International Solar Alliance (ISA)

Webinar on E-Mobility & Storage
3rd December 2020 | 16:00 Hrs - 19:00 Hrs IST

Summary Report

Background

The ISA has been working closely with its Member Countries to enable solar deployment by providing support in the areas of demand aggregation, capacity building, access to affordable financing, knowledge dissemination and technical assistance. The ISA has aggregated a cumulative demand of 13 GW with a potential project pipeline of USD 5.5 billion across its six programmes. The aggregated pipeline of projects would contribute towards and facilitate the achievement of SDG 7 (Affordable & Clean Energy) and SDG 13 (Climate Action). The ISA Secretariat is currently working with Governments, corporates, donors, development institutions and other stakeholders on the issues of Energy Access, Energy Security and Energy Transition. As a part of its continuous efforts to assist Member Countries, ISA is now assisting in implementation of certain innovative pilot solar projects through financial support of USD 50,000 in each of the Least Developing Countries (LDCs) and Small Island Developing States (SIDS) Member Countries.

Context

The energy transition is a pathway toward transformation of the global energy sector from fossil-based to zero-carbon. At its heart is the need to reduce energy-related CO_2 emissions and other greenhouse gases to limit climate change. One of the important learnings from the Covid-19 Pandemic is the need for acceleration of the efforts by all countries. The recent reports show that many countries are giving more attention to this aspect.

Every year, about 50 billion tons of CO_2 are emitted from all over the globe. Overall, the energy industry contributes mainly to CO_2 emissions. According to the International Energy Agency's report, electricity/heat generation and transport account for approximately two-thirds of overall CO_2 emissions and, since 2010, have accounted for almost all of the increase in global CO_2 emission. The entire transport sector constitutes around 18 percent of energy-related CO_2 emissions worldwide, while road vehicles alone account for almost 12 percent of the global CO_2 emissions. To address the rise in global temperature and to mitigate severe climate change, significant and rapid actions are required to stabilize or even lower the atmospheric concentration of carbon dioxide.

With the technology advancement, considerable reduction in battery prices and developing charging infrastructure, the e-mobility is evolving as one of the most promising solution to mitigate the CO_2 pollution crises. This suggests that we could accomplish almost 12 percent reduction in global CO_2 emission if the whole road transport system is electrified and switched to the fully decarbonized energy mix, then we can reach a realistic 12 percent reduction in global CO_2 emission.

Similarly, hybrid Solar projects with other renewable sources and Battery storage is becoming a sustainable and economic alternative for fossil power. The opportunities in both EVs and Storage space is immense with wide multitude of applications and potential. Both these technologies need to be focused in order to aid in our Green Recovery of economies.

In a world increasingly anxious about climate change, the surge in the generation of renewable energy over the past 20 years seems to be just a tipping point of the larger trend. The variable nature of wind and solar power means that storing energy is emerging as the next big challenge. Large-scale battery installations are springing across electricity grids around the world to make them more flexible.

About the Webinar

In the above context, ISA organized a dedicated webinar on 'E-Mobility & Storage' to provide a platform for discussing various facets related to technology options, business models, financing and benefits of such projects. The objective of this webinar was to initiate fruitful dialogue between various stakeholders including technology suppliers and Member Countries so as to develop an actionable roadmap for implementation of such projects. The webinar also covered practical aspects regarding technology landscape and on-ground challenges for such projects.

The webinar was attended by more than 90 participants from across the globe including key representations from ISA Member Countries including Comoros, Fiji, Guyana, Guinea, Liberia, Niger, Myanmar, Yemen, Australia, Jamaica, Togo and Tonga respectively. In addition, distinguished speakers from across the globe delivered presentations on diverse aspects related to Solar E-Mobility & Storage including on scope of Solar E-Mobility & ISA's Programme, synergy between EVs and PV, Policy & Regulatory Framework, Role of Energy Storage for RE Integration for Utility scale and EVs, and experience sharing from across the globe.

S.No.	Category	Topic	Speaker
1	ISA's Programme on Scaling Solar E-Mobility & Storage	• Overview of ISA's Programme on Scaling Solar E-Mobility & Storage	• Dr. Philippe Malbranche, Director Programme, ISA
2	Charging Infrastructure	• E-Mobility Charging in Europe: Scaling, challenges & solutions • Electrification of Transport: Opportunities in India	• Mr. Marcel Rümenapf, Head of Account Management, Siemens • Mr. Amit Bhatt, Executive Director, World Resource Institute (India)
3	RE integration with storage	• Role of Energy Storage for RE Integration	• By Mr. Rahul Walawalkar, President, India Energy Storage Alliance and President & MD, Customized Energy Solutions (India).
4	Experience sharing	• E-Mobility & Battery Energy Storage System • AES' implementation experience of Energy Storage Projects • E-Mobility and Charging Infrastructure,	• By Mr. Rajnish Goyal, General Manager (ESSG), BHEL, India. • Mr. Rajendra Shrivastav, President, AES – India. • Mr. N Mohan, Deputy General Manager, EESL, India.

Key Discussion Points

The various speakers delved on diverse perspectives with regards to implementation of Solar E-mobility & Storage across ISA Member Countries. On the technology side, the speakers discussed variety of options including Solar EV charging infrastructure and battery storage. Further, the speakers also discussed scale of future electricity requirements for charging EV and shared the experience of Solar EV charging and discussed the associated topics of current trends of EV charging infrastructure and energy storage integration with renewable energy options so as to arrive at a future roadmap to facilitate implementation of such technologies in ISA Member Countries. Some Member Countries also provided their perspectives through lessons learnt on ground so as to discuss on practical pathways of sustainably implementing such projects.

Key Takeaways

ISA Programme on Scaling E-Mobility and Storage

- Preparing case studies on various battery technologies for various applications to develop awareness in the ISA member countries.
- Collecting business models implemented within various countries with plans to release the guidelines for business models (such as technical, economical, regulations, etc.)
- Selection of best-case studies for replication and setting up of proposals for a large-scale replication in ISA member countries.

Electric Vehicles (EVs)

- Severe health consequences are caused by the emissions of internal combustion engines. In 2016, 14,800 people died in Delhi alone due to $PM_{2.5}$ pollution and the life expectancy of Delhi residents decreased by 6.3 years.
- The main issues with the implementation of e-mobility are limited driving range, high capital costs and customer resistance to change.
- Excessive heating and cooling severely impacts battery life. Shorter battery life will lead to frequent replacement and will further increase the O&M cost of the EVs.
- For an effective E-Mobility ecosystem it is essential to assess the type of vehicles (personal and shared vehicles) being used by the citizens, to develop RE-energising infrastructure for battery charging and swapping, to develop EV manufacturing capacity and battery management system.
- As a policy initiative, under the Fame-II scheme, Government of India is providing Demand incentive based on the battery size at the rate of INR 20,000/kWh for buses and INR 10,000/kWh for other vehicle segments.
- High upfront and operational cost, low utilisation, land availability are the main reasons for the lack of charging infrastructure.
- In addition to the expense of EV charging stations, the cost of grid infrastructure forms a large part of CAPEX.
- Additional utility scale and local battery storage is required to meet the potential demand of EV charging infrastructure.

- EV charging technologies such as the pantograph have made it possible to charge EVs quickly and encouraging long distance transportation to opt for E-Mobility.

Storage and Integration with RE

- Various Energy Storage Technologies are seeing significant performance improvements and cost reduction trends over past decade and this is expected to continue over next decade
- The cost curve for the battery storage projects estimates 50 percent cost reduction by 2030
- Battery price will continue to go down and about 50 percent of cost reduction in storage system is estimated by 2030
- The global average market potential for grid-connected energy storage is projected at about 318 GW by 2030.
- Apart from Electrochemical Batteries such as Lead Acid, Li-ion, flow batteries and metal air batteries research are also taking place in thermal and gravity storage.
- It is important to understand the technology as well as the application requirements of battery storage systems such as grid system operations, investment differential, RE integration, microgrids and EVs for efficient use.
- Integration of renewable energy into the grid with Utility Scale Battery Storage system emerged as one of the prominent solutions to the RE curtailments and firming the RE capacity.
- The renewable energy and storage hybrid projects have already started competing with existing peak load plants in the grid around the globe, and with further cost reductions, they can also provide potential cleaner baseload generation.
- The DC-coupled RE integrated battery storage systems is 40 percent less expensive and have nearly 5 percent less losses than the AC-coupled system.

Important Points for Further Actions

- Country level policies and regulations interventions are required to absorb the price risks of E-Mobility and Storage related technologies and to bring it to parity with its traditional counterpart.
- Need to develop business models for integrating decentralized solar energy with battery storage for the public charging stations.
- The Megawatt scale battery storage and charging infrastructure needs to be developed to meet the potential demand for E-Mobility.