Bio-energy and Bio-CNG in India

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IEA forecasts

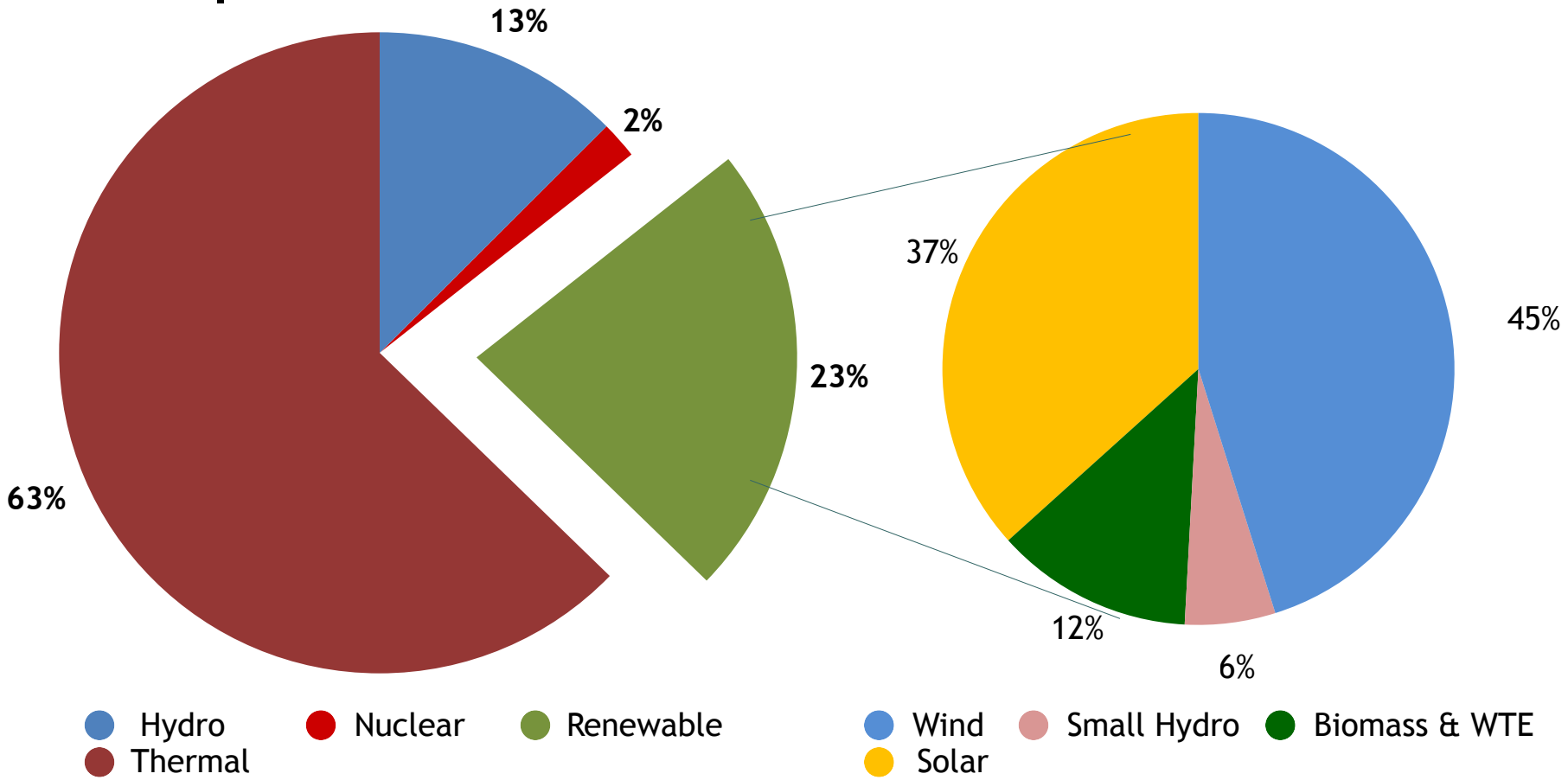
Biomass & Waste will be largest contributors to global primary energy by 2050 - for 2 deg C temperature rise scenario.

By 2035, Biomass will contribute 14% of global primary energy (against 8% for Solar and Wind)

In India, Biomass and Waste will continue to constitute 23% of Primary Energy Demand, albeit with higher efficiency, through use of advanced Bio-Technologies, for cooking/ heating + transport + electricity

Renewable Power Status

Share in Total Installed Capacity



Total installed capacity 360 GW- Renewable capacity 80.6 GW

Agriculture and Bioenergy linkage

- India's rising population coupled with high GDP growth, is increasing the demand for food; thus making it imperative to practice Bio-economy, viz improving the efficiency of agriculture production and consumption chain;
- A key element of Bio-economy would be the optimal utilisation of crop residues for conversion to cattle feed, compost, biofuels, and other bio-based products.
- Advanced Bio-Technologies are almost ready to deliver, cost effectively, liquid fuels from agricultural residues and Biogas (or Bio CNG + Liquid CO2) from agriculture residues/manure/organic fraction of MSW and can facilitate transition to "Farm linked Bio-Economy".
- Co-Products include Compost, which would increase farm yields and reduce the demand for Chemical Fertilisers.

Potential of Bio-energy in India

Agricultural residues / energy crops

- 195 M.ha. of gross cultivated area of the country producing ~683 MTA dry biomass – estimated surplus ~ 179 MTA (A recent study by IARI)
- About 50 M.ha land under mono cropping - opportunity for short cycle biomass crops.
- Large quantities of biomass being burnt

Cattle dung and Poultry droppings

- 1000 MTA from 300 million cows & buffaloes.
- 30 MTA from 500 million poultry birds.

MSW

- **U**rban population of about 550 mil - is estimated to generate > 100 MTA of MSW

Quantities will only increase as the production and the efficiencies of their use go up.

Potential of Bio-energy in India

- Surplus biomass can produce: 51.35 billion litres of bioethanol *(Ref: IARI Study)* or 50 - 80 billion cum of biogas (20-32 Million Tonnes of BioCNG)
- Bio-energy potential for Municipal and industrial wastes and animal wastes add up to even larger numbers

National Policy on Biofuels

- National Policy of December, 2009 revised in 2018 with indicative target of 20% biofuels blending with Petrol and 5% with diesel by 2030.
- Reduce oil imports by 10% by 2022
- Encourage use of biofuels by promoting indigenous feedstock production by integrating with the ambitious targets of doubling of Farmers Income, Import Reduction, Employment Generation, Waste to Wealth Creation
- Creation of National Biomass Repository by conducting assessment of biomass across the Country
- Provision for appropriate financial and fiscal measures to support development and promotion of biofuels thereby enlarging their utilization in different sectors

Govt initiatives for Bio-energy

MNRE Programmes:

- Domestic Biogas and Manure Management
- Waste-to-Energy Programme including Bio-CNG
- Biomass Power and Co-generation

Ministry of Drinking Water and Sanitation:

Gobardhan scheme for promoting cleanliness in the villages through waste treatment for production of organic fertiliser and biogas for use in the villages and for production of Bio-CNG

MoPNG / OMCs / GAIL:

Schemes for providing VGF for Bioethanol Projects and off-take support for Bio-ethanol, Bio-diesel and BioCNG

Bioenergy Options

- **Improved solid fuels (Pellet, Briquettes, Char)**
- **Biomass Combustion / Co-generation**
- **Gaseous Fuels**
  - Bio-chemical / Biomethanation (Biogas)
  - Thermo-chemical (Producer Gas)
  - Hydrogen
- **Liquid Fuels**
  - Thermo-Chemical (Pyrolysis)
  - Bio-chemical (Ethanol, Butanol)
  - Extraction (Trans esterification / biodiesel)

Status of of Ethanol Projects Worldwide

- Issues over techno-economic viability.
- The 1st commercial scale plant to be commissioned was that of Beta Renewables (50 million litres/ year) with operations stabilising in 2014 but it faced many techno-economic issues.
- Abengoa, Dupont and DSM-POET commissioned commercial scale plants in USA (75 to 80 million litres/ year) but they all faced techno-economic issues and are not considered great success stories.
- Shell-Raizen commissioned commercial scale plant in Brazil (75 million litres/ year) with feedstock of bagasse/ cane trash but don't seem to have plans to scale up outside of Brazil.

Status of of Ethanol Projects in India

- Oil Marketing Companies had announced 12 Commercial Scale Projects, each having production capacity of 30 million litres/year 2G Ethanol per year (from feedstock of 120,000 tonnes agriculture residues).
- Foundation Stones were laid on 25th Dec 2016, however, not much is heard about progress of these projects
- CFA (Central Finance Assistance) was announced @ Rs 150 crores per Plant, under the JI-VAN scheme.
- Economic viability is perceived to be the key issue for lack of progress. Besides, technologies selected for these projects also had not been proven at commercial scale.

Status of of Biogas/ BioCNG Projects in India

- Large number of LOIs issued by the OMCs for setting up BioCNG projects
- Number of industrial waste based projects being set up
- First of the large scale BioCNG projects based on agro residues is at advance stages of construction
- Technologies are evolving for agro residues
- The scheme for Bio-CNG off-take by the OMCs isn't adequate in terms of establishing bankability of agro-residue based projects
    - The scheme doesn't differentiate between agro residues and industrial wastes
    - same off-take price offered for several years, i.e. no increase due to imminent increase in cost of feedstock and O&M costs over the years

Status of of Biogas/ BioCNG Contd/-

- Outlook remains bright as the feedstock is available and CNG demand is soaring with its use spreading across the country
- The pace of progress will gallop with improved policies or development of technologies, which will reduce the plant costs as also their O&M costs

Thank You

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