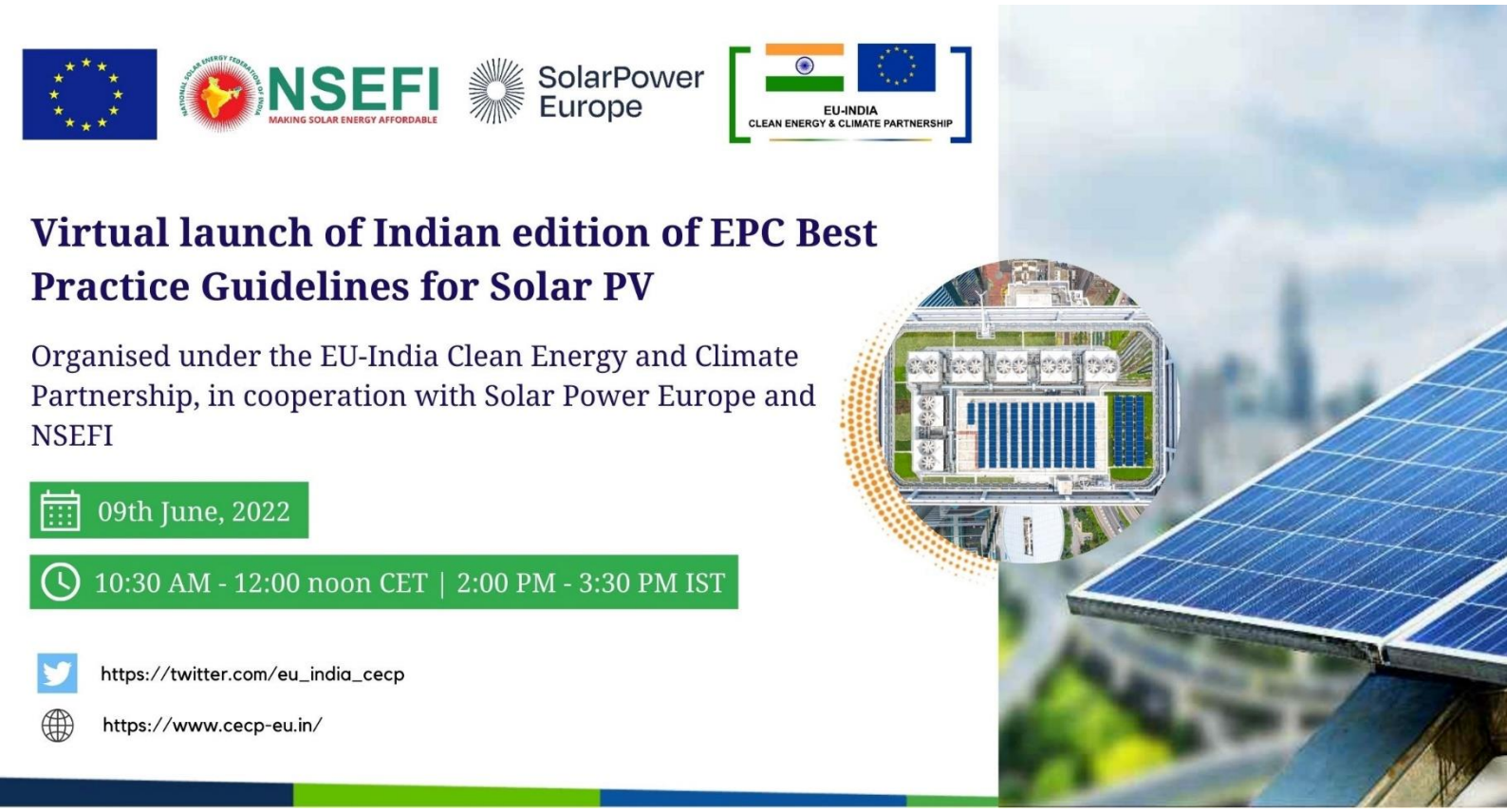

EU-India virtual launch of Indian edition of EPC best practice guidelines for Solar PV- Event Proceedings

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EU-India virtual launch of Indian edition of EPC best practice guidelines for Solar PV

On 9th June 2022, the EU-India Clean Energy & Climate Partnership (CECP) project in collaboration with the National Solar Energy Federation of India (NSEFI) and SolarPower Europe, hosted virtual launch of Indian edition of EPC best practice guidelines for Solar PV. To address the need for industry-wide best practices for EPC, the Indian edition of the EPC Best Practice Guidelines was developed, involving 31 solar experts from India and Europe. The guidelines reflect the experience and views of a considerable share of the Indian and European EPC industry players. It is based on the first edition of SolarPower Europe's EPC Best Practice Guidelines and has been adjusted to the Indian context in a joint effort between SolarPower Europe and NSEFI.

The event was attended by 50+ participants from the European Commission, EU Member States, representatives from solar project developers, financial institutions, research bodies, academia, not for profit, etc.

1.1. Opening remarks & welcome of participants

Mr. Edwin Koekkoek, First Counsellor – Energy & Climate Action, EU Delegation to India welcomed the participants from Europe as well as from India. He briefed that Europe and India entered into an agreement in 2016 under the EU-India Clean Energy Climate Partnership. In the last few years EU and India have been working very closely on sectors related to renewable energy, energy efficiency and smart grids. He discussed the 2050 net-zero target of EU and 2070 net-zero target of India along with India's 500 GW non-fossil fuel capacity by 2030. He mentioned that the EU is keen to work with India to achieve their own renewable energy and energy efficiency targets as well as targets of India. To do so, there must be an exchange of best practices; collaboration between Indian and EU suppliers working in the areas of renewable energy and energy efficiency. This can be done through webinars, workshops, activities and study tours. Participants would be welcome to visit the project website (https://www.cecp-eu.in/) to get more information on the different initiatives in the framework of the CECP.

Keynote address and launch of EPC guidelines and report on enhancing Solar PV rooftop uptake in India through innovative EU business models

Sh. Lalit Bohra, Joint Secretary, Ministry of New & Renewable Energy thanked the EU-India Clean Energy and Climate Partnership, NSEFI and SolarPower Europe for organizing this event. He set out the "*Panchamrita*" announced by Honorable Prime Minister of India:

- India will reach its non-fossil energy capacity to 500 GW by 2030
- to meet 50% of the energy requirements from renewable energy by 2030
- reduce the total projected carbon emissions by 1 billion tons
- By 2030, India will reduce the carbon intensity of its economy by less than 45%
- India to achieve net neutrality by 2070

As of May'22 India has ~113 GW of installed RE capacity and ~160 GW including large hydro. Along with this, various projects of 8 GW are on various stages of implementations that include the tendering stage as well as the final executions. Looking at the huge and humongous target of 500 GW by 2030, it becomes important that we have our best EPC practices. The projects are going to have a life of minimum 25 years and that have to last all the kind of weather conditions. The plants need to be installed with highest possible standard using the best available equipment and construction methodology to deliver key performance.

In the virtual event, two reports were launched:

- **Indian edition of Engineering, Procurement and Construction (EPC) Best Practice Guidelines for solar PV.** The report can be accessed here.
- **Report on enhancing Solar PV rooftop uptake in India through innovative EU business models.** The report can be accessed here.

The EPC best practice guidelines developed under the CECP project with inputs from industry partners is an excellent step in this direction and the industry will be benefited from this. The second report on enhancing Solar PV rooftop talks about various business models of the rooftop solar. As of now, the MNRE rooftop solar program does inculcate various business models, however, it is a very good step that various business models have been have summarized in this report which may enhance the rooftop solar uptake for various consumer category with active participation of relevant stakeholders such as consumers, discom, vendors, regulators, state agencies, etc. These alternative models will play an important role in achieving the target. Although the most of these are at the nascent stage but once it takes off it will increase the rooftop solar growth in an exponential way.

1.2. Presentations

Mr. Subrahmanyam Pulipaka, Chief Executive Officer, National Solar Energy Federation of India made a presentation on EPC guidelines and thanked MNRE for launch of the reports. The presentation discussed about:

- Cost of solar energy generation vs other power sources and how the solar electricity generation is declining over the past decade
- Importance of solar EPC best practices
- Highlights from India edition
    - Updated recommendations based on the requirement of the Indian Grid Code
    - Inclusion of the key national legislation on occupational health & safety
    - Standards for component quality from the latest SECI tender
    - Detailed recommendations on the handover to O&M service provider

He thanked EU-India CECP and SolarPower Europe for coming together to put the best practices from Indian perspective and this document will act as a guiding principle for all the upcoming projects. India is the classic example of how generation cost has fallen down over the years. India is the only country in the world where today the peak power price which is a combination of storage is the lowest, even lower than some of the new tenders that were discovered. There is no doubt in saying that this is the 4th consecutive year where India is standing with his head held high in most attractive country index for new segments and standards like this can help us keep up the position better and improve the investor confidence.

Mr. Vaibhav, Director, PwC India and Team member - CECP Project made a presentation on enhancing Solar PV rooftop uptake in India through innovative EU business models. He stated that onsite solar represents 70% of the total installed capacity in the European Union which is contrast to India. Growth of rooftop solar in Europe has been driven by ambitious policy decisions and favorable market conditions, including:

- Ambitious regulatory frameworks
    - 2009 Climate and Energy Package
    - 2018 Clean Energy Package
    - 2021 Fit for 55 package
- Stable support schemes
- Clear administrative procedures
- Cost effectiveness of solar PV: solar panel prices have decreased 96% since 2020
- Growing environmental consciousness: 9 in 10 EU citizens agree to encourage additional investment in RE

Key takeaways from the report to support increased solar rooftop deployment are:

- Support Schemes:
  - Virtual net-metering: to address the challenge of availability of dedicated roof space
  - Enhancing the uptake through utility owned and enabled business models
  - Collective self-consumption models: streamlined regulatory provisions can help in aggregating demand where roofs are shared by customers
- Financing mechanisms:
  - Crowdfunding or community-based investments
  - Solarization of MSME rooftops through leasing and financial aggregation
  - Dedicated credit line to support SME segment
- Digital Solutions
  - Enabling smart contracts through blockchain technology
  - Integration of energy storage to reduce dependency on grid and reduction of overall cost
  - Digitization of solar PV rooftop systems
  - Adopting smart EV charging with solar rooftop systems

1.3. Panel discussion on EPC best practices for solar PV (Moderator: Mr. Benjamin Clarke, Business Analyst, International Cooperation, SolarPower Europe)

- Mr. Ralph Gottschalg, Head of Fraunhofer Center for Silicon Photovoltaics (CSP)
- Mr. Mohit Aggarwal, AGM, ACME
- Ms. Ritu Lal, Senior VP & Head, Institutional Relations, Amplus
- Mr. Hiten Parekh, VP – C&I Business, SunEdison
- Mr. R K Sharma, Director, Svaryu Energy (Formerly Refex)

Q: Mr. Benjamin Clarke - Is there a ratio between quality assurance and costs in solar PV projects and how do you justify kind of increased CapEx in the early stages of the project?
A: Mr. Ralph Gottschalg- The industry is in a race to save cost incurred in the entire value chain, however it is always advisable to spend more money upfront and having a proper design and a proper quality control to avoid for the expenses in the end. If we buy high quality components, we pay more CapEx getting manufacturing designed per needs and have lower energy in loss due to unplanned maintenance. The EPC guidelines are the first step to bring together the long-term performance.

Q: Mr. Benjamin Clarke - What consideration do you have to make during the EPC phase to ensure quality operation?
A: Ms. Ritu Lal – She discussed that:

- Incorrect installations sometimes have a very high cost
- A lot of challenge come in rooftop solar projects like accessibility, safety and maintenance
- It is always advisable to focus on precautions and procedures during the construction process
- To sell the electricity at higher revenue, it is important to have less O&M challenges

All the expenses incurred at design and construction stage pays up while execution if followed quality operation

Q: Mr. Benjamin Clarke - What are some of the main reasons for underperforming assets?

A: Mr. Hiten Parekh – The cost of customer acquisition and the ability to reach retail customers is becoming increasingly challenging. At the same time the drive to adopt solar has accelerated a lot. So, a lot of mid-size companies have upgraded themselves to be so called EPC companies and because of that, the ability to have a high-quality efficient design team is lacking.

- The knowledge required to choose a high-quality module is non-existent
- lack of awareness from a safety point of view and ease of operation on the rooftop point of view
- Irregular maintenance of modules
- lack of know-how on the quality of the water and the quality of the hardware which is required to clean the modules in terms of the equipment used to physically clean the dust on the modules

Q: Mr. Benjamin Clarke - What are some of the main findings in supplier audits?
A: Mr. R K Sharma- Module is the most important component of the project and it's costing more than half of the project, so naturally our focus lies with the manufacturing processes that take place at factories in India.

- The age of the plant is very important for solar modules
- Stagewise inspection up to the final inspection, so then we get the best quality of the modules
- R&D facilities also play a very important role for any manufacturer, so we need to keep an eye on our innovations taking place in the factory

Q: Mr. Benjamin Clarke - If a product is qualified or certified to a standard, do we still have to worry about its quality or performance?
A: Mr. Ralph Gottschalg – No certification is suitable indicator to the quality control.
We don't have any tests which actually proves that the manufacturing has been done according to specifications. People do a lot of paper-based studies, but we never ever look at the supply chain beyond paper-based things. We've seen plenty of studies recently where the design was good, and the production was slightly variable and causing lots of problems.

Q: Mr. Benjamin Clarke - What mechanisms are there to ensure the balance between the price and the quality of goods, services & equipment through the competitive bidding process?
A: Mr. Mohit Aggarwal- We need to take care about the three important parameters for the execution i.e. time, cost and quality. Our plant has to be operational giving us revenues for at least 25 to 30 years, so we have to be very careful while selecting the EPC companies.

- we should not be over specifying the equipment. Based on the local climatic conditions we need to specify the requirements in the equipment
- we need to be very clear when we are giving the orders to any of the vendors
- Check the quality of material in scope vs being supplied
- it is essential to make a balance between the billing breakup of supply and service contracts
- we need to protect ourselves by giving the contracts to the quality EPC contractors and ensuring timely execution
- there must be strict monitoring of the equipment

Q: Mr. Benjamin Clarke - Why is understanding of climate important in the design and procurement of PV project? Are there any specific kind of product considerations that need to be made when operating in the sort of climates that you find around India?
A: Ms. Ritu Lal-

- Beyond 28 degrees, the generation starts to drop, hence, the understanding of climate is important while designing solar PV projects

- Rajasthan & Gujarat has huge quantum of solar be it ground mount or even with rooftop solar. These are places with very high temperatures so there is now a fair amount of understanding of what needs to be built in to protect against high temperatures
- Ex. For rooftop installations we request clients to give us a little bit of space inside so that you can wall mount inverters. If you're able to prevent direct heat falling on inverter, it extends the lifetime of the inverter
- Sometimes insulations and coatings have to be used for cables to protect them from high heat

1.4. Consolidation of thoughts & vote of thanks

Mr. Benjamin Clarke, Business Analyst, International Cooperation, SolarPower Europe thanked MNRE for their presence and for the support of the development of clean energy in India. He wished luck to the panelists and thanked the audience.

AGENDA

Launch of Indian edition of Engineering, Procurement and Construction (EPC) Best Practice Guidelines for solar PV

Date: 9th June 2022 (Friday)
Time: 10:30 AM to 12:00 Noon CET / 2:00 PM to 3:30 PM IST

TIME (CET)	TIME (IST)	Agenda
10:30–10:35	2:00–2:05	**Opening remarks and welcome of participants** Mr. Edwin Koekkoek, First Counsellor- Energy and Climate Action, Delegation of the European Union to India
10:35-10:45	2:05-2:15	**Keynote Address and Launch of EPC guidelines and Report on enhancing Solar PV rooftop uptake in India through innovative EU business models** Sh. Lalit Bohra, Joint Secretary, Ministry of New & Renewable Energy
10:45-11:00	2:15-2:30	**Presentation on EPC guidelines** Mr. Subrahmanyam Pulipaka, Chief Executive Officer, National Solar Energy Federation of India
11:00-11:15	2:30-2:45	**Presentation on report on Report on enhancing Solar PV rooftop uptake in India through innovative EU business models** Mr. Vaibhav Singh, Director, PwC India and Solar expert, EU-India CECP project
10:15-11:50	2:45-3:20	**Panel discussion on EPC best practices for solar PV** 1. Mr. Ralph Gottschalg, Head of Fraunhofer Center for Silicon Photovoltaics (CSP) 2. Mr. Sandeep Kashyap, President, ACME 3. Ms. Ritu Lal, Senior VP & Head, Institutional Relations, Amplus 4. Mr. Hiten Parekh, VP – C&I Business, SunEdison 5. Mr. R K Sharma, Director, Svaryu Energy (Formerly Refex) 6. Mr. Saurabh Mehta, Head BD& Projects, Mahindra Susten **Moderator:** Mr. Benjamin Clarke, Business Analyst, International Cooperation, SolarPower Europe
11:50-11:55	3:20-3:25	**Q&A**
11:55-12:00	3:25-3:30	**Consolidation of thoughts & vote of thanks** European Commission/Delegation of EU to India