

Asia LEDS Partnership

Grid Scale Renewable Energy Community of Practice

Summary Report of GRE CoP Session 3 at the Asia Clean Energy Forum 2018

June 6, 2018 | Manila, Philippines

The [Asia LEDS Partnership \(ALP\)](#), National Renewable Energy Laboratory (NREL), and USAID conducted an in-person session on June 6, 2018 at the Asia Clean Energy Forum (ACEF) 2018 in Manila, Philippines as part of the ALP's [Grid-Scale Renewable Energy Community of Practice \(GRE CoP\)](#). This peer-learning session built on key concepts and findings from a deep-dive workshop organized at the by USAID, GIZ and NREL on June 5, 2018 on '*Grid Integration of Variable Renewable Energy*'. GRE CoP members participated in a second deep-dive workshop on '*Renewable Energy Auctions: A New Paradigm for Asia*' organized by USAID on June 8, 2018 at ACEF 2018. Discussions from the two deep-dive workshops have been summarized at the end of this report.

GRE CoP session on 'Integrating Renewable Energy into the Grid: Opportunities, Challenges and the Way Forward'

The GRE CoP session provided a platform to engage in deeper discussions on key priorities and challenges of renewable energy grid-integration in the participating countries. Participants included government utilities representatives, power system operators, regulators, and representatives from technical institutions from Bangladesh, Bhutan, India, Indonesia, Kazakhstan, Laos PDR, Nepal, Sri Lanka, and Thailand.

Representatives from LEDS GP Energy Working Group (EWG), USAID, and ALP facilitated the GRE CoP session to maximize learning and peer-to-peer exchange of experiences on the topic.

Opening Remarks and Introduction to the GRE CoP – Carishma Gokhale-Welch, LEDS GP EWG & Nikhil Kolsepatil, ALP

- Brief overview of the objectives, priority areas and support offered under the LEDS GP EWG and ALP. The ALP aims to promote LEDS in the Asia and Pacific region. Clean mobility (transport), NDC/Clean energy finance, Grid Scale Renewable Energy and National, Sub-National integration are the priority areas of ALP in the current year. LEDS GP is supported by 6 technical working groups (Transport, SNI, Benefits, Agriculture, Forestry & Land Use, Finance, Energy) with expertise to provide technical assistance, peer learning opportunities, and training support in the region.
- GRE CoP is an interactive and member driven network that offers peer-learning opportunities, knowledge sharing, and access to expert assistance for furthering large-scale renewable energy deployment.
- It provides opportunities for CoP members to engage and benefit from activities such as topic specific sessions, online open discussions, peer-to-peer exchange, training workshops, knowledge resources and tools, country-specific no-cost technical assistance.

Highlights from deep-dive workshop on RE Grid integration – Jaquelin Cochran, NREL

- There are no technical limits for variable RE integration, though economic limits may exist
- Grid integration solutions depend on the system specific analysis, and good data underpins robust analyses. Analyses, scenarios and models are evolving and should be updated frequently as questions change
- Moving from compensation to incentives can encourage conventional fleet flexibility
- Cost-effective solutions are available for grid integration at the distribution level as alternatives to smart grids/micro-grids
- Establishing appropriate technical standards and interconnection codes is critical for grid integration

Working Sessions

As part of a group exercise, participants were invited to reflect on the existing situation and challenges of their respective countries in terms of integrating renewable energy into the grid. Participants were also asked to share recommendations and potential actions to advance grid-scale renewable energy integration in their countries.

The group exercises helped identify country challenges and needs for RE grid integration from policy making and technical perspectives. The session also highlighted opportunities for peer-exchange and sharing opportunities between countries.

Key topics of interest that emerged from discussions:

- Grid codes: establishment, timely updates to requirements, and enforcement of grid codes
- Grid integration and distribution system studies
- Implementation of incentives and compensation mechanisms to promote flexibility in grid operation
- Competitive auctions for renewable energy procurement

Group Activity 1

Participants were divided into two groups: one focused on policy and the second focused on the technical aspects of RE grid integration. Each group were asked to identify and present on the existing situation, challenges, and needs of countries in terms of integrating RE into the grid.

| Policy Group | Technical Group |
|---|---|
| <p><i>Challenges:</i></p> <ul style="list-style-type: none"> • Ensuring stability of grids vis-à-vis cross-boundary interconnections among neighbouring countries • Integration of off-grid RE systems • Weak buy-in for RE because of misconceptions (e.g. RE is expensive) • Passive planning | <p><i>Challenges</i></p> <ul style="list-style-type: none"> • Overloaded transmission systems • Lack of ancillary services market • Poor load data and lack of modelling tools • Weak enforcement of grid codes |

| Policy Group | Technical Group |
|--|---|
| <p><i>Needs:</i></p> <ul style="list-style-type: none"> • Updates to grid codes • Target setting both in terms of technical and policy considerations and how these relate and contribute to the Paris Agreement • Management of systems (grid systems, dispatching systems) to allow RE integration to the grid • Support in establishing regulatory policies such as FiT as well as incentive mechanisms for RE developers • Mechanisms to strengthen community engagement to gather opinions on policies to be adopted such as tariffs • Knowledge and capacity building for all key stakeholders on RE to secure buy-in and induce demand • New mechanisms to accelerate RE procurement • Support on RE auction design | <p><i>Needs:</i></p> <ul style="list-style-type: none"> • Assessment of capacity (technical knowledge and skill, resources, policies) as well as costs at the system level • Studies as well as effective data collection process to assess grid capacity to accommodate RE • Studies and recommendations on establishing markets for RE (e.g. how to identify costs) • Clear definition of “flexibility” according to local context; parameters could include – definition, measurement, incentives, etc. • Dynamic and flexible grid. Implementation of pilots and subsequent scale-up. • Regulatory policies including incentive mechanisms and penalties must be put into place and enforced • Regional cooperation for cross-boundary interconnection to balance and optimize use of RE sources |

Group Activity 2:

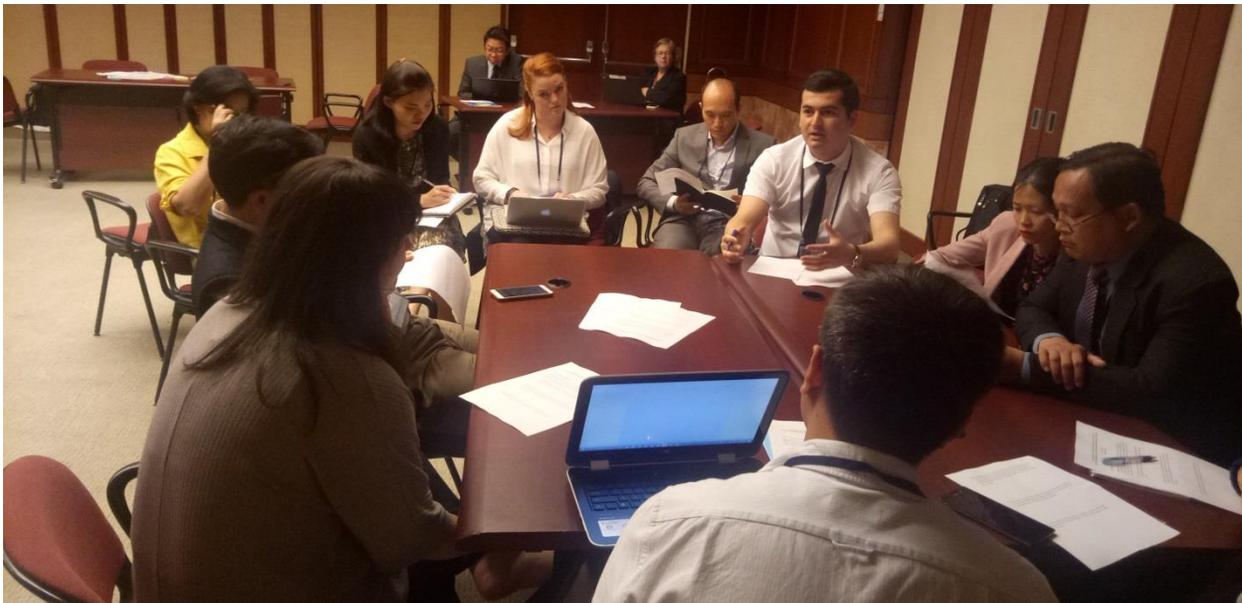
Participants were grouped according to country and asked to share the most important steps and possible actions they would recommend if they had a meeting with their Energy Minister.

| Country | Recommendations and Way Forward |
|-------------------|--|
| Sri Lanka | <ul style="list-style-type: none"> • Improve flexibility of the grid • Develop of information and communication technology infrastructure that will make grid smarter • Direct focus on energy storage and increase demand response |
| Bangladesh | <ul style="list-style-type: none"> • Provision of assistance for resource assessment • Development of incentive mechanisms for RE developers • Increased flexibility of the grid to accommodate RE integration • Facilitate regional cooperation for knowledge exchange on RE • Establish attractive market structure for RE |
| Uzbekistan | <ul style="list-style-type: none"> • Speed up the process of establishing regulatory frameworks for RE with due focus on grid stability |
| Indonesia | <ul style="list-style-type: none"> • Clear roles of stakeholders (e.g. utilities) on grid code enforcement with due consideration of multiple grids present in the country given its islands as well as the bigger role for system operators to improve penetration of variable RE • Conduct studies on grid capacity for RE integration, with clearly defined methodology in the identification of potential RE types to be |

| Country | Recommendations and Way Forward |
|-----------------|---|
| | integrated, flexibilities, and forecasting |
| Lao PDR | <ul style="list-style-type: none"> Establishing regulation and processes for RE auctions, especially solar |
| Vietnam | <ul style="list-style-type: none"> Improve RE planning strategies The power system in Vietnam has long transmission lines from north to south. Solar and wind farms are located in the same place so there is a need to upgrade the transmission system to transfer RE-generated power to other places of the country. Upgrade grid codes upon establishment of a concrete plan for RE integration to the grid |
| Thailand | <ul style="list-style-type: none"> Certainty and sustainability of RE policies beyond the political tenures of ministers |
| India | <ul style="list-style-type: none"> Trans-grid systems to maximize RE penetration Benchmarking flexibility through appropriate metrics |

Overall, the participants appreciated the benefits that the peer-exchange and learning offered. They also expressed their interest to continue engaging in such activities as part of the GRE CoP and to apply knowledge gained for furthering renewable energy deployment in their countries.





Access further details and materials from the GRE CoP session:

[Agenda](#)

[Presentation](#)

Deep-dive workshop on ‘Grid Integration of Variable Renewable Energy: Innovative Solutions at the Transmission and Distribution Levels’

A deep-dive workshop was conducted by USAID, GIZ, and NREL on June 5, 2018 highlighted country implementation experiences to share information on emerging solutions for efficiently integrating variable renewable energy in transmission and distribution systems.

Summary of key points discussed:

- **Decision support tools can enable power system flexibility:** Grid integration studies are useful to understand power system-specific issues resulting from growing penetration of RE sources in the grid. Well-defined decision support studies and tools can help identify cost-effective solutions and strategies to help realize ambitious RE deployment goals. High resolution RE data along with models and analyses that are updated regularly can effectively address evolving RE integration challenges. Experiences of Sri Lanka and Thailand in conducting grid integration studies for RE integration planning were shared.
- **Flexibility in the generation fleet:** Utilizing conventional power generation fleet for improved flexibility is a cost-effective approach to support renewable integration and power system operation. Flexibility assessments should be incorporated into regular planning and strategy by policy makers. Well-designed policy, market, and regulatory frameworks can help unlock flexibility from existing generation assets. There is a need for market redesign and having better valuation and incentives in place to promote flexibility. Country experiences from India and Germany in this regard were presented.
- **Utility-scale storage to benefit power systems:** Storage can be an effective solution to aid variable RE penetration and should be tailored to the particular grid’s needs. Experiences and outcomes from implementing energy storage systems in Hawaii’s island grids were shared. Considerations and approaches that can support cost-effective decisions about the deployment of energy storage (in terms of its type, size, and location) were highlighted.
- **Facilitating RE integration on the distribution system:** Well-integrated and accurately sized distribution networks are a cost-effective solution to integrate high levels of distributed RE generation. Germany’s experience in deploying significant distributed RE generation without notably needing smart grids/micro-grids and energy storage was shared. Innovative approaches to interconnection processes, compensation mechanisms, and planning can help address technical challenges (e.g. 2-way power flow, voltage control) arising from connecting large amounts of distributed solar PV to the distribution system. Results from a modeling/simulation study conducted for distributed rooftop solar PV in Indian cities were presented. Hawaii shared insights from its journey towards achieving high levels of power generation through distributed solar PV.

Deep-dive workshop on ‘Renewable Energy Auctions: A New Paradigm for Asia’

USAID organized a deep dive workshop on June 8, 2018 that provided insights from RE auctions in various countries from Asia and beyond, sharing lessons and analyses of how to address challenges in introducing RE auctions through effective auction design.

Presentations from the workshop can be accessed [here](#).

Summary of key points discussed:

- Countries have increasingly transitioned from incentive based regimes to competitive RE auctions, a more dynamic market based mechanism, which has helped achieve low prices for wind and solar power. RE auctions are a more appropriate choice for countries once the RE market has been established.
- Understanding the underlying contextual reasons behind the low prices realized in auctions and making informed policy choices is important, as results will be difficult to replicate across countries. Strong correlation has been observed in ASEAN countries between enabling policy and regulatory environment and private investment flows into RE. Policy makers have to adapt the auction design to their policy goals and market environment so as to effectively reduce barriers to private sector participation and trigger investment in RE deployment.
- Adequately incorporating integrated resource planning approaches and system costs related to transmission capacity/expansion, grid integration, and policy development into auction design ensures that true costs are reflected in auction results. Experiences in this regard from RE auctions in Mexico, UK, South Africa, Germany and Switzerland were shared. Design approaches to promote community driven projects and factor in their notable social and economic development impacts were highlighted through cases from countries such as Zambia and Panama.
- Insights from the solar pilot auction currently under design in Laos PDR highlighted key considerations for effective auction design. Limited competition, lower grid capacity, higher investor risks and cost of finance are key challenges faced by countries introducing RE auctions. Understanding the market and tailoring auction design to the market size, adopting simplistic price-based static auction and transparent auction rules, aligning RE and grid deployment, and designing bankable power purchase agreements (PPAs) can contribute to addressing these challenges. Risks of under building and delays can be mitigated with solid contracts and penalties.
- Emerging trends of RE auctions in Asian countries were highlighted. Cases from Thailand, India and Philippines underlined the potential of hybrid RE solutions and minimum firm power output requirements for auctions to utilize complementarity of different RE sources and manage variability and reliability of the power system. Lessons learnt from auctions in Thailand, El Salvador, Mexico, Peru, Sub-Saharan Africa countries and related recommendations such as use of technology-specific auctions,

and provision of clear and timely information on capacities of transmission interconnection grids, among others were shared.

Useful Resources from the deep-dive workshops:

- [Status of Power System Transformation 2018](#)
- [Toolbox for coal power plant flexibility](#) (includes 40 technical retrofit measures for main systems of the power plant)
- [Greening the Grid](#)
- [Modeling study for distributed rooftop solar PV in Indian cities](#)
- [Renewable energy auctions: Cases from sub-Saharan Africa](#)
- [Renewable Energy Auctions: Analyzing 2016](#)
- [Renewable Energy Auctions: A Guide to Design](#)

Access presentations from the two deep-dive workshops [here](#).

For any feedback or queries please contact:

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