Sustainable Future Fuel for Global Climate Change Challenges

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Creating 'Bio-CNG/ CBG Based Production and Utilization Infrastructure Network' and Integrating 'National Biogas and Natural Gas Grid' (NBNGG)

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Biomass Waste -Menace of Mixing Waste: Segregation at Source for Resource Recovery

- Waste is a resource and need not be mixed while generated.
- Mixed waste: Handling, segregation and resource recovery becomes unmanageable and costly.
- Segregation of waste at source is necessary.

- Biomass waste is bulky and voluminous and source of pollution and diseases.
- Biomass waste at source is in the forms of:

• a) woody, b) loose and leafy and c) liquid.

- Technologies are available for generation of resources, energy and organic fertilizer/ compost.

• Woody biomass waste can be used through combustion/ gasification technology and also for liquid fuels production.

• Loose, leafy and liquid biomass waste and seeds for biogas/ methane generation and Liquid fuels: bio-diesel and bio-alcohol production.

Biomass Waste –limited availability, Transportation Carbon foot print requires Decentralized Plants

- **Biomass waste is cultivation based and its supply is always limited.**
- **Competition for its utilization by alternate biomass technologies.**
- **Judicious and most economical technology solutions producing energy and organic fertilizer needs to be used.**
- **On this consideration biogas/ bio-methanation technology becomes most suitable for loose, leafy and liquid- biomass wastes, as it produces both gaseous fuel/ energy as well as organic fertilizer.**
- **Bulky and voluminous Biomass waste transportation is costly and leaves larger carbon foot print for establishing large size biogas and bio-liquid plants.**
- **It warrants that decentralized plants are set up at their source of bulk generation.**

Deliverables of Bio-methanation Plants

- **Bio-methanation technology offers 4-in-1 solution as:**
  - ***Energy (biogas) Generation Plant***
  - ***Organic/ bio-fertilizer Production Plant***
  - ***Biomass waste Treatment Plant***
  - ***Environment Protection Plant:***

    Reducing GHG Emission
- ***Estimated Annual Biogas Generation Potential:***

  65.85 million tonnes Bio-CNG
- ***Estimated Annual Bio/ organic Fertilizer Production Potential:*** ***658.42 million tonnes***
- **It deserves govt. support and subsidy from all concerned Ministries: New and Renewable Energy, Petroleum & Natural Gas, Fertilizer, Agriculture, Urban & Rural Development, Environment & Forests.**

Limited biomass Production/ Managing 4 Fs

- **Bio-energy/ Biogas sector has got a major constraint in the form of limited supply of biomass.**
- **Biomass time cycle for production, huge land area requirement being used for fuel, food, fodder and fertilizer (organic fertilizer/ bio-fertilizer).**
- **4 Fs will have to be balanced to avoid controversies.**
- **The policies, strategies and projects and programmes to be well knitted for meeting competing needs of land for industrial, energy, housing, institutional and agricultural sectors.**

Prioritization/ earmarking Biomass wastes for various Bio-energy Plants

- **Need to priorities/ earmark biomass wastes for various bio-energy technologies-combustion, gasification, bio-methanation and bio-liquid fuels (bio-diesel and bio-alcohol).**
- **Loose and leafy and wet biomass wastes (including cattle dung) to be supplied for bio-methanation plants (for production of gaseous energy and organic/ bio-fertilizer) instead of combustion and gasification.**
- **The hard and woody biomass wastes may be supplied for combustion and gasification and second generation bio-fuel production.**

Establish Biomass Waste Resource Banks (BWRBs) and Gandhi Committee and Treat biomass Wastes Young

- **Handle biomass wastes at the source of their origin immediately before they become dirty to handle requiring special manpower and transport to take them to landfills and STPs.**

- **Establish highly decentralized 'Biomass Waste Resource Banks (BWRBs)' for collecting, sizing and storing biomass waste to feed bio-methanation, gasification, combustion based energy and bio-fertilizer producing plants.**

- **Establish 'Gandhi Committees' in each urban ward, industry and village to facilitate sustenance of BEFCI.**

‘Hybridization’ suitable renewable energy technologies with Bio-energy Technoplogies

- ‘Hybridization’ of a set of suitable renewable energy technologies, generally nucleated around bio-energy (including bio-methanation) technologies, for a location is to be the ‘mantra’ for sustainable energy supply for sustainable and environment friendly development.
- Instead of competing for each other, strengths of one is to be used for overcoming weaknesses of the other renewable energy technology.
- This requires good ‘technology integrators’, who may have a feel of all and may not be hard core experts of various renewable energy technologies.

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- For self sufficiency there is a need for augmenting gaseous fuel supply.
- For sustaining soil fertility there is a need for enormously increasing organic fertilizer production and supply.
- It warrants for 'Creating Bio-CNG/ CBG Production and Utilization Infrastructure Network' in India consisting of:
- Establishment of 'Biogas Grid' at sugar mill/ food processing industries levels, and
- Establishment of 'Biogas Grid' at village level.

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***Establishing 'Village Biogas Grid' (VBG) for providing clean cooking gas to every household, including under 'Ujjwala Yojana'.***
- ***Establishing one multi-feed (including crop waste) 'Bio-gas-Fertilizer plant' in each of the revenue village, say six lakh nos. with average capacity of 1000 cubic meter biogas generation.***
- ***These plants to have capability to treat village sewage/ excreta from toilets (which is going to become a serious problem once all the houses/ house-holds start using these toilets, as envisaged in 'Swachh Bharat Mission').***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***Connecting 'Village Biogas Grid' with each other to form a 'Local Area Biogas Grid Network' (LABGN) having 'Biogas Purification plant'.***
- ***LABGN is connected to 'Biomass Processing and Biogas Producing and Purifying Industries Network' (BPPIN) having Bio-gas-Fertilizer plants in Sugar Mills, Agro/ Food/ Fruit processing rural industries.***
- ***LABGN and BPPIN is connected to existing National/ Local Area/ City Gas Grid based on CNG/ PNG Network (NLCNG).***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***This way, a 'National Biogas and Natural Gas Grid' (NBNGG) will be created like 'National Electricity Grid Network' (NEGN) in the country.***

- ***This approach will help in:***
  - ***Harnessing full bio-gas-Fertilizer potential in the country.***
  - ***Ensure clean cooking gas supply.***
  - ***Supplying bio-organic fertilizer.***
  - ***Generating massive employment.***
  - ***Saving enormous amount of foreign exchange due to non-import of CNG/ LNG and crude oil in the country.***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***'Bio-gas for All' for providing clean gaseous fuel for cooking.***
- ***'Bio-fertilizer for All' for providing bi-organic fertilizers to all crops, fruits and vegetables' cultivation.***
- ***All the Sugar Mills, Agro/ Food/ Fruit processing industries to be mandated to set up Bio-gas-Fertilizer plants in their own premises through creating a joint venture.***
- ***Existing ETPs, STPs treating biomass waste/ effluent to be converted to ETBPs, STBPs (B-stands for bio-gas-fertilizer).***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***All Dairies, Gaushalas, stray animal shelters etc. to be mandated to set up Bio-gas-Fertilizer plants in their own premises through creating a joint venture or agreements with such professional biogas-fertilizer companies, such that responsibility rests with the biomass waste generators.***
- ***All other bulk biomass waste generators, in different areas, like fruit and vegetable mandis/ markets, hotels, restaurants, community halls/ barat ghars, housing societies to be mandated to set up Bio-gas-Fertilizer plants in their own premises through creating a joint venture or enter into arrangement with such professional biogas-fertilizer companies to set up plants in near by areas, if space is not available or the biomass waste quantity is small such that responsibility rests with the biomass waste generators.***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***Providing Generation Based Incentives (GBI) to biogas/ CBG over and above the price for the competing fuels, like CNG, PNG, LPG, LNG etc.***
- ***Creation of level playing field between 'Bio-ethanol' and Compressed Bio-gas (CBG)' while fixing procurement price and other incentives according to energy/ heat value.***
- ***Fixing Bio-CNG/ CBG purchase price at about Rs.75/- per kg. as CCEA*** **ex-mill price of ethanol derived from B-heavy molasses and sugarcane juice at Rs. 54.27 per liter and Rs. 59.48 per liter, derived from 100% sugarcane juice for ethanol supply year 1st December 2019 to 30th November *2020.***

Govt. support awaited for Improving Economic viability of Biogas-fertilizer Plants

- **Earlier fixing Bio-CNG/ CBG purchase price at Rs.60/- per kg. was requested when ethanol price was Rs.47.13 per liter fixed in June 2018.**

- **Providing Generation basd Incentive of Rs. 14/- per kg including Rs. 2/- towards biogas fertilizer over and above Rs. 46/- per kg price being price fixed by Oil marketing companies under SATAT.**

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***Other incentives to include low cost loans, priority lending from banks and financial institutions, viability gap funding, GST @5% for biogas/ CBG, plants & machinery and project development/ execution services, free of charge injection to gas grid etc.***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- ***Creation of 'Bio-gas- Fertilizer Fund'. The financial incentives being provided by different Ministries, like MNRE, Fertilizer, Agriculture, Drinking Water and Sanitation, Urban Development and others to be credited to this fund to provide GBI.***
- ***Low cost finances available under Bi-lateral/ Multi-lateral international organizations/ financial institutions are also to be credited to this 'Fund'.***
- ***CSR, MPLAD, MLALAD finances are also credited to this 'Fund'.***
- ***The 'Bio-gas-Fertilizer Fund' can be operated by NABARD.***

Business and Entrepreneurship Development in Biogas-Fertilizer Sector

- **Preparation of standards for biogas plant based bio/ organic fertilizer and bio-pesticides.**
- **Introduction of Composite Cylinders.**
- **Development of ABG Cylinders.**
- **Helping in enormous and decentralized employment generation**
- **Fighting the menace of biomass waste**
- **Fuel and fertilizer production**
- **Hitting many birds from one shot.**

Bio-energy, Bio-fertilizer, Water Nexus and Climate Change

- **Input: Soil + Fertilizer + Water + Energy (Sun)**
- **Output: Biomass and Food Production**
- **Consumption/ Utilization of Biomass and Food leads to generation of Biomass waste**
- **Complete the Cycle by recycling/ Eco-friendly Disposal of Wet & Dry Biomass waste to reproduce:**

➢ ***Bio-energy + Bio-fertilizer + Water***

➢ ***Send them back to soil***

➢ ***Sustain Food Production***

➢ ***Protect/ Prevent Ecology, Environment, climate change***

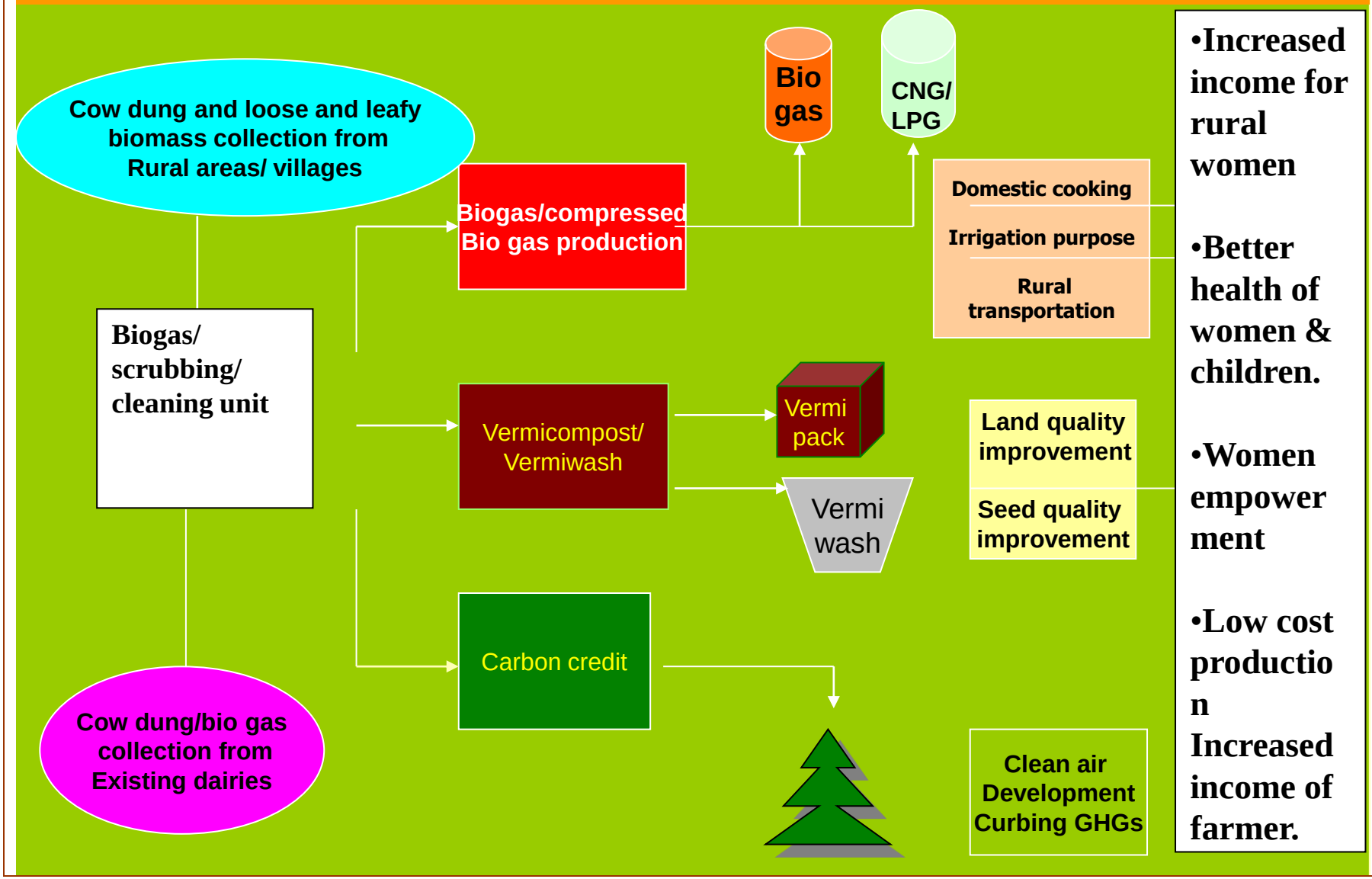
Launching Biomass-Energy-Fertilizer and Water Conservation Mission

Govt. is suggested to launch:

“Biomass-Energy-Fertilizer Mission”
and
link with
Water Conservation
and
“Swachch Bharat Mission”
for
Effectively Fighting Miseries of climate Change

presentation: dr. arshukla

Schematic Diagram for Hybridization of Bio-energy: Biogas-Fertilizer Plants



Feeding System at Lambra Kangri Biogas Plant, Hoshiarpur, Punjab

Slurry Tanker and Cattle dung Weighing at Lambra Kangri Biogas Plant, Hoshiarpur, Punjab

Biogas meter and Smart Phone use at Lambra Kangri Biogas Plant, Hoshiarpur, Punjab

Biogas Plant installed at Amrit Fertilizer, kunjpura, Karnal, Haryana

BGFP Plant at Ashoka Biogreen, Talwade, Nasik (Maharashtra)

Purified and Bottled Biogas from MNRE Project being used in a School at Nashik, Maharashtra

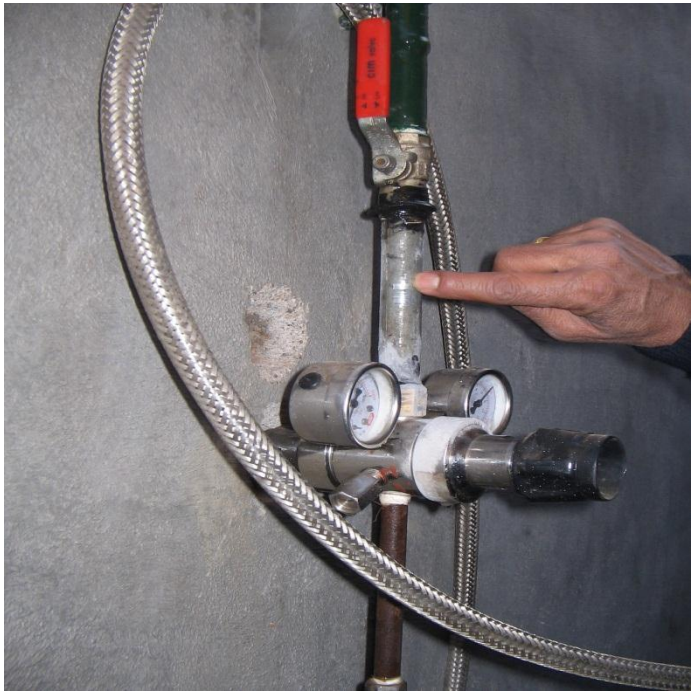
Purified Biogas Cascade

Biogas Burner in Kitchen

Purified and Bottled Biogas from MNRE Project being used in a School at Nashik, Maharashtra

LPG Bank being replaced

Biogas Supply Regulator



Biogas, Enrichment and Bottling unit

Capacity:

20 Nm^3 raw biogas per hour

End use:

Vehicular and Thermal

BGFP project at Abohar, Ferozepur, Punjab, India

PEDA 1 MW Biogas Plant, Ludhiana

Feeding System

Digesters


Ready to Transport
to Customer Location


Pressure Reduction System
at Customer Location

Biogas, Enrichment and Bottling unit at Jaipur - I

Indigenously developed LPSA system

Biogas, Enrichment and Bottling unit at Jaipur - II

Buffer balloons

Biogas cylinders

at

Bakrol, Dist Vadodara


Biogas
vehicle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AN
igl
CNG RUN VEHICLE

Biogas in Use for Cooking

Biogas Flame

Biogas Burner in Use

Bio-fertilizer

THANK YOU

For your attention!

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