Is India on track to meet RE target of 175 GW by 2022

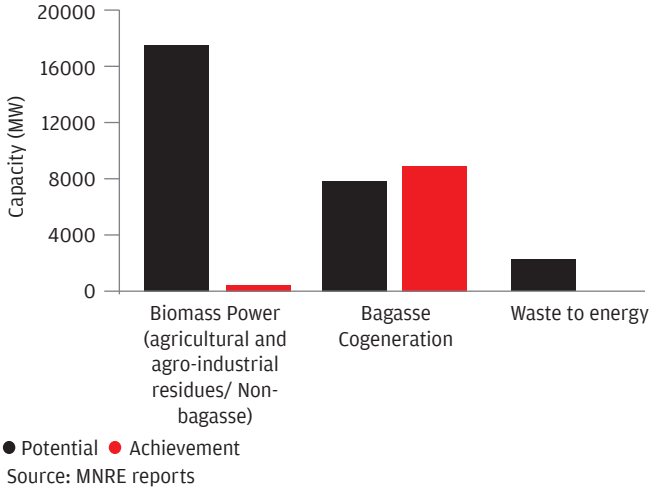
Biomass/Bagasse

1. Burning biomass for energy is not new – large numbers of poor women continue to use biomass as cooking fuel to the detriment of their health. But what is new is to burn biomass/bagasse in controlled environments to make fuel. This is a win-win option, as farmers get value for their residue; it is not burnt in the open to add to air pollution and it provides energy.

2. The fact is that biomass – from crop residue to kitchen waste – is a key cause of air pollution and adds to the enormous challenge of waste management in the country. Therefore, any efforts to use this so-called waste for gasification and energy generation would go a long way to combat pollution and make waste into a resource.

3. The current availability of biomass in India is estimated at about 500 million metric tonnes per year. Studies sponsored by the MNRE has estimated surplus biomass availability at about 120 – 150 million metric tonnes per annum covering agricultural and forestry residues corresponding to a potential of about 18,000 MW. In addition, the potential of bagasse cogeneration is estimated based on full utilisation by 550 sugar mills in the country. There is no estimation of the organic-household waste that is generated in the country in terms of its energy potential. (see Graph 1)

Graph 1: Biomass energy: Potential vs Achievement

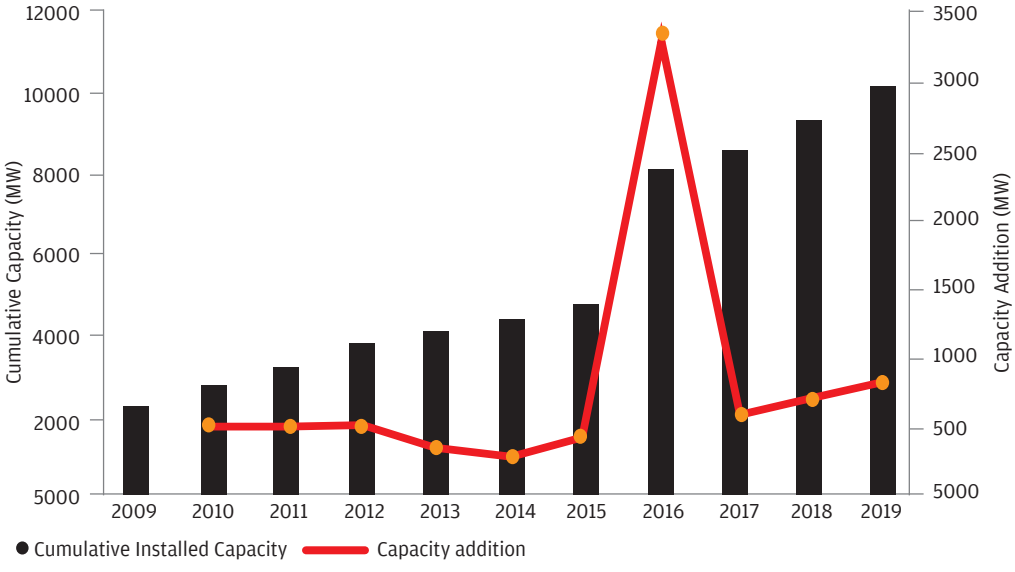


Source: MNRE reports

4. Given this possibility, a rather unambitious target of 10,000 MW of biomass energy has been included in India's Renewable Energy (RE) target of 1,75,000 MW by 2022. This target had been achieved as of December 2019.

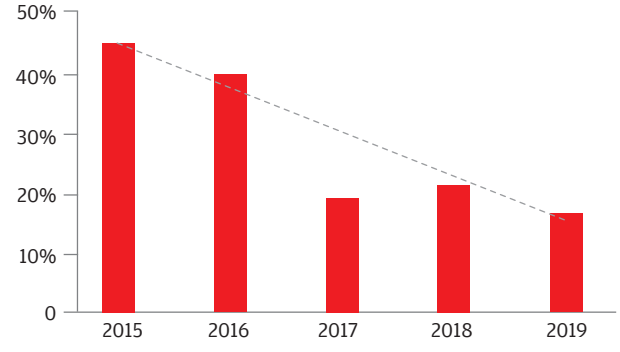
Centre for Science and Environment
41, Tughlakabad Institutional Area, New Delhi 110 062, INDIA
Ph: +91-11-29956110 - 5124 - 6394- 6399 Fax: +91-11-29955879
E-mail: cse@cseindia.org Website: www.cseindia.org

Graph 2: Capacity addition over the years



Source: MNRE, CEA

Graph 3: Plant Load Factor of Biomass plants

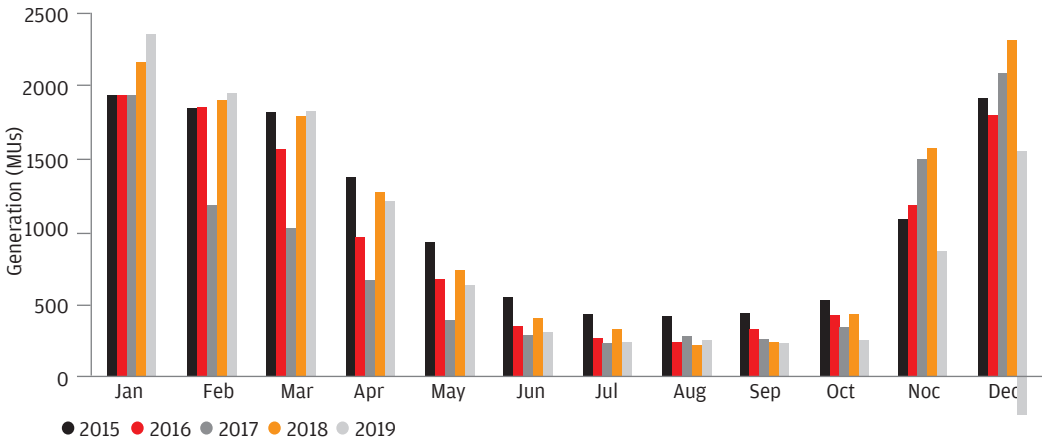


Source: Analysis by CSE based on CEA data

5. MNRE incentivizes biomass through its biomass-based cogeneration scheme for sugar mills and other industries. Under this, it provides central financial assistance at the rate of ₹25 lakh per MW of surplus exportable capacity – fed into the grid and ₹50 lakh per MW of installed capacity. In addition this energy gets tax holiday for 10 years and other concessions on customs and excise for equipment. In addition, state electricity regulatory commissions (SERCs) provide preferential tariffs and this source of energy is also included in the 'must run' category – but for plants which are 10 MW and below. (see Table 1)

6. However, given all this, this biomass energy sector seems to be running out of energy. In the past two years, capacity additions have stagnated; additions have dried up (see Graph 2). This is similar for the bagasse

Graph 4: Power generation from bagasse-cogeneration



Compiled by CSE

co-generation projects, which in 2019 has been 12 per cent lower than the previous years.

7. What is inexplicable is that there is also a drastic decrease in the plant load factor (PLF) of biomass plants – from 46 per cent in 2015 to 17.1 per cent in 2019 as per the data from CEA (see Graph 3). This when CERC recommends that the PLF of biomass plants would range from 60-80 per cent. This would suggest gross under-utilization of the existing plants.

8. This industry is dependent on the cyclic availability of raw material – seasonal harvesting of sugarcane and other crops. It is estimated that by and large 1 MW power plant requires 7000-10,000 metric tonnes of biomass per year. Industry says there is shortage of this and costs of raw material are increasing – it costs roughly ₹6 to generate one unit of power.

9. CERC puts the capital cost of these plants at ₹5.6 crore to ₹6.5 crore per MW for biomass plant and ₹5 crore per MW for a co-generation plant. This with the cost of fuel and other operational spends, means that the cost of energy is high – ₹7.35 to ₹8.91 per unit (in bagasse it is between ₹5.75 to ₹7.19 per unit).

10. This tariff makes the industry unviable, particularly in times when there is surplus cheap energy in the grid and discoms are in the red and can't pay. This is perhaps the reason why biomass sector is flagging.

11. CEA has on January 17, 2020, drawn attention to the reduction in generation from bagasse. It says that it has found a "significant decrease in

Table 1: Net Levellised Tariff (upon adjusting for Accelerated Depreciation benefit) (₹/kWh) by CERC

	Biomass Power Projects [other than Rice Straw and Juliflora (plantation) based project]						Biomass Power Projects [Rice Straw and Juliflora (plantation) based project]		
State	Water Cooled Condenser and travelling grate boiler	Air Cooled Condenser and travelling grate boiler	Water Cooled Condenser and travelling grate boiler	Air Cooled Condenser and travelling grate boiler	Water Cooled Condenser and AFBC boiler	Air Cooled Condenser and AFBC boiler	Water Cooled Condenser and AFBC boiler	Air Cooled Condenser and AFBC boiler	Bagasse Based Co-generation Project
AP	7.53	7.78	7.63	7.89	7.44	7.69	7.54	7.8	6.19
Haryana	8.25	8.52	8.35	8.63	8.15	8.41	8.25	8.52	7.19
Maharashtra	8.39	8.66	8.49	8.77	8.28	8.55	8.38	8.66	6.85
Punjab	8.53	8.8	8.63	8.91	8.41	8.69	8.51	8.8	6.61
Rajasthan	7.5	7.75	7.6	7.86	7.4	7.65	7.5	7.76	-
Tamil Nadu	7.45	7.7	7.55	7.81	7.35	7.6	7.45	7.71	5.75
UP	7.62	7.88	7.72	7.99	7.53	7.78	7.63	7.89	6.58
Others	7.89	8.16	7.99	8.27	7.79	8.05	7.89	8.16	6.48

Source: CERC RE Tariff Order 2019-20

generation from bagasse-based energy in November 2019, as compared to the previous year 2018 and this in spite of the increased capacity of 71 MW in just this period." It has asked for explanation from the biomass producers and this is still awaited. (see Graph 4).

12. But given the enormous potential of the source, it is clear answers need to be found. In Punjab and Haryana, for instance, rice straw burning has become a major cause of concern because of its contribution to winter pollution. Currently, in Punjab, only 3 per cent of the paddy stubble is used for generating power

13. There is also the possibility of using biomass as fuel in the coal-based power plants, with some adjustments in the boiler. This will reduce coal usage and pollution and means that existing power capacity can be utilized. NTPC estimates that 5 per cent co-firing will need roughly 200 tonnes of biomass per MW – if this is calculated for India's present coal based power generation capacity, then it would require some 40 million metric tonnes of biomass each year.