

ソロモン国
再生可能エネルギー促進に係る
情報収集・確認調査

最終報告書
別添資料

平成31年3月
(2019年)

独立行政法人
国際協力機構 (JICA)

デロイト トーマツ コンサルティング合同会社
東電設計株式会社

産公
JR
19-022

別添1 報告書概要



Executive Summary of Draft Final Report

February 2019

JICA Survey Team
for 'The Project for Formulating Renewable Energy Road Map in Solomon Islands'

Table for Contents

1. Overview of the Survey
2. Technical Study toward Establishment of Road Map
3. Private Investment
4. Study Items for the next Phase

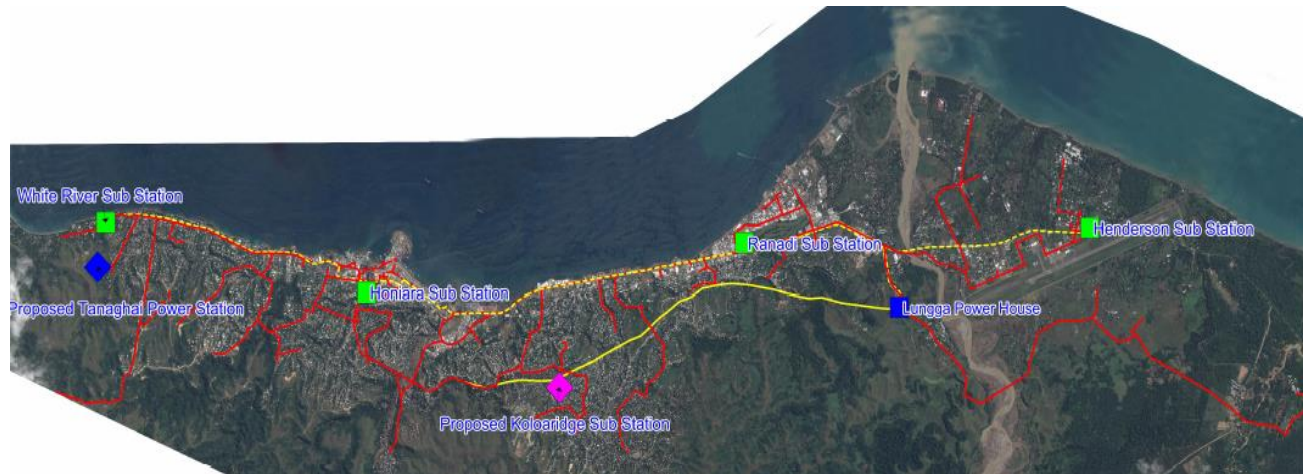
JICA aims to support establishment of a renewable energy road map toward renewable energy 100%

Background and Purpose of the Study

- Japan International Cooperation Agency (JICA) intends to support to formulate the renewable energy road map, whose target is 100% energy generated from renewable power.
- This target accompanies with various challenges and the key approach is to introduce solar PVs and private investments, such as Independent Power Producer (IPP).
- In order to extract potential barriers to achieve the target, and clarify the scope of the future cooperation, the JICA dispatch the preparatory survey team (this mission team).

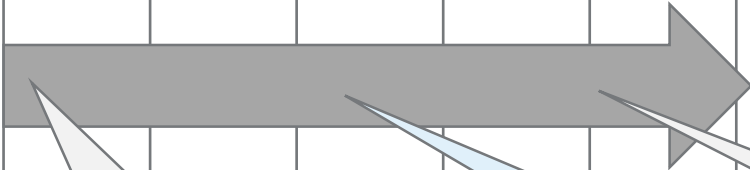
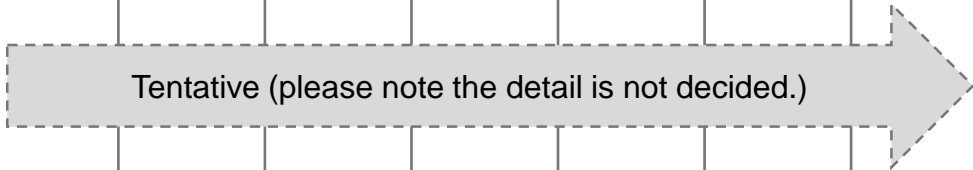
Target Area

- The target of this study is the Honiara region.



The 1st Phase will complete at the end of March, 2019

Expected Schedule

2018	2019											
12	1	2	3	4	5	6	7	8	9	10	11	12
Phase 1 (Preparatory Survey)				Phase 2 (Support Renewable Energy Roadmap)								
												

1st Biz Trip **(3-11 December)**

- Collected basic information
- Discussed the basic concept
- Visited sites

2nd Biz Trip **(28 Jan to 8 Feb)**

- To discuss the potential barriers to be tackled
- To discuss the future vision

3rd Biz Trip **(24 of Feb to 2 Mar)**

- To discuss the draft final report for the future JICA cooperation

In Japan

- To analyze/compare with other Pacific countries circumstances
- To discuss the private investment/business and environmental technology

Several key facts have been found to establish the road map in the second phase

Key Findings of the Survey

- ✓ The overall scale and technical specification of the grid are clarified.
- ✓ Yearly generation projections of Tina Hydro are confirmed in 2010, 2011, and 2012; generation can vary in a large extent (from less than 3 to 15 MW), depending on weather condition.
- ✓ The required capacity of renewable energy to achieve RE 100% on generation base is approx. 50MW of solar PV by 2030 while the required capacity on firm capacity base is 16.5 MW.
- ✓ Private investment is required to increase proportion of renewable energy from the viewpoint of budget.
- ✓ Relating regulations and taxation for establishment of a new business by private investors are studied.
- ✓ Considerable risks in Solomon Islands were scrutinized and discussion points in the second phase are identified. Main discussion points are; Land acquisition, PPA, Loan contract, off-taker, Foreign exchange convertibility, Sub-contractor, Peripheral Infrastructure.

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Fact Findings

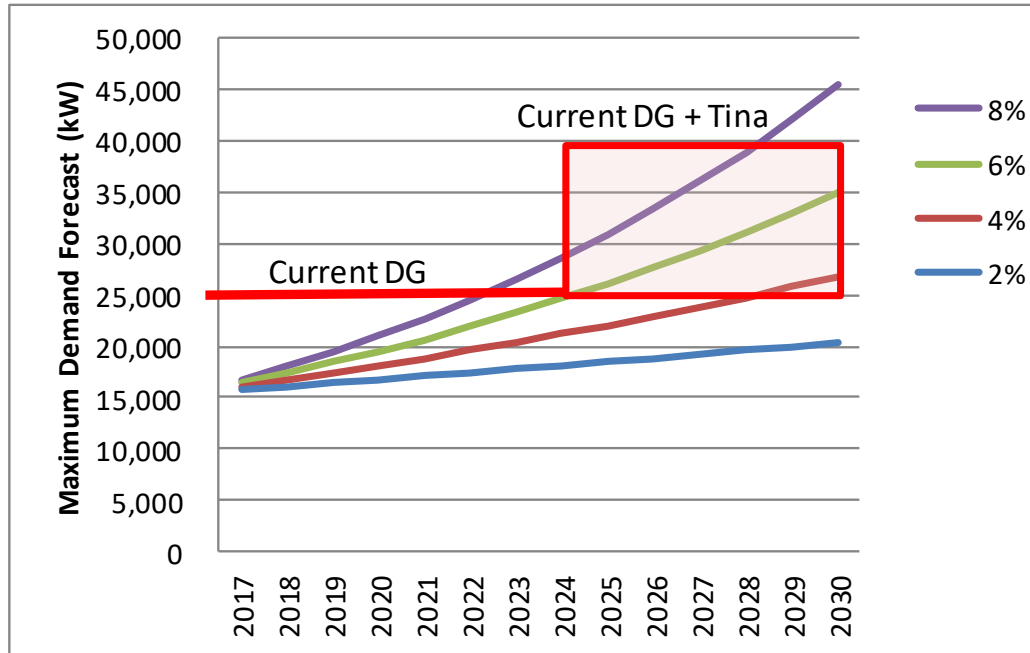
Important data and information have been collected from Solomon Power

Obtained data and Information

Organization/Agency	Collected Information and Discussion Points	
SP	<ul style="list-style-type: none"> • SP organization chart • State Owned Enterprises Act 2007 • SP network development plan • Power demand forecast • Generator capacity and operation • List and location map of generation • Electrical design standards for SI • Dis STD Design Cons. Manual • SAIDI SAIFI 2012-2017 • Substation single lone diagram • Lungga Honiara hourly KW Demand • Fighter 1 monthly generation • Fibre Optic Route 	<ul style="list-style-type: none"> • Tariff menu • Solomon Power Network Overview • Tina hydro Station Single Line Diagram • Historical Data 2014-2017 • Generation Statistics 2015-2017 • Capital Budget 2019-2024 • Genset record 2017 • Meters Customer numbers • Sales by Category for 2018 • SIEA Solar PV System Connection Manual • Tina 66 kV Route data • Tina River Flow data • Top 20 Customers

Additional required capacity varies with increase rates of the demand

Demand Forecast and Existing DG Capacity



Key Assumptions

- ✓ Maximum demand is forecasted by 4 cases (2%, 4%, 6%, and 8%). SP thinks that 4 % increase is a promising scenario at this moment.
- ✓ Nominal capacity of the existing DG is 33.75 MW. However, 25 MW, out of which, is regarded as a firm capacity in the Honiara Grid considering G-1 principle.
- ✓ Tina Hydro (maximum output 15 MW) is assumed to be installed by 2025.

Current power development plan of SP

Budget Plan of SP (as of Dec 2018)

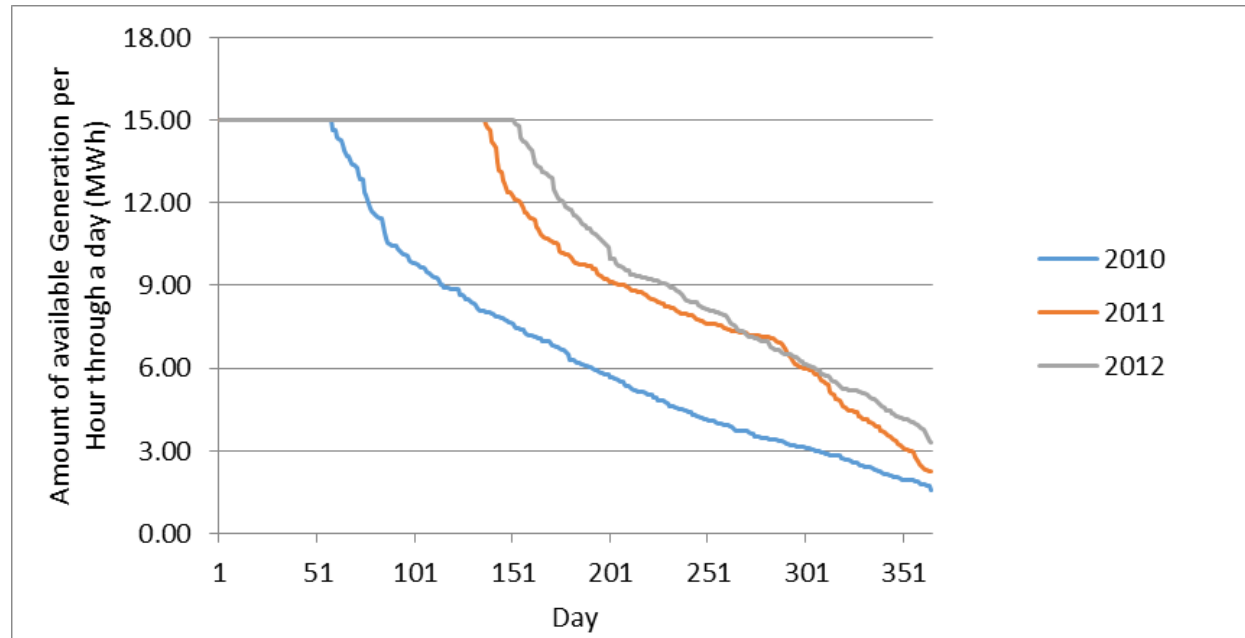
	Project	2019	2020	2021	2022	2023	2024	Total
Generation	Fighter One 1-2 MW Solar Extension	39,900,000						39,900,000
	Solar Ranadi HO Roof and Upgrade	5,500,000	5,000,000					10,500,000
	Central BESS 3.5 MW	1,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	26,000,000
	Wartsila 4.2 MWH New Machine	200,000	11,000,000	11,000,000	11,000,000	11,000,000	11,000,000	55,200,000
	Solar Tanagai Heights		5,000,000	12,000,000	12,000,000	12,000,000	14,000,000	55,000,000
	Tina River Hydro Project (Human Resources)	1,000,000	5,800,000	5,800,000	5,800,000	5,800,000	5,800,000	30,000,000
Transmission	Old Lungga Electrical Upgrade	2,000,000	10,400,000	10,400,000	10,400,000	10,400,000	10,400,000	54,000,000
	SCADA	63,891,870	9,076,170	5,858,100	34,991,178	33,758,760		147,576,078
	33kV Cable Ranadi-Honiara		4,000,000	4,000,000	3,000,000	3,000,000		14,000,000
	66kV Transmission Tina-Lungga	500,000	33,400,000	33,400,000	33,400,000	33,400,000	33,400,000	167,500,000
	66kV Transmission Lungga-Tanagai			1,000,000	29,200,000	29,200,000	29,200,000	88,600,000
	Major Total	113,991,870	88,676,170	88,458,100	143,558,760	143,558,760	108,800,000	688,276,078

Summary of Development Plan of Renewable Energy by SP

- ✓ Fighter One solar extension is expected as 2 MW.
- ✓ Solar Ranadi HO is expected as 220 kW.
- ✓ Solar Tanagai is expected as 1.5 MW.
- ✓ Total 4.7 MW (existing 1 MW + new 3.7 MW) is expected as solar power by 2024.
- ✓ Besides, a central battery system 3.5 MW is expected as well.

Generation of Tina Hydro depends significantly depends on seasons

Assumption of Tina Hydro Generation in a Year



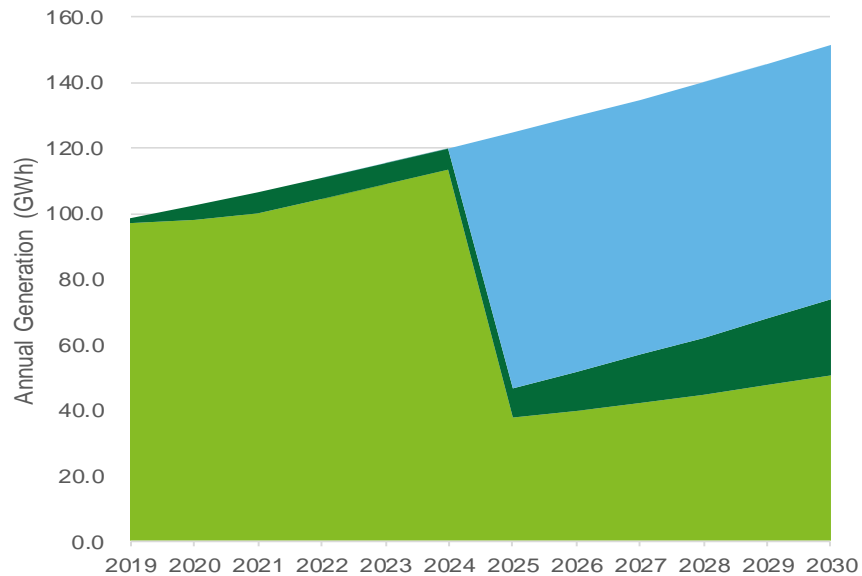
Key Points to be treated

- ✓ Daily generation is estimated by the inflow data of 2010, 2011, 2012.
- ✓ According to the estimation, Tina can generate 15 MW within 50 to 150 days in year.
- ✓ Less than 6 MW is also assumed within 50 to 150 days in year.
- ✓ Thus, operation ways in a day should be carefully studied by season, considering daily demand curve and combination of solar power outputs.

Issues

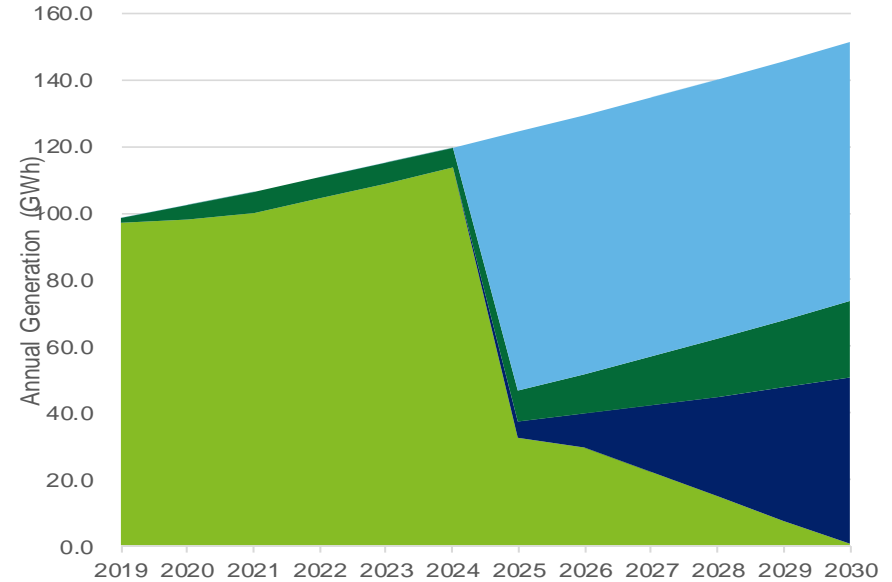
A Scenario towards RE 100% (Generation Base)

Case for Capacity Base RE 100%



■ Tina Hydro (GWh)
 ■ Solar (for Capacity Base RE 100%) (GWh)

Case for Generation Base RE 100%



■ Additional Solar (for Generation Base RE 100%) (GWh)
 ■ Diesel (GWh)

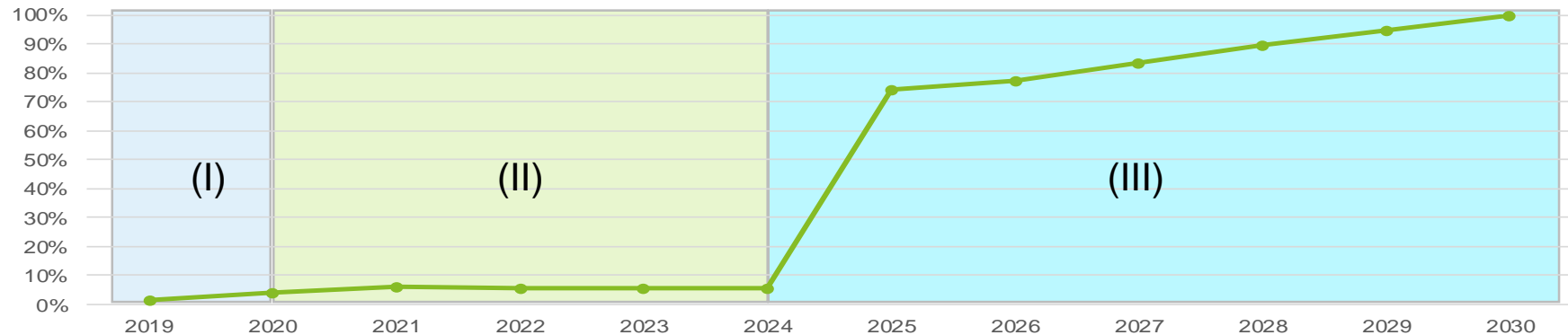
Generation Base RE 100%

- ✓ To meet RE 100 % in 2030 in the generation base, a further solar power is considered in addition to the capacity base RE 100%.
- ✓ In 2030, total approx. **50 MW** is necessary if deficit of RE after Tina Hydro is filled by solar power with battery
- ✓ Not only solar power, alternative countermeasures may be considered to be close to RE 100 % in the generation base.

Toward RE 100%

Tasks to be done for RE 100 % (Generation Base)

Transition to RE 100%



Sample

	Stage (I) (2019-2020) Planning & Preparation	Stage (II) (2021-2024) Standardization and Promotion	Stage (III) (2025-2030) Further Development	After 2030
Solar Development	<ul style="list-style-type: none"> Preparation of Land Study of rooftop PV promotion (regulation) 	<ul style="list-style-type: none"> Introduction of IPP's Solar Introducing rooftop PVs 	<ul style="list-style-type: none"> Rental system of stand-alone solar PV 	
Battery Development	<ul style="list-style-type: none"> Unified Planning for Battery Installation Safety Standardization of Battery Installation 	<ul style="list-style-type: none"> Installation of Short Duration Battery 	<ul style="list-style-type: none"> Installation of Long Duration Battery Utilization of EV 	<ul style="list-style-type: none"> Introducing reuse battery (EVs)
Grid Development	<ul style="list-style-type: none"> Master planning 	<ul style="list-style-type: none"> Strengthening for Connection of IPP' Solar Study of mini-grid 	<ul style="list-style-type: none"> Strengthening for Connection of IPP' Solar Development of mini-grid 	<ul style="list-style-type: none"> Extension of grid to rural areas and connect with mini-grids
IPP Introduction	<ul style="list-style-type: none"> Study of Land preparation Guide line for risk allocation 	<ul style="list-style-type: none"> Public invitation for land acquisition 	<ul style="list-style-type: none"> Public Tender of Large Scale IPPs 	

Small scale solar PVs and Energy Efficiency also play an important role toward RE 100%

Examples of Other Optional Plans

Type	Measures	Current Situation	Assumption for Introduction	Effect in 2030		Contribution to RE 100% (%)
				Peak Capacity (MW)	Generation (GWh)	
Solar PV	Middle Scale Solar Power (Industry)	50 kW (Ranadi)	100 kW x 30 sites	3	4.2	2.8
	Roof Top Solar Power (Residential)	0	5 kW x 500 sites	2.5	3.5	2.3
Energy Efficiency	Distribution Loss Reduction	11 %	25 MW x (4% reduction) 140 GWh x (4% reduction)	- 1	-5.6	3.7
	Demand Side Efficiency	-	10 %Improvement from the Reference plan	-2.6	-15	10.0

Further Development after 2030 to maintain RE 100 %

Other RE Resource	Hydro Power	0	1 MW x 3 sites	3 (60% capacity factor)	15	-
	Floating Solar	0	1 MW x 3 sites	3	4.2	-
	Geo-Thermal	0	20 MW + Submarine Cable to Connect Honiara	20 (60% capacity factor)	105	-

Private Investment is required to fulfill the needs

Forward RE 100%

1. Identification of Players for Solar Power Development

- A capacity of **50 MW** of solar PV is necessary by 2030 to be RE 100% in the generation base. 25 sites of 2 MW-scale PV are required by 2030.
- **Not only ODA finances but also private investments are expected**. ODA financing and private investment are not competitors.

2. Needs of Battery

- The more installed solar PV is, the more necessary back-up source is. If battery is expected as the back-up source, IPP may prepare for the back-up (short-duration battery) for each site.
- When battery supplies for the nighttime (long-duration battery), a surplus power is necessary to charge to the battery.
- When a **central battery** is planned, the location and transmission capacity is carefully studied.

3. Loss Reduction

- **Loss reduction** is also one of measures to achieve RE 100%. Technical loss is estimated at 11 % in 2017.

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Fact Findings

Important data and information have been collected through interviews in Solomon Islands and Japan

Main Interviews in the Solomon Islands

Organization/Agency	Collected Information and Discussion Points
MMERE	<ul style="list-style-type: none"> • Revision of SINEP • Progress on Tina Hydro project
SP	<ul style="list-style-type: none"> • Technical Discussion to introduce RE • Discussion on the Road Map
MLHS	<ul style="list-style-type: none"> • Land Issues relating to Customary Land and Registered Land • Flow to change the status from Customary to registered land
FID, MCILI	<ul style="list-style-type: none"> • Flow of Establishment of incorporation
MOFT	<ul style="list-style-type: none"> • Supports by ADB (PPP center) • Taxation (Economic Reform Unit, Foreign Investment Division) • Tax exemption and tax reform (Economic Reform Unit)
MDPAC	<ul style="list-style-type: none"> • Role of MDPAC • Aid coordination and overview of development partners
CBSI	<ul style="list-style-type: none"> • Currency convertibility and foreign reserves
SIPA	<ul style="list-style-type: none"> • Port facilities
Commercial Banks	<ul style="list-style-type: none"> • Conditions of Loan Contract
WB	<ul style="list-style-type: none"> • Progress on Tina Hydro Project • Electrification in Rural areas
ADB	<ul style="list-style-type: none"> • Development of PPP center

Important data and information have been collected through interviews in Solomon Islands and Japan

Interviews in Japan

Organization/Agency	Collected Information and Discussion Points
Commercial Bank	<ul style="list-style-type: none">• The environment for investment to the Solomon Islands
Manufacturer (Battery)	<ul style="list-style-type: none">• Adaptability of batteries to RE100% grid
Manufacturer (EV)	<ul style="list-style-type: none">• Possibility of introduction of EV (second-hand EV and reuse battery)
Manufacturer (Floating PV)	<ul style="list-style-type: none">• Technical information of floating solar PV (offshore)
Potential Investor	<ul style="list-style-type: none">• Investment appetite

Private investors and stakeholders concern several risks

Implications of Risks (Japanese Stakeholders)



Potential Investor A

Limited information (risks) to make a decision to invest in a project.



Potential Investor C

We do not expect reliable contractor/sub-contractor in SI.



Potential Vendor A

Cost on single project in SI is too expensive. Thus, we need a large scale.
>> Multiple sites are required.



International Bank A
(Tokyo Branch)

Country risk seems to be high because investment rating is lower than threshold rate for our standard.
>> Difficult to provide project finance.



Potential Investor B

Information (discussion points) is quite limited to make a decision to invest in a project.



Potential Investor D

Land issue is critical for power project in SI. PPA format has not prepared.

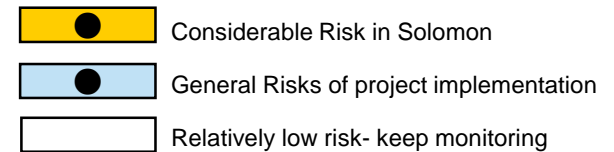


Potential Vendor B

Technical capacity of operation and maintenance might be problem.

Several risks have been identified for power project (solar PV) from discussions and the collected information

Risk Mapping for IPP Investment on Solar Project



Risk Patterns in Power Plant Development and Business		Development Flow for Power Project											
		FS	Approval	Land Acquisition	PPA	Spec	EPC Contract	Loan Contract	SPC formation	Construction	O&M		Business
										Operat ion	Mainten ance	Collect ion	Debt Repaym ent
(1)	Sponsor risk								●				
(2)	Project delay risk		●	●	●	●	●	●					
(3)	Risk on construction completion								●				
(4)	Operational risk									●	●		
(5)	Sales risk				●							●	
(6)	Interest rate risk							●					●
(7)	Foreign exchange risk							●				●	●
(8)	Cash flow risk												●
(9)	Social / Environmental risk	●	●						●				
(10)	Disaster risk								●	●			
(11)	Country risk	The Risk can be caused through all stages.											

Issues

Discussion points (Seven Risks and One Study Point) are a key for introducing private investment in Solomon Islands

Risks for IPP Investment on Solar Project in the Solomon Islands

Category		Issues
Project Delay	Land Acquisition	<ul style="list-style-type: none"> Land ownership <ul style="list-style-type: none"> ➤ customary and registered land
	PPA Negotiation	<ul style="list-style-type: none"> Few experience of PPA with IPP players PPA format has not been developed.
	Loan Contract	<ul style="list-style-type: none"> Credit risk for the SP and the SIG
Sales Risk	Off-taker	<ul style="list-style-type: none"> The stable power The technical capacity of the power system
Currency Convertibility	Foreign Exchange	<ul style="list-style-type: none"> Sovereign guarantee or enough amount of Foreign Reserve
Construction Completion	Local Subcontractors	<ul style="list-style-type: none"> Less technical knowledge and management skills Less Experience
	Peripheral Infra	<ul style="list-style-type: none"> Access road Grid connection
Economy of Scale		<ul style="list-style-type: none"> Less feasible with small scale (cost impact)

✓ Risks shall be clarified, publicized and allocated among the stakeholders.

✓ Clear presentation of risk allocation allow investors to make a decision for an investment.

Toward RE 100%

Rational allocation for considerable risks in SI to balance investors appetite and gov't responsibility is recommended

Recommendation ~ an allocation of Considerable Risks (Tentative)

Category		Risk Taker		Description
Project Delay	Land Acquisition	SP		The issue roots from historical background and it is quite challenging for investors to combat the issue.
	PPA Negotiation	Negotiable		The contents of PPA is depending on business environments in each countries..
	Loan Contract	Gov't		Sovereign Guarantee supported by Insurance by MIGA or other insurance agency would be available to cap the risk.
Sales Risk	Off-taker	Negotiable		An adaption of output suppression control shall be discussed. If so the condition for the suppression shall also negotiated.
Currency Convertibility	Foreign Exchange		Private Investor	Decision by private investors if the foreign reserve is affordable for their projects.
Construction Completion	Local Subcontractors		Private Investor	Scrutinizing if the extra cost for foreign EPC is feasible for their projects. Or, investors take EPC risk on their own.
	Peripheral Infra	Gov't / SP		Peripheral infrastructure is provided as public service or not.
Economy of Scale		Gov't / SP		It is preferable for investors to be secured a multiple candidate sites / a bunch of rooftops. <i>e.g. Public Invitation.</i>

A Guideline will be drafted in the second phase (below: The Sample of a guideline and checklist)

A Sample of a Guideline

The Guideline for Risk Allocation for Renewable Energy Project in the Solomon Islands

Table of Contents

1. Risk on survey and design
 1. Delay risk
 2. Environmental and social Impact
2. Risk on land acquisition
 1. Land identification
 2. Land provision
3. Risk on construction ~ capacity of contractors
 1. Construction delay
 2. Cost overrun
 3. Loss in construction
 4. Defect in construction
4. Risk on operation and maintenance
 1. Delay in commencement of operation
 2. Accidents caused by operation and maintenance works
 3. Defect in part replacement
 4. Currency convertibility
5. Risk at project completion
 1. Site clearance
6. Common risks through a project's period
 1. Force majeure
 2. Fluctuation in CPI, interest rate, exchange rate
 3. Tax reform
 4. Change in laws- relating to electric facilities, management rules, etc
 5. Obtainment of permission

A Sample of Checklist for a Guideline (PPP/PFI)

	Risk Category	Description	Risk Taker	
			Gov't/SP	IPP
Survey and Design	Delay risk	Defect in design, cost overrun for study,		√
	Environmental and social impact	Impossible to proceed the project as a result of EIA	√	
Land	Identification	Identification of owner and category of land; registered or customary land	√	
	provision	Acquire the land and lease out	√	
Project Delay	Construction delay	Lack of EPC contractor's capacity		
	Cost overrun	Change a order for a construction		√
	Loss in construction	Damage a third party		√
	Defect in construction	Defect in facility, construction works		√
O&M	Delay in Commencement of operation	Delay in signing in a contract, grid connection,		√
	Accident caused by O&M	Disruption of generation due to accidents relating to O&M		√
	Defect in parts replacement	Defect In parts and replacement work		√
	Currency Convertibility	Confirm the amount of foreign reserve	√	√
completion	Site clearance	Site clearance for renting back		√
Risk through project	Force majeure	Natural disaster	√	√
	Tax	Tax reform and tax exemption	√	
	Permission	Obtainment of permissions for business ~ FID, COI,	√	√

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Technical details and risk allocation shall be studied for establishment of the road map

Study Items for the Road Map in the second phase and the future cooperation

Establishment of a Road Map toward RE 100 %

Tech

Stage 1 Prerequisite phase

- Review of demand forecast
- Review of operation of the existing diesel generators
- Review of plan of 3.5 MW battery project
- Study on energy efficiency and loss reduction
- Study of solar PV site selection (technical support)

Stage 2 Before the Commencement of the Tina Hydro operation

- Power system development plan before Tina Hydro operation commences, focusing on an increase in capacity of solar PV and diesel generators.
- Review of the transmission plan

Stage 3 After the Commencement of the of the Tina Hydro operation

- Power system development plan after Tina hydro operation commences.
- Study on optimal operation of Tina Hydro from the viewpoint of RE100%
- Introduction plan of battery into the grid.
- Review of T/Ls

Private investment

- Study on risk allocation among stakeholders- referencing [PPP and PFI schemes](#)
 - Review of risks in the SI- e.g. *interviewing private investors in South East Asia or Oceania*
 - Supporting land preparation within registered land by the SP- e.g. *Public invitation for the land*
 - Study of promotion of **rooftop solar PV**- e.g. *regulation of net-metering and standby charge, mini-grid etc*
 - Study of PPA contents- e.g. *soft/hard PPA*
 - Clarification of subcontractors' capacity- e.g. *Capacity building for contractors in the SI or investigation of subcontractors in Fiji or other countries within the Pacific Ocean*
 - Case study of private investment and IPPs in other countries in the Pacific Ocean- e.g. *Palau and Fiji*
 - Currency risk- e.g. *PPA in foreign currency (receive money in USD, AUD etc. from SP)*

[Draft a Guideline for risk allocation](#)

別添2 ワークショップスライド（技術）

Renewable Energy Development in Japan and Technical Trends towards Renewable Integration

February 5, 2019
JICA Survey Team

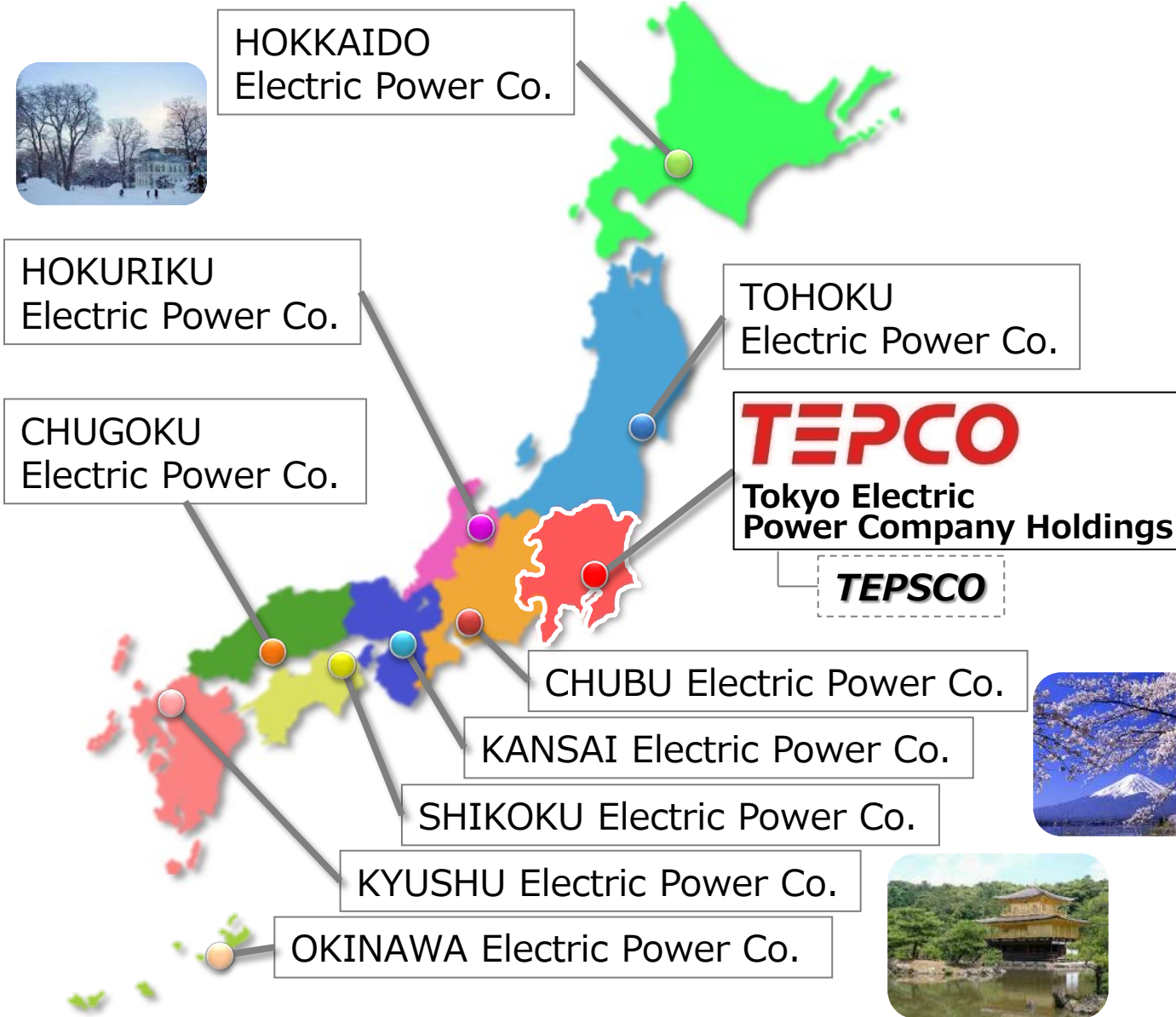
Summary

1. Introduction of Japanese power business and renewable energy development in Japan
2. Contribution of hydropower to enhance solar and wind power which are unstable power resource
3. Grid stability technology in island
4. Suggestion on renewable energy introduction in Solomon Islands

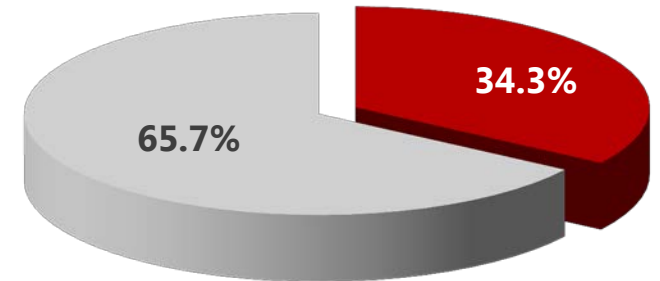
1. Power Sector in Japan

Power Utilities in Japan

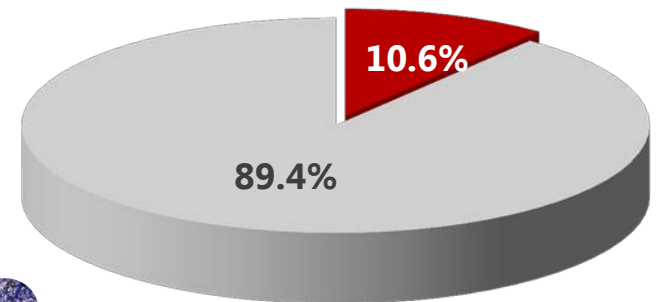
□ There are 10 vertically integrated electric utilities in Japan.



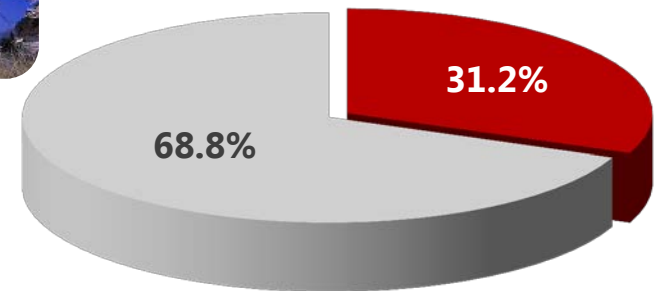
■ TEPCO ■ Total Service Area
Number of Customers



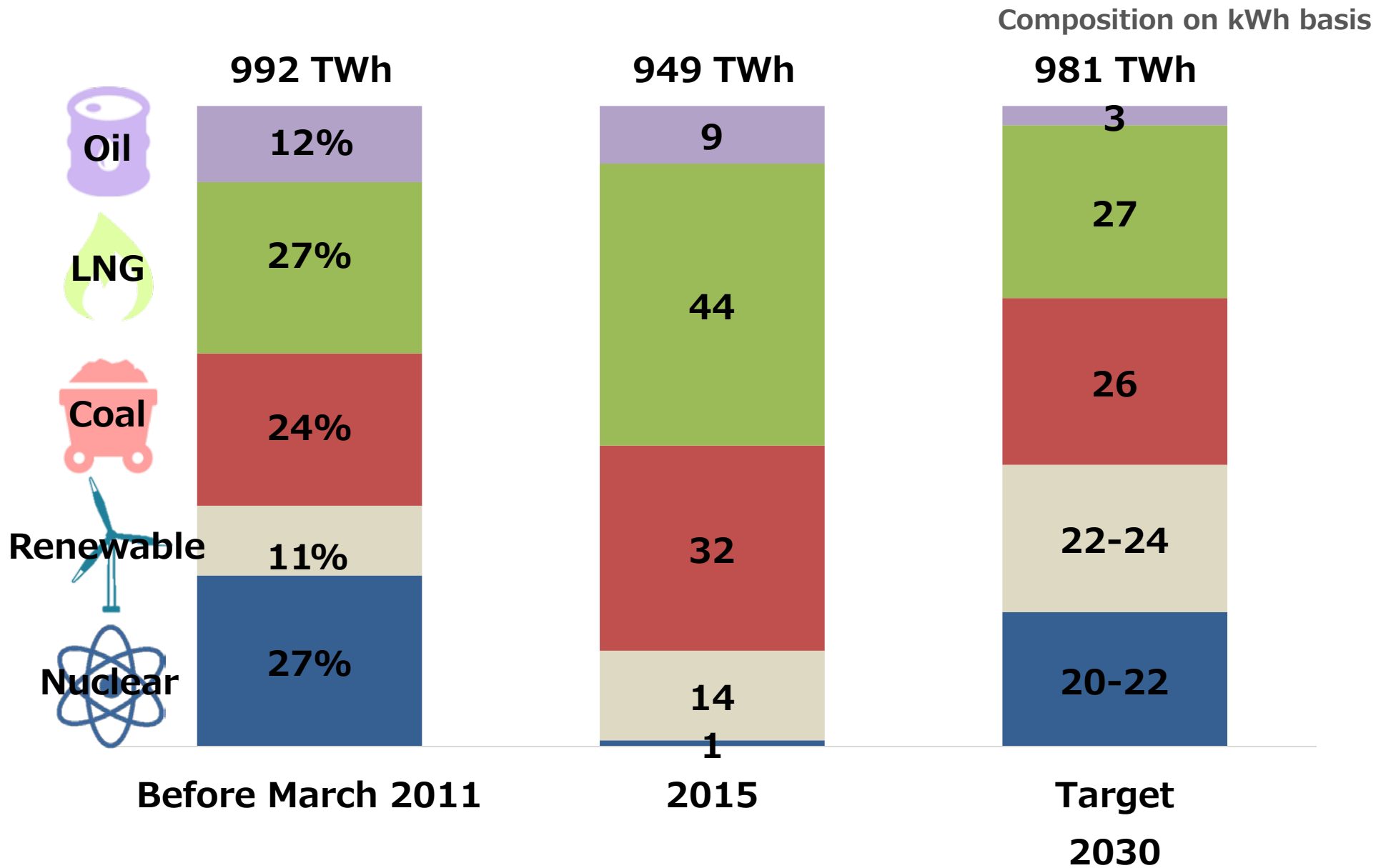
Service Area



Electricity Sales

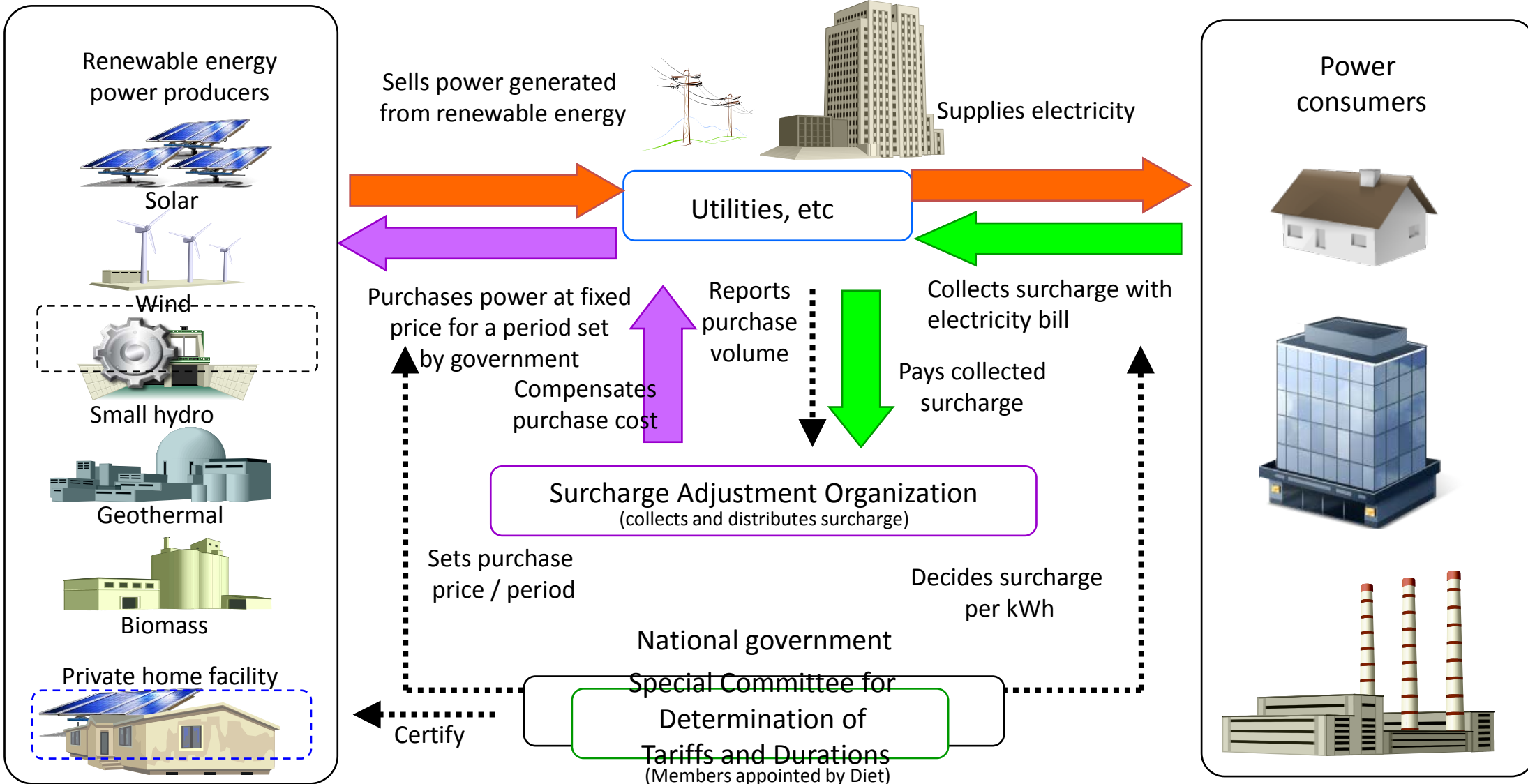


Energy Mix Transition in Japan



Outline of FIT System in Japan (July 2012-)

- Power utilities purchase power generated from renewable energy at fixed price for a certain period of time
- Purchasing cost is surcharged to consumers depending on consumption volume



Purchase Conditions for FY 2012-2017

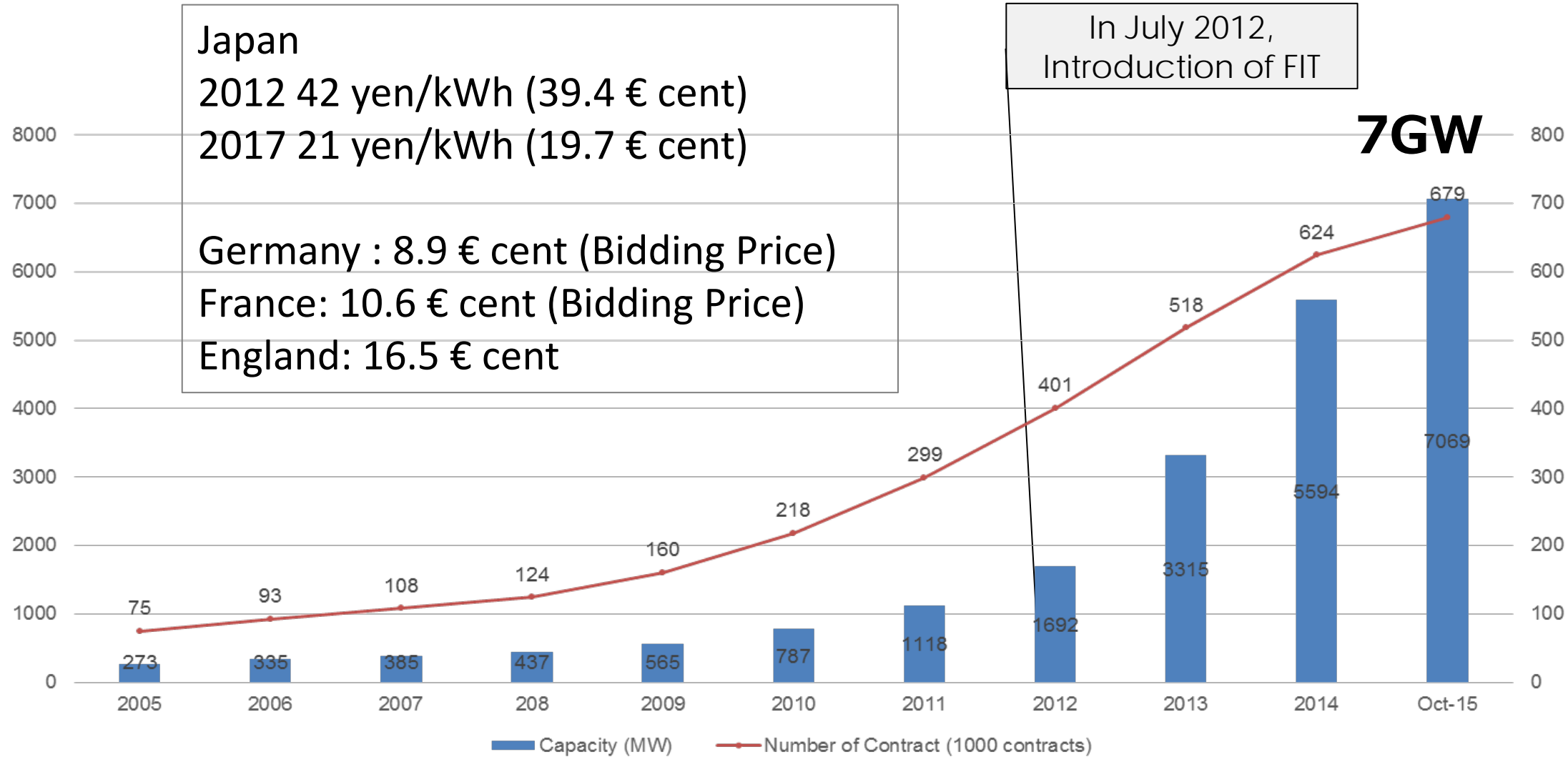
Energy	Purchase category		Price (JPY/kWh)						Period (yrs)	
			FY2012	FY2013	FY2014	FY2015 April-June	FY2015 July-Mar	FY2016		FY 2017
Solar	Under 10 kW (surplus purchase)		42	38	37	33 ^(※1) , 35 ^(※2)		31 ^(※1) , 33 ^(※2)	28 ^(※1) , 30 ^(※2)	10
	10 kW or more		40	36	32	29	27	24	21	20
	2 MW or more		—						Bidding	20
Wind	Under 20 kW		55					55	20	
	20 kW or more		22					21		
	Offshore		—	36				36		
Hydro	Newly built	Under 200 kW	34					34	20	
		From 200 kW up to 1MW	29					29		
		From 1MW up to 30MW	24					27 (1MW-5MW) 20 (5MW-30MW)		
	Existing headrace used	Under 200 kW	—	25					20	
		From 200 kW up to 1MW	—	21						
		From 1MW up to 30MW	—	14						

* Biomass and Geothermal prices are not indicated in the above table.

(※1) When generators are not required to install output control equipment

(※2) When generators are required to install output control equipment

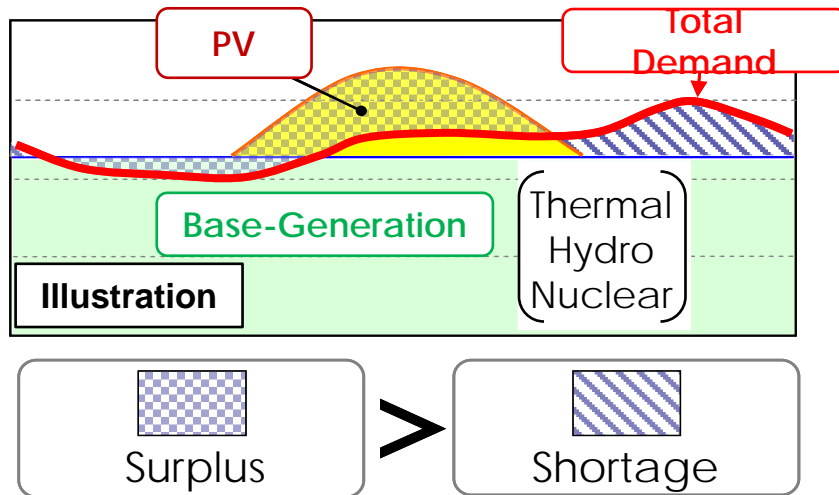
Purchase of PVs in TEPCO Power Grid



Source: METI & TEPCO

Grid Connection Problems

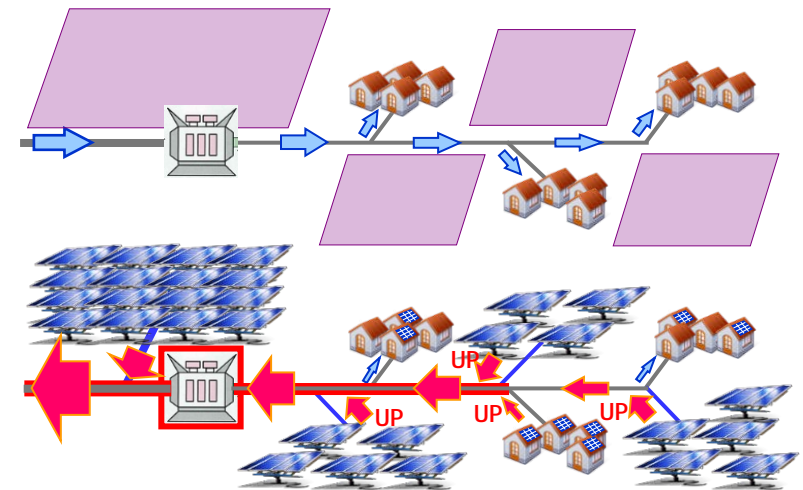
(1) Demand-supply restriction



Hokkaido, Tohoku, Shikoku, Kyushu, Okinawa Power Companies announced that they would postpone their replies on the network access applications from renewable developers. (Sep 2014)

- Mandatory installation of output control equipment.
- Transition to time-based output restriction rule (from 30 d/y to 360 h/y (PV), 720 h/y (wind)).

(2) Network capacity restriction



Surplus of renewable energy output at transmission lines, transformers.

- Setting the rule of transmission system information publication.
- Launched **bidding scheme (2017)** for renewable developers to share the burden of upgrading the network facilities.

Illustration

Problem and measures

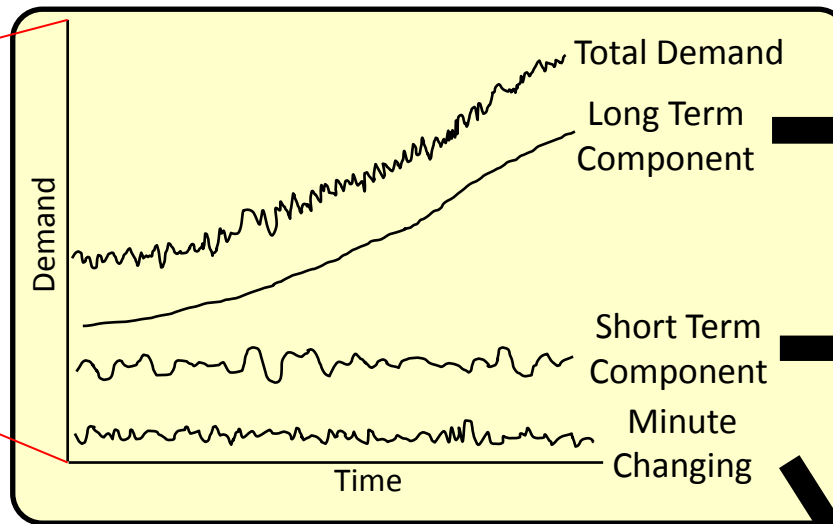
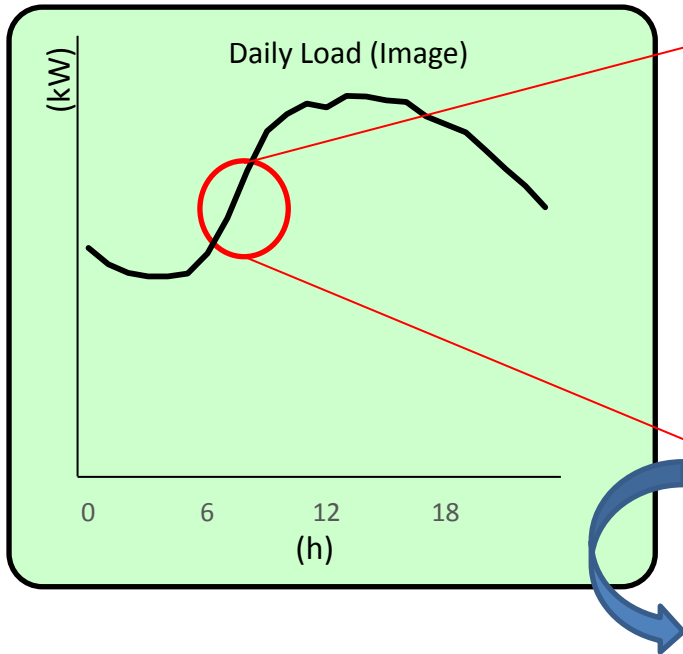
2. Roles of Hydropower in the Grid

Hydro Power Generation Plant and Adjustment Capability by Type

- Reservoir Type, Pondage Type and Pumped-Storage Type Hydropower Plant have capability of Output adjustment, Load Frequency Control and Governor Free Operation

	Run-Of-River Type	Pondage Type	Reservoir Type	Pumped-Storage Type		
Overview	This type use natural flow rate of river	This type adjust the changing flow of river during 1day to a week and generate at peak time	This type has large reservoir to adjust the changing flow of seasonal river to generate electricity	This type has upper dam and lower dam, pumps up during off-peak hours such as nighttime or holiday, and generates electricity at peak time.		
				Generation Operation	Pumping Operation	
					Adjustable speed	Fixed-speed
Governor Free	NA	Possible	Good	Good	Good	NA
Capability of Load Frequency Control	NA	Possible	Good	Good	Good	NA
Adjustment of Output	NA	Good	Good	Good	Good	NA
Range of Output Adjustment	—		About 50~100%		About 70~100%	NA
Period of Adjustment of output	—	About 1min. (Output Change within Output adjustment range)				—
Start/Stop	—	3~5 min./1~2 min.			5~10min./1~2min.	
Main Role	Base Supply Capability	Peak Supply Capability	Peak Supply, Adjustment and Reserve Capability	Pumping Power Adjustment capability	Pumping Power	

Output Adjustment and Load-Following

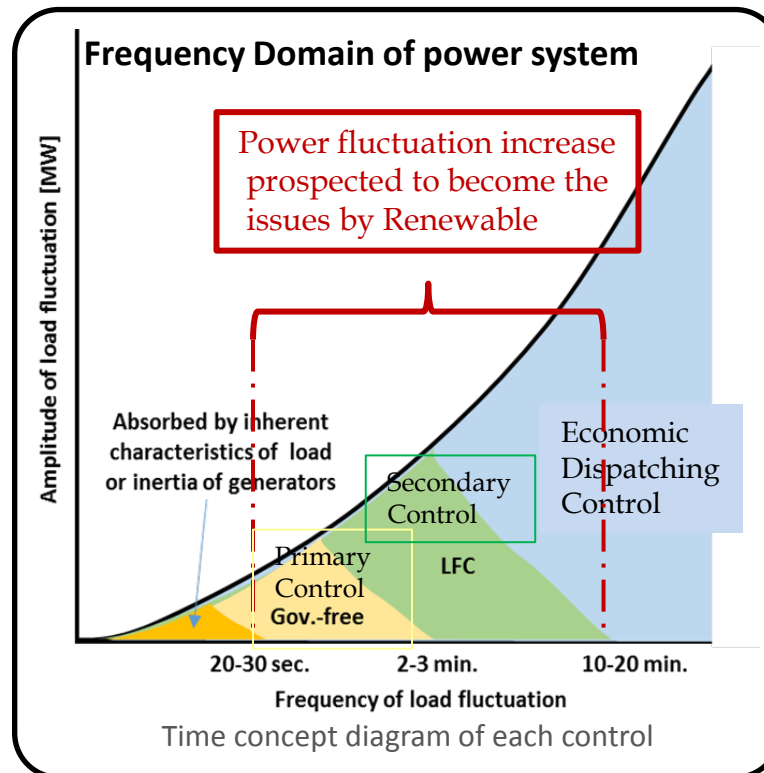


ELD
(Economic Load Dispatch)
ELD is output command signal which is sent from load dispatch center.

LFC
(Load Frequency Control)
Output command adjust the short term load by detecting the frequency deviation by Auto Frequency Control Equipment.

Governor Free Operation
Governor detect the rotating speed changing by frequency changing.

- ELD correspond to the load changing which is larger than LFC shall correspond.
- Characteristics of load LFC correspond to the load changing during the a few minute to ten minutes.
- Short-cycle load fluctuations from several tens of seconds to several minutes are handled by governor-free operation and self-control characteristics of load



Why Hydro Power is Important

1. Security and Environmental Reasons

- 100% Domestically-Produced Energy
- Extremely Low Greenhouse Gas Emission

2. Technical Reasons

- Low Cost Generation
- Contribution to System Stabilization
 - Quickly Start and Stop Operation
 - Function as Big Battery (Peak Supply Capability)

Hydro Power in Honiara System

Tina Hydro Power Plant

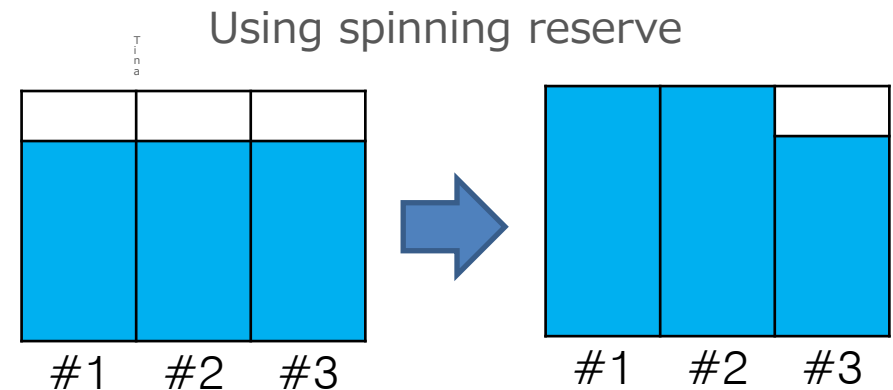
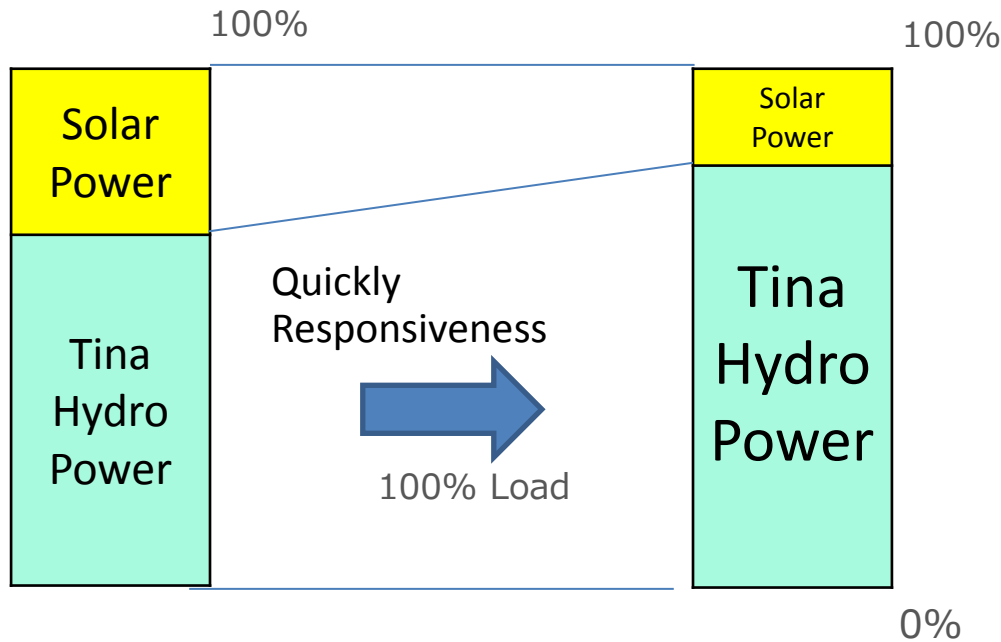
- Tina Hydro is able to supply to the most of the demand of Honiara Grid.
- Tina Hydro has a capability to contribute to system stabilization to adjust sudden change of power demand or supply.

Characteristics of Tina HPP	
Operating capacity	15 MW (at 18 m ³ /s)
Detail	3 × Francis of 5 MW
Rated Head	97 m
Pondage Capacity (Full Supply Level)	7,000,000 m ³
Catchment Area (m ²)	125 km ²
Expected Operation Type	Pondage
Annual Generation	78.35 GWh

Function of Tina Hydro for Grid Stability



- Solar power sometimes suddenly drop the power due to the weather condition.
- Tina can quickly adjust the deficit as soon as possible.

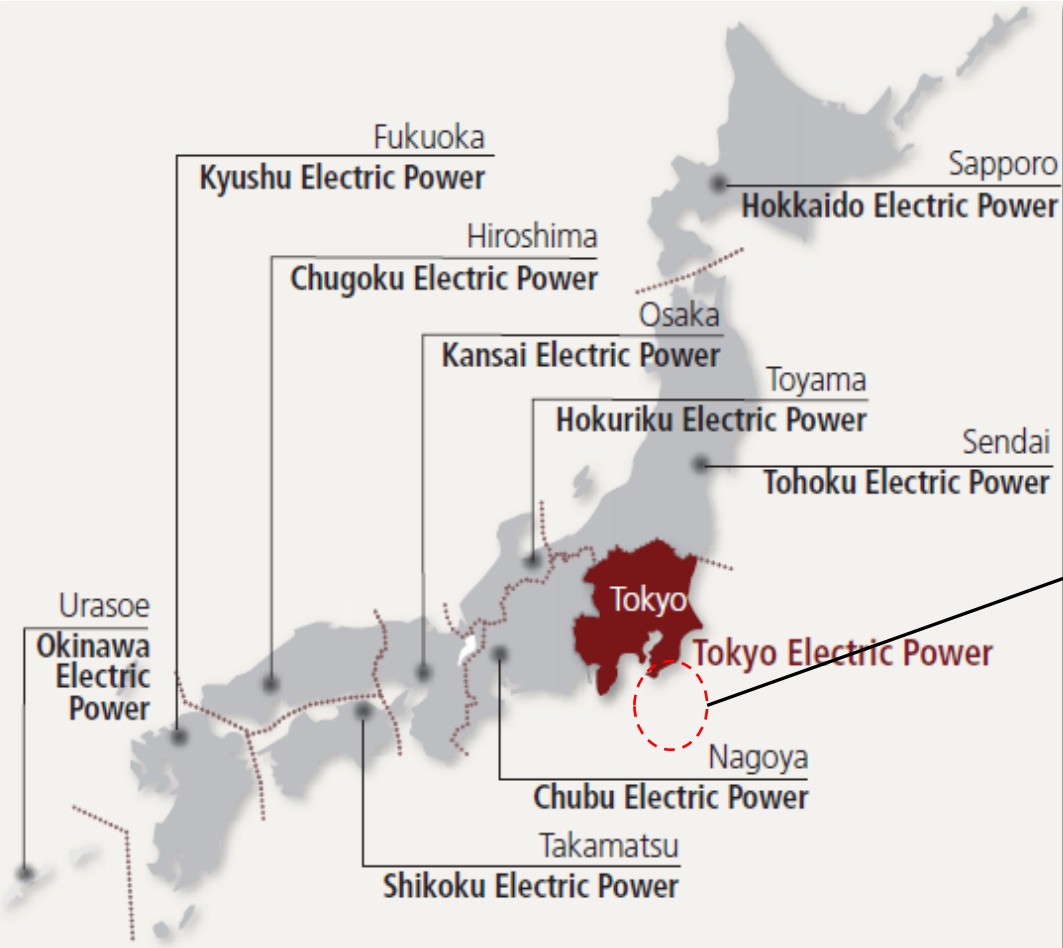


Tina's Unit Operation

Supply to the Sudden Drop of Solar by Tina

3. Grid Stability in Island

NEDO Demonstration Project for Smart Grid in Niijima Island



Niijima Island



Population : 2,749
(as of 2017)
Land :23.64 km²
Distance :150km from Tokyo

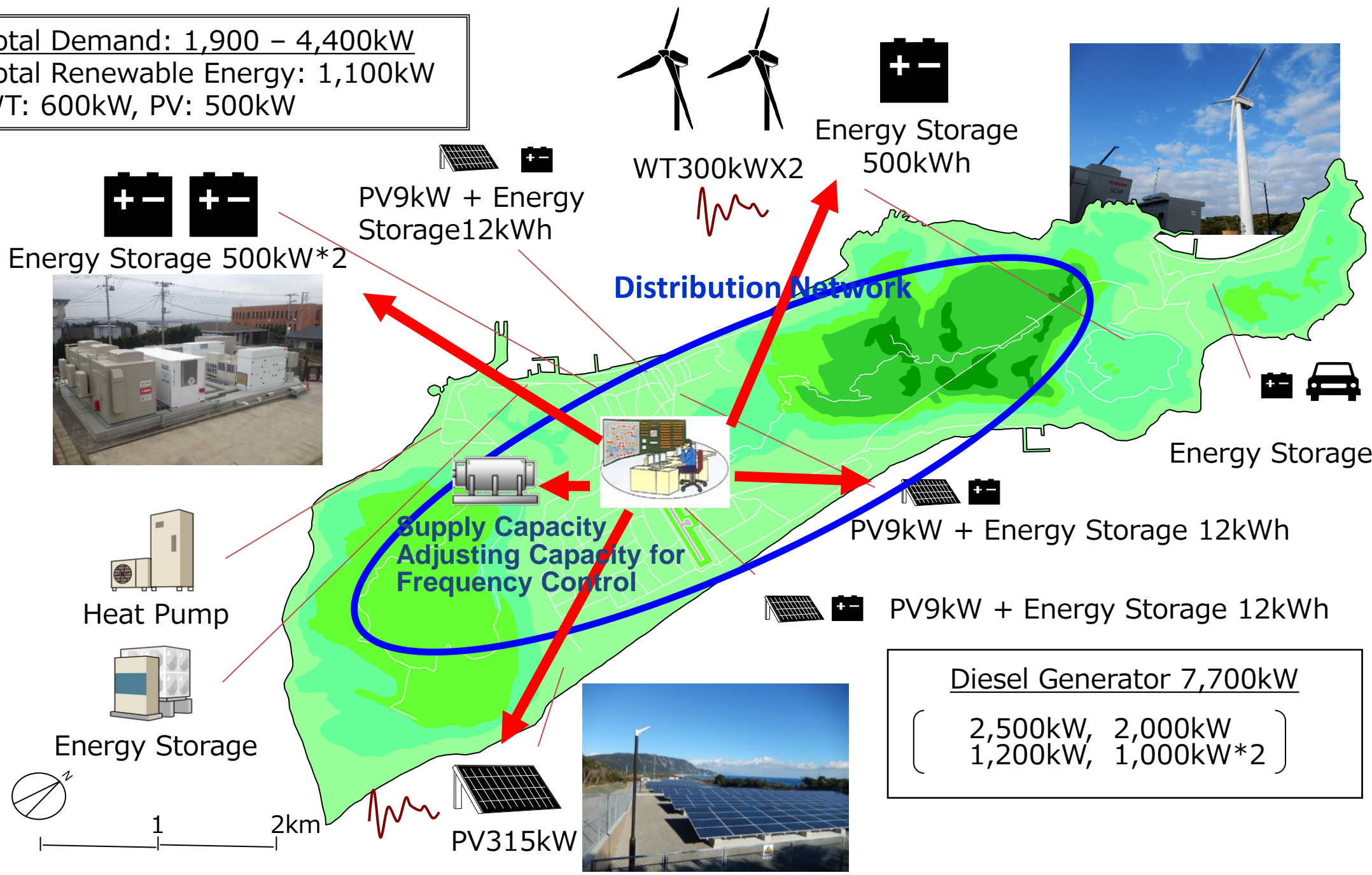
<u>Total Demand: 1,900 – 4,400kW</u>
<u>Diesel Generator 7,700kW</u>
2,500kW, 2,000kW
1,200kW, 1,000kW×2

Objective

To verify EMS to operate the grid efficiently
→ EMS is useful for harmonizing renewable energy

NEDO Demonstration Project for Smart Grid in Niijima Island

Total Demand: 1,900 – 4,400kW
 Total Renewable Energy: 1,100kW
 WT: 600kW, PV: 500kW



Diesel Generator 7,700kW
 (2,500kW, 2,000kW
 1,200kW, 1,000kW*2)

Battery Use in Grids

Battery has potential to solve some issues in Renewable Energy by quick response. For example, Frequency, Reliability, voltage.

	Influences to Grids	issue
Fluctuation		<ul style="list-style-type: none"> • Keep Frequency
Output		<ul style="list-style-type: none"> • Over-generation • Need Backup • Demand-Supply plan in difficult
Distribution widely		<ul style="list-style-type: none"> • Voltage deviation

reference) Electro-heat 2018No.219



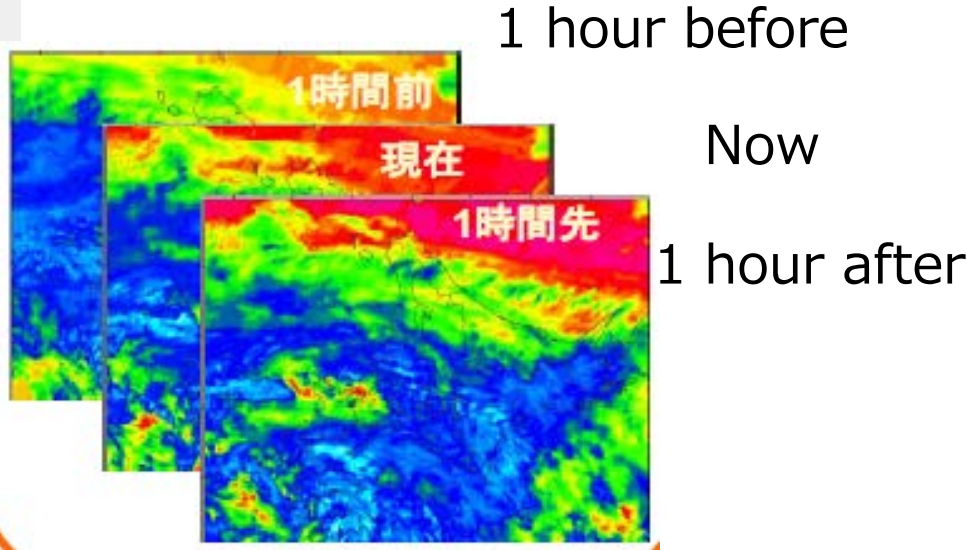
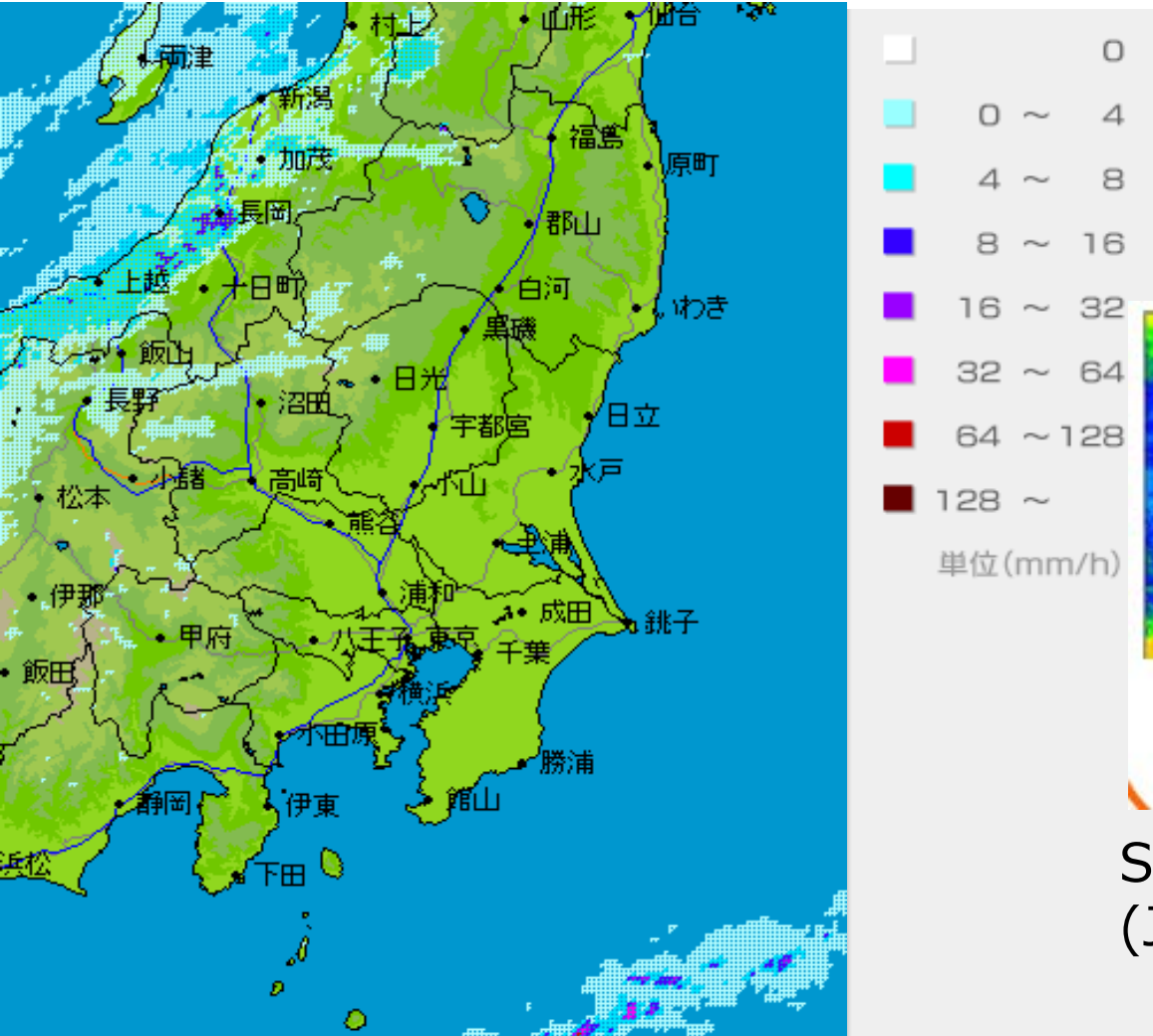
Battery Comparison

There are several kinds of Batteries. It's important to know each battery characteristic before installing grids.

	Lead	NaS	Lion	Redox Flow
Suitable use	Long duration		Short duration	Long duration Short duration
Efficiency	75~87%	90%	94~96%	80~90%
Cycle Life	1,000~5,400	4,500	4,000~15,000	∞
Project Life	10-20 years	15 years	7-20 years	20 years
Energy density	167〔Wh/kg〕	780〔Wh/kg〕	360〔Wh/kg〕	103〔Wh/kg〕
System Cost	500~1,000〔US\$/kWh〕	400〔US\$/kWh〕	500~3,400〔US\$/kWh〕	1,000〔US\$/kWh〕

reference) TEPCO

Weather Forecast System (for Stand-by Spinning Reserve 1 hour after)



Solar Generation Forecast System (Japan Weather Association)

TEPCO Website

EV as an Energy Storage

Objective Reduce fossil energy consumption and CO2 emissions

Outline Electric Vehicle uses electricity only. Quick charger or home charger can be used for electricity charge.

Economy of EV vs Gasoline Car (Assumption)

	Driving a Year	Efficiency	Unit Cost	Expenditure
EV	10,000 km	8 km/kWh	60 UScent/kWh	750 US\$
Gasoline Car	10,000 km	10 km/L	1.2 US\$/L	1,200 US\$



Home charger



Quick Charger

- If an electricity for EV comes from solar it can say a clean car.
- Electricity price may be reduced after Tina or solar are introduced.
- Surplus electricity can be stored.

4. Suggestion on Renewable Energy Introduction in Solomon Islands

National Policy (2018)

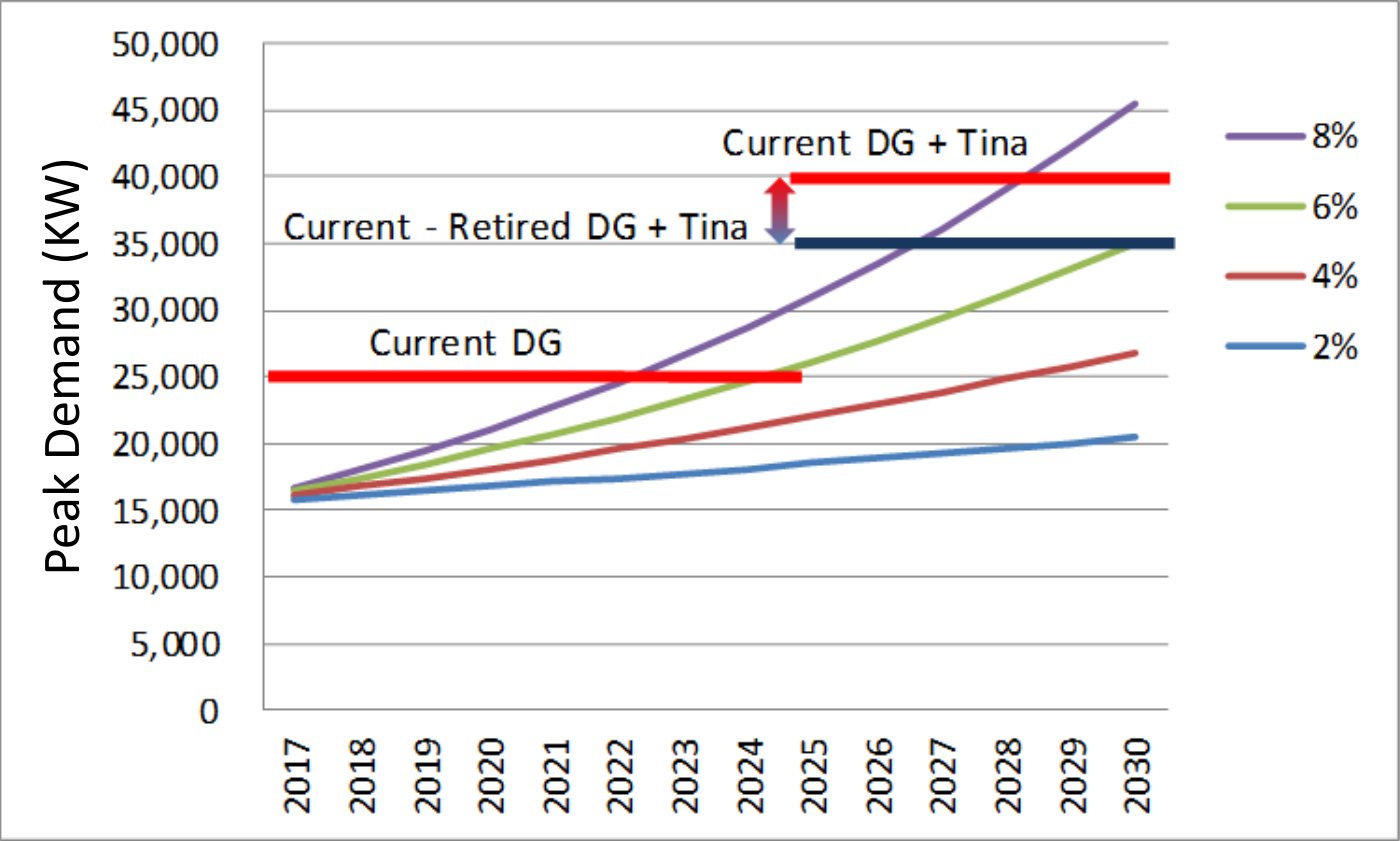
<National Target: Tentative>

Increase the use of renewable energy sources for power generation in urban and rural areas to 50 % by 2035.

<Solomon Power's Target>

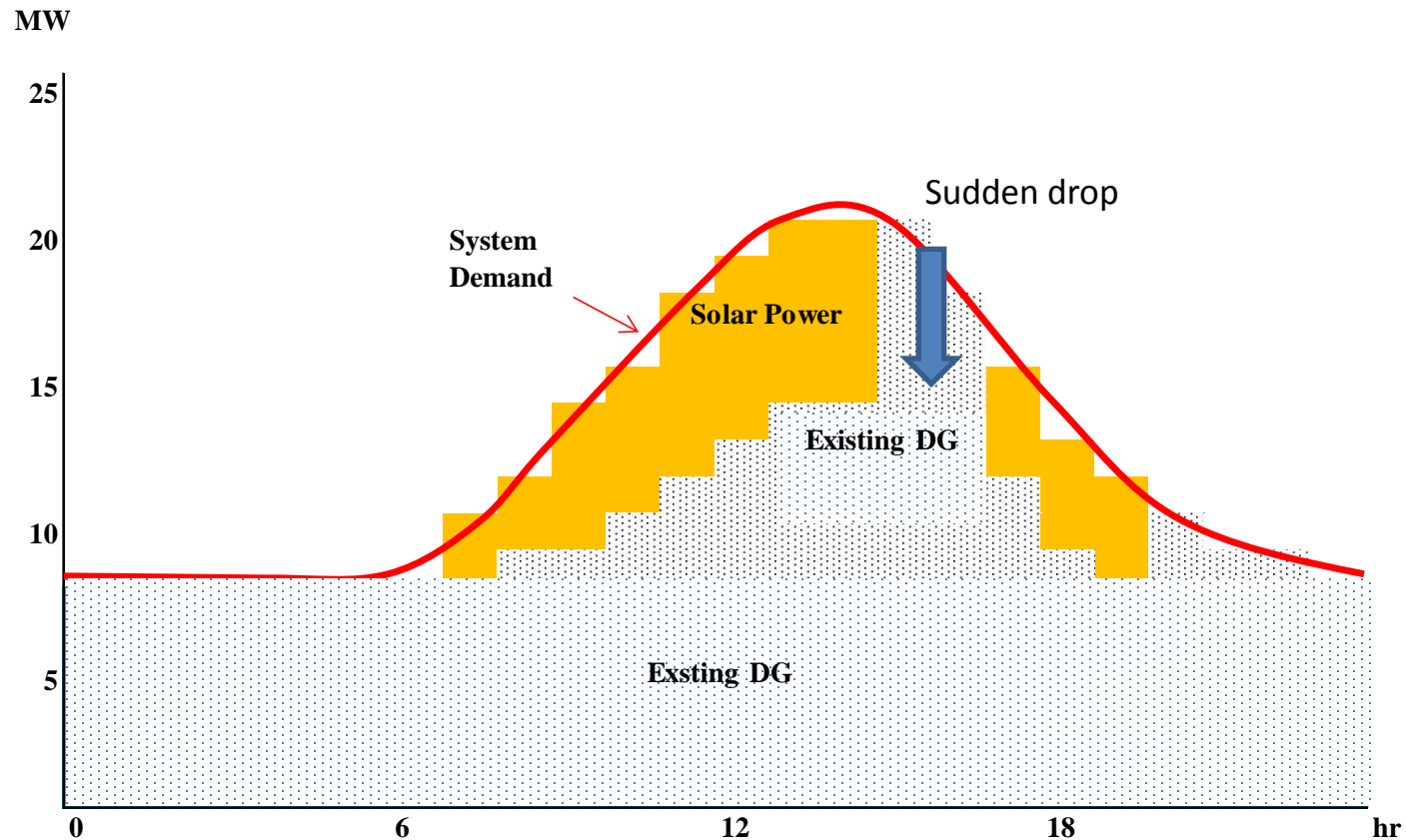
Achievement of 100 % renewable energy introduction in the Honiara grid.

Power Demand Forecast and Generation Capacity



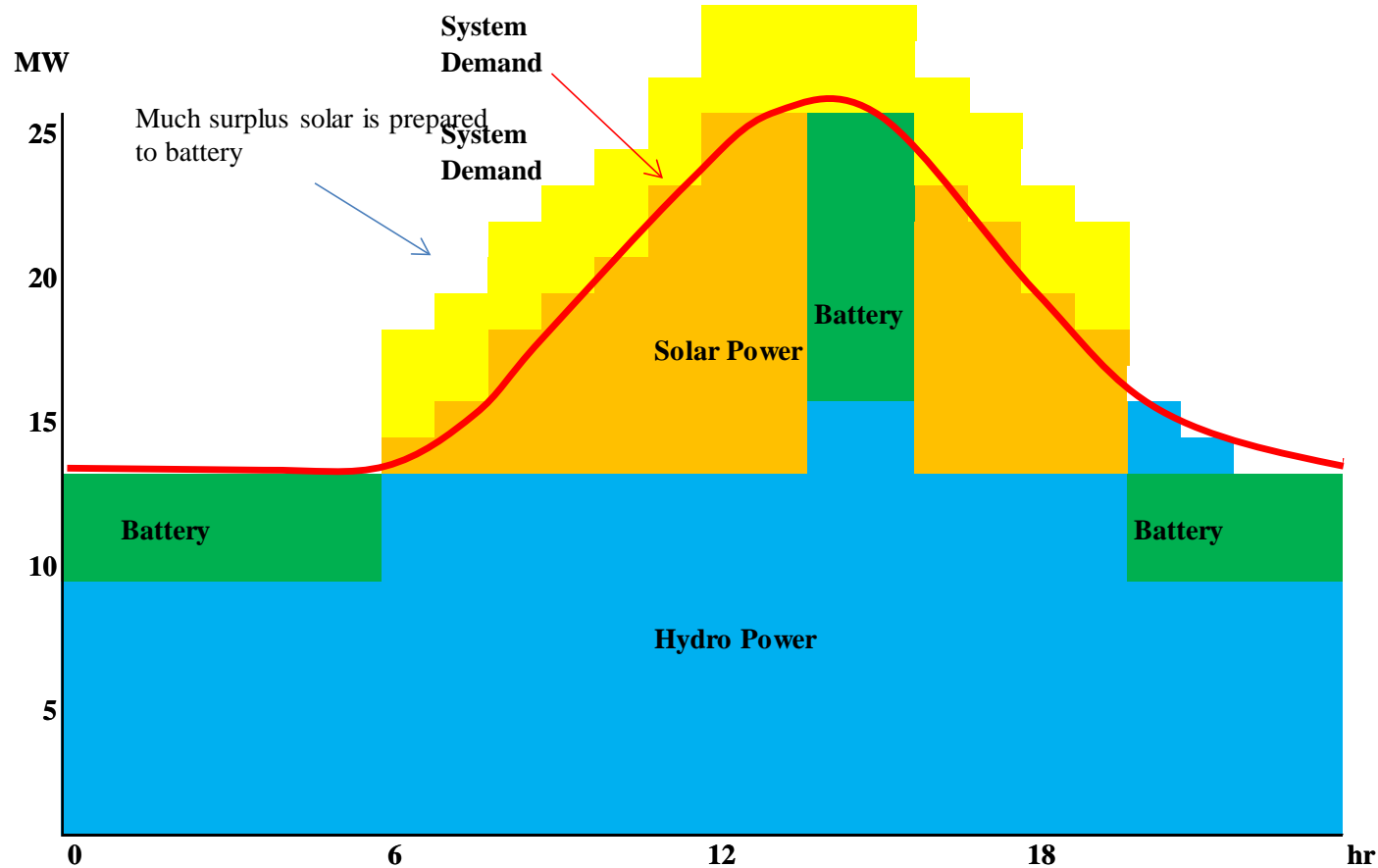
- Peak demand is forecasted by 4 scenarios by SP.
- Existing DG capacity is estimated at 25,000 kW.
- If Tina hydro comes into the grid in 2025, some of DG can be stopped and replaced by Tina.

Assumed Operation in 2022



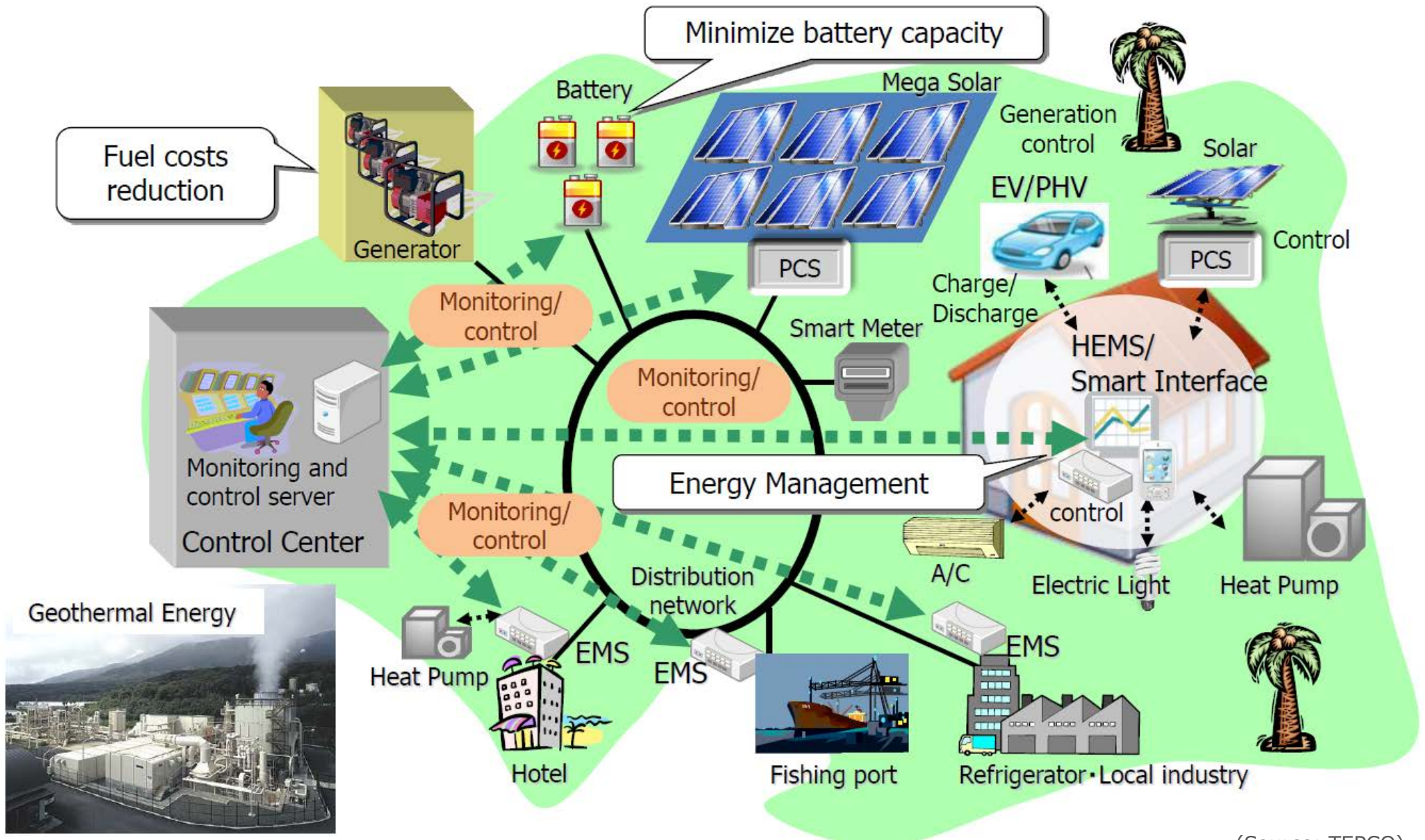
- In 2022, some solar power come into the grid. However it cannot operate in nighttime.
- Solar power sometimes drops in cloudy or rainy hours.
- To fill such gap, existing DG can be a back-up .

Assumed Operation in 2030



- In 2030, Tina hydro comes in to the Grid and it can occupy more than half of generation in a day.
- To achieve 100 % renewable energy, solar power is also introduced.
- However, solar sometimes does not generate in a bad weather and not generate in night time. To fill such gap, existing DG or “Battery” sourced by solar power can be a back-up .

Future Smart Island



(Source: TEPCO)

別添3 ワークショップスライド（民間投資）



JICA's Renewable Energy Workshop (Section 1: Private Investment)

- The trends of RE in the world market and the keys for attraction of private investment-
5 February 2019

JICA Survey Team
for 'Data Collection Survey for the Promotion of Renewable Energy in Solomon Island'

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Appendix:
Other Countries Examples

General investors' view in any countries should be reflected onto the RE roadmap.

Summary

This Presentation

1. Private investment is the key for renewable energy development, rather than public finance in the recent days.
 2. The views/concerns of international private investors are quite similar in any developing countries.
- 
3. Learned lessons from other countries' cases should be reflected on the Solomon Islands' RE framework.
 4. Solomon Islands shall take care of the same points to attract international investors for formulating the framework in the Phase 2.

Case Country	Points to be learned
 Vietnam	Unfair PPA to private investors' risks
 India	Government Supports to reduce investors' risks
 Philippines	Privatization to cut government cost

Forward Second Phase

Establishment of the Roadmap forward renewable energy 100% in consideration to Investors' views in terms of comprehensive perspectives.

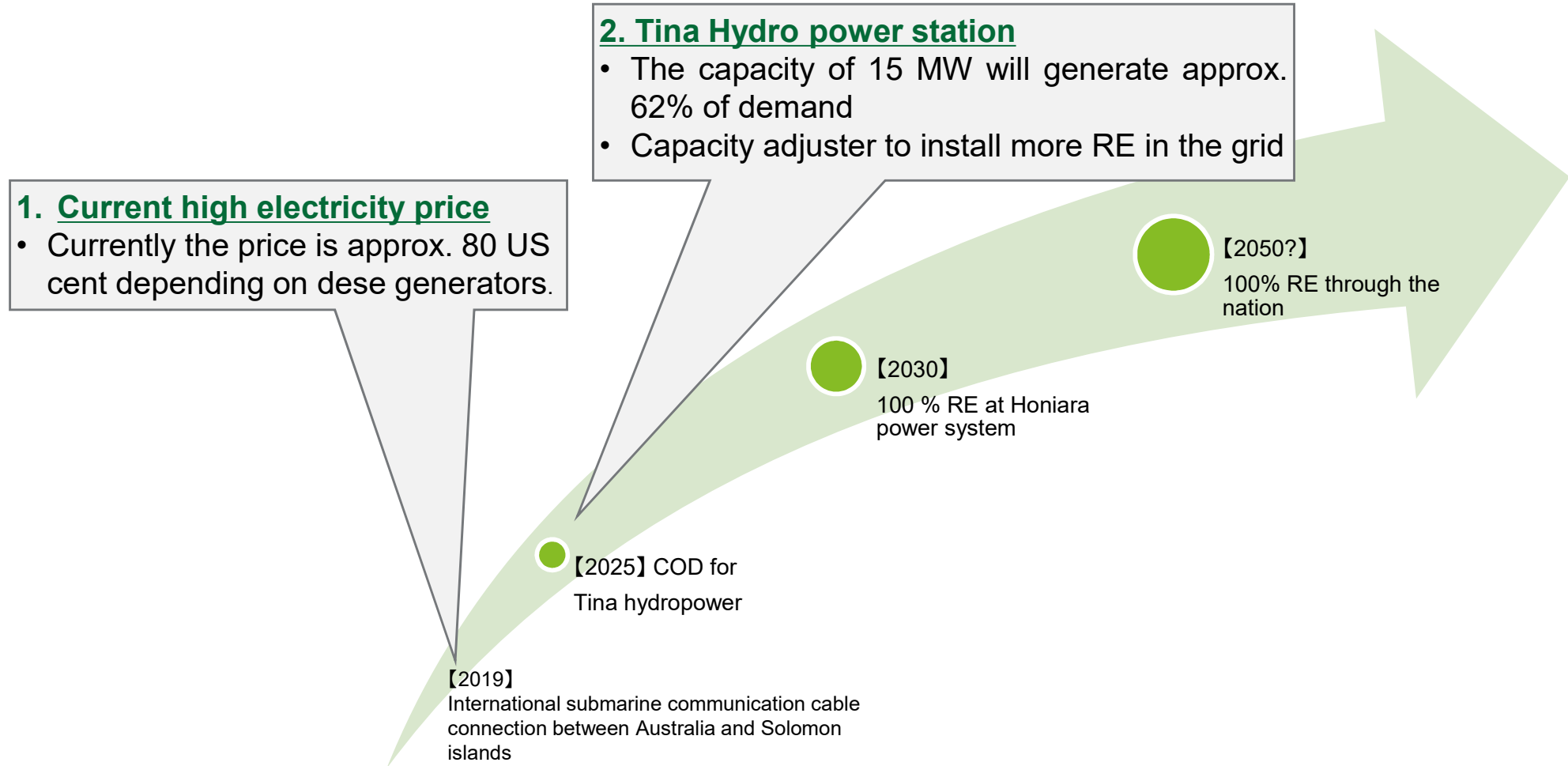
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Appendix:
Other Countries Examples

Solomon Islands has high potential to achieve 100% Renewable Energy.

1.1 Potential for RE 100%



Three phases are expected to achieve 100% Renewable Energy in Solomon Islands.

1.2 Development Steps

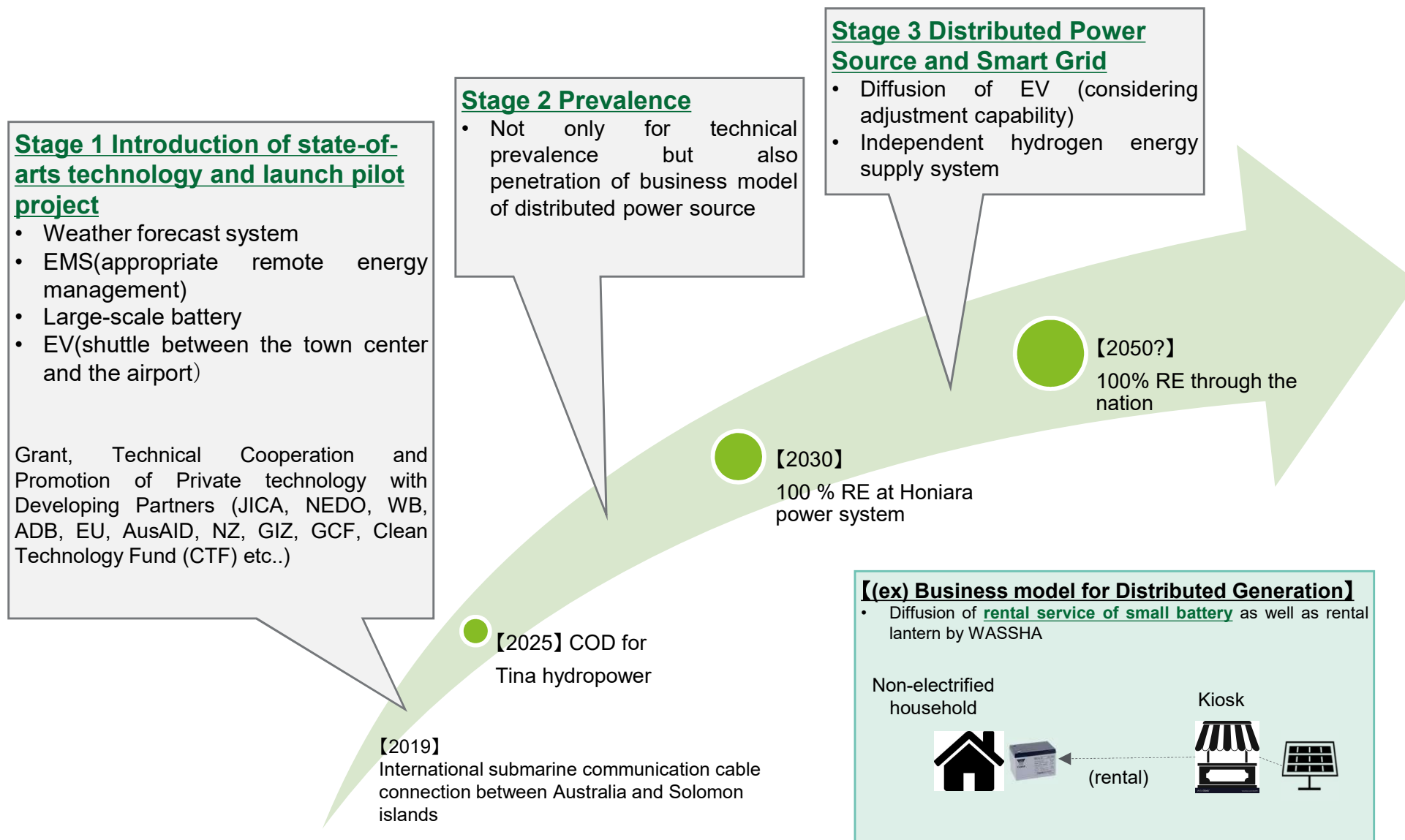


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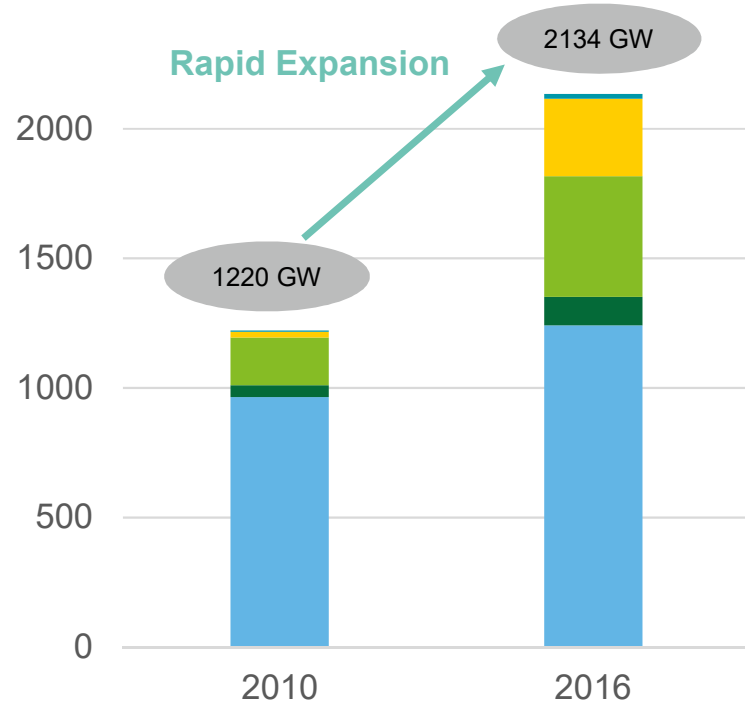
Appendix:
Other Countries Examples

Renewable energy increases around the world.

2.1 Installation and Development

Installed Capacity

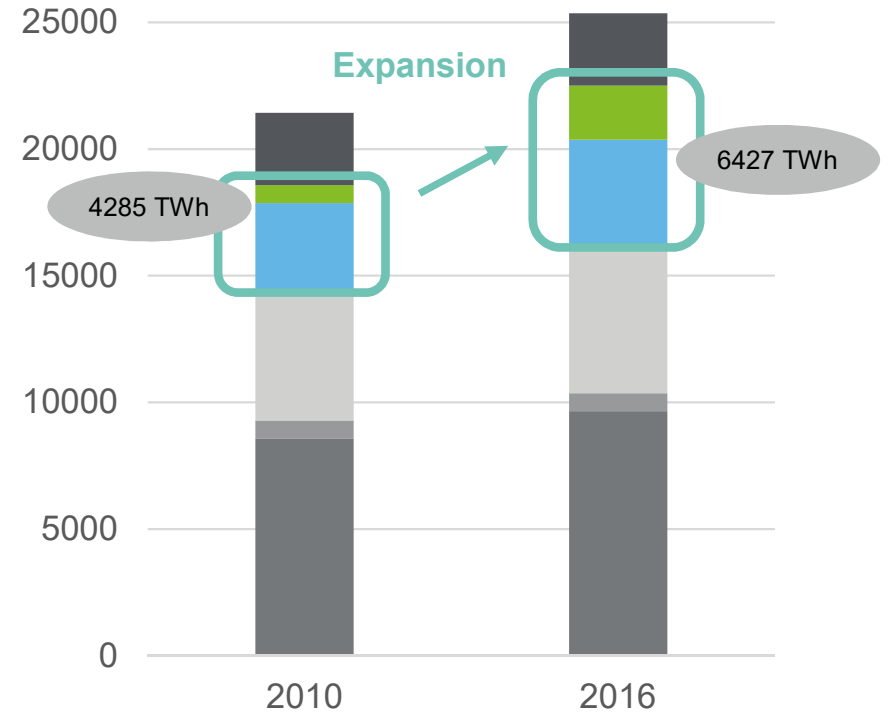
(GW)



- Ocean , CSP, and geothermal power
- solar PV
- Wind
- Bio
- Hydro

Power Generation

(TWh)

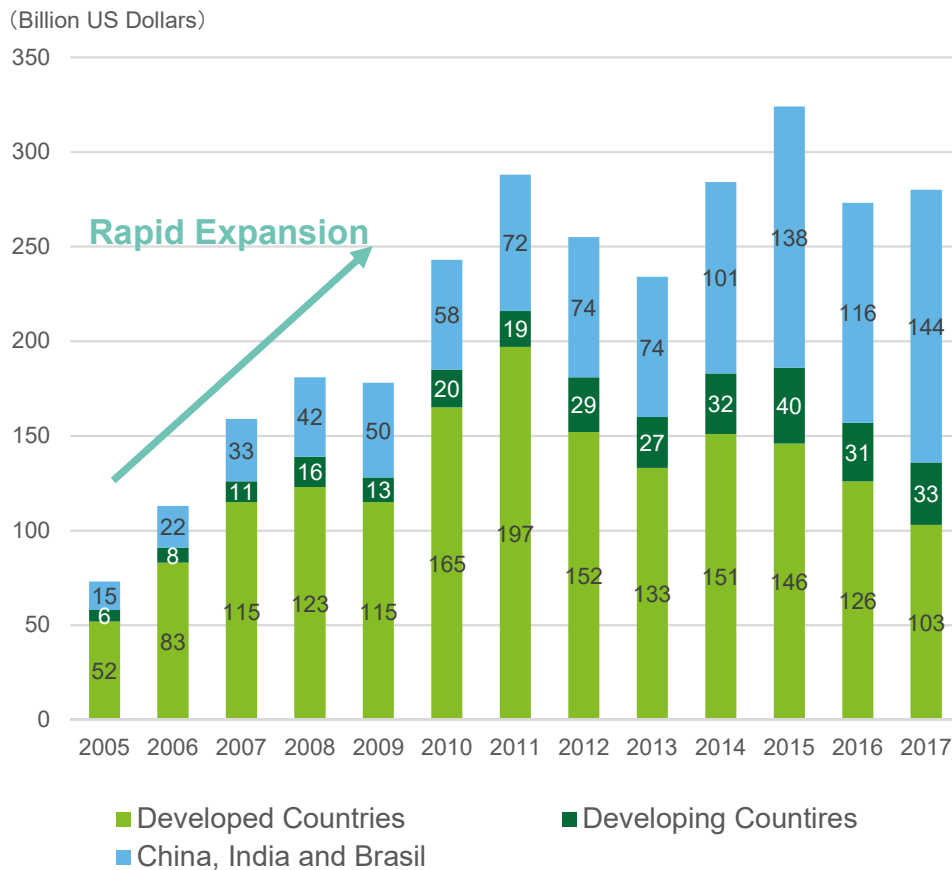


- Nuclear
- Hydro
- Oil
- Others renewable
- Gas
- Coal

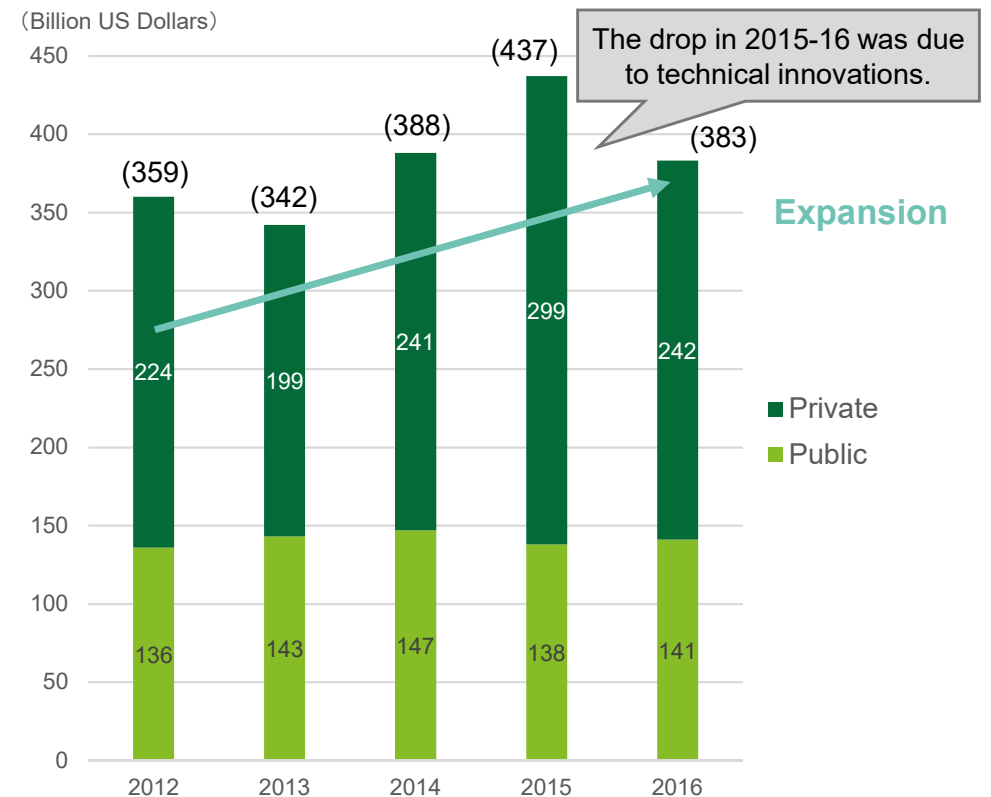
Private Investment on renewable energy has increased steadily in both developed and developing countries instead of public money.

2.2 Investment on Renewable Energy

World Trend of Investment on Renewable Energy



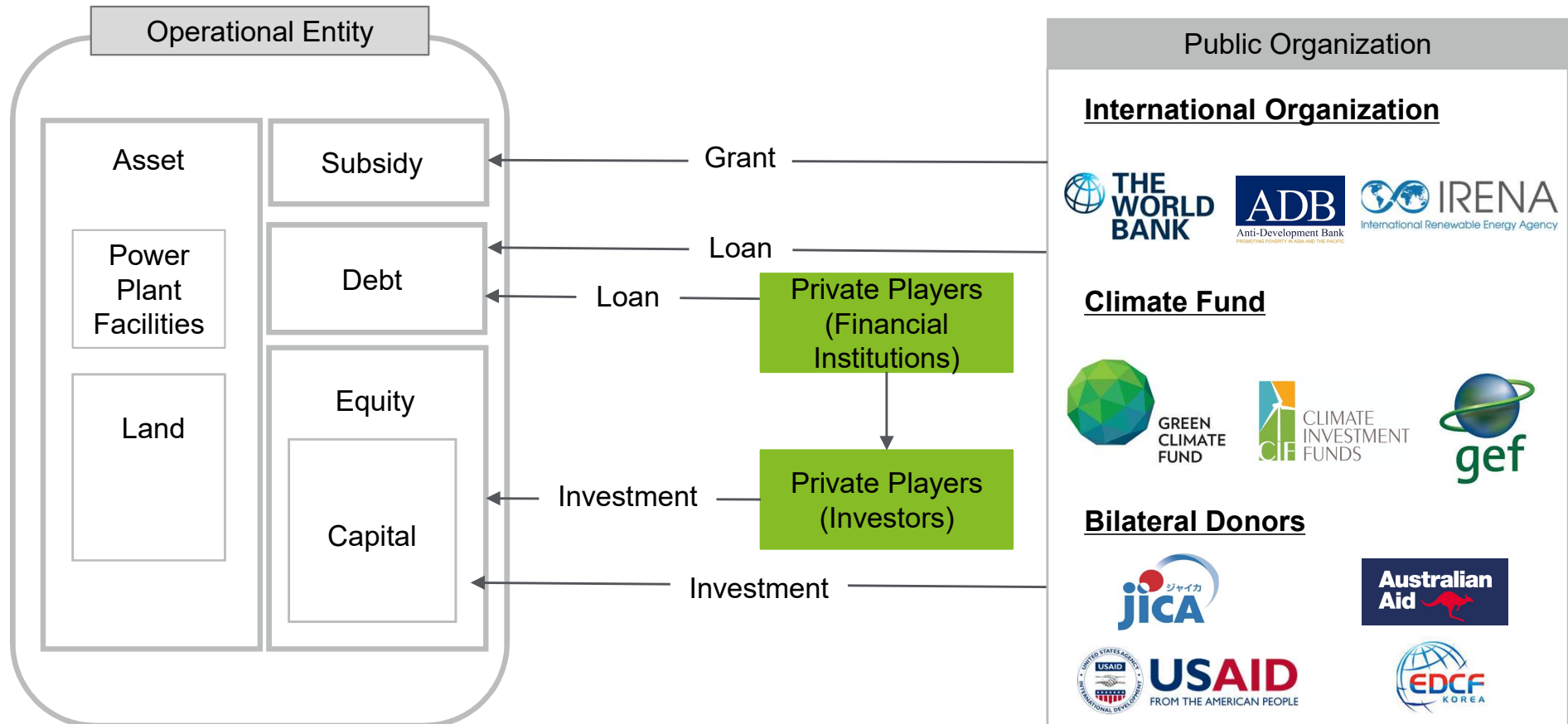
Investments by Sectors



Source: prepared by JICA Survey Team based on UNFCCC(2014), Summary and Recommendations by the Standing Committee on Finance, Climate Policy Initiative (2017), Global Landscape of Climate Change Finance 2017, Climate Policy Initiative (2017), Global Landscape of Climate Change Finance 2017, UNEP and BNEF (2018), and Global Trends in Renewable Energy Investment 2018

Both Public and Private source is available for renewable energy in the Solomon Islands.

2.3 Financing Access for Renewable Energy



The private finance to the power sector which generates cash flow has dramatically been increased, but the public finance to grid sector still plays important roles in developing countries.

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Appendix:
Other Countries Examples

FIT is a driver for installation of renewable energy but not a silver bullet.

3.1 Feed-in-Tariff (FIT)

Benefit

- To lower or avoid a barrier for entering the market.
 - Investors can enjoy a stable and long-term benefit with renewable power.
- To increase the capacity of renewable energy easier
- To develop spherical industry and supply chain promptly

Disadvantage

- Residents should pay expensive electric bills or government should allocate a huge amount of budget to the fund for FIT.
- The amount of approval would be limited not by markets but the political decision.
- Sustainable growth cannot be expected without a market mechanism, causing the end of the “trend” for introducing renewable energy.








- The FIT functions a drive to create a business environment for renewable energy in new markets.
- However, to design appropriate FIT price totally depends on countries due to differences in business environments in each country.



Due to the decreasing price of renewable energy, and oppression of governmental budget, many countries are moving from FIT to market Mechanism.

Transition from FIT to auction has progressed in Asian countries.

3.2 Needs for Private Investment and Auction

Country		Current regulation
 India	From FIT To Auction	<ul style="list-style-type: none"> • 【Wind】 Introduction of auction in some provinces (2017) • 【Solar】 Transition from FIT to auction (Price 2.44INR/kWh (3.4 US cent/kWh *))
 Thailand	From FIT To Auction	<ul style="list-style-type: none"> • 【Wind】 6.6THB/kWh (20.5 US cent/kWh*)(2017) • 【Solar】 5.66-6.85THB/kWh (17.5-21.2 US cent/kWh*) (2017)
 Viet Nam	From FIT To Auction	<ul style="list-style-type: none"> • 【Wind】 1,614VND/kWh (6.9 US cent/kWh) (~2021) • 【Solar PV】 2,086VND/kWh (9.0 US cent/kWh) (~2019)
 Indonesia	Auction	<ul style="list-style-type: none"> • Introduction of auction (2017) • Maximum price is set by regions (17.52 US cent/kWh in the most expensive region)
 Taiwan	From FIT To Auction	<ul style="list-style-type: none"> • 【Offshore wind】 7.1085 NT\$/kWh (22.7 US cent/kWh)(2017) • 【Solar PV】 4.410-6.103 NT\$/kWh (14.1-19.5 US cent/kWh)(2017) Premium is added to Floating solar PV and high efficiency solar panels

* Exchange rates are as of Jan 2019.

Policy/Regulation/Rule to reduce investors' risk is of essence.

3.3 Discussion Points

	Other Developing Countries Cases	Solomon Cases
PPA	<ul style="list-style-type: none">Moderate risk allocation between IPP and off-taker (ex: grid connection, power control etc)	<ul style="list-style-type: none">Soft PPA (5 pages) or Hard PPA (100 pages)There is no format paper. (invisible risks).
Tariff / Land Acquisition	<ul style="list-style-type: none">High tariff with land acquisition by IPPLow tariff with land acquisition by off-taker	<ul style="list-style-type: none">Quite high barrier to acquire land by private players themselves
Government	<ul style="list-style-type: none">Government bond for financeConvertibility Guarantee	<ul style="list-style-type: none">Some tax exemptions
Finance	<ul style="list-style-type: none">Local bank capacity to evaluate RE riskClearance of foreign investment, tax, company law for international players	<ul style="list-style-type: none">High risks tend to prevent private players to obtain finance to projects in Solomon Islands
Others (Infrastructure)	<ul style="list-style-type: none">Local company of Engineering, Procurement, and Construction (EPC)	<ul style="list-style-type: none">Lack of EPC companies

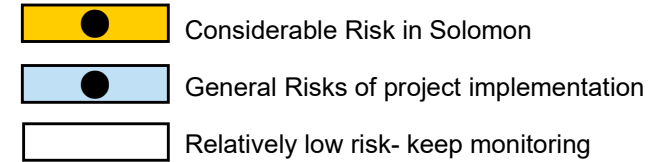
Solomon Islands need to establish environments where international private players could participate into Solomon Markets by mitigating various risks.

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Other Countries Examples

Several risks should be managed through project.



4.1 Risk Mapping for IPP Investment on Solar Project

Risk Patterns in Power Plant Development and Business		Development Flow for Power Project												
		FS	Approval	Land Acquisition	PPA	Spec	EPC Contract	Loan Contract	SPC formation	Construction	O&M		Business	
											Operat ion	Mainten ance	Collect ion	Debt Repaym ent
(1)	Sponsor risk								●					
(2)	Project delay risk		●	●	●	●	●	●						
(3)	Risk on construction completion								●					
(4)	Operational risk										●	●		
(5)	Sales risk				●								●	
(6)	Interest rate risk							●						●
(7)	Foreign exchange risk							●					●	●
(8)	Cash flow risk													●
(9)	Social / Environmental risk	●	●						●					
(10)	Disaster risk								●	●				
(11)	Country risk	The Risk can be caused through all stages.												

Land acquisition, PPA negotiation, and risk mitigation for finance should be considered carefully in Solomon islands.

4.2 Details of Considerable Risks (1/3)

Category		Description
Project Delay Risk	Land Acquisition	<ul style="list-style-type: none"> • Land ownership issues- customary and registered land- can cause not only delay but also suspension and cancellation of projects. <ul style="list-style-type: none"> ➤ Limited numbers of boundaries and owners are registered at Register Title Officer. ➤ Customary lands take a longer time to negotiate for use.
	PPA Negotiation	<ul style="list-style-type: none"> • Few experience of PPA with IPP players • Intra-relation in terms of dealing with PPA
	Loan Contract	<ul style="list-style-type: none"> • Credit risk for SP and the Government of Solomon Islands can cause difficulty for negotiations for the loan agreement. • A possibility of Sovereign Guarantee by the Government of Solomon Islands

Off-takers and foreign exchange should also be carefully considered.

4.2 Details of Considerable Risks (2/3)

Category		Description
Sales Risk	Off-taker	<ul style="list-style-type: none">• The stable power purchase by SP from IPPs. This strongly connects to the financial structure of SP.• The technical capacity of the power system management-planned outage and accidental outage• Business strategy for SP - The concept of market share of SP and IPPs• Development Plan for power plants and transmission/distribution lines can affect the future sales of IPPs.
Foreign Exchange Risk	Securing Foreign Exchange	<ul style="list-style-type: none">• Payment collection is based on Solomon Island Dollars whereas expenditure for the project is mainly in foreign currency; US dollars, Australian dollars and/or others. Some amount of <u>sovereign guarantee</u> is required for <u>securing exchange risk</u> in order to attract IPPs.

Local subcontractors, peripheral infrastructure, and PPA should also be carefully considered.

4.2 Details of Considerable Risks (3/3)

Category		Description
Risk on Construction Completion	Capacity of Local Subcontractors	<ul style="list-style-type: none"> • Well-being financial structure • Technical knowledge and management skills • Deployment of appropriate numbers of skilled labours • Procurement of local materials on time
	Peripheral Infrastructure	<ul style="list-style-type: none"> • The capacity of port facilities and arrangement loading and unloading of construction materials and equipment • Access to the construction site from the port- access road • Connection to the grid- the distance from the existing distribution lines • Responsibility for connection- process, required time and burden of expense on construction and materials
Sales Risk	PPA	<ul style="list-style-type: none"> • Development of PPA format- in consideration of business and environment in the Solomon Islands • Delay in negotiation with IPP due to lack of experience

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Appendix:
Other Countries Examples

Several supports are available for the energy sector of the Solomon Islands.

5. Suggestion for the Second Phase and the Future Cooperation

Private Investment

- Development of Road map toward 100% renewable islands and SP's business model
- Development of contract scheme and incentive for renewable energy
 - Development of PPA format
 - Consultation Risk sharing and management
- Implementation of Pilot Project

Technical

- Technical assistance for developing energy master plan
- Feasibility study for solar PV, wind, and other power sources
- Technical assistance for grid operation with weather forecast and battery
- Technical cooperation for capacity building
- Introductory study of state-of-arts technology on islands etc.....



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Other Countries Examples

Floating solar PV and Redox Flow Battery are beneficial for pursuing the renewable energy goal.

6. Introduction of Japanese Technology

Floating Solar PV

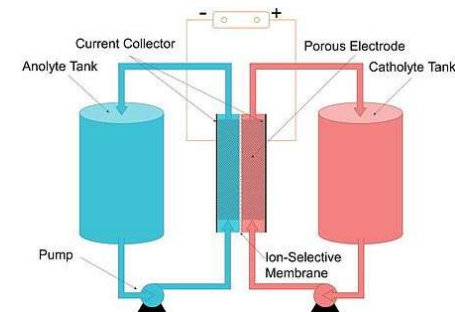
- Floating mounting structure made of High-density Polyethylene (HDPE) moored with chain and/or anchor
- no need to negotiate with landowners
- no shadow
- Cooling by water surface
- Easier construction and assembly work



Source: Mitsui Sumitomo Construction

Redox Flow (RF) Battery

- (container type: bottom right picture) 125 kW / unit
- Continuous 4hrs running
- Long lifetime-20 years
- Safe battery
- RF works for both short term and long term.
 - adaptable for levelling load in short time with weather forecast
 - charge during low-demand and discharge during the high-demand time



Source: Sumitomo Electric industry, Ltd.




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Appendix:
Other Countries Examples
A1: India
A2: Vietnam
A3: Philippines


There are many practices to attract private investment in Asia.

A.0 Examples of Attraction of Investment Appetite in Asia

Category				
Land and Loan	Land Acquisition	Beneficial	Moderate	Not attractive
Business environment and Infrastructure	Foreign Investment	Beneficial	Beneficial	Moderate
	Regulation and Tax Exemption	Beneficial	Beneficial	Beneficial
	Capacity of Local Subcontractors	Beneficial	Moderate	Beneficial
	Grid connection and other Infrastructure	Moderate	Not attractive	Not attractive
PPA	PPA	Moderate	Not attractive	Beneficial
Credit	Off-taker	Moderate	Not attractive	Not attractive
	Securing Foreign Exchange			Not attractive

A.1 INDIA



Category		
Land and Loan	Land Acquisition	Beneficial
Business environment and Infrastructure	Foreign Investment	Beneficial
	Regulation and Tax Exemption	Beneficial
	Capacity of Local Subcontractors	Beneficial
	Grid connection and other Infrastructure	Moderate
PPA	PPA	Moderate
Credit	Off-taker	Moderate
	Securing Foreign Exchange	

Rapid growth of solar PV and wind is targeted in National Power Planning



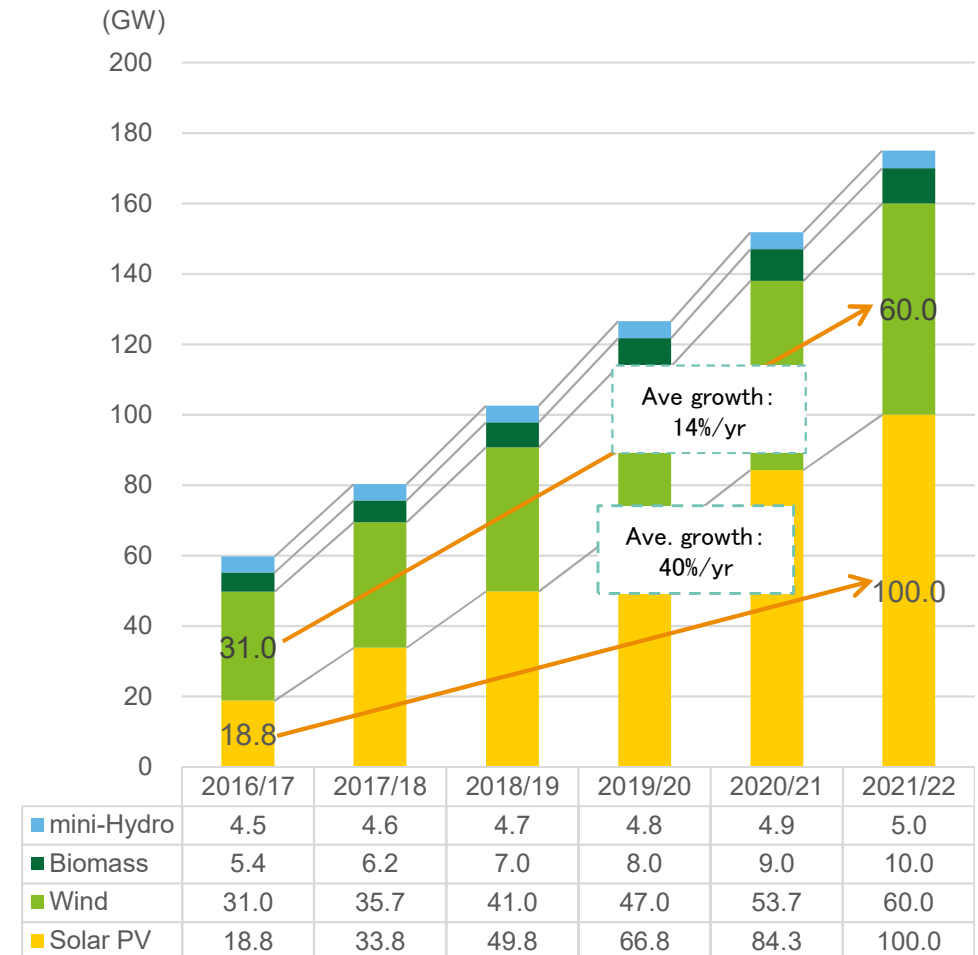
A.1 INDIA

A.1.1 Renewable Energy (Policy)

Law and Regulation

From MW to GW	<ul style="list-style-type: none"> Ministry of New Renewable Energy (MNRE) publicized transformative plan to expand the capacity of renewable energy to 175 GW by 2022 (2015)
Wind power development plan	<p>【Onshore wind】</p> <ul style="list-style-type: none"> Installation target is set as 60 GW by 2022, namely 5 GW increase per year over 5 years. <p>【Offshore wind】</p> <ul style="list-style-type: none"> The 1st auction for development of offshore wind is planned 2018-19. (1-2GW).
Solar PV development plan (JNNSM)	<ul style="list-style-type: none"> Installation target of the gov't is 100 GW by 2022 namely increase of more than 15 GW in solar PV is planned. 60 GW and 40 GW are planned for on-ground and on-roof respectively. Solar Park Plan is launched by MNRE. In the plan, SECI conducts procurement through auction in cooperation with provincial gov't.

Renewable Energy Development Plan (~2022)





Renewable energy will be the main power source after 2030.

A.1 INDIA

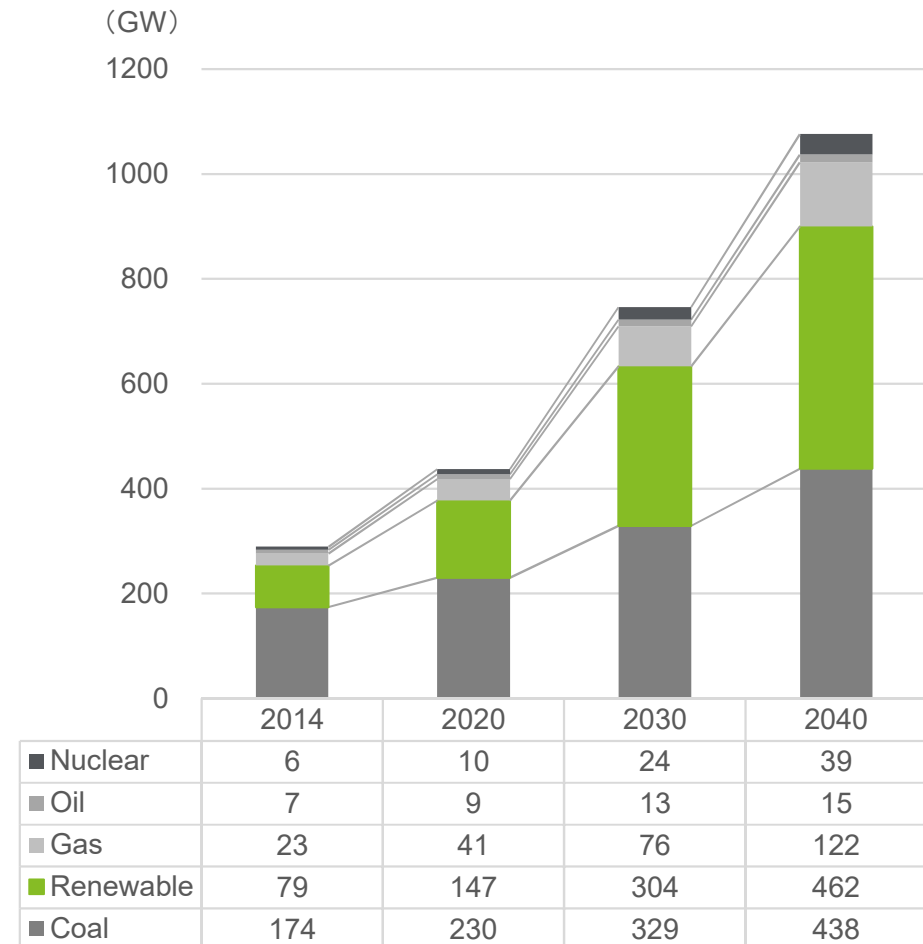
A.1.2 Business Environment (Climate Change and Energy Policy)

- Renewable energy will be the main power source after 2030 in consideration to the acceleration of renewable energy and deceleration of coal-fired thermal power plant.
- Green finance is recommended by the gov't both in public and private sector for Environmental and social projects and

Laws, Regulation and Green Finance

National Energy Policy (2017)	<ul style="list-style-type: none"> • Target: <ul style="list-style-type: none"> ➢ Development of 100 smart cities ➢ 10% reduction in crude oil import by 2022 (base year: 2014-15) ➢ Installation of 175 GW by 2022 Feature: <ul style="list-style-type: none"> ➢ Promotion of development of nuclear energy ➢ Promotion of development of distributed generators
Intended nationally Determined Contribution to Paris Agreement(2016)	<ul style="list-style-type: none"> • Reduction of 33-35% in the emission of GHG per GDP by 2030 (Base: 2005) • Target proportion of non-fossil fuel based generation is set as 40% by 2030 under an assumption of technical support by developed countries.
Green bond guideline and relating guidance	<ul style="list-style-type: none"> • Disclosure Requirements for issuance and Listing of Green Debt Securities (2017) • Green Banking Road Map (2017)

National Power Development Plan (~2040)



Federal gov't supports private investors in land acquisition and grid connection to mitigate investors' burden



A.1 India

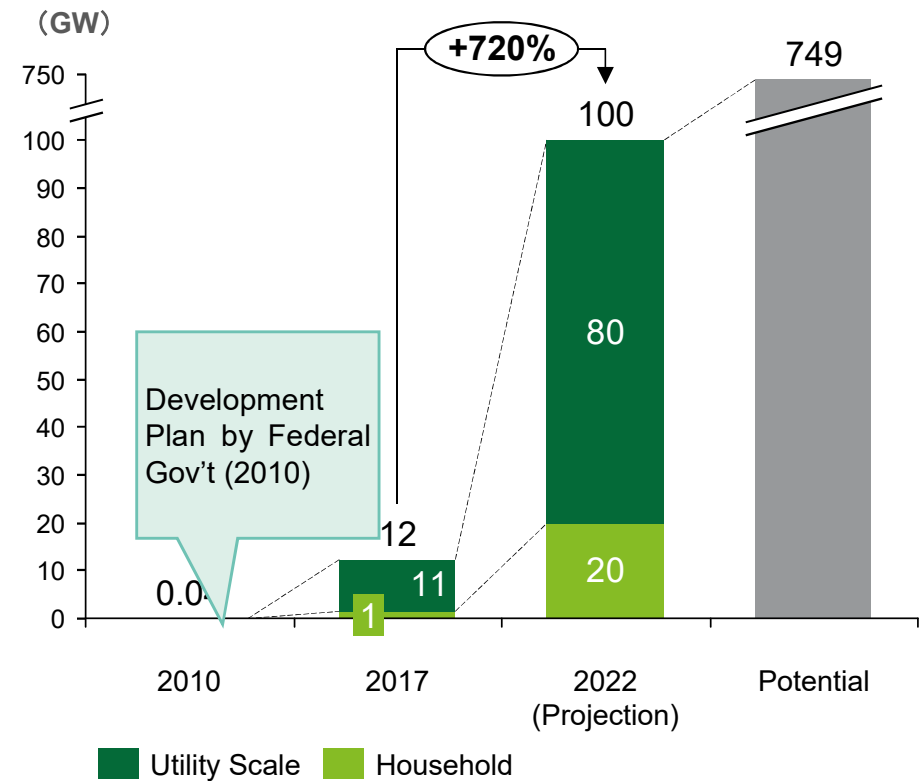
A.1.3 Example of Solar PV Schemes in India

- Since 2014, “Solar Park” scheme fully supported by the federal gov't is the mainstream of procurement of solar PV generation in utility-scale, boosting renewable energy in India.

Solar Park Projects

- Solar Energy Corporation of India (SECI), funded by federal gov't, procures IPP through bidding in cooperation with provincial gov't.
- **The federal gov't supports land acquisition and grid connection aiming to mitigate the burden of IPPs.**
- A capacity of 7.4 GW was under construction as of 2016, while 20 GW was initially planned for 34 projects in 21 provinces. In 2014.

Solar PV Development Plan (~2040)



The gov't aims to attract appetite of foreign investments with incentives of import tax exemption and invest permission.



A.1 India

A.1.4 Renewable Energy(Promotion Incentives)

	Incentives	Description
Renewable energy	Renewable Purchase Obligation (RPO) Scheme	<ul style="list-style-type: none"> Enforcement in 2010 Target is 7% as of 2017 and 15% as of 2020
	Tax exemption and other support by gov't	<ul style="list-style-type: none"> Investment permissions on renewable energy are given to foreign investors. Import tax exemption is adopted to renewable industry (except solar. Safeguard duty of 25% from China and Malaysia from 2018 to 2020).
Solar PV	"MUST RUN"	<ul style="list-style-type: none"> IPPs can receive compensation from GUVNL(GUJARAT URJA VIKAS NIGAM LTD) for disconnection order and suppression order if their power plant commissioned properly except the cases in which there is grid security problems and/or security problems on equipment, person, or others).
	Net metering system (NMS)	<ul style="list-style-type: none"> A surplus of generated power by rooftop system can be sent and sold to the grid system. NMS is under the jurisdiction of provincial gov't.
Wind	Accelerated depreciation	<ul style="list-style-type: none"> IPPs can depreciate their assets at 40%. The depreciation allows IPPs to depreciate earlier and to save a tax.

Severe fiscal situation of provincial government and lack of transmission infrastructure delay the progress of RE




A.1 India

A.1.5 Renewable Energy(Issues)

Problems	Description
Financial situation of provincial government	<ul style="list-style-type: none"> The severe financial situation of provincial government can inhibit the installation of renewable energy due to a higher cost than other energy. Credit capability varies each province.
Technical issues for distribution	<ul style="list-style-type: none"> In rural area engineers and technicians for transmission lines are not enough to maintain. Operational know-how and experiences are required with renewable energy that causes.
Lack of Transmission facilities	<ul style="list-style-type: none"> Instability on the national grid is assumed due to the installation of a large capacity of renewable energy (solar PV:100GW and wind: 60GW). Construction of the transmission line, stabilization of the grid operation and installation of batteries in nationwide are not organized by the federal government, whereas each province implement countermeasures for power system stability. Large transmission loss of 30% affects finance of distribution companies..
Decline in electricity sales price	<ul style="list-style-type: none"> The electricity sales price for solar PV and wind have dropped because both solar PV and wind were transferred from FIT. Risk on sales has risen because provincial governments do not agree with the price that IPPs awarded with for PPA due to sales price's plunge by a national project (JNNSM).
Delay in diffusion of rooftop solar PV system	<ul style="list-style-type: none"> The delay is caused due to negative action by the province's distribution company. Introducing rooftop systems on a large scale is challenging because of the small capacity of Individual system.
Change in policy for industrial development	<ul style="list-style-type: none"> The government has put forth a policy to bolster domestic industry of solar PV, which may cause localization requirement. (Import Tax, Local Contents' Rate, etc)

A.2 Vietnam



Category		
Land and Loan	Land Acquisition	Moderate
Business environment and Infrastructure	Foreign Investment	Beneficial
	Regulation and Tax Exemption	Beneficial
	Capacity of Local Subcontractors	Moderate
	Grid connection and other Infrastructure	Not attractive
PPA	PPA	Not attractive
Credit	Off-taker	Not attractive
	Securing Foreign Exchange	

The targets are energy mix and utilization of domestic natural resource through the development of renewable energy and coal



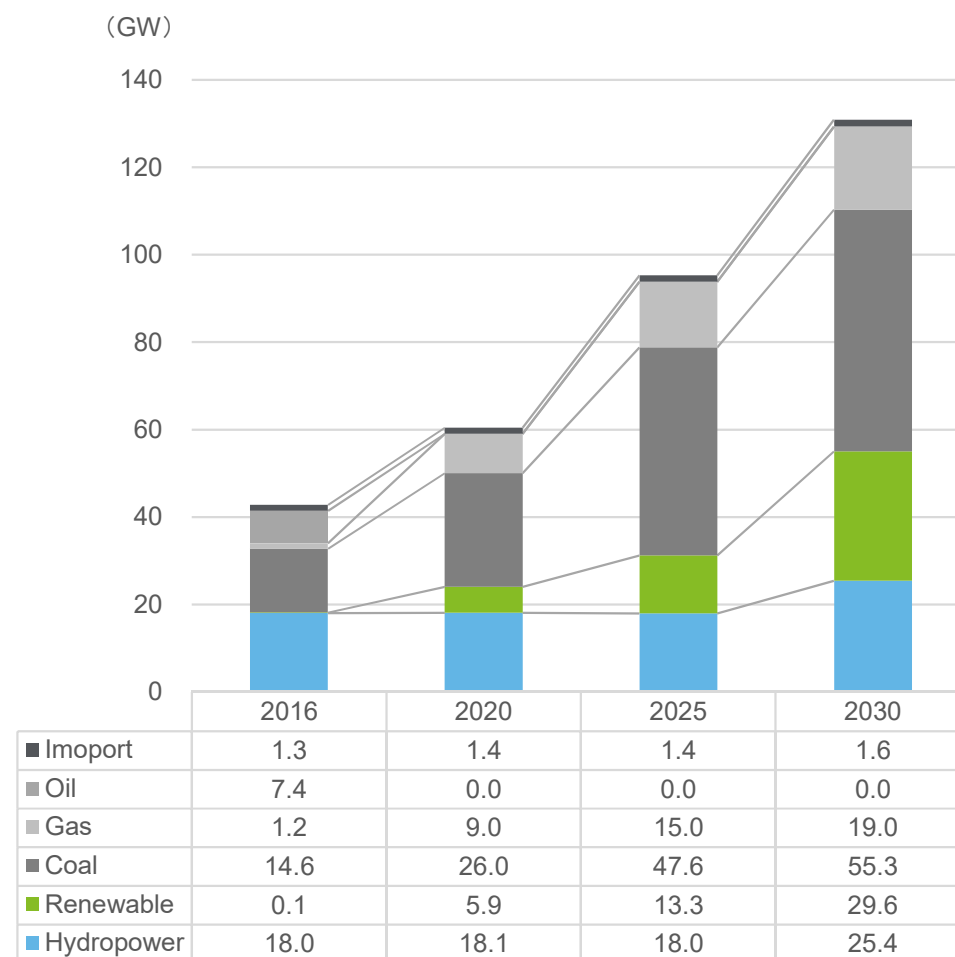
A.2 Viet Nam

A.2.1 Business Environment(Climate Change and Energy Policy)

Laws, Regulation and Green Finance

Power Development plan (PDP) 7 2011-2020	<ul style="list-style-type: none"> • Target: To assure energy security with efficient use of resource and energy mix • Overview: 【Energy Security】 <ul style="list-style-type: none"> ➢ Import of coal ➢ Promotion of renewable energy(*1) ➢ Solar PV as one of the most important power sources(*2) 【Introduction of Energy Market Mechanism】 <ul style="list-style-type: none"> ➢ Decisions of electric bills based on energy market mechanism (to aim reduction of electric price as 8~9 US cent/kWh by 2020)
Intended nationally Determined Contribution to Paris Agreement(2015)	<ul style="list-style-type: none"> • Reduction of 8% (62.65Mt-CO2) in GHG emission by 2030
Green bond guideline and relating guidance	<ul style="list-style-type: none"> • Policy and regulation relating to green finance were established by SBV and MoF. The next action is to issue a green bond and establish an action plan for the guideline.

Power Development Plan (~2030)



The gov't bolsters renewable energy, in particular, wind, biomass and solar PV are prioritized in Renewable Energy Development Strategy



A.2 Viet Nam

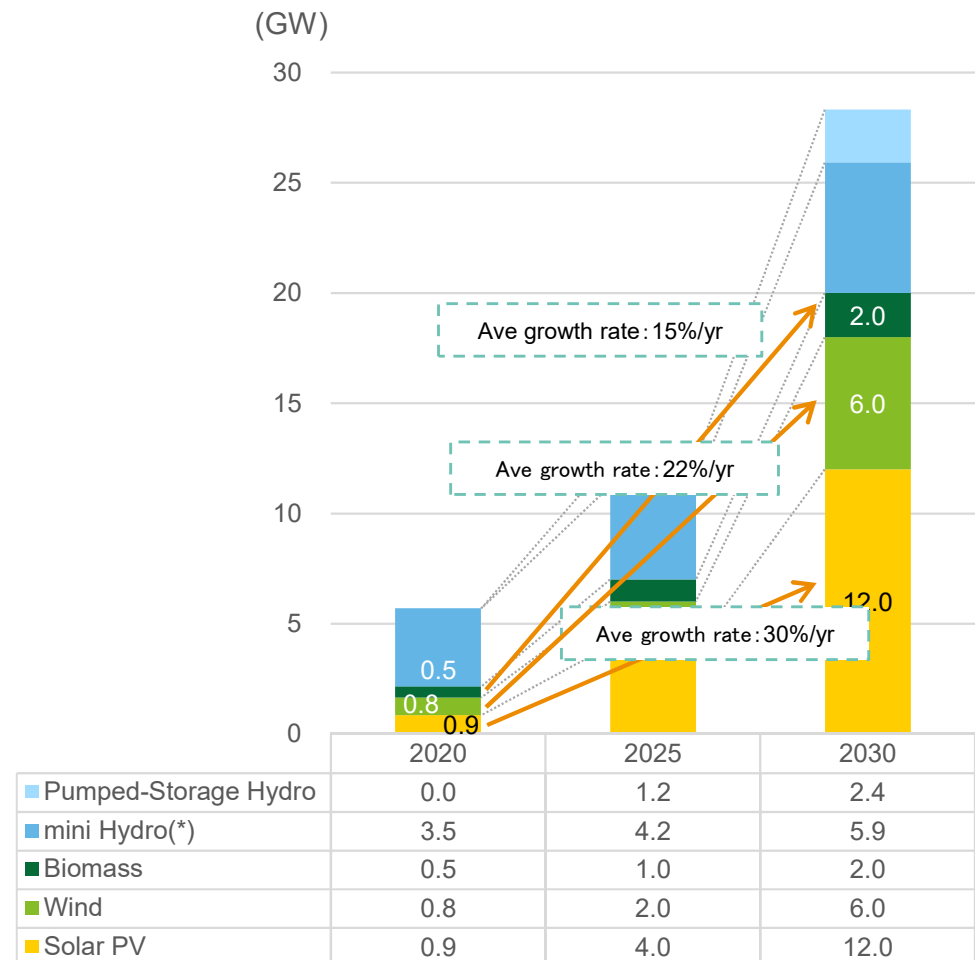
A.2.2 Renewable Energy (Policy)

Law and Regulation

Renewable Energy Development Strategy (2016)

- Target: Promotion of Renewable Energy and reduction of GHG emission
- Overview:
 - 【Renewable Energy Development Strategy】**
 - The proportion of renewable energy; 7% by 2020 and 10% by 2030 respectively.
 - Wind, Biomass and solar PV are prioritized.
 - Promoting onshore wind by 2030 and studying offshore wind after 2030.
 - 【Introduction of Market Mechanism】**
 - Adoption of FIT to grid-connected power plants.
 - Establishment of Sustainable Energy Promotion Fund (SEPF)
 - 【Reduction of GHG】**
 - Reduction of 5%, 25%, and 25% by 2020, 2030, and 2050 respectively, through reducing import of oil and coal.

Renewable Energy Development Plan (~2030)



*: excluding Hydropower plants (30MW or more)

Source: prepared by JICA survey Team based on MOIT(2017)

• Various laws and regulations support an introduction of renewable energy.



A.2 Viet Nam

A.2.3 Renewable Energy(Promotion Incentives)

Incentives	Description
Tax Exemption	<ul style="list-style-type: none"> • Import tax is waived for materials that are not produced in the Philippines. • Corporate tax reduction for the first 15 years after commencement of operation; 10% for the first 15 years (after 15 years, 28%). Additional tax exemption for the first 4 years after commencement of operation and 50% reduction for the subsequent 9 years.
Land Availability	<ul style="list-style-type: none"> • Reduction in land use charge, land lease charge and water surface lease charge at least 14 years for power plant and transmission lines projects. • Provincial gov't must allocate the land to IPPs as per the approved land use plan.
Financing	<ul style="list-style-type: none"> • Investment share between foreign and domestic investors is not limited. • As for Solar PV, investors receive incentives for investment trust and import trust by 70% of total capital investment.
FIT	<ul style="list-style-type: none"> • FIT price for wind (onshore) power raised by 9%(US\$ 7) upon existing IPPs' requests. • FIT for solar PV will end at the end of June 2019 and auction scheme is being studied for post-FIT (WB). • Biomass and geothermal are studied for FIT adoption.
Net metering system (NES)	<ul style="list-style-type: none"> • Factory, commercial building, and household enable to send and sell a surplus of generation. • Sales price is same as FIT and there is no limit for the number of sales.
Sustainable Energy Promotion Fund (SEPF)	<ul style="list-style-type: none"> • The fund is established and funded by gov't budget and revenue from the environmental fee levied on fossil fuel; • Compensate the costs incurred by power entities on the: Investment in independent power systems using independent RE-based power sources.
Renewable Portfolio Standard (RPS)	<ul style="list-style-type: none"> • Generation company and distribution company are obliged to supply and purchase the defined amount of renewable energy respectively as follows; <ul style="list-style-type: none"> ➢ Generation company (1GW or more except BOT): 3% (2020), 10% (2030), 20%(2050) ➢ Distribution company: 5% (2020), 10% (2030), 20%(2050)

- **Commercial risks are shouldered by IPPs much more than EVN in Standard PPA.**




A.2 Viet Nam

A.2.4 Renewable Energy(Issues)

Issues		Description
Standard power purchase agreement (SPPA)	Off-taker's risk	<ul style="list-style-type: none"> • EVN can terminate the contract only with their own business, whereas the compensation is secured only for one year. • EVN can reject to purchase the generated power only with their technical reasons of transmission line while those technical issues are justified by EVN.
	Political risk	<ul style="list-style-type: none"> • The loss for IPPs due to policy shift isn't indemnified.
	Compliment deal	<ul style="list-style-type: none"> • International arbitration is not accepted.
	Grid connection	<ul style="list-style-type: none"> • IPPs generally bear the cost for grid connection.
	Electricity price	<ul style="list-style-type: none"> • FIT guarantees a fixed-price for 20 years but doesn't consider price escalation.
FIT	<p><u>FIT scheme will end in June 2019 and will transit to auction.</u></p> <p>【Wind】 FIT price for wind (onshore) power doesn't attract much appetite from foreign investors even after raising the price by 9%(US\$ 7).</p> <p>【Solar】 FIT is impossible to develop new solar PV projects in consideration to the deadline of adaptation for the current FIT scheme. In order to adopt current FIT, IPPs should commence operation by the end of June 2019.</p>	
Net metering system (NMS)	<ul style="list-style-type: none"> • NES is enforced but the scheme has not capitalized so far. Therefore, EVN has not created operational guidance for NMS. 	
Others	<ul style="list-style-type: none"> • Poor incentive and support for renewable energy • Poor capacity building • Poor infrastructure in rural areas • Complicated process for permission • Concerns about the stability and capacity of the national grid. 	

A.3 Philippines



Category		
Land and Loan	Land Acquisition	Not attractive
Business environment and Infrastructure	Foreign Investment	Moderate
	Regulation and Tax Exemption	Beneficial
	Capacity of Local Subcontractors	Beneficial
	Grid connection and other Infrastructure	Not attractive
PPA	PPA	Beneficial
Credit	Off-taker	Not attractive
	Securing Foreign Exchange	Not attractive



Privatization in the energy sector (generation) has been progressed.

A.3 Philippines

A.3.1 The energy sector in Philippines

- Transformation of the energy sector has progressed under the Electric Industry Reform Act (EPIRA) since 2001 and the country debt is likely reduced by 40%.

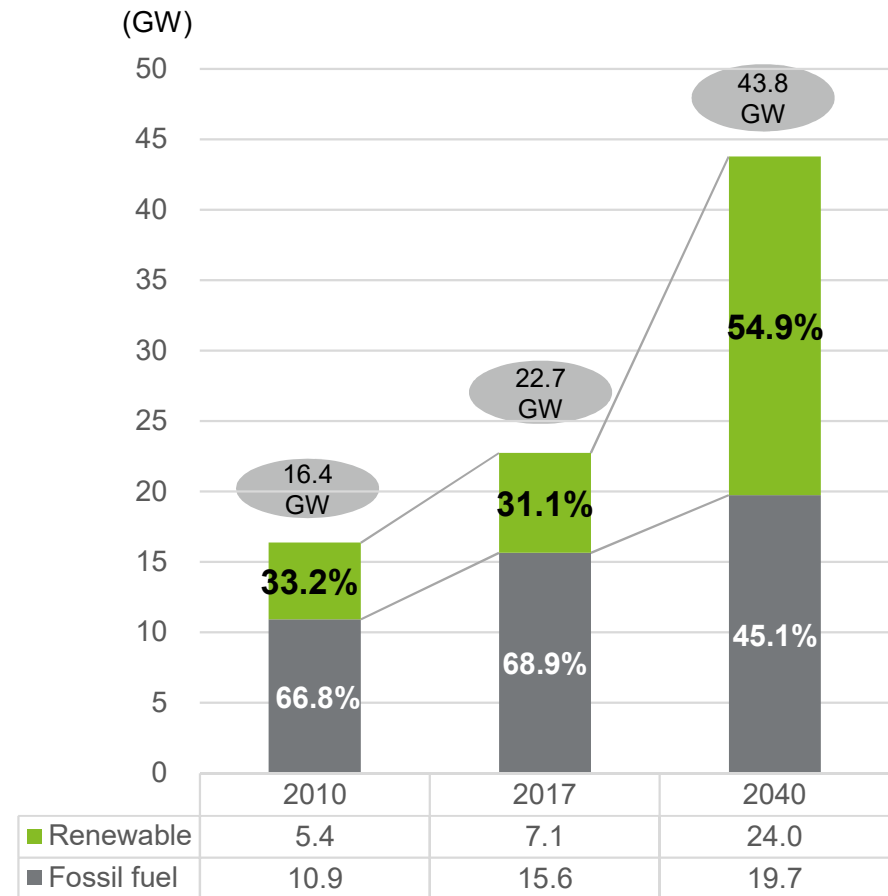
Category	2000	Progress in 2017
Privatization	–	4601.43 (73.8%) / 6233.53 MW
Selling to IPP	–	3607.52 (73.5%) / 4906.22 MW
Foreign Debt	PhP 830 billion	PhP 490.7 billion (US \$9.72 billion)
Contestable Customer	240 (in 2013)	898

* Exchange rate as of Jan 2019

Privatization of the Sector

- National Power Company is a state-owned enterprise that has been dedicated to the development of rural electrification from the former biggest power generator.
- 6233 MW and 4906 MW were identified for privatization and IPP contractors respectively.
- Since the transformation commenced, EPIRA has sold 73.8% of identified capacity for privatization and 73.5% for IPPs.
- This progress in deals has improved foreign debt of the Philippines to a great extent.
- Market mechanism has also penetrated into off-takers.

National Power Development Plan (~2040)



Philippines plans to increase renewable energy to 15GW by 2030 after demolition of FIT.



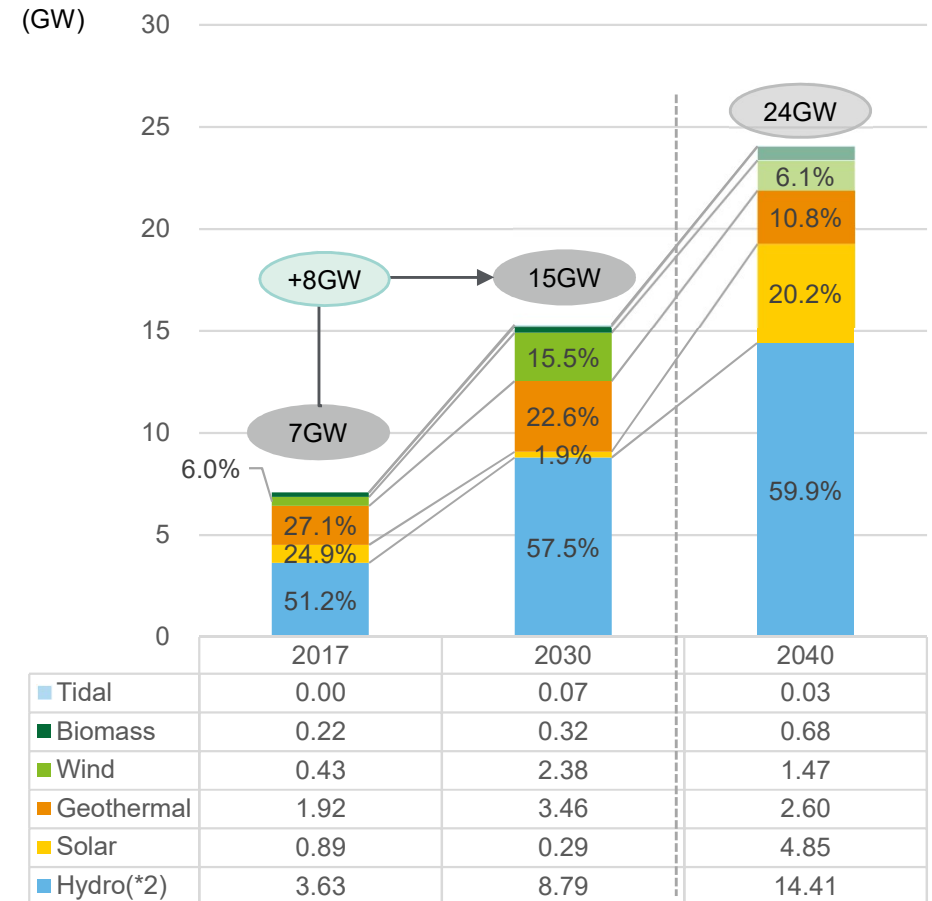
A.3 Philippines

A.3.2 Capacity increase in renewable energy

Privatization of the Sector

- **FIT and tax exemptions** have boosted up the renewable energy since 2008 and will end the scheme in 2019.
- Even after the end of the scheme, the capacity is planned to increase in large extent through **private investment and market mechanism.**

National Power Development Plan (~2040)



Sales prices for RE are relatively high but all risks for project are shouldered by IPPs.



A.3 Philippines

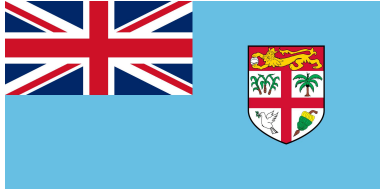
A.3.3 Incentives and Issues for Private investors

Incentives	Description
PPA	<ul style="list-style-type: none"> Sales price is relatively high (US 47 cent per unit* for solar and 42 cent per unit* for wind.)
Tax Exemption	<ul style="list-style-type: none"> Tax exemption is adopted to Corporate tax and Import tax for 7 years.
Financing	<ul style="list-style-type: none"> Financing is available for investors from both domestic and foreign markets. Domestic companies are well-financed. Relatively easier to find domestic investment partners than other developing countries' markets.
FIT	<ul style="list-style-type: none"> FIT is available for renewable energy.
Net metering system (NES)	<ul style="list-style-type: none"> NES is successfully ongoing. Guidebook is published for solar PV.

*Exchange Rate (0.053 USD/peso) on 2019/01/18

Issues	Description
PPA	<ul style="list-style-type: none"> Transmission companies are also privatized and there is a risk to take a long time to negotiate with potential off-takers.
	<ul style="list-style-type: none"> Electricity price Sales price is determined when the construction work ends. After demolishment of FIT in 2019, IPPs should negotiate profitable PPA with off-takers by their own risks.
FIT	<ul style="list-style-type: none"> As of Jan 2019, all FIT fund has been allocated to IPPs except biomass and mini-hydro. All FIT will be demolished in 2019.
Foreign Investment	<ul style="list-style-type: none"> Establishment of the overseas subsidiary with a proportion of 40% foreign capital or less is required for international bidding and power generation business other than BOT. Foreign companies have constraints for FS, development, water use permission, and land use.
Others	<ul style="list-style-type: none"> <u>Land and Grid connection should be prepared by IPPs' own risks.</u>

A.4 Fiji



Fiji aims to supply 99% of electricity as renewable energy by 2030.



A.4 Fiji

A.4.1 Business Environment (Climate Change and Energy policy)

Law and Regulation

Fiji National Power Policy 2013-2020	<ul style="list-style-type: none"> • Target: To assure energy security with efficient use of resource and energy mix • Priority policy: <ul style="list-style-type: none"> 【Grid-based power supply】 <ul style="list-style-type: none"> ➢ Promote private sector investment in electricity generation. ➢ Strengthen transparency and effectiveness of the regulation 【Rural electrification】 <ul style="list-style-type: none"> ➢ Develop a national electrification master plan ➢ Establish an electrification fund and associated framework 【Renewable Energy】 <ul style="list-style-type: none"> ➢ Maintain a comprehensive assessment of Fiji's renewable energy resources ➢ Make all data on renewable energy resources available to the public and prospective investors
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Intended nationally Determined Contribution to Paris Agreement(2015)	<ul style="list-style-type: none"> • Reduction of CO2 emission in the energy sector by around 30% from Business as usual (BAU) by 2030
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Targets for Energy Sector (~2030)

Category	Baseline	Targets		
		2015	2020	2030
Share of renewable energy				
Renewable energy share in electricity generation	56% (2011)	67%	81%	99%
Renewable energy share in total energy consumption	13% (2007)	15%	18%	25%

Fiji has issues on land acquisition, PPA and financing as well as Solomon Island

A.4 Fiji

A.4.2 Incentives and Issues for Private investors

Incentives	Description
Tax Exemption	<ul style="list-style-type: none"> Tax exemption is adopted to Import tax for specific industry including facilities for renewable energy.
Financing	<ul style="list-style-type: none"> Sustainable Energy Financing Project (SEFP) funded by World Bank is available for renewable energy.
FIT	<ul style="list-style-type: none"> Standard PPA was publicized in 2015

Issues	Description
Land Acquisition	<ul style="list-style-type: none"> The lands are classified into three; customary land (87%), gov't (5%) and private land (8%). Private investors can only obtain private land. Otherwise, investors should have lease contract with landlords for 99 years. The negotiation for customary lands would take a time as well as Solomon.
PPA	<ul style="list-style-type: none"> The target price between is set by Fijian Competition and Consumer Commission as approx. FJD0.3308/kWh (approx. US 15 cent/kWh). The price is a uniform price among all types of power sources in any capacity. However, the actual PPA price for solar PV is less than the target price as a result of negotiations.
Financing	<ul style="list-style-type: none"> EFL (off-taker: state-owned enterprise) is in relatively stable financial situation (increasing benefit). However, it is preferable for investors to secure insurance for trading by public entities including MIGA and NEXI.
Grid Connection	<ul style="list-style-type: none"> IPPs prepare grid connecting facilities and land for installation connecting facilities
Net metering system (NES)	<ul style="list-style-type: none"> The sales price is

別添4 質疑応答（ワークショップ）

2. Results of Questionnaire Survey

Questionnaire

<Questionnaire>

Collector : JICA Survey Team
Date: 5-Feb-19
Target Layer: Seminar Participants

<Background>

Solomon Islands aims at enhancement of renewable energy especially hydro and solar.

If such renewable energy comes into the grid, the electricity cost may be reduced compared with the existing diesel generation.

However, solar power has unstability. If too much solar power comes in, countermeasures may be required due to the unstability.

This means solar installation may reduce electricity price but affect power quality.

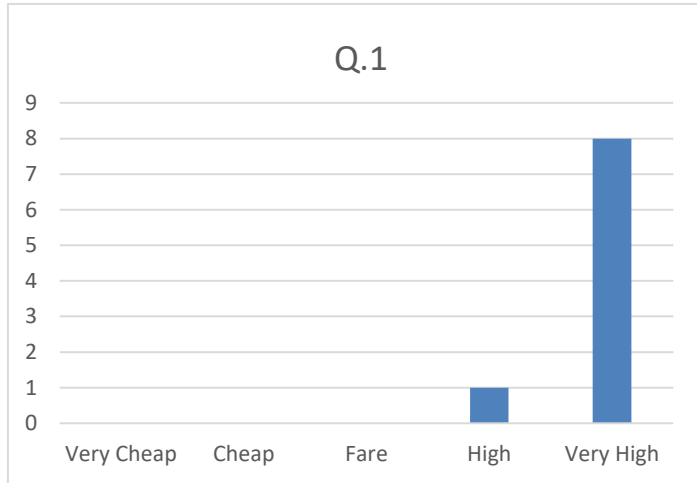
The questions are to collect needs and opinions on electricity price and power quality.

Answerers

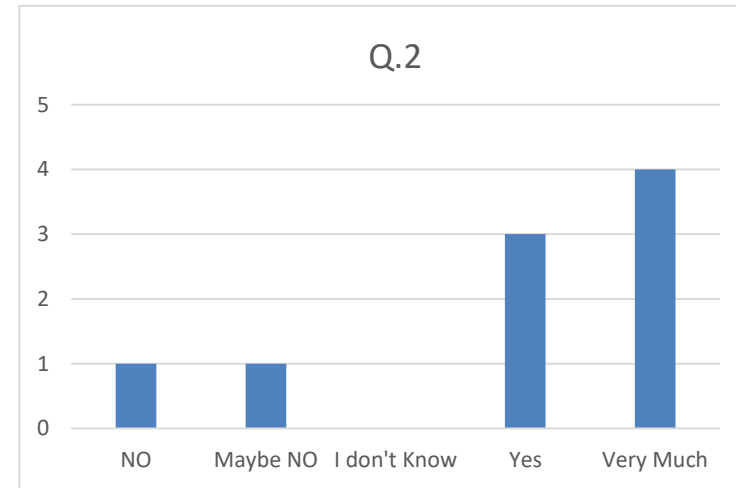
1	2
Male	Female
8	1

Answers to Q1-Q3 (Awareness)

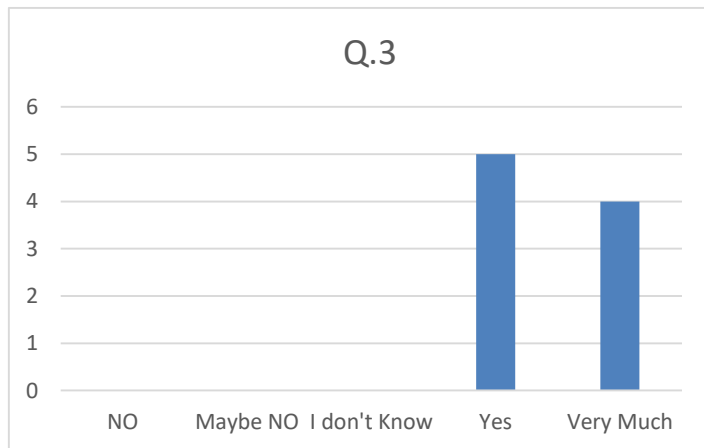
Q1. Do you feel that the electricity price is high ?



Q2. If the electricity price becomes lower, do you use electricity more ?

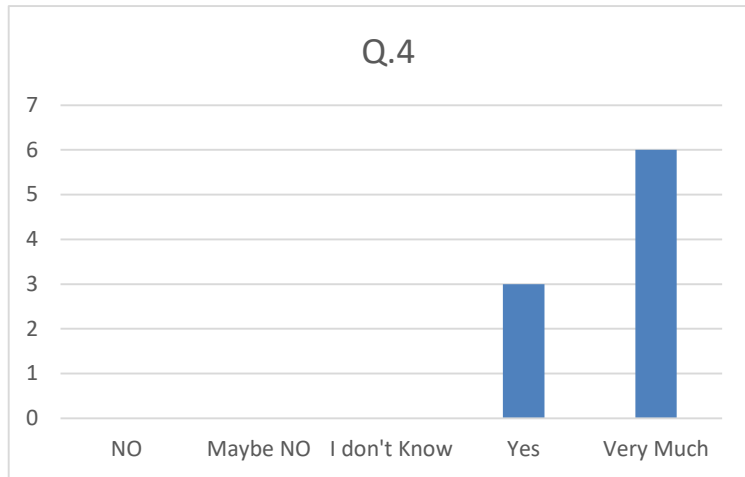


Q3. Do you feel that the global warming affects your life ?

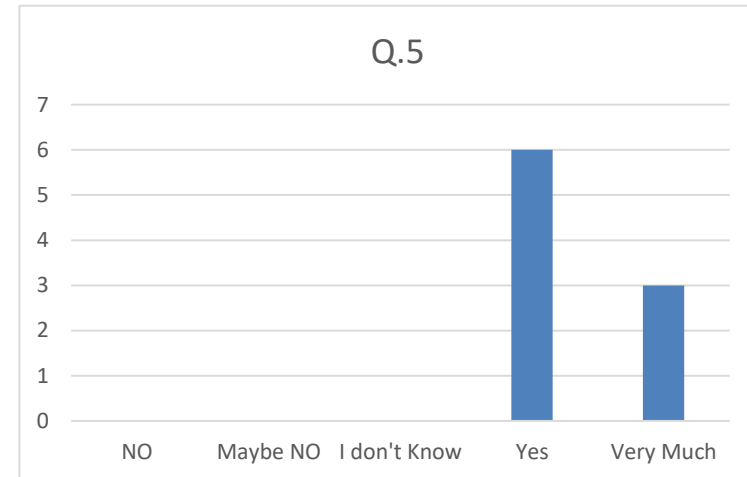


Answers to Q4-Q7 (Power Quality)

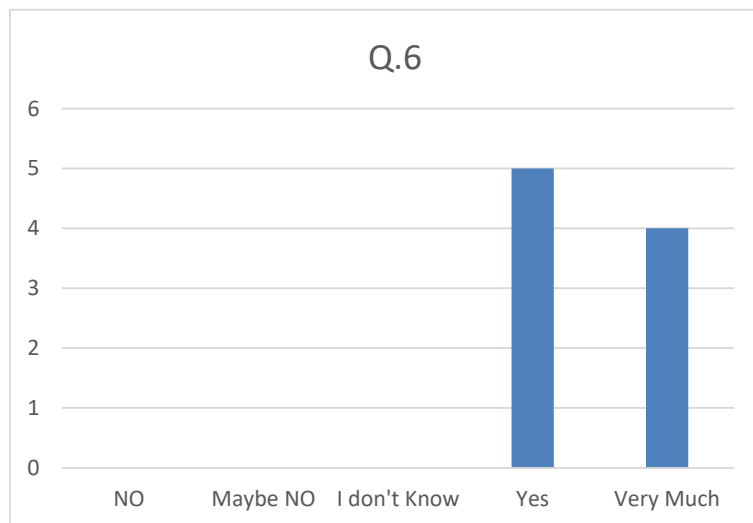
Q4. Do you feel inconvenient if power outage happens in several minutes in daytime ?



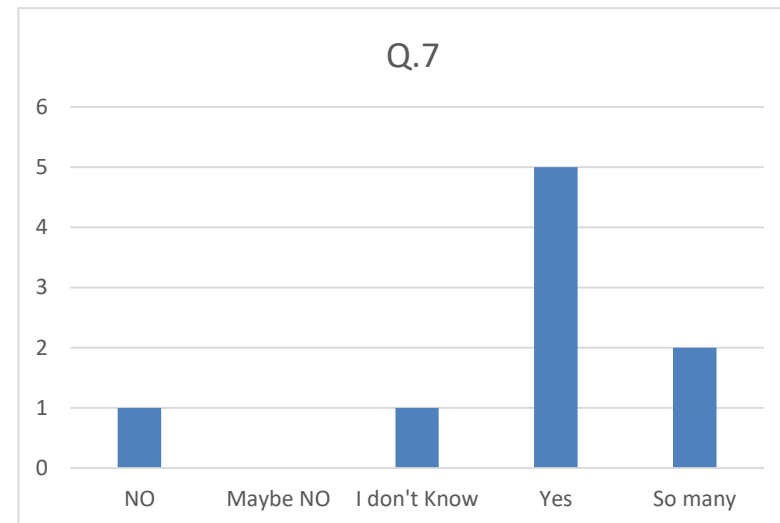
Q5. Do you feel inconvenient if power outage happens in several minutes in nighttime ?



Q6. Can you cooperate for power saving in emergency if the electricity tariff is discounted ?



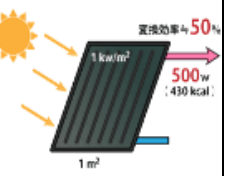
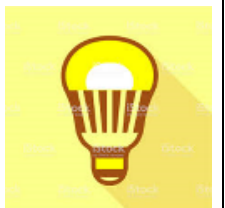



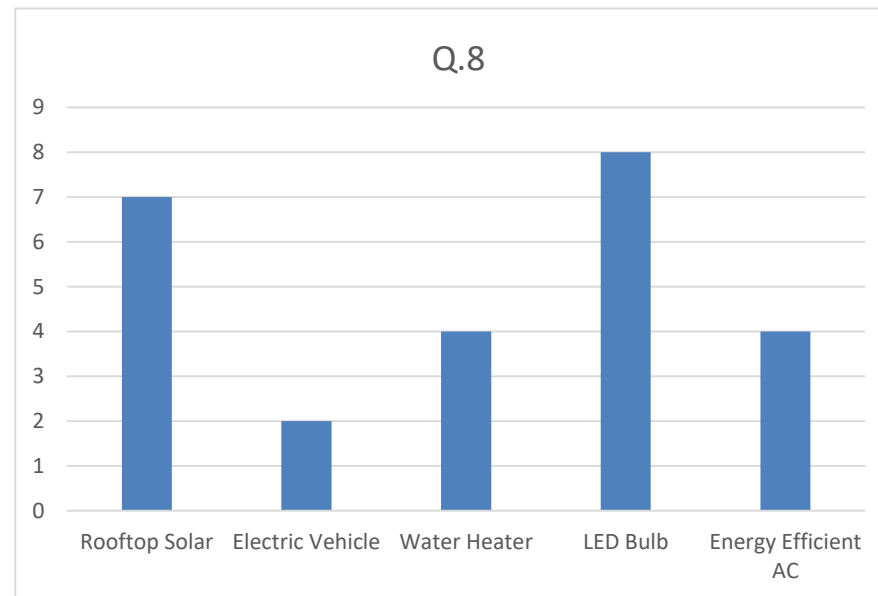
Q7. Do you have experiences which you feel problems in voltage and frequency of power ?



Answers to Q8 (New Technology)

Q8. What are you interested in energy saving technology ? (multiple answer is possible)

1	2	3	4	5
Rooftop Solar	Electric Vehicle	Water Heater	LED Bulb	Energy Efficient AC
				
Electricity generation in your home	Electricity charge in your home	Hot water making in your homw	Low electricity consumption for lighting	Energy efficiency Air-Conditioner



別添5 電気自動車

A5 Electric Vehicle

A5.1 Electric Vehicle in Oceania

A5.1.1 Australia

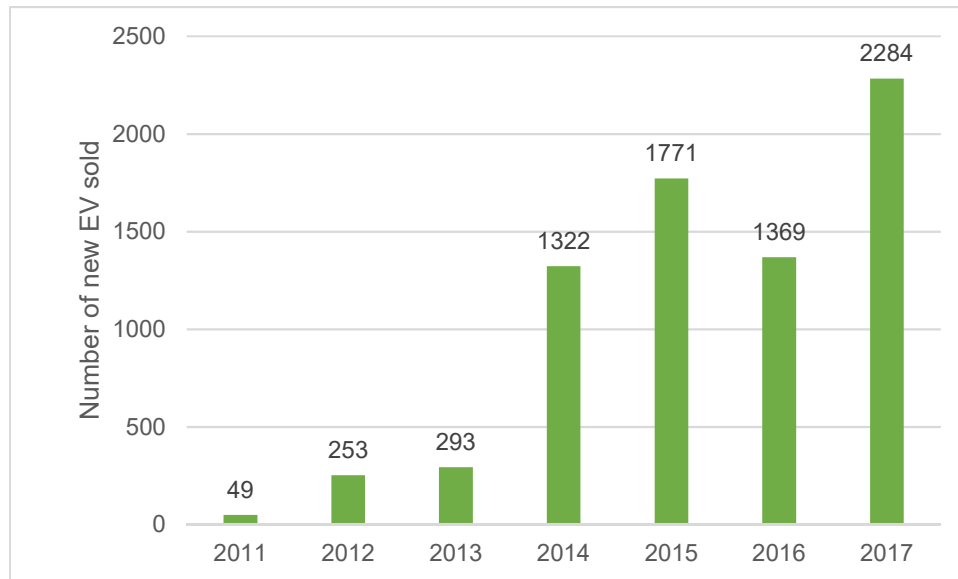


Figure 9-1 Sales Trend of Electric Vehicles in Australia from 2011 to 2017

Source: ClimateWorks Australia

Note: The graph presents the sum of battery electric car (BEV) + Plug-in hybrid electric car (PHEV)

(1) Electric Vehicle Sales in Australia

Figure 9-1 illustrates the sales trend of EVs in Australia for the period 2011 to 2017. According to the report 'The state of EVs in Australia', which was submitted to the national parliament in June 2018, the number of EV sales in Australia has increased since 2011, with 2,284 EVs sold nationwide in 2017, due to the increased variation in EV models. Moreover, people are interested in EVs as luxury cars, hence sales have increased among high-income earners. For sustained growth of EVs, a wider price range is required and a second-hand market in EVs is one of the options to boost overall sales, despite the market remaining under developed.

(2) Government Policy on Electric Vehicles

To encourage customers to purchase EVs, clear government policy is expected. However, the federal government has not developed any initiative to increase the number of EVs in Australia.

Conversely, the federal government did announced AU\$ 6 million investment in an ultra-rapid EV charging network with renewable energy, built by Chargefox.

Besides, some states have also publicized an action plan to boost EV as part of efforts to pursue a reduction in Greenhouse Gas (GHG) emissions. The Australian Capital Territory (ACT) government developed an action plan for the 2018-21 ACT transition to zero emissions vehicle-Action Plan. In this plan, the ACT government aims to reduce CO₂ emissions by 40% by 2020 (with 1990 as the base year). The Queensland government developed its EV strategy ‘The future is electric’ in 2017 to outline preparation for the transition to EVs, including work to establish the Queensland Electric Vehicle Council, while the Tasmanian government set out Climate Action 21 in 2017. In this plan, the state government prioritizes the promotion of EV and other alternative forms of transport to reduce emissions. Meanwhile, the New South Wales government published ‘Future Transport 2056’ as its long-term transport master plan.

Table 9-1 States’ Action Plans List for Electric Vehicles

State	Action Plan	Target or main strategy relating to EV
ACT	2018-21 ACT’s transition to zero emission vehicles	40% reduction in CO ₂ emissions by 2020
New South Wales	Future Transport Strategy	Sustainable transportation is mentioned as one of six state-wide outcomes, including contribution to net zero emissions with energy efficiency of the vehicle fleet and EV use.
Queensland	The future is electric	Empower the community, enable the transition, explore a cost-effective program and envisage what future actions may be required
South Australia	Low Emission Vehicle Strategy	Establishment of EV is targeted as one of five strategic themes. The government encourages efforts to install public recharging infrastructure in strategic locations as well as implementing standards for private recharging units.
Tasmania	Climate Action 21	Reducing transport emissions (as one of six prioritized areas)

Source: prepared by JICA Survey Team based on each state’s action plan

Only a few EV buying incentives are available in Australia. The partnership program with Macquarie Leasing offers a 0.7% discount on EV purchases and 0.5% on eco-friendly cars. Another incentive is a reduction in registration costs in Victoria and ACT, while EV owners in Victoria can receive AU\$ 100 discount on annual registration fees, while in the ACT, EV drivers enjoy a 20% discount on annual registration fees as well as having stamp duty waived. Table 9-2 summarizes the incentives by states.

Table 9-2 State and the Federal Government Policy and Incentives for Electric Vehicle Users

		ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Tot
Uptake	EV purchase 2011-2017	165	1238	13	688	957	61	1324	375	483
	EV sales per 10,000 vehicle (2017)	21	10	1	6	22	3	10	8	7
Regulation	Vehicle CO2 emission standards									*
Financial Incentives	Stamp duty, registration and tax discounts	✓	✓	✓	✓	*		✓		✓
	Direct vehicle subsidy									*
	Fleet incentive						✓			✓
	Charging infrastructure incentive	✓		*	✓					*
	Toll and parking discount				✓					
Non financial incentives	Vehicle lane and parking privileges	✓								
	Electric vehicle public transport trials	✓		✓		✓				
	Government fleet policy	✓	✓			✓	✓			
	Information and education programme	✓	✓		✓	✓	✓	✓		✓

Source: ClimateWorks Australia

Note: ACT: Australian Capital Territory, NSW: New South Wales, NT: Northern territory, QLD: Queensland, SA: South Australia, TAS: Tasmania, VIC: Victoria, WA: West Australia

(3) Charging Infrastructure

The International Council on Clean Transportation (ICCT) studied the relationship between the availability of charging infrastructure and EV uptake in 350 cities worldwide. The study drew a conclusions of positive correlation between the numbers of charging stations and EV uptake and concluded that the availability of charging infrastructure was essential for increasing EV. Looking at the charging infrastructure in Australia, the nation has experienced a sharp rise of 64% or so from 476 in 2017 to 783 in 2018.

A5.1.2 New Zealand

The proportion of RE in New Zealand reached approx. 84.8% in 2016 and the nation aims to

achieve RE 100% by 2035. As part of efforts to reduce GHG emissions, the New Zealand government announced the Electric Vehicle Program and a government package in 2016 to tackle current barriers, including the limited available selection of models; a lack of widespread public charging infrastructure and a lack of awareness about electric vehicles as well as moves to increase EV uptake. The contents of the package are shown in Table 9-3.

Table 9-3 New Zealand government's package for EVs

New Zealand government's package (announced in 2016)
<ul style="list-style-type: none">• A target EVs of 64,000 by 2021• Extension of the Road User Charges exemption on light EVs until those proportion makes up two per cent of the light vehicle fleet• Adoption of the new Road User Charges exemption on heavy EVs until those proportion makes up to two per cent of the heavy vehicle fleet• Budget allocation of NZD 1 million (approx. JPY 75 million) annually to nationwide campaign for five years• The right to drive through bus lanes• Review of tax depreciation rate to avoid any disadvantage on EVs• Establishment of leadership group for EVs across public and private sectors

Source: Ministry of Transport, New Zealand

Considering sales records of new EVs in 2016 to 2017 were 1500 and 3470 (in 2016 and 2017), the market expansion should keep on more than doubling by 2021 and as the government recognized, cross-section cooperation is crucial. In terms of public charging stations, 104 locations are currently available.

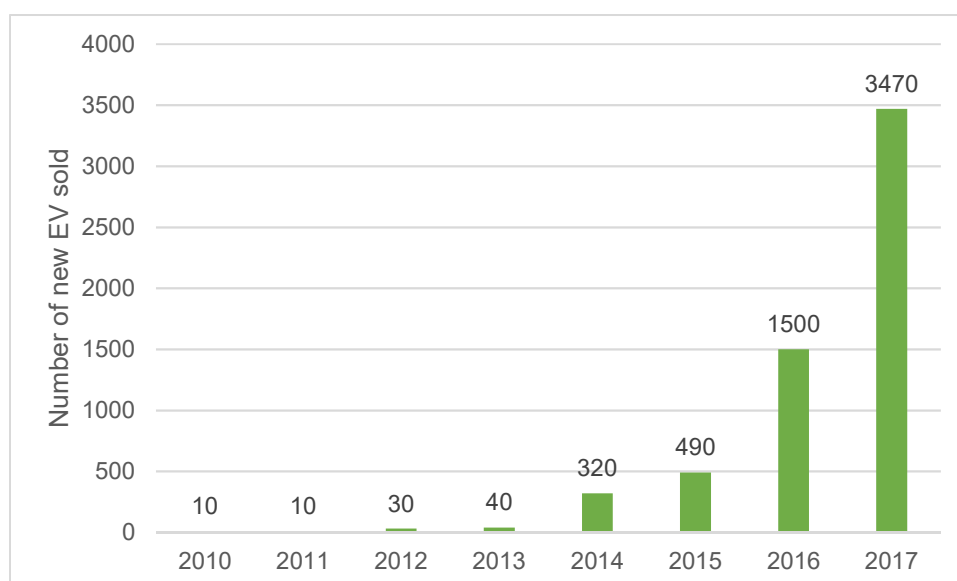


Figure 9-2 Sales Trend of EVs in Australia from 2011 to 2017

Source: prepared by JICA Survey Team based on Global EV Outlook 2018, OECD

Note: The graph presents the sum of battery electric cars (BEVs) + Plug-in hybrid electric cars (PHEVs)

A5.1.3 Fiji

Fijian government publicized Green Growth Framework in 2016 to pursue sustainable socio-economic development. In the framework, sustainable transportation is set as one of ten thematic pillars. In the pillar, exploring and investing in low carbon vehicles are proposed as a short-term goals and EV is considered as one of the instruments for alternative fuel sources. Aiming to encourage investment in EVs, the government plans to introduce a 55 percent capital deduction for any purchase of EV for the next five years.

In terms of public charging stations, income generated with EV charging is tax-exempt for seven years, given that the capital investment needed for a start-up business exceeds FJD 500 thousand. In the 2018-2019 financial year, the minimum capital investment was reduced to FJD 100 thousand.

A5.2 Future EV Options in Solomon Islands

A5.2.1 Regulatory and Tax Supports

According to the ICCT report¹, examples in Australia and New Zealand and feedback from an EV car manufacturer, the key drivers for boosting the introduction of EV include: i) charging stations,

¹ Availability of charging station and incentives for purchasing EV show positive correlation

ii) incentives (including tax), iii) EV price and iv) government policy in general. In SI, the transport distance of cars is relatively short due to the size of the islands, which is why the number of charging stations seems less important in SI than in other larger countries. With car prices, the sales price is relatively high due to import costs, including transportation and import duty. If tax exemption is applied to EV import duties, the sales price will drop and EVs may become competitive with gasoline and diesel cars. Accordingly, incentives for EV drivers, including subsidized electric bills and reduced car registration cost will spark further EV demand. Moreover, government policy, such as imposing additional taxation on gasoline and diesel cars and limiting their numbers will further promotes EVs.

A5.2.2 Promotion of Second-hand EVs and Reuse Battery

Considering high sales prices and current income, the prevalence of new EVs in SI is not realistic in the near future. Conversely, in consideration of the short inland transport distance in the nation and the relatively low sales price, second-hand EVs are more suitable.

Furthermore, the capitalization of second-hand EVs can elicit another benefit; introduction of reuse batteries (see Photo 9 1) for RE 100% as well as EV promotion. The reused battery utilizes recycled EV battery after dismounting from EVs and inspecting the remained life cycles. The greater the number of second-hand EVs introduced, the more available reused batteries become. The reused battery functions as an energy source in the grid and supports the RE 100% goal.



Photo 9-1 Reuse Battery: (left) Exterior, (right) Inside of package

Source: 4R Energy

(these are statistically significant at 0.05)

別添6 税額控除申請フォーム

Appendix 6 Tax Exemption Form



Solomon Islands Exemptions Committee
P.O. Box G9
Honiara
Telephone: (677) 28249
Email: tmanepuria@mof.gov.sb

NON-STATUTORY EXEMPTION APPLICATION FORM

This form must be used to apply for various discretionary exemptions from taxes and duties administered by the Solomon Islands Customs and Excise Division and the Solomon Islands Inland Revenue Division. This form is not required to access statutory exemptions (provided by law).

Applications for exemptions are considered by the Revenue and Customs Exemptions Committee, which provides recommendations to the Minister of Finance and Treasury. Exemptions can be granted by the Minister in full, part, or not granted, consistent with the recommendations of the Committee. The Committee hereby specifies that this form is the appropriate form to be used to apply for exemptions, consistent with [Regs name, 2.03(1)].

Conditions attached to exemptions that are granted must be complied with. Information concerning the details of exemptions that have been granted will be published quarterly, including the names of recipients, nature of business activity and the nature and period of the exemption.

An application will not be considered unless it has been lodged at least two months prior to the activity for which an exemption is sought, except applications under section 9 of the Income Tax Act, which must be lodged within 6 months of the commencement of business operations.

Exemption applications must be on this form and be fully completed. Additional documents may also be required to assess an application. Guidance is provided to assist applicants on each page and a summary of the exemptions process and requirements is provided at the end of this form.

If you have difficulty in completing this form or want any further information, please contact [Committee Secretary].

PART A: DETAILS OF PERSON APPLYING FOR EXEMPTION

Name:

Address:

.....

.....

.....

.....

Telephone:

Fax:

E-Mail Address:

PART B: DETAILS OF ORGANIZATION OR BUSINESS TO BE CONSIDERED FOR EXEMPTION

Organization Name:

Business or Trade Name:

Date of Registration with Registrar of Companies:

Certificate of Registration Number:

Commencement Date of Business Activities:

Business Address:

.....

.....

Nature of Business:

Sector/Industry:

Is the organization a not-for-profit agency?: Yes / No

Is the organization registered for goods tax?: Yes / No

Company Shareholder(s): Share:%

..... Share:%

..... Share:%

..... Share:%

Additional Information/Requirements:

1. Attach copy of Certificate of Incorporation.
2. If the organization is a not-for-profit agency, attach documents demonstrating it is of good national or international standing. This will include evidence:
 - a. that the organization has a constitution and a permanent office in Solomon Islands;
 - b. that the organization operates on a strictly not-for-profit basis; and;
 - c. of a good history of compliance with any taxes and duties payable by the organization (including PAYE obligations).
3. If the organization is a not-for-profit agency, attach documentary evidence of the source of funds (donor) and the details of the not-for-profit project.

PART C: COMPLIANCE HISTORY OF ORGANIZATION

Taxpayer Identification Number (TIN):

[CED equivalent Number?]:

Name and address of tax agent or accountant:

Total number of current employees:

Total annual value of current employee wages:

State liability and tax/duties paid in the past four years:

Year:	
	<u>Liability</u>	<u>Paid</u>	<u>Liability</u>	<u>Paid</u>	<u>Liability</u>	<u>Paid</u>	<u>Liability</u>	<u>Paid</u>
Import duty								
Export duty								
Goods tax								
Sales tax								
Provisional tax								
Income tax								
Stamp duties								
PAYE								
Withholding tax								
Vehicle licences								

If full tax or duty liability has not been paid in one or more of the past four years, explain why:

Additional Information/Requirements:

1. Attach copies of any other relevant documents.

PART D: EXEMPTION APPLICATION INFORMATION

Indicate taxes and duties for which an exemption is requested, the value of each exemption and the period over which it will apply:

<u>Tax/Duty</u>	<input checked="" type="checkbox"/>	<u>Value</u>	<u>Period (dates from – to)</u>
Import duty	<input type="checkbox"/>		
Export duty	<input type="checkbox"/>		
Stamp duty	<input type="checkbox"/>		
Goods tax	<input type="checkbox"/>		
Sales tax	<input type="checkbox"/>		
Income tax	<input type="checkbox"/>		
Total			

When is the project, investment or transaction expected to commence?

Describe the project, investment or transaction for which an exemption is requested:

.....

.....

.....

.....

.....

Explain why the project, investment or transaction would be unable to profitably proceed without an exemption (see additional information below):

.....

.....

.....

.....

.....

Does the application include exemptions for any excluded items (see list below)? Yes / No

Additional Information/Requirements:

1. An application cannot be for a project, investment or transaction that would be able to profitably proceed without public support. An exemption for such a purpose would increase private profit at the cost of public revenue.
 - a. Attach the business case or other documents that demonstrate that public support is necessary.
2. Excluded items include the following:
 - a. goods purchased for resale;
 - b. consumable items to be used in the normal course of business, including, but not limited to, fuel, oil, lubricants and spare parts;
 - c. road vehicles which are to be used wholly or partly for private purposes; and
 - d. goods for private use.

PART E: EXEMPTION DETAILS

Income tax (E6)

NOTE: Complete this Part if the application includes a request for an exemption from income tax.

Describe the project, investment or transaction for which an exemption is requested and the associated operations in detail:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Describe the source and amount of capital employed in the operations:

.....
.....
.....
.....
.....

Indicate whether the following apply for any income for which an exemption is sought (see additional information below):

Income eligible for exemption under a statutory exemption: Yes / No

Additional Information/Requirements:

1. An application cannot include a request for an exemption from income tax on income eligible for a statutory exemption.
2. Attach documentation that shows:
 - a. the extent of local value added in production; or
 - b. an estimation of time to recover the cost of capital.

PART F: NATIONAL INTEREST ASSESSMENT

Total value of exemption requested (revenue to be foregone):

Have exemptions previously been granted for the project, investment or transaction? Yes / No

If so, provide the following details:

Order number:

Date of order:

Revenue foregone:

Describe the nature and value of any other public assistance previously or currently received:

.....

State how the exemptions applied for would further the National Interest (see additional information below):

.....

State how the project, investment or transaction will be financed:

.....

If private financial commitments are to be made to counter any environmental impact of the project, investment or transaction, describe their nature:

.....

Additional Information/Requirements:

1. A list of factors that are regarded as relevant in assessing whether a project, investment or transaction furthers the National Interest is specified by Regulation. These are reproduced at the end of this form.

PART G: NATIONAL INTEREST ASSESSMENT: BENEFITS AND COSTS

Estimate the following:

Profit of the project:

Profit of the project accruing to Solomon Island residents:

If the project is not-for-profit, value of the project:

Number of additional positions (employment) in Solomon Islands:

Value of wages from these additional positions:

Additional Government revenue arising directly from the project:

Value of other forms of public assistance for the project:

Effect of the exemption on profit of competitors:

Restoring the environmental impact of the project:

Private financial commitments to counter environmental impacts:

Additional Information/Requirements:

- 1.** Attach documents that support the estimates provided in this Part.

PART H: DECLARATION

I (name)

of (address)

declare that:

- the information given in this application including any and all attachments is true and accurate; and
- I agree to the public release of information concerning this application (including information provided in the application) as required by Solomon Islands law.

(signature)

(date)

Exemption Application Form: Summary of process and requirements

This attachment summarizes the exemptions process and a number of the application requirements. The next section outlines the process, including the committee steps and processing timeframes. The list of factors specified by Regulation as relevant to the assessment of National Interest is also included along with a list of documents that are likely to be necessary to attach to an application. Finally, information concerning the information published about each exemption for transparency and accountability is provided.

Process

The Solomon Islands Government established the Exemption Committee to consider and make recommendations to the Minister of Finance on all exemption requests. The Committee follows guidelines prescribed in Regulation when considering requests for exemption. The Committee is also responsible for the following.

- Overseeing the proper administration of the scheme
- Designing and publishing Exemption forms, and the education of the public about the processes for applying, and the criteria against which applications are considered
- Providing summary information to the Minister of Finance on a quarterly basis
- Ensuring the Minister has the information necessary for publication of exemptions, including Gazette notices
- Providing advice to the Minister on amendment to the schedule of statutory exemptions

[Insert process of application, including address to send applications.]

The Committee must inform applicants within five working days of receiving an application if further information is required. The Committee may require other information from applicants, or that a person appears to provide further information or make representation on the application.

If an application is not recommended due to lack of information, an applicant may make a new application if further information, not available in the original application, is available. This would not necessarily apply if an applicant withheld relevant information in their original application.

National interest Assessment

The Exemption Committee will not recommend to the Minister that an exemption be granted unless the Exemption Committee assesses that:

- a) the project will further the National Interest; and
- b) the economic benefit of the proposed project to Solomon Islands exceeds the economic cost.

In assessing whether a project will further the National Interest, the Committee will consider the following positive and negative factors.

Positives

- a) the contribution to economic growth, particularly in rural areas;
- b) the contribution to the national development goals for Solomon Islands;
- c) consistency with Government development and growth strategies;
- d) the replacement of business assets in areas that have been the subject of a Ministerial Order that a state of disaster exists in all or part of Solomon Islands in accordance with Section 12 of the National Disaster Council Act (Cap.148);
- e) increased employment opportunities for Solomon Islanders, including:
 - i. the creation of a substantial number of new jobs;
 - ii. a contribution to diversity in the job market;
 - iii. the creation of jobs in rural areas;
- f) the contribution to the export of goods produced or manufactured in Solomon Islands;
- g) the contribution to infrastructure assets in Solomon Islands, particularly in rural areas;
- h) the potential contribution to increased tax, duty or excise revenue in the medium to long term (5-10 years);
- i) the contribution to income/profit distributed in rural communities;
- j) the contribution to the overall wellbeing of citizens of Solomon Islands, rather than just an individual association or family;
- k) the contribution to incoming tourism or tourism infrastructure in Solomon Islands; and
- l) the sustainability of the organizations and business activity associated with the project, investment or transaction.

Negatives

- a) whether the proposed project, investment or transaction requires public support through an exemption to be viable; (Note It is not in the National Interest to provide an exemption for a project, investment or transaction that does not require public support to proceed. In this case, an exemption simply increases private profit while reducing public revenue.)
- b) distortionary effects, including discouraging or disadvantaging businesses or sectors that have not been granted an exemption;
- c) the cost to revenue, particularly in the short term;
- d) other forms of government or donor assistance provided, including other concessionary tax, duty or excise arrangements;
- e) environmental costs (taking account of credible commitments to counter these and restore the environment); and
- f) social costs.

Documents to be attached to Exemption Applications

Copies of all relevant documents are to be attached an exemption application. Documents likely to be relevant include the following.

- Business plan
- Project plan
- Cost-benefit analysis
- Feasibility study
- Financial assessment of project
- Financing plan
- Cash flow forecasts
- Sensitivity analysis of key assumptions
- Details of resourcing commitments
- Other relevant applications
- Prior year tax, duty and excise payment history
- Certificate of registration under the Foreign Investment Act 2005
- Resource planning or other consents necessary for the project to proceed
- Evidence of the source of funds for SIG or donor-funded projects

Publication of information

The Minister is required to table in Parliament and publish in the Gazette information in respect of all exemptions granted, including the following.

- Name and address of the investor
- Nature of their business activity
- Nature and period of the exemption granted
- Reason for granting the exemption

•

別添7 登録地と慣習地の境界図

Appendix 7 Boundaries between registered and customary land (on Map)



別添8 次フェーズにおけるアウトプットイメージ

Appendix 8 Output image of the next phase

Private Investment

Recommendation ~ an allocation of Considerable Risks (Tentative)

Category		Risk Taker		Description
Project Delay	Land Acquisition	SP		The issue roots from historical background and it is quite challenging for investors to combat the issue.
	PPA Negotiation	Negotiable		The contents of PPA is depending on business environments in each countries..
	Loan Contract	Gov't		Sovereign Guarantee supported by Insurance by MIGA or other insurance agency would be available to cap the risk.
Sales Risk	Off-taker	Negotiable		An adaption of output suppression control shall be discussed. If so the condition for the suppression shall also negotiated.
Currency Convertibility	Foreign Exchange		Private Investor	Decision by private investors if the foreign reserve is affordable for their projects.
Construction Completion	Local Subcontractors		Private Investor	Scrutinizing if the extra cost for foreign EPC is feasible for their projects. Or, investors take EPC risk on their own.
	Peripheral Infra	Gov't / SP		Peripheral infrastructure is provided as public service or not.
Economy of Scale		Gov't / SP		It is preferable for investors to be secured a multiple candidate sites / a bunch of rooftops. e.g. <i>Public Invitation</i> .

A Guideline will be drafted in the second phase (below: The Sample of a guideline and checklist)

A Sample of a Guideline

The Guideline for Risk Allocation for Renewable Energy Project in the Solomon Islands

Table of Contents

1. Risk on survey and design
 1. Delay risk
 2. Environmental and social Impact
2. Risk on land acquisition
 1. Land identification
 2. Land provision
3. Risk on construction ~ capacity of contractors
 1. Construction delay
 2. Cost overrun
 3. Loss in construction
 4. Defect in construction
4. Risk on operation and maintenance
 1. Delay in commencement of operation
 2. Accidents caused by operation and maintenance works
 3. Defect in part replacement
 4. Currency convertibility
5. Risk at project completion
 1. Site clearance
6. Common risks through a project's period
 1. Force majeure
 2. Fluctuation in CPI, interest rate, exchange rate
 3. Tax reform
 4. Change in laws- relating to electric facilities, management rules, etc
 5. Obtainment of permission

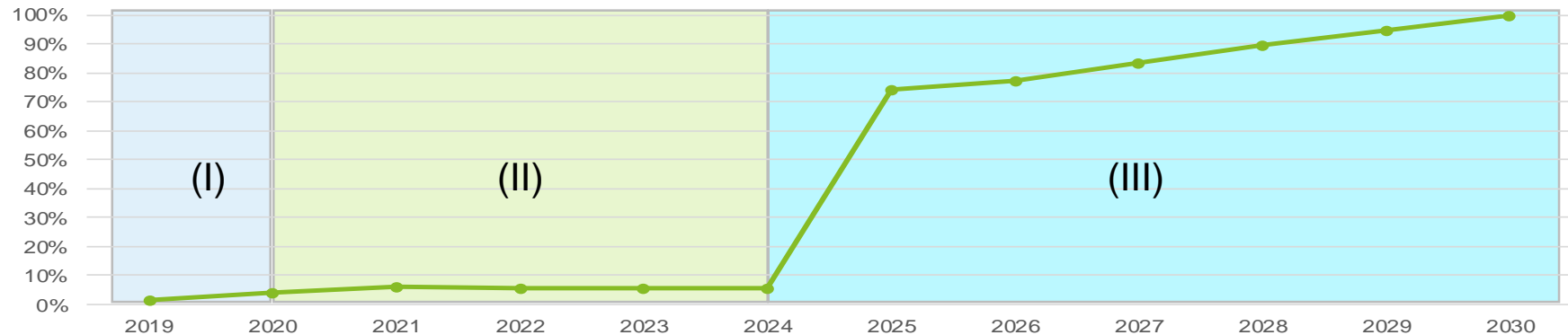
A Sample of Checklist for a Guideline (PPP/PFI)

	Risk Category	Description	Risk Taker	
			Gov't/SP	IPP
Survey and Design	Delay risk	Defect in design, cost overrun for study,		√
	Environmental and social impact	Impossible to proceed the project as a result of EIA	√	
Land	Identification	Identification of owner and category of land; registered or customary land	√	
	provision	Acquire the land and lease out	√	
Project Delay	Construction delay	Lack of EPC contractor's capacity		
	Cost overrun	Change a order for a construction		√
	Loss in construction	Damage a third party		√
	Defect in construction	Defect in facility, construction works		√
O&M	Delay in Commencement of operation	Delay in signing in a contract, grid connection,		√
	Accident caused by O&M	Disruption of generation due to accidents relating to O&M		√
	Defect in parts replacement	Defect In parts and replacement work		√
	Currency Convertibility	Confirm the amount of foreign reserve	√	√
completion	Site clearance	Site clearance for renting back		√
Risk through project	Force majeure	Natural disaster	√	√
	Tax	Tax reform and tax exemption	√	
	Permission	Obtainment of permissions for business ~ FID, COI,	√	√

Technical Study

Tasks to be done for RE 100 % (Generation Base)

Transition to RE 100%



Sample

	Stage (I) (2019-2020) Planning & Preparation	Stage (II) (2021-2024) Standardization and Promotion	Stage (III) (2025-2030) Further Development	After 2030
Solar Development	<ul style="list-style-type: none"> Preparation of Land Study of rooftop PV promotion (regulation) 	<ul style="list-style-type: none"> Introduction of IPP's Solar Introducing rooftop PVs 	<ul style="list-style-type: none"> Rental system of stand-alone solar PV 	
Battery Development	<ul style="list-style-type: none"> Unified Planning for Battery Installation Safety Standardization of Battery Installation 	<ul style="list-style-type: none"> Installation of Short Duration Battery 	<ul style="list-style-type: none"> Installation of Long Duration Battery Utilization of EV 	<ul style="list-style-type: none"> Introducing reuse battery (EVs)
Grid Development	<ul style="list-style-type: none"> Master planning 	<ul style="list-style-type: none"> Strengthening for Connection of IPP' Solar Study of mini-grid 	<ul style="list-style-type: none"> Strengthening for Connection of IPP' Solar Development of mini-grid 	<ul style="list-style-type: none"> Extension of grid to rural areas and connect with mini-grids
IPP Introduction	<ul style="list-style-type: none"> Study of Land preparation Guide line for risk allocation 	<ul style="list-style-type: none"> Public invitation for land acquisition 	<ul style="list-style-type: none"> Public Tender of Large Scale IPPs 	

Small scale solar PVs and Energy Efficiency also play an important role toward RE 100%

Examples of Other Optional Plans

Type	Measures	Current Situation	Assumption for Introduction	Effect in 2030		Contribution to RE 100% (%)
				Peak Capacity (MW)	Generation (GWh)	
Solar PV	Middle Scale Solar Power (Industry)	50 kW (Ranadi)	100 kW x 30 sites	3	4.2	2.8
	Roof Top Solar Power (Residential)	0	5 kW x 500 sites	2.5	3.5	2.3
Energy Efficiency	Distribution Loss Reduction	11 %	25 MW x (4% reduction) 140 GWh x (4% reduction)	- 1	-5.6	3.7
	Demand Side Efficiency	-	10 %Improvement from the Reference plan	-2.6	-15	10.0

Further Development after 2030 to maintain RE 100 %

Other RE Resource	Hydro Power	0	1 MW x 3 sites	3 (60% capacity factor)	15	-
	Floating Solar	0	1 MW x 3 sites	3	4.2	-
	Geo-Thermal	0	20 MW + Submarine Cable to Connect Honiara	20 (60% capacity factor)	105	-