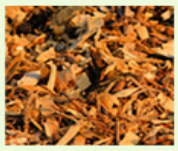
Access to Energy

Quarterly Bulletin

CONTENTS



ISSN 2278 - 5663

Volume 9, February 2016

EDITORIAL

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International Solar Alliance (ISA) has an ambitious agenda to provide a platform for collaboration among sunny countries to facilitate a solar driven economy. It is a bold statement of purpose as it speaks about the 'means' rather than the 'end'- an approach that meaningful activities to utilize the solar energy resource through solar specific technologies (the *means*) will give desired *end*-results in areas of energy access, energy security, rural livelihoods and climate change. It is also different as it focuses on creating a dominating buyer's group in contrast to the supplier's group generally seen in the global energy market.

As the co-initiator (with France) of ISA, India can certainly offer its success story of transforming the solar PV sector from being on the fringes to the mainstream power sector in less than a decade. It can be taken as a good example by the policy makers as well as project developers, financiers, equipment manufacturers and civil society to develop effective and evidence based policies/ programmes that would create the environment for scaling up solar energy technologies and markets in their own countries. It also gets opportunities to learn from countries that have similar success stories from solar thermal sector, with particular emphasis on system design, development, optimization and applications.

What is International Solar Alliance?

The International Solar Alliance (ISA) is a co-initiative by India and France to align all the 121 countries, located fully or partially between Tropic of Cancer and Tropic of Capricorn, to mutually exploit their solar resources towards their special energy needs. The rationale behind the Alliance is to allow cooperation among the ISA countries to supply their energy needs from solar resource, thus promoting clean, affordable energy around the world through:

- Increased deployment of solar technologies
- Increased investment in solar sector by developing innovative financing mechanism

ISA was launched at COP21 Climate Conference in Paris on 30th November, 2015.

Technology Focus

Land neutral PV- A new solution to the conventional PV plants

By: Lovedeep Mann – Senior Consultant &
Sushovit Adhikari – Consulting Engineer, IT Power India

Densely populated countries such as China, India, Japan and many others often face the challenge of land availability for infrastructure development. Solar photovoltaic (PV) plants, although a clean source of electricity, however, also require large patches of land for their setup. The new concept of land neutral PV is driven by cornering the issue of land identification and thus securing it at affordable rates for the project lifetime.

In land neutral PV project, the systems are installed above the water surface of lakes, ponds, and water reservoirs. Also, these systems can be put up over irrigation channels or even on land adjacent to these water bodies. Such projects differ from the conventional ground/ rooftop-mounted PV systems mainly in terms of the location of installation i.e. over the water surface.

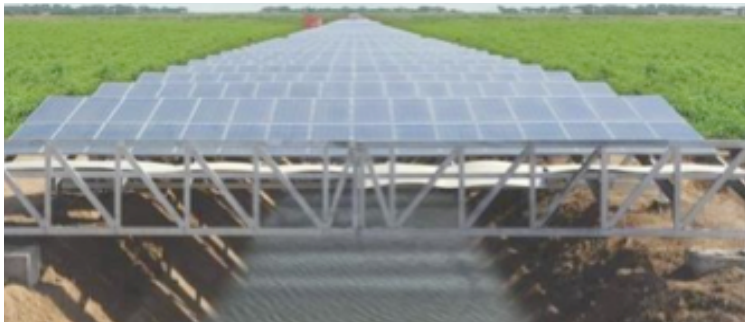
10 kWp floating PV system installed at Newtown, Kolkata
Source: IT Power

Land neutral PV projects aid in the management of water resources by preventing water evaporation. Due to the presence of the floating PV panels over the water surface, the temperature of water remains constant reducing the growth of algae in the water. Close proximity to water also potentially lead to improved PV panel performance through the cooling effect. It is also obvious that land neutral PV requires an in depth selection of components and an adaptation of the design to the non-optimal site conditions. As these PV systems are installed on a water body, the components used, have to be waterproof and robust for humid environmental conditions. This includes higher requirements on ingress protection against water, adequate mounting structure and suitable power transfer from the PV arrays on water bodies to the land-based infrastructure.

Although land neutral projects offer co-use of area and usually do not incur land acquisition or land lease costs, the actual installation requires more effort leading to higher CAPEX than conventional PV. In order to become a broadly adopted and viable concept for the industry two domains of development are identified:

- Technical adaptable solutions for mooring and electrical interconnection to land which can be installed at less optimal sites (e.g. open reservoirs with high annual water level variations, canals with many curves)
- Cost optimization for structures and the related components.

In a narrow sense, land neutral PV plant does not represent a new technology but is rather a new solution to the issue of land scarcity for PV plants, especially in the developing economies.



1 MWp Canal-top PV system installed over Narmada canal, Gujarat
Source: http://www.sardarsarovardam.org/greenpowerinformation.aspx

IT Power India in consortium with M/s Intec-GOPA-International Energy Consultants, Germany, and supported by KfW, Germany, has done an assessment of the technical concept of land neutral PV on the irrigation reservoirs and its canals in Kerala. This assessment also included identification of actual project sites and their evaluation. As an outcome, potential sites for 200 MWp land neutral PV in Kerala were identified.

Interview for Access to Energy: Offshore Wind projects are coming to India

Charles Yates - CmY Consultants Limited, UK

What is offshore wind?

Offshore wind is the construction and operation of wind farms in the sea to generate electricity from wind. Stronger wind speeds are available offshore compared to on land, so offshore wind's electricity generation is higher and it may be easier to get planning permission, environmental permits and to lease land as opposition to construction is usually weaker. However, offshore wind farms are relatively expensive due to the challenges of installing turbines at sea and the specialist boats and other equipment required. Construction of offshore wind farms faces similar challenges to offshore oil and gas platforms and in a number of areas the solutions are similar.

The offshore wind sector is relatively young and major advances in technology and project delivery are driving down costs. The cost of energy from a typical offshore wind farm built in 2020 is expected to be around 45% lower than for a project built in 2010. The biggest cost reductions will come from larger, more efficient turbines (Vestas has a giant 8 MW turbine), better blade design, improved organisation of the supply chain and reductions in the cost of finance as investors get comfortable with project risks.

At the end of 2015, there will be an estimated 11 GW of offshore wind in operation globally with operating capacity growing at 25% per annum. Offshore wind is most advanced in the UK (45% of all global capacity is in the UK) and elsewhere in Europe (a further 40% of all capacity) but is growing fastest outside of Europe (estimated growth of 45% per annum).

What is India doing to develop offshore wind projects?

The Government released its National Offshore Wind Energy Policy on 1st October, 2015 and is actively preparing for the first projects which are expected to be in Gujarat and Tamil Nadu. The Ministry for New and Renewable Energy (MNRE) is seeking to maximise opportunities for the local supply chain while learning from international experience. The British Government and MNRE have appointed IT Power to help deliver this policy by applying international best practice adopted for Indian circumstances. The British Government and MNRE have appointed IT Power to help deliver this policy by applying international best practice adopted for Indian circumstances.

MNRE is currently developing the tariff for offshore wind and the best tender process to appoint developers for the first projects. In 2016, collection of wind speed and other key data such as the condition of the sea bed will start at a site in Gujarat and another in Tamil Nadu.

What are the benefits of Indian offshore wind?

This exciting government initiative is designed to:

- Significantly contribute to renewable generation
- Create jobs, supply chain opportunities and taxes
- Open up export markets for foundations, steel, etc.
- Attract foreign investment
- Open up large new areas for wind generation
- Take advantage of stronger, more reliable offshore winds

DesignBuilder: State-of-the-art software

The DesignBuilder, a globally preferred building performance analysis software, is used to simulate and analyze the energy performance of a building. DesignBuilder uses EnergyPlus, the state of the art simulation engine from the US Department of Energy as its background calculation engine for whole energy modelling including HVAC, daylighting, airflow, cost, energy and carbon emissions.

IT Power India, partnering with Team Catalyst Pty Ltd., Australia (the sole distributor of DesignBuilder in India), has taken up the role of providing technical and marketing support for the promotion of DesignBuilder in India. IT Power and Team Catalyst provide consulting services in building energy efficiency and energy simulation of buildings using DesignBuilder to help designers get an insight into the impact of their design strategies on building environmental performance. IT Power India, with Team Catalyst, has conducted several workshops and trainings for architectural and engineering students with focus on use of DesignBuilder for design of energy efficient and Energy Conservation Building Code (ECBC) compliant building.

Spotlight

Practical Training on Solar Energy Systems for Afghanistan delegation

IT Power India had organized a 10-day training program, in India, for delegates from Afghanistan as a part of the GIZ Afghanistan program (called Institutional Development for Energy in Afghanistan (IDEA)). These delegates were from various government organizations of Afghanistan such as, Ministry of Energy & Water (MEW), Vocational Training Centre (VTC- MEW, under MEW), Da Afghanistan Breshna Sherkat (DABS), Kabul Polytechnical University (KPU), Ministry of Rural Rehabilitation and Development (MRRD), and Academy of Sciences of Afghanistan (ASA). The IDEA program is intended to promote renewable energy and energy efficiency in Afghanistan and enable private investment into its energy sector.

The training focused on knowledge transfer through:

a) Hands-on training on testing & quality standards,
b) Assembling & system repairing,
c) Site visits to existing solar plants (MW scale plant & off grid systems) & manufacturing facilities and
d) Training on design & modelling software.

The training concluded with distribution of certificates appreciating the Afghan delegates for their dedication towards promoting renewable development through knowledge transfer in Afghanistan and thus, contributing to the success of the training session.

Testing of the performance of lithium-ion batteries by IT Power Australia

Despite recent reductions in the cost of lithium-ion batteries and the potentially significant advantages the technology offers, energy system designers and end-users are cautious about transitioning to new battery technologies, especially for remote applications where reliability is critical.

ITP Australia has been awarded a grant from the Australian Renewable Energy Agency to conduct independent testing of the performance of six major lithium-ion battery brands, an 'advanced' lead-acid battery and a conventional lead-acid battery. The test will compare the batteries side by side in hot daytime and cool overnight temperatures similar to what they would be expected to face in real-world conditions.

The project seeking to provide performance data to help overcome reluctance in adopting the advanced technology is currently under its construction phase.

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