

100% RENEWABLE ENERGY (RE)

BIHAR



Solar Panels in Dharnai Village, Bihar

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The conventional energy system has led to multiple problems and crises. They are directly responsible for climate change, air, water and soil pollution. They are a threat to the environment and pose for the loss of habitat due to the destruction of forests. It can led to overall food crisis and energy poverty.

Hence we need to take action by working towards an energy system which is sustainable and is based on conservation, efficiency , load and demand side management and more importantly ecologically sustainable form of renewable energy.

100% Renewable is just not the concept but a call to take action. Bihar can truly take leadership and move on a pathway of 100% RE Energy to bring its glorious past.

Present electricity scenario:

Bihar, a state in India known for its golden history has witnessed the enlightenment of Buddha and has housed the best ancient university of Nalanda. In the year 2000, when Bihar got bifurcated it relinquished most of the mines and minerals to Jharkhand. Notwithstanding, Bihar has been on a path of development and has one of the highest transformative potential among other states.

Historically, the state of Bihar has deep foundations of trade, industry, enterprise, overseas remittances and a productive labour force. Bihar has true potential to become a replicable model of growth for India and rest of the world. However one of the biggest challenges for this growth is, the access to modern energy.

The situation of power in Bihar was never healthy and it reached a critical stage after the bifurcation of the state, since most of the power-generating units were situated in Jharkhand. **Bihar has peak demand deficit of about 28% and transmission and distribution (T&D) loss of about 38%. In other words about 400 Mega Watt (MW) wasted out every 1000 MW used.**

Bihar largely depends on central sector allocation and on power trading to meet its present requirement. With a generation capacity of 546 MW and lowest per capita consumption of 122.11 Kilo Watt Hour (KWh), it is no surprise that 82% of the population lacks access to electricity.

Renewable Energy to empower Bihar:

Energy vision of any state is based on two things, firstly to provide electricity to its people and secondly to support developmental effort based on Gross Domestic Product (GDP) growth. It is

a daunting task but with right vision and approach, Bihar can be on the path of power surplus state. This can be achieved only through Renewable energy approach. One of the key reasons for Bihar to look into and adapt to the option of Renewable Energy is the fact that Bihar does not have abundant coal deposits to use it for energy. Instead it does have abundance of inherent natural and strategic advantages like solar, hydro and wind power.

What is required is a demand driven electrification that can be tailored to the local needs and scalable as per the local requirements, an electrification process that has low gestation periods and provides local employment and enterprise opportunities.

Given this, a decentralised way of electrification using renewable, locally available resources is the best way forward, thus ensuring a long-term energy security for the state.

Government of Bihar in action:

Bihar government has demonstrated strong will to move towards usage of more and more renewable energy. A Pune based group, WISE, prepared a complete mapping of renewable energy and the action plan potential

in Bihar. The report indicates the renewable energy potential in Bihar in the range of 18,000 MW. Bihar government also formulated a RE policy in 2011, which is the backbone to bring a lot of investment in renewable energy. However, the current policy needs a change to accommodate the present situation, like mainstreaming the decentralised renewable energy projects. The government has launched various schemes to promote renewable energy.

100% renewable Energy for Bihar- A Guide Map

100% is not a fantasy for someday but a hard hitting reality to secure its energy requirements. Bihar can truly be a leader by moving towards 100% RE to safeguard its own interest. It is possible!

In the backdrop of the prevailing situation and opportunities, CEED believes that Bihar has the opportunity to charter an alternative energy paradigm, with decentralised renewable energy at its core to move towards becoming 100% on renewable energy. These are the few sectors that require immediate attention, although there are various sectors which can be on 100% renewable energy.



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100% RE FOR RURAL ELECTRIFICATION

A concentrated solar power system on a hospital rooftop in Bihar

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According to the 2011 national census data, 83 percent of Bihar households do not have access to modern electricity supply. Supplying lifeline electricity of 100 watt to un-electrified households in India in general and Bihar in particular require less than 10000 MW and 1000 MW of generation capacity against the approx. addition of 50000 MW in the 11th Five-year plan . It is quite evident that the increase in capacity addition does not ensure electricity supply to un-electrified households proportionally.

The vision for 100% RE based Rural Electrification:

“A state-wide network of decentralised renewable energy plants (stand alone mini and micro-grids), developed with support from state government agencies in collaboration with private entrepreneurs for a high impact and accelerated economic development of the state”.

Mini and Micro-grids can offer reliable and cost competitive electricity services to the people and can facilitate the integration of renewable energies, reduce transmission losses by having generation close to demand and can adequately adjust to demand growth. It can operate both in island mode and grid-connected mode,

making operations flexible and can also offer grid support features.

Bihar should focus on developing a smart grid for rural electrification beginning by supplying only basic electricity needs to the area. However over time this can be expanded, as demand and supply grows, step by step to a full 24/7 supply with 100% renewable.

Successful Decentralised renewable energy (DRE) Projects in Bihar

DRE has the potential to deliver ‘energy now’ to the people of Bihar. Projects should use a variety of technologies and materials, selected as a result of local resources, and generation at or near point of end use, and distribute the electricity to domestic and commercial end-users through a micro-grid. While projects may be off-grid initially, there is potential to connect isolated projects later through a smart grid system.

Dharnai Solar Micro-grid project

An innovative and one of its kind smart micro-grid based on renewable energy technologies has been set-up in Dharnai in Jehanabad district of Bihar. The project is working successfully on ground and benefitting 450 households in the village with

a population of 2200 people. The project is providing electricity for agriculture, commercial and residential purpose. The Dharnai micro-grid project also focuses on creating an alternative governance system to manage energy resources. It aims to promote the community control of energy resources and making them independent. Through this demonstration, there is an exemplary and replicable model on the ground and needs to be multiplied at a larger scale.

The Hon'ble chief minister of Bihar, Shri Nitish Kumar had visited the village and endorsed the ideas and concept of applying more and more

renewable energy for rural practices. While talking about the project he said, "*Renewable energy is the appropriate and most authentic source of energy and people should support it*".

Apart from Dharnai Solar micro-grid project, DRE is already being implemented by various private businesses in Bihar. In West Champaran district, Husk Power Systems (HPS) are using biomass gasification to generate electricity from rice husk. Rockefeller Foundation has planned to invest in 500 such mini and micro-grid projects, powered by renewable energy. They are already operating about 40 plants in Bihar.



Solar panels installed on roofs at Dharnai village

© Ravi Sahani



Solar Powered Micro Grids in Dharnai Village

©Subrata Biswas



A street of Dharnai village is lit up by a solar powered street lamp

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100% RE FOR AGRICULTURE

A woman works in the fields at Dharnai. Solar panels can be seen in the background.

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Bihar with its bountiful natural resources of fertile soil, abundant water, diverse climatic condition and deep cultural linkages is one of the fastest growing state in India. The agriculture practices is one of core competences of Bihar. Agriculture is the key source of income and 76% of its population is engaged in agricultural pursuits. Bihar's productivity in agriculture can increase manifold with improved methods and system management. One of the areas where Bihar can be a leader, is by phasing out dirty diesel from agricultural practices. This will make the farmers produce more competitive and profitable and will save farmers from the unpredictable oil market prices, apart from irrigation, warehouse or cold storage needs to be promoted on 100% renewable energy. These are the various areas where renewable energy can play a vital role in making agricultural goods profitable.

The ambitious two-phase, five-year roadmap for the fiscal years 2012 to 2017 and 2017 to 2022, aims at setting up an exclusive 1,500 MW power network for agriculture. The power network will curb dependence of farmers on diesel generators for farming. The plan also includes

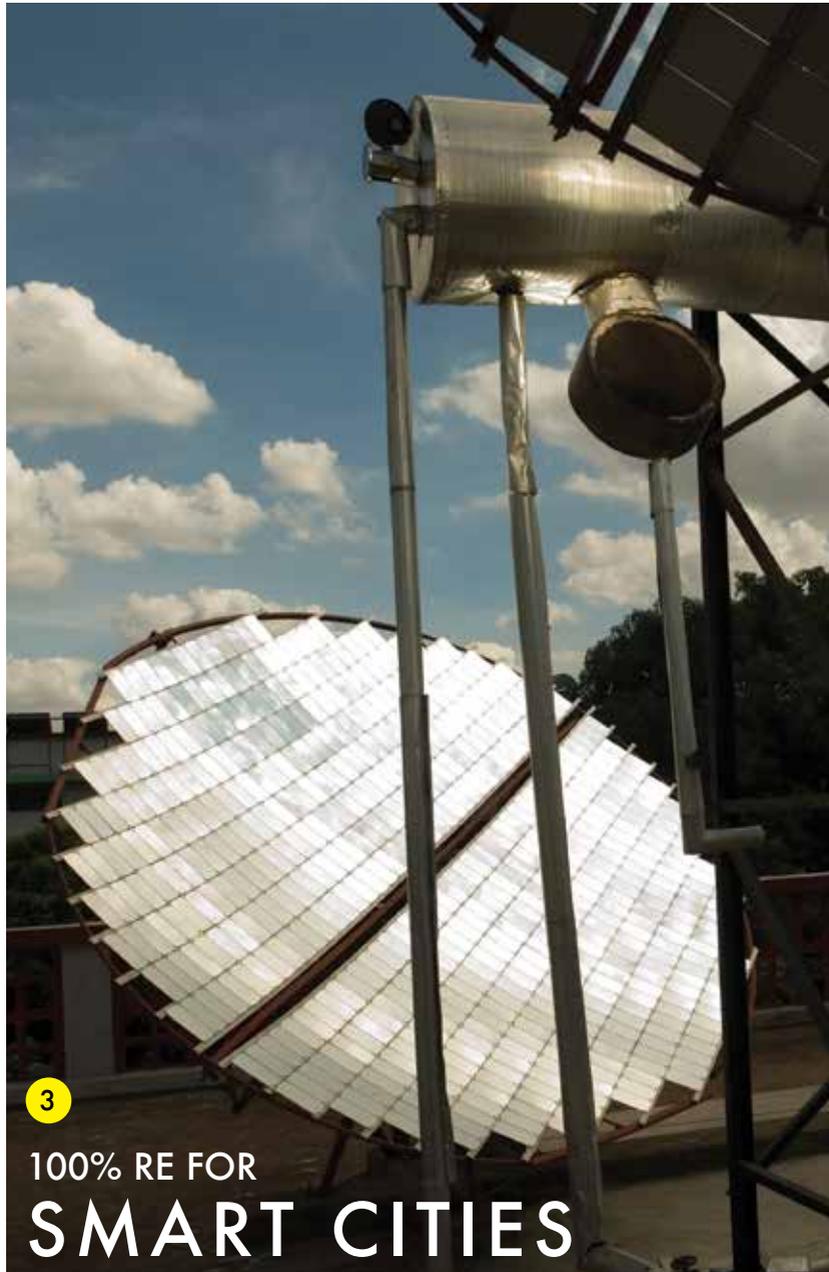
innovative idea of integrating solar power with fisheries. The state government under the slogan of "upar bijli aur neeche paani" (electricity from above (solar) and fish below) is planning to install solar panels around the ponds for tapping green energy. The budget for the first fiscal is Rs 1.5 lakh crore. Bihar government is already working towards solar powered irrigation system. It has a plan to install 28500 solar pumps of 2 HP capacity.

The vision for 100% RE for Agriculture should focus on the following vision:

"A strong policy to support and enable the agriculture practices, to inject usage of renewable energy, to make farm produce attractive, profitable and competitive with a provision of priority lending sector for renewable energy application for agricultural activities" .

With detailed planning and phased manner implementation, Bihar agriculture practices can be truly on 100% renewable energy.

Let's have "one food item from Bihar in every Indian's Plate and that too without harming environment".



3

100% RE FOR SMART CITIES

A concentrated solar power system on a hospital rooftop in Bihar

© Harikrishna Katragadda

Under the smart cities programme, Bihar government should work towards making cities much cleaner, liveable and enjoyable. This can start with Patna, which was historically known as Pataliputra, was the centre of political and economic importance. Now, it has the opportunity to become an innovation leader in power sector and bringing pride to its glorious past.

In January, 2015, CEED launched The “plug into the Sun-Patna” project aimed towards creating an enabling framework to set ambitious and realistic renewable target, backed by key policy reforms in building confidence in renewable energy investment, to meet Patna’s rising electricity supply gap. The report “Rooftop Revolution: Uncovering Patna’s solar potential” disclosing Patna’s potential for solar power using city’s roof-space. **The largest potential for solar power rests with residential buildings, which account for 86% of the city’s solar potential. The estimated solar-suitable rooftop space in Patna is around 9 Sq. KM, which can accommodate 759 MW of solar Power.**

The report not only maps the potential and viability of the various building types falling under different tariff categories but also detailed business models and scenarios under which

solar rooftop is advantageous. For residences, solar rooftop is still very complex and needs some fiscal support. However, the increasing power tariffs from grid electricity and the falling prices of solar power systems makes it a potential and sustainable source of energy.

Solar Rooftop revolution for Patna is not just a concept but a vision to realise Patna as a green capital powered by clean and sustainable sources of energy like solar.

Conclusion

A resurgent Bihar can chart an alternative development pathway via decentralised energy infrastructure to provide for the energy needs of its population in an equitable and sustainable manner.

Renewable energy can energise the state now by enabling communities to produce and manage power according to their needs by utilising local resources. Such an alternative energy paradigm could foster inclusive and sustainable development, enabling Bihar a leapfrog into the future and showcasing to the world a new decentralised form of development-bottom up.

100% RENEWABLE IS A MOVEMENT OF CITIZENS WHO ASPIRE TO TAKE ACTION, SHARE EXPERIENCES, DEVELOP EDUCATIONAL MATERIALS AND CATALYSE A DEBATE TO GO 100% RENEWABLE WITH THE AIM OF DEVELOPING BEST PRACTICES, FORGING PARTNERSHIPS AND BUILDING STRENGTH IN NUMBERS.



Children sit under solar panels in Dharnai village.

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