Knowledge Co-Creation Program
(Group & Region Focus)

GENERAL INFORMATION ON

RENEWABLE ENERGY IN GRID
-MAINLY ON PHOTOVOLTAIC- (A)
課題別研修「再生可能エネルギー導入計画
-太陽光発電を例として-（A）」
JFY 2017
NO. J1704430 / ID. 1784603
Course Period in Japan: From July 2, 2017 to August 11, 2017

This information pertains to one of the JICA Knowledge Co-Creation Program (Group & Region Focus) of the Japan International Cooperation Agency (JICA), which shall be implemented as part of the Official Development Assistance of the Government of Japan based on bilateral agreement between both Governments.

'JICA Knowledge Co-Creation Program (KCCP)' as a New Start

In the Development Cooperation Charter which was released from the Japanese Cabinet on February 2015, it is clearly pointed out that *"In its development cooperation, Japan has maintained the spirit of jointly creating things that suit partner countries while respecting ownership, intentions and intrinsic characteristics of the country concerned based on a field-oriented approach through dialogue and collaboration. It has also maintained the approach of building reciprocal relationships with developing countries in which both sides learn from each other and grow and develop together."* We believe that this 'Knowledge Co-Creation Program' will serve as a center of mutual learning process.

I. Concept

Background

In combating global environmental problems, effective use of natural energy in line with the promotion of renewable energy use is becoming increasingly significant. Among renewable energy sources, solar power generation is expected to be a promising growth industry in a low carbon society, and its demand is expanding as performance is improved and price is declined by recent technological developments.

Whereas solar power can be generated directly from photovoltaic (PV) or indirectly using concentrated solar power (CSP), this course places an emphasis on PV. PV generation system consists of solar panels, controllers, and storage batteries, and it generates electric power from photovoltaic energy. Since the technology is relatively simple to handle, photovoltaic generation is widely prevailing. On the other hand, problems related to inadequate installment, maintenance and management are growing, thus it is important that government and related institutions provide sufficient guidance.

Japanese resources depend heavily on imports and the nation has been making efforts to develop alternative energy. Japan started the development of renewable energy a quarter of century ago and it has now become one of the world leaders in the field of PV generation through collaborations between industry, government and academia.

Based on Japanese PV generation technology, this program offers a place of mutual study among participants engaged in electrification based mainly on PV generation.

For what?

This program aims at learning necessary knowledge technologies, and policies to adequately introduce, promote, maintain and manage photovoltaic generation for the effective use of solar energy, especially local grid system and local or national grid connected system for power source diversity.

For whom?

This program is intended for officials who develop and manage PV generation projects at central/rural governmental organization and electric power generation public corporation.

How?

Participants will have the opportunity to attend lectures, participate in experiments, practical training, visits to and training at private enterprises, discussions, and presentations on the technology of photovoltaic generation, storage, control, electricity consumption, etc. In this program, not only will participants learn Japanese technology in this field, but learn from each other's experiences. Through these activities, participants will acquire systematic technologies for photovoltaic generation as well as an understanding of the prospects and issues concerning the effective use of photovoltaic energy in ones' own countries.

II. Description

1. **Title (J-No.):**
   Renewable Energy in Grid -Mainly on Photovoltaic- (A) (J1704430)

2. **Course Period in Japan:**
   July 2 to August 11, 2017

3. **Target Countries:**
   Algeria, Azerbaijan, Brazil, Egypt, Kazakhstan, Mongolia, Myanmar, Pakistan and Uzbekistan

4. **Eligible / Target Organization:**
   This program is intended for government ministries who are in charge of introduction, promotion, maintenance and management of photovoltaic generation.

5. **Course Capacity (Upper limit of Participants):**
   12 participants

6. **Language to be used in this program:**
   English

7. **Overall Goal:**
   Photovoltaic generation will be adequately introduced, promoted, maintained and managed for the effective use of solar energy.

8. **Course Objective:**
   Participants will be able to understand the theory and practice of photovoltaic generation and apply them to business for the introduction, promotion, maintenance and management of photovoltaic generation systems.

9. Expected Module Output and Contents:

This program consists of the following components. Details on each component are given below:

Objective	Subject	Contents	Methodology
To be able to explain basics of PV generation technology	Part I PV generation technology	(1) Outline of photovoltaic generation technology (2) Current situation and issues of PV generation systems in developing countries (3) Four key points for sustainable PV generation systems (4) Sunlight & generation quantities calculation (5) Fundamentals of renewable energy technology (6) Maintenance for PV array & system (7) Maintenance technology of lead storage battery (8) PV system designing (9) Verification test results in mega solar project (10) Visit to Large scale Mega sola generation plant	Lectures, Field Study
To be able to explain grid system technology	Part II Power system technology	(11) Basics of grid & grid connection (12) Outlines of Japanese grid-interconnection code (13) Practice for understanding power grid (14) Countermeasure for a large amount of installation of solar photovoltaic (15) Design for PV storage system (16) Design for grid with renewable energy (17) Example of micro grid projects (18) Visit to •Akagi Laboratory for Grid of Central Research Institute of Electric Power Industry •NAS Battery •Local power control center •Demonstration system for voltage management equipment	Lectures, Practice, Field Study
To be able to explain policy and operation of renewable energy, especially photovoltaic generation	Part III Japan's policy & measures on renewable energy	(19) Renewable energy policy in Japan (20) Policy for PV generation spread (21) Spread & sustainability of the PV system (22) Certification of equipment for PV system (23) Conditions for spread of PV generation & policy planning (24) PV generation spread activities & the training system for Installers (25) Construction quality management of PV system (26) Community energy development (27) Approaches to renewable energy by KEPCO (28) Visit to •Japan Electrical Safety & Environment Technology Laboratories (JET) •Japan Photovoltaic Energy Association (JPEA)	Lectures, Practice, Field Study

To be able to make action plan and improve skills of policy planning	Part IV Practical training to draw up an action plan	(29) Presentation of job report (30) Guidance on recognition of issues (31) Review of lecture contents (32) Preparation of action plan (33) Presentation of action plan	Lectures, Practice

III. Conditions and Procedures for Application

1. Expectations from the Participating Organizations

(1) This program is designed primarily for organizations that intend to address specific issues or problems identified in their operation. Participating organizations are expected to use the project for those specific purposes.

(2) This program is enriched with contents and facilitation schemes specially developed in collaboration with relevant prominent organizations in Japan. These special features enable the project to meet specific requirements of applying organizations and effectively facilitate them toward solutions for the issues and problems.

(3) Participating organizations are expected to make the best use of the results achieved by their participants in Japan by carrying out the activities of the Finalization Phase described in section Ⅱ-9.

2. Nominee Qualifications

Applying Organizations are expected to select nominees who meet the following qualifications.

Essential Qualifications

(1) Current Duties: being in charge of policy for renewable energy-related government ministry, administrative organization, electric power generation public cooperation and so on.

(2) Experience in the relevant field: have more than five (5) years' experience in the renewable energy field, and intend to work in the same organization continuously after finishing the training.

(3) Age: be between the ages of twenty-five (25) and forty-five (45) years

(4) Educational Background: have a bachelor's degree of science and/or engineering, or equivalent thereof, in a field related to this program,

(5) Language: have a sufficient command of spoken and written English,

(6) Health: must be in good health, both physically and mentally, to participate in the Program in Japan. Pregnant applicants are not recommended to apply due to the potential risk of health and life issues of mother and fetus.

3. Required Documents for Application

(1) Application Form: The Application Form is available at **the JICA office (or the Embassy of Japan).**

(2) Photocopy of passport: to be submitted with the application form, if you possess your passport which you will carry when entering Japan for this program. If not, you are requested to submit its photocopy as soon as you obtain it.

*Photocopy should include the followings:
Name, Date of birth, Nationality, Sex, Passport number and Expire date.

(3) English Ability Certificate: If available, please attach the official certificate for English ability such as TOEFL, TOEIC, IELTS etc.

(4) Job Report and Issue Analysis Sheet (IAS): to be submitted with the application form. Fill in Annex I and II of this General Information, and submit them along with the Application Form. IAS is to be signed and approved by a supervisor.

Job Report and IAS are the necessary documents for screening of an applicant. Each participant will be required to present his/her Job report and IAS in approx. 10 minutes in an early stage of the training course. Visual materials such as Power Point and pictures may be helpful for your presentation if you bring them. When you use PowerPoint, it is preferable to use letters more than 24-point and not to use pictures on the background.

4. Procedure for Application and Selection

(1) Submitting the Application Documents

Closing date for applications: **Please inquire to the JICA office (or the Embassy of Japan.)**

(After receiving applications, the JICA office (or the Embassy of Japan) will send them to **the JICA Center in JAPAN by May 8, 2017.**)

(2) Selection

After receiving the documents through proper channels from your government, the JICA office (or the embassy of Japan) will conduct screenings, and then forward the documents to the JICA Center in Japan. Selection will be made by the JICA Center in consultation with concerned organizations in Japan. *The applying organization with the best intention to utilize the opportunity of this program will be highly valued in the selection.* Qualifications of applicants who belong to the military or other military-related organizations and/or who are enlisted in the military will be examined by the Government of Japan on a case-by-case basis, consistent with the Development Cooperation Charter of Japan, taking into consideration their duties, positions in the organization, and other relevant information in a comprehensive manner.

(3) Notice of Acceptance

Notification of results will be made by the JICA office (or the Embassy of Japan) **not later than June 2, 2017.**

5. Document(s) to be submitted by accepted candidates

None.

Soft (data) and hard copy of Job Report should be brought to Japan along with participants.

6. Conditions for Attendance

(1) to strictly adhere to the program schedule.
(2) not to change the program topics.
(3) not to extend the period of stay in Japan.
(4) not to be accompanied by family members during the program.
(5) to return to home countries at the end of the program in accordance with the travel schedule designated by JICA.
(6) to refrain from engaging in any political activities, or any form of employment for profit or gain.
(7) to observe Japanese laws and ordinances. If there is any violation of said laws and ordinances, participants may be required to return part or all of the training expenditure depending on the severity of said violation.
(8) to observe the rules and regulations of the accommodation and not to change the accommodation designated by JICA.

IV. Administrative Arrangements

1. Organizer

(1) Name: JICA Kyushu International Center

(2) Contact: kicttp@jica.go.jp

2. Implementing Partner

(1) Name: Kitakyushu International Techno-Cooperative Association (KITA)

(2) URL: http://www.kita.or.jp/english/e_index.html

3. Travel to Japan

(1) Air Ticket: The cost of a round-trip ticket between an international airport designated by JICA and Japan will be borne by JICA.

(2) Travel Insurance: Coverage is from time of arrival up to departure in Japan. Thus traveling time outside Japan will not be covered.

4. Accommodation in Japan

JICA will arrange the following accommodations for the participants in Japan:

JICA Kyushu International Center (JICA KYUSHU)
Address: 2-2-1, Hirano, Yahata-Higashiku, Kitakyushu-shi, Fukuoka 805-8505, JAPAN
TEL: 81-93-671-6311 FAX: 81-93-671-0979
(where “81” is the country code for Japan, and “93” is the local area code)

If there is no vacancy at JICA KYUSHU, JICA will arrange alternative accommodations for the participants. Please refer to facility guide of JICA KYUSHU at its URL, http://www.jica.go.jp/english/contact/domestic/

5. Expenses

The following expenses will be provided for the participants by JICA:

(1) Allowances for accommodation, living expenses, outfit and shipping

(2) Expenses for study tours (basically in the form of train tickets)

(3) Free medical care for participants who become ill after arriving in Japan (costs related to pre-existing illness, pregnancy or dental treatment are not included)

(4) Expenses for program implementation, including materials

For more details, please see “III. ALLOWANCES” of the brochure for participants titled “KENSHU-IN GUIDE BOOK,” which will be given before departure for Japan.

6. Pre-departure Orientation

A pre-departure orientation will be held at the respective country’s JICA office (or Japanese Embassy) to provide participants with details on travel to Japan, conditions of the workshop and other matters.

V. Other Information

The participants are kindly requested to bring their laptop computer and USB flash memory with them for making reports.

VI. ANNEX

I. Job Report
II. Issue Analysis Sheet
III. FY2016 (A) Course Training Schedule (for reference)

ANNEX I

Name of Training Course	RENEWABLE ENERGY IN GRID -MAINLY ON PHOTOVOLTAIC- (A)
Name of Applicant	
Name of Country	

Job Report

Remarks 1: The Report should be typewritten in English (12-point font, A4 size paper), and total pages of the report should be limited to 3 pages (not including organization chart).

Remarks 2: Each participant will have a meeting with course leader based on this Job Report and IAS at the early stage of the training in order to make training more effective and fruitful by comprehending each participant's situations and problems.

Remarks 3: Please itemize your answer and make them specific.

1. Energy Situation in your country (up to 1 page)

- Primary energy consumption rate (circle graph)
- Energy self-sufficient rate
- Electric power consumption rate (circle graph)
- Electrification cover rate
- Gap between electric power supply & demand
- Electricity charges (for residence & Industry), Coke charge (for 350 ml can)
- Enactment & enforcement situation of renewable energy law &/or regulation

2. Organization and main tasks (up to 1 page)

(1) Main tasks of the organization

(2) Organization chart

Please draw a chart of your organization including the department (section) names with the number of staffs in it and mark where you are positioned.

(The chart should be attached and not be counted in this page limit.)

Please describe a duty of each department (section) briefly.

(3) Brief description of your assignments

(4) Problems in your job

3. Expectations for the training course (up to 1 page)

(1) Your purpose of participating in this course

(2) Subjects of the course which you are interested in the most

(3) How do you expect to apply skills and knowledge that you will gain through the module (refer to Annex III) to tackle problems in your home country?

(4) Other matters which you are expecting to obtain from the course

4. Have you ever learned the following subjects in your work? We want to know your work experience. Please check either "Yes" or "No".

If your answer is "Yes", please fill out the number of years you have engaged in the respective work under the item "Years".

	Yes	No	Years
1) Energy policy, law, or regulation ……	( )	( )	( )
2) Renewable energy without PV generation	( )	( )	( )
3) PV system promotional activities ……	( )	( )	( )
4) Installation of PV generation facilities ……	( )	( )	( )
5) Electrical power network system and/or micro-grid ……	( )	( )	( )
6) Others ( ), Years ( )			

If you check "6) Others", please specify subject associated with solar power technology, not covered in items "1)" to "5)".

ANNEX II

Issue Analysis Sheet (IAS) Guidelines

1. What is IAS?

(1) IAS is a tool to logically organize relationships between issues and contents of the training program in Japan.

(2) IAS will help the nominee to clarify his/her challenges to be covered in each expected module output and to formulate solutions to them.

(3) The sheet is to be utilized as a logical process control sheet to draw up improvement plans for the issues by filling out the sheet in phases from prior to the nominee's arrival through to the end of the training.

(4) In addition, it is used for the course leader and lecturers to understand the issues that each participant is confronting, and provide him/her with technical advice, useful references and solutions through the training program in Japan.

2. How to fill out IAS?

(1) Please describe the issues you (your organization) confront(s) in column "**A: Issues that you (your organization) confront(s)**".

★ Prepare the separate rows for each problem; if necessary, please add new rows.

(2) In column "**B: Actions that you (your organization) are (is) taking**", please describe actions that you (your organization) are (is) taking to solve the issues shown in "**Colum A**".

This information is very important to carry out the training course and also to make Action Plan as a fruit of the training.

(3) In order to solve issues, you (your organization) need various types of information, so you hope to participate in this training course.

The main purpose of this training course is to provide the information you need. The contents of this course is shown in **Ⅱ-9 (Expected Module Outputs and Contents).**

Referring to the "List of Subjects" in this table, please extract subjects from which you expect to get useful information you need, and write their Subject No. in column "**C: Subject No**".

★ You can input as many subjects as you think the subjects are related.

★ You do not need to input "Subject Titles" into the chart, but only "Subject No."

Issue Analysis Sheet (IAS)

Name _____

	【 A】Issues that you confront(s)	【 B】Actions that you are taking	【 C】Subject No.*)
1			
2			
3			

【C】Please write the Subject No. you most expect to get the information you need .

*) Please refer the number of subjects shown in the tables in “9. Expected Module Output and Contents” on page 3 - 4 of this GI.

ANNEX III

FY2016 (A) Course Training Schedule (for reference)

Date		Morning (9:30-12:30)	Afternoon(13:30-16:30)	Date		Morning (9:30-12:30)	Afternoon(13:30-16:30)
10-Jul	Sun			31-Jul	Sun		
11-Jul	Mon	Briefing	Program Orientation	1-Aug	Mon	Calculation of solar radiation & power quantities	Calculation of solar radiation & power quantities
12-Jul	Tue	General Orientation（Economy）	General Orientation (Politics, Administration）	2-Aug	Tue	Maintenance of Lead Storage Battery	Design for Power Storage System Facilitation
13-Jul	Wed	Course Orientation& Action Plan Guidance	Exchange program with school	3-Aug	Wed	Calculation of solar radiation & power quantities	Kitakyushu→Tokyo
14-Jul	Thu	Outline on PV Generation	Issue Identification by Analyzing SHS Problem	4-Aug	Thu	Countermeasures against troubles	Certification of Equipment for PV System
15-Jul	Fri	Issues related to PV Spread	Issues related to PV Spread	5-Aug	Fri	Outlines of Japanese Grid-Interconnection Code	Verification Test Results in Mega Solar Project
16-Jul	sat			6-Aug	sat		
17-Jul	Sun			7-Aug	Sun	Tokyo→Fujiyoshida	Visit to Meglav Exhibition Center, etc.
18-Jul	Mon	JR(Job Report) Guidance	JR Guidance	8-Aug	Mon	Visiit Hokuto Mga-Solar	Hokuto→Tokyo
19-Jul	Tue	Fundamentals of Renewable Energy	Outline of PV Concept Facilitation	9-Aug	Tue	Example of Micro grid systems introduction	Construction engineer training system
20-Jul	Wed	JR Presentation	Policyfor PV Generation Spread	10-Aug	Wed	Design of PV system	Exercise of PV system Design Facilitation
21-Jul	Thu	Basics of Grid & Grid Interconnection	Explanation of Practice in KIT	11-Aug	Thu	Visit to Near Future Housing Exhibition Hall	Tokyo→Kitakyushu
22-Jul	Fri	A:Practices for dye-sensitized solar cells/ A:Measuring Silicon Solar Cell Characteristics/ B:Practice for understanding Power Grid		12-Aug	Fri	Reviewon obtained Information	Revive & long life of lead-acid batteries
23-Jul	sat	8:30 - 13:30 JICA bus tour		13-Aug	sat		
24-Jul	Sun			14-Aug	Sun		
25-Jul	Mon	Conditions for Spread of PV Generation & PolicyPlanning	Exercise for Analysis of PV Project (bring your CPU)	15-Aug	Mon	Reviewon obtained Information	AP Guidance
26-Jul	Tue	Countermeasure for a Large Amount of Installation of Solar Photovoltaics	Approaches to Renewable EnergybyKEPCO 16:30-17:30 Facilitation	16-Aug	Tue	Resources and EnergyProblem	AP Guidance
27-Jul	Wed	Practice of Maintenance for PV Array& System	Practice of Maintenance for PV Array& System	17-Aug	Wed	Construction quality management of PV System	NAS Battery
28-Jul	Thu	Visit to large scale Mega Sola Power plant	Visit to large scale rooftop PV on the Factory	18-Aug	Thu	Examples of PV System Introduction	Outline of PV Generation
29-Jul	Fri	Power Conditioner & Energy Storage System	Reviewon obtained information	19-Aug	Fri	Evaliation Meeting	AP Presentation Closing Ceremony
30-Jul	sat			20-Aug	sat		

For Your Reference

JICA and Capacity Development

The key concept underpinning JICA operations since its establishment in 1974 has been the conviction that "capacity development" is central to the socioeconomic development of any country, regardless of the specific operational scheme one may be undertaking, i.e. expert assignments, development projects, development study projects, training programs, JOCV programs, etc.

Within this wide range of programs, Training Programs have long occupied an important place in JICA operations. Conducted in Japan, they provide partner countries with opportunities to acquire practical knowledge accumulated in Japanese society. Participants dispatched by partner countries might find useful knowledge and re-create their own knowledge for enhancement of their own capacity or that of the organization and society to which they belong.

About 460 pre-organized programs cover a wide range of professional fields, ranging from education, health, infrastructure, energy, trade and finance, to agriculture, rural development, gender mainstreaming, and environmental protection. A variety of programs and are being customized to address the specific needs of different target organizations, such as policy-making organizations, service provision organizations, as well as research and academic institutions. Some programs are organized to target a certain group of countries with similar developmental challenges.

Japanese Development Experience

Japan was the first non-Western country to successfully modernize its society and industrialize its economy. At the core of this process, which started more than 140 years ago, was the *"adopt and adapt"* concept by which a wide range of appropriate skills and knowledge have been imported from developed countries; these skills and knowledge have been adapted and/or improved using local skills, knowledge and initiatives. They finally became internalized in Japanese society to suit its local needs and conditions.

From engineering technology to production management methods, most of the know-how that has enabled Japan to become what it is today has emanated from this "*adoption and adaptation*" process, which, of course, has been accompanied by countless failures and errors behind the success stories. We presume that such experiences, both successful and unsuccessful, will be useful to our partners who are trying to address the challenges currently faced by developing countries.

However, it is rather challenging to share with our partners this whole body of Japan's developmental experience. This difficulty has to do, in part, with the challenge of explaining a body of "tacit knowledge," a type of knowledge that cannot fully be expressed in words or numbers. Adding to this difficulty are the social and cultural systems of Japan that vastly differ from those of other Western industrialized countries, and hence still remain unfamiliar to many partner countries. Simply stated, coming to Japan might be one way of overcoming such a cultural gap.

JICA, therefore, would like to invite as many leaders of partner countries as possible to come and visit us, to mingle with the Japanese people, and witness the advantages as well as the disadvantages of Japanese systems, so that integration of their findings might help them reach their developmental objectives.

CORRESPONDENCE

For enquiries and further information, please contact the JICA office or the Embassy of Japan.
Further, address correspondence to:

JICA Kyushu International Center (JICA KYUSHU)
Address: 2-2-1, Hirano, Yahata Higashiku, Kitakyushu-shi, Fukuoka,
805-8505, Japan
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