

## Editorial

**Dr. R. R. Sonde**

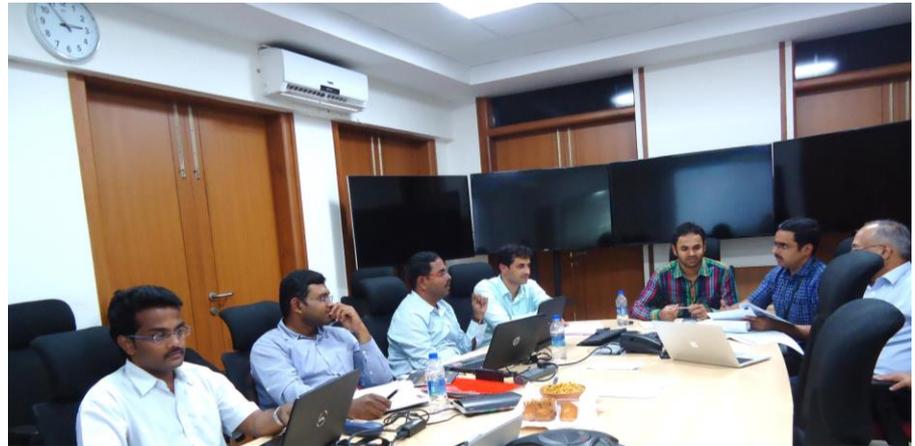
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The Paris Convention by the Conference of Parties (CoP) later in November this year will be a water shed event in the challenging journey on climate change. The scientific tell-tale indicators of global warming have become so clear that the global community will hopefully come to a consensus on the need on taking substantial and sure to implement decision.

Technology will continue to be the core in any evolving consensual solution and time is “now” for multiple scale collaboration in developing universally acceptable solutions. Fossil fuels continue to be the main source of energy but renewable energy will overlap fossil fuels in the next few decades before the latter will take over as a major source of energy. Hybrid energy generation plants will become important during this overlap period where fossil- renewable or another renewable will be the way the new energy systems will develop and be deployed in the global landscape in immediate and near future time scale.

In this context, SCOPEBIG is an excellent example on the concept of hybrid where solar biomass is coupled ingeniously to maximise the efficiency of the coupled system far beyond the solar alone system. This exists in a geography where solar is moderately strong (1400 kWhr annual radiation) and where biomass in the form of rice husks is predominantly available. These conditions exist in tropical geographies from South East Asia to African nations where solar and



Meeting in progress with THERMAX Ltd

biomass are available in equal measures. Hence this (SCOPEBIG) EU sponsored project with five consortium partners, three from India and two from Europe, is an excellent example of introducing the right technologies in the field to ensure it will be successful for future multiplication globally. CSTEP-Thermax – BSPGCL – CNRS – ECN are the partners in this consortium with each of the partner bringing in their expertise to develop this project of three MWe. EU the 80% funding body and MNRE the oversight ministry are providing the strategic input for a smooth administration of SCOPEBIG which is clearly a project of international importance.

SCOPEBIG is an excellent example of how a very innovative integration can boost the overall efficiency of the power plant where the strong features of each of the energy source (solar and biomass) are intricately woven in a manner that one will get a power plant with an optimised capacity to generate power. Concentrated solar in the form of medium temperature small troughs, fluid bed combustor and

gasifier, a grate fired boiler and then a turbine cycle are the major features of the project.

With all the basic elements on design, engineering, project management, land being tied up, the project has started so that by December 2016 the project will see its completion and beginning of the commissioning and grid connectivity.

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## Project Updates

- Completed the design of the plant
- Completed the preliminary assessment on Solar and Biomass resources
- Finalised the consortium agreement
- Initiated project report for clearances.

## Visits

May 26-28: A team from Thermax visited ECN and CNRS to discuss the design review, gasifier design, biomass analysis and consortium agreement

June 18-20: A team from CSTEP and Thermax visited Patna to discuss the clearances with MD, BSPGCL

July 23 & 30: A team from Thermax visited CSTEP to discuss the Project Report

August 13-14: A team from CSTEP and Thermax visited Patna to discuss the project progress and to obtain clearances from BSPGCL.

## News Articles Update



Compiled by  
**Suresh NS**

Senior Research Engineer CSTEP

### A second green revolution yet to become a reality in Bihar

Farmers from the state of Bihar are finding it difficult to source quality seeds, fertilisers and diesel on time from the Government. at subsidised rates. Some of the farmers in the state are facing problems in receiving payments for the produce sold to Government agencies. This reflected a large impact on the annual production from 2011 to 2014 especially on rice and wheat. The adaptation of organic farming is increasing rapidly in Bihar as it gives a higher price for the produce compared to that of traditional farming.



Govt fails to help farmers in Bihar.  
Photograph: Reuters

This may have a cascading effect on the yield and biomass generation in the state. Thus, the plants/processes relying on these biomasses will have difficulty in effective operation.



Situation has either remained the same or has deteriorated somewhat after the talk of second green revolution in eastern states got louder.  
Photograph: Reuters



Productivity of rice and wheat has declined.  
Photograph: Reuters

Source: <http://www.rediff.com/business/report/pix-special-second-green-revolution-yet-to-become-a-reality-in-bihar/20150629.htm>

### China's first biomass-solar power plant

Zhejiang Longquan Biomass Power Plant, with 75 tph circulating fluidised bed boilers and two sets of 15 MW condensing turbine generator, is operating 6000 hours in a year and generating 162 million kWh of electricity. It is using sawdust, straw and other agricultural waste produces as biomass feedstock and dust generated in the process is effectively generated as fertilisers. The plant covers an area of 280 acres. Tang Yongping, CEO of the plant mentioned that the transportation costs are hindering the development of biomass based plants. The plant is planning to install a 1.44 MW solar to generate electricity, which is equivalent to about 430 tons of coal in a year. Solar is expected to add 1.3 million kWh to the grid.

Source: <http://www.datenna.com/2015/04/14/chinas-first-biomass-solar-power-plant/> & <http://www.ibnlive.com/news/world/chinas-first-biomass-solar-power-plant-begins-operation-978728.html> & <http://www.lq35.cn/index.php?m=frontpage&a=index>

## Should India look towards Biomass Electricity?

Large size biomass plants have a major problem in getting the required amount of feedstock. Smaller plants are a better option in this regard. Even smaller plants are not sustainable as the electricity production costs were Rs. 4-6 per kWh, but buy-back tariffs were only Rs. 3-4 per kWh. Therefore, it requires a good leverage by policy makers and Government. An impetus in this area should be given to utilise land (40 million hectares of wastelands as per IISc estimates) effectively for meeting the needs of biomass. This will also provide employment and income creation benefits within the agriculture sector along with significant reduction in emissions.



This article was authored by Pooja Vijay Ramamurthi, Research Engineer, CSTEP

Source: <http://www.biospectrumindia.com/biospecindia/views/220899/should-india-look-biomass-electricity>

## Journal articles Update

### A polygeneration system for the methanol production and the power generation with the solar-biomass thermal gasification

This paper investigated the potential of concentrated solar power use in biomass gasification systems in Western China. The endothermic reactions of gasification, which require temperatures in the range of 1000-1300 K, are driven by solar energy. Syngas is used to produce methanol and unreacted gas is used for power generation via a combined cycle. The energy efficiency of the polygeneration system (both for production of methanol and power generation) is about 50%.

Thus maximising the utilisation of available energy will increase the overall efficiency of solar-biomass system.

Source: <http://www.sciencedirect.com/science/article/pii/S0196890415001442>

### Hybridisation optimization of concentrating solar thermal and biomass power generation facilities

A combination of solar and biomass sources is promising for lower plant investment costs. The study



investigated different configurations of these systems in terms of technical, economic and environmental performances. The integration with molten salt based storage is considered for best performing hybrid configuration. A majority of electricity (70%) would come from biomass even with 7 hours of storage. The study says that solar tower-biomass systems have highest net cycle efficiencies (33%) while Fresnel-biomass systems have low investment costs (AU \$ 4.5 m/MWe). The investments in hybrid plants are 69% lower compared to that of stand-alone solar plants.

Source: [www.sciencedirect.com/science/article/pii/S0038092X13004738](http://www.sciencedirect.com/science/article/pii/S0038092X13004738)



Biomass for CSP plants

### Hybrid Concentrated solar power (CSP) biomass plants in a semiarid region: A strategy for CSP deployment in Brazil

The high capital costs and lack of local industries are the major obstacles hindering the development of CSP in Brazil. The low cost approach is the integration of sustainably managed biomass to the CSP plants. The study indicates that the hybrid systems can generate electricity at US\$ 110/MWh at optimised conditions. The semiarid northeast region of Brazil is suitable due to availability of abundant solar resource and low cost biomass.

Source: [www.sciencedirect.com/science/article/pii/S0301421515002463](http://www.sciencedirect.com/science/article/pii/S0301421515002463)

## Interview

**Dr. D.K. Khare**

Director (Biomass Gasification)  
Ministry of New and Renewable  
Energy, Govt. of India



### Could you briefly tell us the importance of solar energy with relevance to the National Solar Mission or growth of Renewable Energy technologies in India?

*There has been a visible impact of renewable energy in the Indian energy scenario during the last one year or so. India has witnessed tremendous changes in the policy framework with accelerated and ambitious plans to add 175 GW including 100 GW from solar energy alone by 2022. This target has enlarged the scope of the Jawaharlal Nehru National Solar Mission. Apart from solar, 60 GW target have been set for wind energy, 10 GW from biomass and 5 GW from small hydro power. Many investors and stakeholders have evinced their interest to the sector by making their commitments of over 266 GW, in the solar energy, wind energy, small hydro and bio energy sectors during the REINVEST Meet held in February, 2015. These targets and commitments have laid a strong foundation for the penetration of renewable energy in India in the coming years.*

### In your opinion, what are your expectations, in terms of contributions to this Mission, from the different States?

*The roles of States are very important and crucial. States have to execute projects, provide lands, create evacuation facilities etc. The role of Distribution Companies (DISCOMs) would be very crucial as they have to make commitments for buying power and exceed RPO set for the states. The roles of the State Electricity Regulatory Commissions are also quite crucial similar to the role of*

*Central Government. The Central Government initiated changes in the policy framework which have to be accepted by the states so as to accelerate the growth in attaining the ambitious plans to increase the contribution of renewable energy. Of course, huge investment from government, public and private sector with lower interest rate would be required in this sector.*

### Do you foresee any challenges? If yes, what would they be with respect to CSP and PV?

*There are many challenges in using concentrating solar power, both solar thermal and solar PV in the country. The selection of technologies may depend upon exact sites/locations. If proper technologies were used, it is possible to set up economically viable large sized plants in India. One important aspect has to be considered about manufacturing mirrors, other associated ancillaries etc. in India. This would help in reducing the capitol cost as well as generation costs.*

### Do you foresee the integration of biomass with solar energy in the Indian context for better viability?

*Integration of solar thermal technologies with biomass seems to be quite promising. However, we may keep in mind about how much biomass can be saved by using Solar Thermal system. Once integrated biomass and solar thermal plant start operating in India, it is possible that most of the existing biomass combustion-based power plants would adopt this hybrid plan.*

### What are the social benefits expected from new renewable energy plan?

*Many social benefits are expected through increased share of renewable energy. The renewable energy plan would help in attaining energy security and energy access besides addressing the issues related to the climate change.*

Consortium Partners



This project is funded by the European Union  
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This project is implemented by CSTEP.