Faraoun	Production Mgr.	OSOCO	hamdyfaraoun@hotma
8	Ahmed Hussien Soliman	Energy Manager	Mopco	a.hussien@mopco.eg.(
9	Ahmed Abdel Rahman Zahran	EE Assistant G.M	Abu Qir Pet.	Ahmed.zahran@abuqi
10	Amr Magdy Abdel Fattah	Energy MS Section Head	Enppi	amrmagdy@enppi.com
11	Wagih Hassan Mohamed Nada	Mech. G.M	Enppi	wagihnada@enppi.com
12	Mohamed Atia	Process Engineer	Enppi	Mohamed.atia@enppi
13	Shaimaa Hassan Mohamed	Energy Dep. Mgr.	Enppi	S_hassan@enppi.com
14	Mohamed Hussein Saeed	EE Projects G.M	Echem	mhussein@echem-eg.(
15	Amr Tawfik	G.M	Enppi	amrtawfik@enppi.com
16	Kareem Maged Hegab	Process Engineer	Enppi	Kareem.hegab@enppi.
17	Manal Naguib	Refining & petrochemical Dep. Mgr.	enppi	manalnaguib@enppi.c

COE - Train the Trainers Training (16 Oct – 20 Oct)

- Interactive workshop which discusses a number of training principles, methods, and training preparation and delivery techniques.
- Trainees prepared and delivered a short presentation utilizing the methods and techniques discussion during the workshopProcess and equipment efficiency.

Training Skills for Process Plant Trainers

This Training Skills for Process Plant Trainers consists of the following:

Training Skills for Process Plant Trainers			
Module 1	Training Principles	Lesson 1	Training Basics
		Lesson 2	The Trainer
		Lesson 3	Trainee Learning Principles
Module 2	Training Techniques	Lesson 1	Effective Communication
		Lesson 2	Effective Instructional Delivery
		Lesson 3	Teaching Technical Information
Module 3	Effective Training Delivery	Lesson 1	Training Preparation
		Lesson 2	Individual Paced Training
		Lesson 3	Planned Job Observations
		Lesson 4	Managing Employee Performance
		Lesson 5	Trainee Evaluation

Proprietary Information 207282-000-PRE-000-0001_Rev 0 16 October 2022 4

Phases of Effective Training

PHASE ONE Initial Training
Training in the basic knowledge and skills takes place. This is required for the employee to successfully and safely perform the job functions

PHASE TWO Job Qualification
The employee is observed and evaluated while performing each job duty. As the employee demonstrates the required proficiency, the ability to perform that duty is documented.

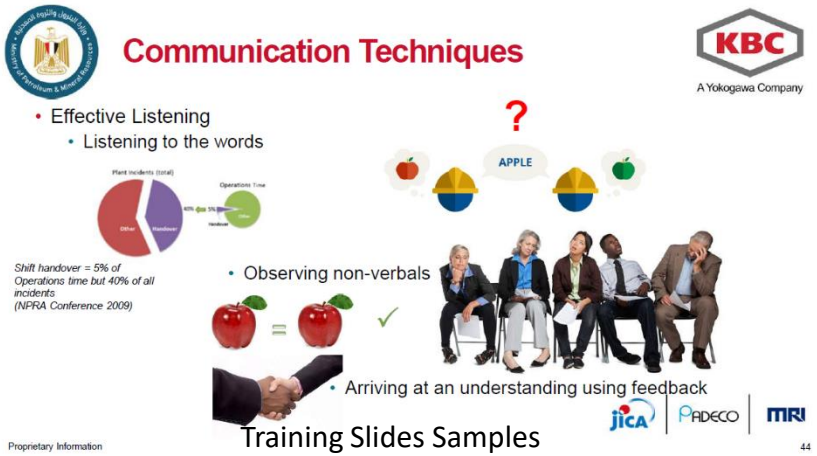
PHASE THREE Performance Improvement
The employee will be observed while performing the job as part of the performance management system. Performance coaching is provided to improve performance.

PHASE FOUR Refresher and Supplemental Training
The employee's job qualification is maintained by participating in refresher and supplemental training as required.

Proprietary Information 16 October 2022 17

Training Slides Samples

COE - Train the Trainers Training (16 Oct – 20 Oct)



Training Slides Samples

Photos for Train the Trainer Training Course (16-20 October 2022)

Ser.	Names	Position	Entity
1	Waleed Mohamed Hanafi	Cost Engineer	Enppi
2	Tarek Zein El Deen	Process Engineer	Enppi
3	Mohamed Magdy Fathy	Process Engineer	GPC
4	Mohamed Emad Lashin	Process Engineer	Enppi
5	Islam Adel Tantawy	-Senior Process Engineer	Enppi
6	Gasser Samir Elfaham	Energy Efficiency Team Lead	GASCO
7	Hamdy Ahmed Mahmoud Faroun	Production Manager	OSOCO
8	Ahmed Abd El Rahman Zahran	Energy Efficiency Assistant G. M.	Abu Qir Pet.
9	Amr Magdy Abdelfattah	Energy MS Section Head	Enppi
10	Wagih Hassan M. Nada	Mech. General Manager	Enppi
11	Mohamed Atia	Process Engineer	Enppi
12	Shaimaa Hassan Mohamed	Energy Department Manager	Enppi
13	Mohamed Hussein Saeed	Energy Efficiency Projects G. M.	Echem
14	Amr Tawfik	General Manager QHSE	Enppi
15	Kareem Maged Hegab	Process Engineer	Enppi
16	Manal Naguib	Refining & Petrochemical Depart. Magr.	Enppi
17	Ahmed El Sayed Ahmed	Department Manager	Enppi
18	Ahmed Abd Allah Abdel Mottaleb	Process Engineer	Eprom
19	Mahmoud Mohamed Metwally	Process Engineer	Eprom
20	Hosam Hamdy Ibrahim Hussein	Process Engineer	Eprom
21	Rami Abdellatif Ahmed	Energy Eff. Department Manager	Eprom
22	Hassan Abdel Wahab Hassan	QEHS – G.M	Eprom
23	Ehab Nadi Abdel Tawab	Process Engineer	Eprom
24	Emad Magdy Hamaya	Assist. G.M	Enppi

COE - Introduction to Pinch Technology and Super Target Training (7 Nov – 10 Nov)

- Training program which aims to give an overview of the fundamentals of Pinch Technology and Super Target.
- The rules of Pinch Technology principles by which energy efficient heat exchanger network design much abide
- Become familiar with the practical software tools

Photos for Pinch technology Training Course (7-10 November 2022)

Ser	Name	Position
1	Hamdy Ahmed Faraoun	Production Manager
2	Mohamed Magdy Fathy	Energy Efficiency
3	Mohamed Hussien Saeed	Energy Efficiency P.M
4	Ahmed Hussien Soliman	Process optimization EE Manag.
5	Ahmed El Sayed Ahmed	Department Manager
6	Hosam Hamdy Ibrahim	Process Engineer
7	Mahmoud Mohamed Metwally	Process Engineer
8	Ahmed Abdel Rahman Zahran	EE Assisst. G.M
9	Mohamed Ali El medany	Process Engineer
10	Mohamed Alaa mohamed	Process Engineer
11	Ehab Nadi	Process Engineer
12	Rami Abdellatif Ahmed	Energy efficiency Dep. Mang.
13	Hassan Abdel Wahab Fakhr El Deen	Sr. Process Engineer
14	Ahmed Abdel Hameed Abdel Gelil	Sr. Process Engineer
15	Abdel Rahman Mokhtar	Sr. Process Engineer
16	Tarek Zein El Deen	Process Engineer
17	Kareem Maged Hegab	Process Engineer
18	Gasser Samir El Faham	Energy efficiency team leader

The Knowledge Cooperation Program on Energy Efficiency and Conservation (Japan – 2 to 13 December 2022)

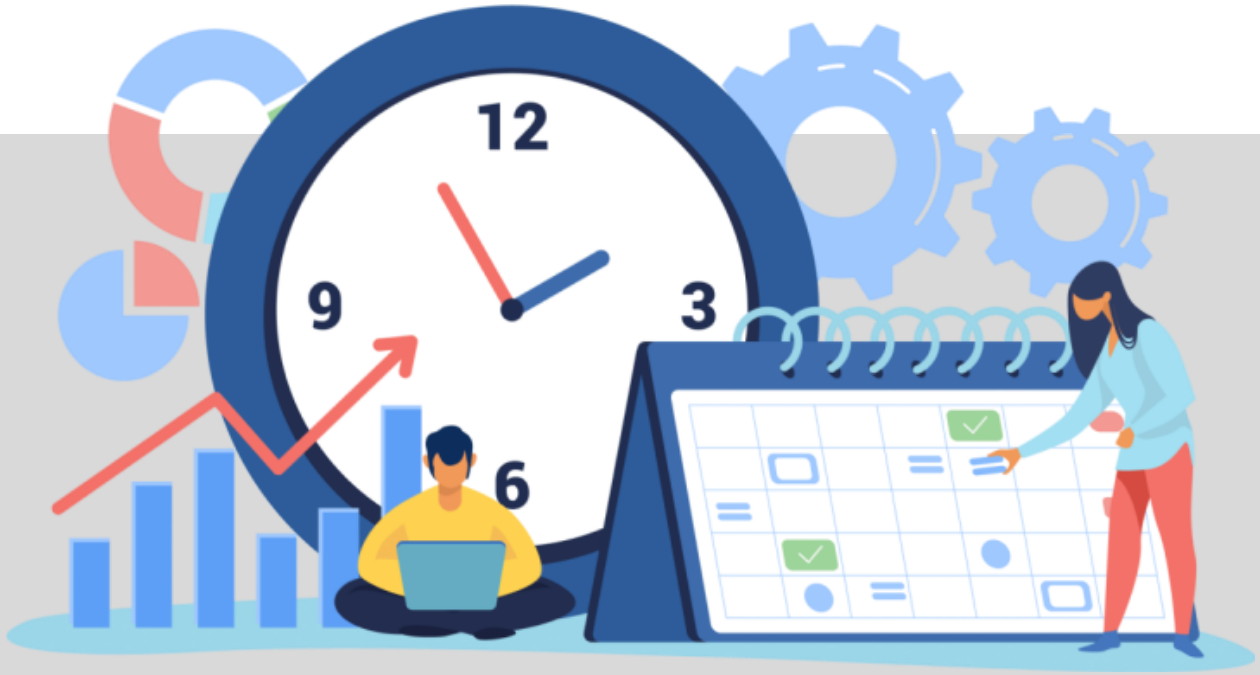
- Deepen the understanding of Japan's energy efficiency and conservation (EEC) policies, services, and technologies, and Build relationships with Japanese companies.
- 9 participants from The MoPMR attended:
  - 5 classroom-style lectures.
  - 10 EEC related site-visits where you can experience Japan's energy-saving technologies.

ENERGY EFFICIENCY
EGYPTIAN PETROLEUM SECTOR

وزارة البترول والثروة المعدنية
Ministry of Petroleum & Mineral Resources

05

Timetable



Timeline for 2022

Activities	Q1	Q2	Q3	Q4
3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)	Final CORC Roadmap Development Classroom and On job Training		Software Provision	
3-3 Support for Development of EE&C Strategy and Roadmap	Final EMSF Roadmap Development Chairmen Awareness Workshops			
3-4 Creation of manuals and SOP, etc., strengthening of EE&C promotion implementation system			Manual, SOP	
3-5 CoE Establishment Preparation		CoE Strategic Workshop	Training Management Guidelines CoE organization Document	

Timeline for 2023

Activities	Q1	Q2	Q3	Q4
3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery)	Software Provision			
3-3 Support for Development of EE&C Strategy and Roadmap				
3-4 Creation of manuals and SOP, etc., strengthening of EE&C promotion implementation system	SOP			
3-5 CoE Establishment Preparation	Training Management Guidelines CoE organization Document			

Thank You


وزارة البترول والثروة المعدنية
Ministry of Petroleum & Mineral Resources

The Project for Capacity Development on Energy Efficiency and Conservation

Report on T/C Activities to Date: TT2 (prepared for 4th JCC)

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

Contents

1. Activity
2. Activity
3. Activity
4. Activity
5. Activity
6. Issues to be Followed Up
7. Overall Evaluation

1. Activity 5.1
Assessing CAPMAS's institutional capacity on energy data management

Activity 5.1

Assessing CAPMAS's institutional capacity on energy data management

◆ *Activities*

Capacity assessment conducted in July-August 2021.

➢ *Output*

CAPMAS has a good institutional capacity to publish energy related statistics. CAPMAS, however, needs a mechanism to continuously improve its products.

➢ *Challenges*

We focused on inheriting existing institutional capacity as much as possible (rather than starting from scratch).

2. Activity 5.2
Gap analysis of 4 C/Ps' data collection capacity, and target setting

Activity 5.2

Gap analysis of 4 C/Ps' data collection capacity, and target setting

◆ *Activities*

OJT conducted at CAPMAS to identify the gaps between the proposed national energy balance table and the existing examples.

➢ *Output*

It was found that a good Egyptian national energy balance, based on MEDSTAT format can be prepared.

➢ *Challenges*

One-off activity is possible and was achieved. How can it be sustained?

3. Activity 5.3
In-house trainings for 4 C/Ps on international standard energy data management

Activity 5.3

In-house trainings for 4 C/Ps on international standard energy data management

◆ *Activities*

Energy balance table workshop (March)

Best practices in energy data management (July)

➢ *Challenges*

Each organization has its own expertise; having a dedicated energy data expert is desirable.

4. Activity 5.4
Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM)

Activity 5.4

Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM)

◆ *Activities*

- A very simple business process (annual cycle) for national energy balance table preparation has been developed.
- Business process manual (BPM) has been drafted and shared (next slide).

➢ *Challenges*

- The process had to be simple and repetitive (as continulation is essential)

Activity 5.4 Business Process Manual

❖ Business Process Manual for National Energy Balance Creation

Business Process Manual

EDMS

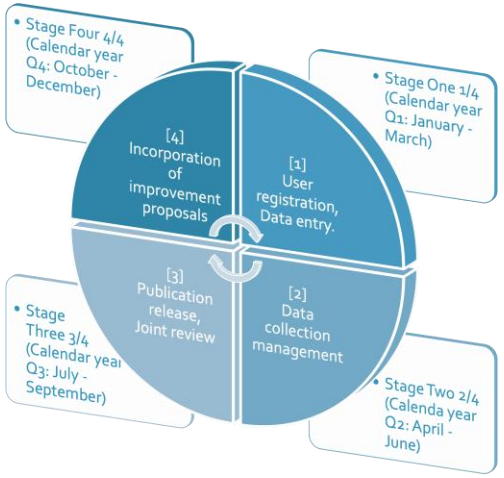
Energy Data Management System

National Energy Balance Creation using EDMS

(Energy Data Management System)

An inter-ministerial collaboration among the Central Agency for Public Mobilization and Statistics (CAPMAS), Ministry of Petroleum and Mineral Resources (MOPMR), Ministry of Electricity and Renewable Energy (MOERE), Ministry of Environment (MOE), and the Industrial Development Authority (IDA), supported by JICA Technical Cooperation Project

Annual Business Cycle (4 Stages)



An annual cycle starts from October and consists of four stages

The preparation for the national energy balance table publication starts from January every year, with expectation that the previous fiscal year data will become available from around January – March. The cycle follows the quarterly steps to collect data, publish, review and to improve for the next annual cycle.

4

Acknowledgement

EDMS

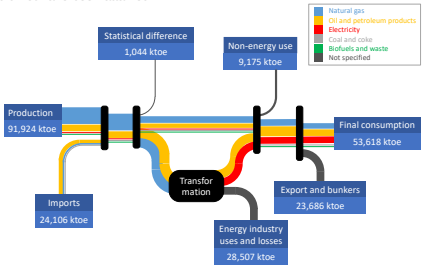
Energy Data Management System

This Business Process Manual for the National Energy Balance Creation using EDMS (Energy Data Management System) is the common property of the participating organisations to the EDMS Group.

The EDMS Groups an inter-ministerial collaboration among the Central Agency for Public Mobilization and Statistics (CAPMAS), Ministry of Petroleum and Mineral Resources (MOPMR), Ministry of Electricity and Renewable Energy (MOERE), Ministry of Environment (MOE), and the Industrial Development Authority (IDA), supported by Japan International Cooperation Agency (JICA) Technical Cooperation Project.

National energy balance has been prepared and published on annual basis in Egypt until the early 2000s by the Office of the Energy Policy (OEP). The publication, however, has been discontinued. CAPMAS, based on MEDSTAT initiative cooperation, revived the publication for FY 2016-17 although with limited contents. With the aim to enhance and continue the CAPMAS publication, JICA started a technical cooperation project involving four counterpart ministries, agency, and authority, namely MOERE, MOPMR, CAPMAS and IDA as the EDMS Group. MOE was asked to join the initiative with regards to their importance of their biomass and coal related data management capacity.

The technical cooperation activity achieved to have CAPMAS's data collection, processing, and publishing functions to be conducted on routine basis. A simple web-based data collection, analysis and presentation application, the energy data management system (EDMS) was for this purpose. The EDMS Group and JICA would like to thank all the contributors for their devotion without which the objectives could not have been attained.



3

5. Activity 5.5
Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA

Activity 5.5 EDMS

Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA

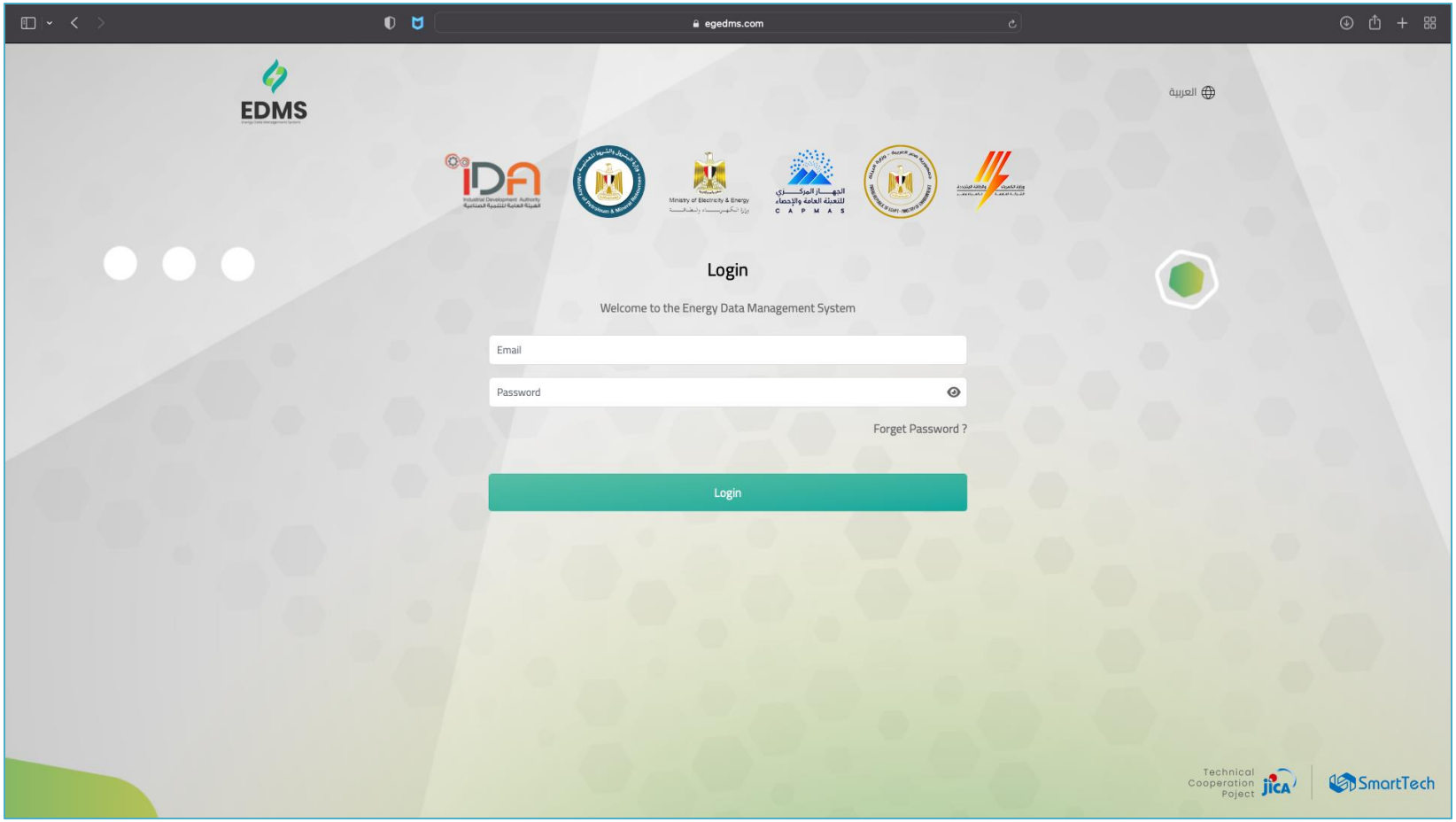
◆ ***Activities***

- System requirement document was prepared.
- A local system vendor (SmartTech) was appointed.
- The development has been completed and tested.
- Trainings were conducted
- Functions are proven with the creation of FY 2020-21 balance table, charts and balance figure.
- User manual has been drafted.

➢ ***Challenges*** - too many to be listed up...

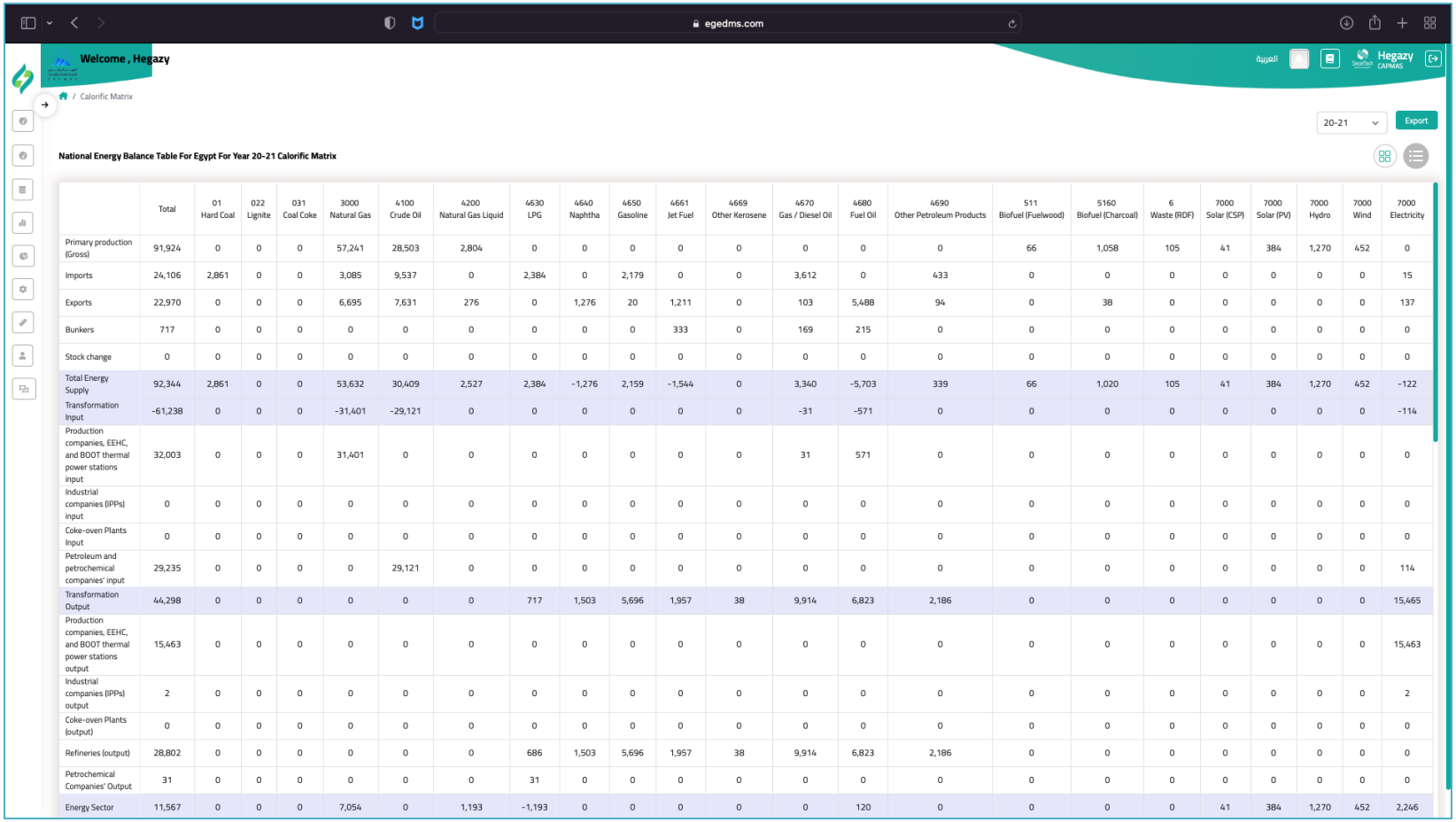
Activity 5.5 EDMS

❖ Login screen with logos



Activity 5.5 EDMS

❖ Full national energy balance table (calorific matrix)



egedms.com

Welcome , Hegazy

العربية Hegazy CAPMAS

/ Calorific Matrix

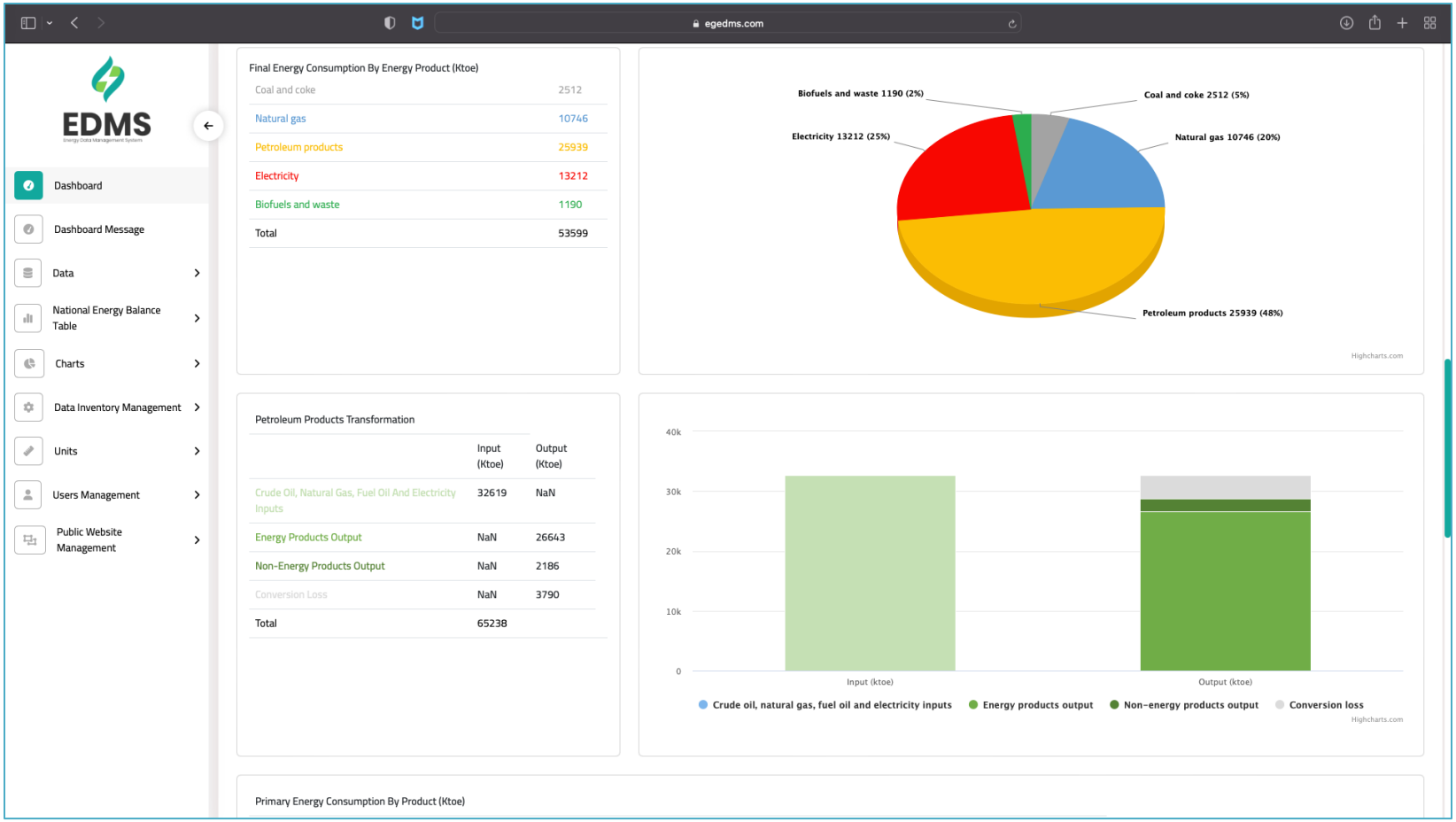
20-21 Export

National Energy Balance Table For Egypt For Year 20-21 Calorific Matrix

	Total	01 Hard Coal	022 Lignite	031 Coal Coke	3000 Natural Gas	4100 Crude Oil	4200 Natural Gas Liquid	4630 LPG	4640 Naphtha	4650 Gasoline	4661 Jet Fuel	4669 Other Kerosene	4670 Gas / Diesel Oil	4680 Fuel Oil	4690 Other Petroleum Products	511 Biofuel (Fuelwood)	5160 Biofuel (Charcoal)	6 Waste (RDF)	7000 Solar (CSP)	7000 Solar (PV)	7000 Hydro	7000 Wind	7000 Electricity
Primary production (Gross)	91,924	0	0	0	57,241	28,503	2,804	0	0	0	0	0	0	0	0	66	1,058	105	41	384	1,270	452	0
Imports	24,106	2,861	0	0	3,085	9,537	0	2,384	0	2,179	0	0	3,612	0	433	0	0	0	0	0	0	0	15
Exports	22,970	0	0	0	6,695	7,631	276	0	1,276	20	1,211	0	103	5,488	94	0	38	0	0	0	0	0	137
Bunkers	717	0	0	0	0	0	0	0	0	0	333	0	169	215	0	0	0	0	0	0	0	0	0
Stock change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Energy Supply	92,344	2,861	0	0	53,632	30,409	2,527	2,384	-1,276	2,159	-1,544	0	3,340	-5,703	339	66	1,020	105	41	384	1,270	452	-122
Transformation Input	-61,238	0	0	0	-31,401	-29,121	0	0	0	0	0	0	-31	-571	0	0	0	0	0	0	0	0	-114
Production companies, EEHC, and BOOT thermal power stations input	32,003	0	0	0	31,401	0	0	0	0	0	0	0	31	571	0	0	0	0	0	0	0	0	0
Industrial companies (IPPs) input	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coke-oven Plants Input	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum and petrochemical companies' input	29,235	0	0	0	0	29,121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114
Transformation Output	44,298	0	0	0	0	0	0	717	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	15,465
Production companies, EEHC, and BOOT thermal power stations output	15,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,463
Industrial companies (IPPs) output	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Coke-oven Plants (output)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refineries (output)	28,802	0	0	0	0	0	0	686	1,503	5,696	1,957	38	9,914	6,823	2,186	0	0	0	0	0	0	0	0
Petrochemical Companies' Output	31	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Sector	11,567	0	0	0	7,054	0	1,193	-1,193	0	0	0	0	0	120	0	0	0	0	41	384	1,270	452	2,246

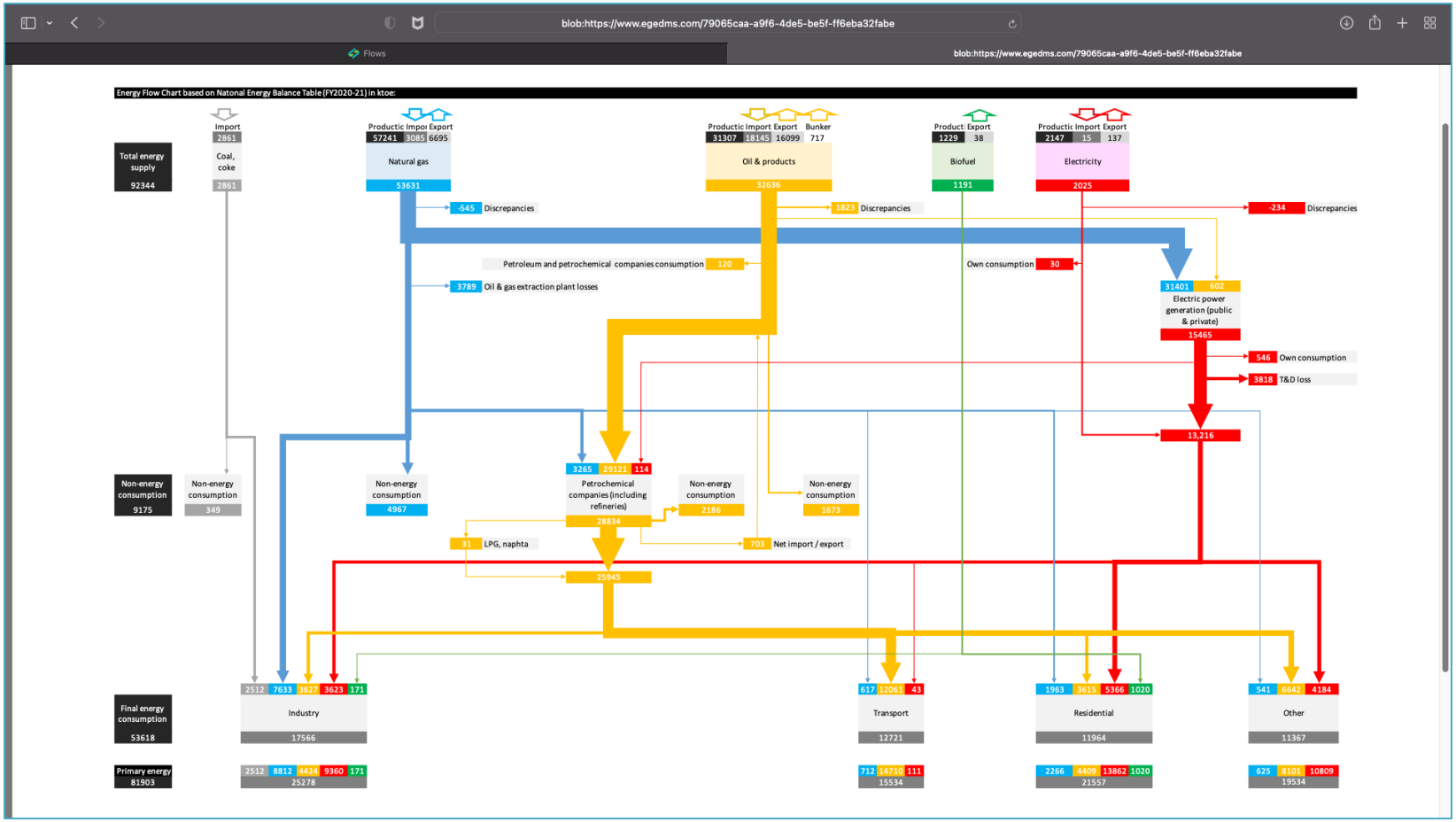
Activity 5.5 EDMS

❖ Visualisation - charts & tables



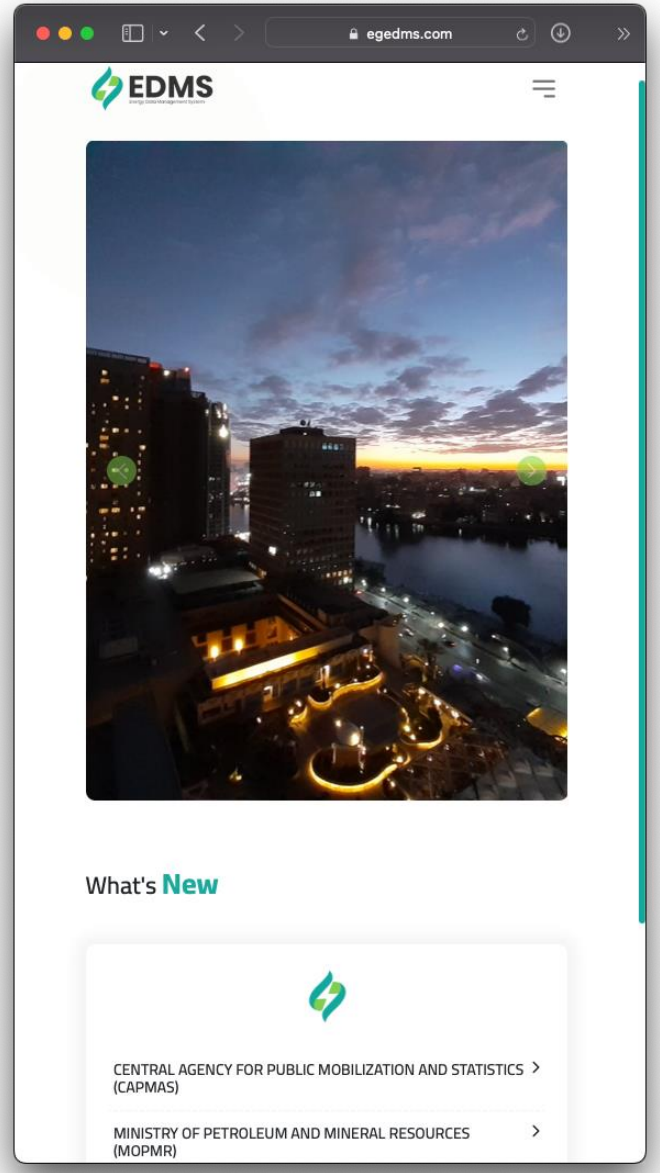
Activity 5.5 EDMS

❖ Visualisation - balance figure (energy flow)



Activity 5.5 EDMS

- **Publicity (optional) Info dissemination page (responsive screen design)**



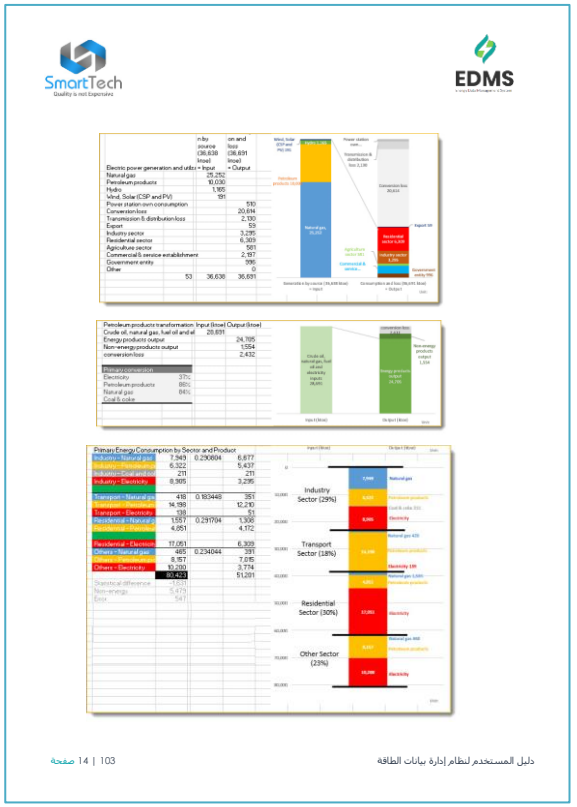
Activity 5.5 EDMS

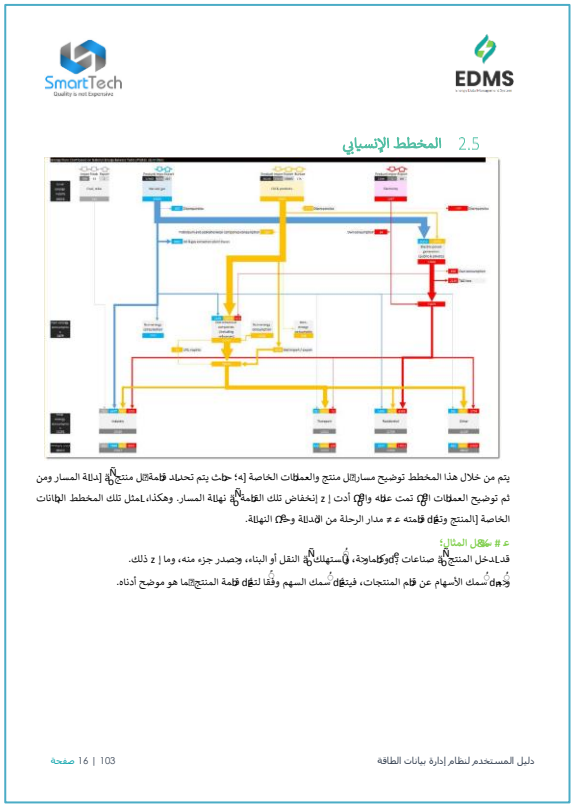
❖ User Manual and Tutorial Videos

نظام إدارة بيانات الطاقة من سمارت تك هو محطة واحدة لجميع الخدمات جمع البيانات الإحصائية الرسمية من جميع الجهات الحكومية المعنية بمختلف أنواع الطاقة.

تم الإعداد بواسطة

فريق سمارت تك
يناير 2023
www.smarttechsys.com





يتم من خلال هذا المخطط توضيح مسارات كل منتج والعمليات الخاصة به؛ حيث يتم تحديد قائمة كل منتج داخلة المسار ومن ثم توضيح العمليات التي تمت عليه والتي أدت إ z إنخفاض تلك القائمة نهائية المسار. وهكذا، يمثل تلك المخطط الطاقات الخاصة [المنتج وتكون قائمته ء ≠ مدار الرحلة من الداخلة وحتى النهائية.

ء # مثال المثال:

قد يدخل المنتج صناعات كوكلماجة، يُستهلك النقل أو البناء، ويصدر جزء منه، وما | z ذلك.

وجود سُمك الأسهم عن قيم المنتجات، فيتكون سُمك السهم وفقًا لتكون قيمة المنتج بما هو موضح أدناه.

6. Issues to be Followed Up

Issues to be Followed Up

- **EDMS is functional, ready for FY 2021-22 National Energy Balance Table preparation. CAPMAS is expected to communicate and collaborate with the other organisations for the completion of the table, then, onto publication.**
- **If unanticipated structural change in energy supply, transformation, consumption were to occur, the participating organisations are expected to support CAPMAS to incorporate the change into the national energy balance table.**

7. Evaluation

Evaluation

- **TT2 activities contributed to uniting the energy data owner organisations.**
- **With EDMS and the Business Process Manual, a collaborative and sustainable mechanism for National Energy Balance development is created.**
- **The government authorities for energy, environment, and industries are now making use of the National Energy Balance created with EDMS as a tool for their policy making.**

شكرا جزيلا

The Project for Capacity Development on Energy Efficiency and Conservation

Report on T/C Activities to Date: TT1/IDA part (prepared for 4th JCC)

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

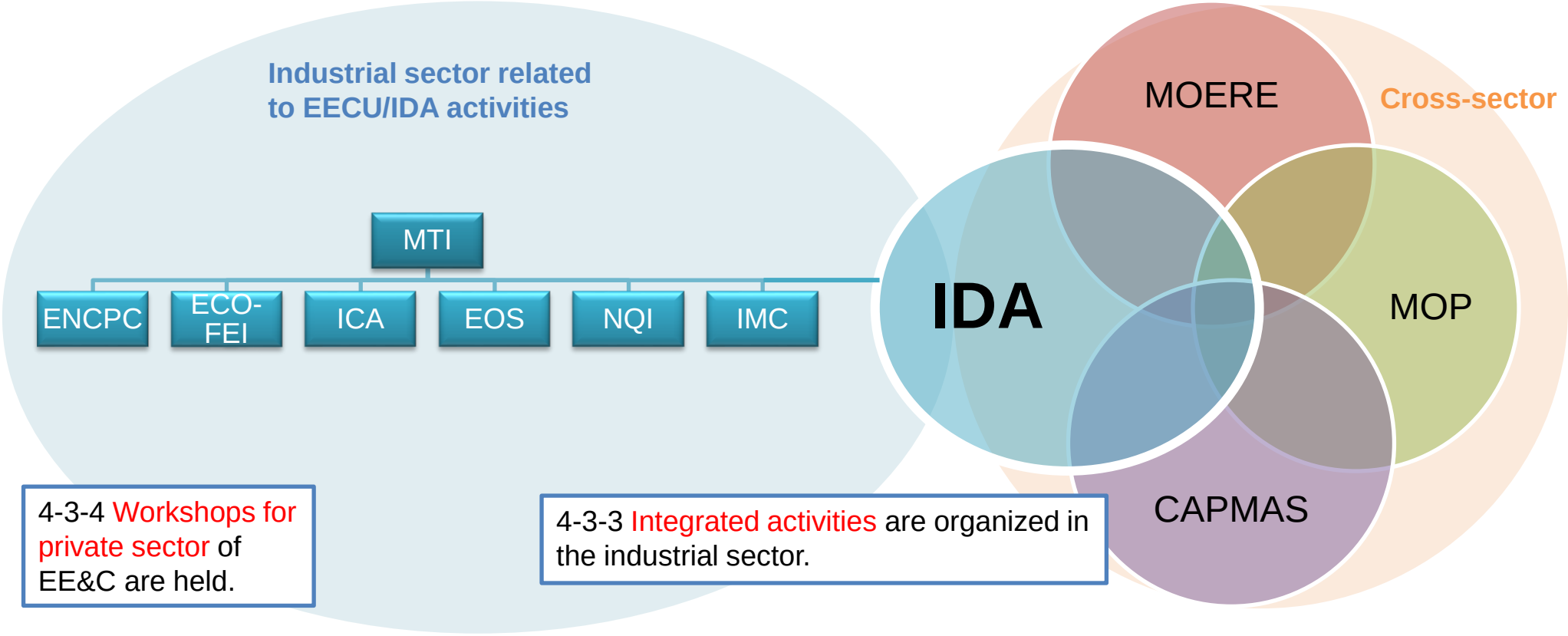
Contents

1. Overview of EECU/IDA activities
2. Activity 4.3.1 to Date
3. Activity 4.3.2 to Date
4. Activity 4.3.3 to Date
5. Activity 4.3.4 & 4.3.5 to Date
6. Evaluation

1. Overview of EECU/IDA activities

Overview of EECU/IDA Activities

4-3-1 Preparation for establishment of EECU of IDA to promote EE&C in the industrial sector (functions of the EECU) are studied and planed.
4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined.
4-3-5 Training are held for IDA personnel.



4-3-4 Workshops for private sector of EE&C are held.

4-3-3 Integrated activities are organized in the industrial sector.

2. Activity 4.3.1 to date

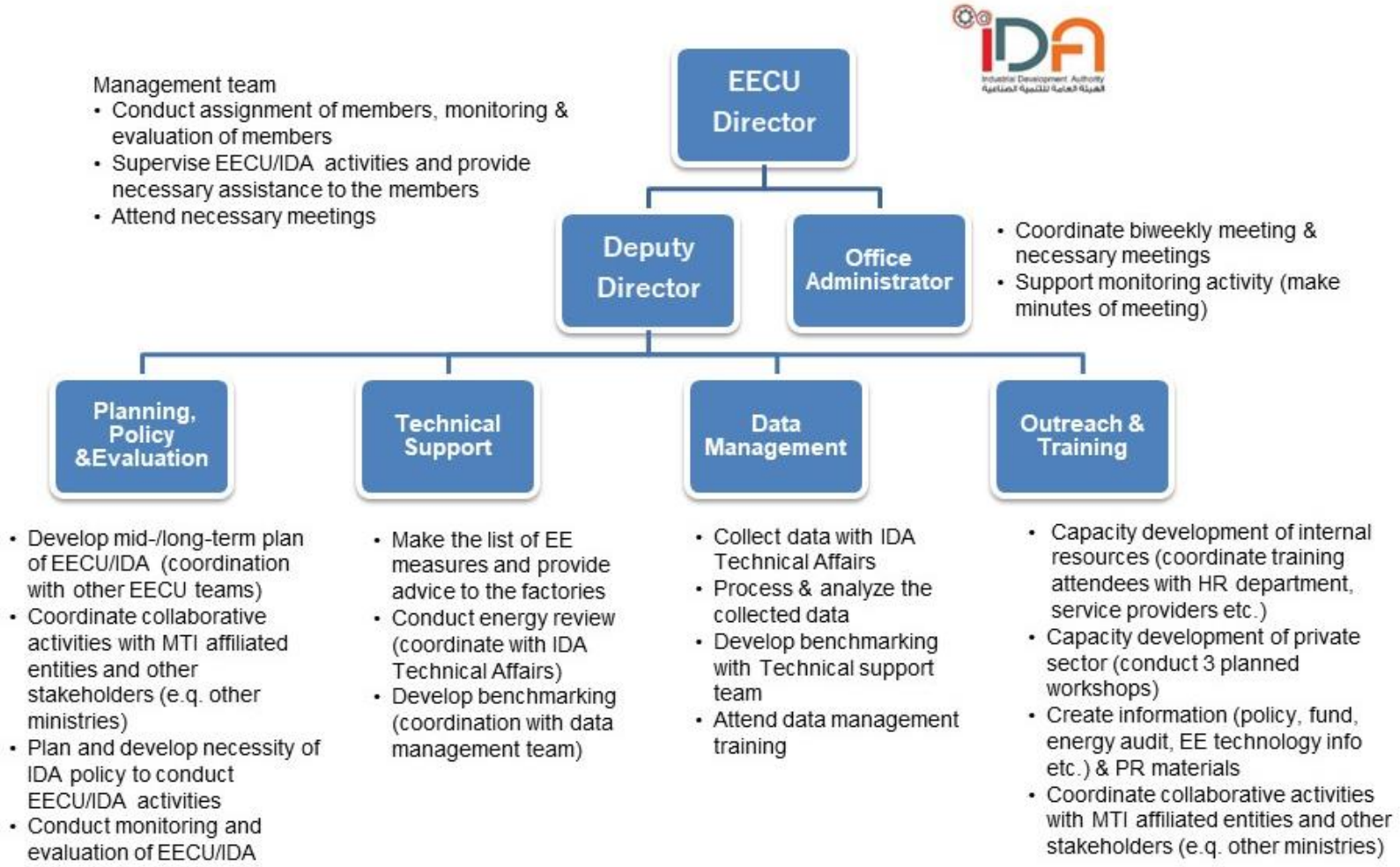
Activity 4.3.1 to date

4-3-1 Preparation for establishment of EECU of IDA to promote EE&C in the industrial sector (functions of the EECU) are studied and planed.

◆ *Activities*

- ✓ Organization structure and functions of EECU were finalized.
- ✓ Monitoring of EECU activities was conducted in Sep – Oct/2022.
- ✓ Regular meetings of EECU were conducted 9 times in total and shared progress of each team activities.
- ✓ Organizational reform is under consideration (new chairman, IDA was assigned in Sep/2022).

Organization Structure of EECU/IDA



3. Activity 4.3.2 to date

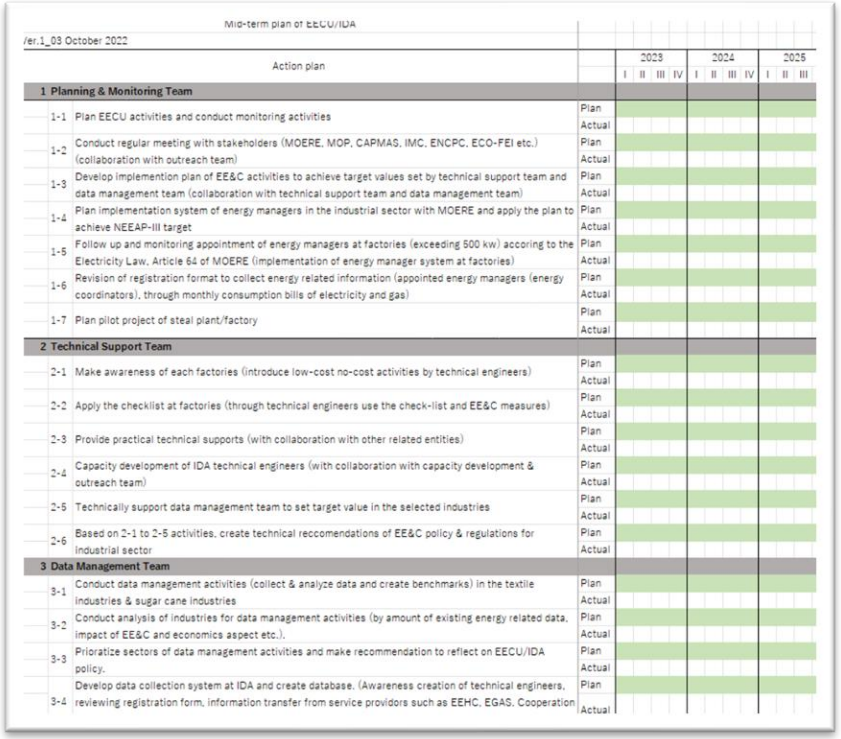
Activity 4.3.2 to date

4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined.

◆ *Activities*

<Planning & Monitoring Team>

- ✓ Mid-term plan of EECU (action plan by Dec/2025) was developed.
- ✓ Internal note was issued to collect energy related data at factories the IDA technical department conduct site visits.
- ✓ Application form of industrial registration was updated to be used by investors.



Mid-term plan of EECU/IDA

/er.1_03 October 2022

Action plan			2023				2024				2025		
			I	II	III	IV	I	II	III	IV	I	II	III
1 Planning & Monitoring Team													
1-1	Plan EECU activities and conduct monitoring activities	Plan											
		Actual											
1-2	Conduct regular meeting with stakeholders (MOERE, MOP, CAPMAS, IMC, ENCPC, ECO-FEI etc.) (collaboration with outreach team)	Plan											
		Actual											
1-3	Develop implemention plan of EE&C activities to achieve target values set by technical support team and data management team (collaboration with technical support team and data management team)	Plan											
		Actual											
1-4	Plan implementation system of energy managers in the industrial sector with MOERE and apply the plan to achieve NEEAP-III target	Plan											
		Actual											
1-5	Follow up and monitoring appointment of energy managers at factories (exceeding 500 kw) accoring to the Electricity Law, Article 64 of MOERE (implementation of energy manager system at factories)	Plan											
		Actual											
1-6	Revision of registration format to collect energy related information (appointed energy managers (energy coordinators), through monthly consumption bills of electricity and gas)	Plan											
		Actual											
1-7	Plan pilot project of steal plant/factory	Plan											
		Actual											
2 Technical Support Team													
2-1	Make awareness of each factories (introduce low-cost no-cost activities by technical engineers)	Plan											
		Actual											
2-2	Apply the checklist at factories (through technical engineers use the check-list and EE&C measures)	Plan											
		Actual											
2-3	Provide practical technical supports (with collaboration with other related entities)	Plan											
		Actual											
2-4	Capacity development of IDA technical engineers (with collaboration with capacity development & outreach team)	Plan											
		Actual											
2-5	Technically support data management team to set target value in the selected industries	Plan											
		Actual											
2-6	Based on 2-1 to 2-5 activities, create technical reccomendations of EE&C policy & regulations for industrial sector	Plan											
		Actual											
3 Data Management Team													
3-1	Conduct data management activities (collect & analyze data and create benchmarks) in the textile industries & sugar cane industries	Plan											
		Actual											
3-2	Conduct analysis of industries for data management activities (by amount of existing energy related data, impact of EE&C and economics aspect etc.).	Plan											
		Actual											
3-3	Prioratize sectors of data management activities and make recommendation to reflect on EECU/IDA policy.	Plan											
		Actual											
3-4	Develop data collection system at IDA and create database. (Awareness creation of technical engineers, reviewing registration form, information transfer from service providors such as EEHC, EGAS, Cooperation	Plan											
		Actual											

Activity 4.3.2 to date (cont.)

<Technical Support Team>

- ✓ EE checklist was developed to promote EE activities at factories & use by the IDA technical department during their sites visits.
- ✓ List of EE (No/ Low-Cost) measures was developed to facilitate the implementation of EE activities at factories.

	Furnaces and combustion equipment	○		Is the air ratio appropriate (e.g., 1.3), and is the exhaust gas temperature checked regularly?
			○	If the load capacity is changing, is the capacity of the burner appropriate?
			○	Is the thermal capacity of the furnace body and the furnace carrier reduced?
			○	Are the burners maintained and inspected (cleaned, replaced when worn)?
			○	Is the operation of the combustion control system stable?
			○	Ventilation system: Is the ventilation capacity sufficient?
			○	At the time of renewal: Consider updating the boiler, etc. (to higher efficiency).
	Pumps and fans	○		Do you check the opening and closing status of valves on a daily basis (to prevent forgetting to close them)?
		○		Is the flow rate (air volume - water volume) - pressure appropriate?
		○	○	Are the routes and sizes of pipes and ducts appropriate?
			○	Is the speed of flow adjustment controlled (by inverter)?
			○	Is the number of units controlled according to the load capacity?
	Compressor management	○		Is the filter at the air supply port cleaned?

Tips for Energy Conservation for Industries

THERMAL UTILITIES

Boilers

- Preheat combustion air with waste heat *(22 ^{0}C reduction in flue gas temperature increases boiler efficiency by 1%).*
- Use variable speed drives on large boiler combustion air fans with variable flows.
- Burn wastes if permitted.
- Insulate exposed heated oil tanks.
- Clean burners, nozzles, strainers, etc.
- Inspect oil heaters for proper oil temperature.
- Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.
- Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels). *(5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)*
- Automate/optimize boiler blowdown. Recover boiler blowdown heat.

Activity 4.3.2 to date (cont.)

<Data Management Team> (in cooperation with TT-2)

- ✓ Developed the energy and production data collection forms.
- ✓ Started data processing of the textile industry as well as food processing industry. Data of 80/200 factories in dying sector and 18 factories of the sugar industry was processed & analyzed.

Activity 4.3.2 to date (cont.)

<Capacity Development and Outreach Team>

- ✓ Activities linked to 4.3.3 - 4.3.5

4. Activity 4.3.3 to Date

Activity 4.3.3 to date

4-3-3 Integrated activities are organized in the industrial sector.

◆ *Activities*

- ✓ 2nd and 3rd RECP trainings were prepared by the Capacity Development and Outreach Team & conducted in Aug and Sep/2022 in cooperation with ENCPC.
- ✓ Preliminary discussion with MOERE was conducted in Oct/2022 to discuss the implementation procedures of Energy Register and

5. Activity 4.3.4 & 4.3.5 to Date

Activity 4.3.4 & 4.3.5 to date

4-3-4 Workshops for private sector of EE&C are held.

4-3-5 Trainings are held for IDA personnel.

◆ ***Activities***

<Capacity Development and Outreach Team>

- ✓ 1st IDA workshop targeted industrial zone managers was prepared & conducted in Oct/2022 via online.
- ✓ 2nd IDA workshop was prepared & conducted at IDA in Feb/2023.
- ✓ 120 IDA engineers were trained through 3 RECP workshops.

6. Evaluation

Evaluation

- ✓ IDA has newly established EECU/IDA to promote EE&C activities in the industrial sector.
- ✓ Awareness creation was successfully made through various trainings targeted IDA personnel by the JICA project.
- ✓ Basic policies & tools to promote EE&C activities in the industrial sector were prepared through JICA project activities.
- ✓ EECU/IDA has organized meetings and workshops in the industrial sector in cooperation with other related entities.
- ✓ Continues efforts is expected to be made by EECU/IDA to promote further EE&C activities in the industrial sector.

شكرا جزيلا

ANNEX-8

The Project for Capacity Development on Energy Efficiency and Conservation

Report on T/C Activities TT1 (all C/Ps) (prepared for final JCC)

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

Contents

1. Basic Principle and Consensus for White Paper (WP) Preparation
2. MOERE
3. MoPMR
4. IDA
5. CAPMAS

1. Basic Principle and Consensus toward Preparation of White Paper (WP)

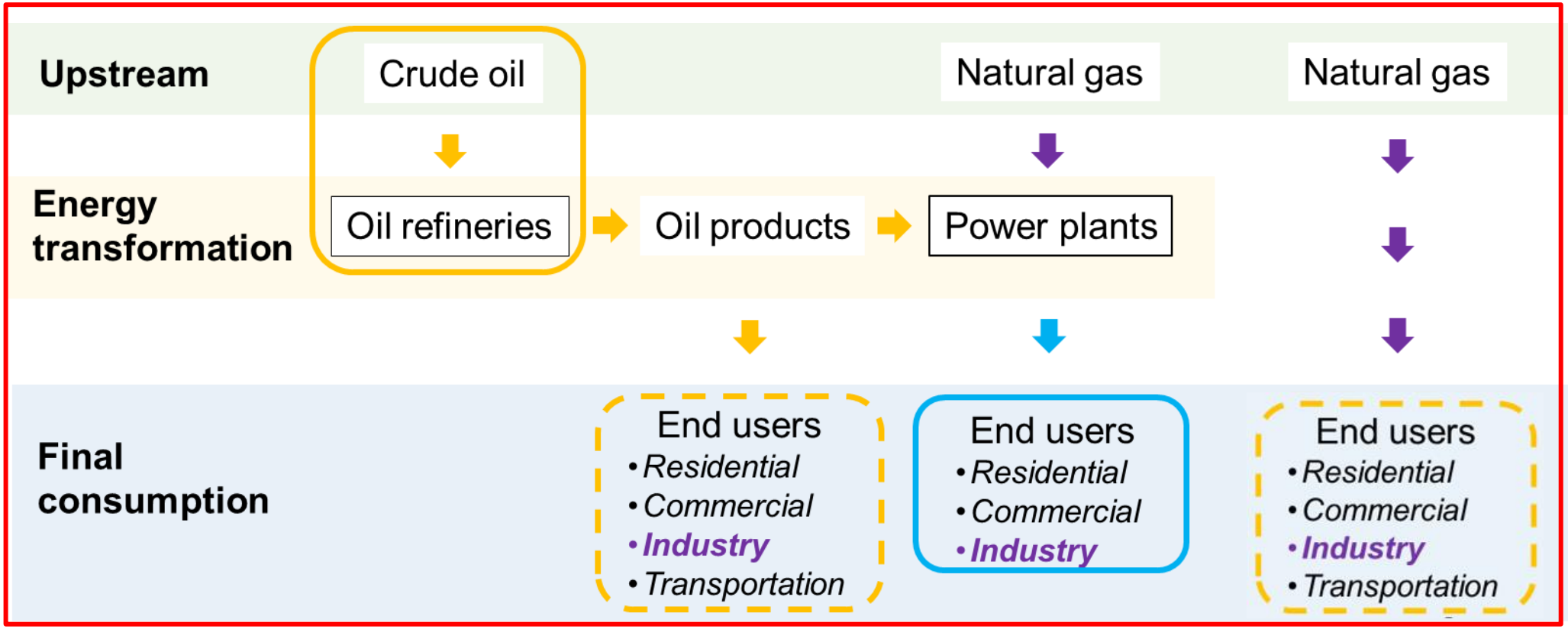
Basic Principle and Consensus for WP Preparation

Key Consensus through previous discussions

- ✓ Summarization of ***essence and key points*** of **necessary next steps / action plan** confirmed through this JICA's Technical Cooperation activities.
- ✓ Consideration of energy saving targets + other setting. (e.g. Energy savings, energy intensity, CO2 reductions?)
- ✓ Volume of WP:
  - ➢ ***10 pages for each entity at maximum.***

Basic Principle and Consensus for WP Preparation

Frame of WP



Electricity sector to be considered in WP

Petroleum sector to be considered in WP

Based on energy balance data

Basic Principle and Consensus for WP Preparation

Schedule of TT1 (4 CPs) up to date

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Meeting/WS		#2			#3			#4			#5		
JCC	#2					#3							Final
WP formulation								▲ 1st draft of WP					▲ Release of WP

3rd discussion meeting with 4 CPs

1st version drafted in the end of Sep.2022

Interim reporting to 3rd JCC (discussion among with 4 CPs)

2. MOERE

MOERE

- **Projects which MOERE-EECCPD will be mainly responsible for, and cooperation with JICA is expected in particular.**
- **Collaboration between 4 counterpart organizations (MOERE/MoPMR/IDA/CAPMAS) will be sought for the proposed projects.**

Future Goals & Action Plans

Development of the framework for the NEEAP-III
NEEAP-III preparation based on national energy balance and energy efficiency KPIs.
Sectoral units
As 4 units are in the process of establishment, MOERE will further support establishment and activation of 4 units.
Standard and labelling system
Continued and institutionalized cooperation among stakeholders to enhance the Standard and Labelling program under EESLC.

MOERE

Energy Manager and Energy Register

Development of accreditation mechanism for certified energy manager and facilitation of energy manager and energy register.

Training and Capacity Building

Cooperation can be developed with MoPMR /COE, especially in efforts to develop ESCOs, Super ESCOs, and Energy Managers.

EE Projects with High Energy-Saving Potential

4 EE Projects have been identified.

New “Quick Win” Projects

Some new project (“quick win” programs) can be identified and added to NEEAP-III

EE Projects in Cooperation with Other Ministries

Ministry of Tourism and IDA in solar water heater promotion.

MOERE

New Technologies

MOERE will focus on 1) Hydrogen, 2) E-mobility, 3) Waste to energy, and 4) Water desalination

Development of Energy Efficiency KPIs and Benchmarks

- Energy efficiency KPIs can be further developed and linked to energy balance.
- Development of an action manual for EE indicators, which can be used as a handbook. (e.g. with EEHC, CAPMAS)
  - Benchmark development in industrial sector (e.g. with IDA. E-JUST)
  - Benchmark development in building sector (e.g. with EEHC, EDCs)

3. MoPMR

MoPMR

- **The output measures of "The Strategic Vision of the EE Strategy 2022-2035 (Nov.2022)" master plan have been reflected in the White paper.**
- **MOPMR has been actively working to reinforce the EE Strategy as well as the Energy Management System Framework Roadmap (EMSF) across the whole sector.**

Future Goals & Action Plans

Development of sustainable financial mechanism for EE Projects

- Developing a harmonized methodology for economic and financial evaluation of EE investments.
- Feasibility assessment of:
  - establishing Sector's EE revolving fund and potential sources of financing;
  - creating super ESCO and ESCO model to help implement identified opportunities; and
  - designing and deploying a carbon credit for the EE and RE projects.
- Developing a harmonized Performance Contracting Scheme.
- Implementing a pilot project to validate the ESCO business model under local circumstances.

MoPMR

Digital energy management system

Digital Transformation (data digitalization) and implementation of energy management programs for the heavy consumers.

Monitoring and improving the energy performance

- EE Indicators set up (e.g. Energy Intensity) and this KPI should cover all levels starting from equipment, units to the companies and sub sector activities and finally the overall sector performance.
- Benchmark major energy consumers against Industry Standards to be capable of comparing the performance of the entities against the best industry practices and peers.
- Set Minimum Energy Performance Standards (MEPS) for major equipment widely used in the petroleum sector including gas & steam turbines, motors, pumps, compressors, boilers, chillers, heaters, coolers, etc.

Improve Awareness and Knowledge Sharing

Developing an EE knowledge management system which will serve as a one-stop shop for knowledge dissemination including success stories, case studies, BAT, EE market data, EE service providers, etc. This system will be accessible to all stakeholders.

MoPMR

Energy System Optimization and Integration

- Energy Systems Integration which integrates the energy systems of adjacent companies in specific region/ area to share power/utilities.
- Utilization of excess hydrogen from petrochemical/refining plants as well as minimizing wastes from the plants.
- Expanding the implementation of Co-generation.

Renewable Energy, Hydrogen and Decarbonization Technologies

- Introducing Renewables Energy (RE) across the Sector Value Chain.
- Promoting the Low Carbon Hydrogen Production (Green, Blue, Gray).
- Introducing CCUS/CCS Technologies.
- Introducing biofuels and Green Petrochemicals.

Improving the Energy Efficiency in the End Users

Introduction of EE Labels / Fuel Economy Standards for Passengers' Cars.

4. IDA

IDA

- **EECU/IDA identified awareness creation & outreach as the key priority to realize benefits to introduce EE&C activities on manufacturers' business operations.**

Action Plan

Data Management Field

- Process existing data of selected sub-sectors (textile industry, 200 companies in the dyeing industry) and data digitalization
- Data analysis (textile industry)
  - Data classification, Energy intensity calculation, Benchmark development
- Development of new automated industrial energy data management system for data collection and analysis in IDA.
- Data integration in updating the National Energy Balance in collaboration with CAPMAS and other stakeholders.
- Extension of the data management activities to other sub-sectors within the textile sector (e.g. dyeing, spinning fields)

IDA

Energy Manager and Registration (Collaboration with MOERE)

- Creation of an EECU/IDA action plan for the application of the energy manager system at factories.
- Awareness raising for the potential factories:
  - Holding workshops for the private sector.
  - Introducing various efficient technologies.
- Preparation of EE technical lists / check lists for EE solutions at factories.
  - Collection and study of existing information on domestic and international materials.
  - Develop lists of EE solutions and EE technologies.
  - Activities for energy intensive factories.

Integrated Activities

- Participation / organizing EE related conferences with other entities (cross sector).
- Organizing integrated meetings in industrial sector.
  - Organizing meetings with each MTI affiliated entity about integrated activities.
  - Holding workshops to the private sector & the public institutions.

IDA

Capacity Development & Outreach Field

- Holding awareness raising EE&C workshops for the private sector and for public sector.
  - Contents of workshop
    - Effectiveness of EE activities proved in E-JUST pilot project in AC field and knowledge and experiences of ENCPC & ECO-FEI.
    - Introduction of governmental service from MTI related entities.
    - Case study on introducing commonly adoptable EE technologies
    - Study / creation of EE roadmaps of model factories
    - EE funds examination
- Materials preparation for workshops
  - EECU activities' introduction including achievements and future steps.
  - Effectiveness of EE activities
  - Lists of governmental service to be provided
  - List of promising EE technologies and equipment adoptable in industrial sector
  - EE funds availability
  - EE roadmaps at model factories

5. CAPMAS

- **The national energy balance table is considered a mirror which reflects the energy situation in Egypt, which shows that status of supply and consumption, also with considerations on foreign trade of all kinds of energy.**
- **The fiscal year 2020/21 national energy balance table was prepared and analysed using the Energy Data Management System (EDMS), which is an information system newly introduced under the technical cooperation from JICA.**

Action Plan

Further Improvements / Developments in Energy Statistics

- Each ministry / agency / will enter the data that pertains to it according to specific timelines (which will be determined by agreement among parties concerned)
- After the data entry stage, CAPMAS will review the data and its quality and logicality by comparing it with a long-term time series and after reviewing and checking the data, then it will be presented for ratification by the head of the sector and the head of CAPMAS on the outputs of the energy balance.
- Publishing the data on CAPMAS's website.

Reinforcing the National Energy Balance Table

- Sub-sector wise electricity and natural gas sales data have been identified and obtained from MOERE and MOP respectively.
- Further collection of sub-sector wise petroleum products sales data as well as identification of the actual consumption data with IDA will have to be pursued.

Sub-sector	Natural gas sales (m3 million)	Electricity sales (GWh)	Total energy consumption (ktoe)
Iron and steel	1,880	8,452	**2,289**
Chemical and petrochemical	1,312	4,363	**1,465**
Non-ferrous metals	56	65	**52**
Non-metallic minerals	1,738	7,956	**4,812**
Transport equipment	0	181	**16**
Machinery	1,074	6,228	**1,429**
Mining and quarrying	0	53	**5**
Food and tobacco	1,217	5,179	**1,456**
Paper, pulp and printing	313	1,531	**393**
Wood and wood products	0	162	**14**
Textile and leather	447	3,096	**637**
Construction	0	0	**0**
Industry not elsewhere specified	1,148	3,419	**1,248**
Total	**9,185**	**42,123**	**17,566**

Further Improvements in the National Energy Balance Table

- Adding more comprehensive renewable energy (with focus on biofuels and waste) supply data in response to the expectations for low emissions society. This step is currently being carried out in coordination with the Ministry of Environment which has cooperated with the project.
- In the event that Egypt will enters the era of using innovative energy such as hydrogen, the data relating to hydrogen utilization needs to be reflected / included in national energy statistics / balance.

شكرا جزيلا

The Project for Capacity Development on Energy Efficiency and Conservation

ANNEX-9

Announcement

February 2023

PADECO Co., Ltd.
Mitsubishi Research Institute, Inc.
KBC Process Technology Ltd.

Hand over of the equipment and closing of the project office

The Project Team will hand over equipment purchased for the project activities to each counterpart.

1. **Early March:**
The Project Team will inform each counterpart of the tentative **equipment list** and future steps.

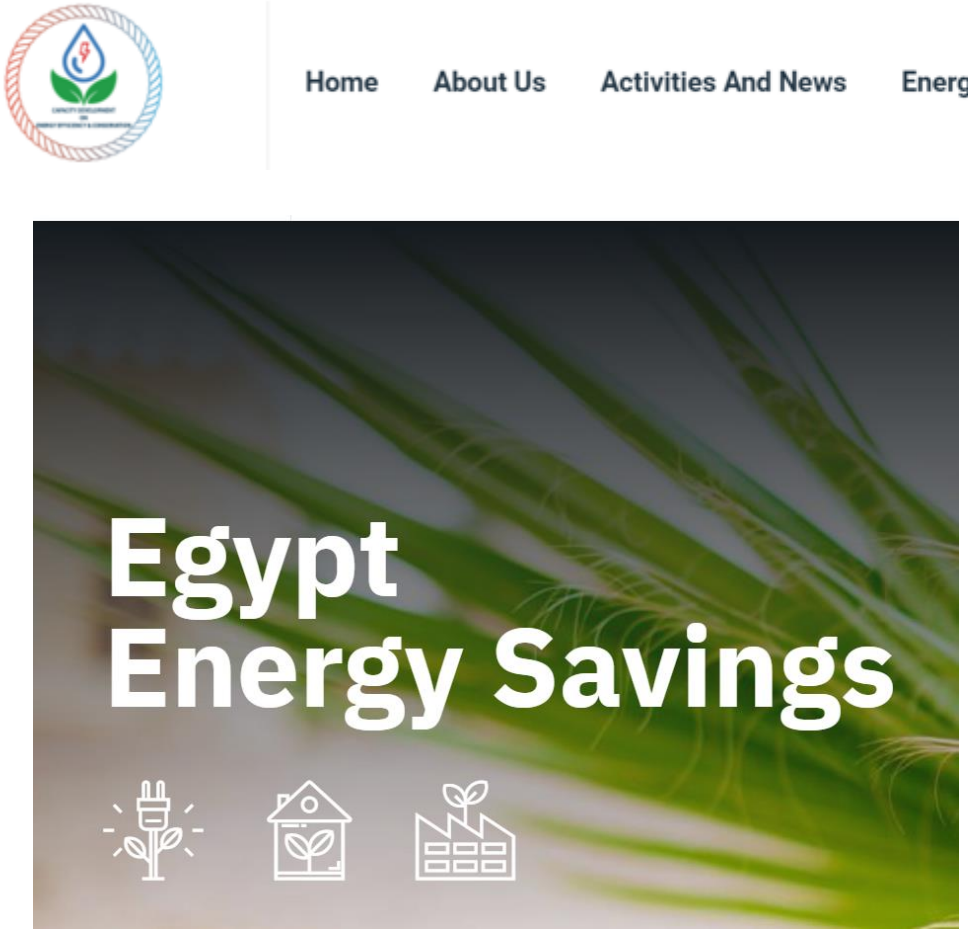
2. **Monday, 27 March 27, 10:00 a.m.**
One or two staff members from each counterpart will gather at the project office at the GrEEK Campus to decide on the equipment to receive. (Some coordination may be made among the counterparts)

3. **By mid-June:**
Each counterpart will come to the project office to transport the equipment. (Some equipment cannot be handed over until mid-June or late June.)

4. **Mid June:**
The project office at the GrEEK Campus will be closed.

The Project Website

The Project website has been released and it is updated continuously.
http://egypt-energysaving.com/



شكرا جزيلا

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development on Energy Efficiency and Conservation

Version 6

Implementing Agency: Ministry of Electricity and Renewable Energy (MOERE), Ministry of Petroleum and Mineral Resources (MOP), Industrial Development Authority (IDA), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS)

Dated 9 May 2023

Target Group: Relevant institutions of above agencies

Period of Project: January 2020 - June 2023

Project Site: Cairo

				May 2023 (Monitoring period: Aug 2022-May 2023)	
Narrative Summary	**Objectively Verifiable Indicators**	**Means of Verification**	**Important Assumption**	**Achievement**	**Remarks**
Overall Goal					
EE&C promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.	To reduce energy by 18% compared to 2010 by 2035 (target set by Integrated Sustainable Energy Strategy to 2035)	Energy Efficiency Annual Report		MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs. The National Energy Balance (EB) was developed with 4 C/P and other relevant cooperation.	
Project Purpose					
In order to promote EE&C policies at the national level, such as NEEAP-II and the Egypt Oil and Gas Sector Modernization Program (OGMP), JICA T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EE&C promotion strategies and plans, data management, and expansion of the introduction of high-efficiency equipment.	1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management system is established. 3. Roadmap for EMSF (Energy Management System Framework) in petroleum sector is formulated.	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Government policy for energy efficiency and energy subsidies is maintained *Note: electricity subsidies are to be completed in 2024/25*	1. Review of implemented projects in NEEAP-II was completed and reported in the First Energy Efficiency Report. 2. Development of EDMS (Energy Data Management System) was completed. 3. Development of EMSF roadmap was completed.	
Outputs					
TT3 (MOERE) 1. Organizational and personal capacity for EE&C promotion of EECCD in MOERE is strengthened.	(MOERE) 1-1 Standard method for collecting and analysing macro and micro data is introduced and data base is developed (linking to TT2) 1-2 Energy efficiency promotion roadmap including awareness raising is developed 1-3 Annual report template is introduced 1-4 MOERE officers are certified against EE&C related programs	- Energy Efficiency Annual Report - JICA Project Monitoring Sheet	Officers in charge of activities concerning energy efficiency are appointed in the concerned directorates and allocated as project working group	1-1 MOERE officials participated in energy data management training (TT2). MOERE published the First Energy Efficiency Report which is based on data and includes energy saving evaluation from supply/demand sides, key KPIs and energy balance. 1-2 - Future plan is developed as a part of the white paper (TT1). - Energy saving potential roadmap (up to 2036) was prepared/shared in TT1 workshop. - Awareness raising activities were conducted through COP27 (seminars and booth), project website, and through E-JUST (on AC and smart home demonstration). 1-3 The first annual report was developed and published in Nov/2022 at COP27. 1-4 2 participants obtained LEED Green Associate certification. Follow up training was conducted in Dec/2022.	
TT3 (MOERE) 2. Potential technology for energy efficiency is examined and promotion policy is proposed.	2-1 Effectiveness of air-conditioner in building is verified including economic efficiency, environmental standard 2-2 Effectiveness of home appliances including energy efficiency standards and labelling program such as fridge, AC and lighting is verified			2-1 (AC demonstration) Data collection was conducted from Jun/2021 to Aug/2022. Both cooling and heating result has been analyzed. 2-2 (Smart home test) Data collection was conducted from Feb/2022 to Jan/2023. Data analysis of power consumption in 5 households was conducted. (S&L system) 3 Workshops were held to improve Standards and Labeling system participated by MOERE, EOS, NREA, GOIEC ICA, and CPA. List of laboratories was developed. Key issues were identified, and next actions were summarized.	

TT4 (MOP) 3. The administrative capacity of MOP/EECD for EE&C promotion is strengthened, and EE&C promotion strategy roadmap is created. 3-1 Review of EE&C Framework Related to MOP and Organizing its issues 3-2 Study of Energy Audits, Improvement Policies, Technologies, Methodologies and Framework (pilot for a refinery) 3-3 Support for Development of EE&C Strategy and Roadmap (including CoE establishment preparation) 3-4 Development of Manuals and SOPs to strengthen EE&C Activities	(MOP) 3-1-1 Energy efficiency framework "Benchmarking/As is/ Gap Analysis" report 3-2-1 Issuance of pilot plant audit report comprising: (plant benchmark - gap analysis - list of gap closure opportunities - roadmap to close energy gaps - sitewide utility model) 3-2-2 On job and class room training of 15 MOP personnel (5 trainings) 3-3-1 Energy efficiency framework "To be" report summarizing roadmap to close EE framework 3-3-2 Standardised format and media for data collection is introduced (linking to TT2) 3-3-3 Issuance COE Mission, activities and Objectives 3-3-4 Issuance of CoE high level organization document 3-3-5 Issuance of CoE Training Management Guide document 3-3-6 Issuance of COE organization building support document 3-3-7 Conducting several days (on-site) training for COE staffs 3-4-1 Issuance of SOP	- Petroleum sector "Benchmarking/As is/ Gap Analysis" Report (EE&C Strategic (EMSF) Roadmap) - Pilot plant audit report (Benchmarking/gap analysis/project package/EE roadmap) - Training lists - JICA Project Monitoring Sheet - Petroleum sector "To be" Report (EE&C Strategic (EMSF) Roadmap) - Petroleum sector SOPs - CoE Mission, activities and objectives report - CoE Organization document - CoE Training management guide document - Attached Matrix about COE Support List. - COE Training records	3-1-1 Report issued as part of revised CA report. 3-2-1 Final report issued. 3-2-2 Total of 7 trainings and 2 additional workshops held onsite. 3-3-1 Issued roadmap and validated with main stakeholders. 3-3-2 Worked with MOP and CAPMAS under TT2 to revise energy balance data collection process and report. 3-3-3 Workshop successfully conducted and its report was issued and accepted. Preliminary list of models for the simulation software and the virtual reality (VR) was prepared to MOP. 3-3-4 CoE Organizational Concept and Design Document Issued. 3-3-5 CoE Competency Development and Training Management Guide Document Issued. 3-3-6 CoE Organizational Concept and Design Document Issued. 3-3-7 3 training sessions conducted onsite. **3-4-1 SOP FINAL was issued/accepted on May.8.**	
TT1 (MOERE, MOP, IDA, CAPMAS) 4. Recommendations are made for the formulation of integrated EE&C policies at the national level, and its white paper is formulated. 4-1 Summarization of a future national integrated EE&C policy and its action plan as a white paper, etc. is developed and it will be released in the final JCC. 4-2 Abovementioned EE&C policy and its action plan includes key factors toward its actual implementation (e.g. when, who, what, how). (IDA) 4-3 EE&C activities in the industrial sector is strengthened for EE&C socio economic development.	(MOERE,MOP,IDA,CAPMAS) 4-1 Holding periodical meetings and discuss among 4 C/Ps (7 times) including JCCs and draft white paper of future policy and action plan with introduction of standardised format and media for energy related data collection. It is prepared with consideration of the national CO2 reductions target as well. 4-2 Key factors necessary to realize future policy & action plan are clarified and included in the white paper, etc. (IDA) 4-3-1 Draft of EECU functions at IDA is formulated. 4-3-2 Draft of EE&C policies/regulations to be introduced in the industrial sector is formulated in IDA. 4-3-3 IDA organizes meetings with IDA related entities and integrated EEC activities in the industrial sector is formulated. 4-3-4 1) IDA holds EE&C workshops 3 times. 4-3-4 2) Targeted companies prepare its EEC roadmap. 4-3-5 IDA personnel participate in trainings in Egypt.	(MOERE, MOP, IDA, CAPMAS) - Energy Efficiency Annual Report - JICA Project monitoring report - Minutes of Meetings - Draft of MOP EE&C policies issued - Key points of future EE&C action plan are discussed and summarized (IDA) - EECU functions and policy paper - JICA Project Monitoring Sheet - Minutes of Meetings	4-1 Knowledge sharing event was held at #2 JCC relating to NEEAP-II. 7 times discussion including JCC among all C/Ps have been conducted. 4-2 White Paper has been prepared by all counterparts. 4-3-1 Implementation structure and functions of EECU were finalized. Monitoring system of EECU was conducted in Sep-Oct/2022. Regular meetings were conducted 9 times in total (Apr/2022-Jan/2023). 4-3-2 Activities of each team of EECU/IDA were conducted - Mid-term plan of EECU was developed, internal note was issued , application form of industrial registration was updated and data collection form was developed to collect energy related data, EE checklist and list of EE measures were developed, 4-3-3 2 RECP trainings were conducted in Aug and Sep/2022 by ENCPC. Preliminary discussion with MOERE was conducted in Oct/2022 to discuss the implementation procedures of Energy Register and Energy Manager in the industrial sector. 4-3-4 1) 1st IDA workshop targeted industrial zone managers was prepared & conducted in Oct/2022 via online. 2nd IDA workshop was prepared & conducted at IDA in Feb/2023. 4-3-4 2) Discussions were made for selection of potential companies. Necessary tools (EE checklist / list of EE measures) and IDA engineers was trained to support roadmap development of targeted companies. 4-3-5 120 IDA engineers were trained at 3 RECP workshops (Jul-Sep/2022).	

TT2 (MOERE, MOP, IDA, CAPMAS) 5. CAPMAS publishes national energy statistics, which are referred to by MOERE, MOP and IDA for making and monitoring EE&C promotion policies.	(MOERE, MOP, IDA,CAPMAS) 5-1 In-house training for 4 C/Ps in Egypt (16 times in total) and overseas training in Japan 5-2 Data submission from MOERE, MOP and IDA to CAPMAS on a standardised format and media. (e.g. Annual provision of energy parameters/ KPIs from MOP to CAPMAS) 5-3 Publication of CAPMAS's energy statistics based on standardised format data obtained from MOERE, MOP and IDA. 5-4 Convening of a feedback / follow-up discussion meeting by CAPMAS on energy statistics publication with MOERE, MOP and IDA (4 times).	(CAPMAS) - JICA Project Monitoring Sheet - Meeting minutes of feedback / follow-up meetings among the four executing agencies.		5-1 Nine remote collaborative meetings were conducted with CAPMAS on data collection practices (Jan – Dec 2022). A workshop (presentation meeting) on National EB Table was held (Mar/2022). One day training (two sessions) for CAPMAS on the best practices of energy data management conducted (Jul/2022). Two EDMS demonstration trainings (Sep, Nov 2022), and two EDMS UAT & trainings (Dec 2022, Jan 2023) conducted. 5-2 EDMS with input format, data processing, and presentation output generation functions developed and delivered. The user manuals are shared with the participation of 4 C/Ps and MOE . Complete national EB data on data inventory for FY 2015/16 - FY 2020/21) collected and recorded on EDMS, ready for publication purpose. 5-3 National EB Table FY 2020-21 publication drafted based on EDMS output. 5-4 CAPMAS's National EB Table publication FY2020-21 reviewing meetings convened with the participation of MOERE, MOP, IDA and MOE in Nov, Dec 2022, and Jan, Feb 2023.	

Activities	**Inputs**		**Important Assumption**
	The JICA T/C Project Side	**The Egyptian Side**	
TT3 (MOERE) 1-1 Energy efficiency PDCA system is developed including macro and micro data management, target setting, monitoring and feedback. (Organizational, policy) 1-2 Updating EE methods, drafting EE roadmap and template of annual report. (Organizational, policy) 1-3 implementation capacity of EECCD staff is developed including data management and policy making. (personal, training) 1-4 Developing evaluation method of EE technology and calculation method of EE potential. (personal, training) 1-5 Development of awareness raising program and support for implementation.	1. Dispatch of the JICA experts - Team Leader/Energy Efficiency Policy 1 (Leader) - Sub-Team Leader/Energy Efficiency Policy 2 (Sub-Leader) - Energy Data Management 1 - Energy Data Management 2 - Energy Efficiency Strategy/Program (Electric Power) - Energy Audit・Technology (Electric Power) 1 - Energy Audit・Technology (Electric Power) 2 - Pilot Project (Electric Power) - Energy Efficiency Strategy (Oil) 1 - Energy Efficiency Strategy (Oil) 2 - Energy Efficiency Strategy (Oil) 3 - Energy Efficient Technology (Oil), Energy Audit (Oil) 1,2 - Energy Audit (Oil) 3 - Energy Audit (Oil) 4 - Energy Audit (Oil) 5 - Energy Audit (Oil) 6 - Oil and Gas (Technology) - Public Awareness/Coordinator1 - Public Awareness 2/Coordinator3 - Energy Efficiency Promotion (Industry)/ Capacity Development/ Private Sector Collaboration 2. Trainings & seminars: - Trainings in Egypt - Trainings in Japan (1 times) - Seminars in Egypt (2 times) 3. Faculties and Equipment - In accordance with necessity of activities - EDMS (Energy Data Management System) - Petroleum sector simulation software licenses - Thermal Camera - Project office	1. Assignment of C/Ps - Project Director (P/D) - Task Manager for Electricity (MOERE) - Task Manager for Petroleum (MOP) - Task Manager for IDA - Task Manager for CAPMAS 2. Recurrent costs - C/P's wages and allowances - C/P's domestic travel expense	Most of the trained staff continue to work for energy efficiency field in Egypt
TT3 (MOERE) 2-1 EE demonstration for air-conditioner in residential places. 2-2 Validation analysis of home appliances including refrigerator, room air-conditioner and lighting etc.			**Pre-Conditions**
TT4 (MOP) 3-1-1 Conduct interviews with "sample" personnel from MOP, holding companies and affiliate companies 3-1-2 Benchmarking against international practices 3-1-3 Conduct workshops to share outcome of analysis 3-2-1 Site visit to Pilot refinery (energy auditing) 3-2-2 Conduct roundtable discussions and PFD (Process Flow Diagram) reviews with pilot refinery personnel 3-2-3 Develop sitewide utility model for pilot refinery 3-2-4 Generate list of energy performance improvement opportunities and discuss with pilot refinery for their acceptance 3-2-5 Conduct 5 trainings 3-2-6 EE&C framework "Gap analysis" report summarizing current EE gaps within the Petroleum sector compared to international practices 3-2-7 Basic training for acquisition of EE methods for petroleum sector facilities such as refineries and petrochemical facilities including specifications, bench-marking, gap analysis and KPI management etc.			⬇

3-3-1 Drafting strategic roadmap for petroleum sector 3-3-2 Facilitate internal workshop within MOP to define the missing Petroleum Sector policies which will help MOP meet their country level commitments (linking to TT1) 3-3-3 Facilitate an internal workshop within MOP to develop action plans and schedule to achieve the above (linking to TT1) 3-4-1 Develop SOP 3-4-2 Draft of documents defining the energy parameters and KPIs which MOP commits to provide on defined and agreed frequency and accuracy (linking to TT2)			<Issues and countermeasures> Training plan in Japan shall be discussed among stakeholders on timely basis in the light of travel restrictions caused by COVID-19. For instance, number of training plans may be reduced from current plan (3 times) plan to 1 or 2 times.
TT1 (MOERE, MOP, IDA, CAPMAS) 4-1 Discussion on future integrated national EE&C national policy and action plan with introduction of standardised format and media for energy related data collection (linking to TT2) among 4 C/Ps shall be made and confirmed through meetings /workshops including following key points: - Future national EE&C action plan and key roles of the petroleum sector is discussed and drafted in MOP. - MOP energy consumption reductions commitment would be confirmed. 4-2 Key factors to realize the future policy and its action plan (e.g. when, who, what, how) shall be discussed and confirmed among 4 C/Ps. (IDA) 4-3-1 Preparation for establishment of EECU of IDA to promote EEC in the industrial sector (functions of the EECU) are studied and planed. 4-3-2 EE&C policies/regulations of IDA to be formulated for the industrial sector are examined. 4-3-3 Integrated activities are organized in the industrial sector. 4-3-4 Workshops for private sector of EE&C are held. 4-3-5 Training are held for IDA personnel. TT2 (MOERE, MOP, IDA, CAPMAS) 5.1 Assessing CAPMAS's institutional capacity for energy data management, and for contributions for EE&C promotion. 5.2 Gap analysis of 4 C/Ps' data collection capacity and target setting. 5.3 In-house trainings for 4 C/Ps on international standard energy data management. 5.4 Establishing an inter-organizational data collection process, a standard data collection format, and a business process manual (BPM). 5.5 Development of prototype energy data management system (EDMS) to be shared by CAPMAS, MOERE, MOP and IDA.			