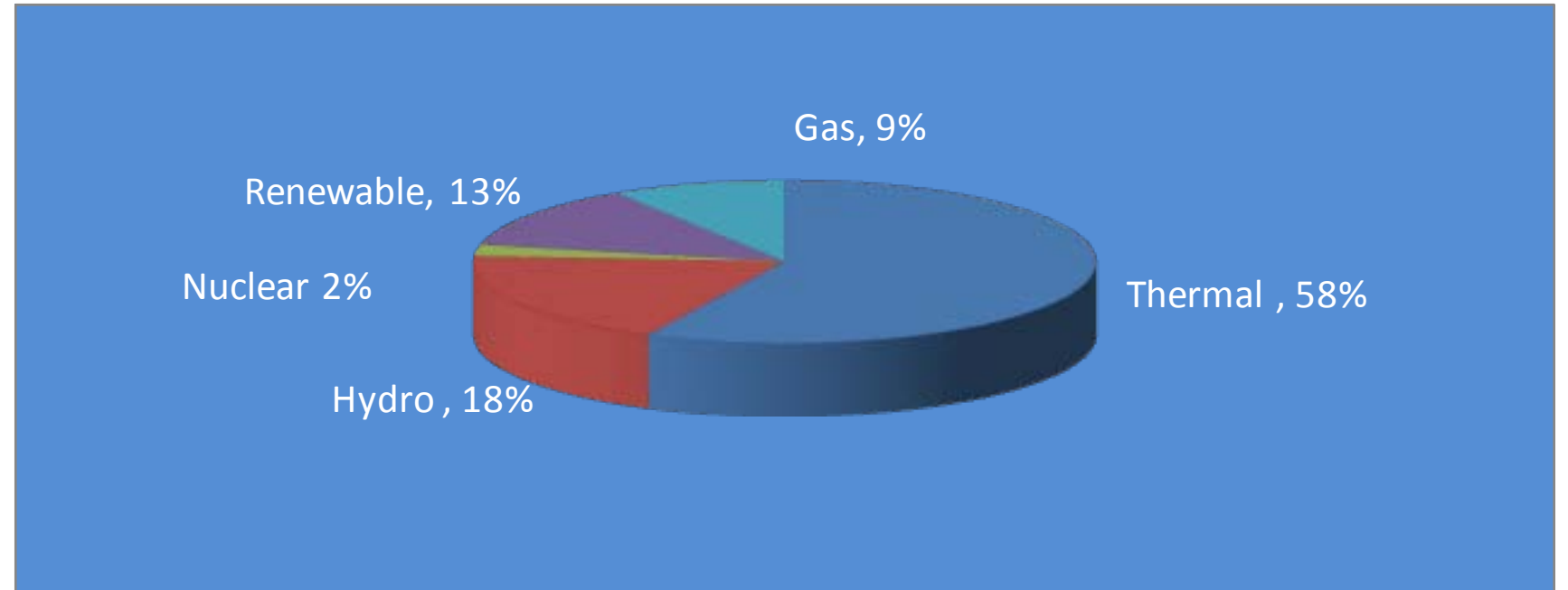


OVERVIEW OF BIOGAS IN INDIA

ANIL DHUSSA
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Indian Power Sector at a Glance

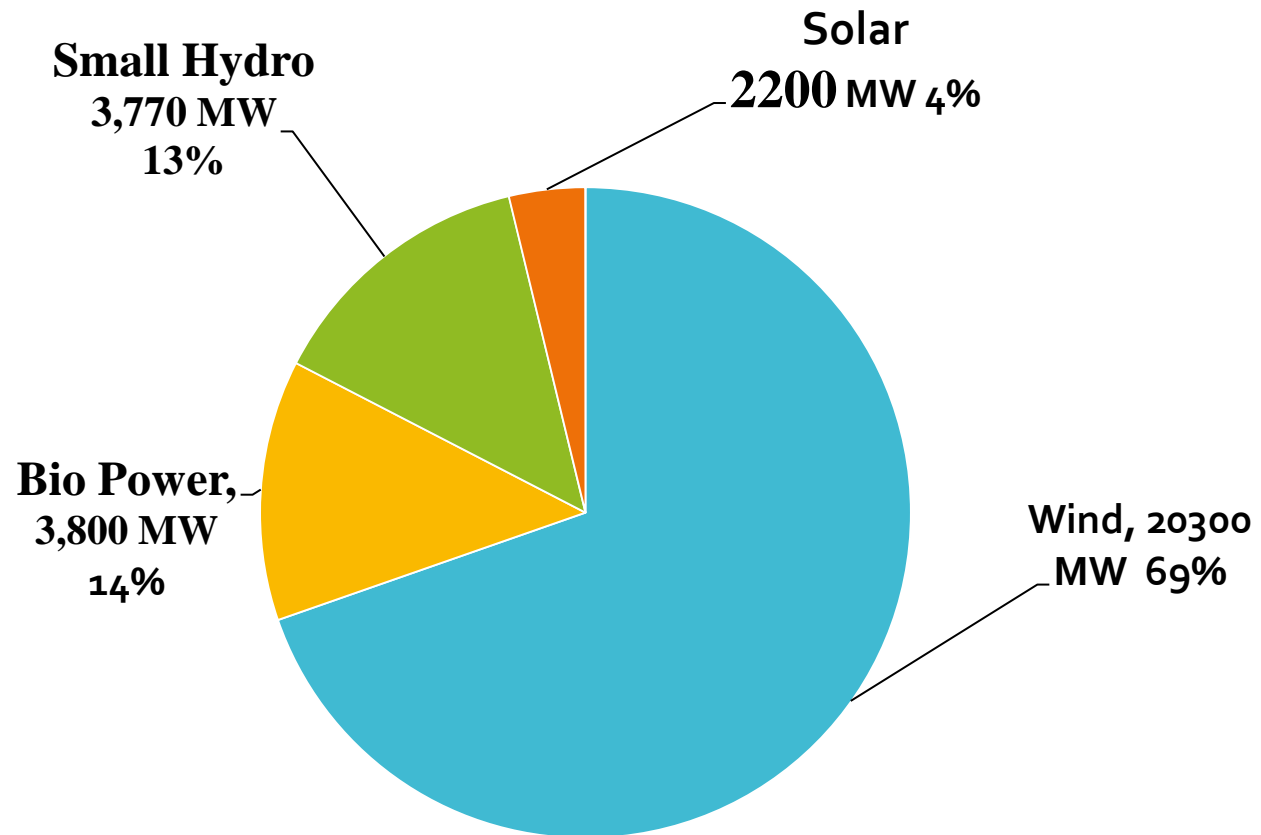
Total installed capacity :
2,30,000 MW



Thermal 1,56,000	Hydro 40,000	Gas 21,000	Renewable 30,000	Nuclear 4800
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Indian Renewable Energy at a Glance

Total Installed capacity 30,000 MW



Renewable Energy in India - Credentials

- 5th Position in overall RE Capacity
Installation world-wide
- 5th largest Wind Power capacity
- 2nd largest number of Biogas plants
- 6 million decentralized RE systems
- Renewable is the second largest source of power generation after thermal.

Potential of Biogas in India

Agricultural residues / energy crops

- 141 M.ha. of arable land producing over 700 MTA biomass – estimated surplus ~ 150 MTA
- 50 M.ha arable land is under mono cropping - potential for short cycle cellulosic biomass.

Cattle dung and Poultry droppings

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

MSW

- By 2020 urban population likely to be 550 mil - would generate > 100 MTA of MSW

Importance and Relevance of Biogas

Agricultural residues / energy crops

- Biomethanation of Bio-waste enhances energy security through efficient utilization of local resource.

Manure

- AD produces superior organic manure, required for sustaining soil fertility.
- Industrial AD Plant residues can be treated to produce organic fertilizer of assured quality

Municipal Solid Waste

- Rapidly growing urban pollution and scarcity of land necessitate alternate solutions to landfills
- Decentralised Biogas Plants for treating segregated organic MSW would be an effective solution

Biogas in India

A few broad applications

- 4.7 M Household biogas plants based on cattle manure mainly for producing cooking fuel
- Mid sized biogas plants based on cattle manure and other similar wastes for heat, electricity or motive power
- Biogas from urban and industrial wastes and effluents
- Co-digestion of farm / agricultural residues with urban and industrial wastes

Some Recent Projects

- 2.4 MW project based on mix of poultry droppings, cattle manure along with some agro industrial wastes after MW scale projects based on only cattle dung
- About ten projects on production and upgradation of biogas to Compressed Natural Gas Quality fuel. Capacity ranges from 0.4 to 8 TPD bio-CNG.
- 1.6 MW power from sugar industry solid waste
- Bio-CNG and Power from biogas at distilleries and STPs
- Biogas upgradation to Natural Gas Quality, Bio-CNG, for use as transport fuel

These projects are in addition to the household units, small and large power generation projects based on cattle manure and industrial wastes



Biogas Plant Designs
Top: Floating drum
Bottom: Fixed dome

Biogas from Industrial Wastes

Likely WTE Capacities

- o Distillery effluent : 1 MW / 30 kL
- o Dairies (milk processing) : 100 kW / 3 lakh litres
- o Paper Mills (Black Liq.+) : 1 MW / 60 TPD paper
- o Slaughterhouse waste : 100 kW / 10-12 TPD
- o Poultry droppings : 1 MW / 1 Million birds
- o Cattle manure : 100 kW / 25 TPD

Biogas from distillery spent wash:

One of the major sources

- o Capacity 30 kL
- o Biogas production 12000 cum./day
- o Power generation :
 - Steam turbine route 0.5 MW
 - Reciprocating Engine 1 MW
- o Cost Rs. 45 Mill / MW
- o Payback period 3-4 years

Biogas Project at a Dairy Complex in Ludhiana

Capacity: 1.0 MW
power from biogas
produced from about
250 tonnes/day of
cattle manure



1.2 MW
power project
based on cattle
manure

Dairy Colony in
Jabalpur



Biogas from bagasse wash water

Tamil Nadu
Newsprint and
Papers Company



Biogas from solid waste at Slaughter- house

Capacity: 3000
cum / day



Biogas from Sugar Industry Solid Waste (Press mud)

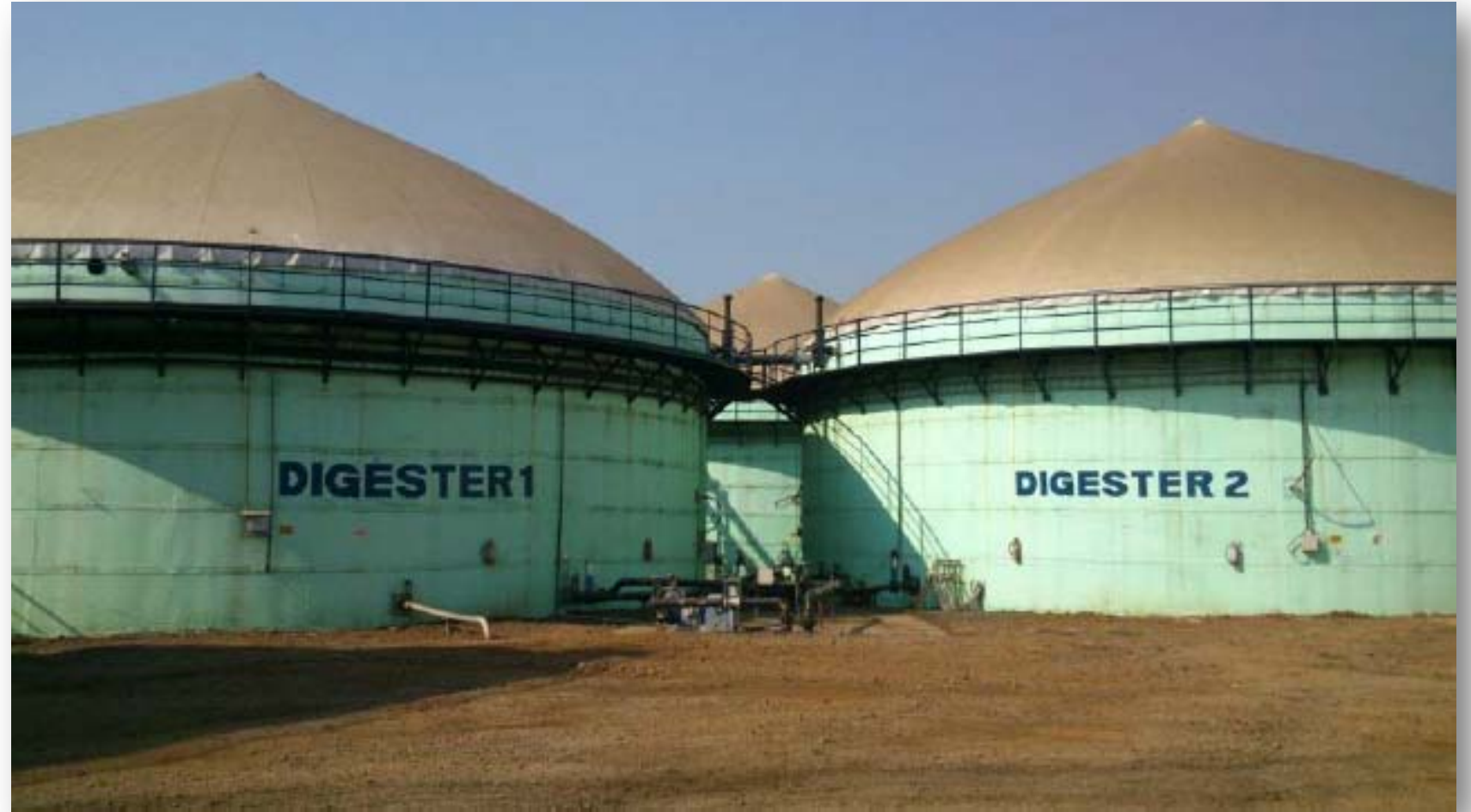
- Sugar Industry produces solid waste known as Press Mud
- Quantity of Press Mud produced is about 3.5 to 4% of the sugarcane crushed
- Biogas yield per tonne of press mud
 - : 100 cum. (40 kg Bio-CNG or 50 litres diesel)
- Biogas yield per tonne of cane crushed:
 - : 4 cum. (1.6 kg Bio-CNG or 2 litres diesel)

Characteristics of Bio-CNG

Parameters	Biogas	Bio-CBG
Methane (v/v)	55-65%	92-98%
CO ₂ (v/v)	35-45%	2-8%
H ₂ S (ppm)	500 – 30,000	<20 ppm
Moisture	Saturated	< -40 deg
Other Impurities	Present	Not present
Calorific Value (LCV)	~ 19500 kJ/kg	~ 52000 kJ/kg

1 kg of BioCBG= 1.5 liter of Petrol

First large
scale Bio-
CNG plant in
India



Biogas
cleaning
system for
 H_2S
removal



Biogas
cleaning
system for
CO₂
removal



Bio-CNG Cascade



Use of
digested
press mud
as Organic
manure



Maize



Cabbage

Government Support for Biogas Programme

- Subsidy for installation : ~20% of cost
- Preferential tariff for sale of generated electricity
- Fiscal Incentives / Concessions
 - Accelerated depreciation
 - Import duty
 - Excise duty for RE devices
 - Income Tax
- Sponsorship for Research and Development

Other Policy Measures for promotion of Biogas Programme

- Open access to electricity grid for the power from renewable sources including AD
- Preferential tariffs assigned by State regulators for sale of electricity
- RE Power Obligations for Transmission Companies
- Captive generation decontrolled
- Policy framework for pumping upgraded Biogas into gas grids and for price fixation for Bio-CNG – work in progress

Thank You

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