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Knowledge Partnership for Clean Energy Workout on the Indonesia Centre of Excellence

> 14-21 December 2015 Mandarin Oriental Hotel Jakarta, Indonesia



Knowledge Partnership for Clean Energy Workout on the Indonesia Centre of Excellence

HIGHLIGHTS

1. Asian Development Bank- Government of Indonesia Knowledge Partnership

The Government of Indonesia has set its targets for the energy sector, including but not limited to universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and raising the share of renewable energy from 6% in 2014 to 23% in 2025.

As part of its efforts to reach these targets, the Government, through the Ministry of Energy and Mineral Resources (MEMR), planned to establish the Center of Excellence (COE) on Clean Energy to bring together national and international expertise from the public and private sector to promote and support clean energy development in Indonesia.

Upon request of the Government, the Asian Development Bank (ADB) committed to supporting the establishment of the COE. ADB's support is in line with its Midterm Review of Strategy 2020 Action Plan (MTR), which puts innovation and partnership at the center stage. Specifically, the MTR recommends pursuing the following:

- an institutional framework and modalities to adopt new and innovative cost effective technologies and products to strengthen ADB operations;
- product development partnerships including those from the private sector; and
- a framework involving flexible procurement rules and financing arrangements to facilitate strategic knowledge partnerships with external institutions

In a kick off meeting last October 2015, ADB, through the Southeast Asia Regional Department, and MEMR signed a Memorandum of Understanding outlining areas of collaboration between the two entities. ADB also brought private sector technology providers to Jakarta to dialogue with MEMR officials on possible collaboration with, or contribution to, the COE. In November 2015, ADB brought MEMR officials to Japan to dialogue with private and public sector energy officials, learn about various smart grid options and the generation of hydro and thermal power, and observe the operations of an ultra-super critical coal fire plant.

On 16-18 December 2015, ADB organized an output-based, brainstorming session between COE potential partners and MEMR staff to discuss possible collaboration for the following actions to support the COE:

- Geospatial Decision Support System- For enhancing investment planning for renewables and electrification.
- Technology Innovation- Identifying clean energy technologies to be applied to Indonesia and applying mechanisms of technology transfer and market transformation
- Investment Programming- Identifying potential investments for clean energy development in Indonesia

See Annex A for a list of participants to the workout.

2. Objectives of the Workout

The December 2015 workout in Jakarta is but the first in a series of intensive workout sessions envisioned to help Indonesia and other countries find and implement clean energy solutions best suited to their conditions. The purpose of these workouts are as follows:

• Gather

Agencies from all over the world with expertise and commitment for clean energy development, with emphasis on microgrid development, will gather together to exchange knowledge and help identify possible clean energy solutions for Indonesia (and other countries eventually).

• Practice

Through face-to-face meetings and webinars, the workouts will enable agencies to support Indonesia COE and other countries to design, construct, and operate microgrids.

• Share

As the project with the Indonesia COE on Clean Energy intensifies, ADB will disseminate knowledge and call for more participation to the group workout on a voluntary basis.

3. Government Presentation

The Government of Indonesia were represented by the following officials of the MEMR:

- Mr. Franciscus Sutijastoto, Head R&D Agency
- Mr. Kasbani, Head of R&D
- Mr. Muhammad Irsan, Head of Lab Facilities
- Mr. Ady Mulyawan Raksanegara, Head of Subsection Law
- John Paterson, Consultant

The Government shared the indicative operational plans of COE with the following 3 pillars and called for support of ADB and the partners as a group.

- <u>Decision support system development</u> with geographic analysis, technical information, monitoring and evaluation,
- <u>Collaborative learning</u> for business modeling, basic science, *technology innovation*, and
- <u>Program support</u> for feasibility assessment, investment and financing, and manufacture processing.

The COE aims to

- Promote new and renewable energy development and integration at micro to medium enterprise and industry levels;
- Undertake research, development, and demonstration activities in controlled environments and as pilot projects;
- Provide project development and implementation support;
- Optimize policy and regulatory frameworks to enhance private sector investment and participation; and
- Find innovative solutions to mitigate costs and risks for both public and private sectors in the deployment of new and renewable energy.

Its scope of work is described below:



4. Outputs

Below are the outputs delivered after three days of extensive dialogues among the Government, ADB, and the partners, with high appreciation and assessment from the Government and participants.

4.1 Consensus built for knowledge solution as team comprising public and private partners.

All public and private knowledge partners in attendance unanimously expressed their willingness to contribute as a team to Indonesia's effort to establish the COE, highlighting

their expertise, experience, demonstration projects, and knowhow. Mr. Franciscus "Toto" Sutijastoto, Head R&D Agency, MEMR appreciated the opportunity to work with a diverse group of knowledge partners functioning as a team. The knowledge partners and the Government requested ADB to play a coordination role to operationalize the knowledge partnership group by connecting the Government to each partner.



ADB and the global partners agreed to continually work together in order to deliver specific outcomes in (i) decision support system development, (ii) collaborative learning, and (iii) program support.

4.2 Concrete suggestions by the team for establishing COE

The participants made some suggestions on how to move the COE agenda forward and where they can contribute, including but not limited to the following:

- Harnessing through innovative partnership and south-south cooperation relevant knowledge and expertise from global partners;
- Establishing/refining a roadmap for the COE, with realistic milestones to obtain the ambitious target;
- Creating an enabling policy environment for clean and renewable energy;
- Integrating technology with innovative financing, and exploring technology marketplace model;
- Demonstrating an assisted-broker model for the transfer of renewable/clean energy to Indonesia;
- Building local capacity;
- Formulating Indonesian standards, learning from global standards, and establishing testing facilities and certification program;
- Sorting through available technology and prioritizing which ones are suitable/viable/ marketable for Indonesia (including solar PV, solar thermal, biomass, biofuel, wind, hydro, geothermal, battery storage, electric vehicle, energy management system, microgrid, space-based technology, remote sensing technology);
- Understanding ground realities by involving the private sector about investment/marketing opportunities and risks, and creating a support system to mitigate said risks, thereby encouraging investors;

- Enhancing IT systems to integrate additional components, e.g., wastewater, socioeconomic dynamics, air pollution, land issues, etc.; and
- Recognizing that strong and stable commitment of the government (vis-à-vis policy, project, COE) will enhance predictability/financial viability and investor confidence.

Mr. Sutijastoto welcomed the suggestions and highlighted the roles the COE could and should play in light of current realities. These include:

- COE as information clearinghouse, where it serves not just as integrator of investment-related information but also proactively addresses current and potential issues in the operation, maintenance, and sustainability of energy projects, e.g., implementation of power purchase agreements;
- COE as facilitator of business and technology matchmaking through innovative broker model; and
- COE as communications advocate, encouraging the dialogue between and among multiple stakeholders and ensuring that relevant government agencies are easily reachable to the stakeholders.



Mr. Sutijastoto (left) and SERD/IRM's Pradeep Tharakan.

4.3 Introduction ADB Technical Assistance on Establishing a Pilot Center to Facilitate Climate Technology Investments

Responding to Mr. Toto's suggestion, Mr. Deepak Wadhwa and Mr. Sasank Goli of IPEx Cleantech Asia introduced the ADB's Technical Assistance (TA): Establishing a Pilot Center to Facilitate Climate Technology Investments. The TA is overseen by Mr. Jiwan S. Acharya, Senior Climate Change Specialist (Clean Energy), ADB.



'IPEx Cleantech Asia advises and facilitates Cleantech deals between technology owners worldwide, and technology users or project developers in Asia, with the aim of der-risking, lowering costs and accelerating associated commercial, regulatory and legal processes' The TA includes highlights an assisted-broker model for the transfer of low-carbon technologies to Asia and the Pacific. The model operate as a marketplace or matchmaking mechanism. This subproject, contracted to IPEx Cleantech Asia, will address the lack of a well-informed market for technology transfer transactions and bring together willing low-carbon technology providers and recipients to help facilitate technology transfer. It will lead the way toward the establishment of a full-fledged

business for the transfer of low-carbon technologies in Asia and the Pacific that can be replicated in other regions.

4.4 Information Clearance House

The Team unanimously supported the Government plan for the COE to become an information clearing house to solve various issues that hamper private sector investment due to insufficient communication with Government agencies. In this regard, the ADB, the Government, and the private sector agencies—among them China New Energy Chamber of Commerce, Korea Environmental Industry & Technology Institute, LG CNS, Regional Task Force (RTF) comprising technology providers, financiers, and investors— agreed to a test run with real issues.

A roundtable meeting among the major partners will be held in January 2016. For this exercise, ADB may set a joint knowledge partnership agreement with RTF.

4.5 Specific Expertise and Knowledge Shared

 Dr. Shizhong Li, Tsinghua University shared the best practice in PRC for biofuel and biomass solution. The Government and Dr. Li in principle agreed to explore the possibility to conduct (i) collaborate learning on localizing the technology and business model development, and (ii) feasibility assessment for possible investment, financing, facilitating manufacturing collaboration between Chinese and Indonesian industries.



 Dr. Sicheng Wang and Ms. Yaling Luo of the China New Energy Chamber of Commerce (CNECC) shared the current status of solar PV deployment in the PRC and Government's policy framework. Dr. Wang called for joint development of concrete roadmap for establishing the COE. CNECC proposed a collaborative learning through workshop and study tour to PRC. DG Toto appreciated the proposal and agreed to explore the possibility of the program.



Dr. Sung-Sik Moon, Korea Environment Industry and Technology Institute (KEITI), shared the Government of Korea's policy on green technology and Sudokwon landfill project with the world's largest 50 MW wasteto-energy power plant. KEITI proposed scholarships for Government of Indonesia's staff to learn in Korea and the joint conduct of feasibility study in Indonesia. DG Toto appreciated the proposal and agreed to explore the



possibility of the program. Dr. Moon and Dr. Shizhong Li exchanged the views on the relevant collaborative solution for biomass in Indonesia.

 Dr. Jai Govind Singh, Asian Institute of Technology (AIT), explained AIT's initiatives for microgrid development and zero emission building. Dr. Singh proposed the provision of collaborative learning and agreed with the Government and ADB to conduct a webinar on innovative technologies in March 2016. The workout team will be invited.



 Dr. Dong Wook (Dylan) Kim, LG CNS, shared the Korean experience for microgrid projects in Jeju and Ulleung Islands. The participants agreed with Mr. Kim's point that a crucial key for success is the targeting and commitment of the stakeholders. LG CNS proposed to provide knowledge solution through various kind of modalities as part of the team. The Government of Indonesia appreciated the offer.



 Dr. Gerald Hane, CEO of Battelle-Japan, provided practical tips to start up the COE, highlighting that strategy, governance, excellent people, and process are critical factors. He also listed some needs for logistical and administrative arrangement, which are familiar to him as is in in a similar position to operationalize laboratories entrusted by the Government of United States to Batelle. The Government of Indonesia appreciated the information and requested further contribution.



• Mr. Kiyoshi Takebayashi, board member of the Regional Task Force (RTF), agreed to work as part of the team and highlighted RTF's strength in mobilizing RTF member companies comprising private sector technology providers, financiers, and investors.

For details on the PowerPoint presentations shared during the workout, please visit <u>http://www.k-learn.org/learning-events/integrated-knowledge-partnership-workout-indonesia-center-excellence-clean-energy#20151216</u>.

5. Progress updated on Decision Support System (DSS) development

At the workout, ADB's Mr. Bhuwneshwar Sah gave an update on the Decision Support System (DSS) being developed for the COE called for continued support from the COE Working Group (WG). The DSS is designed to enable the COE to assess the potential for, and suitability of, new and renewable energy investments in a given area.

The WG, under the leadership of Mr. Sah, is composed of the following:

- MEMR Mr. Muhammad Irsan and Mr. John Paterson
- ADB- Mr. Naoki Sakai (SDCC-KS) and Pradeep Tharakan (SERD/IRM)
- ADB consultant under ongoing TA No. 8826-INO: Sustainable and Inclusive Energy Program (48323-001)- Mr. Kemal Prakoso and Mr. Rohmadi Ridlo from Castlerock Asia
- University of Tokyo- Dr. Hiroyuki Miyazaki

Earlier, on 14 December 2015, a preliminary meeting with the WG was held at MEMR to review the progress on data collection and refine the directions of the DSS. Another review meeting on the progress of data collection was held on 21 December.

Most of the basic data, e.g., topography, landscape and socioeconomic data, have been collected from relevant institutions and processed. However, data related to level of electrification and PLN grid have yet to be inputted in the system. Land use data have also been collected. Statistical data, in report form, related to biomass production (agriculture, plantation, forestry and other land use categories) have been obtained and is currently being inputted in the system.

Geothermal potential site and related information has been obtained. The hydro potentiality map will be estimated using river basin exit point and head height.

Dr. Miyazaki indicated that the University of Tokyo is preparing a research output based on a climate model developed by the Meteorological Research Institute of Japan. This will be used for a demonstration exercise of GIS-based energy mix planning. The data includes wind speed and solar radiation for 1980-2010 with 20-km resolution globally. For proper application of the data, there is a need to locally calibrate it for Indonesia using ground data collected from meteorological stations. Such calibration is currently ongoing with ground data collected by a local consultant and government staffs.

The framework for the DSS has been formulated and discussed during the workout sessions, The DSS will be developed step by step. As an initial step, energy mix from potential energy source mapping will be targeted for completion in February 2016.

6. Next Steps

Based on the consensus and shared knowledge, ADB will further provide knowledge support in three ways.

6.1 DSS Framework Model Development

Under the ownership of the Government of Indonesia, the ADB, University of Tokyo, and other team members will continue contributing toward the formulation of the DSS Framework Model. From the processed data, all required input data for DSS model will inputted to the model. After several trials, the first prototype model will be delivered to the Government by early February 2016.

6.2 Information Clearing House Model Development with RTF through Knowledge Agreement

ADB will support the Government's effort to become an information clearinghouse on matters relating to new and renewable energy. One of its objectives as a clearinghouse is to dissolve barriers to private sector investment and participation arising from insufficient communication with concerned government agencies. A trial focusing on real issues will be conducted involving the Government, ADB, and RTF, with RTF bringing in private sector perspective from its members, among them technology providers, financiers, and investors.

ANNEX A Participants to the Workout on the Indonesia Center of Excellence on Clean Energy

The following are the members of the workout team:

1. Knowledge Partners

• Dr. Shizhong Li, Tsinghua University

Dr. Shizhong Li is the executive member of China New Energy Chamber of Commerce, and a full professor and deputy director of the Institute of New Energy Technology, Tsinghua University, Visiting Professor of Hong Kong University of Science & Technology, the executive director of MOST-USDA Joint Research Center for Biofuels (China), the director of Beijing Engineering Research Center for Biofuels, and Associate Editor of Biomass and Bioenergy. He is also a member of the Bioenergy Advisory Board of International Risk Governance Council, the consultant to Hainan Provincial Government. He conducts leading research on advanced biofuels, such as 1.5 generation biofuels and 2nd–4th generation biofuels, has more than 100 publications and 18 granted patents, and also contributes to roadmap designing, development strategy formulating, and incentive policy making for promoting China's Biofuel and Bioenergy industry.

• Dr. Moon, Sung-Sik, Korea Environmental Industry & Technology Institute

Dr. Sung-Sik Moon, General Director of the Korea Environmental Industry & Technology Institute (KEITI), has been with the institute for 23. KEITI is a semi-government agency that facilitates environmental R&D, trains professionals, certifies environmental technology and eco-products, develops environmental Industry, distributes eco-friendly business models, and supports environmental health and safety management.

• Mr. Sicheng Wang, Energy Research Institute and China New Energy Chamber of Commerce

Mr. Sicheng Wang is the senior scientist at Energy Research Institute (ERI), NDRC. He is a member of the China Renewable Energy Society and Vice Director of China Renewable Energy Industry Association. Dr. Wang is also the vice director of PV committee of China RE Society. He has been working in PV field for more than 30, beginning 1982. As chief director, he has developed numberous PV systems and sponsored 5 National GB standards. He has attended preparation of Renewable Energy Law and PV FIT. As chief director, he also worked on several international cooperation projects like the GEF/World Bank REDP projects, UNDP wind-PV hybrid village power projects, REEEP project for rural electrification, ADB PV Demo Project in Nepal, Solar Street Light project in Tajikistan, World Bank Beijing Solar School project, and more. Mr. Wang is experienced in both grid-connected and off-grid PV technologies.

• Dr. Jai Govind Singh, Asian Institute of Technology

Dr. Jai Govind Singh is Coordinator of Energy Field of Study, SERD, AIT Thailand. Dr. Singh has teaching, research, and outreach interests in the areas of smart grid and renewable energy management; microgrid and distributed generations; reregulation/restructuring of electricity supply industry; generation and integration of renewable energy in power grid etc. He has been actively involved in different research/development projects sponsored by international donors/agencies, e.g., produced 4 peer reviewed issues paper on 'Renewable Powered Micro/Off Grid Generation Systems in Thailand, Indonesia, Philippine and India'

sponsored by IRENA, and implemented a 'Pumped Storage Micro-Hydro Systems in AIT' sponsored by EBARA/Japan etc.

• Dr. Gerald J. Hane, Battelle

Dr. Gerald J. Hane is the President and CEO of Battelle-Japan, a joint venture of Battelle Memorial Institute, the world's largest independent, non-profit research organization, headquartered in Columbus, Ohio (USA), and the Mitsubishi Corporation headquartered in Tokyo, Japan. In addition to its headquarters laboratory in Columbus, Ohio, Battelle manages six national laboratories for the U.S. Department of Energy and one national laboratory for the U.S. Department of Homeland Security. Battelle-Japan advances partnerships in technology commercialization, contract research and laboratory management services in Japan as well as with key partners across Asia. Business sectors include energy and environment, security, information technology, health care, and agriculture. Partners include strategic and financial organizations in the Asia region.

• Mr. Dylan Dong Wook Kim, LG CNS

Mr. Dong Wook(Dylan) Kim is Senior Manager / Sales Representative for Innovative Energy Business Unit, LG CNS. He was in charge of Smart Grid Business Development in Korea (Energy Storage, AMI, etc) and Project Manager of Jeju Smart Grid Pilot System, including Renewable energy, AMI, Energy Storage and Microgrid system.

- Ms. Yaling Luo, China New Energy Chamber of Commerce
- Dr. Hiroyuki Miyazaki, University of Tokyo
- Mr. Kiyoshi Takebayashi, Regional Task Force
- Mr. Jyunya Momose, TEPCO
- Mr. Astusi Ono, RESTEC
- Mr. Akio Kajimoto, Supreme Energy
- Mr. Takeshi Masuyama, Bank of Tokyo Mitsubishi
- Mr. Julian C. Hill. Technical Advisor, Deloitte
- Mr. Deepak Wadhwa, IPEx Cleantech Asia
- Mr. Sasank Goli, IPEx Cleantech Asia

2. Government of Indonesia

- FX Sutijastoto, Head of R&D Agency, Ministry of Energy and Mineral Resources
- Kasbani, Head of R&D Center for Renewable Energy, Ministry of Energy and Mineral Resources
- Muhammad Irsan, Laboratory Head of R&D Agency, Ministry of Energy and Mineral Resources
- Ady Mulyawan, Legal Officer of R&D Agency, Ministry of Energy and Mineral Resources

3. Asian Development Bank

- Naoki Sakai
- Bhuneshwar Sah
- Pradeep Singh
- Maria Christina Dueñas
- Kristine Lim Ang

ANNEX B Team for the Knowledge Partnership for Clean Energy: Indonesia Centre of Excellence

ADB's Midterm Review of Strategy 2020 Action Plan (MTR) puts innovation and partnership at the center stage and the partnership with the Indonesian Government for the establishment of the COE on Clean Energy supports these. Beyond that, the partnership brings into operation ADB's "Finance++" approach, where financing, strategic partnerships, and high-quality knowledge are brought together to accelerate development effectiveness. The partnership further practices the "One ADB" approach, with back offices such as the Energy Sector Group (Energy SG) and the Knowledge Sharing and Services Center (KSSC), front offices like the Southeast Asia Department, Indonesia Resident Mission, and Private Sector Operations Department, jointly conducting knowledge capture and sharing initiatives to support the establishment and operationalization of the COE. The partnership also aims to generate South-South collaboration, with countries like the PRC and Korea contributing to Indonesia's knowledge base on clean energy.

ADB Team:

Under the supervision of Yongping Zhai, Technical Adviser for the Energy SG, and Ryu Fukui, head of the KSSC, the following ADB staff have been supporting the Indonesia COE on Clean Energy a reality:

Operation Department

• Pradeep J. Tharakan, Senior Climate Change Specialist

Operational Support

- Naoki Sakai, Senior Knowledge Sharing and Services Specialist (Team Leader)
- Priyantha Wijayatunga, Principal Energy Specialist
- Jiwan Acharya, Senior Climate Change Specialist (Clean Energy)
- Bhuwneshwar Sah, Infrastructure Specialist (GIS)
- Maria Christina Dueñas, Knowledge Sharing and Services Officer

Ministry of Energy and Mineral Resources Team:

Under the supervision of the energy minister, H.E. Mr. Sudirman Said, the following staff of the MEMR are responsible for operationalizing the COE.

Task Force for Accelerating the Development of New, Renewable Energy and Energy Conservation

- William Palitondok Sabandar Head
- Dhita Rachmadini, Member
- Syarifah Nuly Nazlia, Member

R&D Agency

- FX Sutijastoto, Head of R&D Agency, Ministry of Energy and Mineral Resources
- Kasbani, Head of R&D Center for Renewable Energy, Ministry of Energy and Mineral Resources
- Muhammad Irsan, Laboratory Head of R&D Agency, Ministry of Energy and Mineral Resources
- Ady Mulyawan, Legal Officer of R&D Agency, Ministry of Energy and Mineral Resources
- John Paterson, Consultant