Renewable Energy Monitor

February- March 2016

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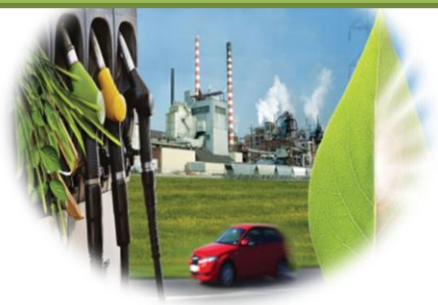

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Policy

Policy to promote investment in renewable energy on anvil. The Karnataka government is working on a model policy for creating an enabling environment for both prospective renewable energy investors and farmers who sell or lease their land to harness renewable power in the state. State energy minister Mr D K Shiva Kumar said while investors are worried about getting land to set up renewable energy projects, farmers are worried about losing land and this hampers investments in renewable power.

He said the new policy would be a win-win situation for both and a model for the country. The inspiration for the policy came following the successful launch of work on the 2000 MW solar park at Pavagada in Tumakuru district in Karnataka, said to be the world biggest. The farmers here have volunteered to give up their land on lease after the government decided to earmark 300 MW for them by encouraging them to set up small plants with a capacity of 1MW to 3MW on their land.

Government setting up $1.25 bn renewable energy fund. The government is in the process of setting up a $1.25 billion fund, backed by state-owned and private institutions, to finance renewable energy projects.The move will help in the scaling up of clean energy generation from 37 gigawatts (GW) at present to 175GW by 2022, according to a senior government official. State-owned institutions such as Power Finance Corp. Ltd and Rural Electrification Corp. Ltd have already committed a total of $300 million to the fund. The fund will make equity and mezzanine investments in renewable energy projects and will be modelled like the **National Infrastructure Investment Fund** (NIIF) which is set up with a corpus of about ` 40,000 crore, partly funded by private investors, to finance infrastructure projects, including stalled ones.

Clean energy sector sees 44% rise in new capacity addition. New capacity addition in the clean energy sector continues to maintain momentum as the first nine-month period of this fiscal recorded 44 per cent growth compared with the year-ago period. Solar continues to be the fast-growing segment and has overtaken bio-power in total capacity. Wind power sector has crossed the milestone of 25,000 MW in total capacity. The renewable energy sector added 3,030 MW of new capacity during first three quarters of this fiscal compared with 2,104 MW in the same period of the previous fiscal, according to the Union Ministry of New and Renewable Energy (MNRE). Of the new capacity added so far during this fiscal, wind and solar segments contributed 1,645 MW (1,333 MW in the year-ago period) and 1,120

MW (431 MW) respectively. Small hydro power and bio-power contributed 122 MW (187 MW) and 132 MW (152 MW) respectively. As of December 31, 2015, total grid-installed renewable power capacity in the country stood at 38,822 MW. Total installed capacity of wind power stood at 25,088 MW. Solar was the second major segment with cumulative capacity of 4,879 MW. Bio-power occupied the third position with a total installed capacity of 4,551 MW.

Government to auction mega hydropower projects. India is trying to make hydropower projects attractive as part of its commitment to cut carbon emissions. India is planning to offer new hydropower projects with all approvals and land-use rights in a bid to mitigate risks and attract investors. The plan is similar to the Ultra Mega Power Projects or UMPP model that is in vogue for thermal power projects. Though the government attempt to set up 4,000 MW capacity UMPPs in thermal power has yielded mixed results, experts see merit in the model. India is trying to make hydropower projects attractive as part of its commitment at the latest Paris climate conference to cut carbon emissions by 30-35% by 2030. The government believes that it is essential to have a model that addresses the risks involved in large, capital intensive and resource-uncertain hydropower projects. At present, these account for only 15% of the country's 284 gigawatt (GW) capacity, compared to fossil fuelbased capacity accounting for 70%.

New norms aim to make it easier to acquire land for solar parks. To tackle the problems of acquiring land for solar park projects and keeping costs down, the ministry of new and renewable energy (MNRE) has come out with **fresh guidelines** that allow state governments to use unproductive and non-agricultural land for the purpose, and emphasize minimum use of private land. "Land for setting up of solar parks will be identified by state governments unless the implementing agency has its own land. In order to provide for such large tracts of contiguous land with appropriate insolation levels, the state governments may prioritize the use of government waste/non-agricultural land in order to speed up the acquisition process. The use of private land may be minimized," the guidelines unveiled by MNRE on 5 February said.

Government to train solar technicians under the Suryamitra Programme. The Gurgaon district administration will equip students with skills in installation, commissioning, sales and service of solar devices at the Rajiv Gandhi Renewable Energy Park in Sector 29 to push the uptake of solar power in the city. The three-month course will be offered under the Suryamitra programme (**status**) in association with **National Institute of Solar Energy**. It will start in April with a batch of 25 students. Officials said that NISE already offers these courses, but the administration realized that due to the location of the institute, it is not accessible to every one. The Suryamitra programme was started by the NISE and ministry of new and renewable energy resources for training in renewable energy devices. Candidates are invited from across the country and anyone holding a diploma in Electrical Engineering or an Industrial Training Institute candidate can apply. The course is run free of cost and the students will be informed through outreach programs and advertisements as well.

CERC issues regulations achieve clean energy target, sound grid operations. The Central Electricity Regulatory Commission (CERC) has taken a number of initiatives which are aimed to enable reliable and secure operations of large interconnected grid operations. The CERC has notified regulations with regard to Deviation Settlement Mechanism (DSM) and Grid Code and Ancillary Services Regulations to support variable generation. The CERC has notified regulations with regard to Deviation Settlement Mechanism (DSM) and Grid Code and Ancillary Services Regulations to support variable generation. CERC also released the **Framework on Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar).** The Forum of Regulators (**FOR**), which is a representative

body of central and state electricity regulatory commissions, will prepare model regulations for states on Forecasting, Scheduling and Deviation Settlement for Solar & Wind Generation. The regulator proposes to amend the DSM Regulations after RE energy states demanded relaxing the deviation settlement norms stating that the deviation limit of 12% or 150 MW is likely to be counter-productive. Some of the states also approached the Centre with a plea that if relaxation in DSM norms is not provided, they would not be able to integrate such large scale RE power into the grid norms up to 2017. The official informed that CERC will relax the deviation settlement norms upto 2017.

Wind energy producers to get incentives for `repowering'. The government wants to replace old, low-capacity windmills with modern machines that can generate much more power from the same location, and plans to offer incentives such as low interest rates for "repowering" them. The Ministry of New and Renewable Energy (MNRE) circulated a **draft wind repowering policy** which states it aims to phase out wind turbines with less than 1MW capacity and built before the year 2000 and replace them with new ones, which will further expand capacity in country that is already the world's fourth largest wind energy producer.

Features of the policy

Objective: Objective of the Repowering Policy is to promote optimum utilisation of wind energy resources by creating facilitative framework for repowering.

Eligibility: Wind turbine generators of capacity 1 MW and below would be eligible for repowering under the policy.

Incentive: For repowering projects Indian Renewable Energy Development Agency (IREDA) will provide an additional interest rate rebate of 0.25% over and above the interest rate rebates available to the new wind projects being financed by IREDA.
ii. Benefits available to the new wind projects i.e. Accelerated Depreciation or GBI as per applicable conditions would also be available to the repowering project.

Implementation Arrangements: The repowering projects would be implemented through the respective State Nodal Agency/Organisation involved in promotion of wind energy in the State.

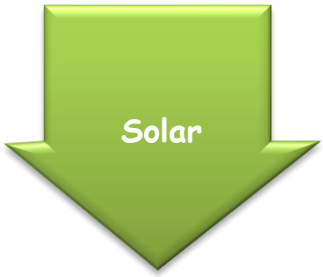
It is estimated that over 3000 MW capacity installation are from wind turbines of 500 kW or below. In order to optimally utilise wind energy resources, repowering is required. "Other benefits available for new wind projects such as accelerated depreciation (AD) or generation-based incentive (GBI) will also apply for repowered ones. Such projects will also be exempted from honouring the power purchase agreements they have signed to provide power for the period in which the repowering is carried out.

IEDC studying hybrid model to produce renewable energy. IL&FS Energy Development Co. (IEDC) has embarked upon a first-of-its-kind feasibility study to examine the possibility of integrating wind and solar power production along with energy storage at a single plant. The results are expected by September. IEDC, the power and infrastructure arm of IL&FS, currently operates 760 MW of wind farms across seven states and is developing one each at Ramagiri in Andhra Pradesh and Nana Layja in Gujarat. It is setting up solar parks of 5,000 MW capacity in Rajasthan in collaboration with the state government. The company is also into bagasse-based power generation and bio-mass projects. The study will examine what combination of wind, solar and storage at different locations is ideal from cost and generation perspectives. Sponsored by the United States Trade and Development Agency (USTDA), GE has been roped in as a consultant. Although hybrid renewable power plants have yet to come up in India, developers realise they have numerous advantages. Both forms of energy are, by their nature, erratic,

arising only when there is sunshine or high-speed wind. At a hybrid plant, solar and wind energy could counterbalance each other to provide more consistent power. Hybrid models would also reduce land costs, with solar modules being laid out in the area between wind turbines.

Banks, NBFCs to fund clean energy projects. Minister of State (independent charge) for Power, Coal, New & Renewable Energy Resources Mr Piyush Goyal said twenty-four public sector and eight private sector banks and four public sector and two private sector NBFCs have committed for financing renewable energy projects of 76,352 MW capacity with an outlay of Rs.3,82,255 crore over five years through green commitment certificates. The Minister said these banks and financial institutions had supported projects of 25,318 MW capacity with sanctioned and released amount of Rs.63,473 crore and Rs.26,105 crore respectively, as on December 31, 2015 after making the commitments. Among public sector banks, State Bank of India will be financing the largest capacities of 15,000 MW with an outlay of Rs.75,000 crore, followed by IDBI bank (3,000 MW). The 24 public sector banks will be financing projects of 31,649 MW.

The Times of India, 04 February 2016| Mint, 05 February 2016| The Hindu, 07 February 2016| Mint, 08 February 2016| The Times of India, 17 February 2016| Business Standard, 21 February 2016 | The Hindu, 10 March 2016| The Economic Times, 23 March 2016



Rent Your Rooftop & Get Solar Power at a Cheaper Rate. Give us your rooftop and we will give you cheap solar power this is the model being used by many solar power companies to rake up their rooftop solar installation capacities industrial establishments, commercial buildings, malls and large gated communities are the target for these operators who would set up solar rooftops for free and sell you power at rates that are cheaper than the local utilities. The model, popularly referred to as the **OPEX** - operational expense model - however, has its limitations when it comes to gated communities. Some five-six companies including **Hero Future Energy** have already entered the fray and are on the lookout for large rooftop space in industrial complexes, commercial buildings, malls and gated communities. According to officials, about 8sq mt of rooftop is required to set up panels to generate 1 kilo watt and a minimum capacity of 30 kW makes an installation viable. The power generated can help building owners cut down on power costs and gainfully use the roof which would otherwise remain unused. However, there are no model lease agreements and there is no way of making these agreements between the solar company and the roof owner a binding agreement. This has been one of the factors holding back the success of the large scale rooftop solar installations.

India's second solar slum inaugurated in Kolkata's Topsia. West Bengal's first and India's second solar slum was inaugurated on 23 February 2016 by state power minister Mr Manish Gupta at Topsia's Majdoor Para area falling under ward number 66 of the Kolkata municipal corporation. As many as 800 families doting the slum area where sunlight hardly enter the rooms will be benefited by the project of installing solar domes that have been conceptualised and developed by solar power expert Mr S. P Gon Chaudhuri and his team. In the first phase, 200 families have now been benefited. Earlier, the NB Institute for Rural Technology (NBIRT) headed by Mr S. P Gon Chaudhuri was asked by the Centre to set up 500 solar domes for urban slums as well as rural areas in each of of Kolkata, Mumbai, New Delhi and Bangalore with funds sanctioned by the science and technology ministry. According to plans, a total of 2,000 solar domes will be set up in the four cities out of which the first 200 solar

domes have now been installed in the Topsia slums. The Centre has sanctioned Rs 21.65 lakh for the project to be monitored by a committee appointed by the science and technology ministry.

SkyPower signs 200 MW solar power purchase agreement with Telangana. Canada-based solar energy project developer SkyPower has signed four power purchase agreements (PPA) with the Telangana government to build and operate 200 MW of solar energy projects in the state, the company said in a statement. Mr Kerry Adler, President at SkyPower said over the past several months, SkyPower has secured 400 MW of solar projects in Madhya Pradesh and Telangana.

Greenlight Planet raises Rs 34 cr from Overseas Private Investment Corporation. Solar energy solutions provider and distributor Greenlight Planet has raised 34 crore in debt-financing from Overseas Private Investment Corporation, the development finance institution backed by the US government. This comes about a year after the company raised $10 million in equity financing in a round led by private equity firm Fidelity Growth Partners India, now rebranded as Eight Roads Ventures. Greenlight has also raised seed funding from Mr Prabhat Sinha, cofounder of ZS Associates, followed by a Series A funding led by Luxembourg-based private equity firm, Bamboo Finance. Proceeds from the long-term debt financing will be used by the nine-year-old company, which was established by a team of student engineers at the University of Illinois, Urbana-Champaign, to expand its distribution capacity and channels in India and the African continent, as well as to further develop and roll out Easy Buy, its pay-as-you-go platform that enables customers to purchase solar products over a staggered instalment scheme.

AP set to turn into solar energy hub. Having set an ambitious target of adding a minimum total solar power capacity of 5,000 mw in the next five years, Andhra Pradesh is now turning into a major hub for solar energy manufacturing facilities in the country. Major players including Essel Infraprojects, Golden Concord Holdings, Trina Solar Science and Technology Energy and Xi'an Longi Silicon Materials Corporation are already at various stages of setting up manufacturing facilities in AP with an estimated investment of around Rs 18,200 crore and employment opportunities for around 19,000 people. According to industries department sources, several other firms are also keen on investments in AP and expected to head to the state in the coming months. Explaining the huge market available for manufacturers in the state, he said already two major solar parks have been planned - one at Anantapur with a proposed capacity of 1500 mw and another at Kurnool with a capacity of 1000 mw. Apart from these, the government is also keen on solar power rooftop systems for individual households and solar power pumpsets for irrigation and energy banks, the official added. In addition to these, the advantage of ports also gives AP an advantage of turning into a hub for exporting solar energy products, said another industries department official, adding that as per the solar power policy, the government gives priority in land allotment for solar parks on long-term lease basis and also exemption from electricity duty for a period of 10 years.

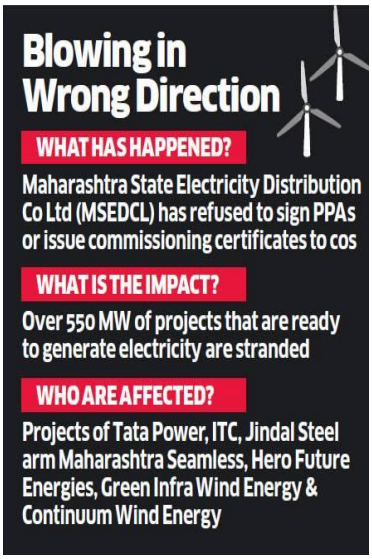
The Economic Times, 01 February 2016| The Times of India, 22 February 2016 | The Economic Times, 23 February 2016| The Economic Times, 24 February 2016| The Times of India, 24 February 2016 |

Tata Power arm to acquire Indo Rama's 30 MW wind farm in Maharashtra. Tata Power Renewable Energy Limited (TPREL), a 100% subsidiary of Tata Power, has signed an agreement with Indo Rama Renewables Limited (IRRL) to acquire its 100% subsidiary, Indo Rama Renewables Jath Limited (IRRJL), which owns a 30 MW wind farm in Sangli district of Maharashtra. The value of the deal was not disclosed by the company. The wind farm, which is fully operational since July 2013, has executed a long-term power purchase agreement with Maharashtra State Electricity Distribution Limited and is registered under the Generation Based Incentive scheme of ministry of new & renewable energy, a Tata Power release said. With this acquisition, Tata Power's total generation capacity will go up to 9,130 MW and its operational end power generation capacity will touch 570 MW with wind turbines located across five states – Maharashtra, Rajasthan, Gujarat, Tamil Nadu and Karnataka. TPREL also has 250 MW of wind projects under construction across Gujarat, Madhya Pradesh and Andhra Pradesh.

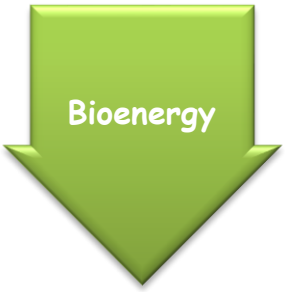
IL&FS enters into JV with ORIX Corp. for wind energy projects. Infrastructure Leasing & Financial Services Ltd (IL&FS) entered into a joint venture with ORIX Corp to set up wind energy projects in India. ORIX, one of the world's largest diversified financial services groups based in Japan, has been a significant shareholder in IL&FS since 1993.ORIX has invested 49% of the equity of the wind platform of IL&FS aggregating to 1,004 megawatt (MW), of which 775 MW is operational, and the balance is under construction.

Rs 4,000 crore investments in wind energy on brink of becoming NPAs in Maharashtra. Over 550 MW of projects that are ready to generate electricity are stranded because Maharashtra State Electricity Distribution Co Ltd (MSEDCL) has refused to sign power purchase agreements (PPA) or issue commissioning certificates. Projects of Tata Power, ITC, Jindal Steel subsidiary Maharashtra Seamless, Hero Future Energies, Green Infra Wind Energy and Continuum Wind Energy are facing the risk. Project developers are waiting for action from the Maharashtra State Electricity Distribution Co Ltd (MSEDCL), which has refused to sign PPAs or issue commissioning certificates.

Maharashtra released a new renewable energy policy in July 2015, which said "a total of 5,000 MW capacity of wind energy projects shall be commissioned. Out of that, an initial 1,500 MW will be used to fulfill RPO (renewable purchase obligations) of distribution companies, and the rest, 3,500 MW capacity of wind projects, can be utilised as open access for inter-state/ intra-state open access/captive consumption/REC (renewable energy certificates), etc." MSEDCL, however, has conveyed to developers that the 1,500 MW of installed capacity from which it will accept wind power, will be from 2011 and not from the time of release of the new policy. Between 2011 and July 2015, when the new policy was unveiled, MSEDCL had already signed PPAs for around 1,000 MW of wind power, which meant it would accept only 500 MW more.



The Financial Express, 23 March 2016| Mint, 17 March 2016| The Economic Times, 28 March 2016



Infosys to give biofuel stoves in Karnataka district. Software major Infosys on Saturday unveiled a project for distributing 43,000 bio-fuel cook stoves over the next nine months to 21,500 families in Karnataka's Koppal district.

The project will be implemented with NGO Samuha, which will train locals on using the stoves and build awareness among the families on their benefits. Infosys itself aims to be a carbon neutral company by 2018 and is focused on slashing its per capita electricity consumption by 50 percent.

India's first biofuel refinery to be ready by 2019. With Indian oil marketing companies (OMCs) witnessing a surge in the requirement of bio-fuel, as national policies mandate certain percentage of its blending with petrol and diesel, India within next three years will get its first bio-fuel refinery in Assam. It will be implemented by Numaligarh Refinery Limited (NRL), in partnership with Chempolis Oy, a Finland-based company, the Rs 950-crore project will use bamboo, which grows abundantly in the region, as its feedstock and produce fuel grade bio-ethanol. The project has been planned keeping in view the future demand of bio-fuel in the region. The refinery would be producing 49,000 tonnes of ethanol annually and this would primarily be used to blend petrol and diesel of NRL and the surplus will be sold to other oil marketing companies to cater to the Eastern and Northeastern markets. Production of fuel grade bio-ethanol is expected to reduce NRL's requirement of imported Methyl Tertiary-Butyl Ether (MTBE) and Py-Gas for petrol blending due to higher octane number of ethanol and would result in net savings for the company.

NRL and Chempolis jointly undertook an assessment study for ascertaining the availability of the required feedstock in Northeastern India. The Finnish company also carried out experimental testing of various specimens of bamboo and other potential biomass feedstock materials available in the region and provided the entire pre-project technical consultancy required for completion of the Detailed Feasibility Study for the project. The project is expected to give a fillip to bamboo cultivation in the region and help bring an economic transformation for many in rural areas.

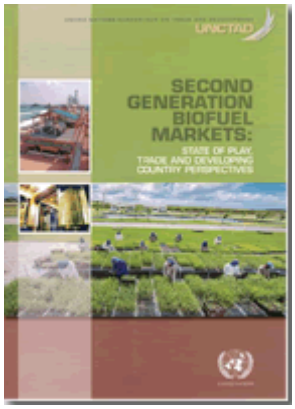
Business Standard, 11 February 2016 | The Economic Times, 27 March 2016

Reports

Second-generation biofuel markets: state of play, trade and Developing Country perspectives. UNCTAD's first report on the state of biofuel technologies in 2007 highlighted a sector with great potential, but at the time that was a long way off from markets. In 2015, countries made commitments toward a more environmentally balanced future through the Sustainable Development Goals (SDGs), and now seek to expand policies for low-carbon development after the agreement reached in Paris at COP21.

The year also marked a milestone in the bioeconomy, as the point in time when the production of second-generation biofuels (2G) finally took off at commercial scale. Developing countries now face a new set of market opportunities and policy dilemmas to enhance their usage of biomass, which can now be transformed into more valuable products.

This report focuses on how these market opportunities can be capitalized on and how to promote technology transfer for developing countries interested in engaging in advanced biofuel markets for the attainment of the SDGs, and as an instrument to meet their commitments under COP21. By carrying out a non-exhaustive mapping of cellulosic ethanol projects and recent policy lessons around the globe, this report seeks to provide public and private practitioners with a macro-picture of the advanced biofuels sector, with a specific focus on cellulosic ethanol as of 2015-2016.



First-generation biofuels (from seeds, grains or sugars)	Second-generation biofuels (from lignocellulosic biomass, such as crop residues, woody crops or energy grasses)
■Petroleum-gasoline substitutes ◊ Ethanol or butanol by fermentation of starches or sugars ■Petroleum-diesel substitutes ◊ Biodiesel by transesterification of plant oils (FAME and FAEE) » Can be produced from various crops such as rapeseed (RME), soybeans (SME), sunflowers, coconut oil, palm oil, jathropha, recycled cooking oil and animal fats ◊ Pure plant oils (straight vegetable oil)	■ Biochemically produced petroleum-gasoline substitutes ◊ Ethanol or butanol by enzymatic hydrolysis ■ Thermochemically produced petroleum-gasoline substitutes ◊ Methanol ◊ Fischer-Tropsch gasoline ◊ Mixed alcohols ■ Thermochemically produced petroleum-diesel substitutes ◊ Fischer-Tropsch diesel ◊ Dimethyl ether (substitutes propane as well) ◊ Green diesel

Source: UNCTAD (2008).

The report concludes with five suggestions for the responsible development of the second-generation biofuels industry:

- Create regulatory frameworks for advanced bioenergy tailored to national circumstances, which do not necessarily focus on the type of supply but instead on existing local demands. The fulfillment of such regulations is likely to meet domestic development strategies in line with the SDGs.
- Promote cooperation between domestic organizations and foreign companies for joint ventures by means of investment agreements in order to facilitate technology transfer. This is important to avoid the emergence of a large technological gap between first-generation, land-intensive feedstocks and second-generation, capital-intensive biofuels in developed and developing countries.
- Consider the broader aspects of bioeconomy sectors, including biomaterials, in ways that avoid locking industrial development paths into specific sectors or technologies. This would provide flexibility for market players that operate biorefineries as they could target multiple markets, including materials, feed, food and energy - both domestic and internationally.
- Incorporate lessons from the sustainability criteria applied for first-generation biofuels into near and mid-term sustainability provisions or labels for advanced biofuels.
- Continuously promote technical dialogue among different production regions of advanced fuels in order to ensure compatible standards for feedstock and promote trade in advanced biofuels.

India, China led investments in renewable energy in 2015: UN. India and China led developing countries in investments made in renewable energy in 2015, when for the first time commitments in solar, wind and other renewables capacity by emerging economies surpassed those by wealthy nations, a UN-backed report has said.

The report '**Global Trends in Renewable Energy Investment 2016**' by the UN Environment Programme said the developing world including China, India and Brazil committed a total of USD 156 billion in new renewables capacity last year, up 19 per cent from 2014. Investments by developed countries were down eight per cent in 2015 to USD 130 billion.

The year 2015 was the first time when investment in renewables in developing countries outweighed that in developed economies, the report said. A large part of the record-breaking investment in developing countries took place in China, which lifted its investment by 17 per cent to USD 102.9 billion, more than a third of global commitments. India was also among the top 10 investing countries in renewable energy, with its commitments rising 22 per cent to USD 10.2 billion.

UNCTAD, February 2016| UNEP, March 2016