ANNUAL REPORT 2017-18

World Institute of Sustainable Energy

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ABOUT WISE ...

The World Institute of Sustainable Energy (WISE) is a not-for-profit organization established in 2004, based in Pune, India. WISE is committed to the cause of promoting sustainable energy and sustainable development through the advancement of low-carbon, renewable, and energy efficient pathways that pave the way to achieving the sustainable goals of energy security, livelihood security, and climate security.

Since its inception, WISE has pioneered many important initiatives. These include:

- Developing state-level action plans/roadmaps for climate mitigation through accelerated deployment of clean energy technologies and energy efficiency measures.
- Developing a renewable energy pathway for achieving the target of 15% renewable energy by 2020, as specified by the National Action Plan on Climate Change (the Government of India officially accepted WISE's findings for inclusion in the five-year plan targets).
- Developing state-level vision documents and renewable energy action plans for the transition to a low-carbon and energy efficient economy.
- Facilitating India's transition towards low carbon development by supporting implementation of national policies and programs through the development of offshore wind power (for the first time ever) in India, in collaboration with the EU (as part of a global consortium).
- Developing state-level policies and capacity building for renewable development agencies.
- Research in critical areas like transition to a sustainable energy system by 2050, wind power and solar energy, power sector reforms, etc.
- Piloting a model Renewable Energy law for India.

Our Work with International Governments has led to:

- strengthening cooperation with and building capacities of member countries.
- developing implementation mechanisms for accelerating RE development and fostering sustainable development in India.

Our work with the Central and State Governments of India has led to:

- development of roadmaps and regulatory frameworks for advancing RE development in the country.
- facilitating renewable energy in twelve states, including Maharashtra, Rajasthan and Gujarat (west); Kerala, Karnataka, Tamil Nadu and the UT of Puducherry (south); Bihar and Uttar Pradesh (north); Chhattisgarh (central); West Bengal and Odisha (east).

Our work with the RE Industry/Associations has resulted in:

- introducing appropriate financing mechanisms and boost indigenous manufacturing within the sector.
- enhancing human resources/skills development to build competencies, strengthen the sustainable energy sector, and ensure the smooth transition to a low-carbon economy.

Reflections

India continued its leading role in renewable energy development and climate mitigation during 2017-18. In fact, we became the fourth country in the world, in installed RE power capacity, just behind China, the United States and Germany. While we kept up with our performance in RE capacity addition, the wind power installations saw a steep fall in comparison to the previous year. This was compensated by the doubling of capacity installed of solar power. Mitigation of climate change has acquired an even bigger urgency, in view of its manifestations growing around the world. Since 2005, India also started experiencing sporadic outbursts of extreme weather events and floods.

For the last fourteen years, WISE has been a pioneering partner in our nation's efforts in this field. During the year under review, we made significant contributions in areas of our core strengths. A major achievement during the year was the installation of LiDAR in the offshore platform near Pipavav in Gujarat, in the Gulf of Khambat, as part of the EU-supported FOWIND project. This is the first-of-its-kind project in India and will facilitate precise assessment of wind power potential in the offshore areas of Gujarat. We expect to see development of pilot offshore wind projects in this area, in the near future. Another significant and firsttime effort was the launch of the portal 'All About Renewables' in November 2017 and the publication of 'Renewables India 2017' report, the first in the series of annual reports planned with support from Shakti Sustainable Energy Foundation, New Delhi.

WISE extended its activities to new areas of sustainability by continuing to assist the development of a greenfield smart city in Gujarat. Besides, we gained significant expertise in the electricity utility space. Power sector and utility transformations are critical to the emerging kaleidoscope of distributed renewables, which will gain even greater foothold in the sector, in the coming years. We also began preparatory work to strengthen our presence in two other critical areas for future sustainability viz. energy efficiency and climate change.

As we are about to complete fourteen years of our journey, we pledge to keep adapting to the changing needs of the sustainability transition. There has never been a dull moment as we discover new critical areas of work to facilitate this much needed transition.

G M Pillai

Founder Director General

POWER POLICY AND REGULATION

WISE was involved in supporting new-age high-tech cities in the technical and regulatory aspects of electricity generation and distribution. The institute was also involved in supporting electricity regulatory commissions, state nodal agencies, etc., in RE Regulation and decentralized RE generation.

Preparation of ARR and Tariff Petition for GIFT Power Company Limited, Gujarat

The Gujarat International Financial Tech-City (GIFT) is a global financial and IT services hub, the first-of-its-kind in India, designed to be at or above par with globally benchmarked financial centers. GIFT is located in Gandhinagar, Gujarat. GIFT Power Company Ltd (GIFTPCL) has been established as a wholly owned subsidiary of GIFT to provide infrastructure and power in the GIFT city. WISE supported GIFTPCL in the technical and regulatory areas related to electricity distribution in GIFT city. The scope of work involved preparation of the company's maiden annual revenue requirement (ARR) and tariff petition as per multi-year tariff regulations of the Gujarat Electricity Regulatory Commission (GERC). The petition covered the projection of category-wise energy sales, power purchase quantum and sources, power purchase cost, and other financial costs. WISE assisted GIFTPCL in the public hearings at GERC and responded to various objections/suggestions received, besides analysing the tariff order received from GERC.

Consumer Counsel for the Odisha Electricity Regulatory Commission

As Consumer Counsel for the Odisha Electricity Regulatory Commission (OERC) since 2011, WISE was responsible for the systematic analysis of ARR and tariff petitions submitted by the power utilities for 2018-19. The scope of work included preparing a summary of the tariff petitions filed by the utilities from the consumer's perspective and analysing the ARR.

As Consumer Counsel, WISE attended the public hearing at OERC in February 2018 and presented its viewpoint on the ARR submitted by each utility before OERC. The summaries and detailed analyses by WISE were then incorporated in the respective tariff orders issued by OERC.

Visual Representation of the GIFT city in Gujarat

Developing Mini-Grid Renewable Energy Generation and Supply Regulations for Odisha

This Shakti-supported project began in 2016-17, and aimed to assist the Odisha Electricity Regulatory Commission (OERC) in developing mini-grid renewable energy generation and supply regulations to facilitate mini-grid project development in Odisha. The scope of work included:

- Formulation of mini-grid renewable energy generation and supply regulations for the state of Odisha.
- Enhance the capacity of the state to advocate, promote and deploy RE based mini-grid projects on a large scale.
- Enhance energy access and socio-economic development of the underserved/un-electrified rural areas in the state.

In the current year, WISE prepared the discussion paper for the draft "OERC (Mini-Grid) Regulations 2017", which highlighted the (a) scope and application of the regulations, (b) the operating regime and technical standards for interconnectivity, (c) commercial framework, (d) roles and responsibilities of the various parties involved, viz. SNA, distribution licensee, mini-grid operator, GRIDCO, and the consumers, etc. OERC, through a public notice dated 24 October 2017, published the Discussion Paper and draft regulations, inviting comments/suggestions on the same.

Strengthening Institutional Capacity of BREDA for Energy Access Interventions

To facilitate SNAs in achieving the national target of 24x7 electricity, WISE, with support from Shakti Sustainable Energy Foundation, New Delhi, embarked on the mission of building the institutional capacity of the Bihar Renewable Energy Development Agency (BREDA) through strengthening and enhancing its human resources, management tools/procedures, vision documents, and operational systems. The project commenced in April 2017. The scope of work included:

- Training to overcome the skill gaps prevailing in the key functional areas of the SNA viz. project planning and implementation, policy and regulation, organizational structure and human resources, financial management and governance, and outreach and communications (details on Page No.14).
- Developing a Vision Document and Business Plan for 2018-22, aimed at transforming BREDA into a financially self-reliant organisation.
- Developing special management tools/procedures based on the SNA's needs. For eg. draft implementation guidelines were developed to facilitate implementation of grid-connected solar rooftop PV projects under the net-metering mode.

The final report was submitted in March 2018.

WISE undertook the task of developing power sourcing and power distribution business models for a new-age, smart city being developed in Gujarat. The institute also carried out the techno-economic feasibility study for developing a solar park in the special investment region of the city.

Providing Regulatory Assistance to Rural Electric Cooperative Society, Mula Pravara, Ahmednagar

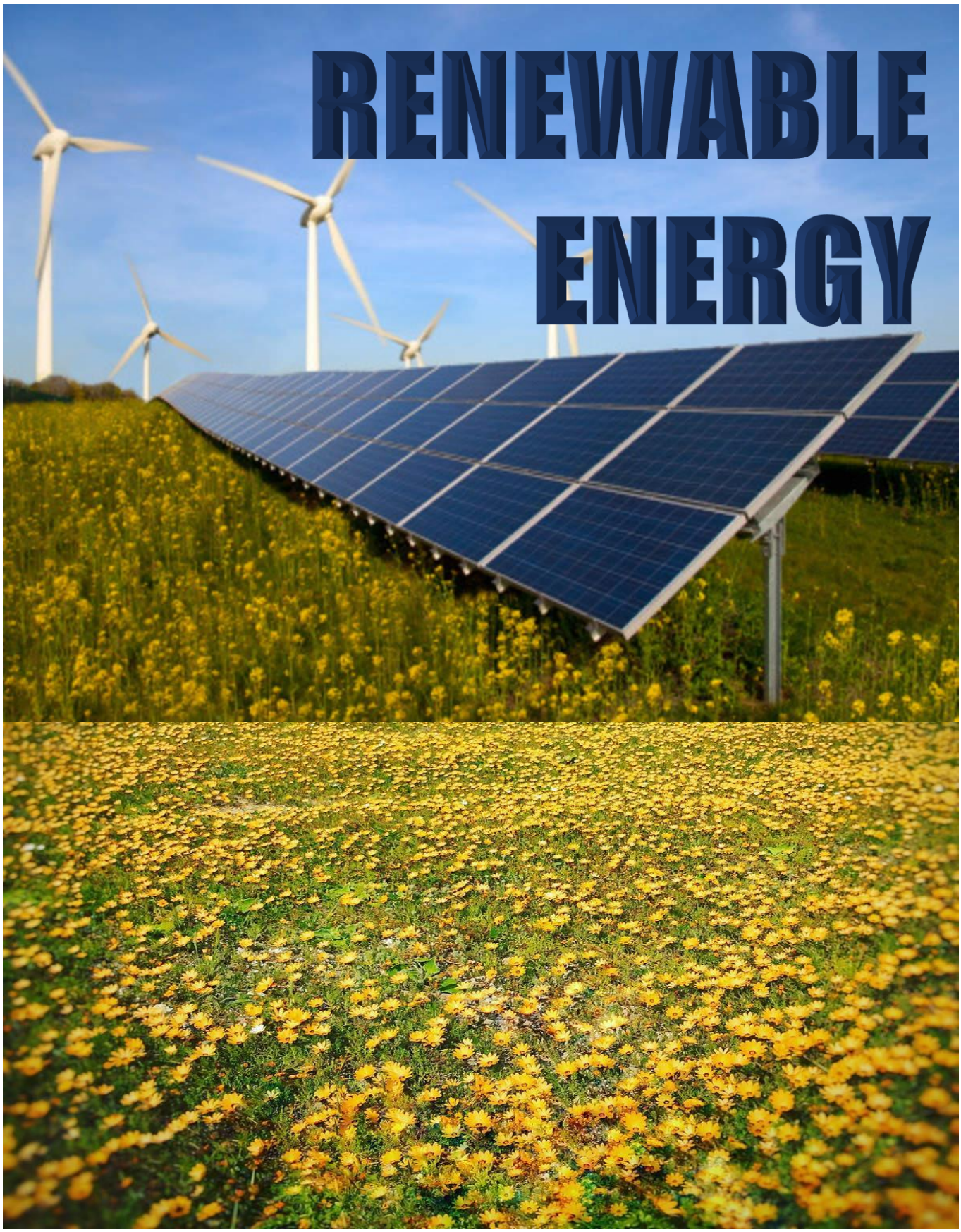
WISE supported the Mula Pravara Rural Electric Cooperative Society (distribution licensee), Ahmednagar, for preparation of a comprehensive report on bulk and retail supply tariff (approved by the Maharashtra Electricity Regulatory Commission during 2000-01 to 2009-10) and development of a five-year Business Plan for its future operations. The project which commenced in 2016-17 was completed in the current year. WISE prepared the Five-year Plan along with the feasibility study for installation of captive coal and solar PV projects on the land available within the jurisdiction of supply area of the society, with projections of ARR and expected revenue from tariff and revenue gap. The report also shows the techno-economic feasibility of setting up a coal-based power plant and provides regulatory provisions for electricity purchase from such captive plants.

Support to New-Age City on Power Procurement and Power Distribution Business Models

A new-age smart city is being developed in the state of Gujarat along the dedicated freight corridor planned between Delhi and Mumbai. The Project Management Consultant (PMC) for the city engaged WISE in the previous financial year (2016-17) to evolve power sourcing and power distribution business models for the smart city, besides aiding in various technical and regulatory matters. Following activities were carried out in the current year.

Visual Representation of the New-age Smart City being developed in Gujarat.

- Final assessment of various power sourcing alternatives (SPV, PPP, BOOT, captive generation, etc.) and power distribution options (through host DISCOMs, parallel distribution licensee, appointing franchisee for power distribution, etc.), evaluating respective merits and demerits, and SWOT analysis of each model.
- Shortlisted the appropriate models for power sourcing and power distribution and after a detailed analysis (based on technical, financial, commercial, and regulatory aspects), finalised the most appropriate model for power sourcing and distribution. Subsequently, the final submission was made to the Project Management Consultant.


RENEWABLE
ENERGY

R E TECHNOLOGIES

The Indian Renewable Energy Development Agency Ltd. (IREDA) appointed WISE to undertake a field evaluation of 72 solar power plants commissioned under the RPSSGP scheme with an installed capacity of 91.8 MW, and 6 solar plants commissioned under the demo scheme with an installed capacity of 18 MW. The performance evaluation was based on technical, financial and social parameters. The final report was submitted to IREDA.

SOLAR POWER

Project Management for Setting up Rooftop Solar Projects for Industries (Siemens, Modi Steel), and Educational Institutes (Vikhe Patil Foundation and Pravara Rural Educational Society)

Siemens Ltd, Mumbai and Modi Steel, UP

WISE supported Siemens Ltd, Mumbai, for setting up a 2.1 MW rooftop solar plant at their factory in Kalwa. The work involved carrying out the concept design, feasibility study, validation of power consumption analysis, preparation of bill of material and project specifications for bidding, designing preliminary layout of structural arrangement for solar panels and structural walkways, recommendation for power evacuation scheme, studying electrical drawings and recommendation of AC panel modifications, etc. After finalization of the DPR, tender was floated (based on specifications given by WISE) and BOSCH was selected as EPC. WISE further extended its support during the project commissioning period for executing quality installation inspections. The installation of the 2.1 MW solar rooftop power plant was completed within six months of the project start date. Final performance report was submitted accordingly.

A feasibility study for installation of a 128 kWp rooftop solar plant at MODI steel factory in Uttar Pradesh was also successfully conducted by WISE.

A WISE team member testing solar PV plant components at site for the IREDA project

Vikhe Patil Foundation, Ahmednagar

Similarly, WISE supported Vikhe Patil Foundation, Ahmednagar, for setting up of a 1 MW rooftop solar plant at their engineering and medical college campus. The scope of work included preparing the detailed project report, bid document for EPC selection, evaluation of BIDs, selection of bidder and support during installation and commissioning. In 2017-18, part of the solar project capacity was commissioned in the college campus.

Pravara Rural Educational Society, Pune

WISE also aided the Pravara Rural Educational Society located in Loni, Pune, for setting up a 350 kW rooftop solar plant on its polytechnic building and hostels for both girls and boys. The installation and commissioning of the rooftop solar plant was completed within 6 months from the start date.

Setting up Solar Plant in RESCO Mode

KSPG Automotive India Private Ltd, Pune, approached WISE for setting up a ground-mounted solar power plant (800 kW) in RESCO mode at their factory in village *Takwe Budruk* in Pune. WISE extended support for power purchase agreement, support for execution of e-reverse bidding for selection of bidder and policy and regulatory related due diligence. The project for setting up the solar plant in RESCO Mode was awarded to CleanMax Solar.

LiDar installed near Pipavav in Gujarat, near the Gulf of Kambhat.

Wind Power

Facilitating Offshore Wind in India (FOWIND): Installation of LiDAR

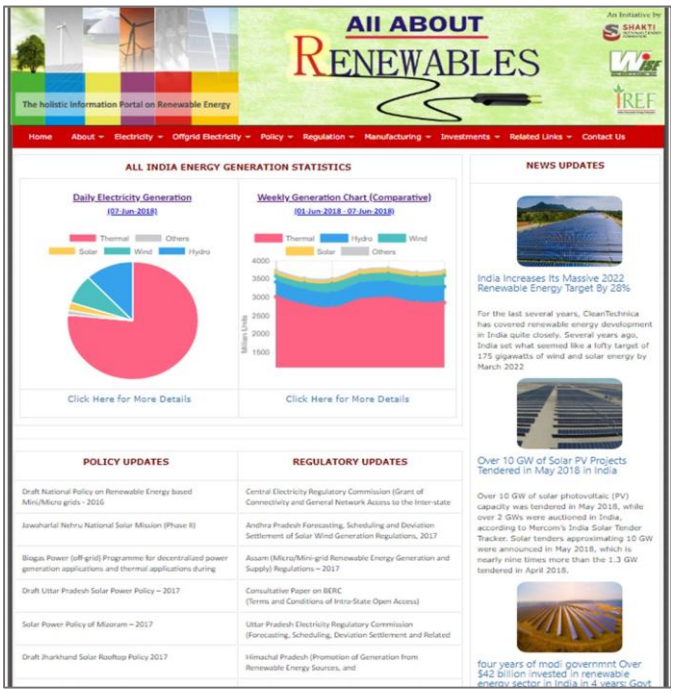
The 'Facilitating Offshore Wind in India (FOWIND)' project funded by the European Union's Indo-European Cooperation on Renewable Energy is a five-year project which commenced in 2013-14**.** WISE is one of the key consortium partners for the project and is responsible for executing the project activities in the state of Gujarat.

In the year under review, WISE facilitated the installation of LiDAR on the offshore platform near Pipavav in the Gulf of Khambat. A team comprising members from the Ministry of New and Renewable Energy (MNRE), the National Institute of Wind Energy (NIWE), WISE, and Meteopole, successfully installed the LiDAR in November 2017. The LiDAR installation resulted in kick-starting offshore wind resources measurement in the Gulf of Khambat. Along with the LiDAR, NIWE installed a separate wind mast on the same platform.

Team comprising members from MNRE, WISE, NIWE, and Meteopole, responsible for the installation of the LiDAR.

Assessment of Wind Power Feasibility in the Lakshadweep Islands

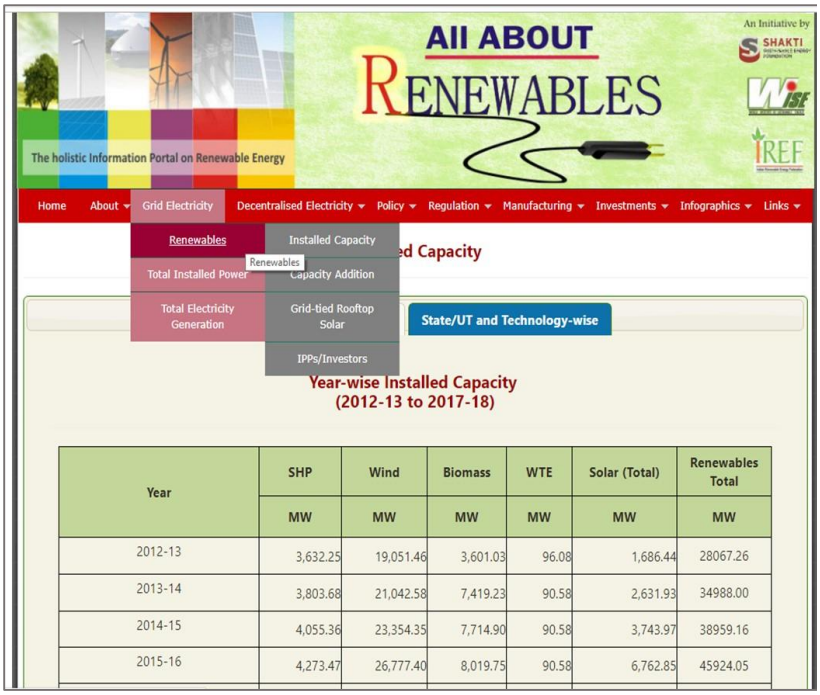
All the islands of Lakshadweep were electrified during the period of 1962 to 1983. The Lakshadweep electricity department generates and distributes electricity to consumers in the island round-the-clock. All of these islands are powered through diesel-based power generation systems. However, during the past few years, solar PV generation stations were also added in most of these islands. In this regard, the Lakshadweep Energy Development Agency (LEDA) sought the support of WISE to explore the possibility of installing wind turbines on its three islands, namely Kadmat, Kalpeni and Minicoy. WISE prepared the detailed project report in this regard and submitted it to LEDA.



R E INFORMATION MANAGEMENT

Comprehensive Periodic Tracking and Dissemination of RE Developments in India

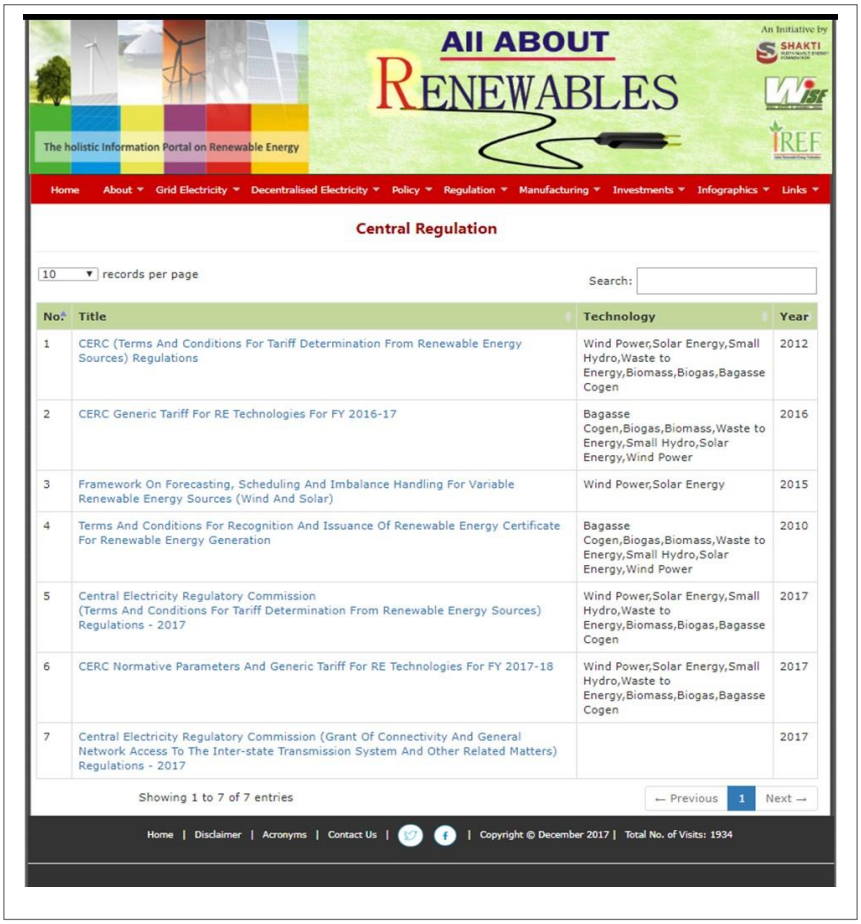
India has been making steady progress in the development of renewables. While stakeholders are deliberating cost-effective ways to integrate ever-increasing quantum of renewables into the grid, lack of robust and reliable data is limiting their ability to develop suitable solutions. Although there have been previous attempts to create some web portals on renewable energy, they were either not regularly updated or did not have in-depth coverage and analysis of all the major developments in the RE sector. Besides, all the relevant data was not available under one single roof, but dispersed and piecemeal in its spread.



Year	SHP	Wind	Biomass	WTE	Solar (Total)	Renewables Total
	MW	MW	MW	MW	MW	MW
2012-13	3,632.25	19,051.46	3,601.03	96.08	1,686.44	28067.26
2013-14	3,803.68	21,042.58	7,419.23	90.58	2,631.93	34988.00
2014-15	4,055.36	23,354.35	7,714.90	90.58	3,743.97	38959.16
2015-16	4,273.47	26,777.40	8,019.75	90.58	6,762.85	45924.05

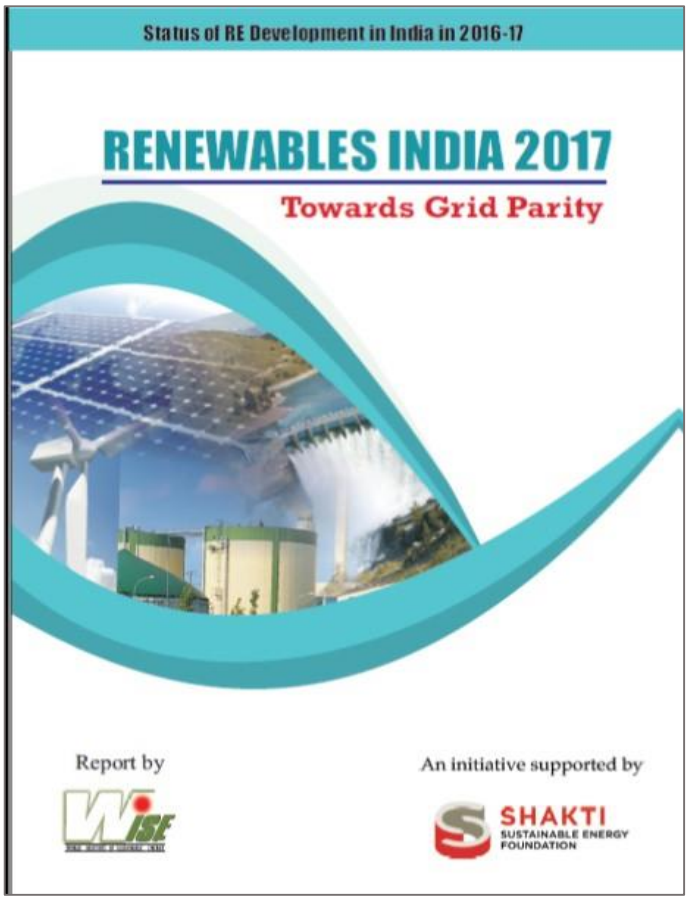
The WISE-SHAKTI-IREF Portal

WISE, in association with the Indian Renewable Energy Federation (IREF), and with support from Shakti Sustainable Energy Foundation, decided to come together and create a renewable energy portal (specifically renewable electricity) that would track developments happening in the renewable energy space on a regular basis, and comprise sector-holistic information, ranging from cross-linkages with the power sector, manufacturing details, capacity addition information, new technologies, to latest news updates and analysis of policy and regulatory orders, all under one and the same roof. The portal development started in 2016-17 and was completed in the current year under review.



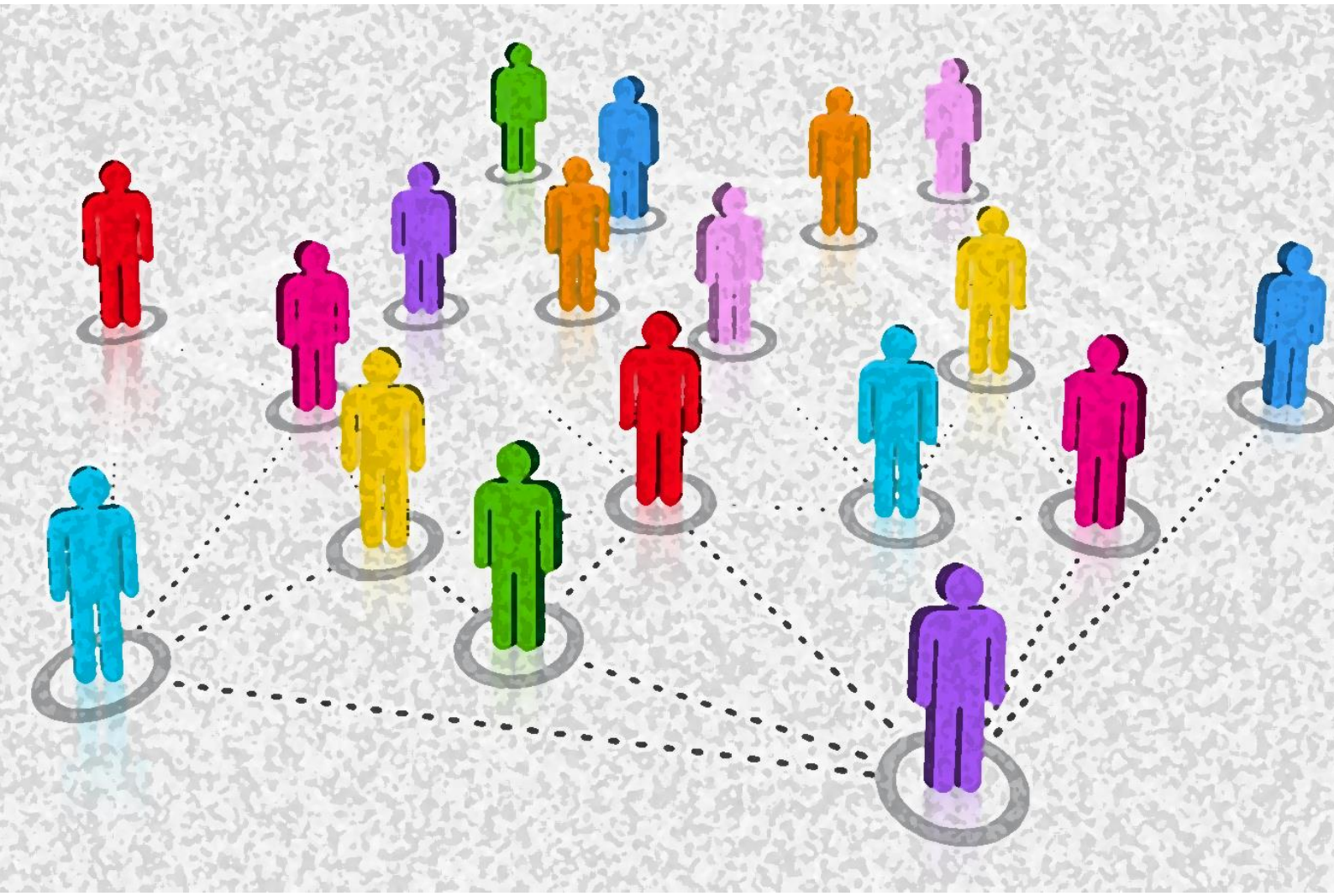
Named 'All About Renewables', the portal comprises the following key features.

- Access to around 200+ policies and regulations and availability of 'easy-to-read' summary tables of central/state/UT policies and regulations either state-wise, technology-wise, or year-wise.
- Availability of daily/weekly/monthly electricity generation figures of renewables and conventional electricity generation at the 'click of a button'. Availability of dynamic graphs to compare daily/weekly generation of different RE technologies, as also RE vis-à-vis conventional generation.
- Access to over 100+ links of central and state/UT government organisations, 50+ NGOs, electric utilities, 350+ national and international reports, and journals/magazines in the RE sector.
- Interactive maps highlighting location, address and capacity details of IPPs/investors of wind (50+ MW), solar (20+ MW), small hydro (2-25 MW) and biomass.
- Availability of daily news updates, orders and amendments, latest events, etc.



As part of the project, WISE also brought out the first-of-its-kind report titled *Renewables India 2017: Towards Grid Parity*, the first in the series of annual publications that assimilates data from the portal and provides a snapshot of the status of renewable energy in India. The report aims to provide policy makers, government officials, renewable energy professionals, civil society, and other key stakeholders with insights on developments taking place in the RE sector on an annual basis, enabling them to make informed decisions, and aiding the transition to a low carbon economy. The 'All About Renewables' portal (www.allaboutrenewables.com) and *Renewables India 2017* were launched in November 2017 at an event organised in New Delhi (details on Page No.13).

OUTREACH AND TRAINING



↑Senior officials from GWEC, DNV GL and WISE disseminating information on FOWIND and its activities at 'Windergy 2017' in New Delhi.

↓Officials and other visitors at the FOWIND stall.

Participation in Windergy India 2017

WISE, along with its Lead Partner the Global Wind Energy Council (GWEC) and DNV GL participated in the three-day exhibition "Windergy India 2017".

The exhibition and conference was organised by GWEC and IWTMA in April 2017 in New Delhi. The exhibitors showed keen interest in understanding the research findings of FOWIND. Visitors to the exhibition included OEM personnel, equipment suppliers and service providers, IPPs, government and non-government officials, researchers, etc.

Organisation of a One-day Industry Conclave on Offshore Wind

WISE facilitated the organisation of a one-day industry conclave on "Zero to Five GW: Facilitating Offshore Wind Development in Gujarat and Tamil Nadu" in March 2018 in New Delhi. The conclave focused on the development of offshore wind projects in India. FOWIND also launched its Feasibility Reports for Gujarat and Tamil Nadu during the conclave, which was the final deliverable under the project.

FOWIND members and industry officials at the FOWIND conclave on offshore wind in New Delhi.

Mr Praveen Kumar, Addl Secretary, MNRE, seen delivery the Inaugural Address at the launch of the 'All About Renewables' portal in New Delhi.

Launch of the WISE-Shakti-IREF Renewable Energy Portal

WISE in association with the Indian Renewable Energy Federation (IREF), and with support from Shakti Sustainable Energy Foundation, New Delhi, developed a first-of-its-kind, holistic web portal on renewable energy in India called 'All About Renewables'.

The portal was launched at an event organised in New Delhi in November 2017, at the hands of Mr Praveen Kumar, Addl. Secretary, Ministry of New and Renewable Energy, Government of India.

During the launch, WISE also released the report, *Renewables India 2017*, the first in the series of annual publications that provides a snapshot of the status of renewable energy in India in 2016-17. Both, the launch of the web portal and report aims to pave the way for wider awareness and increased knowledge and discussions that can enable policy and help achieve India's RE targets.

Release of the 'Renewables India 2017' report. From L to R: O P Agarwal, CEO, WRI-India; G M Pillai, Founder DG, WISE; Praveen Kumar, Addl. Secretary, MNRE; V Subramanian, Chief Mentor, IREF; Krishan Dhawan, CEO, Shakti Foundation; and Mijo Vodopic, Sr. Programs Officer, MacArthur Foundation.

K A Siddiqui, Dy. Director, BREDA, addressing the participants at the Capacity Building workshop held in BREDA, Patna. Seated (from L to R) are Surendra Pimparkhedkhar, Sr. Fellow, WISE and Project Coordinator, Dr Sudhir Kumar, External Consultant, WISE, and Abhishek Pratap, Project Director, CEED.

Capacity Building Training Programme for BREDA

A two-day capacity building training programme was organised by WISE in association with the Centre for Environment and Energy Development (CED), the local partners, on 'Strengthening Institutional Capacity of BREDA for Energy Access Interventions' in January 2018 in Patna.

The programme was part of the Shakti-funded capacity building project for SNAs for energy access. The programme was attended by around 40 senior and middle managerial level officials deputed from the field office as well as the head office. It briefly covered the policy and regulatory provisions for promoting decentralized RE systems, including the mini-grid, and offered hands-on training on latest software used for resource analysis and project optimization of solar PV. Demonstration of the management tools/application software developed by WISE, was also part of the training provided.

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