10GW of biomass power achievable by 2022

Biomass sector on path of revival

State level policy cohesion key to momentum

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Dear Readers,

Welcome to the April-June 2015 issue of BioPower India! Our theme for this issue is "Re-energizing the Biomass Power Sector in India". As most of our readers are aware, over the last few years, biomass IPPs have been facing rough weather due to various issues-ranging from fuel supply linkages to unviable tariffs-leading to a slowdown.

However, things seem to be shaping up in recent months.

The recent judgment by the Appellate Tribunal for Electricity (detailed out in the Policy Updates section) on two-part tariffs and open-access transmission and distribution systems is a key step to revitalize investor interest and demonstration of an effective policy and tariff regime. As the Government aims to install 10 GW of biomass-based power by 2022, it is important to unveil further measures to re-energize the sector with a view of firmly establishing it on track to the 10 GW target.

Through this issue, our endeavor is to share current experiences as also avenues being explored for re-energizing the biomass sector. The lead article elucidates that the current need is improved alignment between the central and state policies and multi-stakeholder collaboration to facilitate revival of existing biomass investments through suitable tariff and financing interventions, alignment on plant performance metrics to recalibrate investor expectations and capacity building support for upcoming projects. States with a conducive policy environment have experienced above-average growth in installed capacity and by and large have also experienced reasonably effective operational performance of plants. Thus, the need of the hour is to ensure a cohesive and responsive ecosystem across the states to truly enable the turnaround.

Our conversation with Dr. N.P. Singh, Advisor (Biomass) at MNRE, highlights possible improvements and policy interventions needed to revive the biomass sector in India.

The spotlight in this issue is on IL&FS Energy’s 13MW biomass power plant in Punjab which has resolved multiple challenges it was facing through technological improvements as well as support from the state government and community. The issue also features global perspective on the Biomass sector through our conversation with Dr. Winfried Damm, Country-Director of Indo-German Energy Program, GIZ India in addition to the recommendations for re-building the momentum in the biomass sector from the Indian Biomass Power Association. Finally, this issue also explores alternative channels for harnessing bioenergy by focusing on the pulp and paper industry with an illustration from J.K. Paper.

It is our constant endeavor at BioPower India to provide a platform for engaging in meaningful dialogue about the goings-on in the biomass sector in India, to facilitate conversations around the same and to showcase efforts made in the field. We do hope you enjoy this issue of BioPower India. Please send your feedback and let us know what other areas you would like us to cover. We look forward to hearing from you at biopowerindia.mnre@gmail.com.

(V K Jain)
State level Policy Cohesion Key to Momentum

The Government of India has set a target of 10GW of biomass based power by 2022. A holistic perspective needs to be adopted to re-vitalize the sector and set it on course to achieving this target. This has to be done keeping in mind the advantages that biomass based power has over other renewable sources. Biomass based power is stable and firm source of clean energy as compared to other renewable sources such as wind and solar. Biomass energy is the only renewable energy which makes direct contribution to rural economy. A large proportion of income generated by these plants through feed-in-tariffs gets ploughed back to the rural economy in the form of farmer earnings from selling biomass feedstock, rural persons employed in plant operations etc. This is unlike other renewable energy technologies where subsidies ultimately find their way to the country from where the power generating equipment was sourced. If accorded appropriate focus over the next 7 years, the biomass power sector has the potential to attract INR 300 billion1 of capital investment and also provide 16.82 million person days of employment annually, mostly to the rural youth. In addition, farmer incomes are estimated to increase by Rs 17.63 billion per annum with additional 5.6GW biomass capacity coming online by 2022. Clearly the opportunity is immense.

Moreover, the sector is key to addressing a growing challenge, particularly in Northern parts of India: lot of farmers in the more fertile states of India such as Punjab, Haryana, Uttar Pradesh practice multi-cropping which implies they have a very short time period (4-15 days) available between harvesting one crop and getting the farm ready for the other crop.

---

1 Assuming capital investment of Rs 5.4 crores per MW
2 Assuming employment potential of 3 person-day per ton of biomass
3 Assuming average price of feedstock as Rs3150 per ton (as per latest CEBR estimated) and average consumption of 1000 tons of fuel per MW per annum
The agri-residue in such cases is mostly burnt in the open which releases high levels of harmful gases such as carbon-dioxide, carbon mono-oxide, methane, nitrous oxides, sulphur dioxide and aerosols which not only pose a huge health hazard to the local population but also impact global climatic conditions. Biomass plants help in abatement of air pollution from burning of crop residue by utilizing that as feedstock to generate power.

Chequered growth of the sector

Grid connected biomass power sector has a chequered growth history with pockets of success. Grid connected biomass power and cogeneration currently accounts of 12% (4418MW) of the installed renewable energy capacity in India (as on 31 March 2015). Though the biomass sector is well established in India, and has seen a Compound Annual Growth Rate (CAGR) of 17% over the last 6 years, it has witnessed a slowdown in capacity addition over the last couple of years with low double digit growth rate of 11% & 10% in FY 2013-14 and FY 2014-15 respectively.

Historically the states leading the pack in establishing biomass based power supply (including co-gen) have been Uttar Pradesh, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. However, states such as Andhra Pradesh, Chhattisgarh and Tamil Nadu which have a high installed capacity base have seen little or no growth in the last 3-4 years primarily due to under-performance of the already existing plants.

States such as Maharashtra and Karnataka continue to enjoy the growth momentum and have been growing at an above average rate (sector average growth rate for FY 2013-14 was 11% and 15% for FY 2012-13). This growth in biomass power capacity is partly driven by bagasse based cogeneration plants in these states.

Some states particularly Punjab and Rajasthan have also been growing at a steady rate in line with the sector average growth rate. These states have been primarily driven by biomass based power rather than bagasse cogeneration.

Government target of 10GW potentially achievable

The government has proposed a tentative state wise break-up of the 10GW target it has set for the grid connected biomass power by 2022. If we compare the growth rate for FY 2013-14 and the CAGR required to achieve the 2022 target, many states seem to be on-track to achieving it provided they are able to keep up the current momentum.

<table>
<thead>
<tr>
<th>State</th>
<th>Target capacity for 2022 (MW)</th>
<th>Cumulative Installed Capacity as of Mar 2014 (MW)</th>
<th>2013-14 growth rate</th>
<th>CAGR required to meet target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haryana</td>
<td>209</td>
<td>45</td>
<td>0%</td>
<td>21%</td>
</tr>
<tr>
<td>Punjab</td>
<td>244</td>
<td>141</td>
<td>13%</td>
<td>7%</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>3,499</td>
<td>777</td>
<td>0%</td>
<td>21%</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>197</td>
<td>30</td>
<td>200%</td>
<td>27%</td>
</tr>
<tr>
<td>Gujarat</td>
<td>288</td>
<td>44</td>
<td>44%</td>
<td>27%</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>118</td>
<td>26</td>
<td>63%</td>
<td>21%</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>2,469</td>
<td>940</td>
<td>24%</td>
<td>13%</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>543</td>
<td>381</td>
<td>0%</td>
<td>5%</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1,420</td>
<td>603</td>
<td>23%</td>
<td>11%</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>649</td>
<td>571</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Bihar</td>
<td>244</td>
<td>43</td>
<td>0%</td>
<td>24%</td>
</tr>
<tr>
<td>Other</td>
<td>120</td>
<td>412</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,000</td>
<td>4014</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: MNRE

The scenario is challenging for states such as Tamil Nadu, Bihar, Haryana, UP, Andhra Pradesh which need to re-build the momentum in order to meet their targets. Of these, Tamil Nadu, Andhra Pradesh & Uttar Pradesh have a large installed base of biomass power and need to capitalize on their biomass feedstock availability potential to get back on track.

State policy- a key determinant in growth of the sector

Though the feedstock availability potential and existing technology plays an important role in the growth of biomass power projects, a key determinant of the health of the sector is the State policy. As is evident from the charts below, states which continue to see success in the biomass power sector are ones which have a streamlined and conducive policy environment.
States with conducive policy environment on the growth path for biomass power in India

**Rajasthan**
- Has a policy which focuses on biomass power
- Annually revised tariffs
- Government land to be allotted at a discounted rate of 10% to biomass power producers
- Allows open access for sale of electricity generated
- Single window clearance for biomass projects

**Punjab**
- Has a policy which focuses on biomass
- Has state-determined targets for biomass (600 MW) and cogeneration (500 MW)
- Exemption from electricity duty
- Allows open access for sale of electricity generated
- Annually revised tariffs
- Single window clearance within 60 days

**Maharashtra**
- Has a policy which focuses on biomass
- Has state-determined targets for biomass (400 MW) and cogeneration (1000 MW)
- Capital subsidy of Rs. 1 crore will be granted for biogas and biomass cogeneration projects, for installing HV/EMV substations
- Expenditure on evacuation system is made through Green Energy funds for renewable energy projects
- Exemption from electricity duty applicable for captive use or third party sale for 10 years
- Allows open access for sale of electricity generated

**Karnataka**
- Has a policy which focuses on biomass
- Has state-determined targets for biomass (200 MW) and cogeneration (281 MW)
- Annually revised tariffs
- KREDL will sublease developed land to biomass developers for a period of 30 years
- Allows open access for sale of electricity generated
- Karnataka Power Transmission Corporation (KPTCL) will undertake the necessary augmentation of transmission network
- Available Green Energy fund for promotion of RE
States which need renewed policy focus to regain the momentum

**Haryana**
- Does not have a state-specific biomass target
- Has increased cross subsidy charges by 4 times which curbs open access sale of power
- BPP will install the transmission/distribution lines and transformers required for transmitting power from biomass power plant and pay for its maintenance
- Long process for approval of bioenergy projects with clearances from multiple departments

**Uttar Pradesh**
- Does not have a state-specific biomass target
- BPPs can sell only 10% power produced through open access
- Tariffs have not been revised annually
- BPP has to pay for grid interfacing equipment and arrangements
- Long process for approval of bioenergy projects with clearances from multiple departments

**Chhattisgarh**
- Does not have a state-specific biomass target
- Tariffs have not been revised annually
- BPP will install the transmission/distribution lines and transformers required for transmitting power from biomass power plant and pay for its maintenance

**Bihar**
- Does not have a state-specific biomass target
- BPP shall necessarily offer to supply to BSES a minimum of 25% of power generated

**Odisha**
- Does not have a state-specific biomass target
- Tariffs have not been revised annually
- Grid interfacing with the generating units to be constructed by developers at their own cost
- Long process for approval of bioenergy projects with clearances from multiple departments

**Andhra Pradesh**
- Does not have a policy which focuses on biomass
- Does not have a state-specific biomass target
- No tax exemptions for BPPs
- No support for land acquisition
- Has increased cross subsidy charges by 40% which curbs open access sale of power
- Tariffs have not been revised annually

**Tamil Nadu**
- Does not have a policy which focuses on biomass
- Does not have a state-specific biomass target
- No tax exemptions for BPPs
- No support for land acquisition
- Tariffs have not been revised annually
Central and State Policy alignment is the missing link for re-building the sector

Tariffs: Achilles’ heel for the biomass power sector

The biggest challenge associated with biomass power sector is the tariff at which the biomass power producers are able to sell the electricity produced. Unlike other renewable energy sources, biomass power projects have a significant operation and maintenance expense which is primarily linked to the prices of the feedstock used as fuel in the plant. Though most states followed CERC guidelines and declared two part feed-in tariffs (fixed and variable), the lack of continuous revision of these tariffs (thus becoming out of pace with the increasing feedstock prices) has created a key challenge for the developers of biomass power plants.

“Policies of the Central and State governments must go hand in hand in order to re-build the biomass power sector in India”, says S.C. Natu, Senior Vice President at MITCON, a consultancy and engineering design firm engaged in the space.

As is evident from the figure below, tariffs set by most states are much lower than those recommended by CERC for that particular state.

<table>
<thead>
<tr>
<th>State</th>
<th>Proposed CERC Tariff</th>
<th>Prevalent SERC Tariff</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>7.36</td>
<td>4.79</td>
<td>&gt;54%</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>7.3</td>
<td>5.35</td>
<td>&gt;44%</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>8.16</td>
<td>6.41</td>
<td>&gt;27%</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>7.27</td>
<td>4.86</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>7.32</td>
<td>6.19</td>
<td>&gt;18%</td>
</tr>
<tr>
<td>Punjab</td>
<td>8.29</td>
<td>6.78</td>
<td>&gt;22%</td>
</tr>
</tbody>
</table>

Source: CERC, SERCs

Fuel supply chain needs to be strengthened

Due to challenges related to fuel supply and plant performance in the biomass power sector, past projects have not been able to meet the investor requirements of around 14% IRR and a 7-8 year payback period which have dampened the investor interest in the sector.

Though India uses agri-residue as feedstock for its biomass power plants, this waste product also is used as fodder for cattle and domestic fuel which collectively account for over 60-70% of the use in rural areas. The remaining feedstock supply is chased not only by the biomass IPPs but also other competing industries such as oil mills, paper and pulp mills, cement plants and other industries which have captive electric and thermal usage. Moreover, a fair amount of feedstock also gets wasted due to inefficient and improper harvesting and collection processes. This problem is compounded by fragmented nature of agricultural holdings. Another challenge associated with agri-residue as biomass feedstock is its storage. Since the same types of feedstock are only available during the harvest season in a year, they need to be processed and stored such that the power plant has continuous supply of fuel even during non-harvest periods. "Maharashtra and Rajasthan have more or less set their fuel supply chain in order. However, more work, both technical and institutional, is to be done for streamlining paddy straw harvesting and logistics management in Punjab" highlights Dr. G.C. Datta Roy, an industry veteran and currently Advisor at DESL. Streamlining the supply chain of feedstock requires collaborative effort between farmers, developers, state agencies as well as MNRE advises Dr. Roy. Setting up of decentralized feedstock collection and processing centres needs to be encouraged to help mitigate the issues of fuel supply for biomass based power plants.

Efficiency improvements still required in biomass power technology

Biomass power generation technologies, though mature, still require efforts for improving plant performance and reducing maintenance. "The existing design methodology of biomass boilers is based on tweaking the parameters of a conventional coal-based system, and this poses serious issues owing to the spatio-temporal variation of biomass composition, especially in India”, says Dr. R Vinu, Faculty at National Centre for Combustion Research and Development, IIT Chennai. He further added that. This calls for a scientific understanding of the relationship between biomass composition and the operating parameters of the furnace and its efficiency. According to Ashish Garg, Principal SIF Fund "Bio-power plants are operating at low PLF with high maintenance and frequent shut downs due to fouling, slagging and clinkering. The life of the super heaters (a key component) is compromised because of high levels of potassium and chloride in the abundantly available biomass, like rice straw. A holistic approach combining mechanical and chemical engineering is needed to effectively surrise the issue. Fortunately Indian-market specific solutions have been developed, thanks to leading research institutions like NCCR at IIT Madras and industry partners like Agni Energy."
Road to recovery can be paved with renewed policy alignment and multi-stakeholder collaboration

The biomass power sector in India has been caught in a vicious cycle of unavailability of feedstock leading to increasing feedstock prices consequently decreasing the financial viability of plants due to tariffs not keeping pace with the change in feedstock prices. Per Industry advisers, many plants need a revival boost. Some key measures are needed to re-energize the sector.

Revival of existing Biomass investments through suitable financing interventions

Many of the existing biomass projects which are either non-operational or reeling under losses due to operational challenges can potentially be revived by offering suitable re-financing scheme. This will enable them to get back on track and hopefully contribute to improving the confidence of other prospective developers and investor community. New investments can also be encouraged through other innovative sources of finance such as green bonds.

Capacity building and hand-holding support for upcoming projects

Greater co-operation between research institutes focussed on technology development and the biomass power industry needs to be fostered so that the sector can benefit from the R&D currently being carried out to improve its operational performance.

Also, a technical assistance facility can be created which can act as single window support system to provide knowledge management and operational support to upcoming projects for a defined period in order to provide the necessary backing that’s currently needed for the sector.

Different entities (both within and outside the government) need to come together to make concerted efforts to rebuild the momentum in this sector. The key responsibility should not only lie within the Ministry of New and Renewable Energy but also other agencies and regulatory bodies such as those linked to rural development and environment and climate change.

10 GW of Biomass by 2022 is not an impossibility but requires a concerted and well thought approach – it is not only the need of the hour for a few developers currently engaged in the space but a key component for India to frame a sustainable energy future.

Aparna Khandelwal is the Business Lead for Sustainability Outlook, a division of kinetics Consulting. Aparna has 8+ years of experience across sectors linked to sustainability with specialization in business advisory, program management, market intelligence, financial modelling and investment assessment. Her core expertise lies in Renewable Energy, Sustainable Finance and Impact Investing.
“Collaborative Stakeholder Engagement is the Key to Unlocking the Potential of Biomass Power Sector in India”

The Bioenergy roadmap had set ambitious targets of 1,900 MW from biomass by 2017. Currently, the sector stands at 1,400 MW (end of FY2014-15). What steps has the Ministry taken to ensure the biomass power sector achieves its targets?

The Ministry is currently implementing a wide range of programmes to support biomass projects including National Programme on Grid Interactive Biomass Power and Bagasse Cogeneration, National Programme based on Biomass Gasifier (for decentralized distributed generation of electricity for rural electrification and for captive use in the industry) and National Programme on Biomass Energy and Cogeneration (Non Bagasse) in Industry.

Specifically focusing on biomass power linked initiatives; the Ministry has constituted a Working Group under the chairmanship of Advisor (Biomass Power) with representatives from the State Nodal Agencies (SNA), Indian Biomass Power Association (IBPA) and industry experts as members to identify key barriers and challenges in the sector and to recommend appropriate actions to address the same. Apart from interaction with the regulatory commissions, the Working Group is also in close dialogue with financial institutions for their support in extending debt at reasonable rate of interest to the existing as well as new developers and with state nodal agencies for reassessment of biomass potential and review of procedures for granting statutory approvals for establishment of projects.

Under the ongoing MNRE-UNDP/GEF Biomass Power Project, studies/pilot demonstration projects for: (i) creating infrastructure for harvesting, collection, processing, and transport of biomass from the field to plants site (decentralized biomass depots); (ii) dedicated energy plantation on wastelands; and (iii) integration of solar thermal with existing biomass power plants have also been taken up to develop best practices for strengthening biomass supply and sustainability of the power plants.
The growth of the biomass power sector has been slow. From your perspective, what factors have hindered the progress of the sector?

I agree - in spite of the inherent benefits and the potential for biomass power generation in the country, the biomass power sector has not maintained its pace of growth. The sector faces certain challenges unlike other renewable energy sectors (solar and wind), primarily being the uncertainty around the biomass fuel prices. Other key constraints include: (a) cumbersome processes followed by the states for granting statutory approvals/clearances, and allotment of the projects; (b) sustained unavailability of quality biomass and (c) non-availability of low-cost financing.

In addition, competing uses of the feedstock have also created significant challenge for the industry - e.g. increasing prices of conventional fuel, mainly coal and furnace oil, have made biomass a very viable option for use in furnaces and boilers in small and medium industries. This has resulted in steep and fast escalation in biomass feedstock prices. However revision of tariffs by state electricity regulatory commissions has not kept pace with the increasing costs of biomass, adversely impacting the financial viability of large biomass based power plants. Hence, change in tariff based on prevailing fuel cost is emerging as one of the key prerequisites for faster growth of the sector.

What measures can be adopted to streamline the availability of fuel supply?

Assuring adequate supply of feedstock is one of the most important factors in determining operational success of biomass power plants. Zoning of biomass is a critical step in this direction. This implies defining a geographical catchment area for a biomass plant which can cater to the plant’s fuel supply requirements in a sustainable and economical manner. Ideally, the plant sizing and the technical-commercial feasibility of a biomass power plant should be done based on the available biomass within the proposed catchment area.

Through some of its projects, MNRE is also trying to work on and demonstrate cheaper and more efficient models of fuel collection and management such as decentralized collection and sorting centres.

The Ministry has also been working towards getting the biomass resource atlas updated to provide a better perspective to developers and investors regarding the availability of biomass feedstock in a particular area.

“Revised regulations notified by CERC for biomass is a very welcome and timely step”

An additional step to promote biomass power plants with effective fuel supply linkages is to work with corporates who have captive biomass and require considerable amount of electricity for their production. An example of such an effort is the biomass power project being set up by Ruchi Soya with the support of the Ministry where the feedstock is soya stalks which come from the raw material used by Ruchi Soya to manufacture its key product - edible oil.

How can states be encouraged to follow CERC recommendations on feed-in-tariff for biomass?

The revised regulations notified by CERC in May 2014 for biomass is a very welcome and timely step in our efforts to resolve various problems faced by the biomass developers in sustained operation of their power plants. We are happy that the Commission has acknowledged and recognized the issues and collected actual field-level information/data from various stakeholders and performed systematic analysis of various technical, financial, and operational parameters before approving normative values to these parameters critical for determination of generic tariff for biomass power. An important aspect of the recommendation is to revise the fuel price annually based on an independent survey.

The key will be to get the SERCs to adopt CERC recommendations. Most of the states are in the process of revising their tariff for biomass. MNRE is having regular dialogues with the various State Electricity Regulatory Commissions to encourage them to adopt the CERC recommendations. Moreover, the Ministry through its UNDP-GEF Biomass project has been conducting capacity building workshops with various state agencies to help shape a conducive environment and provide the required impetus for revival of the existing plants and further growth of the sector.

Investor interest has been low in the biomass power sector. Are there any steps being undertaken by the Ministry to promote innovative financing instruments for the renewable energy sector?

The Ministry has been extremely active in garnering support for investments in renewable energy sector including biomass power and has been working towards shaping innovative instruments and interventions to help improve the investor sentiment. There is now a growing investor interest in renewable energy in India and the Ministry is taking steps to capitalize on this opportunity.

Ministry’s efforts bore fruit with RBI including Renewable Energy as part of priority sector classification through their recent circular in April 2015. As per the norms, bank loans up to a limit of Rs 15 crore to solar
“Collaborative stakeholder engagement is the key to unlocking the potential of biomass power sector in India”

Biomass power provides benefits beyond just clean power. Given this, what efforts are currently being made by MNRE to promote biomass power with other government agencies?

MNRE has already engaged various other ministries such as the Ministry of Finance for promotion of renewable energy including biomass power. As mentioned earlier, MNRE’s efforts have led to RBI including renewable energy under priority sector lending as well as giving the go-ahead to issue green bonds through multiple agencies for financing clean energy projects.

Additionally, the Ministry is also engaged in conversations with the Ministry of Rural Development to utilize some of their existing schemes including Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) to garner support for biomass fuel collection for the power plants.

As always, Ministry is willing to provide support to the state governments depending on their specific needs in order to promote this sector.

What is your outlook for the biomass power sector in the country?

I believe collaborative stakeholder engagement is key to unlocking the potential of biomass power sector in India. Biomass is renewable, carbon neutral, and has the potential to shape large-scale productive activities and employment especially in rural areas. It is one of the promising resources for generation of energy/power in rural areas using commercially available thermal and biological conversion technologies.

India is one of the top markets for biomass power with an aggregate installed capacity (including bagasse co-gen) of over 4400 MW. Annual addition of biomass power capacity is over 400 MW with bulk being of bagasse-based cogeneration in sugar mills. Most of this capacity addition has been realized through the private sector, which testifies to the effectiveness of the Ministry’s efforts.

Today, biomass power segment is a home-grown industry, with countries having: (a) indigenous facilities for manufacturing of requisite plant and machinery; (b) capacity to build, operate and maintain the power plants; and (c) maturity to absorb new technologies/processes. Indian gasifier manufacturers are exporting their systems to both developed and developing countries. Biomass based boilers are also exported by the Indian Industries to a number of countries.

I am confident that combined efforts of MNRE as well as other stakeholders will not only help accelerate new investments in the sector but also enable wider deployment of biomass power plants in the country.

Dr. N. P. Singh is Advisor at the Ministry of New and Renewable Energy (MNRE), Government of India and is currently heading Biomass Power / Cogeneration, Waste-to-Energy Group, Small Hydro Power, Information and Public Awareness Group and Energy Parks Programme. He joined the Ministry in November 1983 (then known as Department of Non-Conventional Energy Sources). Dr. Singh is also Director General, National Institute of Solar Energy (NISE) (an autonomous R&D Institute of MNRE) and a member of Governing Council of multiple institutes.
Biomass IPPs should be Viewed as Agro - Waste Processing Plants

Background

Air pollution in India is a serious issue with the major source being fuel-wood and biomass burning. In autumn and winter months, large scale crop residue burning in agriculture fields is a major source of smoke, smog and particulate pollution causing near-permanent haze and smoke observed above rural and urban India. In Northern India, plumes of smoke arising from the fields are a common sight particularly in Punjab during the rice harvesting season. In the months of October – December, this phenomenon is so chronic that the effects are also felt in neighboring states of Delhi and Haryana. Burning of agro-waste emits harmful gases like carbon dioxide, methane, carbon monoxide, nitrous oxide, sulphur oxide and large amount of particulate matters, which adversely affect human health as well as the environment. Burning of agro-waste will not cease unless alternate productive use of this waste like electricity generation becomes reliably available and widely adopted in rural and urban India.

However, in spite of overall biomass power potential of more than 25 GW, only 6% has been harnessed so far, which is amongst one of the least harnessed renewable energy sources of India. This is corroborated by the status of renewable energy capacity deployment in 2014-15. As against a target of 100 MW set by Ministry of New and Renewable Energy (MNRE), Government of India for 2014-15, only 45 MW of biomass power projects were commissioned. In all other renewable energy sources, the installed power capacity achievement in 2014-15 far exceeded the targets including bagasse based cogeneration which has a much more viable business model than biomass.

Currently, the biomass sector is going through the most difficult crisis and is on the verge of collapse. Around 50% of the installed capacity is under active generation mainly on account of inadequate state support. Most of the biomass projects today face the challenge of seasonality which has resulted into sub-optimal operations of these projects meaning lower PLF and has resulted into significant under-recovery. Seasonal availability of the fuel creates challenges for collection and storage of biomass which requires significant working capital.

Some of the other key challenges that are commonly faced include – absence of organized and regulated markets for sourcing of agro-waste, dependence on traders for supply of biomass leaving the industry at price risk and higher rate of gross calorific value than the actual and less than station heat rate envisaged by various regulators, leaving substantial under-recovery of energy charges.
Since biomass based power projects are highly labour intensive, this sector also has the highest potential of job creation compared to any other power source both conventional and non-conventional. It is therefore high time to relook at the biomass power sector as one of the key success factors in the Government of India’s initiative for creating millions of jobs and livelihood opportunities.

IL&FS has two community linked biomass based power projects – a 13 MW project based on cotton stalk in the Marathwada region of Maharashtra State and a 12 MW project based on paddy straw in the state of Punjab.

The experience of operating the 12 MW paddy straw based power project in Punjab has been summarized in the box 1 and 2 below.

**Potential Benefits of Biomass Power Projects**

Our estimates indicate that there is an opportunity for creation of jobs to the tune of 1500 million person-days per annum representing income generation for the employed workers of around INR 365 billion annually, if the entire biomass potential of 25 GW is harnessed. In addition, the industry represents an income opportunity of INR 270 billion per annum for the farmers (assuming an average land holding of 5 acres per farmer). Further these biomass power projects can also generate number of other entrepreneurial opportunities for rural youth through their participation in the fuel supply chain.

The other direct benefit of biomass projects is their ability of operating as an agro-waste processing project thereby reducing the levels of toxic gases in the atmosphere and contributing to a better environment.

Some of the benefits of operating our biomass power project in Punjab have been summarized in Box 3.

**Box 1: Challenges involved in operations of 100% rice straw based power project**

Punjab Biomass Power Limited (PBPL) is running a 12 MW rice straw based power plant in district Patiala and this is the only operational plant in India which is 100% rice straw based biomass project.

100% rice straw based biomass power plants have many challenges in terms of collection of straw from fields, storage of straw with proper stacking at collection centres, protection of straw from rains and organic degradations, transportation of straw, cutting of straw, jamming in the fuel feeding system of power project and chemical properties of straw.

Rice Straw contains high Alkali and Silica thus has low ash fusion temperature. This causes clinker formation in the super-heater zone and a severe problem of deposition in the convection zone. Thus the plant requires frequent stoppages for the cleaning of the boiler.

**Box 2: Measures undertaken to improve plant performance**

- PBPL started a fire-side chemical XCEL TREAT 578 and this has reduced the frequency of stoppages drastically.
- Adequate inventory of maintenance spares at Plant and regular check on rates & availability of spares with suppliers in the vicinity.
- Proper coordination between engineers, operation and fuel handling supervisors.
- Monitoring of pressure and temperatures at every important part of steam cycle through SCADA.
- Manpower planning for procurement processes, maintenance, stores, shift engineers, administration and accounting processes.
- Use of Long Range Soot Blowers, cleaning of water walls.

**Box 3: Benefits of operating PBPL**

- The power plant burns the rice straw in a controlled manner. An Electrostatic Precipitator is used to remove fine particles like dust and smoke.
- The reduction in CO₂ emissions from rice straw plant is about 180 grams of CO₂/kWh.
- People in villages in the radius of 25 kilometres around Ghanour village of Patiala have seen significant improvement in air quality during harvesting seasons. Complaints of respiratory problems have also reduced.
- For the rice straw collection, around 1500 people get direct/indirect employment. On an average, 1 baler provides employment to 15 people in rice straw collection and PBPL is currently working with about 100 balers.
- PBPL has strength of 100 employees on its payroll and an equal number is engaged in labour works and security works of plant and collection centres.
- Large numbers of unskilled labours are employed for shifting & cutting of fuel and housekeeping activities of plants through subcontractors.
Rebuilding Momentum of the Biomass Power Sector

The positive impact that a biomass power project has on the environment far exceeds the cost reflective tariff that these projects ought to receive from the State. Hence there is need for special dispensation of these projects in order to rebuild the momentum of this sector that would lead to sustainable operations. Some key enablers are summarized below:

- Given the seasonal nature of operation of biomass power projects, these projects need to be treated as ‘seasonal projects’, with the PLF being approved by the Regulator for a 7-9-month period (i.e. period of operation of the project).
- Banks and financial institutions need to extend support to these projects in the form of working capital finance to enable storage of biomass during season for operations during off-season so that the overall PLF of such projects improve thereby contributing to a viable business model.
- Biomass projects need to be considered as ‘agro-waste processing plants’ rather than pure power projects. The cost of generation from such projects cannot be compared to other forms of power generation such as coal based power projects. The cost of power generation of biomass projects primarily includes the cost of treating agro-waste, which does not have any other alternate use, and eventually ends up being burnt in the open fields, thereby causing enormous damage to the environment.
- The State needs to support the farmers to remove the paddy straw waste from their farms. Under a rice-wheat cropping pattern, rice has to be harvested early in order to accommodate the wheat crop. This leads to very little time being left in the hands of the farmers to turn around for planting the wheat crop. Within this period, the farmer has to get rid of the rice stubble and prepare the land for sowing the wheat crop.
- There needs to be technical and commercial framework to ensure that tail end generation plants can supply electricity to the rural population living within a predefined perimeter of the project.

Box 4: Role of State Government in making Rice Straw based plants a success

PBPL last year got lot of support from the State Government as there was advertisement on the local FM Radio highlighting that burning of rice straw in the fields is punishable offence and imploring farmers to sell rice straw to PBPL balers present in their area. The ad highlighted the benefits of such action including the opportunity to earn income even while helping reduce the pollution thus leading to an overall uplift in the welfare of their own families.

To support this initiative, PBPL also equipped balers with trolleys and cutters free of cost so that those could be provided to the interested farmers.

State Governments also need to support in providing land for storage of the rice straw at subsidized leased rentals. PBPL took more than 100 acres of land in the periphery of 30 km radius and opened around 12 collection centres. State Government provided land for 4 collection centres at subsidized rates. This was done by State Government officials to curb the pollution in and around their areas.
Way Forward for the Biomass Industry in India

In view of the significant localized livelihood potential that biomass based power plants represent, it is in the interest of the Government to see that the full potential of the sector is exploited. However unless there is revival of the existing power plants and a suitable framework is created for ensuring sustainable fuel supply chain, large organizations will not be interested in investing in this sector. However it is clear that in order to exploit the full potential, participation by such large industry groups with strong financial capabilities is a key pre-requisite. Some of the interventions that will be required to take forward this sector have been proposed below:

- State Electricity Regulatory Commissions (SERCs) need to adopt Central Electricity Regulatory Commission (CERC) determined tariff for biomass power projects
- Linking the fuel supply chain of biomass based generation with Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) or with the Panchayat administration
- Financial restructuring of outstanding loans of existing biomass projects
- Community engagement for biomass procurement at the grass root level
- Establishing various farmer groups and self-help groups for becoming part of the fuel supply chain
- Assessment of infrastructure support required for these groups in terms of providing various equipment for collection and processing of biomass such as chippers, bailers, tractors, etc. and the logistics for transportation of fuel.

The policy framework for establishing the fuel supply chain and some special dispensations stated above will ensure sustained operations of the biomass based power projects and the sector will attract manifold investment.

Pardeep Aggarwal is Vice President, IL&FS Energy Development Company Limited

B. Tech (Mechanical) from Punjab Engineering College, Chandigarh and MBA (Finance), from IMT, Ghaziabad, he has around 22 years of experience in Project planning, development and execution of the small and medium power projects. He is looking after operations of 12 MW Biomass project located in Punjab. He was also involved in erection and commissioning of 63 MW Coal washery reject plant in Chattisgarh and has also commissioned 1 MW Rooftop Solar project for Amity University. He has earlier worked with Crompton Greaves, Triveni Engg & Industries Ltd and Snowy Mountains Engineering Consultants.

Namrata Mukherjee heads the policy and regulatory practice at IL&FS Energy Development Company Limited (IEDCL). She is responsible for leading the Company’s Policy & Regulatory advocacy efforts and works closely with Industry Associations like CII, FICCI, WIPPA to take forward some critical issues facing the sector. Prior to this, she has worked with Mercados EMI in New Delhi specializing in the renewable energy sector and the Regulatory Studies and Governance Division in The Energy and Resources Institute (TERI), New Delhi.
IN CONVERSATION WITH

“10 GW of Biomass by 2022 is Achievable, But it won’t be an Easy Task”

What’s your view on the RE sector in India, considering the government of India has a goal of setting up 10 GW of biomass power by 2022? Do you think this goal is achievable?

I feel the renewable energy goals set by the government of India are very ambitious, though they are achievable. On one hand, I see the Indian government getting on track and really pushing all the issues that are necessary. But on the other hand, India has a federalized system of governance and all the states need to provide their support in building this momentum and come out with conducive policies. It can be complicated to harmonize policies with a lot of different interests, as was seen in the European Union. But India has been doing a really good job on this till now.

With regards to biomass, 10 GW out of 175 GW might seem low at a first glance. However, right now, there is about 4.4 GW of installed biomass capacity and the target is to more than double the current capacity, which is very ambitious.

Keep in mind the goal of the Indian government for 24x7 power implying that everyone gets line connection.

What are the challenges that India is likely to face in order to achieve this goal of 10 MW of Biomass power?

Achieving 10 GW of biomass power implies that you need to have fuel available. On the face of it, India has the fuel available to achieve this target capacity. But as we learnt in Germany, there are a lot of issues that have to be addressed with regards to biomass based power which go beyond purely the technical ones. These include the price of fuel, land issues, discussions about fuel vs. food (though that may not be the current challenge in India) and also mechanisms to ensure that the electricity tariff is calculated based on existing fuel price.

It also needs to be kept in mind that any power plant will have to be functional for the next 20 years at least and have a payback period of 5-10 years. You need to make sure that you get your money in the next 10 years from a biomass power plant as well.

How is the uptake of Biomass power being affected by the growth of other renewables like solar and wind? Is there a shift in global outlook with interest shifting towards solar?

Yes, we are seeing a shift in the interest amongst renewable energy sources.
We found that solar is far more efficient on an energy harvest potential per hectare view. Comparing biomass to solar photovoltaic, this potential is at least 20 times higher for solar. Therefore, if you are using new land, for just harvesting energy, then biomass based power is probably not the best thing.

Currently, the perspective on solar is much brighter and this can be seen not only across the globe but even in the India. At the moment, installed capacity of solar is less than that of biomass (<4 GW), but the target for solar is 100 GW as compared to biomass which has a target of just 10 GW.

But I wouldn’t say that you should only rely on solar. In solar there is a need for storage because electricity is needed even at night time when solar electricity cannot be generated. At that point, biomass comes into the game. Moreover, the biomass aspect also becomes important when you are discussing about how to utilize the potential waste (agricultural residue and municipal solid waste).

What steps can be taken to re-energize the biomass sector in India?

The first thing to revive any sector is governmental push in the form of a firm target. That has been present in Europe and India is on the right track there. It is very important that the biomass sector gets political support and biomass energy initiatives are encouraged.

You often need different kind of technological solutions for processing varying feedstock. In order to innovate and develop technology, one needs quite a vivid scientific community, research centers and interactions and learnings from the international community. In order to grow the biomass based power sector, there is a need for research, experience, patience, a spirit of incorporating learnings and experiences from other countries, and subsidy environment which won’t be an easy task.

What lessons can India take from Europe’s experiences in biomass based power sector?

In Germany, the high feed-in-tariff was the basic incentive for adoption of biomass power. In the past, Germany had quite a number of smaller biomass power plants. Then we erected and built bigger plants, which had higher efficiencies. Some of those are still in use all around Germany. The feedstock varied from cow dung (a biogas plant really) to corn. Using corn slowly became an issue because using agricultural land for producing new crops for fuel was considered to be a problem. Moreover, 5-10 years ago there were many instances of technical problems with some of those power plants. Some of these technical and non-technical issues like the availability of new land and discussions on using fresh biomass for fuel etc. caused the German government to significantly reduce the goals in the field of biomass based power and biofuels.

A key difference between Europe and India is that the fuel used in Europe is primarily woody in nature. In India, a lot of the biomass feedstock is rice husk or paddy straws or coconut shells or mustard seeds. These products are already discards of the original product—what can be termed as agri-waste or agro processing waste. It is a valuable waste and it can be used for energy generation because a lot of capacity is still left. This is an aspect that becomes important while talking about biomass. One should be very careful in using new biomass for fuel production only. When one considers the waste to energy production potential of biomass, it is quite high. It is better to use waste biomass for energy production than using land to grow crops for the purpose of energy generation.

When one reaches the end of the value chain of biomass products, the waste can be used for fuel purposes. But before that, as long as there is the possibility to grow biomass that can be reasonably used, either by using it as wood, furniture, or for food, obviously that comes first. At the end of the chain, when it is close to garbage, then using this bio-waste and converting it into energy makes sense.

Do you see a future case in which the biomass power sector will not need to depend on subsidies?

For the biomass sector, we see the possibility of that happening in niche areas where an additional value is served. There might be regulations which don’t allow disposal of waste in certain areas. In that case, being able to reasonably use the material that needs to be disposed for biomass power projects might provide a good answer.

However, in general terms, I am afraid that it may not be true for the entire sector, especially while solar PV prices will come down and the grid will be rolled out further more. However, if we take into account other aspects like utilization of agri-residue or cogeneration, reducing air pollution etc., then all those are great factors to bring forward and promote the biomass sector in India.
What is GIZ’s outlook for India on Renewable Energy?

GIZ is very keenly involved and is happy to support the Indian government to further renewable energy adoption in the country. We have been working in the biomass sector focusing on tri-generation and energy efficiency, which is one of our strength areas. We did a couple of biomass projects related to producing power from jatropha plants and pellet production as well as a pine needle gasification project. Now we are looking at the future potential of these projects. GIZ is also focusing on the Green Energy Corridor which would help renewables to get integrated with the central grid. For all the renewable energy projects, we are focusing more and more on developing the business cases. We hope to identify areas where we get renewables to be financially viable on their own and not rely on subsidies.

Dr. Winfried Damm is the Director of the Indo-German Energy Programme at GIZ India.

He has been a member of national parliament in the energy sector and also worked with the municipal utility (Stadtwerke) of Leipzig. He had been involved in many national legislative outcomes starting with the first feed-in-law for renewables up to the current capacity market discussions. Stadtwerke invested more than EUR100 mn in two biomass plants of 20 MW with his approval as well as some smaller ones including biogas. Dr. Damm received his MBA from Michigan State University (USA), diploma from University of Hagen, Germany and Ph.D. from FU Berlin.
Biomass Sector on the Path of Revival

Biomass sector can create a rural revolution in the country. It has numerous benefits that are unparalleled compared to any other energy source, including other sources of renewable energy. Biomass based power is a step towards empowering the rural population, providing opportunities and making them important stakeholders in their own development process. The sector can play a key role in country’s growth not just in terms of improved GDP growth but also rural development.

Currently, the primary requirements of rural India are energy access and employment opportunities. Biomass based power, a renewable source of energy, is an ideal solution and provides numerous benefits.

- It provides high quality reliable power which helps meet the electricity needs in rural areas.
- Biomass power plants typically are built in rural areas of the country due to the availability of feedstock, thus contributing to the development of backward regions.
- The technology is 100% indigenous and thus the capital investment is made domestically, unlike other renewable energy segments, which have imported components leading to majority of the capital being deployed in international products and firms.
- Biomass based power engages the rural population for supply of feedstock (farmers for providing raw agriculture residue and other people engaged in collection, transportation and preparation of that feedstock) which results in increased liquidity in the rural system. A major proportion of the electricity tariff that’s received for biomass based power is ploughed back into the rural economy. This is the biggest advantage of Biomass sector and the prospects of generating rural employment can be estimated only second to the government run MGNREGA scheme (without any financial implications).

- The burning of agriculture waste is also checked by using it in biomass based power plants thus preventing numerous health hazards and threats, as otherwise agri-waste is mainly burnt by farmers in order to have their fields ready for the next crop.
- Being a renewable source, there are savings on fossil fuel and resultant carbon emissions in the environment.

Although traditionally Biomass has been the main source of energy for majority of the rural people in the country, Biomass based power industry established its foothold in the country only in early 2000. The technology is now well established; however the sector has been facing regulatory hurdles and challenges, which have acted as a barrier to the operation and growth of the sector.
Investments in the biomass based power sector have mostly been made by first-time entrepreneurs, who have had a vision to contribute to the renewable energy sector and in the growth of rural India. The plant and machinery are 100% indigenous and the sector has not had backing of foreign investment unlike the wind and solar sector, which have mostly been in the limelight in renewables space. Ironically, this has been a limiting factor for the sector to get the due attention for its operational needs and requirements from policy makers and regulatory authorities.

Grid connected biomass power sector has reached an installed capacity of 4.4GW (1410MW from biomass and 3008MW from bagasse cogeneration) in the country, however due to rapid changes in the economy, the regulatory and policy support to biomass sector has not kept track with the changing economic and operational conditions due to which the sector has suffered and somewhat lost its momentum. This has resulted in unsustainable operations which in turn have adversely affected financial institutions as well as developers who have invested in this sector over the last 5 years.

CERC and MNRE have acknowledged that the biomass sector is facing challenges and barriers in its operation and development and have formed task force committees on Biomass with the objective to identify and remove these barriers. Findings of the task force committee setup by CERC to look at the regulatory barriers faced by the sector have led to CERC amending some key biomass regulations.

The biggest challenge of tariff fixing linked to fuel price has been sorted out with CERC recommending this being set every year based on the independent surveys conducted by the State Nodal agency. Most of the State Electricity Regulatory Commissions have followed the CERC task force recommendations and have adopted a majority of them. This has been a silver lining for the biomass sector and has paved the path for its revival. Most of the State Electricity Regulatory Commissions have started revising the biomass power tariffs and have also agreed to the fuel price fixing mechanism recommended by CERC. This resolves a major hurdle for the biomass sector and paves a path for smooth operations of biomass power plants in the future.

MNRE had also formed a working group on biomass to smoothen out the operational hurdles faced by the biomass based power sector. The working group under MNRE has identified key operational barriers in the sector. Now the need is to take this from research to implementation stage. The biggest challenge is the revival of already commissioned capacity in the biomass based power sector. Specific policy initiatives are required to bring it back to track.
The sector is hoping for specific policy measures for the biomass power sector such as:

- Implementation of the CERC amended regulations for biomass based power plants by all SERCs - As some SERCs are still struggling to revise the regulations based on CERC recommendations, the sector would like a directive from the Ministry of Power to all SERCs for adopting the amended biomass regulations of CERC.

- Initiation of suitable policy measures for reducing the cost of funds for biomass sector through interest subvention support with specific funds allocation from MNRE / National Clean Energy Fund is a key need. A scheme is being launched by IREDA wherein 30% of an existing loan has been converted to low cost interest of 2%. The biomass sector, which has been struggling to fulfill its loan repayments, requires a similar and specific scheme.

- Generation based incentive (GBI) for biomass based power sector - A GBI policy initiative is most needed in biomass sector as it has a high operational cost in terms of fuel which fluctuates considerably due to various external factors. Generation based incentives are necessary to arrest the fuel price fluctuation and ensure continuous and viable operations of biomass power sector. In the past, GBI has been provided to the wind sector and the biomass sector needs to be provided similar incentives.

- The revival of existing biomass investments through suitable policy initiatives - These existing plants have suffered losses due to the regulatory and policy disconnects and currently many of these projects are experiencing severe financial duress. The commissioned plants need specific incentives for 3-5 years in order to provide them an opportunity to recover their past losses and become viable in the future.

- The launch of the Biomass Mission for which the Ministry has already prepared a vision document is a requirement to promote the biomass sector and this must be initiated at the earliest.

The government must look into these existing disconnects on a priority basis. Our existing regulatory system is time consuming and arduous. For a sector such as biomass based power, where fuel has to be purchased at regular intervals, delay in correcting these disconnects is leading to mounting losses and this has been a major reason for the stalled progress of the biomass based power sector.

Mere setting up a system and process of independent regulation is not enough. It is equally important to check if the system is able to perform properly and make necessary changes to make it effective.

Biomass based power sector is optimistic and is looking into the future with new hope and interest of contributing to the ‘MADE IN INDIA’ vision of government. The sector requires specific focus and handholding for 3-5 years to bring it back on track.

Amitabh Tandon is the Promoter and Managing Director of Transtech Green Power. He is the founder member and Secretary of Indian Biomass Power Association (IBPA) a non-profit organization of Biomass Power developers in the country. Mr. Tandon has over 25 years of experience in various projects related to biomass power, agriculture, telecom and software. He has been nominated by the government on the governing council of Sardar Swaran Singh Institute of Bio-energy.
INDUSTRY SPEAK

Building the case for Bio-Energy in Indian Pulp and Paper Industry

Need for leveraging renewable sources of energy in Pulp and paper industry

In the present scenario of energy crisis, rising energy cost and the global movement to reduce Green House Gas (GHG) emissions for environmental protection, it has become imperative to go for high pressure and efficient energy generation, distribution and utilization systems all around. Additionally, the increased use of biomass based energy is also gaining importance for similar reasons including environmental protection and fossil fuel conservation. This article takes a look at the business needs and the business case which this sector presents particularly in context of Pulp and Paper Industry.

Being a highly energy intensive sector with energy cost component pegged at about 16-25% of the total cost of production, the pulp & paper industry must look for non-conventional sources to satisfy its energy requirement. One of those options lies in its value chain. Biomass has a very strong relationship with pulp and paper industry as wood pulp is the basic raw material for virgin grade paper manufacturing. The mills use a variety of raw material viz. wood, bamboo, recycled fibre, bagasse, wheat straw, rice husk, etc.; approximately 31% are based on chemical pulp, 47% on recycled fibre and 22% on agro-residues.

New plant - biomass conveyor individual feeding system for the auxiliary fuel into the boiler
Using black liquor and saw dust to produce power

In the process of pulp manufacturing, the wood logs are cut into required size of chips and then pulp is prepared by processing the chips in different vessels (Digesters) with chemicals at a reasonable temperature and pressure. The pulp wood tree mainly contains fibre, lignin, resins and moisture. During the process of pulp manufacturing, while on one hand, the fibre is washed, screened, cleaned and bleached to make it suitable for paper manufacturing, on the other hand the lignin and the resins along with very fine fibres are separated from the fibre which is a bi-product called as black liquor.

Though there are various processes for treatment of black liquor, it is one of the most important biomass fuels in the paper and pulp industry due to its high calorific value (3100-3200 Kcal/kg). Black liquor can be burnt in the boiler after converting it into concentrated liquor through evaporation process and using the steam such generated for power generation or for industrial processes which need steam. Power generation is through “Topping Cycle Power Plant”, where part of the steam is extracted from the turbines for use in Process. Chemical recovery from the smell coming out of burning black liquor in the boiler through causticizing and lime kiln process is another advantage of the whole process.

Additionally, while cutting wood logs into chips, the bark from the wood logs is separated as it does not contain good fibre and also some wood dust is generated at the time of this cutting. Around 15% of green wood used in pulp manufacturing is left behind as a by-product called saw dust. The saw dust also contains good calorific value (2100 to 2200 Kcal/kg) and is burned in a bark or multi-fuel boiler for generating steam and power.

Power and steam generation from the black liquor and saw dust in pulp and paper industry is totally bio-energy.

Case of JK Paper: Experiencing higher resource efficiencies from use of bio-energy

The Pulp & Paper industry in India largely continues to use old low pressure steam boilers and power generation systems. In the modern pulp manufacturing units where high pressure and high temperature boilers are used, the steam and power generated from bio-energy not only meets the requirements of entire pulp manufacturing process but also in several cases yields extra power which can be exported to the grid.

This has been validated through experience at JK Paper's Orissa Plant (installed capacity of 290,000 TPA Writing & Printing paper) where a new pulp & paper unit along with power plant (capacity of 35 MW) has been recently installed and latest state-of-the-art technology has been used. The new plant boiler operates at 535° Celsius temperature and 105 kg/cm² pressure as compared to the old plant boiler operating at 410° Celsius and 32 kg/cm².

The plant is able to generate 20.2 GJ of energy per ton of BD pulp from biomass including 18.1 GJ/ton from black liquor and remaining 2.1 GJ/ton from saw dust.

Use of bio-energy as a percentage of total energy needs has improved from 38.8% to 64.8%. This significant improvement in share of bio-energy was primarily due to improved technology (such as higher efficiency multiple fuel power boiler, high concentration black liquor solid firing etc.) and better utilization of biomass.

The energy consumption per ton of production for pulp manufacturing has reduced from 22.5 Giga-Joules per ton of BD Pulp to 16.9 GJ/T of Pulp. The energy consumption in only paper manufacturing in also reduced from 13.8 Giga-Joules per ton of paper to 7.1 GJ/Ton.
This improvement was linked to improved technology for pulp manufacturing and energy conservation schemes undertaken by the plant.

The coal consumption has also seen a significant decrease with the co-firing of biomass with coal in the power plant set up with the paper and pulp unit from 2.1 tons of F grade coal/ton of paper to 0.95 tons of F Grade coal/ton of paper.

**Reduced O&M expenditure on fuel helps build the case for bio-energy in pulp & paper industry**

Although Biomass power is slightly expensive as compared to traditional coal thermal power, in the case of paper & pulp industry, the fuel is readily available as mill reject (black liquor). Therefore the O&M cost, which is predominantly the fuel cost in case of Biomass based Power, is reduced significantly. Also, paper & pulp industry already has the infrastructure to handle wood and biomass for their paper business. This infrastructure can be used directly to handle large scale of biomass for power generation and bio-refining.

Bio-energy is definitely a promising option to fulfill the energy needs of Paper & pulp industry in India. The key here is to start with incremental steps like investing in relatively cheaper but proven technologies like CHP and Co-firing. This will help the industry to gain experience and develop internal capabilities. As new technologies like bio-refining become more commercially viable, the industry can grab the opportunity to not only become self-sufficient but can also help reduce the trade deficit the country has to bear as a result of crude oil imports.

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Mr. M.C Goel is Head- Business Development at JK Paper India. He has over 40 years of experience and has experience with various leading organizations in different senior executive positions like Phoenix Pulp & Paper Thailand, CPL, Nigeria, Goenka & Thapar group of Industries and Ministry of Power in India. Mr. Goel is an Engineering Graduate from I.I.T., Roorkee, Post Graduate from I.I.T., New Delhi, and PGDM in Project Management.
Policy Update

Rajasthan Electricity Regulatory Commission releases Draft Order for determination of biomass tariff for projects commissioned in FY 2015-16

Issue Date: May 15, 2015

This is a draft order for determination of tariffs for the FY 2015-16. This tariff is applicable for projects commissioned during FY 2015-16 and the revised variable cost is applicable for projects commissioned during 2009-15.

The levelized generic tariff for Biomass, Biogas and Biomass Gasifier based power plants getting commissioned during FY 2015-16, has been worked out based on financial principles, operational parameters and performance parameters as specified under the RERC RE – Biomass, Biogas and Biomass Gasifier Tariff Regulations, 2015. Useful life has been considered as 20 years for these power plants for determination of their respective generic levelised tariff.

The tariff for Biomass, Biogas and Biomass Gasifier based power plants shall be a two part tariff consisting of fixed cost component and fuel cost component. The fixed cost component shall have the following components:

(a) Operation and Maintenance (O&M) Expenses;
(b) Depreciation;
(c) Interest on loan capital;
(d) Interest on Working Capital; and
(e) Return on Equity.

The discount factor has been considered equivalent to post tax weighted average cost of capital (WACC). Accordingly, the discount factor considered is 10.89%.

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<tr>
<th>FY 2015-16</th>
<th>Fixed charges (Rs/kWh)</th>
<th>Variable Charges (Rs/kWh)</th>
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<td>(Levelised for 20 years)</td>
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<td>Water Cooled Condenser</td>
<td>Without availling AD Benefit With AD Benefit availed</td>
<td>2.75</td>
<td>3.62</td>
</tr>
<tr>
<td>Air Cooled Condenser</td>
<td>Without availling AD Benefit With AD Benefit availed</td>
<td>2.57</td>
<td>3.62</td>
</tr>
<tr>
<td>Biogas Power Plants</td>
<td>Without availling AD Benefit With AD Benefit availed</td>
<td>3.00</td>
<td>3.91</td>
</tr>
<tr>
<td>Biomass Gasifier Power Plants</td>
<td>Without availling AD Benefit With AD Benefit availed</td>
<td>2.81</td>
<td>3.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Rajasthan Electricity Regulatory Commission Releases Notification for determination of biomass tariff for plants commissioned before 2008

Issue Date: May 7, 2015

The tariff determined through this Order will be in force from April 1, 2015 and will remain applicable for a period for four years from the date of commencement. Tariff for electricity supply to the distribution licensee by Biomass power plants, for which Power Purchase Agreements (PPA) have been executed under GoR Policy of 1999 and commissioned before 30.09.2008 shall be as under:

<table>
<thead>
<tr>
<th>Renewable Energy Generation during the year</th>
<th>Tariff in Rs. Per kWh for plants under GoR policy of 11.3.99</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>2.7500</td>
</tr>
<tr>
<td>1999-00</td>
<td>2.8875</td>
</tr>
<tr>
<td>2000-01</td>
<td>3.0319</td>
</tr>
<tr>
<td>2001-02</td>
<td>3.1835</td>
</tr>
<tr>
<td>2002-03</td>
<td>3.3426</td>
</tr>
<tr>
<td>2003-04</td>
<td>3.5098</td>
</tr>
<tr>
<td>2004-05</td>
<td>3.6853</td>
</tr>
<tr>
<td>2005-06</td>
<td>3.8695</td>
</tr>
<tr>
<td>2006-07</td>
<td>4.0630</td>
</tr>
<tr>
<td>2007-08</td>
<td>4.2662</td>
</tr>
<tr>
<td>2008-09</td>
<td>4.4795</td>
</tr>
<tr>
<td>2009-10</td>
<td>4.7034</td>
</tr>
<tr>
<td>2010-11</td>
<td>4.9386</td>
</tr>
<tr>
<td>2011-12</td>
<td>5.1855</td>
</tr>
<tr>
<td>2012-13</td>
<td>5.4448</td>
</tr>
<tr>
<td>2013-14</td>
<td>5.7171</td>
</tr>
<tr>
<td>2014-15</td>
<td>6.0029</td>
</tr>
<tr>
<td>2015-16</td>
<td>6.3030</td>
</tr>
<tr>
<td>2016-17</td>
<td>6.6182</td>
</tr>
<tr>
<td>2017-18</td>
<td>6.9491</td>
</tr>
<tr>
<td>2018-19</td>
<td>7.2966</td>
</tr>
</tbody>
</table>


CERC - Determination of generic levelised generation tariff for the FY 2015-16

Issue Date: March 31, 2015

In accordance with the RE Tariff Regulations, CERC has determined - the generic levelised tariffs for various renewable energy technologies. This order has defined tariff levels for projects in the following categories: wind energy, small hydro, biomass power project with Rankine cycle technology, non-fossil fuel based co-generation, solar PV, solar thermal, biomass gasifier and biogas power plants.
To calculate the net levelised tariff, a host of parameters have been considered. These include useful life of plant, control period, tariff period, discount factor, capital cost, debt-equity ratio, return on equity, interest on loan, depreciation, interest on working capital, capacity utilization factor, plant load factor, auxiliary power consumption and fuel costs. The resulting tariffs determined are:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>7.48</td>
<td>7.36</td>
<td>7.75</td>
<td>5.80</td>
<td>6.53</td>
</tr>
<tr>
<td>Haryana</td>
<td>8.16</td>
<td>8.03</td>
<td>8.44</td>
<td>8.32</td>
<td>6.76</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>8.28</td>
<td>8.16</td>
<td>8.58</td>
<td>8.45</td>
<td>6.43</td>
</tr>
<tr>
<td>Punjab</td>
<td>8.41</td>
<td>8.29</td>
<td>8.71</td>
<td>8.58</td>
<td>6.21</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>7.44</td>
<td>7.32</td>
<td>7.72</td>
<td>7.59</td>
<td>-</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>7.39</td>
<td>7.27</td>
<td>7.67</td>
<td>7.54</td>
<td>5.41</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>7.56</td>
<td>7.44</td>
<td>7.84</td>
<td>7.71</td>
<td>6.17</td>
</tr>
<tr>
<td>Others</td>
<td>7.81</td>
<td>7.70</td>
<td>8.10</td>
<td>7.97</td>
<td>6.08</td>
</tr>
</tbody>
</table>

Source: [http://www.cercind.gov.in/2014/draft_reg/Petition%20On%20SM%20004%202015.pdf](http://www.cercind.gov.in/2014/draft_reg/Petition%20On%20SM%20004%202015.pdf)

**Decision of Appellate Tribunal for Electricity for revision of biomass tariffs on a regular basis**

**Date: March 23, 2015**

The Appellate tribunal decision was in response to the original petition filed by the Indian Biomass Power Association seeking appropriate direction under section 121 of the Electricity Act, 2003 to the State Electricity Regulatory Commissions regarding revision of annual tariff for biomass based power projects and to provide open access to biomass based power projects.

It was observed that some State Electricity Regulatory Commissions, particularly Madhya Pradesh, Orissa, Gujarat, Tamil Nadu and Rajasthan are not revising the tariff on annual basis on the basis of actual cost of biomass fuel.

In its order, the Tribunal directed the State Commission that going forward, for determination of tariff for biomass based power projects:

1. The State Commission shall determine a two part tariff i.e. fixed and variable charges in respect of biomass based power projects instead of a single flat energy tariff. The fixed charges may be determined based on the life cycle of biomass power projects. However the variable charges may be determined periodically on the basis of prevailing biomass fuel price which may be fixed after carrying out a State specific study. The fuel price may be determined annually through an independent study. Alternatively fuel price may be determined for the first year of the control period of say 2 to 3 years with percentage annual escalation linked to appropriate indices for the subsequent years of the control period. At the end of a control period, the fuel price may be re-determined for the first year of the next Control Period.

2. Under the Electricity Act, 2003, the generating companies have freedom to supply electricity to the customers of their own choice. The State Commissions have to provide non-discriminatory open access on payment of the requisite charges. Therefore, the biomass based generators who have not entered into a Power Purchase Agreement with the distribution licensees of the host State should be given non-discriminatory open access for the transmission & distribution system to facilitate supply of power to third parties within or outside the State subject to the provision of the Act and the Regulations.

Source: [http://aptele.gov.in/judgements/O.P%20WO.3%20of%202012.pdf](http://aptele.gov.in/judgements/O.P%20WO.3%20of%202012.pdf)

**RPO Targets Proposed by Electricity Regulatory Commissions of Tripura and Madhya Pradesh**

Electricity Regulatory Commission of Tripura and Madhya Pradesh recently declared their RPO targets for the next few years. Tripura has proposed targets till 2020 and Madhya Pradesh till 2019. The table below summarizes the solar and non-solar RPO targets in the last two years as well as the targets proposed by the SERCs. While Tripura’s earlier targets were quite low, the proposed targets see an ambitious spike, surpassing the NAPCC (National Action Plan for Climate Change) targets.

The targets set by Madhya Pradesh, on the other hand see a small but steady growth. However, they still fall below the NAPCC targets.

<table>
<thead>
<tr>
<th>Tripura</th>
<th>Solar (%)</th>
<th>Non-Solar (%)</th>
<th>Total (%)</th>
<th>Solar (%)</th>
<th>Non-Solar (%)</th>
<th>Total (%)</th>
<th>NAPCC Targets Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2014</td>
<td>0.35</td>
<td>0.65</td>
<td>1.00</td>
<td>4.70</td>
<td>5.50</td>
<td>7.00</td>
<td>7.00</td>
</tr>
<tr>
<td>2014-2015</td>
<td>1.05</td>
<td>1.45</td>
<td>2.50</td>
<td>6.00</td>
<td>7.00</td>
<td>14.00</td>
<td>8.00</td>
</tr>
<tr>
<td>2015-2016</td>
<td>1.10</td>
<td>0.90</td>
<td>2.00</td>
<td>6.00</td>
<td>7.00</td>
<td>14.00</td>
<td>9.00</td>
</tr>
<tr>
<td>2016-2017</td>
<td>1.30</td>
<td>1.00</td>
<td>2.30</td>
<td>6.50</td>
<td>7.50</td>
<td>16.00</td>
<td>10.00</td>
</tr>
<tr>
<td>2017-2018</td>
<td>1.50</td>
<td>1.50</td>
<td>3.00</td>
<td>7.00</td>
<td>8.50</td>
<td>16.00</td>
<td>11.00</td>
</tr>
<tr>
<td>2018-2019</td>
<td>1.75</td>
<td>1.25</td>
<td>3.00</td>
<td>7.50</td>
<td>9.25</td>
<td>22.00</td>
<td>12.00</td>
</tr>
<tr>
<td>2019-2020</td>
<td>2.00</td>
<td>1.50</td>
<td>3.50</td>
<td>8.00</td>
<td>9.50</td>
<td>27.50</td>
<td>13.00</td>
</tr>
</tbody>
</table>


Disclaimer: The regulations presented here are summaries of the original and should not be referenced for legal or commercial purposes. For the original regulations, refer to the websites of the issuing agency.
Our recommended read for the quarter is Biomass for Heat and Power Technology Brief by IRENA. Released earlier in the year, this brief provides a good overview for anyone looking to understand the present-day opportunities and challenges that lie in the biomass sector internationally.

Biomass for Heat and Power goes beyond merely outlining the basics of how various biomass technologies work but also assesses the advantages and disadvantages associated with the various technologies, the costs involved (both capital and operational expenditure) and the potential payback period.

The brief focuses on technologies like biomass-based power generation and Combined Heat and Power, co-firing of biomass in coal-fired plants and anaerobic digestion of wet biomass with CHP for small scale CHP applications.

It provides guidelines for determining the most suitable technologies for various kinds of heat and power requirements. The report highlights various biomass based technologies which reduce greenhouse gas emissions from coal-fired power plants and enable efficiencies higher than those using 100% biomass fuel.

It also touches upon biomass pre-treatment technologies like drying, pelletization and briquetting, torrefaction and pyrolysis as effective means to make handling, transport, and biomass conversion processes more efficient and cost effective.

Unlike most technology briefs, Biomass for Heat and Power also talks about the other aspects that would affect the viability of biomass power projects and has insights for policymakers as well as investors and developers in the biomass heat and power generation space. It highlights the fact that one of the key challenges related to bioenergy is the optimization of potential benefits (such as GHG savings, biodiversity, employment opportunities, energy security) and trade-offs (such as and food security). The report provides very useful cost-structures for plants as well as feedstock, with projections for costs and revenues in a 5 and 15 year time-frame.

A key fact highlighted in the report was that in 2012 bioenergy accounted for about 10% or 51 EJ of global energy demand, which was larger than any other single renewable energy option.

There are several important implications of this report for the biomass sector in India. Firstly, the fact that there is a growth in biomass-based electricity generation globally is a positive indicator for the Indian biomass sector. Secondly, it is pointed out that policy plays a very important role in increasing the uptake of biomass power in a region and an appropriate regulatory framework and support measures are critical to ensure sustainability of the bioenergy sector.

According to the report, consistency of policy that supports biomass power is deemed essential, and economic incentives, such as Feed-in-Tariffs (FITs) or tax credits, are required, at least at the initial stage of development. However, it is also acknowledged that there is a need to ensure that the economic incentives do not cause financial burdens and hinder the technology’s development over time, which might occur if incentives are set too high. Thus, a “Tariff degression” approach is recommended, wherein progressive tariff reductions are introduced over time.

Overall, the report provides a very comprehensive summary of the different stages of development of various biomass heat and power generation technologies in the world and presents a useful snapshot of the economics of different kinds of biomass projects that can be seen globally.
Launch of Biomass Knowledge Portal and Discussion Forum

A web based Biomass Knowledge Portal and interactive Discussion Forum has been developed by the Ministry of New and Renewable Energy, Government of India with the aim to disseminate developments in the sector to all stakeholders.

The portal is a user friendly, single point source for updated and effective information/data related to generation of power - grid interactive, off-grid and captive; and thermal energy - from biomass using different thermal conversion technologies – combustion, gasification and cogeneration. The portal is expected to enhance the capacities and act as a platform for various stakeholders such as project promoters, financial institutions, regulators, policymakers, state agencies and others for exchange of information, sharing success stories, and interaction on issues faced by the sector.

The portal has two distinct sections:

- **Domain Information** will have information related to resource potential; conversion technologies including benchmark parameters, cost, criteria for selection; government programmes & policies, interactive map with state specific information; case studies; tariff & regulatory orders, compiled directories, e-library and international scenario related to biomass sector.

- **Discussion Forum** is framed as a moderated and impartial interactive platform for discussion among concerned stakeholders for exchange of knowledge/ideas and draw mutual benefits from collective learning. The moderated responses and discussions would be shared on the forum to enable ‘real-time’ answers to critical questions. The responses to queries will be moderated and presented in a summarized form for maximizing benefits to all members.

This initiative of the Ministry has been launched under the MNRE - UNDP/GEF assisted Project on “Removal of Barriers to Biomass Power Generation in India”. The Ministry hopes that the Biomass Knowledge Portal will significantly contribute towards developing biomass based power generation in India in an effective and optimal way.

The Biomass Knowledge Portal has been developed by M/s Idam Infrastructure Advisory Private Limited along with M/s Via Interactive Technologies Private Limited.

The web portal can be accessed through www.mnre.gov.in or by scanning the QR Code on the smartphone.
Study on Socio-Economic and Environmental Impacts of Biomass Power Plants

The Ministry of New and Renewable Energy (MNRE) has recently commissioned Ernst and Young to undertake a “Study on Socio-Economic and Environment Impacts of Biomass Power Projects” under the MNRE-UNDP/GEF Project on “Removal of Barriers to Biomass Power Generation in India”.

As most biomass based power plants rely on agricultural residue, a significant part of the fuel supply chain is managed by the rural farmers and traders. Given the above, there exists a need for a detailed study on the social, economic and environment impacts of biomass power project, especially in the local rural economy.

Considering that biomass is a promising source for generation of power and has the potential to provide large productive employment in rural areas, the outcome of the study may also be useful in securing term loans from Banks and other Financial Institutions. This would provide an impetus to the sector through timely and adequate credit.

Objective

The key objective of the study is to assess and quantify the socio-economic and environmental impact of biomass based power projects on the rural economy and environment. The study will cover 1 MW and above grid-connected biomass power plants.

Scope of the study

The study is adopting a detailed case-based approach for various biomass based power plants spread across a number of states to cover regional and seasonal variation, impact of scale of plant, fuel type and design of plant operations.

The following socio-economic and environmental impacts are being considered under this study:

- Social welfare: income, health and education
- Security of energy supply
- Local pollution and environment
- Migration from rural areas

An interesting feature of the commissioned study is its focus on the entire supply chain and value chain of biomass power plants. Following aspects will be studied as part of this exercise:

- Existing logistics of fuel linkage and supply in the plants, including cost and benefits of energy plantation, collection of agri-residues, transportation, processing, storage and seasonal variations;
- Total economic, social and health impact across the total fuel supply chain, including indirect and ripple down benefits;

- Effect on income of marginal, small and/or large farmers, including off season income;
- Effect on income of marginal, small and/or large farmers, including off season income;
- Emergence and economics of new processing, distribution and service industries in rural communities around the establishment of biomass plants;
- Effect on local labour opportunities, number of person-days of wage labour, additional income and migration flows;
- Effects on health conditions, due to biomass burning.

- Benefits that have accrued to the local/regional manufacturers/industries as a result of the Biomass power plants
- Avoided emission of particulate matter by using agricultural residue in Biomass Power plants as compared to open burning.

Sites for on-field data collection

The following power plants have accorded their consent for conduct of the study and for on-field data collection:

<table>
<thead>
<tr>
<th>Company</th>
<th>Plant location</th>
<th>Plant capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transtech Green Power Ltd</td>
<td>Kachela Bagari-Sandur, Jalora, Rajasthan</td>
<td>12 MW</td>
</tr>
<tr>
<td>SM Environmental Technologies Pvt. Limited</td>
<td>Chippabarod, Rajasthan</td>
<td>8 MW</td>
</tr>
<tr>
<td>Malwa Power Ltd</td>
<td>Gulabewala, Muktsar, Punjab</td>
<td>7.5 MW</td>
</tr>
<tr>
<td>Orient Green Power Company Limited</td>
<td>Narasimhapur, Madhya Pradesh</td>
<td>10 MW</td>
</tr>
<tr>
<td>Orient Green Power Company Ltd</td>
<td>Puducherry, Tamil Nadu</td>
<td>10 MW</td>
</tr>
<tr>
<td>SLS Power Ltd</td>
<td>Nellore, Andhra Pradesh</td>
<td>6.5 MW</td>
</tr>
</tbody>
</table>

We look forward to sharing the findings of the Study with the industry stakeholders in the future issues.
News

Maharashtra Cabinet Approves policy on Renewable Energy

June 3, 2015: The Maharashtra Cabinet approved a composite policy on renewable energy, in which it has set a target of achieving 14,400 MW of installed capacity in a period of five years and attracting an investment of Rs 1 lakh crore. The policy aims at increasing the share of renewable energy from around 9% to 15% in this time period. Aims of the policy include achieving the installed capacity of 7500 MW of solar energy, 5000 MW of wind energy, 1000 MW of bagasse based cogeneration, 400 MW small hydro, 200 MW of industrial waste-to-energy and 300 MW of agriculture waste-based products. The current installed capacity of renewable energy is 6,700 MW.

Source: http://www.business-standard.com/

Approval for Issue of Tax Free Bonds for Renewable Energy

Ministry of Finance vide its letter dated 30th April 2015, has accorded an in-principle approval for issuance of Tax Free Infrastructure Bonds of Rs. 5,000 crore for funding renewable energy projects during the FY 2015-16 by Central Public Sector Enterprises (CPSEs) aimed towards achieving 175 GW capacity by 2022 as announced in Budget 2015-16.

Accordingly, the Ministry of New and Renewable Energy has submitted a proposal to Ministry of Finance for allocation of tax free Bonds to 5 CPSEs – i) Indian Renewable Energy Development Agency (IREDA) – Rs. 2,000 crore; ii) Indian Infrastructure Finance Company Ltd. (IIFCL) – Rs. 1,000 crore; iii) Power Finance Corporation (PFC) – Rs. 1,000 crore; iv) Rural Electrification Corporation (REC) – Rs. 1,000 crore; and v) Solar Energy Corporation of India (SECI) – Rs. 100-200 crore.

Source: MNRE

Inclusion of Renewable Energy Projects in Priority Sector Lending Norms of Commercial Banks

Reserve Bank of India (RBI) vide its circular dated 23rd April 2015, on “Priority Sector Lending: Targets and Classification” has issued revised guidelines for all scheduled commercial banks making significant inroads for renewable energy in the priority sector lending:

a) Inclusion of renewable energy in categories of priority sector, in addition to existing categories;

b) Bank loans up to a limit of Rs. 15 crore to borrowers for purposes like biomass based power generators, solar based power generators, wind mills, micro-hydel plants and for non-conventional energy based public utilities, viz. street lighting systems and remote village electrification. For individual households, the loan limit will be Rs. 10 lakh per borrower.

Source: https://rbi.org.in/

Indian Farmers Fertilizer Cooperative (IFFCO) Orders Combined Heat and Power Supply Plant for Urea and Fertilizer Factory in Uttar Pradesh

May 12, 2015: Mitsubishi Hitachi Power Systems, Ltd. (MHPS) has received a turnkey order for a combined heat and power (CHP) supply plant. The plant order was placed by Indian Farmers Fertilizer Cooperative Limited (IFFCO), India’s largest fertilizer producer. The newly ordered CHP plant is scheduled to go on-stream in July 2016. The cogeneration plant is to be built within IFFCO’s existing Phulpur plant in Uttar Pradesh, northern India. Plans call for an output of 22 megawatts (MW) and steam volume of 60 tons per hour. After commissioning, the new plant will stably support the power and steam consumption demands of IFFCO’s large-scale urea and fertilizer factories.

Source: https://www.mhps.com/

Big Jump in Renewable Energy Certificates Trading Volumes

May 28, 2015: A marked pick-up in the demand for renewable energy certificates was seen in the trading
Fuel from Coconut Husks: Chennai Corporation Seeks Interest

May 21, 2015: The Corporation of Chennai has called out for green energy firms interested in generating biomass out of tender coconut husks in an Expression of Interest (EoI) put out by the civic body’s Central region. Nearly three tonnes of tender coconut husks are generated on a daily basis from the Central region. These husks are accumulated and transported to dump yards where they rot with the rest of the garbage. In a bid to change this, the civic body is now on a lookout for firms interested in processing the husks in order to generate biomass and subsequently bio-fuel, which could be used for cooking purposes as well as to run automobiles. The civic body is even willing to let the eligible firm establish a biomass generating unit.

Source: http://www.newindianexpress.com/

Getting Rid of Garbage, Generating Power with Biomass in Bengaluru

April 21, 2015: After solar and wind energy, the Karnataka Government is now focusing on power generation from biomass, especially in Bengaluru, where waste generation is very high and waste management is poor. Meetings have been scheduled with relevant stakeholders to see how energy can be generated from the biomass waste that Bengaluru produces. Bengaluru generates over 3,600 tonnes of waste per day, of which 60-70% is organic. This can be used to generate electricity ward wise, which will also help in solid waste management. Biomass energy is being generated in some other parts of Karnataka like Davangere, but it is not being done yet in the capital city.

Source: http://www.deccanherald.com/

Significant orders by Appellate Tribunal for Electricity on RPO Compliance

Appellate Tribunal for Electricity (APTEL) has delivered two major judgements on 16th and 20th April, 2015 in the case of RPO waiver given by GERC, and on the petitions filed by INWREA on RPO compliance. These orders observe that if the distribution licensee has not made efforts to procure requisite renewable energy to fulfill the RPO and also has not procured REC, the State Regulatory Commission should not revise RPO under Regulation 4.2 (which deals with revision in the percentage targets for a year), and non-availability of REC is a pre-condition for carry forward under Regulation 9 (which describes the consequences of default if the obligated entity does not fulfill RPO and also does not purchase REC). It also observes that while revising the RPO targets, the State Commission has to ensure that such revision should not defeat the objective of the Electricity Act and the Regulations.

Source: http://www.apTEL.gov.in/judgements/

Abellon wins Energy Globe Awards 2015 from India

Abellon Clean Energy won the Energy Globe Awards, 2015 from India. Initiated in 1990, the Energy Globe Awards is one of the world’s most prestigious environmental awards, given annually to outstanding projects focusing on energy efficiency, renewable energy and resource conservation. Abellon was selected as the National Winner from India from among 60 entries, which were judged by an eminent jury chaired by Ms. Maneka Gandhi, Member of Parliament and noted environmentalist.

Abellon’s nominated project established a decentralized collection model, employing 118 local entrepreneurs to collect cotton stalk and other crop residues for bio-powder and bio-pellet production. More than 336,000 tons of biomass was used for the production of 319,200 tons of pellets, replacing the use of lignite and therefore reducing CO2 emissions by 542,640 tons.

Source: Abellon Clean Energy
Datebook

6th World Renewable Energy Technology Conference
Date: August 21-23, 2015
Location: New Delhi, India
Type of event: Conference and Expo
Organizer: Energy and Environment Foundation
Link: http://wretc.in/

9th Renewable Energy India Expo
Date: September 23-25, 2015
Location: Greater Noida – UP, India
Type of event: Conference and Expo
Organizer: UBM India
Link: http://www.ubmindia.in/renewable_energy/home

International Congress and Expo on Biofuels & Bioenergy
Date: August 25-27, 2015
Location: Valencia, Spain
Type of event: Conference
Organizer: OMICS Group
Link: http://biofuels.bioenergy.conferenceseries.com

International Bioenergy (Shanghai) Exhibition and Asian Bioenergy Conference
Date: October 21-23, 2015
Location: Shanghai, China
Type of event: Conference and Expo
Organizer: BEC- Biomass Energy Committee, China
Link: http://www.ibsce.com/cms2/

Bioenergy 2015
Date: September 2-4, 2015
Location: Jyväskylä, Finland
Type of event: Conference
Organizer: Bio Energy Events
Link: http://www.bioenergyevents.fi/

International Bioenergy and Bioproducts Conference (IBBC) 2015
Date: October 28-30, 2015
Location: Atlanta, USA
Type of event: Conference
Organizer: TAPPI
Link: https://www.eiseverywhere.com/ehome

European Biomass to Power
Date: September 16-17, 2015
Location: Berlin, Germany
Type of event: Conference
Organizer: Active Communications International
Link: http://www.wplgroup.com/aci/conferences/eu-ebp5.asp

IEA Bioenergy Conference 2015
Date: October 27-29, 2015
Location: Berlin, Germany
Type of event: Conference
Organizer: European Biomass Association
Link: http://ieabioenergy2015.org/
INDIAN RENEWABLE ENERGY DEVELOPMENT AGENCY LIMITED
FINANCING AND PROMOTING SELF-SUSTAINING INVESTMENT IN ENERGY
GENERATION FROM RENEWABLE SOURCES, ENERGY EFFICIENCY AND ENVIRONMENTAL
TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT.

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- Solar Energy
- Hydro Power
- Biomass Power
- Energy Efficiency & Conservation
- Cogeneration
- Waste to Energy
- Power Evacuation System

DEVELOPMENT ACTIVITIES
- Investor's Manuals
- Business Meets
- Administering MNRE Schemes
- SCHEMES
- Take-over Loan from Banks/FIs
- Project Financing
- Equipment Financing
- Bridge Loan against SDF

NEW INITIATIVES
- Securitization against receivables
- Financing IFIs/SPVs
- Consortium/co-finance
- Performance
- Grantees
- Consultancy & Advisory Services

Loan Sanction Rs. in Cr.

Role of IREDA
Dedicated FI for Renewable Energy
Pioneered RE Financing in the country
Catalyzed Banks & FIs to finance RE
Developed Innovative financing models

LEDING TERMS
Min. Loan: Rs. 50 Lakh
Loan: upto 75% of project cost
Interest: 9.90% to 10.75%
Moratorium: 6 to 12 months
Repayment: Upto 9 years

Rooftop Solar PV Power Projects
(Industrial, Commercial & Institutional Rooftops)
Loan: upto 75% of project cost
Interest: 9.90% to 10.75%
Moratorium: 6 to 12 months
Repayment: Upto 9 years

* updated as on 14/07/2015

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POWER UP A BILLION DREAMS

RE-INVEST 2016 is scheduled to be held from 18-20 February 2016. The resounding success of first edition of the event has made this annual Indian congregation on renewable energy a ‘must-attend’ for industry leaders and for advocates of the sector from around the world. The 2015 edition’s success was marked by:

- 387 Green Energy Commitments submitted by both global & domestic investors
- Commitment by developers for 272 GW of renewable energy
- Over 3000 delegates attended from 41 countries including 200 investors from India and abroad
- 119 Indian & International organizations exhibited their products


The Conference will feature multiple technical and breakout sessions discussing various facets of Renewable Energy industry. The Exhibition will showcase breakthrough scientific developments from manufacturers, project developers, investors and other players in the renewable energy space, as well as India’s manufacturing capabilities and latest technologies.

Don’t Miss this Exciting Opportunity.
Come. Explore unlimited opportunities in India’s Renewable Energy sector.
Registrations will open soon.

For more information, please contact:
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