

付 属 資 料

1. 署名した M/M
2. 事業事前評価表
3. 署名した R/D
4. 平成 19 年度要請書
5. 平成 20 年度要請書
6. 事業強化のための電力セクター調査帰国報告会資料
7. 面接者リスト
8. 収集資料リスト

**MINUTES OF MEETING
BETWEEN
THE JAPANESE PREPARATORY STUDY TEAM
AND
THE ROYAL GOVERNMENT OF BHUTAN
ON
JAPANESE TECHNICAL COOPERATION
FOR
IMPROVEMENT OF EFFICIENCY FOR RURAL POWER SUPPLY**

Japan International Cooperation Agency (hereinafter referred to as "JICA") has sent the Japanese Preparatory Study Team (hereinafter referred to as "the Team") headed by Mr. Kaoru Suzuki to Bhutan from 28th January to 6th February, 2008.

The purpose of the Team was to discuss the concept and scope of the Technical Cooperation Project for the Improvement of Efficiency for Rural Power Supply (hereinafter referred to as "the Project").

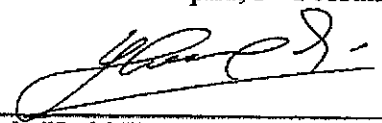
During their stay in Bhutan, the Team had a series of discussions on the Project with the authorities of the Royal Government of Bhutan (hereinafter referred to as "the Bhutanese side").

As a result, the Team and the Bhutan side agreed on the matters referred to in the documents attached hereto.

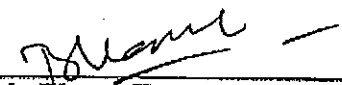
Thimphu, 5th February, 2008



Mr. Kaoru Suzuki
Leader
Preparatory Study Team
Japan International Cooperation Agency



Mr. Yeshe Wangdi
Director General
Department of Energy
Ministry of Economic Affairs



Mr. Bharat Tamang
Managing Director
Bhutan Power Corporation Ltd.

ATTACHMENT

1. BACKGROUND

Based on the Bhutan's request to extend technical assistance to prepare the rural electrification master plan in 2002, JICA had conducted the development study, "The Study for Development of the Dzongkhag-wise Electrification Master Plan in Bhutan" from 2003 to 2005.

In order to implement the rural electrification based on the master plan, the capacity of Bhutan Power Corporation Ltd. (hereinafter referred to as "BPC") and Department of Energy (hereinafter referred to as "DOE") need to be strengthened to achieve the target of 100% electrification by 2020 from the rate of 57% as of 2005.

Accordingly, the Bhutanese side requested the Government of Japan to extend the technical cooperation to develop the capacity of BPC and DOE. Responding to the Bhutanese request, JICA sent the Team to formulate the Project from 28th January to 6^h February 2008.

2. PROJECT TITLE

The Team and the Bhutan side agreed that the Project title is "Improvement of Efficiency for Rural Power Supply".

3. ADMINISTRATION OF THE PROJECT

Director General of DOE, as the Project Director, will bear overall responsibility for the administration of the Project.

General Manager of Human Resource and Administration Department of BPC, as the Senior Project Manager, will be responsible for the implementation of the Project.

General Manager of Distribution and Customer Services Department of BPC, as the Project Manager, will be responsible for technical matters of the Project.

Head of Renewable Energy Division of DOE, as the Coordinator, will be responsible for the implementation and coordination of the Project.

The provisional organization chart for the Project is as shown in ANNEX I.

4. PROJECT DESIGN MATRIX AND PLAN OF OPERATION

The Project Design Matrix (hereinafter referred to as "PDM") and the Plan of Operation (hereinafter referred to as "PO") were elaborated through discussions. The Team and the Bhutan side agreed to recognize PDM and PO as an important tool for the project management and the basis for monitoring and evaluating the Project. The PDM and the PO will be utilized by both sides throughout the implementation of the Project.

J.S.

me

169

The PDM and the PO will be subject to revision within the framework of the Record of Discussions (hereinafter referred to as "R/D") whenever needs arise in the course of the implementation of the Project with mutual consultation.

Moreover, some specific target number of indicators, details of activities, and responsible person for each activity, all involved staff from DOE and BPC will be defined later upon preparing comprehensive training program with focus on rural power supply.

The PDM (version 1) and the PO (version 1) are herewith attached as ANNEX II and ANNEX III respectively.

5. RECORD OF DISCUSSIONS

Based on the field investigation and the series of discussions between the Team and the Bhutanese side, the draft R/D has been prepared and agreed between the two parties. After confirmation by JICA, R/D will be signed by Head of Development Cooperation Division, GNH Commission, Director General of DOE, Managing Director of BPC and the Resident Representative of JICA Bhutan Office prior to the implementation of the Project.

The R/D confirms the framework of the Project and the measures to be taken by the Bhutanese side and JICA.

The draft R/D is attached in ANNEX IV.

6. JOINT COORDINATING COMMITTEE

Members of the Joint Coordinating Committee (hereinafter referred to as "JCC") will be appointed by both sides before the signing of the R/D. The functions and compositions of the JCC are described in ANNEX IV.

7. OTHERS

DOE requested to share the portion of local costs such as international telecommunication and internet fees which Japanese experts use in the Project office and transportation fees of Japanese experts, with JICA because of the limitation of DOE's budget.

ANNEX I	ORGANIZATION CHART
ANNEX II	PROJECT DESIGN MATRIX (version 1)
ANNEX III	PLAN OF OPERATION (version 1)
ANNEX IV	DRAFT OF RECORD OF DISCUSSIONS

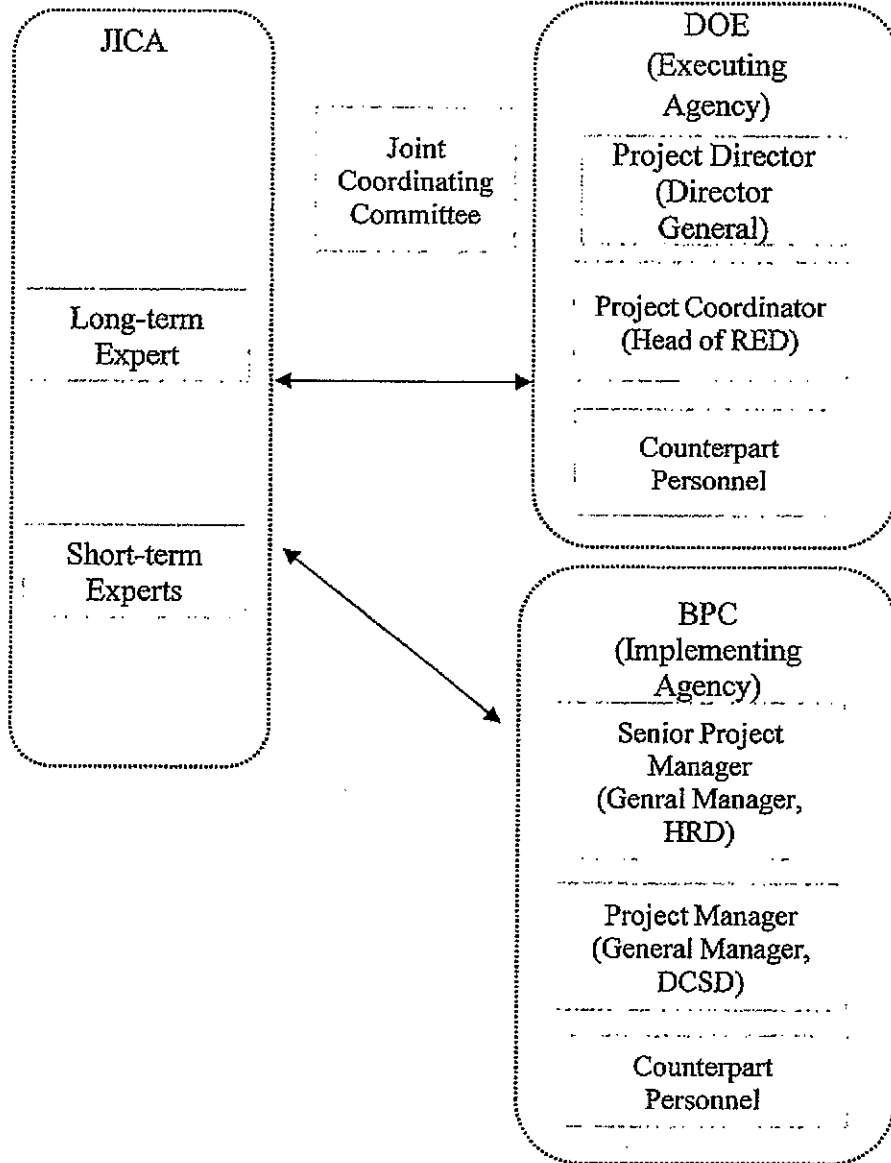
[Handwritten signatures]

109

ORGANIZATION CHART

JAPANESE SIDE

BHUTANESE SIDE



RED: Renewable Energy Division
HRD: Human Resource and Administration Department
DCSD: Distribution and Customer Services Department

167

Project Design Matrix

Project Title: Improvement of Efficiency for Rural Power Supply
 Executing Agency: Department of Energy (DOE)
 Implementing Agency: Bhutan Power Corporation Limited (BPC)
 Project Sites: BPC head office, Bagma training center and DOE office

Target Group: BPC technical and management personnel and relevant DOE personnel in rural power supply
 Project Period: June, 2008- May, 2011 (3 years)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Overall Goal: Electricity service delivery in rural areas will be enhanced.</p>	<p>• More than XX % of customers in rural area will be satisfied with reliability and safety of the electricity service by approx. five years after the project completion.</p>	<p>• Questionnaire survey to electricity customers (by sampling method).</p>	<p>Necessary number of technical and management personnel and budget for operation are allocated.</p>
<p>Project Purpose: Technical and institutional capacity of BPC and DOE are developed to enhance efficiency in delivering rural power supply.</p>	<p>On the completion of the project, the following indicators will be achieved. (On-grid system) 1. XX% of the total trainees under the project can pass the qualification examination. 2. More than XX % of technical personnel can operate and maintain properly the distribution system. (Off-grid system) 3. DOE personnel obtain adequate knowledge and skills on the development of off-grid system.</p>	<p>1. Examination result 2. Interview/questionnaire survey to ESD managers and technical staff, head office managers 3. Interview to DOE personnel and Japanese experts</p>	<p>• Necessary number of technical and management personnel and budget for operation are allocated. • Trained technical and management personnel of BPC and DOE continue to work for their organization. • Rural electrification program is implemented as scheduled.</p>
<p>Outputs: 1. Based on institutional assessment, comprehensive training program with focus on rural power supply is prepared. 2. Training facility at Bagma for rural power supply is improved. 3. Guideline and manual for rural power supply are prepared.</p>	<p>1-1. Long and short-term policy for institutional and human resource development developed/updated 1-2. Comprehensive training plan for DOE and BPC with focus on rural power supply developed 1-3. Detailed course contents for prioritized training prepared 2. Necessary equipment are installed and utilized for training. 3. Necessary guideline and manual are prepared.</p>	<p>1-1. Project report 1-2. Project report and observation 3. Project report</p>	<p>Trained trainees continue to work for BPC / DOE.</p>
<p>4. Capacity of trainers for training facility for rural power supply is improved.</p>	<p>4-1. XX trainers qualified 4-2. Training menus and textbooks prepared by trainers 4-3. Feedback on the trainers from the trainees</p>	<p>4-1. Test result (or evaluation by the third parties such as Japanese experts e.t.c.), interview to trainers 4-2. Project report 4-3. Questionnaire/interview to trainers</p>	<p>Counterpart personnel who participate in the training and activities will not change during the project period. Should it be necessary to change him/her, most suitable person will be replaced immediately and will take over the duty smoothly.</p>
<p>Activities: BPC and/or DOE conduct following activities facilitated / supported by JICA Experts.</p>	<p>1-1 Conduct problem analysis on current and future operation and maintenance management through internal consultation and discussion 1-2 Formulate/ review policy for long and short-term institutional and human resource development 1-3 Identify the needs of capacity development of technical and management personnel 1-4 Prepare comprehensive training program 1-5 Prioritize the necessary training program 1-6 Prepare initial course contents for rural power supply 1-7 Revise the initial course contents for rural power supply based on feedback</p>	<p>Inputs (Means and Cost) Japanese Side A. Dispatch of Japanese Experts (1) Long-term Expert Coordination & Facilitation for Training Program Distribution Engineer Management Expert Off-grid Expert Other short-term experts will be dispatched as necessary. B. Training in Japan and/or third country Counterpart Training in Japan Third country training if necessary</p>	<p>Pre-condition: DOE and BPC deem that training for rural power supply is important and priority issue in their operation policy.</p>
<p>2-1. Identify the necessary facility for the training program for rural power supply 2-2. Establish the required training facility</p>	<p>2-1. Identify the necessary facility for the training program for rural power supply 2-2. Establish the required training facility</p>	<p>2-1. Identify the necessary facility for the training program for rural power supply 2-2. Establish the required training facility</p>	<p>DOE and BPC deem that training for rural power supply is important and priority issue in their operation policy.</p>

<p>3-1 Identify the needs of training 3-2 Prepare draft guideline and manual 3-3 Revise those drafts based on the feedback from trainers 4-1 Identify the items necessary for trainers' training 4-2 Train trainers for priority training 4-3 Prepare training materials 4-4 Conduct the suggested training courses 4-5 Conduct the test and follow up survey to measure the understanding of trainees 4-6 Revise training materials and teaching method if necessary</p>	<p>C. Procurement of equipment D. Necessary expense to implement the Project <u>Bhutanese Staff:</u> A. Allocation of counterparts (1) Project Director – Director General, DOE (2) Senior Project Manager – General Manager of HRD, BPC (3) Project Manager – General Manager of DCSD, BPC (4) Project Coordinator – Head of EED, DOE (5) Full time trainers in necessary fields for the comprehensive training program – BPC B. Allocation of supporting staff C. Provision of office space and facilities for the Project D. Necessary and available Training Facility (inclusive of lands) E. Local Cost Appropriation of necessary budget to support the local cost of the project, such as domestic travel allowances, etc.</p>	
---	--	--

Note: Number in "XX" and "adequate knowledge and skills on the off-grid system" will be defined when comprehensive training with focus on rural power supply is prepared. As for the percentage of customers' satisfaction, yearly target set by BPC at each ESD will be referred in the year of post-evaluation.

MC

JAS

KG

ANNEX III

(version 1)

Plan of Operation	Year			Year 2008			Year 2009			Year 2010			Year 2011			In charge of												
	Year	Month	Project Period	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7					
	2008	2008	Evaluation																									
		Jobit Coordinating Committee (JCC) Evaluation																										
		Output 1: Based on institutional assessment, comprehensive training program with focus on rural power supply is prepared																										
1-1	Conduct problem analysis on current and future operation and maintenance management through internal consultation and discussion.																											
1-2	Formulated/ review policy for long and short-term institutional and human resource development.																											
1-3	Identify the needs of capacity development of technical and management personnel																											
1-4	Prepare comprehensive training program																											
1-5	Prioritize the necessary training program																											
1-6	Prepare initial course contents for rural power supply																											
1-7	Revise the initial course contents for rural power supply based on feedback from trainers and trainees																											
	Output 2: Training facility at Bogana for rural power supply is improved																											
2-1	Identify the necessary facility for the training program for rural power supply																											
2-2	Establish the required training facility																											
	Output 3: Guideline and manual for rural power supply are prepared																											
3-1	Identify the needs of training																											
3-2	Prepare draft guideline and manual																											
3-3	Revise those drafts based on the feedback																											
	Output 4: Capacity of trainers for training facility for rural power supply is improved																											
4-1	Identify the items necessary for trainers' training																											
4-2	Train trainers for priority training																											
4-3	Prepare training materials																											
4-4	Conduct the suggested training courses																											
4-5	Conduct the test and follow up survey to measure the understanding of trainees																											
4-6	Revise training materials and teaching method if necessary																											

DRAFT

**RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE ROYAL GOVERNMENT OF BHUTAN
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE IMPROVEMENT OF EFFICIENCY FOR RURAL POWER SUPPLY**

Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of discussions with the Bhutanese authorities concerned with respect to desirable measures to be taken by JICA and the Royal Government of Bhutan for the successful implementation of the Project on "Improvement of Efficiency for Rural Power Supply" in the Kingdom of Bhutan.

As a result of the discussions, the Resident Representative of JICA Bhutan Office and the Bhutanese authorities concerned agreed on the matters referred to in the document attached hereto.

Thimphu, March **, 2008

Mr. Tetsuo Yabe
Resident Representative
Bhutan Office
Japan International Cooperation
Agency
Japan

Mr. Thinley Namgyel
Head
Development Cooperation Division
GNH Commission
Bhutan

Mr. Yeshe Wangdi
Director General
Department of Energy
Ministry of Economic Affairs
Bhutan

Bharat Tamang
Mr. Bharat Tamang
Managing Director
Bhutan Power Corporation Ltd.
Bhutan

THE ATTACHED DOCUMENT**I. COOPERATION BETWEEN JICA AND THE ROYAL GOVERNMENT OF BHUTAN**

1. The Royal Government of Bhutan will implement the Improvement of Efficiency for Rural Power Supply (hereinafter referred to as "the Project") in cooperation with JICA.
2. The Project will be implemented in accordance with the Outline of the Project that is given in Appendix I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan, JICA will take, at its own expense, the following measures according to the normal procedures under the Colombo Plan Technical Cooperation Scheme.

1. DISPATCH OF JAPANESE EXPERTS

JICA will provide the services of the Japanese experts as listed in Appendix II.

2. PROVISION OF MACHINERY AND EQUIPMENT

JICA will consider providing such equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The Equipment will become the property of the Royal Government of Bhutan upon being delivered to the Bhutanese authorities concerned.

3. TRAINING OF BHUTANESE PERSONNEL IN JAPAN

JICA will receive the Bhutanese personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE ROYAL GOVERNMENT OF BHUTAN

1. The Royal Government of Bhutan will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese

technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. The Royal Government of Bhutan will ensure that the technologies and knowledge acquired by the Bhutanese nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Kingdom of Bhutan.
3. The Royal Government of Bhutan will grant in the Kingdom of Bhutan privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families, which are no less favorable than those accorded to experts of third countries working in the Kingdom of Bhutan under the Colombo Plan Technical Cooperation Scheme.
4. The Royal Government of Bhutan will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts referred to in Annex II.
5. The Royal Government of Bhutan will take necessary measures to ensure that the knowledge and experience acquired by the Bhutanese personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the laws and regulations in force in the Kingdom of Bhutan, the Royal Government of Bhutan will take necessary measures to provide at its own expense:
 - (1) Services of the Bhutanese counterpart personnel and administrative personnel as listed in Annex IV;
 - (2) Land, buildings and facilities as listed in Annex V;
 - (3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above ;

7. In accordance with the laws and regulations in force in the Kingdom of Bhutan, the Royal Government of Bhutan will take necessary measures to meet:

- (1) Expenses necessary for transportation, installation, operation and maintenance of the Equipment referred to in II-2 above within the Kingdom of Bhutan;
- (2) Customs duties, internal taxes and any other charges, imposed in Kingdom of Bhutan on the Equipment referred to in II-2 above; and
- (3) Running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Director General of Department of Energy (hereinafter referred to as "DOE"), as the Project Director, will bear overall responsibility for the administration of the Project.
2. General Manager of Human Resource and Administration Department of Bhutan Power Cooperation Ltd. (hereinafter referred to as "BPC"), as the Senior Project Manager, will be responsible for the implementation of the Project.
3. General Manager of Distribution and Customer Services Department of BPC, as the Project Manager, will be responsible for technical matters of the Project.
4. Head of Renewable Energy Division of DOE, as the Project Coordinator, will be responsible for the implementation and coordination of the Project.
5. The Japanese Experts will provide necessary recommendations and advice to the Project Director, the Senior Project Manager, the Project Manager and the Project Coordinator on any matters pertaining to the implementation of the Project.
6. Japanese Experts will give necessary technical guidance and advice to the DOE and BPC.

7. For the effective and successful implementation of the Project, the Joint Coordinating Committee (JCC) will be established. The functions and compositions of the JCC are stipulated in Appendix VI.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA, DOE and BPC, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

The Royal Government of Bhutan undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Bhutan except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Royal Government of Bhutan on any major issues arising from, or in connection with this Attached Document.

VIII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Kingdom of Bhutan, the Royal Government of Bhutan will take appropriate measures to make the Project widely known to the people of the Kingdom of Bhutan.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be starting from June, 2008, for three [3] years.

APPENDIX I OUTLINE OF THE PROJECT

APPENDIX II LIST OF JAPANESE EXPERTS

APPENDIX III LIST OF MACHINERY AND EQUIPMENT

APPENDIX IV LIST OF THE KINGDOM OF BHUTAN COUNTERPART AND
ADMINISTRATIVE PERSONNEL

APPENDIX V LIST OF LAND, BUILDINGS AND FACILITIES

APPENDIX VI JOINT COORDINATING COMMITTEE

APPENDIX I OUTLINE OF THE PROJECT

1. Title of the Project

Improvement of Efficiency for Rural Power Supply

2. Overall Goal

Electricity service delivery in rural areas will be enhanced

3. Project Purpose

Technical and institutional capacity of BPC and DOE are developed to enhance efficiency in delivering rural power supply.

4. Outputs of the Project

1. Based on institutional assessment, comprehensive training program with focus on rural power supply is prepared
2. Training facility at Begana for rural power supply is improved
3. Guideline and manual for rural power supply are prepared
4. Capacity of trainers for training facility for rural power supply is improved

5. Activities of the Project

BPC and /or DOE conduct following activities facilitated / supported by JICA Experts

- 1-1. Conduct problem analysis on current and future operation and maintenance management through internal consultation and discussion
- 1-2. Formulate/ review policy for long and short-term institutional and human resource development
- 1-3. Identify the needs of capacity development of technical and management personnel
- 1-4. Prepare comprehensive training program
- 1-5. Prioritize the necessary training program
- 1-6. Prepare initial course contents for rural power supply
- 1-7. Revise the initial course contents for rural power supply based on feedback from trainers and trainees

- 2-1. Identify the necessary facility for the training program for rural power supply

2-2. Establish the required training facility

3-1 Identify the needs of training

3-2 Prepare draft guideline and manual

3-3 Revise those drafts based on the feedback

4-1 Identify the items necessary for trainers' training

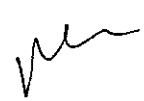
4-2 Train trainers for priority training

4-3 Prepare training materials

4-4 Conduct the suggested training courses

4-5 Conduct the test and follow up survey to measure the understanding of trainees

4-6 Revise training materials and teaching method if necessary



167

APPENDIX II LIST OF JAPANESE EXPERTS

1. Long-term Experts

- (i) Coordination & Facilitation for Training Program


2. Short-term Experts

- (i) Distribution Engineer
- (ii) Management Expert
- (iii) Off-Grid Expert

Other short-term experts will be dispatched as necessary.

Note:

Assignment schedule of experts depends on the progress of the Project and availability of the suitable experts. It will be decided through mutual consultations for each Japanese fiscal year.



137

APPENDIX III LIST OF MACHINERY AND EQUIPMENT

Equipment will be given as necessary for the effective implementation of the Project. Details shall be discussed during the Project.

lll

JAP

13

**APPENDIX IV LIST OF THE KINGDOM OF BHUTAN COUNTERPART PERSONNEL
AND ADMINISTRATION PERSONNEL**

1. Counterpart personnel

- (1) Project Director : Director General, DOE
- (2) Senior Project Manager : General Manager of Human Resource and Administration
Department, BPC
- (3) Project Manager : General Manager of Distribution and Customer Services
Department, BPC
- (4) Project Coordinator : Head of Renewable Energy Division, DOE
- (5) Other Energy officers of DOE, and Project Engineers and other Specialists of BPC

2. Administration Personnel

Handwritten marks: a checkmark, a signature, and the number 127.

APPENDIX V LIST OF LAND, BUILDINGS AND FACILITIES

1. Office space and necessary facilities for Japanese experts and Bhutanese counterparts
2. Other facilities mutually agreed upon as necessary for the implementation of the Project

Ms

see

197

APPENDIX VI JOINT COORDINATING COMMITTEE**1. Function**

The Joint Coordinating Committee will meet at least once a year or whenever the necessity arises in order to fulfill the following functions;

- 1) To evaluate the annual work plan of the Project;
- 2) To review the progress of the annual work plan;
- 3) To review and discuss major issues that may arise during the implementation of the Project;
and
- 4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Provisional Composition

- (1) Chairperson: Director General, DOE
- (2) Head of Development Cooperation Division, GNH Commission
- (3) Member of the Bhutanese side
 - a) Managing Director, BPC
 - b) General Manager of Human Resource and Administration Department, BPC
 - c) General Manager of Distribution and Customer Services Department, BPC
 - d) Head of Renewable Energy Division, DOE as the Project Coordinator
 - e) Other personnel concerned to be assigned by the request of JICA, DOE or BPC, if necessary.
- (4) Member of the Japanese side
 - a) Experts,
 - b) Representative from JICA Bhutan Office,
 - c) Other personnel concerned to be assigned by the request of JICA, DOE or BPC, if necessary.

2. 事業事前評価表

作成日：平成20年2月20日

担当部・課：経済開発部

第二グループ

電力・エネルギーチーム

<p>1. 案件名 ブータン王国 地方電化促進プロジェクト</p>
<p>2. 協力概要</p> <p>(1) プロジェクト目標とアウトプットを中心とした概要の記述</p> <p>本プロジェクトはブータン国の地方電力サービス向上を上位目標とし、地方電力供給の安全と信頼性における効率向上を念頭に、ブータン電力公社(Bhutan Power Corporation: BPC)と経済省エネルギー局(Department of Energy: DOE, Ministry of Economic affairs: MEA)の技術・制度面の能力を強化することをプロジェクト目標としている。BPCにおいては、今後急速に拡大する地方の配電システムの運用・保守管理能力や地方事業所のマネージメント能力の向上、DOEにおいては、小水力発電や太陽光発電等のオフグリッドの電源開発の実施能力を強化することが急務である。プロジェクト目標達成のためのアウトプットとして地方電化の効率的実施のための制度と人材育成の訓練総合計画策定、同計画に基づいたBPCのBegana 訓練センターの改善、ガイドラインやマニュアルの拡充、トレーナーの能力や育成を行う。</p> <p>(2) 協力期間：2008年6月～2011年5月(予定)</p> <p>(3) 協力総額(日本側)：約1.4億円</p> <p>(4) 協力相手先機関：ブータン電力公社(Bhutan Power Corporation: BPC)経済省エネルギー局(Department of Energy: DOE, Ministry of Economic affairs)</p> <p>(5) 国内協力機関：経済産業省、海外電力調査会</p> <p>(6) 受益対象者及び規模等</p> <p>(直接受益) BPC 地方電化担当職員(研修トレーナー、地方事業所職員)、DOE 地方電化担当職員(再生エネルギー課職員)</p> <p>(間接受益) 電力供給を受ける全国民</p>
<p>3. 協力の必要性・位置付け</p> <p>(1) 現状及び問題点</p> <p>ブータン国の全国世帯電化率は57%、農村世帯のみの電化率は約4割である(2005年時点の数値)。長期的戦略に基づいて1990年後半以降、地方電化事業が急速に進められてきており、グリッド延伸による電化世帯数は第7次5ヵ年計画(1992年～1997年)では5,476世帯、第8次5ヵ年計画(1997年～2002年)下では9,164世帯、さらに第9次5ヵ年計画(2002年～2007年)では15,781世帯で、5年毎にほぼ倍増を達成した。引き続き、国際協力機構(Japan International Cooperation Agency: JICA)の支援で策定した「地方電化マスタープラン」(2005年)に基づき、第10次5ヵ年計画(期間は2007年～2012年)で、24,300世帯、第11次5ヵ年計画(2012年～2018年)で残りの約7,800世帯の電化に向け事業が進行しつつある。また、同マスタープランに基づき、オングリッドでの電化が困難な地域の約</p>

4,000 世帯（全体の約 5%）については小水力や太陽光発電等のオフグリッド電源による電化を検討している。

オフグリッド電源による電化については、DOE の再生可能エネルギー課（Renewable Energy Division : RED）が担当し、外国の無償援助にて小水力発電や太陽光発電を個別に実施してきている。

2001 年 7 月の電気法（Electricity Act）の改正により、貿易産業省（Ministry of Trade and Industry: MTI、現在、経済省(Ministry of Economic Affairs: MEA)）の中の電力局（Department of Power）が、①政策を担当する DOE、②電力産業規制を担当するブータン電力庁(Bhutan Electric Authority: BEA)、③BPC の 3 つに分割されたため、現在グリッド延伸については BPC が電化事業を進めつつある。BPC は 2002 年 7 月に分離独立した比較的新しい組織であり、地方における電化世帯の急増に伴い組織としては地方配電の運用・保守管理を担う職員と地方事業所のマネジメント能力向上が必要とされている。

短期的な視点から優先度の高い訓練は 2007 年以降積極的に実施され始めたところであるが、それに伴い、訓練センターの充実とトレーナーの育成は急を要する課題である。

また、長期的展望からの設備の運用・保守管理やマネジメントのあり方とそれに即した人材育成計画が不在の状況となっている。

2020 年までに電化世帯数は現状からさらに倍増する上、それらは現在の電化地域よりも一層アクセスが困難な遠隔地の設備延長となり、面的拡大が見込まれる。現状では設備設置からあまり時間が経過しておらず、配電線延長が限られているため深刻な維持管理上の問題は頻繁に生じていないが、今後は既設設備の老朽化による問題の発現も懸念される。長期的視点に基づく制度・人材育成のための訓練計画の早期策定は不可欠である。

オフグリッド電源による電化については、外国の無償援助にて小水力発電や太陽光発電を個別に実施してきており、その基礎となる政策やガイドラインが策定されていなかった。国連開発計画（United Nation Development Programme: UNDP）支援により再生可能エネルギー政策等が整備されつつあるが、それらを念頭に実際の現場で既存設備の運用・保守管理のあり方と今後の電源開発計画の採択と効率的実施のための技術・財務面の知見が必要とされている。

（２） 相手国政府国家政策上の位置付け

本プロジェクトは地方電化促進に向けて、グリッド延伸による電化においては現在進行中の地方電化の設備建設後の運用・保守管理制度の確立と担当者の能力強化、またオフグリッドにおいては実施を担う担当職員の能力強化により側面支援するという重要な位置づけにある。地方電化推進の重要性については下記のとおりブータン国の国家開発政策と電力開発計画に合致している。

- ブータン政府の開発理念である「Gross National Happiness: GNH」を基本指針として、1999 年に長期的開発の展望を記した「Bhutan 2020 - A Vision for Peace, Prosperity and Happiness」

にて地方電化は重要な政策目標として位置づけている。ブータン政府の電力セクター長期戦略として2020年までに電化率100%（すべての人々に電気を“Electricity for All”）を掲げている。

- 第9次5ヵ年計画（2002年～2007年）において地方電化は地方の生活の質の向上と社会経済開発を推進するための最優先事項としていた。第10次5ヵ年計画（2007年～2012年）のガイドラインにおいては国連ミレニアム開発目標の達成を目指して貧困削減を前面に打ち出している。その中で地域格差の是正と農村における経済開発の推進の観点から地方のインフラ整備は重要であるという見方が示され、中でも地方電化は優先事項とされている。第10次5ヵ年計画ではグリッド延伸による電化については、日本の国際協力銀行（Japan Bank for International Cooperation: JBIC）とアジア開発銀行（Asian Development Bank: ADB）等の資金支援により実施される予定である。

（3） 我が国援助政策との関連、JICA 国別事業実施計画上の位置付け（プログラムにおける位置付け）

本プロジェクトは「政府開発援助中期政策」（平成17年）の重点課題の一つである「持続的成長」への具体的アプローチおよび取り組みの中で、経済社会基盤である電力インフラ整備に関わる人材育成や制度策定支援というソフト面の支援にあたり、我が国の援助政策と合致する。

「JICA 国別事業実施計画 ブータン国」（平成18年11月改訂）の4つの重点課題の一つに地方電化促進を含む「経済基盤整備」が述べられている。電力セクターでの支援はこれまで小水力発電の無償協力や地方電化マスタープラン策定の作成の支援が行われてきたが、今後はこれに人材開発をはじめとするソフト面での協力を強化していくこととしている本プロジェクトは、上記のJICAの国別事業実施計画に沿ったものである。

また、地方電化マスタープラン策定後のハード面での事業化の展開として、JBICが円借款第1号案件「地方電化事業（2007年L/A調印）」により、15,300世帯を電化する予定であり、配電設備後の運用・保守管理のための能力強化を図る本プロジェクトとの連携が期待されている。

4. 協力の枠組み

〔主な項目〕

（1） 協力の目標（アウトカム）

① 協力終了時の達成目標（プロジェクト目標）と指標・目標値

〔目標〕

BPC および DOE の地方電力供給効率性向上のための技術および制度面の能力が強化される。

〔指標〕

オングリッドシステム

- ・一定割合*以上のプロジェクト実施中の受講生が資格試験に受かる。
- ・一定割合*以上のプロジェクト受講生が配電システムを適切に運用・保守管理できる。

オフグリッドシステム

- ・DOE 職員がオフグリッドの開発に適切な知識および技術*を取得する。

注：*プロジェクト開始時の総合訓練プログラム策定時に具体的項目と数値を決定する。

② 協力終了後に達成が期待される目標（上位目標）と指標・目標値

[目標]

地方部における電力供給サービスが向上する。

[指標]

- ・プロジェクト終了後約 5 年後までに一定の割合**以上の地方の顧客が電力サービスの信頼性と安全性に満足する。注：**プロジェクト開始時の総合訓練プログラム策定時に具体的項目と数値を決定する。

(2) 成果（アウトプット）と活動

[成果 1]

地方電力供給に焦点をあて、制度面のアセスメントに基づき、総合訓練プログラムが策定される。

[活動]

- ①-1 組織内のコンサルテーションや議論を通じ、現在および将来的な運営・保守管理の問題分析を行う。
- ①-2 長期的および短期的訓練制度と人的資源開発の方針を策定／レビューする。
- ①-3 技術およびマネジメントの能力開発ニーズを特定する。
- ①-4 総合訓練プログラムを策定する。
- ①-5 必要な訓練プログラムの優先付けを行う。
- ①-6 地方電力供給のためのコース内容を策定する。
- ①-7 地方電力供給のためのコース内容をトレーナーや訓練生からのフィードバックに基づき、改善する。

[指標]

- ・策定あるいは更新した長期・短期的な（運用・保守管理に関する）制度と人的資源開発方針
- ・地方電力供給に焦点をあてた総合的訓練プログラム
- ・優先的訓練の詳細コース内容

[成果 2]

Begana 訓練センター設備が拡充される。

[活動]

- ②-1 地方電力供給の訓練プログラムに必要な設備・機材を特定する。
- ②-2 必要な訓練設備・機材を導入する。

[指標]

訓練のために必要な機材設置・利用

[成果 3]

地方電力供給のための運用指針（ガイドライン）と手引書（マニュアル）が作成される。

[活動]

- ③-1 活動 1 をもとに、地方電力供給のための訓練ニーズを特定する。
- ③-2 運用指針（ガイドライン）と手引書（マニュアル）のドラフトを策定する。
- ③-3 上記③-2 のドラフトをフィードバックに基づき、改善する。

[指標]

- ・作成された必要な運用指針（ガイドライン）と手引書（マニュアル）

[成果 4]

地方電力供給のための訓練施設のトレーナーの能力が向上する。

[活動]

- ④-1 トレーナーに必要な訓練内容を特定する。
- ④-2 トレーナーに対して、特定された優先的訓練を行う。
- ④-3 訓練のための教材を準備する。
- ④-4 提案された訓練コースを導入する。

④-5 訓練生の理解度を測るためのテストやフォローアップ調査を導入する。

[指標]

- ・ 資格認定されたトレーナーの人数
- ・ トレーナーによって作成された訓練メニューと教科書
- ・ 訓練生によるトレーナーへのフィードバック

(3) 投入（インプット）

①日本側（総額 1.4 億円）

- 1) 長期専門家 1 名（地方電化訓練プログラム支援）
- 2) 短期専門家 3 名以上（配電技術、マネージメント***、オフグリッド電化等、必要に応じ）
注***: マネージメント効率向上の観点からの訓練制度策定支援を含む。
- 3) 機材供与 不足している配電の運用・保守管理トレーニング用機材一式（GIS ソフト等、必要に応じ）
- 4) 研修：本邦／第三国研修
- 5) 現地活動費：ワークショップ開催費等

②ブータン国側

- 1) 施設/建物 プロジェクトのための専門家執務室とトレーニング設備
- 2) カウンターパート人材の配置：以下の配置を行う。
Project Director: DOE 総局長
Senior Project Manager: BPC 人材開発・総務部長
Project Manager: BPC 配電・顧客サービス部長
Project Coordinator: DOE 再生可能エネルギー課長
以上に加え、DOE 再生可能エネルギー課エンジニアと BPC 地方電化に関わるエンジニアやその他専門家
- 3) ローカルコスト負担：国内旅費等プロジェクトの現地業務に必要な経費

(4) 外部要因（満たされるべき外部条件）

前提条件： DOE と BPC が組織運営方針にて地方電化のための訓練が重要かつ最優先課題と位置づけている。

外部条件： 成果達成～訓練や活動に参加するカウンターパートがプロジェクト実施期間中に交代しない。万一、交代する場合は、後任として最適な人材が配置され、業務を円滑に引き継ぐ。

目標達成～訓練されたトレーナーが BPC あるいは DOE で継続して働く。

上位目標達成～必要な技術・マネージメント職員数と運営資金が手当てされる。

- ・ BPC と DOE の訓練された技術者とマネージメント職員が自らの組織のために継続的に働く。
- ・ 農村電化プログラムが計画どおりに実施される。

5. 評価 5 項目による評価結果

以下の視点から評価した結果、協力の実施は適切と総合的に判断される。

(1) 妥当性

本プロジェクトは以下の理由から妥当性が高いと判断できる

- 本プロジェクトはブータン国の国家開発計画と電力開発戦略の優先事項である地方電化促進を支援するものであり、また、我が国の援助方針や JICA 国別事業実施計画での重要課題に一致する。

- 本プロジェクトの内容は BPC の戦略計画（Corporate Strategic Development Plan 2007 年）の、顧客へのサービス、効率的な電力供給、職員の専門性構築、という点の重視に一致するものである。電力供給の効率性向上においては、DOE と BPC の体制整備や職員の能力強化によるソフト面の効率化が設備投資とともに喫緊の課題である。ターゲットグループ（主に BPC の配電顧客サービス部職員と DOE オフグリッド電源の電化推進担当職員）のニーズは、設備の効率的運用・保守管理制度確立とその実施能力強化、また、グリッド延伸が困難な地域の電源開発推進のための知見を持つことであり、本プロジェクト内容はこうしたニーズに合致するものである。
- グリッド延伸による電化については ADB が実施してきた技術協力（BPC の能力強化や地方電化促進への技術協力、等）の成果を踏まえ、本プロジェクト内容によって補完し、相乗効果を生むことが期待できる。オフグリッドは UNDP 支援により、再生可能エネルギー政策とコミュニティベースの小水力発電の経験がまとめられつつある。日本は、ブータン国と他国において当該分野での支援経験の蓄積があるため、他ドナーの経験も踏まえ、地域への普及のための実践的支援を行うことの意義は高い。

（２） 有効性

本プロジェクトは以下の理由から有効性が認められる。

- プロジェクト目標は、DOE と BPC との協議を経たものである。体系的訓練制度とプログラム、機材、ガイドラインとマニュアル、トレーナー育成、という 4 つのアウトプットの達成過程を通じてプロジェクト目標へ到達することを意図しており、目標達成の道筋は明確である。プロジェクト目標指標の具体的項目と数値は、プロジェクト開始時の訓練プログラム策定時に最終的に決定することとなったが、職員の能力向上を測定するための試験や第三者による対象者の能力評価等によって確認可能とみられる。
- BPC は、2006 年より、「パフォーマンス・ベース・インセンティブ・システム（Performance Based Incentive System : PBIS）」を導入し、指標にて職員の業務評価や報酬への反映を行っており、職員自身の能力向上への意欲が高いと思われる。

（３） 効率性

本プロジェクトは、以下の理由から効率的実施が見込める。

- 訓練プログラム策定のファシリテーター役を果たす長期専門家 1 名と短期専門家派遣の形式にて、適切なタイミングでブータン側の要望と必要性に応じた分野専門家が派遣でき、効率的である。また、電力設備に関する JICA 長期専門家を 2006 年から 1 年間派遣しており、同専門家による情報収集・分析を一部引き継ぐ形で本プロジェクトの専門家が業務に着手する。
- 資金的負担は主に BPC が担うことが多いとみられるが、BPC では全支出の 4～5% 程度を職員訓練予算に割り当ててきた実績がある。今年度の訓練センターの教室の整備拡充は既に予算

を確保し、進められつつある。したがって、ブータン側の資金については、最低限必要なものはなされると見込まれる。

- 本プロジェクト活動実施のタイミングは、BPC の訓練実施のタイミングや予算策定のタイミングを考慮して計画している。

(4) インパクト

本プロジェクトは以下のようなインパクトの発現が予測できる。

- 上位目標は顧客サービス重視の BPC の戦略目標と一致し、その達成に向けて全社で努力しつつある。効率的な運用・保守管理により電力サービス向上につながるものであり、プロジェクト終了後も引き続き、新たに提案された制度に沿って、訓練を継続的に実施・発展させていくことが期待でき、上位目標の達成が見込まれる。
- 本プロジェクトによって提案される制度、訓練コースは、BPC や DOE の組織編成にも影響を及ぼす可能性が考えられる。

(5) 自立発展性

本案件の自立発展性の見込みは、以下のように予測できる。

- 組織・制度：本プロジェクトでは BPC や DOE が主体的に制度、プログラムを最終決定し、推進していくアプローチをとり、相手側オーナーシップを高めるように配慮している。人員体制面では今後、建設事業に当てられていた職員は運用・保守管理業務を継続して実施できるようになることが見込まれる。
- 技術面：トレーナー育成やトレーナーを通じた職員への技術移転は、ブータン側で持続し、さらに彼ら自身の努力、工夫によって発展していくことが見込まれる。
- 財務面：BPC については、長期的には今後の地方電化の進展とともに電力販売収入に対し、支出が多くなっていくことが予測されるが、財務面をコントロールする PBIS による目標が地方支店にも浸透、効率的料金回収への堅実な財務運営方針がうかがえる。こうした経営努力等により、将来的な問題が軽減され、当面の財務の健全性は保持できるとみられる。

6. 貧困・ジェンダー・環境等への配慮

本プロジェクトは、地方電力供給部門の運用・保守管理やマネジメント強化であり、地方部の一般家庭への電力供給状況が改善することから、ケロシンなど燃料費の節約等による生活水準向上へとつながることが期待される。本プロジェクト内容は制度策定や訓練プログラム策定および訓練実施であるため、直接的に負のインパクトが懸念されるような配慮事項はない。

また、本プロジェクトは、自然及び社会環境の大規模開発を伴うものでないため、自然及び社会環境に対する負の影響はほとんど生じないといえる。

7. 過去の類似案件からの教訓の活用

電化に関わる訓練センターの拡充およびトレーナー育成といったコンポーネントが類似する技術協力プロジェクトとして、例えば「ベトナム 電力技術者養成プロジェクト」、「カンボジア王国 電力セクター育成技術協力プロジェクト」、「フィリピン地方電化プロジェクト」等がある。ベトナムの中間評価ではカウンターパートであるトレーナーの人数不足と現場経験不足の指摘、ベトナム電力公社（EVN）、ハノイ Electric Power College（EPC）、EVN 関連会社の3者の協力実施体制の確立が提言されている。カンボジアの終了時評価では、カンボジアと現状が類似している近隣諸国での第三国研修が役立ったとの教訓がある。フィリピンの中間評価では、プロジェクトのマネジメント強化の必要性などが提言されている。

本プロジェクトでは、プロジェクト開始当初に運用・保守管理に関する制度アセスメントを丁寧に実施することで、カウンターパートの資質、人数、各関係機関の協力体制について再度確認し、実施可能なプログラム策定と体制作りをすることがプロジェクトの円滑な実施への鍵となっている。また、海外研修についてはブータン国の実状と研修内容に応じて、研修場所を選択することになっており、プロジェクトのマネジメントについては、カウンターパートの人材配置を上述4.（3）②のとおり行い、JCC等でプロジェクトの進捗状況を管理していくこととしている。

8. 今後の評価計画

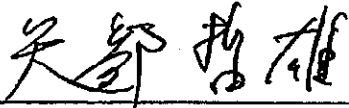
- ・ 中間評価：プロジェクト開始後約 1.5 年後（2009 年 9 月頃）
- ・ 終了時評価：プロジェクト終了の半年前（2010 年 11 月頃）
- ・ 事後評価：プロジェクト終了後 3～5 年を目途に実施

**RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE ROYAL GOVERNMENT OF BHUTAN
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE IMPROVEMENT OF EFFICIENCY FOR RURAL POWER SUPPLY**

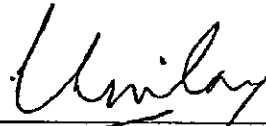
Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of discussions with the Bhutanese authorities concerned with respect to desirable measures to be taken by JICA and the Royal Government of Bhutan for the successful implementation of the Project on "Improvement of Efficiency for Rural Power Supply" in the Kingdom of Bhutan.

As a result of the discussions, the Resident Representative of JICA Bhutan Office and the Bhutanese authorities concerned agreed on the matters referred to in the document attached hereto.

Thimphu, March 6, 2008




Mr. Tetsuo Yabe
Resident Representative
Bhutan Office
Japan International Cooperation
Agency
Japan



Mr. Thinley Namgyel
Head
Development Cooperation Division
GNH Commission
Royal Government of Bhutan



Mr. Yeshe Wangdi
Director General
Department of Energy
Ministry of Economic Affairs
Royal Government of Bhutan



Mr. Bharat Tamang
Managing Director
Bhutan Power Corporation Ltd.
Royal Government of Bhutan

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE ROYAL GOVERNMENT OF BHUTAN

1. The Royal Government of Bhutan will implement the Improvement of Efficiency for Rural Power Supply (hereinafter referred to as "the Project") in cooperation with JICA.
2. The Project will be implemented in accordance with the Outline of the Project that is given in Annex I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan, JICA will take, at its own expense, the following measures according to the normal procedures under the Colombo Plan Technical Cooperation Scheme.

1. DISPATCH OF JAPANESE EXPERTS

JICA will provide the services of the Japanese experts as listed in Annex II.

2. PROVISION OF MACHINERY AND EQUIPMENT

JICA will consider providing such equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The Equipment will become the property of the Royal Government of Bhutan upon being delivered to the Bhutanese authorities concerned.

3. TRAINING OF BHUTANESE PERSONNEL IN JAPAN

JICA will receive the Bhutanese personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE ROYAL GOVERNMENT OF BHUTAN

1. The Royal Government of Bhutan will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese




technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. The Royal Government of Bhutan will ensure that the technologies and knowledge acquired by the Bhutanese nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Kingdom of Bhutan.
3. The Royal Government of Bhutan will grant in the Kingdom of Bhutan privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families, which are no less favorable than those accorded to experts of third countries working in the Kingdom of Bhutan under the Colombo Plan Technical Cooperation Scheme.
4. The Royal Government of Bhutan will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts referred to in Annex II.
5. The Royal Government of Bhutan will take necessary measures to ensure that the knowledge and experience acquired by the Bhutanese personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the laws and regulations in force in the Kingdom of Bhutan, the Royal Government of Bhutan will take necessary measures to provide at its own expense:
 - (1) Services of the Bhutanese counterpart personnel and administrative personnel as listed in Annex IV;
 - (2) Land, buildings and facilities as listed in Annex V;
 - (3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above ;



2



7. In accordance with the laws and regulations in force in the Kingdom of Bhutan, the Royal Government of Bhutan will take necessary measures to meet:

- (1) Expenses necessary for transportation within Bhutan of the Equipment referred to in II-2 above as well as for the installation, operation and maintenance thereof;
- (2) Customs duties, internal taxes and any other charges, imposed in Kingdom of Bhutan on the Equipment referred to in II-2 above; and
- (3) Running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Director General of Department of Energy (hereinafter referred to as "DOE"), as the Project Director, will bear overall responsibility for the administration of the Project.
2. General Manager of Human Resource and Administration Department of Bhutan Power Cooperation Ltd. (hereinafter referred to as "BPC"), as the Senior Project Manager, will be responsible for the implementation of the Project.
3. General Manager of Distribution and Customer Services Department of BPC, as the Project Manager, will be responsible for technical matters of the Project.
4. Head of Renewable Energy Division of DOE, as the Project Coordinator, will be responsible for the implementation and coordination of the Project.
5. The Japanese Experts will provide necessary recommendations and advice to the Project Director, the Senior Project Manager, the Project Manager and the Project Coordinator on any matters pertaining to the implementation of the Project.
6. Japanese Experts will give necessary technical guidance and advice to the DOE and BPC.



7. For the effective and successful implementation of the Project, a Joint Coordinating Committee (JCC) will be established. The functions and compositions of the JCC are stipulated in Annex VI.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA, DOE and BPC, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

The Royal Government of Bhutan undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Bhutan except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Royal Government of Bhutan on any major issues arising from, or in connection with this Attached Document.

VIII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Kingdom of Bhutan, the Royal Government of Bhutan will take appropriate measures to make the Project widely known to the people of the Kingdom of Bhutan.



IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be starting from June, 2008, for three [3] years.

- ANNEX I OUTLINE OF THE PROJECT
- ANNEX II LIST OF JAPANESE EXPERTS
- ANNEX III LIST OF MACHINERY AND EQUIPMENT
- ANNEX IV LIST OF THE KINGDOM OF BHUTAN COUNTERPART AND
ADMINISTRATIVE PERSONNEL
- ANNEX V LIST OF LAND, BUILDINGS AND FACILITIES
- ANNEX VI JOINT COORDINATING COMMITTEE



ANNEX I OUTLINE OF THE PROJECT

1. Title of the Project

Improvement of Efficiency for Rural Power Supply

2. Overall Goal

Electricity service delivery in rural areas will be enhanced

3. Project Purpose

Technical and institutional capacity of BPC and DOE are developed to enhance efficiency in delivering rural power supply.

4. Outputs of the Project

1. Based on institutional assessment, comprehensive training program with focus on rural power supply is prepared
2. Training facility at Begana for rural power supply is improved
3. Guideline and manual for rural power supply are prepared
4. Capacity of trainers for training facility for rural power supply is improved

5. Activities of the Project

BPC and /or DOE conduct following activities facilitated / supported by JICA Experts

- 1-1. Conduct problem analysis on current and future operation and maintenance management through internal consultation and discussion
- 1-2. Formulate/ review policy for long and short-term institutional and human resource development
- 1-3. Identify the needs of capacity development of technical and management personnel
- 1-4. Prepare comprehensive training program
- 1-5. Prioritize the necessary training program
- 1-6. Prepare initial course contents for rural power supply
- 1-7. Revise the initial course contents for rural power supply based on feedback from trainers and trainees

ju

lh

gag *uu*

2-1. Identify the necessary facility for the training program for rural power supply

2-2. Establish the required training facility

3-1 Identify the needs of training

3-2 Prepare draft guideline and manual

3-3 Revise those drafts based on the feedback

4-1 Identify the items necessary for trainers' training

4-2 Train trainers for priority training

4-3 Prepare training materials

4-4 Conduct the suggested training courses

4-5 Conduct the test and follow up survey to measure the understanding of trainees

4-6 Revise training materials and teaching method if necessary

Jn

7

th

yes

ANNEX II LIST OF JAPANESE EXPERTS

1. Long-term Experts

- (i) Coordination & Facilitation for Training Program

2. Short-term Experts

- (i) Distribution Engineer
- (ii) Management Expert
- (iii) Off-Grid Expert

Other short-term experts will be dispatched as necessary.

Note:

Assignment schedule of experts depends on the progress of the Project and availability of the suitable experts. It will be decided through mutual consultations for each Japanese fiscal year.

gn

th

yes m

ANNEX III LIST OF MACHINERY AND EQUIPMENT

Equipment will be given as necessary for the effective implementation of the Project. Details shall be discussed during the Project.

Jn

th

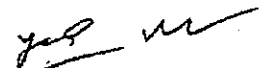
Jan 11

**ANNEX IV LIST OF THE KINGDOM OF BHUTAN COUNTERPART PERSONNEL
AND ADMINISTRATION PERSONNEL**

1. Counterpart personnel

- (1) Project Director : Director General, DOE
- (2) Senior Project Manager : General Manager of Human Resource and Administration
Department, BPC
- (3) Project Manager : General Manager of Distribution and Customer Services
Department, BPC
- (4) Project Coordinator : Head of Renewable Energy Division, DOE
- (5) Other Energy officers of DOE, and Project Engineers and other Specialists of BPC

2. Administration Personnel



ANNEX V LIST OF LAND, BUILDINGS AND FACILITIES

1. Office space and necessary facilities for Japanese experts and Bhutanese counterparts
2. Other facilities mutually agreed upon as necessary for the implementation of the Project



yang we

ANNEX VI JOINT COORDINATING COMMITTEE

1. Function

The Joint Coordinating Committee will meet at least once a year or whenever the necessity arises in order to fulfill the following functions;

- 1) To evaluate the annual work plan of the Project;
- 2) To review the progress of the annual work plan;
- 3) To review and discuss major issues that may arise during the implementation of the Project;
and
- 4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Provisional Composition

(1) Chairperson: Director General, DOE

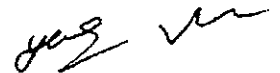
(2) Head of Development Cooperation Division, GNH Commission

(3) Member of the Bhutanese side

- a) Managing Director, BPC
- b) General Manager of Human Resource and Administration Department, BPC
- c) General Manager of Distribution and Customer Services Department, BPC
- d) Head of Renewable Energy Division, DOE as the Project Coordinator
- e) Other personnel concerned to be assigned by the request of JICA, DOE or BPC, if necessary.

(4) Member of the Japanese side

- a) Experts,
- b) Representative from JICA Bhutan Office,
- c) Other personnel concerned to be assigned by the request of JICA, DOE or BPC, if necessary.



4. 平成 19 年度要請書



དངུལ་ཚུལ་ལྷན་ཁག།

གོ་གསལ་རང་དང་སྐྱོན་འགྲུལ་འཛིན་སྐྱོང་ལས་ཁུངས།

DEPARTMENT OF AID & DEBT MANAGEMENT
MINISTRY OF FINANCE
ROYAL GOVERNMENT OF BHUTAN

DADM/IAP-GEN/ 631
August 24, 2006

The Director
Bilateral Department
Ministry of Foreign Affairs
Thimphu

Sub: Submission of Project Proposals

Dear Sir,

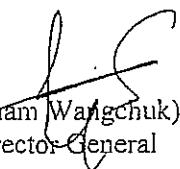
We are forwarding the project proposals under Official Development Assistance schemes of the Japanese Government for Grant Aid Programme for the Year 2008-2009 and Technical Cooperation Programmes for the year 2007-2008.

The above project proposals are submitted as per the invitation of project proposals from the Japanese Government offered vide their Note Verbale No. B/57/06 dated 26 June 2006 communicated to this department by the Ministry of Foreign Affairs.

As such, we would appreciate it if MoFA could kindly forward the same to the Japanese Embassy, New Delhi for their kind assistance.

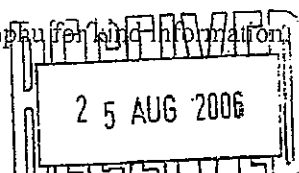
Enclosed: A list and the project proposals.

Yours Sincerely,


(Sonam Wangchuk)
Director General

CC.

- The Resident Representative, JICA, Thimphu for kind information



Project Proposals under the Japanese ODA Scheme-2006

Type of Cooperation	Priority	Project Title	Agency
Grant Aid	1	Grant Assistance for Underprivileged Farmers (KR II 2007)	MoA, DoA
Grant Aid	2	Development of 160 kW Lingzhi Micro Hydel Project in Thimphu, 350 kW Laya Micro Hydel Project in Gasa, 60 kW jangothang Micro Hydel Project in Thimphu and 32 kW Khephu Micro Hydel Project in Trashigang.	MTI, DoE
Grant Aid	3	Up gradation of the training machines and equipments for strengthening the quality of training in formal training institutes (Vocational Training Institutes/traditional arts and crafts institutes)	MoLHR, DHR
Grant Aid	4	Project for Re-construction of Bridges (Phase 3)	MoWHS, DoR
Technical Cooperation (Project)	1	Strengthening of Farm Mechanization Program	MoA, DoA
Technical Cooperation (Project)	2	Strengthening the technical capacity of the Department of Human Resources and its institutes.	MoLHR, DHR
Technical Cooperation (Expert)	3	Expert in Broadcast Engineering	BBSC
Technical Cooperation (Project)	4	Acceleration of Rural Electrification Project	BPC
Technical Cooperation (Project)	5	Local Governance and Decentralization Project Phase II	MoHCA, DLG
Technical Cooperation (Expert)	6	Bridge Design & Construction	MoWHS, DoR
Technical Cooperation (Project)		Extended Program of Immunization (EPI), 2007	MoH, DMS

APPLICATION FORM FOR JAPAN'S TECHNICAL COOPERATION

1. **Date of Entry:** Day 20 Month June Year 2006
2. **Applicant:** The Royal Government of Bhutan
3. **Project Title:** **Accelerated Rural Electrification Project**
(Power Utility Expert (Long Term), MIS & Finance Expert (Short Term) & GIS Expert (Short Term))
4. **Implementing Agency:**
1) Bhutan Power Cooperation
Address: P.O.Box 580, Thimphu, Bhutan
Contact Person: Chhewang Rinzin (Managing Director, BPC)
Tel. No.: 975-2-325095 Fax No. : 975-2-322279
E-Mail: chhewangrinzin@bpc.com.bt
5. **Background of the Project**

Bhutan Power Corporation was launched as a public utility on the 1st of July 2002 with the mandate of distributing electricity throughout the Country and also providing transmission access for generating stations for domestic supply as well as export. One of BPC's basic mandate is to not only ensure that electricity is available to all our citizens but to also make sure that it is reliable, adequate and above all within the means of all consumers.

At present, only about 50% of the Rural areas of Bhutan have access to electricity. The government has a long-term target of 100% electrification by the year 2020. BPC is mandated not only for the 100% electrification by the year 2020 but also for operation and maintenance of the electrical system. Also, BPC is the sole transmission and distribution company in the country and responsible also for the wheeling of electricity to India.

BPC is the largest corporation with about 1400 regular employees and will be employing new engineers for Distribution & Transmission projects, 10th FYP RE Projects as well as for its regular Operation & Maintenance works and to better serve the customers.

Hence a Power Utility Expert (Long Term), MIS & Financial Expert and GIS expert (Short terms) would help BPC in a long way not only in the imparting technical knowledge to the young Engineers but also in giving technical advices on the actual implementation of various transmission and distribution projects that are in pipe line for the BPC. BPC is in the process of setting up the National Load Dispatch Center (NLDC) in the next two years. The advises of the Power Utility Expert in the project would be very vital to BPC.

Also with the JICA funded RE Master Plan for Dzongkhag Wise Electrification in Bhutan, BPC has gone a long way with the Geographical Information System (GIS) in planning the distribution systems, asset management etc. Hence the GIS short term expert would be of great help to BPC in advising and training the engineers on optimal use on the capacity of the software developing applications as well as for sustainability of the GIS database and its usage for BPC.

Therefore, we strongly request an expert for overall advising the management of BPC on technical matters and also for identifying the issues to develop the human capacity program in our sector. It would also help in a long way to streamline the various process that BPC has taken initiative in the field of GIS and MIS for better planning, decision making etc. which would ultimately help in better serving the customers.

6. Outline of the Project

(1) Overall Goal

Advise on technical matters on the Distribution and Transmission Projects to be handled by BPC (including NLDC) and other Operation & Maintenance aspects and Utility functions.

(2) Project Purpose

Strengthen the human resource capacity of BPC

(3) Outputs

1. The capacity development in design, planning, construction and maintenance of the distribution & Transmission lines.
2. The capacity development of power utility and control system utilizing IT communication.
3. The capacity development of Power sector management
4. Train the counterparts (Engineers) of BPC on the process.
5. Recommendations and suggestions for the Human Resource

Development of BPC

(4) Project Activities

- 1-1. To advise BPC on the best practices of Operation & Maintenance.
- 1-2 To develop the manuals for planners, contractors and electricians of the distribution lines
- 1-3. To train the engineers in survey, design and planning
- 1-4. To train the procurement officers in procurement process and material management etc
- 1-5. To Train the field supervisors at the project sites

- 2-1. To review the current utility and control system
- 2-2. To assist, advise & train the engineers for utility and control system (SCADA and IT Communication etc)
- 2-3. OJT training for Counterparts
- 2-4. Organize the seminar for the local staff by the C/P

- 3-1 Advise on any other utility functions that BPC would like to seek help on.

(5) Input from the Recipient Government

1. Counterpart

Title	Position	Department
Project Management & Finance	Finance officers	Finance & Account
-	Procurement Officer	Procurement Service
Survey and Plan	Senior Engineer	Development & Construction (Planning Design & review Cell)
Construction and O&M	Senior Engineer	Development & Construction (Construction Cell & Rural electrification Division)
- do -	Senior Engineer	Customer Service (O&M Cell)
- do -	Senior Engineer	Customer Service (Safety & Customer Relations)
Power Utility and Control System	Senior Engineer	Transmission (Communication & MRT section)

2. Office spaces at the department for each expert and the project office

3. Transportation expenses (In country)
4. Expenses for in-country trainings

(6) Input from the Japanese Government

1. Expert

- Power Utility Expert: 24MM
- MIS & Finance Expert: 3MM
- GIS Expert: 3MM

2. C/P training in Japan or a third country

- MIS and GIS trainings: 2 Person x 2MM
- Power Utility and Control system: 2 Person x 1MM

3. In-country training

- Project Management & Finance
- Survey and Planning
- Construction Management
- O&M Management
- Power Utility and Control system

4. Equipment

Equipment	Amount (US\$)
• GIS system and equipment for tools	100,000
• Equipment for construction supervision and O&M	20,000

7. **Implementation Schedule**

Month July Year 2007 ~ Month July Year 2009

8. **Implementing Agency**

Bhutan Power Cooperation

9. **Related Activities**

ADB: Rural Electrification IV (2007-2012) and TA for finance& account

ACB & GOI: Rural Electrification

Gov. of India and BPC internal funding: Transmission & Distribution Projects

Japan

JICA: Development study for rural electrification (-2005)

JBIC: Rural electrification (Tentative: 2007-2012)

Grant Aid by the government of Japan: Mini/ Micro Hydro projects (1980sand 1990s)

10. *Gender Consideration*

11. Environmental and Social Considerations

(Please fill in the attached screening format.)

12. Beneficiaries

All the valued BPC customers (About 70% of the Bhutanese Population)

Direct beneficiaries: BPC

13. Security Conditions

14. Others

Screening Format

Question 1 Address of a project site

Question 2 Outline of the project

2-1 Does the project come under following sectors?

■Yes □No

If yes, please mark corresponding items.

- Mining development
- Industrial development
- Thermal power (including geothermal power)
- Hydropower, dams and reservoirs
- River/erosion control
- Power transmission and distribution lines
- Roads, railways and bridges
- Airports
- Ports and harbors
- Water supply, sewage and waste treatment
- Waste management and disposal
- Agriculture involving large-scale land-clearing or irrigation
- Forestry
- Fishery
- Tourism

2-2 Does the project include the following items?

■Yes □No

If yes, please mark following items.

- Involuntary resettlement (scale: households, persons)
- Groundwater pumping (scale: m³/year)
- Land reclamation, land development and land-clearing (scale: hectares)
- Logging (scale: hectares)

2-3 Did the proponent consider alternatives before request?

Yes: Please describe outline of the alternatives

(Conduct the EIA)

■No

2-4 Did the proponent have meetings with related stakeholders before request?

Yes No

If yes, please mark the corresponding stakeholders.

Administrative body

Local residents

NGO

Others ()

Question 3

Is the project a new one or an on-going one? In case of an on-going one, have you received strong complaints etc. from local residents?

New On-going(there are complaints) On-going (there are no complaints)

Others ()

Question 4 Name of laws or guidelines:

Is Environmental Impact Assessment (EIA) including Initial Environmental Examination (IEE) required for the project according to laws or guidelines in the host country?

Yes No

If yes, please mark corresponding items.

Required only IEE (Implemented, on going, planning)

Required both IEE and EIA (Implemented, on going, planning)

Required only EIA (Implemented, on going, planning)

Others: ()

Question 5

In case of that EIA was taken steps, was EIA approved by relevant laws in the host country?

If yes, please mark date of approval and the competent authority.

<input type="checkbox"/> Approved: without a supplementary condition	<input type="checkbox"/> Approved: with a supplementary condition	<input type="checkbox"/> Under appraisal
--	---	--

(Date of approval: Competent authority:)

Not yet started an appraisal process

Others: (It is included in the project activities)

Question 6

If a certificate regarding the environment and society other than EIA, is required, please indicate the title of certificate.

Already certified Required a certificate but not yet done

Title of the certificate :()

Not required

Others ()

Question 7

Are following areas located inside or around the project site?

Yes No Not identified

If yes, please mark the corresponding items.

- National parks, protected areas designated by the government (coast line, wetlands, reserved area for ethnic or indigenous people, cultural heritage) and areas being considered for national parks or protected areas
- Virgin forests, tropical forests
- Ecological important habitat areas (coral reef, mangrove wetland, tidal flats)
- Habitat of valuable species protected by domestic laws or international treaties
- Likely salts cumulus or soil erosion areas on a massive scale
- Remarkable desertification trend areas
- Archaeological, historical or cultural valuable areas
- Living areas of ethnic, indigenous people or nomads who have a traditional lifestyle, or special socially valuable area

Question 8

Does the project have adverse impacts on the environment and local communities?

Yes No Not identified

Reason: ()

Question 9

Please mark related environmental and social impacts, and describe their outlines.

- | | |
|---|---|
| <input type="checkbox"/> Air pollution | <input type="checkbox"/> Social institutions such as social infrastructure and local decision-making institutions |
| <input type="checkbox"/> Water pollution | <input type="checkbox"/> Existing social infrastructures and services |
| <input type="checkbox"/> Soil pollution | <input type="checkbox"/> The poor, indigenous or ethnic people |
| <input type="checkbox"/> Waste | <input type="checkbox"/> Maldistribution of benefit and damage |
| <input type="checkbox"/> Noise and vibration | <input type="checkbox"/> Local conflict of interests |
| <input type="checkbox"/> Ground subsidence | <input type="checkbox"/> Gender |
| <input type="checkbox"/> Offensive odors | <input type="checkbox"/> Children's rights |
| <input type="checkbox"/> Geographical features | <input type="checkbox"/> Cultural heritage |
| <input type="checkbox"/> Bottom sediment | <input type="checkbox"/> Infectious diseases such as HIV/AIDS etc. |
| <input checked="" type="checkbox"/> Biota and ecosystem | <input type="checkbox"/> Others () |
| <input type="checkbox"/> Water usage | |
| <input checked="" type="checkbox"/> Accidents | |
| <input type="checkbox"/> Global warming | |
| <input type="checkbox"/> Involuntary resettlement | |
| <input type="checkbox"/> Local economy such as employment and livelihood etc. | |
| <input checked="" type="checkbox"/> Land use and utilization of local resources | |

Outline of related impacts:

[]

Question 10

Information disclosure and meetings with stakeholders

10-1 If the environmental and social considerations are required, does the proponent agree on information disclosure and meetings with stakeholders in accordance with JICA Guidelines for Environmental and Social Considerations?

Yes No

10-2 If no, please describe reasons below.

[]

Application Form for Technical Cooperation (Expert)

By the Government of Japan

1. Outline of the Assignment	
(1) Assignment Title	Accelerated Rural Electrification Project (Power Utility Expert)
(2) Type of Assignment (New / Extension / Successor)	New
If this type is "Extension" or "Successor", please show whose extension or successor it is.	
(3) Period of Assignment and Desirable Time of Dispatch	2 years
(4) Number of Expert(s) Required	1 expert
(5) Category of Service	Assistance in improving the Human Capacity Development in Power Utility Sector (Especially in SCADA, GIS and MIS) <input type="checkbox"/> Policy Consultation / <input type="checkbox"/> Administrative System Development / <input type="checkbox"/> Research and Study / <input checked="" type="checkbox"/> Appropriate Technology Development / <input checked="" type="checkbox"/> Technology Diffusion / <input type="checkbox"/> Seminar / <input type="checkbox"/> Others ()
(6) Name of Related Project / Scheme	<u>2003-2005: Master Plan study for Dzongkhag-wise Electrification in Bhutan</u> <u>2005-: JBIC: Dzongkhag-wise on grid electrification project</u>
(7) Name of Requesting Ministry / Organization and Specific Department / Division / Unit to which the Expert is attached	<u>Main related division</u> <u>Ministry: Ministry of Trade and Industry</u> <u>Bhutan Power Corporation, Engineering Department.</u> <u>Other related division</u> <u>Ministry: Ministry of Trade and Industry</u> <u>Department of Energy</u> <u>Planning and Coordination Division</u>

<p>(8) Location of Service and Distance from the Capital</p>	<p><u>Thimphu, the capital city</u></p>
<p>2. Counterpart Personnel</p> <p>(1) Number, Names and Posts of Counterpart Personnel</p> <p>(2) Name and Post of Supervising Authority to which the Expert is Answerable</p>	<p><u>General Manager, Development & Construction Dept.</u> <u>General Manager, Customer Service Dept.</u> <u>General Manager, Transmission Dept.</u> <u>Head of Engineering Cell</u></p> <p><u>Managing Director, Bhutan Power Corporation</u></p>
<p>3. Background Information on Request of Expert/s</p> <p>This section should show as precisely as possible the general nature of the project for which the expert/s is required. Please state whether the project falls within the government's development programme.</p> <p>It is important to indicate whether the project is a new enterprise or whether it was started previously. In the latter case, any assistance received under other technical cooperation programmes (e.g. under United Nations auspices) should be stated.</p> <p>In the case of academic establishments, it is desirable to know the number of students accepted annually, their level of attainment and the size and status of existing staff as well as details of any research facilities and the level of research being undertaken. (Copies of brochures, annual reports, calendars, syllabus of instruction etc. should be attached where applicable.)</p>	<p><u>The Bhutan Power Corporation is the biggest corporation in Bhutan hiring about 1,400 employees. The countrywide electrification program is also one of the highest priority as a basic infrastructure development to support the socio-economic development and alleviate the poverty in rural areas.</u></p> <p><u>There are many donors (GOI,ADB,NORAD,ACB,SDS) involved with the power sectors to support the enhancement of power sector. Especially, the power generation is already developed. However, we still have a lot of issue to improve our organization. Mainly human capacity developments is urgently required to provide the efficient service for the people:</u></p> <ol style="list-style-type: none"> 1. <u>High Voltage Transmission Lines and Substations</u> 2. <u>Expert of GIS and MIS</u> 3. <u>Communication Expert</u> <p><u>Therefore, we strongly request an expert to give overall advice to operate the power corporation and identify the issues to develop the human capacity development program in our sector.</u></p>

<p>4. Objective of the Assignment</p>	<p>1) <u>To assist the human capacity development at Bhutan Power Corporation in Power Utility Sector</u></p>
<p>5. Expected Output of the Assignment</p>	<p>1) <u>To identify the issue on power sector to develop the human capacity development program for the employees at the Bhutan Power Corporation in the Power Utility.</u></p>
<p>6. Duties and Job Description of the Expert</p> <p>Please show them one after another, if plural experts are requested.</p>	<p>1) <u>To identify the issue</u> 2) <u>To capture the donor involvement to support the fund mobilization</u> 3) <u>To coordinate the current or future JIBC and JICA projects</u> 4) <u>Follow up the past Japanese ODA project</u></p>
<p>7. Inputs by the Recipient Side on the Assignment</p> <p>(1) Expenses for Activities of the Expert</p> <p>(2) Provision of the Office and Motor Vehicle for the Expert</p>	<p>1) <u>Office</u> 2) <u>Office administration cost</u> 3) <u>Communication cost</u></p>

<p>8. Qualifications and Experience required</p> <p>(1) Age Limit</p> <p>(2) Educational Background (Doctor / Master / Bachelor)</p> <p>(3) Practical Experience on Related Field</p> <p>(4) Language (Name / Level)</p> <p>(5) Other Qualification and Experience</p>	<p>1) Under 65 years old</p> <p>2) Bachelor degree in power related field</p> <ul style="list-style-type: none"> - <u>At least 10 years experience working for the power sector.</u> - <u>At least a few years experience working in a developing country.</u> - <u>At least 5 years experience at a executive/management level.</u> <p>3) Excellent skill in English (At least TOEFL 570)</p> <p>4) Engineering experience is essential and Financial background also preferred.</p>
<p>9. Correspondence Name and address of the official to whom correspondence regarding this application should be forwarded.</p>	<p><u>Chhewang Rinzin (Managing Director, BPC)</u> chhewangrinzin@bpc.com.bt</p>

Application Form for Technical Cooperation (Expert)

By the Government of Japan

<p>1. Outline of the Assignment</p> <p>(1) Assignment Title</p> <p>(2) Type of Assignment (New / Extension / Successor)</p> <p style="font-size: small;">If this type is "Extension" or "Successor", please show whose extension or successor it is.</p> <p>(3) Period of Assignment and Desirable Time of Dispatch</p> <p>(4) Number of Expert(s) Required</p> <p>(5) Category of Service</p> <p>(6) Name of Related Project / Scheme</p> <p>(7) Name of Requesting Ministry / Organization and Specific Department /</p>	<p>Accelerated Rural Electrification Project (Power Utility Expert)</p> <p>Extension</p> <p>1 year</p> <p>1 expert</p> <p>Policy consultation on Power Utility at Bhutan Power Corporation</p> <ol style="list-style-type: none"> 1. SCADA and communication system 2. GIS 3. Renewable energy (Mini/micro hydro) <p>Additionally, we requested the expert to provide advices on Management utilizing the information system.</p> <p><input checked="" type="checkbox"/> Policy Consultation / <input type="checkbox"/> Administrative System Development / <input type="checkbox"/> Research and Study / <input type="checkbox"/> Appropriate Technology Development / <input type="checkbox"/> Technology Diffusion / <input type="checkbox"/> Seminar / <input type="checkbox"/> Others ()</p> <p><u>2003-2005: Master Plan study for Dzongkhag-wise Electrification in Bhutan (Development Study)</u></p> <p><u>1986,90: The Micro Hydro Power (Grant Aid)</u></p> <p><u>2006-: JBIC: Dzongkhag-wise on grid electrification project (Under consideration)</u></p> <p><u>Main related division</u></p>
--	--

<p>Division / Unit to which the Expert is attached</p> <p>(8) Location of Service and Distance from the Capital</p>	<p><u>Ministry: Ministry of Trade and Industry</u> <u>Bhutan Power Corporation, Engineering Department.</u></p> <p><u>Other related division</u> <u>Ministry: Ministry of Trade and Industry</u> <u>Department of Energy</u> <u>Planning and Coordination Division</u></p> <p><u>Bhutan Power Corporation, Thimphu (Capital city)</u></p>
<p>2. Counterpart Personnel</p> <p>(1) Number, Names and Posts of Counterpart Personnel</p> <p>(2) Name and Post of Supervising Authority to which the Expert is Answerable</p>	<p><u>Four</u> <u>General Manager, Development & Construction Dept.</u> <u>General Manager, Customer Service Dept.</u> <u>General Manager, Transmission Dept.</u> <u>Head of Engineering Cell</u></p> <p><u>Managing Director, Bhutan Power Corporation</u></p>
<p>3. Background Information on Request of Expert/s</p> <p>This section should show as precisely as possible the general nature of the project for which the expert/s is required. Please state whether the project falls within the government's development programme.</p> <p>It is important to indicate whether the project is a new enterprise or whether it was started previously. In the latter case, any assistance received under other technical cooperation programmes (e.g. under United Nations auspices) should be stated.</p> <p>In the case of academic establishments, it is desirable to know the number of students accepted annually, their level of attainment and the size and status of existing staff as well as details of any research facilities and the level of research being undertaken. (Copies of brochures, annual reports, calendars, syllabus of instruction etc. should be attached where applicable.)</p>	<p><u>The Bhutan Power Corporation (hereafter BPC) is the biggest corporation in Bhutan hiring about 1,300 employees.</u></p> <p><u>The countryside electrification program is also one of the highest priority as a basic infrastructure development to support the socio-economic development and alleviate the poverty in rural areas.</u></p> <p><u>There are many donors (GOI,ADB,NORAD,ACB,SDS) involved to support the enhancement of energy sector. Especially, the power generation is already developed with the assistance of several donors. However, we, BPC still have a lot of issues to improve our organization. Mainly human capacity developments of management and technical skills are urgently required to provide the efficient service for the people:</u></p> <p><u>The main issues are:</u></p> <ol style="list-style-type: none"> 1. <u>SCADA and communication for expansion of National Load Development Center (NLDC)</u> 2. <u>GIS for distribution line planning</u>

	<p>3. <u>Management Information System for efficient management</u></p> <p>Therefore, we strongly request an expert to give overall advice to operate the power corporation and identify the issues to develop the human capacity development program in our sector.</p>
4.Objective of the Assignment	1) <u>To assist the policy planning of power utility at Bhutan Power Corporation</u>
5. Expected Output of the Assignment	<p>1) To develop the strategy and programs on human capacity development in power utility</p> <p>2) To provide the alternative plan of removal Mini/micro hydro projects.</p>
<p>6. Duties and Job Description of the Expert</p> <p>Please show them one after another, if plural experts are requested.</p>	<p>1) <u>To provide technical advices and develop the human capacity development program for SCADA and communication</u></p> <p>2) <u>To provide technical advices on Management Information System</u></p> <p>3) <u>To survey the potential areas for replacement of the removal Mini/Micro hydels after on-grid areas</u></p> <p>4) <u>To provide advices for Japan ODAs future corporations.</u></p>
<p>7. Inputs by the Recipient Side on the Assignment</p> <p>(1) Expenses for Activities of the Expert</p> <p>(2) Provision of the Office and Motor Vehicle for the Expert</p>	<ul style="list-style-type: none"> ■ <u>Office</u> ■ <u>Office administration cost</u> ■ <u>Communication cost</u> ■ <u>Transport cost for business trip</u> ■ <u>Salary and perdiurn for counterparts</u>

<p>8. Qualifications and Experience required</p> <p>(1) Age Limit</p> <p>(2) Educational Background (Doctor / Master / Bachelor)</p> <p>(3) Practical Experience on Related Field</p> <p>(4) Language (Name / Level)</p> <p>(5) Other Qualification and Experience</p>	<p>1) Under 65 years old</p> <p>2) Bachelor degree in power related field</p> <ul style="list-style-type: none"> - <u>At least 10 years experience working for the power sector.</u> - <u>At least a few years experience working in a developing country.</u> - <u>At least 5 years experience at a executive/management level.</u> <p>3) Excellent skill in English (At least TOEFL 570)</p> <p>4) Engineering experience is essential and Financial background also preferred.</p>
<p>9. Correspondence Name and address of the official to whom correspondence regarding this application should be forwarded.</p>	<p><u>Mr. Chhewang Rinzin Managing Director, Bhutan Power Corporation</u></p>

Application Form for Technical Cooperation (Expert)

By the Government of Japan

<p>1. Outline of the Assignment</p> <p>(1) Assignment Title</p> <p>(2) Type of Assignment (New / Extension / Successor) If this type is "Extension" or "Successor", please show whose extension or successor it is.</p> <p>(3) Period of Assignment and Desirable Time of Dispatch</p> <p>(4) Number of Expert(s) Required</p> <p>(5) Category of Service</p> <p>(6) Name of Related Project / Scheme</p> <p>(7) Name of Requesting Ministry / Organization and Specific Department / Division / Unit to which the Expert is attached</p> <p>(8) Location of Service and Distance from the Capital</p>	<p>Accelerated Rural Electrification Project (Management Information System (Data & Information Management) & Financial Management Expert)</p> <p>New</p> <p>3 months</p> <p>1 Expert</p> <p>Implementation of the Integrated Management Information System (MIS), Financial Management System (FMS) and Human Resource Information System (HRIS) for BPC in keeping with the recommendations and suggestions of the ADB TA.</p> <p><input checked="" type="checkbox"/> Policy Consultation / <input type="checkbox"/> Administrative System Development / <input type="checkbox"/> Research and Study / <input checked="" type="checkbox"/> Appropriate Technology Development / <input type="checkbox"/> Technology Diffusion / <input type="checkbox"/> Seminar / <input type="checkbox"/> Others ()</p> <p>Main related division Ministry: Ministry of Trade and Industry Bhutan Power Corporation, Engineering Cell.</p> <p>Other related division Ministry: Ministry of Trade and Industry Department of Energy Planning and Coordination Division</p> <p>Bhutan Power Corporation, Thimphu (Capital city)</p>
---	---

<p>2. Counterpart Personnel</p> <p>(1) Number, Names and Posts of Counterpart Personnel</p> <p>(2) Name and Post of Supervising Authority to which the Expert is Answerable</p>	<p>Four Manager, IT Dy. Manager, Human Resource Department Senior Manager, Finance and Accounts Dept. Asst. Finance Officer, Finance and Accounts Dept</p> <p>Managing Director, Bhutan Power Corporation or his designated representative</p>
<p>3. Background Information on Request of Expert/s</p> <p>This section should show as precisely as possible the general nature of the project for which the expert/s is required. Please state whether the project falls within the government's development programme.</p> <p>It is important to indicate whether the project is a new enterprise or whether it was started previously. In the latter case, any assistance received under other technical cooperation programmes (e.g. under United Nations auspices) should be stated.</p> <p>In the case of academic establishments, it is desirable to know the number of students accepted annually, their level of attainment and the size and status of existing staff as well as details of any research facilities and the level of research being undertaken. (Copies of brochures, annual reports, calendars, syllabus of instruction etc. should be attached where applicable.)</p>	<p>The Bhutan Power Corporation (hereafter BPC) is the biggest corporation in Bhutan hiring about 1,500 employees.</p> <p>BPC being the sole agency responsible for transmission and distribution in Bhutan is the executing agency for all power transmission, distribution and Rural Electrification Projects funded through internal RGOB funds or through donor agencies like GOI, ADB, ACB, SDS etc.</p> <p>BPC formulated out of Corporatization of the erstwhile DOP's transmission and distribution operations, in its endeavor to enhance its professional skills in all its operations, has taken initiatives for improvement in operations.</p> <p>Hence BPC would like to see the implementation of the Integrated Management Information System (MIS), Financial Management System(FMS) and Human Resource Information System (HRIS) for</p> <ol style="list-style-type: none"> 1. Efficient management of Data and Information 2. Faster and better decision making for the Management 3. Proper financial analysis of short term and long term planning 4. Better information to the customers 5. Transparency in functioning and decision making <p>Therefore, we strongly request an expert for the Development of Integrated MIS, Financial Management System and HRIS for BPC for identifying the issues for human resource development program in our Organization.</p>

<p>4. Objective of the Assignment</p>	<ol style="list-style-type: none"> 1) In development of Management Information System (MIS), Financial Management & Analysis and HRIS for BPC in line with the recommendations of the ADB TA 4599 BHU; Capacity Building for BPC. 2) To provide consultative support for different projects undertaken, the financial impact on the long term and short term planning, impact on tariff and proper advice on the treatment of planned and unplanned expenditures as mandated by the Government, taking into account the social obligation especially with regard to rural electrification. 3) Train the counterparts of BPC on the process of development of the MIS, Financial information system and HRIS as well as on the operations of the same. 4) Recommendations and suggestions for the Human Resource Development of BPC
<p>5. Expected Output of the Assignment</p>	<ol style="list-style-type: none"> 1) Functional MIS, FMS and HRIS for BPC 2) Recommendations and suggestions to BPCL management on specific issues(Management, Finance and Human Resource) 3) Trained counterparts in development as well as in the operations of the same.
<p>6. Duties and Job Description of the Expert</p> <p>Please show them one after another, if plural experts are requested.</p>	<ol style="list-style-type: none"> 1) Develop the integrated MIS, FMS and HRIS for the BPC in close consultation with the Management of BPC as well as the counterparts 2) To coordinate, implement changes and improvements in the automated financial and management information system 3) Train the counterparts of BPC for development and operations 4) Suggestions and recommendations on the HR development issues to the Management 5) Hold trainings and workshops on the progress of the project development
<p>7. Inputs by the Recipient Side on the Assignment</p> <p>(1) Expenses for Activities of the Expert</p>	<p>To be borne by the TC fund</p>

(2) Provision of the Office and Motor Vehicle for the Expert	<ul style="list-style-type: none"> ■ Office space at the BPC Head Quarter ■ Transport cost for business trip
<p>8. Qualifications and Experience required</p> <p>(1) Age Limit</p> <p>(2) Educational Background (Doctor / Master / Bachelor)</p> <p>(3) Practical Experience on Related Field</p> <p>(4) Language (Name / Level)</p> <p>(5) Other Qualification and Experience</p>	<p>1) Under 50 years old</p> <p>2) Bachelor/Master degree in Information Systems and Power related field with financial background is preferred</p> <ul style="list-style-type: none"> - At least 15 years experience working for the power sector - At least 2 years experience working in a developing country. - At least 5 years experience at an executive/management level. <p>3) Fluent in English (Written and Spoken)</p> <p>2) Electrical Utility experience in MIS field is essential and Financial background preferred.</p>
<p>9. Correspondence</p> <p>Name and address of the official to whom correspondence regarding this application should be forwarded.</p>	<p>Mr. Chhewang Rinzin Managing Director, Bhutan Power Corporation</p> <p>chhewangrinzin@bpc.com.bt</p>

Application Form for Technical Cooperation (Expert)
By the Government of Japan

<p>1. Outline of the Assignment</p> <p>(1) Assignment Title</p> <p>(2) Type of Assignment (New / Extension / Successor)</p> <p>If this type is "Extension" or "Successor", please show whose extension or successor it is.</p> <p>(3) Period of Assignment and Desirable Time of Dipatch</p> <p>(4) Number of Expert(s) Required</p> <p>(5) Category of Service</p> <p>(6) Name of Related Project / Scheme</p> <p>(7) Name of Requesting Ministry / Organization and Specific Department / Division / Unit to which the Expert is attached</p> <p>(8) Location of Service and Distance from the Capital</p>	<p>Accelerated Rural Electrification Project (GIS Expert)</p> <p>New</p> <p>3 months</p> <p>1 expert</p> <p>Policy consultation and appropriate technology development <input type="checkbox"/> Policy Consultation / <input type="checkbox"/> Administrative System Development / <input type="checkbox"/> Research and Study / <input checked="" type="checkbox"/> Appropriate Technology Development / <input checked="" type="checkbox"/> Technology Diffusion / <input type="checkbox"/> Seminar / <input type="checkbox"/> Others ()</p> <p>Ministry: Ministry of Trade and Industry Organization : Bhutan Power Corporation Limited</p> <p>Bhutan Power Coproration Ltd, Thimphu (Capital city)</p>
<p>2. Counterpart Personnel</p> <p>(1) Number, Names and Posts of Counterpart Personnel</p> <p>(2) Name and Post of Supervising Authority to which the Expert is answerable</p>	<p>Four Dorji Namgay (Engineer, Engineering Cell) Kritika Neopaney (Engineer, Customer Services Dept) Two Personals from the survey background</p> <p>Head, Engineering Cell, BPC</p>

<p>3. Background Information on Request of Expert/s</p> <p>This section should show as precisely as possible the general nature of the project for which the expert/s is required. Please state whether the project falls within the government's development programme.</p> <p>It is important to indicate whether the project is a new enterprise or whether it was started previously. In the latter case, any assistance received under other technical cooperation programmes (e.g. under United Nations auspices) should be stated.</p> <p>In the case of academic establishments, it is desirable to know the number of students accepted annually, their level of attainment and the size and status of existing staff as well as details of any research facilities and the level of research being undertaken. (Copies of brochures, annual reports, calendars, syllabus of instruction etc. should be attached where applicable.)</p>	<p>JICA funded Master Plan for Rural Electrification (2003-2005) used the GPS and GIS for Project planning and mapping of the electrical infrastructure etc. Also training of the counterparts was done in the project on the GIS and GPS.</p> <p>BPC would like to go further in this technology and use the full capacity of the GIS and GPS for Asset Management, Electrical route Planning, Accurate cost estimation, interfacing the GIS/GPS data with Power simulation software etc. Hence more accurate GPS instruments and expertise in using the GIS is required.</p>
<p>4. Objective of the Assignment</p>	<ol style="list-style-type: none"> 1. Application development with GIS and the Asset database of the Electrical Infrastructure that was mapped during the RE Master Plan for District wise Electrification in Bhutan (JICA funded project 2003-05). 2. Training of the counterparts on the GIS and GPS 3. Better use of GIS for Electrical lines planning/mapping for distribution and transmission lines
<p>5. Expected Output of the Assignment</p>	<ol style="list-style-type: none"> 1. Asset management application (queries facility on the asset types etc) 2. Better use of GIS for planning/mapping for distribution and transmission lines 3. Training of the BPC counterparts
<p>6. Duties and Job Description of the Expert</p> <p>Please show them one after another ,if plural experts are requested.</p>	<ol style="list-style-type: none"> 1. To assist in developing the asset management application (queries facility on the asset types etc) 2. Better use of GIS for planning/mapping for distribution and transmission lines 3. Training of the BPC counterparts
<p>7. Inputs by the Recipient Side on the Assignment</p> <p>(1) Expenses for Activities of the Expert</p> <p>(2) Provision of the Office and Motor Vehicle for the Expert</p>	<p>Funding agency</p> <p>BPCL</p>

<p>8. Qualifications and Experience required</p> <p>(1) Age Limit</p> <p>(2) Educational Background (Doctor / Master / Bachelor)</p> <p>(3) Practical Experience on Related Field</p> <p>(4) Language (Name / Level)</p> <p>(5) Other Qualification and Experience</p>	<p>60 Years</p> <p>Master/Bachelor degree in the related field</p> <p>10 years experience in the Power utility and in GIS for Power Utility applications</p> <p>Excellent skill in English (Written & Oral)</p> <p>Electrical Utility experience in GIS field is essential.</p>
<p>9. Correspondence</p> <p>Name and address of the official to whom correspondence regarding this application should be forwarded.</p>	<p>Mr. Chhewang Rinzin, Managing Director, Bhutan Power Corporation Ltd.</p> <p>Chhewangrinzin@bpc.com.bt</p>

Application Form for Technical Cooperation (Equipment)

By the Government of Japan

1. Subject of Technical Transfer (by the Expert/s) for which Equipment should be Provided	1) GIS Systems and GPS
2. Outline of Activities by the Related Expert(s)	1) Train the BPC counterparts on the usage of the GPS equipment 2) Formulate a small pilot project for better understanding on the data collected and its usage
3. Estimated Cost for the Equipment	US\$ 100,000
4. Place of Procurement	<input type="checkbox"/> Recipient Country / <input checked="" type="checkbox"/> Japan / <input checked="" type="checkbox"/> Third Country
5. Preferable Time of Delivery	Mid of 2007 (one month after the GIS (Short term expert) arrives)
6. Necessity of Dispatch of Expert/s for Installation and Adjustment of the Equipment	<input type="checkbox"/> Necessary / <input checked="" type="checkbox"/> Not necessary / <input type="checkbox"/> Not clear
7. Name of Recipient Organization	Bhutan Power Corporation Ltd
8. Place of Installation and the Distance from the Capital	Thimphu (Capital City)

<p>9. Background Information on the Request of the Equipment and its Role in Technical Transfer</p>	<p>JICA funded Master Plan for Rural Electrification used the GPS and GIS for Project planning and mapping of the electrical infrastructure etc. Also training of the counterparts was done in the project on the GIS and GPS.</p> <p>BPC would like to go further in this technology and use the full capacity of the GIS and GPS for asset management, Electrical route Planning, Accurate cost estimation, interfacing the GIS/GPS data with Power simulation software etc. Hence more accurate GPS instruments and expertise in using the GIS is required.</p>		
<p>10. Main Users of the Equipment</p>	<ol style="list-style-type: none"> 1. Better planning of the Electrical lines for Rural Electrification. 2. Better estimation of assets 3. Integration with GIS 		
<p>11. Expected Benefit and Effect of the Equipment Provided</p>	<ol style="list-style-type: none"> 1. Better planning of the Electrical lines for Rural Electrification. 2. Better estimation of assets 3. Integration with GIS 4. Have Asset data base mapped etc. 		
<p>12. List of the Equipment Requested</p>			
<p>(Name of equipment)</p>	<p>(Specification)</p>	<p>(Quantity)</p>	<p>(Cost)</p>
<p>(1) GPS</p>	<p>Would be submitted in consultation with the GIS expert (Short Term)</p>		
<p>(2)</p>			
<p>(3)</p>			
<p>(4)</p>			
<p>(5)</p>			
<p>(6)</p>			

(7)			
(8)			
(9)			
(10)			
(Detailed list and specifications of equipment shall be attached hereafter, if necessary.) Total cost:			
13. Assignment of Staff, Budgetary Allocation and Necessary Arrangements for Maintenance of the Equipment by the Recipient Country			
(1) Budgetary allocation for operation and maintenance of the equipment			
(2) Condition of Space (capacity, electricity, water supply, etc.) for Operation and Maintenance of the Equipment	Not a constraint as BPC has a GIS cell under Engineering Cell		
(3) Assignment of Staff for Maintenance of the Equipment	GIS counterparts of the BPC		
14. Correspondence: Name, postal and telegraphic address of official to whom correspondence regarding this application should be forwarded	Chhewang Rinzin, Managing Director, BPC chhewangrinzin@bpc.com.bt		

5. 平成 20 年度要請書

APPLICATION FORM FOR JAPAN'S TECHNICAL COOPERATION

1. **Date of Entry:** Day 11 Month July Year 2007
2. **Applicant:** The Royal Government of Bhutan
3. **Project Title:**
Improvement of Efficiency for the Rural Power Supply

4. **Implementing Agency:**

Executing Agency:

Department of Energy (DOE)

Address: P.O. Box 106, Thimphu, Bhutan

Contact Person: Dasho Sonam Tshering, Director General

Tel. No.: +975-2-322505 Fax No. +975-2-335122

E-Mail: sting@druknet.bt

Implementing Agency:

Bhutan Power Corporation Limited (BPC)

Address: P.O. Box 580, Thimphu, Bhutan

Contact Person: Chhewang Rinzin, Managing Director

Tel. No.: +975-2-325095 ext 111 Fax No. +975-2-322279

E-Mail: chhewangrinzin@bpc.com.bt

5. **Background of the Project**

The Royal Government of Bhutan (hereinafter, "Bhutan") established a "Vision for Peace, Prosperity and Happiness" in 1999. The vision puts priority on rural electrification in terms of poverty reduction and reduction of regional discrepancies. Therefore, Bhutan targeted "Electricity for all" by the year 2020. This target will be achieved with the expansion of distribution lines (on-grid) and off-grid power supply by independent energy sources.

Bhutan Power Corporation Limited (BPC) was incorporated on July 1, 2002 and is

solely responsible for all transmission and distribution of electricity to domestic and export markets. BPC undertakes power infrastructure expansion programs to improve reliability of supply and achieve the 100% electrification by 2020 (named as Rural Electrification in Bhutan). To remote areas where BPC cannot extend distribution lines, DOE supplies power utilizing renewable energy such as micro/mini hydro-power and photovoltaic.

On the other hand, the electrification rate in Bhutan is still 57.1% in 2005 (“Results of Population and Housing Census 2005”) because of the hard accessibility to rural area which are far from access roads and located in rough and mountainous lands. Additionally, sparsely scattered houses in villages also cause the high cost of electrification of rural households currently estimated at average cost of USD 2,000 per household.

BPC had been implementing the rural electrification under the assistance of Asian Development Bank (ADB), the government of the Netherlands and Austria. To frame the road map for achieving 100% electrification by 2020, DOE requested JICA for the rural electrification master plan study. Based on the said JICA master plan study (2003-2005), the Tenth Five Year Plan (2008-2013) for rural electrification will be implemented with the financial support of JBIC, ADB and other donors.

Un-electrified areas which are still left behind are located in remote area and more difficult to access. Yet BPC is required to extend distribution lines and operate and maintain to those rural areas under the condition of insufficient management, insufficient number of skilled engineers/technicians, lack of tools/equipment etc. In relation to lack of skilled manpower, the recently released BPC’s corporate strategy 2007 defines “building human resource capacity to reduce external dependency” as main strategy to achieve “building professionalism and inspire enthusiasm for work”. Under this strategy, BPC plans to upgrade its in-house Training Center at Begana.

To implement further rural power supply, improvement of efficiency for the rural power supply is essential for successful and sustainable electrification in the long run. Accordingly, DOE requests JICA the Technical Cooperation Project to develop the capacity of human resources on the rural power supply to improve efficiency and sustainable development.

6. Outline of the Project

(1) Overall Goal

Discrepancy between urban and rural areas will be reduced.

(2) Project Purpose

Efficiency on the rural power supply is improved through human resources development.

(3) Outputs

- a) Comprehensive Training Program
- b) Improved Training Facility under BPC
- c) Trained Trainers for the Training Facility
- d) Community based management for Micro Hydro Power System

(4) Project Activities

- a) Comprehensive Training Program
 - Conduct following activities facilitated by JICA Expert
 - a)-1 Internal consultation and discussion
 - a)-2 Problem analysis
 - a)-3 Confirm the necessary and priority training
 - a)-4 Prepare the comprehensive training program
 - a)-5 Define the training program for rural power supply
 - a)-6 Prepare the contents of the priority training
- b) Improved Training Facility under BPC
 - b)-1 Identify the necessary facility for comprehensive training program
 - b)-2 Establish the required training facility
- c) Trained Trainers for the Training Facility
 - Conduct following trainings for rural power supply
 - c)-1 Training for trainers for priority training
 - c)-2 Training for the services centers' managers
 - c)-3 Training for technicians
- d) Community-based management for Micro Hydro Power System

- d)-1 Training for community based management in off-grid system
- d)-2 Training for micro/mini hydro power system

(5) Input from the Recipient Organization

a) Counterparts

- Chairman – DOE
- Project Manager – BPC
- Person in charge of off-grid – DOE
- Person in charge of on-grid - BPC
- Full time trainers in necessary fields for the comprehensive training program – BPC

b) Equipment etc.

- Necessary and Suitable Training Facility (inclusive of lands)
- c) Office space and furniture, free of charge electricity and water in office and telephone and Internet connection for minimum requirements.
- d) Local conveyance would be arranged by BPC for the JICA experts.
- e) BPC would be ready for arranging in-country training, if necessary.
- f) BPC management would support the JICA experts through regular monitoring of the progress of the activities under the project.

(6) Input from the Japanese Government

a) Long/Short Term Experts

- Long Term Expert □ Coordination & Facilitation for Training Program
- Expected Short Term Expert (it will be changed based on the comprehensive training program):
 - Distribution Engineer
 - Environment Specialist
 - Micro Hydro Engineer

b) Training in Japan or third country

- Counterpart Training
 - 2 persons x 2 weeks x 3 years
- Group Training Course on Environmental Impact Assessment
 - 1 persons x 1 month x 3 years

- Third country training if necessary
- c) In-country training
- It will be implemented based on the comprehensive training program
- d) Equipment etc.
- Necessary and Suitable Training equipment such as Training kits and Testing tools/devices, for example:
 - Four Terminal Earth Tester Equipment
 - Transformer Turns Ratio Measuring Kit
 - Automatic Transformer Oil Testing Kit
 - Inter Facial Tension Testing Kit
 - Insulation Tester(low voltage)
 - Earth Tester
 - Digital Multi Meter
 - High Voltage Checker
 - CLAMP on power hi-tester
 - Power Quality Analyzer
 - Insulation Tester(high voltage)
 - Laser Range Finder
 - GIS Software

* Other necessary equipment for the training in Rural Power Supply

7. Implementation Schedule

Month Nov. Year 2008 Month Oct. Year 2011

8. Executing Agency/Implementing Agency

DOE will be the overall executing agency and BPC will be the implementing agency under DOE's coordination.

9. Related Activities

- a) ADB: Rural Electrification IV (2008 – 2013)
- b) ADB TA – 4599 Capacity Building for BPC
- c) ACB & other donors: Rural Electrification program
- d) Government of India & BPC's Internal Funding for Transmission and Distribution Projects.

- e) JICA: Integrated Master Plan Study for Dzongkhag wise electrification in Bhutan (2003-2005)
- f) JBIC: Rural Electrification
- g) Grant Aid by the Government of Japan : Mini and Micro Hydro Projects (1980s and 1990s)

10. Gender Consideration

11. Environmental and Social Considerations

Refer to the Screening Format.

12. Beneficiaries

The benefit of the project would be people in rural area.

13. Security Conditions

14. Others

Screening Format

Question 1 Address of a project site

BPC Head Office in Thimphu, and pilot sites and field offices.

Question 2 Outline of the project

2-1 Does the project come under following sectors?

Yes No

If yes, please mark corresponding items.

- Mining development
- Industrial development
- Thermal power (including geothermal power)
- Hydropower, dams and reservoirs
- River/erosion control
- Power transmission and distribution lines
- Roads, railways and bridges
- Airports
- Ports and harbors
- Water supply, sewage and waste treatment
- Waste management and disposal
- Agriculture involving large-scale land-clearing or irrigation
- Forestry
- Fishery
- Tourism

2-2 Does the project include the following items?

Yes No

If yes, please mark following items.

- Involuntary resettlement (scale: households, persons)
- Groundwater pumping (scale: m³/year)
- Land reclamation, land development and land-clearing (scale: hectares)
- Logging (scale: hectares)

2-3 Did the proponent consider alternatives before request?

Yes: Please describe outline of the alternatives

No

2-4 Did the proponent have meetings with related stakeholders before request?

Yes No

If yes, please mark the corresponding stakeholders.

Administrative body

Local residents

NGO

Others

Question 3

Is the project a new one or an on-going one? In case of an on-going one, have you received strong complaints etc. from local residents?

New On-going (there are complaints) On-going (there are no complaints)

Others {

Question 4 Name of laws or guidelines:

Is Environmental Impact Assessment (EIA) including Initial Environmental Examination (IEE) required for the project according to laws or guidelines in the host country?

Yes No

If yes, please mark corresponding items.

Required only IEE (Implemented, on going, planning)

Required both IEE and EIA (Implemented, on going, planning)

Required only EIA (Implemented, on going, planning)

Others: {

Question 5

In case of that EIA was taken steps, was EIA approved by relevant laws in the host country? If yes, please mark date of approval and the competent authority.

<input type="checkbox"/> Approved: without a supplementary condition	<input type="checkbox"/> Approved: with a supplementary condition	<input type="checkbox"/> Under appraisal
--	---	--

(Date of approval: Competent authority:)
 Not yet started an appraisal process
 Others:()

Question 6

If a certificate regarding the environment and society other than EIA, is required, please indicate the title of certificate.

Already certified Required a certificate but not yet done
Title of the certificate :()
 Not required
 Others ()

Question 7

Are following areas located inside or around the project site?

Yes No Not identified

If yes, please mark the corresponding items.

- National parks, protected areas designated by the government (coast line, wetlands, reserved area for ethnic or indigenous people, cultural heritage) and areas being considered for national parks or protected areas
- Virgin forests, tropical forests
- Ecological important habitat areas (coral reef, mangrove wetland, tidal flats)
- Habitat of valuable species protected by domestic laws or international treaties
- Likely salts cumulus or soil erosion areas on a massive scale
- Remarkable desertification trend areas
- Archaeological, historical or cultural valuable areas
- Living areas of ethnic, indigenous people or nomads who have a traditional lifestyle, or special socially valuable area

Question 8

Does the project have adverse impacts on the environment and local communities?

Yes No Not identified

Reason: []

Question 9

Please mark related environmental and social impacts, and describe their outlines.

- | | |
|---|---|
| <input type="checkbox"/> Air pollution | <input type="checkbox"/> Social institutions such as social infrastructure and local decision-making institutions |
| <input type="checkbox"/> Water pollution | <input type="checkbox"/> Existing social infrastructures and services |
| <input type="checkbox"/> Soil pollution | <input type="checkbox"/> The poor, indigenous of ethnic people |
| <input type="checkbox"/> Waste | <input type="checkbox"/> Maldistribution of benefit and damage |
| <input type="checkbox"/> Noise and vibration | <input type="checkbox"/> Local conflict of interests |
| <input type="checkbox"/> Ground subsidence | <input type="checkbox"/> Gender |
| <input type="checkbox"/> Offensive odors | <input type="checkbox"/> Children's rights |
| <input type="checkbox"/> Geographical features | <input type="checkbox"/> Cultural heritage |
| <input type="checkbox"/> Bottom sediment | <input type="checkbox"/> Infectious diseases such as HIV/AIDS etc. |
| <input type="checkbox"/> Biota and ecosystem | <input type="checkbox"/> Others () |
| <input type="checkbox"/> Water usage | |
| <input type="checkbox"/> Accidents | |
| <input type="checkbox"/> Global warming | |
| <input type="checkbox"/> Involuntary resettlement | |
| <input type="checkbox"/> Local economy such as employment and livelihood etc. | |
| <input type="checkbox"/> Land use and utilization of local resources | |

Outline of related impacts:

[]

Question 10

Information disclosure and meetings with stakeholders

10-1 If the environmental and social considerations are required, does the proponent agree on information disclosure and meetings with stakeholders in accordance with JICA Guidelines for Environmental and Social Considerations?

Yes No

10-2 If no, please describe reasons below.

[]

Application Form for Technical Cooperation (Expert)

By the Government of Japan

<p>1. Outline of the Assignment</p> <p>(1) Assignment Title</p> <p>(2) Type of Assignment (New / Extension / Successor)</p> <p style="font-size: small;">If this type is "Extension" or "Successor", please show whose extension or successor it is.</p> <p>(3) Period of Assignment and Desirable Time of Dispatch</p> <p>(4) Number of Expert(s) Required</p> <p>(5) Category of Service</p> <p>(6) Name of Related Project / Scheme</p> <p>(7) Name of Requesting Ministry / Organization and Specific Department / Division / Unit to which the Expert is attached</p> <p>(8) Location of Service and Distance from the Capital</p>	<p>Improvement of Efficiency for the Rural Power Supply</p> <p>New</p> <p>November, 2008 – October, 2011</p> <p>1 Long term expert and several short-term experts</p> <p><input type="checkbox"/> Policy Consultation / <input type="checkbox"/> Administrative System Development / <input type="checkbox"/> Research and Study / <input type="checkbox"/> Appropriate Technology Development / <input type="checkbox"/> Technology Diffusion / <input type="checkbox"/> Seminar / <input type="checkbox"/> Others <input type="checkbox"/></p> <p>a) ADB: Rural Electrification IV (2008 – 2013) b) ADB TA – 4599 Capacity Building for BPC c) ACB & GOI: Rural Electrification program d) Govt. of India & BPC's Internal Funding for Transmission and Distribution Projects. e) JICA: Integrated Master Plan Study for Dzongkhag wise electrification in Bhutan (2003-2005) f) JBIC : Rural Electrification g) Grant Aid by the Govt. of Japan: Mini and Micro Hydel Projects (1980s and 1990s)</p> <p>Rural Electrification Department (RED), BPC Transmission Department (TD), BPC</p> <p>Begana, 15km far from the Capital(Thimphu)</p>
---	--

<p>2. Counterpart Personnel</p> <p>(1) Number, Names and Posts of Counterpart Personnel</p> <p>(2) Name and Post of Supervising Authority to which the Expert is answerable</p>	<p>Chairman – DOE Project Manager – BPC Person in charge of off-grid – DOE Person in charge of on-grid - BPC Full time trainers in necessary fields for the comprehensive training program – BPC</p> <p>Director General of DOE Managing Director of BPC</p>
<p>3. Background Information on Request of Expert/s</p> <p>This section should show as precisely as possible the general nature of the project for which the expert/s is required. Please state whether the project falls within the government's development programme.</p> <p>It is important to indicate whether the project is a new enterprise or whether it was started previously. In the latter case, any assistance received under other technical cooperation programmes (e.g. under United Nations auspices) should be stated.</p> <p>In the case of academic establishments, it is desirable to know the number of students accepted annually, their level of attainment and the size and status of existing staff as well as details of any research facilities and the level of research being undertaken. (Copies of brochures, annual reports, calendars, syllabus of instruction etc. should be attached where applicable.)</p>	
<p>4. Objective of the Assignment</p>	<p>Efficiency on the rural power supply is improved though human resources development.</p>

<p>5. Expected Output of the Assignment</p>	<ul style="list-style-type: none"> a) Comprehensive Training Program b) Improved Training Facility under BPC c) Trained Trainers for the Training Facility d) Community based management for Micro Hydro Power System
<p>6. Duties and Job Description of the Expert</p> <p>Please show them one after another ,if plural experts are requested.</p>	<p><i>Long Term Expert</i> □ <i>Coordination & Facilitation for Training Program</i></p> <ul style="list-style-type: none"> a) Facilitate the following activities conducted by BPC <ul style="list-style-type: none"> a)-1 Internal consultation and discussion a)-2 Problem analysis a)-3 Confirm the necessary and priority training a)-4 Prepare the comprehensive training program a)-5 Define the training program for rural power supply a)-6 Prepare the contents of the priority training <p><i>Expected Short Term Expert: Lectures and Hands-on Training for specialized areas in rural power supply under the Comprehensive Training Program, such as Distribution Engineering, Environment, and Micro Hydro System.</i></p> <ul style="list-style-type: none"> b) Conduct training for trainers in each specialized field
<p>7. Inputs by the Recipient Side on the Assignment</p> <p>(1) Expenses for Activities of the Expert</p> <p>(2) Provision of the Office and Motor Vehicle for the Expert</p>	<p>Modest office space with furniture and necessary counterpart staff for assistance in implementing the JICA project, one vehicle excluding fuel and daily maintenance, free water, electricity, telephone and internet connection and running charge.</p> <p>Local conveyance would be arranged by BPC for the JICA team.</p>
<p>8. Qualifications and Experience required</p> <p>(1) Age Limit</p> <p>(2) Educational Background (Doctor / Master / Bachelor)</p>	

<p>(3) Practical Experience on Related Field</p> <p>(4) Language (Name / Level)</p> <p>(5) Other Qualification and Experience</p>	
<p>9. Correspondence</p> <p>Name and address of the official to whom correspondence regarding this application should be forwarded.</p>	<p>Department of Energy (DOE) Address: P.O. Box 106, Thimphu, Bhutan</p> <p>Contact Person: Dasho Sonam Tshering, Director General Tel. No.: +975-2-322505 Fax No. +975-2-335122 E-Mail: sting@druknet.bt</p>

Application Form for Technical Cooperation (Equipment)

By the Government of Japan

<p>1. Subject of Technical Transfer (by the Expert/s) for which Equipment should be Provided</p>	<p>Improvement of Efficiency for the Rural Power Supply</p>
<p>2. Outline of Activities by the Related Expert(s)</p>	<p>a. Comprehensive Training Program Conduct following activities facilitated by JICA Expert</p> <ul style="list-style-type: none"> <input type="checkbox"/> Internal consultation and discussion <input type="checkbox"/> Problem analysis <input type="checkbox"/> Confirm the necessary and priority of training <input type="checkbox"/> Prepare the comprehensive training program <input type="checkbox"/> Define the training program for rural power supply <input type="checkbox"/> Prepare the contents of the priority training <p>b. Improved Training Facility under BPC</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify the necessary facility for comprehensive training program <input type="checkbox"/> Establish the required training facility <p>c. Trained Trainers for the Training Facility Conduct following trainings for rural power supply</p> <ul style="list-style-type: none"> <input type="checkbox"/> Training for trainers for priority training <input type="checkbox"/> Training for service centers' managers <input type="checkbox"/> Training for technicians <p>d. Community-based management for Micro Hydro Power System</p> <ul style="list-style-type: none"> <input type="checkbox"/> Training for social preparation in off-grid system <input type="checkbox"/> Training for micro/mini hydro power system
<p>3. Estimated Cost for the Equipment</p>	<p>USD 117,100/-</p>
<p>4. Place of Procurement</p>	<p><input type="checkbox"/> Recipient Country / <input checked="" type="checkbox"/> Japan / <input checked="" type="checkbox"/> Third Country</p>
<p>5. Preferable Time of Delivery</p>	<p>2009</p>
<p>6. Necessity of Dispatch of Expert/s</p>	<p><input type="checkbox"/> Necessary / <input checked="" type="checkbox"/> Not necessary / <input type="checkbox"/> Not clear</p>

for Installation and Adjustment of the Equipment	
7. Name of Recipient Organization	Department of Energy and Bhutan Power Corporation Limited
8. Place of Installation and the Distance from the Capital	BPC Begana Training center, far 15km from HQ, Thimphu
9. Background Information on the Request of the Equipment and its Role in Technical Transfer	The Equipment would be expected to enhance quick and deepening of understanding for the trainees in Training Center.
10. Main Users of the Equipment	Mostly those engineers involved with RE works and also, all BPC employees that are trained in the BPC Training Center.
11. Expected Benefit and Effect of the Equipment Provided	Ease field work through availability of proper equipments and also provide hands-on-training in the training center.

12. List of the Equipment Requested

Procurement List

Currency : US Dollar

DETAILS	Unit	Quantity	Unit Price	Amount
Equipment				
GIS Version 9.5 software	Set	1	27,200	27,200
Sub-total				27,200
Training kits and Testing tools/devices				
Four Terminal Earth Tester	PC	2	850	1,700
Transformer Turns Ratio Measuring Kit	PC	2	7,500	15,000
Automatic Transformer Oil Testing Kit	PC	2	4,200	8,400
Insulation Tester(low voltage)	PC	2	10,000	20,000
Inter Facial Tension Testing kits	PC	2	2,000	4,000
Earth Tester	PC	2	250	500
Digital Marti Meter	PC	2	500	1,000
High Voltage Checker	PC	2	4,200	8,400
CLAMP on power hi-tester	PC	2	2,250	4,500
Power Quality Analyzer	PC	2	8,400	16,800

Procurement List

Currency : US Dollar

DETAILS	Unit	Quantity	Unit Price	Amount
Insulation Tester(high voltage)	PC	2	3,800	7,600
Laser Range Finder	PC	2	1,000	2,000
Sub-total				89,900
	□			
Total	□			117,100

13. Assignment of Staff, Budgetary Allocation and Necessary Arrangements for Maintenance of the Equipment by the Recipient Country

(1) Budgetary allocation for operation and maintenance of the equipment	As required
(2) Condition of Space (capacity, electricity, water supply, etc.) for Operation and Maintenance of the Equipment	Adequate
(3) Assignment of Staff for Maintenance of the Equipment	As required
14. Correspondence: Name, postal and telegraphic address of official to whom correspondence regarding this application should be forwarded	Director General, Department of Energy(DOE) P.O. Box 106, Thimphu, Bhutan

ブータン王国

事業強化のための電力セクター調査

帰国報告会資料

< 目次 >

1. 背景および目的.....	144
2. 調査団.....	144
3. 調査内容.....	144
4. 調査行程.....	145
5. 調査結果.....	146
6. 面談者リスト.....	150

2007年7月18日
独立行政法人 国際協力機構
経済開発部 第二グループ(資源・エネルギー)
電力・エネルギーチーム

1. 背景および目的

ブータンでは、国内の豊富な水力資源の開発が進められており、すでに国内需要を大幅に上回る発電設備を有し、発電電力量の約75%をインドへ輸出して主要な外貨収入源としている。一方、地方農村部の電化は遅れており、農村部の電化率は40%に留まっている。

ブータン政府は、2020年までに世帯電化率100%を目標に、地方電化マスタープラン調査(2003-2005)に基づき、JBIC及びADBの支援による地方電化事業を実施することとした。

今後、本格的な地方電化事業の進展が見込まれているが、インド等の支援を通じて技術力を蓄積してきた発電部門に対し、国内の配電・変電・送電部門は十分な経験を持っておらず、効率的な電力供給体制に課題を抱えている。現在、技術面・経営面の体制強化に向けて、アドバイザー専門家も派遣しているところであるが、電力管理の効率化、技術者レベルの向上、設備の効率的活用を目的とした今後の協力のあり方を明らかにするため、地方電化案件形成支援のための調査団を派遣することとした。

2. 調査団

	氏名	分野	所属	派遣期間
1	林俊行	総括・技術協力計画	JICA 国際協力総合研修所 国際協力専門員	7月4日-7月13日
2	大類久里	協力企画	JICA 経済開発部第二グループ 電力・エネルギーチーム特別嘱託	7月2日-7月13日

3. 調査内容

- (1) 電力分野に対する我が国の協力方針の確認
- (2) エネルギー省およびブータン電力公社との打ち合わせ
- (3) 関連施設の訪問
- (4) 要請案件内容のとりまとめ

4. 調査行程

Date		Activities	Stay
2-Jul	Mon.	Narita - Bangkok	Bangkok
3-Jul	Tue	Bangkok-Paro (KB123) Paro-Thimphu (by car) 15:00-16:30 BPC courtesy call 17:00-19:00 JICA courtesy call & meeting	Thimphu
4-Jul	Wed	9:00-10:30 Meeting with BPC Procurement Dept. 11:00-12:30 Meeting with BPC Engineering & Design Dept. 14:30-16:00 Meeting with BPC Distribution & Customer Services Dept.	Thimphu
5-Jul	Thu	(Arrival of Mr. Hayashi) 8:30-11:30 Visit to the Begana Training Center 14:00-14:50 Meeting with BPC Rural Electrification Dept. 15:00-16:30 Meeting with DOE 16:40-17:20 Meeting with BPC Rural Electrification Dept. 17:30-18:30 JICA	Thimphu
6-Jul	Fri	7:30-11:30 Thimphu - Chhukha 11:30-14:30 Site Visit to Chhukha Hydro Power Plant 15:00-18:00 Site Visit to Tala Dam Site	Tala
7-Jul	Sat	8:30-9:30 Meeting at the Service Center in Gedu 10:00-14:00 Site Visit to Tala Hydro Power Plant 16:30-19:00 Meeting at BPC Store in Phuentsholing	Phuentsholing
8-Jul	Sun	7:00-15:00 - Gidokom 15:00-18:00 Site Visit to Gidokom Mini Hydro Power Plant 18:00-19:00 Gidokom - Thimphu	Thimphu
9-Jul	Mon	8:30-9:20 Internal Meeting in JICA 9:30-11:00 Meeting with DOE 14:15-15:00 Meeting with BPC Rural Electrification Dept. 15:10-17:00 JICA	Thimphu
10-Jul	Tue	8:30-13:00 Internal meeting in JICA 14:30-15:30 Meeting with BPC secretary 15:40-17:00 JICA	Thimphu
11-Jul	Wed	10:00 - Wrap-up Meeting at BPC 14:30- Report to JICA	Paro
12-Jul	Thu	Paro-Bangkok (KB126)	-
13-Jul	Fri	Bangkok-Narita	

5. 調査結果

5-1 BPC 地方電化の課題と JICA 技プロの役割

BPC (Bhutan Power Cooperation) は過去に ADB 資金による地方電化事業を 3 フェーズにわたり実施した経験があり、これから始まる JBIC・ADB の地方電化プロジェクトで過去の経験を生かすことができる体制が存在していると考えられる。地方電化をスケジュールどおりに実施するためには、全国で同時並行的に建設を進める必要があり、個別技術をより多くの技術要員に移転する課題などあるが、このような個別的課題を除けば BPC はこれから始まる JBIC と ADB の地方電化プロジェクトをさほど大きな問題に直面せずに実施できると思われる。したがってブータン地方電化の課題はこれから始まる地方電化プロジェクトのプロジェクト管理ではなく、電化率が増加した結果予想される配電事業効率の低下に対応する問題であろう。電化が進むと配電線がより遠隔地の村まで延伸されるため、配電損失が増加し料金徴収と維持管理の費用が増加する一方、需要密度が低下し一需要家の需要規模も一般的に小さくなるため収入が減少する。この結果、配電事業の技術的・財務的効率性が低下するのが途上国で一般的に観察される電化が進むことによる現象である。この問題を解決するためには、それぞれの国で異なる地理的・社会経済的状況に応じた維持管理や料金徴収手法・体制を検討し、実施してゆく必要がある。人口密度の非常に低い山国であるブータンは、BPC の地方事務所（サービスセンター）に訓練された管理者と技術要員を配置することが重要であり、そのための研修を整備することが地方電化を円滑に進めるために JICA に求められている技術協力課題であると理解された。

5.2 技プロ実施の方針

BPC は意欲的に事業運営体制の整備を開始している。2007 年の Corporate Strategic Plan では、6 つある目的のうちの一つが “To build professional and inspire enthusiasm for work” であり、その下位項目として “Build human resource capacity to reduce external dependency” があり、そのターゲットとして “Develop HR Master Plan by 2008” が示されている。そして具体的実施事項として “Upgrade Training Centre at Begana” が計画されている。またこの戦略的計画の実施を担保するために BPC は “Performance Based Incentive System: Company, Department, and Unit level targets for 2007” で目標設定を行い、その評価手法と見返りを明確にしている。このように BPC は事業体制整備のために自分たちは何をしなければならないか内部的に検討し、既にその計画を持っている。BPC にはマネージメント・レベルだけでなく中間レベルの人材もそれなりにそろっていると思われ、JICA に求められている課題は彼らの計画を実施するための後押しであり、ファシリテーションであると思われる。

5.3 技プロの概要

技プロの目的は BPC の研修機能の整備と、DOE のオフグリッド電化に対する支援に分けられる。BPC の研修について、BPC として包括的な研修プログラムを作成するために、JICA 長期専門家のファシリテーションにより内部的な検討を行い、研修プログラムを作成することを支援の初期段階で行なう。作成された包括的研修プログラムのうち、JICA としては地方電化に関わる研修を優先的に支援することとし、これに関わる研修施設の整備とトレーナーズトレーニングを実施する。他の研修については、基本的に BPC が自分で実施する。しかし JICA の支援として重要な課題は、研修施設と研修内容を整備することだけでなく、常に現場で生じている業務環境の変化に応じて研修プログラムを改訂してゆくことも重要な課題である。このような現場のニーズを常に反映した研修を実施できるよう、研修カリキュラムを改訂するメカニズムがプロジェクトが終了する時点までに動き始めるように支援することも重要な課題である。

また DOE が担当するマイクロ水力は、コミュニティー無償を前提として、その無償の計画とコミュニティーのプロジェクトに対する社会的準備に関わる諸活動を行なう。

5.4 技プロの投入

長期専門家を一人（研修プログラムアドバイザー）BPC に派遣し、そのアドバイザーが包括的な研修プログラム作成のファシリテーションを行なうと共に、短期専門家や機材などの必要なインプット・ニーズを把握し技術協力を実施する。長期専門家に必要とされる知識・経験は電力事業体全体を浅く広く見渡せる視点と、BPC の人的・組織的現状を把握したうえで包括的研修プログラム策定のためにファシリテーションのできる人材であり、また実際の研修機能を整備するために必要な支援ニーズを BPC と検討し明らかにして JICA 支援リソースをうまく使うことのできる人材が求められている。

5.5 マイクロ水力コミュニティー無償

現在検討されているマイクロ水力コミュニティー無償 3 地点のうち、2 地点は既に SHS（Solar Home System：太陽光発電家屋電化システム）で電化されている。またもう 1 地点も、三分の一程度の世帯が SHS を設置している。30Wp の小さなシステムのため夜間照明程度しか使えないが、このコミュニティー無償の目的を地方電化として要請しても採択されないと思われる。コミュニティー無償本来の目的であるコミュニティーをエンパワーするために、地域にある薬草などの資源に付加価値をつけるための手段としてマイクロ水力を位置付け、付加価値をつけるための設備も含めてコミュニティー無償として検討する必要がある。

5.6 円借款との連携

地方電化マスタープラン調査(2003-2005)の結果を受けて、第一号の JBIC 円借款事業「地方電化事業」が採択された。同事業では、地方農村部において配電網の整備が行われ、貧困層の多い地方農村部住民の生活環境改善や地方農村部の経済・社会活動の活性化に寄与する。

他方、山間の遠隔地に延伸される配電線の維持管理や人口密度の低い村落での電気料金徴収、BPC 地方事務所における管理者のマネージメントなどを、BPC の技術者及び管理者の能力強化が急務となっている。

そのため、円借款等で実施される地方電化事業と共に、技術協力プロジェクトにおいて BPC の能力強化を図り、相互補完を行うことより、効果的にブータンの地方電化事業促進されることが期待できる。

表：調査とりまとめ内容

	Proposed Project	Organization	Current Situation/Issues	Revised Project
Project Title	Capacity Building for Rural Electrification to BPC	-	-	Improvement of Efficiency for the Rural Power Supply
Counterpart	BPC	-	-	DOE & BPC
Project Purpose	Capacity Development of BPC human resources	BPC	off-grid system won't be covered by TCP if it is only focused on	Human Resources Development on the Rural Power Supply to work efficiency
Output/Activities	a) Establishment of improved Quality Control and Quality Standards	Procurement Services Dept.	- Inventory management using MIS (Management Information System) is on going with the support of Indian consultant. - Quality control of equipment is required (could be the one of training in TCP)	Output: a) Comprehensive Training Program b) Improved Training Facility under BPC c) Trained Trainers for the Training Facility d) Social Acceptance of Micro Hydro Power System Activities: a) Comprehensive Training Program Conduct following activities facilitated by JICA Expert a)-1 Internal consultation and discussion a)-2 Problem analysis a)-3 Confirm the necessary and priority of training a)-4 Prepare the comprehensive training program a)-5 Define the training program for rural power supply a)-6 Prepare the contents of the priority training b) Improved Training Facility under BPC b)-1 Identify the necessary facility for comprehensive training program b)-2 Establish the required training facility c) Trained Trainers for the Training Facility Conduct following trainings for rural power supply c)-1 Training for trainers for priority training c)-2 Training for the services centers' managers c)-3 Training for technicians d) Social Acceptance of Micro Hydro Power System d)-1 Training for social preparation in off-grid system d)-2 Training for micro/mini hydro power system
	b) Establishment of Project Management techniques	Rural Electrification Dept.	- JBIC project mainly supports for the Project Management. Conduct training in TCP to enhance the capacity of BPC for rural power supply	
	c) Capacity building of BPC in reconnaissance, planning, designing, construction supervising and O&M	Distribution & Customer Services Dept.		
	d) Establishment of prolongation measures for existing power facilities	Engineering & Design Div.		
	e) Capacity building of BPC on EIA		- No environmental engineer in BPC - EIA skill is required	[Alternative] Group Training Course on Environmental Impact
	f) Capacity building of Hotline maintenance of T/L (220kV & 400kV) and hotline washing and maintenance of	Transmission Dept.	T/L is out of the RE issues.	[Alternative] Third Country Training
	g) Capacity building on the operation of NLDC through power system analysis, SCADA and communication system		- NLDC is out of the RE issues. - SCADA system is supported by Indian consultant.	exclude from JICA scheme (Indian consultant can support on this matter).

7. 面談者リスト

Organization	Name	Designation
Bhutan Power Corporation Ltd.	Mr. Chhewang Rinzin	Managing Director
	Mr. Passang Dorji	Company Secretary Office of the Managing Director
	Mr. Nim Dorji	Senior Manager Procurement Services Dept.
	Mr. Jai Dev Sharma	Head & Senior Manager Engineering & Design Div.
	Mr. Kinlay Dorjee	General Manager Distribution & Customer Services Dept.
	Mr. Gyeltshen Wangdi	General Manager Rural Electrification Dept.
	Ms. Deki Yangzom	Deputy Manager Rural Electrification Dept.
	Mr. Heruka Zangpo	Central Maintenance & Training Div. Distribution & Customer Services Dept.
	Mr. Jigme Nidup	Central Maintenance & Training Div. Distribution & Customer Services Dept.
	Mr. Ugyen Dorji	Manager Central Stores Div.
	Mr. Khandu Dorjee	Senior Manager Electricity Services Div.
Department of Energy	Mr. Mewang Gyeltshen	Head / Executive Engineer Renewable Energy Division
	Mr. Ngawang	
Chhukha Hydro Power Co. Ltd.	Mr. Sangay Dorji	Administrative Officer Administration Div.
	Mr. Lam Dorjee	Executive Engineer Maintenance Div.
	Mr. Kuenga Namgay	Superintending Engineer Operation and Maintenance

8 . 収集資料リスト

No.	TITLE	PUBLISHER	PUBLISHED YEAR	SOURCE	Remarks
1	Mini-Micro Hydels and Solar PV Systems for Sustainable Development in Off-Grid Rural Areas of Bhutan: Towards Electricity for All by 2020” Final Report	Department of Energy	November 2006	Renewable Energy Division, DOE	
2	DCSD Manpower	Distribution Customer Services Dept., BPC	January 2008	Distribution Customer Services Dept., BPC	Confidential
3	DCSD Service Center List	Distribution Customer Services Dept., BPC		Distribution Customer Services Dept., BPC	Confidential
4	DCSD Training Report 2007	Distribution Customer Services Dept., BPC	2007	Distribution Customer Services Dept., BPC	
5	Training Material for the DCSD Training 2007	Distribution Customer Services Dept., BPC	2007	Begana Training Center, DCSD, BPC	別添 I のとおり。
6	Training Needs Assessment for DCSD 2008	Distribution Customer Services Dept., BPC		Distribution Customer Services Dept., BPC	
7	Targetted Feeders of the Project (RE4)	JBIC Study Team	2007	西脇専門家	
8	Major Hydro-power Projects			西脇専門家	
9	Power Infrastructure expected at the end of 9FYP (2007) revised			西脇専門家	
10	Presentation by BPC on Current Situation & Issue on the Rural Electrification Projects	Rural Electrification Div., BPC	Feb. 2008	Rural Electrification Div., BPC	Work Shop
11	Issue and challenges associated with off-grid electrification	Renewable Energy Dev. Department of	Feb. 2008	Renewable Energy Dev. Department of	Work Shop
12	Basic: Operation and Maintenance of Overhead Lines	Begana Training Center	June, 2006	Begana Training Center	Training Presentation
13	Basic: Operation and Maintenance of Transformers	Begana Training Center	June, 2007	Begana Training Center	Training Presentation
14	GPS and it's users in BPC	Engineering and Design Div., BPC	2007	Engineering and Design Div., BPC	Training Presentation
15	Distribution LV-ABC Network Planning & Survey Techniques	Rural Electrification Div., BPC	March, 2007	Rural Electrification Div., BPC	Training Presentation
16	BPC Annual Report 2006	BPC	2006	BPC	
17	Corporate Strategic Plan 2007	BPC	2007	BPC	
18	BPC Performance Based Incentive System	BPC	2007	BPC	
19	UNDP Project Document "Community Micro-Hydro for Sustainable Livelihoods"	UNDP		UNDP Bhutan Office	

No.	TITLE	PUBLISHER	PUBLISHED YEAR	SOURCE	Remarks
1	Welcome to the presentations on Findings/Recommendations of DTR substations and over head lines in 2005	Central Maintenance & Training Division	2005	Begana Training Center	Training Presentation
2	Basic: What is Electricity?	-		Begana Training Center	Training Presentation
3	Basic Definition	Central Maintenance & Training Division	2006	Begana Training Center	Training Presentation
4	Presentation on Overview of RE & Upcoming JBIC RE-Program	Rural Electrification Division	March, 2007	Begana Training Center	Training Presentation
5	Presentation on Hot line maintenance techniques and associated Hot line tools	Sangay Dorji Associate Engineer		Begana Training Center	Training Presentation
6	Middle Voltage System			Begana Training Center	Training Presentation
7	Presentation on introduction, operating principles and maintenance of transformers	Central Maintenance & Training Division		Begana Training Center	Training Presentation
8	Picture Presentations for Logmeshungpa	Central Maintenance & Training Division		Begana Training Center	Training Presentation
9	Consideration of Span, Sag & Tension, Uses of Pole & LV Cable sizes	Central Maintenance & Training Division		Begana Training Center	Training Presentation
10	Power System at a Glance	Central Maintenance & Training Division		Begana Training Center	Training Presentation
11	Presentation on findings and recommendations for the year 2006	Central Maintenance & Training Division, Distribution & Customer Services Department		Begana Training Center	Training Presentation
12	Presentation on energy meter	Central Maintenance & Training Division		Begana Training Center	Training Presentation
13	Presentation on basic of energy meter, connections and others	Central Maintenance & Training Division		Begana Training Center	Training Presentation
14	Training for the newly recruited engineers			Begana Training Center	Training Presentation
15	Presentation on Energy Meters Concepts, Reading procedures, Bill Preparation and Presentation of an Overview on Distribution	Central Maintenance & Training Division		Begana Training Center	Training Presentation
16	Transformer failures - Causes & Remedies	Central Maintenance & Training Division		Begana Training Center	Training Presentation
17	Presentation on pre-commissioning checks and tests	Central Maintenance & Training Division		Begana Training Center	Training Presentation
18	Presentation on Pre-commissioning Checks/Tests/Maintenance schedules and Substations Earthing			Begana Training Center	Training Presentation
19	Presentation on under ground cable			Begana Training Center	Training Presentation
20	Presentation on Procedures for conducting LV S	Central Maintenance & Training Division	March, 2007	Begana Training Center	Training Presentation
21	Safety Aspects in Electricity Service Divisions	Central Maintenance & Training Division	2006	Begana Training Center	Training Presentation
22	Safety Presentation for Logmeshungpa	Central Maintenance & Training Division		Begana Training Center	Training Presentation
23	Safety and Electrical Accidents	Central Maintenance & Training Division		Begana Training Center	Training Presentation
24	Generation of Single Line Diagram	Central Maintenance & Training Division		Begana Training Center	Training Presentation

