

Fixing the Weak Link ¹⁶

Discoms must power up to enable renewables' growth



Perspective

Interview with
Dr Shawn Qu

36

Spotlight

Waste to
Energy

42

Technology Focus

Monocrystalline
PV Technology

52

Plus

- Gujarat's new policy aims to ensure land availability 20
- Efforts to improve solar pump efficiency and costs 22
- Greenko reinvents itself to become a renewable energy leader 30
- Kerala explores rooftop and floating solar to optimise space 58

OKAYA[®]
NEVER STOP INDIA

OKAYA[®]
EV
CHARGER



☎ 98 18 90 90 90
www.okayapower.com

RenewableWatch

PUBLISHER

Alok Brara

EDITOR-IN-CHIEF

Nandita Sardana Kochhar

EDITORIAL OPERATIONS

Mudita Mehta (Senior Director)

Devangshu Datta (Consultant)

Shyama Warner (Consultant)

EDITORIAL

Rama Sudhakar Patnaik (Consultant)

Anagha Bhambri (Consultant)

Sugandha Khurana (Associate Copy Editor)

RESEARCH

Director: Dolly Khattar

Senior Research Analyst: Khushboo Goyal

Research Analyst: Sarthak Takyar

Research Analyst: Meghaa Gangahar

BUSINESS DEVELOPMENT

Raman Dev Narang (Deputy CEO)

Ashima Gupta (GM, Advertising Sales)

DIGITAL MARKETING

Rashmi Mahajan (Manager)

DESIGN

Joybroto Dass (Art Director)

Jaison Jose (Sr. Graphic Designer)

Manoj Singh (Graphic Designer)

ADMINISTRATION

Jose James, Saroj Kumar

CIRCULATION

Mehak Taneja

PRINTING/PROCESSING

IPP Ltd

OFFICE

B-17, Qutab Institutional Area,

New Delhi 110 016

Phone +91-11-4103 4600-01

Fax +91-11-2653 1196

Email: info@indiainfrastructure.com

Website: renewablewatch.in

Image courtesy: Shutterstock images

EDITORIAL

The demand for green energy continues to grow in India as well as globally, as countries focus on mitigating climate change. The Covid-19 pandemic is further driving countries to look at sustainable ways of meeting their energy demand by designing economic recovery packages that accelerate the shift towards renewables rather than falling back on fossil fuels. The European Green Deal, Germany's Green Recovery Stimulus and The Republic of Korea's New Green Deal are a few examples of this movement.

Global lenders and financial institutions are also shying away from financing coal-based power in a bid to reduce the carbon footprint and build an environment-friendly portfolio. Japan-based Sumitomo Mitsui Financial Group, Inc. has decided not to provide support to new coal-fired power projects with effect from May 1, 2020. The Japanese Mizuho Financial Group has made similar commitments. US-based JPMorgan Chase announced that it would not provide project financing for coal-fired power projects unless they use carbon capture and sequestration technology. Similarly, the European Investment Bank plans to stop financing fossil fuel-based projects by the end of 2021.

With some of the largest investors in the world increasingly abandoning coal, it is but natural for companies in the power sector to accelerate the transformation process and pivot towards green energy. For instance, early this year, global private equity major BlackRock, which has stakes in various Indian companies such as Coal India Limited (CIL), NTPC Limited, Adani Power, Torrent Power, Tata Power and CESC Limited, announced plans to exit companies that earn over 25 per cent of their revenues from coal-related businesses, including power plants. As more such announcements come to the fore, large conventional power players, which were traditionally focused on thermal power, are now actively looking at diversifying their portfolios to stay relevant in the future.

Thermal power major NTPC, whose generation portfolio is currently dominated by fossil fuels (over 90 per cent of its total installed capacity of 62.9 GW), is taking significant strides towards meeting its target of adding 32 GW of renewable capacity and accounting for a 30 per cent non-fossil fuel basket by 2032. Bharat Heavy Electricals Limited (BHEL), the country's largest equipment maker, is rapidly increasing its presence in the solar and battery equipment space. Leading private power producers such as the Adani Group, Tata Power and JSW Energy are also going green in a big way by working towards ambitious renewable energy targets. Mining majors CIL and NLC India Limited too have joined the renewables' bandwagon as they realise the challenges to thermal generation.

In the years to come, the power sector is bound to witness a massive change in business models as more companies move towards clean generation. Pure-play thermal power producers are likely to be limited, as coal-based power will increasingly play a more supportive role.

16

Fixing the Weak Link

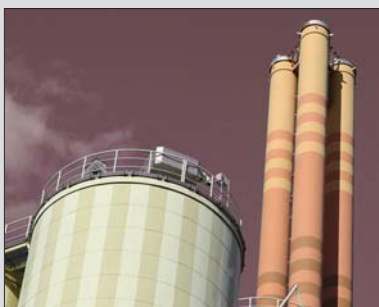
Discoms must power up to enable renewables' growth



42

Spotlight

Waste to Energy



28

Interview with K.V.S. Baba

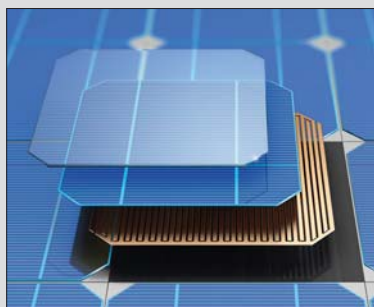
"POSOCO has a critical role in the energy value chain"



52

Technology Focus

Monocrystalline PV Technology



CONTENTS

NEWS BRIEFS

8

TRENDS AND DEVELOPMENTS

Fixing the weak link: Discoms must power up to enable renewables' growth	16
Clearing the way: Gujarat's new policy aims to ensure land availability, but has strings attached	20
Solar pump innovations: Efforts to improve efficiency and costs	22
Driving change: Automobile industry shifts gears to procure renewable energy	24
Solar PV recycling: High potential for reuse of module waste	26

COMPANIES

Interview with K.V.S. Baba: "POSOCO has a critical role in the energy value chain"	28
Greenko: Reinventing itself to become a leader in the renewable energy space	30
Havells India: Growing presence in the solar cable market	32

FINANCE

Green finance: Innovative financial instruments needed to enhance private sector participation	34
------------------------------------------------------------------------------------------------	----

PERSPECTIVE

Interview with Dr Shawn Qu: "Energy storage will be a game changer"	36
Bladeless wind turbines: Innovations focus on a lightweight, noiseless alternative	40

SPOTLIGHT: WASTE TO ENERGY

Twin goals: Southeast Asian countries look to WtE plants for waste and energy management	42
Opportunities in waste: Current status of WtE projects and future potential	44
Channelising waste: WtE programme is evolving, but fundamental challenges remain	48
Waste to use: Delhi's attempts to ease the burden of its landfills	50
Efficient disposal: Jabalpur sets the bar for waste-to-	51

Delivering true value | Higher power, lower LCOE

The background of the entire advertisement is a vast desert landscape with rolling sand dunes under a clear blue sky with some light clouds. In the foreground, several large, rectangular solar panels are visible, partially buried in the sand. The panels are dark in color with a grid of thin lines. A white rectangular frame is superimposed over the center of the image, containing the main text and the product name.

**Shaping the future.
Once again.**

Hi-MO 5

36

Interview with Dr Shawn Qu

"Energy storage will be
a game changer"



58

State Focus

Kerala

CONTENTS

energy conversion

TECHNOLOGY FOCUS: MONOCRYSTALLINE PV TECHNOLOGY

- Growth spurt: Monocrystalline solar gains ground across leading PV markets 52
- Monocrystalline advantage: Technology innovations pave the way for achieving higher panel efficiency 54
- Making inroads: Monocrystalline technology makes its presence felt in the Indian market 56

STATE FOCUS: KERALA

- New frontiers: Kerala explores rooftop and floating solar to optimise space 58

WORLD VIEW

- Power networking: Tunisia focuses on grid expansion for integrating renewables 60

UP AND COMING

- Going to the grassroots: SunMoksha's smart technologies help alleviate rural energy poverty 62

PEOPLE

- Ramesh Babu V., NTPC 64
- Amit Kumar, Indian Energy Exchange Limited 64

PRODUCT RELEASE

- Products in the market 65

DATA AND STATISTICS

- Renewable energy statistics: Achievements, by fuel source 66
- CPSU statistics: Renewable energy generation data 67
- Biogas statistics: Project deployments, by state 68
- Tender update: Recent issues and bid extensions 70

For advertising in the magazine, please email us at advertising@indiainfrastructure.com or call +91 8130 919 700

FORM IV Publisher: Alok Brara Printer: Alok Brara
 Owner: India Infrastructure Publishing Private Limited
 Editor: Alok Brara
 Printing Press: International Print-o-Pac Limited,
 C-4 to C-11, Hosiery Complex, Phase-II Extension, Noida 201305
 Place of Publication: B-17, Qutab Institutional Area, New Delhi 110 016

Going to the Grassroots

SunMoksha's smart technologies help alleviate rural energy poverty

By Sarthak Takyar

Headquartered in Bengaluru, Karnataka, SunMoksha was set up by Dr Ashok Das with a vision to improve energy access for rural and poor communities in non-electrified villages across India. While the national grid has expanded at a good pace, several challenges remain. One, power generation has not kept pace with increased grid access. This is especially evident in rural areas, where electricity demand has been increasing but villagers do not receive regular supply of electricity. Moreover, there is an ongoing debate over the massive investments required to build grid infrastructure in order to reach remote villages. Apart from the high upfront investment involved, transmission and distribution losses add to the running costs of grid infrastructure. Often the grid infrastructure remains idle after it has been developed, thereby leading to wasteful expenditure. Also, power generation in villages happens at a very low scale across India.

As a solution to all these issues, decentralised renewable energy systems and microgrids are becoming popular. However, the uptake of these systems has been low due to several challenges. One, the traditional approach is to focus on energy supply rather than demand management, which makes microgrids inefficient. Two, there is a focus on single source of power generation, which reduces the scope of microgrids. Three, there are operational issues related to the collection of electricity bills from customers; the rate of non-payment of bills by villagers is also high due to low use of technology. Four, getting skilled personnel to teach the necessary technology to villagers is difficult. Five, lack of

access to finance and a sustainable business model is a problem.

To address these issues, SunMoksha has developed Smart Nanogrid™ technology, which allows automated remote monitoring, management and maintenance of microgrids, and demand-supply management on mobile devices. It assists in dynamic balancing of different renewable energy sources, including solar, wind and bioenergy.

It also helps with metering, billing and payment, and sending alerts. The software cuts off power supply automatically if bills are unpaid, or if a consumer exceeds the maximum power allocated to them. Moreover, the software provides differential tariffs for business, irrigation, and household consumers. It schedules demand for microenterprises, irrigation pumps and street lights. In addition, the time and amount of irrigation can be controlled by measuring the moisture of the soil in the region. The software also manages demand vis-a-vis available energy supply and storage capacity.

The data collected by the software is available to all remote stakeholders, such as

sponsors, government agencies, implementers, O&M providers, and remote experts, for monitoring and timely interventions.

The technology also allows for the utilisation of the existing grid infrastructure to improve efficiency. The company partners with grassroots-level organisations to provide a scalable and sustainable business model. It also partners with technical, vocational and business institutions to develop skill-sets and entrepreneurial capacity in villagers.

Renewable Watch takes a look at four key projects implemented by SunMoksha in India...

Smart village at Chhotkei village, Odisha

SunMoksha set up India's first Smart Nanogrid™ village at Chhotkei in Angul district, Odisha. While thermal power plants have been set up in Angul district, grid electricity was unable to reach Chhotkei before SunMoksha set up its Smart Nanogrid™, leaving approximately 600 villagers, living in 140 households, without access to electricity.

SunMoksha set up a 30 kWp solar-powered Smart Nanogrid™ in Chhotkei. Of this, 20 kWp was designed to meet the energy demands of the households and power the streetlights, a temple, and community centres. The remaining 10 kWp was designed for daytime to run irrigation pumps and microenterprises, including stitching, rice-puff machines, provision stores and refrigerators.

According to the company, within a year



Smart irrigation project at Rengalpadu, Odisha

of project implementation, significant positive developments took place at Chhotkei. One, children started studying in the evening. Two, reverse migration took place, as the youth now had access to opportunities to set up new microenterprises. Three, agricultural output increased, as farmers started acquiring irrigation pumps to grow more crops. Four, social interaction increased with the installation of street lights. The company also hired and trained local villagers for project implementation and O&M of the system.

The project received financial assistance from Wartsila India, a Finland-based multinational corporation, under its corporate social responsibility initiative. The initial setup costs were provided by Wartsila India, while SunMoksha handled the ongoing expenses. The Odisha Renewable Energy Development Agency helped SunMoksha in interacting with local government agencies, gathering support from villagers, and receiving the necessary permissions and bureaucratic support. SunMoksha also collaborated with the National Institute of Science and Technology (NIST) to set up a laboratory at NIST for conducting research and development activities for the project.

Smart Island at Kudagaon, Odisha

SunMoksha has implemented a smart-microgrid project at Kudagaon Island in Angul district, Odisha. As the island is cut off from the mainland, distribution companies cannot operate in the village. Moreover, due to lack of irrigation facilities, the villagers could only engage in agricultural activities during the monsoon season.

To solve this issue, SunMoksha installed a 20 kW solar power plant with 72 kWh battery backup. Apart from providing lighting, the power plant has been designed to support the development of microeconomic zone. Now, sufficient electricity is available to support irrigation and other microenterprises during the day, and provide reliable power for lighting, fans, and TVs at night.



Smart microgrid project at Kudagaon island, Odisha.

Significant changes in the lifestyle of the villagers were observed within a few months of the plant's installation. Like in Chhotkei village, many families started setting evening studying hours for their children. Household lights and street-lights enabled movement, socialising and entertainment in the evenings. Moreover, farmers could now have a steady source of water supply through electric pumps, however, unavailability of underground water is causing hurdles. Villagers also want to start flour mills, rice mills and cold storages in the village, thereby leading to village development.

Smart irrigation project in Maudiguda, Odisha

SunMoksha set up a 3 HP solar pumping solution in Maudigudi, Odisha. The pump uses the Smart AQUAnet™ technology developed by the company and serves over 41 farmers. Prior to this, the farmers would cultivate only one crop, during the rainy season. Now, with the installation of

the solar pump, farmers are able to cultivate three crops per year. This has led to a ten-fold increase in the income of the farmers. The technology also helps in the responsible use of water by assisting precision agriculture.

Smart irrigation project in Rengalpadu, Odisha

In Rengalpadu, Odisha, SunMoksha has set up another 3 HP solar pump, which uses the Smart AQUAnet™ technology and serves over 28 farmers. Here, the company wanted to use the technology for fertigation, through which the right quantity of fertilisers could be delivered to the right farmland with the right mix of water. To this end, the concept of shared irrigation as a paid utility service for the farmers was introduced in the village.

The way forward

Despite building innovative technology for renewable energy-based microgrids and irrigation, the company faces tough challenges going forward. This is so because the entire renewable microgrid space in India faces a grim future. One, there is a lack of proper policy arrangements providing long-term visibility to microgrid companies. Two, these companies have to compete with the national grid, which is now reaching even the most remote villages. Still, rural communities are slowly shifting to microgrids as they are experiencing the perils of irregular grid power supply. Keeping this in mind, large companies such as Tata Power plan to invest heavily in the micro-grid space in India. These positive developments will undoubtedly help SunMoksha expand its portfolio. However, more work needs to be done on the policy side to give a fillip to the renewable microgrid segment before it is too late. This is because SunMoksha, which developed its entire technology in India to solve energy poverty in the country's villages, is looking to expand its operations to African countries, where it feels the policy landscape is much more favourable. ■



Smart microgrid project at Kudagaon island, Odisha