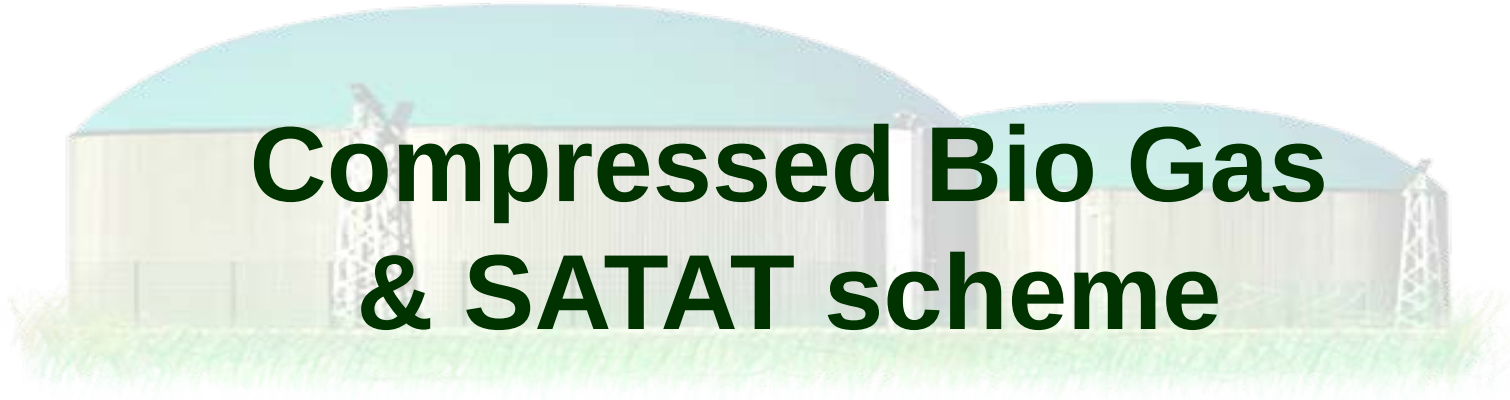
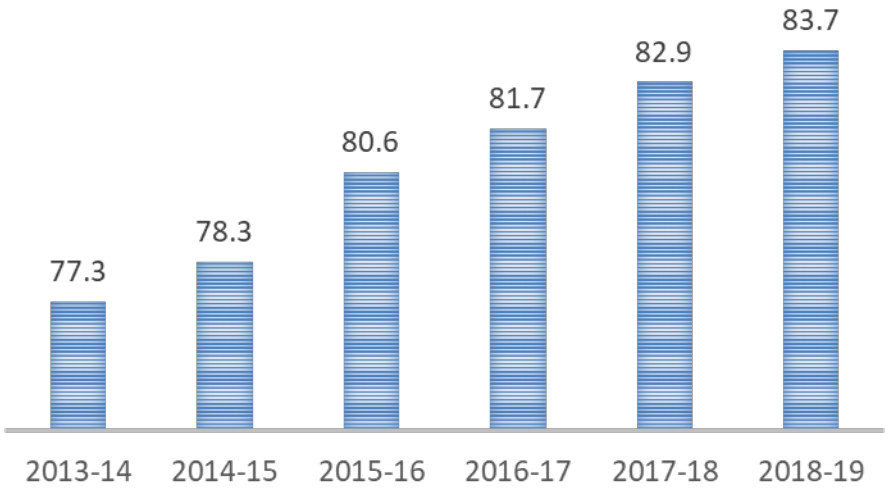


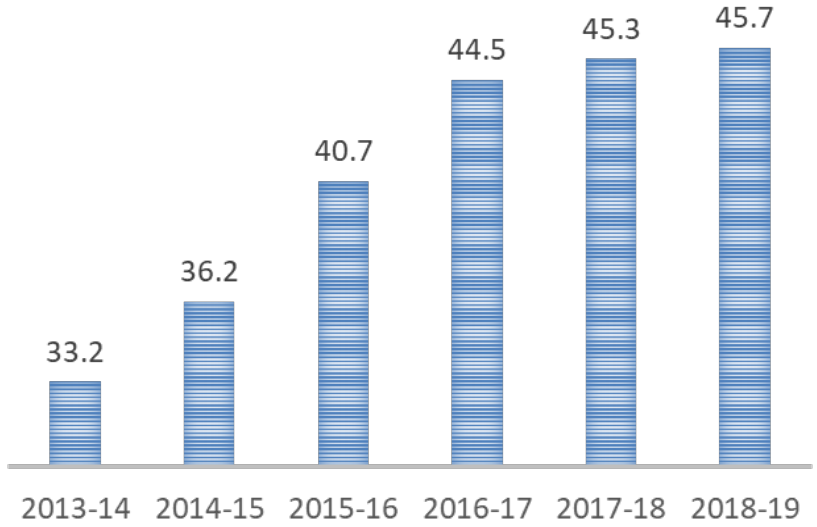
Compressed Bio Gas & SATAT scheme

Drivers for Biofuels – Import Dependence

Import dependency in Crude (%) (based on consumption)



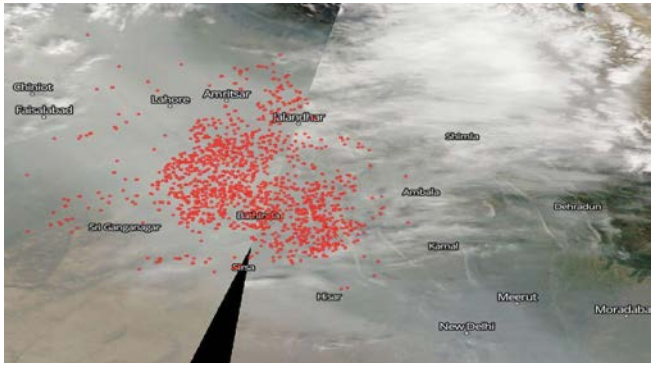
Import dependency in Natural Gas (%)



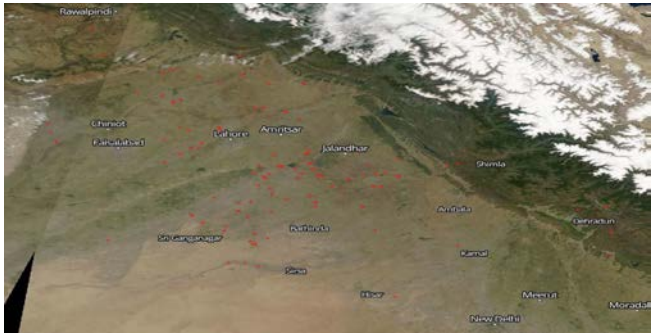
Import dependence expected to rise to 92% by 2040

Source: PPAC, BP Stats, IEA WEO

Crop burning in India



1st November 2018



26th May 2019

- Total dry biomass generated : 682 MMT
- Total surplus crop residue : 179 MMT
- Total crop residue burned : 140 MMT

Crops burned during Winter & Summer

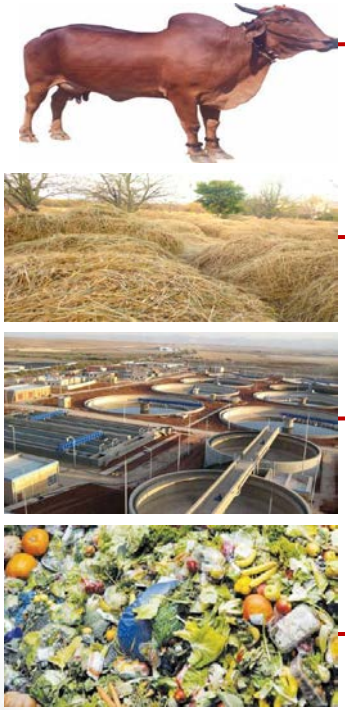
Source : NASA Worldview

CBG Sources in India

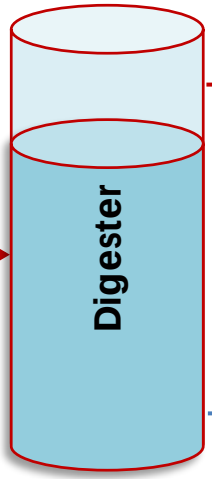
Source	CBG Potential
Cattle Dung & Chicken Litter	41 MMT
Forest Residue	22 MMT
Agriculture Residue	18 MMT
Press Mud, Spent Wash & Bagasse	14 MMT
Municipal Solid Waste	3 MMT
Prospective energy crops in Barren, Waste & Single Crop Land	23 MMT

Total CBG Potential : 120 MMT

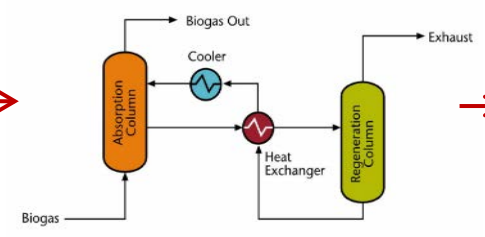
Process of CBG Production



Pre-treatment



Biogas



Purification

Compressor

Cascading

Digestate

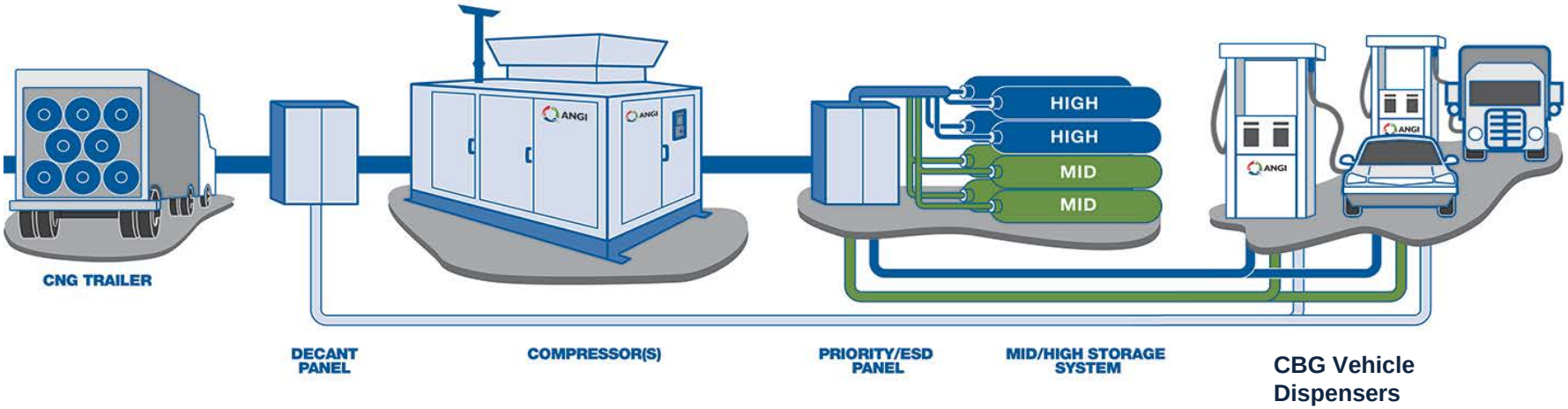
Bio-manure & Slurry

IndianOil Technology in CBG

- **Indigenous enviro-tolerant inoculant producing higher biogas with high methane and reduced CO_2 content developed**
  - **Biogas : methane content of >80%**
  - **In situ conversion of CO_2 to methane**
  - **Suitable for multiple feedstock**
  - **Suitable also for small and mid sized biogas plants**

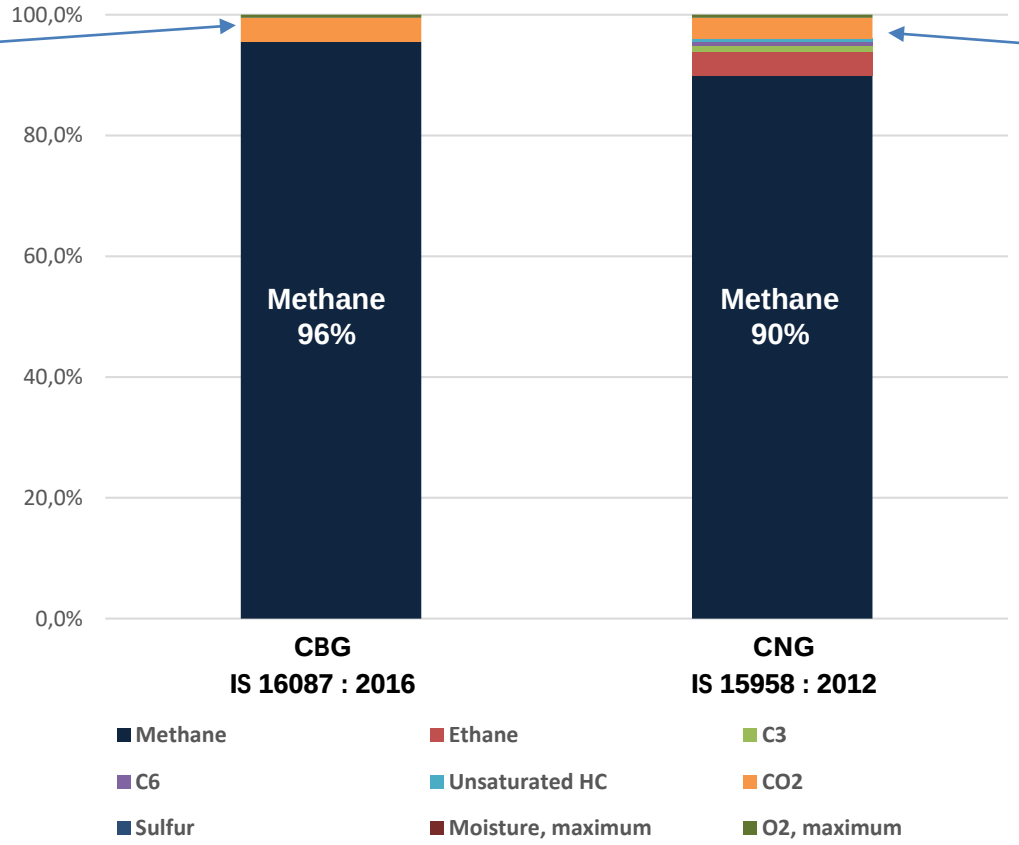
Parameter	IndianOil Technology	Competing Technologies
Methane content in raw biogas %	80-86	50-65
Gas Yield	1.5-2.5 X	X
Hydraulic Residence time, days	8-10	21-35

Daughter-Booster CBG Station



Quality parameters of CNG and CBG

CO_2 : 4%
O_2 : 0.5%
H2S : 20 mg/m^3



Ethane : 6%
C3, C6 & other HC : 10%
CO_2 : 3.5%
O_2 : 0.5%
H2S : 20 mg/m^3

Premium CNG

SATAT Programme

SATAT
SUSTAINABLE ALTERNATIVE TOWARDS AFFORDABLE TRANSPORTATION

2018-2023

5000 Plants

15 MMTPA of CBG

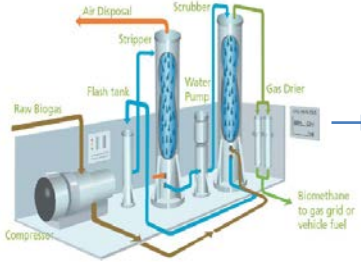
50 MMTPA of Manure

Business Model

Plant Owner

Biomass Collection

Plant Construction & Maintenance



Purification

Compression

Delivery

IndianOil / OMC

CBG Dispensing Equipment

IndiGreen Compressed Bio-Gas 100% Green Auto Fuel

Branding

Retailing

Pricing Enablers

Item	Unit	Price
Basic Price of CBG meeting IS 16087 : 2016 standard, compressed at 250 bar and delivered at OMC Retail Outlet in cascades	Rs./kg	46.00 (USD 0.65)
GST at 5%	Rs./kg	2.30
Total supply price (incl. taxes) to be paid to party	**Rs./kg**	**48.30 (USD 0.68)**

- **Procurement price of CBG from 1.10.2018 to 31.3.2024 : Rs. 46/kg + applicable taxes.**
- **Price will not be lower than Rs. 46/kg + applicable taxes from 1.4.2024 to 31.3.2029.**
- **Commercial Agreement for 10 years for off-take of CBG**

Sale of CBG

- **Noble Exchange Environment Solutions Pune LLP.**
  - Location : Pune, Maharashtra
  - RO : ABC Fuel Station, Pune
  - Sale initiated on : 5.9.2019

Sale of CBG

- **Spectrum Renewable Energy Pvt. Ltd.**
  - Location : Warna, Kolhapur, Maharashtra
  - RO : Sri Krishna Saraswati Agency, Pargaon
  - Sale initiated on : 12.9.2019

CBG fueling by New Tata-Marcopolo Bus

IOT Biogas – Namakkal, Tamil Nadu

Input : Press Mud, Chicken litter, Dairy Effluent
Output : Biogas (CBG : 15 TPD) & Manure (20 TPD)

Asia’s Largest Biogas Plant

VERBIO - Germany

Feedstock Capacity : 330 TPD of Paddy straw

CBG Production : 33 TPD

Bio Manure : An important bi-product

- Increase in crop yield by 20%
- Reduce present consumption of Chemical Fertilizer by 25%
- Replacement of chemical nitrogen and phosphorous
- Restore natural soil fertility
- Protection against drought and soil bourn diseases
- Organic Farming

Enablers for CBG Plant owners

- Long term price stability
- Upfront commercial agreement
- Providing technology for Plants
- Facilitate sale of Bio-manure
- Enablers in proces
  - Inclusion of Bio-manure in Fertilizer Control Order
  - Inclusion of Plants in ‘White Category’ for pollution clearance
  - Inclusion of Plants under Priority Sector Lending

Thank You