Asia LEDS Partnership Grid Renewable Energy Community of Practice

Summary report of Online Session 1 on 'Strategic Energy Planning', April 4, 2018

The first online session of the Grid Renewable Energy (GRE) Community of Practice (CoP), was held on April 4, 2018 and was attended by 21 participants.

In the session, an overview of the GRE CoP and its objectives, planned activities and benefits to members were provided. An expert presentation introduced participants to the fundamental building blocks to establish the policy, regulatory, and investment environment for large-scale RE deployment and provided a deep dive on strategic energy planning. A case example of transmission planning and application of RE zones was presented by country representatives from India.

This initial session of the GRE CoP also included discussions to understand roles and activities of the participants, status and challenges for RE integration in their countries, and to seek inputs towards forthcoming activities for the GRE CoP.

Introduction to the GRE CoP – Nikhil Kolsepatil, ALP

Key points discussed include:

- Brief overview of the objectives, priority areas and support offered under the LEDS GP 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 (on Transport, Sub-National Integration, Benefits, AFOLU[1], Finance and Energy) with field expertise to provide technical assistance and training support in the region.
- GRE CoP is an interactive and member driven network for peer-learning, knowledge sharing, and accessing expert assistance for furthering renewable energy integration at the grid scale.
- 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.
- Nominations for membership to GRE CoP received from 35+ members representing 9 countries (Bangladesh, China, Myanmar, Philippines, India, Vietnam, Laos, Sri Lanka, and Nepal). Most of the members represent national government, ministries, and regulatory agencies related to power sector. Other members from technical and research institutes, sub-national governments and associations.

Proposed activities of the GRE CoP for 2018 and identified topics for the first three sessions of the GRE CoP based on feedback from members.

The topics are 'Introduction to building blocks for scaling up RE deployment and a deep dive on strategic energy planning', 'Smart incentives and enabling environment for large scale RE

[1] AFOLU – Agriculture, Forestry and Other Land Use

deployment' and 'Renewable Energy Grid Integration session providing a basic understanding of how grids operate, challenges and solutions that come with integrating high levels of renewables sources to the grid'.

Introduction to building blocks and deep dive on strategic energy planning – Ilya Chernyakhovskiy, LEDS GP

RE is a cost-effective solution enabling countries to transition towards low carbon energy generation and offers energy security, energy access, economic growth, and socioeconomic benefits. Given the continuing declining trends in cost of RE sources such as wind and solar, RE generation is expected to achieve cost parity with conventional energy sources globally within the next 5 to 7 years. Driven by commitments by countries to install large amounts of RE, investments in clean energy are seen to increase year on year and more so in the Asian region.

Core components to support efforts scale up RE consist of six building blocks, namely 1) Strategic Energy Planning 2) Competitive Procurement 3) RE Zones 4) Smart Incentives 5) Grid Integration 6) Finance.

Strategic Energy Planning is the foundational building block through which a goal or target for RE integration is set –either at regional, national or local level – and policy and actions are then put in place in order to meet the goal. Integrated Resource Planning (IRP) framework is one approach that looks at different scenarios for both the supply and demand side and takes a comprehensive long-term view for energy planning. By using a least cost planning model, the IRP process supports decision makers in selecting a cost-effective mix of investments to achieve energy goals.

Competitive procurement refers to auctions or reverse auctions for RE which help bring down the cost of RE, help the market to naturally establish the price for RE in the country performing the auction, and streamlines the procurement process. Results of recent renewable energy auctions in Chile, Mexico and UAE indicate that RE auctions have been effective in discovering price points much lower than thermal and gas-based power. A reverse auction is a programmatic process that has proven to be a successful structure by which the government attracts private sector investment by reducing risks, organizes how new generation should be built in the future and thereby provides opportunities to build large scale RE.

Identifying and developing **RE Zones** is part of a transmission planning process which focuses on identifying effective locations for developing new RE sources and helps to develop new transmission infrastructure in areas where private sector is able to make new investments that otherwise may not have been accessible. Texas has effectively used the RE zones approach for transmission planning through its Competitive Renewable Energy Zone program.

Smart incentives are essential instruments to support RE market development and differ depending on the stage of the market development at the local level - 1) early commercialization incentives support markets that are just beginning to setup RE 2) Policy support incentives help bridge the cost gap between RE and conventional sources (coal, gas) in markets where commercialization has already happened 3) In developed markets, incentives are focused on improving cost effectiveness to help integrate very large amounts

of RE into the grid. Smart incentives should be designed to support long-term energy development and thus it is important to ensure that incentives are reviewed and evolve in order to continually drive a changing market as desired. Smart incentives fall into four main categories: 1) fiscal or tax incentives, 2) financing, 3) contractual and regulatory, 4) operational. A widely used fiscal or tax related incentive is exemptions which has been effective in countries such as Kenya, where the government has removed the import tax on solar products to reduce the cost of solar to consumers and encourage more people to buy PV.

Grid integration is the practice of developing efficient ways to deliver variable renewable energy to the grid. Wind and solar resources are geographically dispersed and not always aligned with where the centres of load are located. Grid integration addresses issues such as complementarity of RE resources and conventional generation, maintaining optimum transmission grid operation and condition when adding large amounts of RE, meeting demand during periods of low RE generation. Many solutions exist for grid integration which includes changes in system operation, establishment of ancillary markets, flexible load and generation, and energy storage. A number of low cost grid integration solutions that do not need capital investments such as changes to grid codes, interconnection requirements, implementation of RE forecasting, strategic RE curtailment, and expanded balancing footprint can help improve grid integration and reduce levels of possible curtailment. Such cost-effective solutions are suitable for countries pursuing RE integration of 10-15% in general. At higher levels of RE integration, improvements in transmission infrastructure and energy storage interventions are required.

Finance interventions can help lower risks for investments in RE and increase access to finance. Examples of public finance interventions include loan guarantees, low-interest loans, and accelerated depreciation. Private finance interventions such as standardized contracts between the RE generator and off-taker, risk reductions methods, and new business models such as leasing that can help reduce cost of finance and promote RE deployment.

Case study from India on Grid Integration and Renewable Energy Zones

Transmission system planning is undertaken for different purposes including catering to projected energy demand within different states (provinces) and for different end-use categories, for new generation capacity additions, to address operational issues and system constraints, for system planning at inter-state level and intra-state level, and in order to strengthen the transmission grid.

In this process, extensive power system studies help inform the techno-economic evaluation of alternatives/options that is done based on the transmission planning criteria laid out by the country's Central Electricity Authority (CEA). The options are subsequently discussed with stakeholders such as state power utilities and electricity distribution companies, who would be using the transmission system, in order to agree on the design of the final transmission scheme. Construction of the transmission system in India is typically done using tariff based competitive bidding. In cases where transmission infrastructure has to be built in a shorter time period, the regulated tariff mechanism is used.

India has set an ambitious target of achieving 175 GW of RE installed capacity by 2022, consisting of 100 GW of solar energy and 60 GW of wind energy. The country's RE capacity

stands at about 63 GW at present. Given the increasing integration of RE generation, the differing timescales associated with developing transmission and RE generation posed challenges. While the time taken to build/commission conventional generation based power plants (coal, hydro) is 4-5 years which aligns with the time taken to build transmission systems, RE based power plants can be constructed in a much shorter duration of 2-3 years. This poses a challenge for transmission system to keep pace with RE generation development and as a result Indian utilities have started planning the transmission system in advance based on RE targets and plans.

Given the inherent variability and flexibility of RE generation, grid integration is much needed since it offers system flexibility with regards to generation, transmission, and distribution. For instance, generation flexibility enables having reserve capacity in the form of conventional generation that can be scaled up and scaled down quickly to deal with variations in RE generation and energy demand.

The southern and western parts of India hold most of the RE generation potential. India has adopted the RE zones process in its transmission planning and identified zones where considerable actual generation capacity is envisaged to come up based on the RE potential. A Green Energy Corridor, spanning the state of Gujarat in the west of India, to the state of Jammu and Kashmir situated in the northern part of India, has been planned to facilitate grid integration of large scale renewables (including both solar and wind) aggregating to 33 GW. To further facilitate RE integration, this high capacity corridor will be equipped with components such as reactive compensation, energy storage, and smart grid applications. The Green Energy Corridor also includes Renewable Energy Management Centres to undertake forecasting and real-time monitoring of RE generation to ensure grid stability and address variability. The state of Tamil Nadu has similarly used the RE zones approach to build and strengthen transmission systems to facilitate evacuation of considerable wind generation in the southern part of the state.

Access further details and materials from the session:

Agenda

Presentation

For any feedback or queries please contact:

alpsecretariat@iclei.org