

Renewable Energy Monitor

August 2016

Policy/ Initiatives



- NTPC raises Rs 2,000 cr via green masala bonds for clean projects
- Government to provide additional interest rebate to low capacity wind mills
- UP becomes lab for green energy firms looking to tap rural market
- India readies plan to improve renewable power storage

Solar



- Rs 50 lakh for solar lighting of 17 stations on heritage track
- Delhi Metro to install solar plant atop elevated stabling shed
- Tata Power Solar commissions 100 MW project for NTPC
- NLC begins construction work for solar plants
- Tamil Nadu has now reached Number One position in solar power capacity addition
- Essel Green Energy wins 270 MW solar project in Odisha
- Adani Group's solar cell-making unit to start operating by year-end

Wind



- Wind energy sector feels the heat as solar steals limelight
- Tata Power JV Cennergi starts operations of 95 MW wind project
- Hero Group's renewable energy arm to raise \$125 million from IFC

Bioenergy



- India seeks to expand biofuels market to US\$7.5billion by 2022
- OMCs shut biodiesel joint ventures due to lack of commercial viability
- Biofuel can be alternative to fossil fuel
- Innovations, Discoveries & Breakthroughs reported in Moringa Oil Plantation & Production


 Policy

NTPC raises Rs 2,000 cr via green masala bonds for clean projects. State-owned power major NTPC said it has raised Rs 2,000 crore through issuance of green masala bonds in an overseas market that will be used for financing renewable energy projects. Issue of rupee-denominated Rs 20,000 million 7.375 per cent notes due 2021 payable in U.S. dollars was launched pursuant to \$4 billion medium term note programme.

The 5-year bond has a coupon rate of 7.375 per cent and yield of the 7.48 per cent, which is 20 basis points lower than domestic AAA 5-year benchmark yield. The proceeds will be used for financing renewable projects and bonds will be listed in London and Singapore, he added. According to a statement, all payments for securing bonds will be settled by August 10. NTPC has drafted its business plan of capacity addition of about 1,000 MW through renewable resources by 2017.

Government to provide additional interest rebate to low capacity wind mills. To increase power generation potential of low-capacity wind mills, the government will provide additional interest rate rebate of 0.25 per cent for wind turbine generators of up to 1 megawatt. The government has come up with the policy to promote optimum utilisation of wind energy resources as a large number of wind-turbines installed up to the year 2000 are of capacity below 500 KW and are at sites having high wind energy potential.

Initially, wind turbine generators of capacity of up to one MW would be eligible for repowering under the policy. However, the MNRE (Ministry of New & Renewable Energy) can extend the policy to other projects also after evaluation of their initial experience. The main aim of the [Repowering Policy](#) is to promote optimum utilisation of wind energy resources by creating facilitative framework for repowering. As per the policy, IREDA ([Indian Renewable Energy Development Agency](#)) will provide an additional interest rate rebate of 0.25 per cent over and above the interest rate rebates available to the new wind projects being financed by IREDA. Besides, all fiscal and financial benefits available to the new wind projects will be available to the repowering projects.

UP becomes lab for green energy firms looking to tap rural market. India has 237 million people with no access to electricity, says the [International Energy Agency's World Energy Outlook 2015](#) report. Uttar Pradesh, home to about 16% of India's 1.2 billion population, many of whom have poor or no access to power, is emerging as the preferred testing ground for non-profits and companies trying out new business models as they seek to tap rising demand for electricity in rural India. Across the state, these organizations are testing the viability of supplying electricity from mini-grids and solar-powered lighting systems specially designed for villages and small enterprises. The first customers are telcos whose telecom towers in remote parts of the country have, until now, been powered by diesel generators; and shops, even individual households, in villages that were hitherto illuminated by kerosene lanterns. According to Zia Khan, vice-president, initiatives and strategy at the Rockefeller Foundation, which has committed \$75 million of debt financing and early investment capital to energy services companies in India, the market for mini-grids in Uttar Pradesh is promising. The foundation provides finance for setting up micro-grids, helps these utilities in finding anchor customers (mostly telcos), and in marketing power to households and small commercial establishments. About seven utilities that the foundation has financed have so far set up close to 100 grids in Uttar Pradesh and Bihar. By 2018, they will connect around 1,000 villages.

India readies plan to improve renewable power storage. As lithium-ion batteries take centre-stage in the global pursuit for efficient energy storage systems, India has quietly readied a plan aimed at creating systems that can store up to 10,000 mw of intermittently generated renewable power at a

fraction of the cost the West will bear. The about Rs 80,000-crore plan entails setting up hydel pump storage systems in several states over the next five to six years, said Mr SD Dubey, chairman of Central Electricity Authority. A pumped storage facility consists of two large water tanks at two levels, one at the base of a hill and the other at the top of the hill. During the day, when solar power is generated, a portion of the power will be used to pump water from the lower tank to the higher one. At night, when solar power isn't available, water from the elevated tank will be released to work at turbine and generate power. Cost of setting up such hydel pumped storage systems is anything between Rs 6 crore and Rs 8 crore per megawatt. The country has a potential of setting up 90,000 mw of pumped storage system.

[The Hindu](#), 4 August 2016 | [The Indian Express](#), 8 August 2016 | [Mint](#), 16 August 2016 | [The Economic Times](#), 22 August 2016



Rs 50 lakh for solar lighting of 17 stations on heritage track. A sum of about Rs 50 lakh has been approved for the installation of solar lights in 17 railway stations on the world heritage Parwanoo-Shimla rail track. Solar lighting will also be used to light up coaches. This will help earn carbon footprints for reducing the use of energy. Under the project, stations like Taksal, Ghumman, Koti, Sanwara, Dharampur, Kumarhatti, Barog, Solan,

Salogra, Kandaghat, Kanoh, Kathleeghat, Shoghi, Taradevi, Jutogh, Summer Hill and Shimla will be covered. With the recurring expenditure being considerably less, on its introduction, the solar system will also reduce monetary expenditure on the track where the profitability is not high. As it is a UNESCO certified rail track, the railway authorities have to maintain its ancient architecture with little transformations.



The Ministry of Railways has been laying stress on making all railway stations energy efficient and stations which have achieved an exemplary feat in this have also been awarded nationally. The 96-km Kalka-Shimla track is an engineering marvel comprising 102 tunnels and 864 bridges.

(Source: The Tribune, 6 August 2016)

Constructed in 1898 by the British to provide connectivity to Shimla, which was their summer capital, it was declared a world heritage track in 2008. The 2 feet 6 inches narrow gauge draws visitors from various foreign countries, especially during the summer, for its scenic beauty.

Delhi Metro to install solar plant atop elevated stabling shed. **Delhi Metro** will install a 3 MWp solar power plant atop an elevated stabling line of Kalindi Kunj depot, the first-ever such shed being built in the DMRC network. Delhi Metro has so far installed solar power facilities at three of its depots -- Yamuna Bank, Ajrona and Mukundpur --and work is in progress towards installing more such plants in the other depots. The plant will cater to trains operating on the Janakpuri West Botanical Garden corridor, construction of which is underway. The cost of installing this solar plant will be borne by the developer, as is the case with all DMRC plants, and Delhi Metro shall pay for the energy charges at the rate of Rs 5.4945 per unit, as levelled tariff for 25 years. As per the plan, the plant will be set up on the frames of the stabling lines and will also serve the dual purpose of being the roof of the facility. By

March in 2017, it would have commissioned solar power plants with capacity of about 20 MWp and by March 2018, it will generate 31 MWp of solar power, it said. As per its solar policy, DMRC plans to generate 50 MWp of solar power by the year 2021.

Tata Power Solar commissions 100 MW project for NTPC. Tata Power Solar, one of the country's largest integrated solar companies, announced it had successfully commissioned a 100 MW solar project for NTPC in Anantapur, Andhra Pradesh. This is the biggest solar project commissioned using domestically manufactured solar cells and modules, the company said. The plant is expected to generate nearly 160 million kWh of energy per year and help offset approximately 110,000 tonnes of carbon dioxide emissions in its first year of operation.

NLC begins construction work for solar plants. State-run NLC India ([Neyveli Lignite Corporation](#)) formally began construction work for solar power projects with 4,000 MW capacity in Neyveli, about 210 km from Chennai. These projects are being taken up under the National Solar Mission announced by the Centre. As part of this, construction of 65 MW solar power plant on 325 acres in the township began with Neyveli Lignite Corporation (NLC) India CMD, Mr Sarat Kumar Acharya formally kick-starting the construction activities. About 2.38 lakh solar photo voltaic modules (solar panels) each with a power generating capacity of 280/310 watt would be installed under the project, a company statement said. The power generated would be synchronised with the [Tamil Nadu Electricity Board](#), it said.

Tamil Nadu has now reached Number One position in solar power capacity addition. India's total installed solar capacity has grown by over 80 per cent in the last 12 months to reach 8,100 MW. According to [Bridge to India](#), a global solar energy consulting firm out of the 3,600 MW capacities added during this period, 2,700 MW has come from four southern States. Tamil Nadu alone added over 1,200 MW on the back of a generous feed-in-tariff of Rs 7.01/kWh. The State now ranks No.1 for commissioned capacity in both wind and solar. As of date, Tamil Nadu leads the solar capacity addition table with an installed capacity of 1,368 MW, followed by Rajasthan (1,307 MW), Gujarat (1,112 MW), Andhra Pradesh (961 MW), Telangana (923 MW) and Madhya Pradesh (756 MW).

- ✓ **Six states account for 80% of the capacity added in India.**
- ✓ **Including the current pipeline of 14 GW, 55% of total current and planned capacity will be located in four southern states; fresh demand from these states is expected to be muted.**
- ✓ **Market growth beyond 2018 will depend on fresh demand coming from states such as Maharashtra, Gujarat and Uttar Pradesh**

(Source: [Bridge to India.com](#))

Presently, those six States account for 80 per cent of the solar capacity added in India. The remaining 23 States including some of the largest power consuming states like Maharashtra, Karnataka and Uttar Pradesh, account for just 20 per cent of the installed capacity.

In the initial phase of solar sector development in India, until 2014, bulk of solar capacity addition came up in Rajasthan, Gujarat and Madhya Pradesh (about 57 per cent). But, the Southern states have taken a decisive lead in 2015, driven primarily by their growing power needs.

Essel Green Energy wins 270 MW solar project in Odisha. Essel Green Energy, an arm of Subhash Chandra's Essel Group, has won the bulk of the 270 MW tender floated by the SECI ([Solar Energy Corporation of India](#)) for projects in Odisha. SECI officials confirmed that Essel has been awarded 240 MW, while Jyoti Infrastructure has got 10 MW and IBC Solar Ventures India 20 MW. As in several solar auctions this year, SECI set a reserve price of Rs 4.43 per unit, which the successful bidders offered without going lower. The winners were decided on the basis of the lowest VGF (viability gap funding) sought from the renewable energy ministry. Jyoti Infrastructure asked for VGF of Rs 49.15 lakh per MW, IBC sought Rs 49.25 lakh and Essel Green Rs 49.5 lakh per MW.

The Odisha project is the biggest that Essel Green Energy has won and is larger than its entire current solar portfolio of 225 MW across 12 projects, six of which have been commissioned. It has one small hydro project and is building 17 others for a total of 82 MW. Six wind farms are under construction, while sites for another five have been identified for a total capacity of 500 MW. This is the first major solar auction in Odisha. An auction of 20 MW was held in 2014 under the first phase of the Jawaharlal Nehru National Solar Mission. With thermal power priced low, the state has been a latecomer to renewable energy since the tariffs are not competitive. It is, however, identifying land to set up a solar park with a capacity of about 1,000 MW across 5,000 acres, with a total investment of Rs 6,500 crore. The winners of the latest auction will have to locate and develop their own land.

Adani Group's solar cell-making unit to start operating by year-end. The Adani Group's facility for manufacturing solar cells and modules will be operational before the end of the calendar year. The group is in the process of setting up a 1.2 GW manufacturing facility for making solar cells and modules. Solar cells with advance technologies such as bifacial would be manufactured for the first time in the country.

Mundra Solar PV Ltd is a subsidiary of Adani Enterprises. Mr Samir Vora CEO (Manufacturing Solar) of Mundra Solar PV Ltd said that investment for the first phase is about Rs 2,000 crore and second phase would be around Rs 3,000 crore. In the second phase, along with cell and module, silicon wafers would also be manufactured. It will create a combined capacity of 2 GW at the facility.

[The Tribune](#), 6 August 2016 | [Business Standard](#), 7 August 2016 | [The Hindu](#), 17 August 2016 | [The Hindu](#), 18 August 2016 | [The Hindu Business Line](#), 22 August 2016 | [The Economic Times](#), 24 August 2016 | [The Hindu Business Line](#), 30 August 2016



Wind energy sector feels the heat as solar steals limelight. The increased focus on solar energy and recent policy changes, such as withdrawal of certain tax benefits in wind energy, could impact new investments in the latter and hamper India's chances of achieving the target of 60 gigawatts (GW) of wind energy capacity by 2022, according to companies and analysts. India has set itself the target of achieving 100GW of solar energy and 60GW of wind capacity by 2022. It currently has 27GW of wind and about 8GW of solar capacity installed. The country is adding solar capacity at its fastest pace and is attracting interest from global renewable energy firms, pension funds and sovereign wealth funds. In 2015-16, for instance, it added over 3GW of solar capacity and 3.3GW of wind energy. The previous year, it added 1.1GW of solar capacity and 2.3GW of wind. Over the past five years, wind turbine generator (WTG) costs have fallen

about 20% while those of solar modules have fallen by about 80%. This has, in part, helped solar tariffs to fall to a record-low of Rs 4.34 per kilowatt-hour (kWh) in January from around Rs 17 per kWh in 2010. This could mean a better IRR for solar energy projects. The IRR is used to measure the attractiveness of a project.

Tata Power JV Cennergi starts operations of 95 MW wind project. Tata Power's 50:50 joint venture with [Exxaro Resources](#) in South Africa, Cennergi (Pty) announced commencement of commercial operations for its 95 MW Tsitsikamma Community wind farm project. According to the statement, Cennergi was picked as the preferred bidder for two wind projects under the [Renewable Energy Independent Power Producer Procurement Programme](#) of the South African government.

With the commissioning of the [Tsitsikamma project](#), Cennergi's operational portfolio has increased to 229 MW as it achieved commercial operations of its 134 MW [Amakhala Emoyeni](#) wind project in July 2016. The commissioning of the Tsitsikamma project has bolstered Tata Power's renewable portfolio outside India and shows its commitment to enhancing non-fossil based generation portfolio up to 30-40 per cent of its total generating capacity and creating value for stakeholders, the firm said.

Hero Group's renewable energy arm to raise \$125 million from IFC. [Hero Future Energies](#), the renewable energy arm of automotive major Hero Group, is planning to raise around \$125 million from IFC ([International Finance Corporation](#)). The proceeds will be used to fund construction of solar and wind plants across India. Hero Future Energies is also actively looking to expand its international business in various geographies. The proposed investment by IFC and IFC Global Infrastructure Fund is in the form of equity in Hero Future Energies, said IFC.

GREEN INVESTMENTS

Investments by IFC in renewable energy from 2011 to 2016 YTD

Year	Company	Amount (\$ mn)
2011	Wind Energy Plants in Tamil Nadu and Gujarat	6.5
2011	Shalivahana Green Energy	15
2011	Simran Wind Project	5
2011	NSL Renewable Power	22.79
2012	Renewgen Environment Protection Kotte	9
2013	NSL Renewable Power	5
2013	Bhilwara Energy	0.9
2013	Himtal Hydro Power Company	-

YTD: Year to date

Source: News Corp VCCEdge

(Source: *Business Standard*, 24 August 2016)

Since its incorporation in 2012, Hero Future Energies has identified projects of two Gw and plans to have a total installed capacity of 1,000 MW in the next 12 months. Both operational and under-construction projects are located in Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Karnataka, Maharashtra, Rajasthan and Telangana. Hero Future Energies has implemented 25 MW of rooftop projects and it plans are to further expand its rooftop solar business.

[Mint](#), 17 August 2016 | [The Economic Times](#), 19 August 2016 | [Business Standard](#), 24 August 2016 |


 Bioenergy

India seeks to expand biofuels market to US\$7.5bil by 2022. India is targeting a more than seven-fold expansion in its biofuels market over the next six years, stepping up the country's efforts to cut its reliance on energy imports. Blending 5% of biodiesel with regular diesel and 10% ethanol with gasoline could boost the market to 500 billion rupees (US\$7.5bil) by 2022, from about 65 billion rupees now, Oil Minister Mr Dharmendra Pradhan said.

India would require 6.75 billion litres of biodiesel and 4.5 billion litres of ethanol for blending over the six years, he said. The US\$2 trillion economy has struggled for about a decade to blend more ethanol with gasoline, and biodiesel with regular diesel. The goal in 2016 is 5% blending for both gasoline and diesel. State-run fuel retailers Indian Oil Corp, Bharat Petroleum Corp and Hindustan Petroleum Corp are together investing 90 billion rupees to develop infrastructure for biofuels and build ethanol plants, according to the oil ministry. Companies such as Austria's Munzer Bioindustrie GmbH, India's Praj Industries Ltd. and CVC India Infrastructure Pvt are also planning biofuel projects. To help achieve the blending targets, the government will consider meeting the shortfall between the costs and estimated revenues from biofuel projects to make them viable.

OMCs shut biodiesel joint ventures due to lack of commercial viability. Once touted as the fuel of the future, biodiesel, extracted from jatropha seeds, has lost its sheen for oil marketing companies. Due to lack of availability and commercial viability, the three OMCs (oil marketing companies) — IOCL ([Indian Oil Corp. Ltd](#)), BPCL ([Bharat Petroleum Corp. Ltd](#)) and HPCL ([Hindustan Petroleum Corp. Ltd](#))—have shut down the joint ventures companies they had started for jatropha cultivation to manufacture biodiesel. IOC, HPCL and BPCL had in 2008-09 planned to take up cultivation of jatropha across more than 180,000 acres in the states of Chhattisgarh, Madhya Pradesh and Uttar Pradesh. IOC and HPCL had formed a joint venture with the CREDA ([Chhattisgarh State Renewable Development Agency](#)) to take up large-scale jatropha farming across 74,100 acres and 37,000 acres, respectively. The joint venture was incorporated in February 2009 with Indian Oil and CREDA holding 74% and 26% equity, respectively. So far, IOCL has planted jatropha in 8,000 hectares—for biofuel production in the states of Chhattisgarh, Madhya Pradesh and Uttar Pradesh.

'Biofuel can be alternative to fossil fuel'. Biofuel made from microalgae can prove to be an alternative to conventional fossil fuels, said experts participating in the international conference, titled 'MACB 2016' 'Microalgal and Cyanobacterial biotechnology conducted by the NFMC ([National Facility for Marine Cyanobacteria](#)) in Tiruchirappalli, Tamil Nadu from 30 August to 1 September 2016. Cyanobacteria dating back to 3.5 billion years is the only organism which in addition to fixing carbon and oxygenating the environment, also fixes nitrogen, they said. Being a tropical country and a mega diversity hotspot for flora and fauna, germplasm plays a significant role in biotechnology. NFMC is conducting its second international conference after two decades. The conference will have seven plenary lectures and 27 invited lectures by eminent researchers and young scientists. A poster presentation will also be held.

Innovations, Discoveries & Breakthroughs reported in Moringa oil Plantation & Production (Advanced Biofuel Center). Advanced Biofuel Center (ABC) breakthroughs in Moringa oil research, a new Moringa tree varietal, and a high-phenolic Moringa oils. Advanced Biofuel Center revealed that a new varietal of Moringa tree Seed had been developed after several years research and trials.



(Source: I Love Moringa.com)

This varietal has been named MOMAX3 ([Maru-Moringa](#)) due to the location of its discovery. The MOMAX3 cultivar is noteworthy for producing a very high quality of Moringa oil with three to five times more quantity than available Moringa seeds variety. India based Advanced Biofuel Center has been working on Moringa since last decade with a focus on understanding the unique properties of the plant that can be manipulated to coax it to reach its fullest potential addressing horticultural practices, agronomics and sustainability issues. ABC's arm Moringa India has analysed the Present and future dynamics of Global Moringa Market. The main findings of the report shall be presented to the attendees of [4th Global Moringa](#) meet being organised by Advanced Biofuel Center on Moringa Production and Application on 24-25 September at Jaipur in India.

[The Star](#), 11 August 2016 | [Mint](#), 25 August 2016 | [The Times of India](#), 31 August 2016 | [PR Underground](#), 30 August 2016