



**BIOGAS FORUM INDIA**

**(BigFIN)**

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## From The Editor's Desk...



Biogas Forum India's (BigFIN) journey entered into 10<sup>th</sup> year with a lot of new beginnings and exchange of ideas with promotion of biogas in the country. The motto of publication of this newsletter is to keep the BigFIN members updated with latest news about different segments of biogas research and development sectors and new initiative taken in the country. Biogas Forum aims to spread awareness of the values of sustainability as well as the innovative ways in which India continue to meet the challenges and conquer the inadequate energy supply situation. In this prospective, it is important to learn from the other parts of the world as well for our latest edition which discuss the same with various stakeholders throughout the world i.e. about embracing challenges, customized solutions and a focus on biogas based project while achieving the aim of **“Gram Swaraj through self-sufficiency of Energy need”**.

The governing principles behind biogas forum towards energy sustainability include the democratization and finding a balance of energy mix with the special focus on biogas. Biogas as a main driving source of energy mix for transportation fuel, *SATAT, the initiative is aimed at providing a Sustainable Alternative Towards Affordable Transportation (SATAT) as a developmental effort that would benefit both vehicle-users as well as farmers and entrepreneurs.* Under this scheme, it is planned to roll out 5,000 Compressed Bio-Gas plants across India in a phased manner, with 250 plants by the year 2020, 1,000 plants by 2022 and 5,000 plants by 2025. These plants are expected to produce 15 million tonnes of CBG per annum, which is about 40% of current CNG consumption of 44 million tonnes per annum in the country. At an investment of approx. Rs. 1.7 lakh crore, this initiative is expected to generate direct employment for 75,000 people and produce 50 million tonnes of bio-manure for crops.

We are of the opinion by producing as much energy as possible locally, so that we could reduce global dependence of long distance transmission lines and diffuse the concentration of economic power which resides largely with a very few companies and institutions. There is an increasing sense of environmental impact in people they are constantly becoming conscious about the different kinds of environmental hazards that could affect our future this has led to post savings and shift towards sustainable living.

We hope that you find this issue both interesting and inspiring your inputs to grow this sector will always be welcome.

Thank you for reading.

**Virendra Kumar Vijay**

**General Secretary, Biogas Forum-India (BigFIN)**

**Professor & Head, CRDT, IIT Delhi**

## President's Column



The Ministry of New and Renewable Energy (MNRE) issued Administrative Sanction-cum-Guidelines for implementation of ‘**Biogas based Power Generation and Thermal Application Programme (BPGTP)**’ on 29.11.2018 for the period 2017-18 to 2019-20 (coterminous with the 14<sup>th</sup> Finance Commission) at a total outlay of Rs.34.80 crores. It covers biogas based power generation (Off-grid) in the capacity range of 3 kW to 50 kW and biogas based thermal energy for heating as well as cooling applications from biogas plants ranging from 30 m<sup>3</sup> to 2500 m<sup>3</sup>. The financial support for biogas based power ranges from Rs.40,000/- to Rs.30,000/- for SC/ ST and all category beneficiaries of NER States and from Rs.35,000/- to Rs.25,000/- for all other States/ category of beneficiaries. For thermal/ cooling applications the financial support is 50% of the support available for biogas based power generation for each category of beneficiaries. The other two programmes on biogas, launched by MNRE in the year 2018, for the same period are:

- a. **New National Biogas and Organic Manure Programme (NNBOMP)** for installation of 2.55 lakh biogas plants (equivalent to about 8.40 lakh cubic meter of biogas generation per day) in the capacity range of 1-25 m<sup>3</sup> per day.
- b. **Programme on ‘Energy from Urban, Industrial and Agricultural Wastes/ Residues’** for biogas, bio-CNG/ enriched biogas, power and biomass gasifier components for aggregated capacity of 57.0 MWeq.

In the year 2018 Schemes/ Programmes/ Policy launched on Biogas-Fertilizer technology sector by the Ministry of Drinking Water and Sanitation (MDWS) and Ministry of Petroleum and Natural Gas (MoPNG) are:

- a. **Galvanizing Organic Bio-Agro Resources-Dhan (Gobar-Dhan)** under Swachh Bharat Mission (Gramin) SBM-G launched by the Ministry of Drinking Water and Sanitation.
- b. **National Policy on Biofuels – 2018** brought by the Ministry of Petroleum and Natural Gas includes Bio-CNG and is kept in the category of ‘Advanced Biofuels’.
- c. **Sustainable Alternative towards Affordable Transportation (SATAT)** was launched on 1<sup>st</sup> October 2018 by the Ministry of Petroleum and Natural Gas. Under the SATAT scheme, purchase price of Rs.46/- per Kg for ‘**Compressed Biogas**’ (CBG) has been offered and to be executed by Oil and Gas Marketing Companies, for the first time. Indian Oil Corporation (IOCL), Bharat Petroleum Corporation (BPCL) and Gas Authority of India (GAIL) has come forward and started signing MOUs/ agreements with Bio-CNG plant promoters for purchase and marketing of Bio-CNG through their outlets.

There is a need for a clear cut policy/ programme on ‘**Village Gas Grid**’ for supplying cooking energy to supplement gas supply under Ujjwala Yojna in villages using smart gas meters. The subsidy available for LPG needs to be made available by MoPNG on the biogas generated, metered and used by biogas plants to make it attractive. It would also be better that MNRE includes ‘**Village Gas Grid**’ under BPGTP programme of MNRE, as it is not very clearly included in Gobar-Dhan programme of MDWS as well. There is also a need for giving better rate of Rs.54/- per Kg for bio-CNG/ CBG by MoPNG and also have a level playing field with competing fuel like bio-ethanol being promoted for transportation sector. This will help in reducing crude oil imports. Adequate financing of this sector has to be a part of overall strategy of any programme, which is lacking in the programmes/ policies of all the Ministries/ Departments. The subsidy of Rs.1500/- also needs to be made available for biogas based organic fertilizer by the Ministry/ Department of Fertilizers.

Available provisions made by different Ministries/ Departments, namely BIS Standard for biogas composition, segregating waste at source, Fertilizer Control Order, subsidy of Rs.1500/- per tonne for city-compost and advising fertilizer companies to supply certain percentage of organic fertilizers along with chemical fertilizers together with these six programmes/ schemes/ policy on biogas in the year 2018 brings a unique opportunity in the biogas-fertilizer sector.

All the stake holders have to continue to work with the concerned Ministries/ Departments towards inclusions of suggestions hinted in para 4, so that biogas-fertilizer sector grows to achieve its full potential in energy generation, organic fertilizer production, employment generation and waste treatment.

**Dr. Atma Ram Shukla**

**President, Biogas Forum-India (BigFIN)**

**SOME INITIATIVES/ACTIVITIES HELD AT IIT DELHI DURING LAST**  
**SIX MONTHS**

**1. Compressed Biogas Technology – Demonstration for Vehicular Application in Bhopal, Madhya Pradesh**

The Indian Institute of Technology Delhi with financial support from the Department of Science and Technology, Ministry of Science and Technology, Government of India through Madhya Pradesh Council of Science and Technology has recently (2018) established a compressed biogas (CBG) production technology at Sharda Vihar Jankalyan Samiti, Bhopal, Madhya Pradesh. The Sharda Vihar Jankalyan Samiti, Bhopal has a Kamdhenu Gaushala having 250 indigenous cow breeds of Gir and Sahiwal and 150 calves. The availability of the cow dung is around 2.5–2.7 tonnes per day. The project was aimed to sustainably utilize the available cow dung for compressed biogas production for the operation of vehicles that are being run the Samiti, and also to support the organic farming in its premises. This plant produces nearly 40 kg of compressed biogas (equivalent to compressed natural gas – CNG) per day from 100 m<sup>3</sup> of biogas per day. Apart from compressed biogas the biogas plant also provides 200 kg of dried bio-fertilizer which is being used by the Samiti for organic cultivation of farm produce.



**Fig. 1.** Water scrubbing technology installed for CBG production at Sharda Vihar Jankalyan Samiti, Bhopal, Madhya Pradesh.

## 2. Demonstration of CBG Model at 2<sup>nd</sup> Global RE Invest, India Expo Mart, Greater Noida

The **Ministry of New and Renewable Energy (MNRE)**, Government of India organised the 2nd Global RE-INVEST India-ISA Partnership Renewable Energy Investors Meet & Expo from 3-5 October 2018 at the India Expo Centre, Greater Noida. **RE-INVEST** is a global platform to explore strategies for the development and deployment of renewables. It showcases India's clean energy market and the Government's efforts to scale up capacity to meet the national energy demand in socially, economically and ecologically sustainable ways.

Under this programme, twenty-one research institutes were invited to showcase the recent ongoing research on green technologies. The Centre for Rural Development & Technology, IIT Delhi was one of them among invitee. The Biogas family group from the centre demonstrated a cheaper and viable technology for compressed biogas (CBG).



**Fig. 2.** Prof. V K Vijay and Dr. Ram Chandra at the stall showcased at the 2<sup>nd</sup> Global RE Invest.

## 3. Expert Panel Meeting ‘Towards a Sustainable Earth’

Prof. V K Vijay from Centre for Rural Development & Technology participated in Expert Panel Meeting ‘Towards a Sustainable Earth’ call for approving joint projects from India, China, UK, Japan and Sweden in London and represented DBT, Government of India on 20.11.2018 coordinated by NERC UKRI.



**Fig. 3.** Expert Panel Meeting ‘Towards a Sustainable Earth.

(Source: Personel mail and Linkdin Update, 20<sup>th</sup> November, 2018)

#### **4. Visit of Shri Chandi Prasad Bhatt, eminent Environmentalist, Padma Bhushan**

CRDT IIT Delhi and UBA invited Shri Chandi Prasad Bhatt, eminent Environmentalist, Padma Bhushan, to learn from him about the environment and ecology, and how new generation of students can be made aware of local eco surroundings and how it can be started as a module in Unnat Bharat Abhiyan program.



**Fig. 4.** Visit of Shri Chandi Prasad Bhatt to CRDT, IIT Delhi.



## **BIOGAS RELATED ARTICLES**

### **1. Production of Biogas from Organic Fruit Waste in Anaerobic Digester using Ruminant as The Inoculum**

Organic waste, fruit waste and vegetable waste are the best substrate to produce biogas. Waste management system for producing biogas can be used as a solution with the waste problem by converting the wastes into biogas. This study is expected to review the effect of substrate type and substrate composition for the volume of biogas produced. In this study, materials consist of fruit wastes (oranges, apples, papayas, and tomatoes), cow ruminant, urea, cow dung, Na<sub>2</sub>CO<sub>3</sub> buffer, NH<sub>4</sub>HCO<sub>3</sub> buffer, and distilled water with variations of the substrate materials, F/ W, and the buffer types. The addition of cow manure and Na<sub>2</sub>CO<sub>3</sub> buffer with 1:2 of F/W, production of biogas is greater than a variable which is used NH<sub>4</sub>HCO<sub>3</sub> buffer and without the addition of cow dung. Variables with addition of cow dung with 1:1 of F/W and using Na<sub>2</sub>CO<sub>3</sub> buffer, the result is greater than the variable using the same buffer but without the addition of cow dung and variables with 1:1 of F/W with the addition of cow dung and Na<sub>2</sub>CO<sub>3</sub> buffer and variables with the same feed and without the addition of cow dung produce more biogases than variable which is the using NH<sub>4</sub>HCO<sub>3</sub> buffer, 1:1 of F/W and without the addition of cow dung. [Read more...](#)

(Budiyono et al., 2018, MATEC Web of Conferences)

### **2. Biogas: Development and perspective in Europe**

This paper presents an overview of the development and perspectives of biogas in and its use for electricity, heat and in transport in the European Union (EU) and its Member States. Biogas production has increased in the EU, encouraged by the renewable energy policies, in addition to economic, environmental and climate benefits, to reach 18 billion m<sup>3</sup> methane (654 PJ) in 2015, representing half of the global biogas production. The EU is the world leader in biogas electricity production, with more than 10 GW installed and a number of 17,400 biogas plants, in comparison to the global biogas capacity of 15 GW in 2015. In the EU, biogas delivered 127 TJ of heat and 61 TWh of electricity in 2015; about 50% of total biogas consumption in Europe was destined to heat generation. Europe is the world's leading producer of biomethane for the use as a vehicle fuel or for injection into the natural gas grid, with 459 plants in 2015

producing 1.2 billion m<sup>3</sup> and 340 plants feeding into the gas grid, with a capacity of 1.5 million m<sup>3</sup>. About 697 biomethane filling stations ensured the use 160 million m<sup>3</sup> of biomethane as a transport fuel in 2015.

[Read more...](#)

(Scarlat et al., 2018, Renewable Energy)

### **3. Biogas Production from Palm Oil Fruit Bunch in Anaerobic Bio-digester through Liquid State (LS-AD) and Solid State (SSAD) Method**

The crucial problem facing the world today is energy resources. Waste production of palm oil fruit bunch potentially produces as a renewable energy resource. Palm oil fruit bunch contains 44% cellulose, 18% lignin and 34% hemicellulose. The organic carbon source is contained in biomass potentially produce biogas. Biogas is one of alternative energy, which is environmentally friendly and has been widely developed. This research was aimed to examine the effect of pre-treatment in the raw material of waste palm oil fruit bunch for the production of biogas, the effect of time, C/N ratio, and effect of microbial consortium. The variables are total solid (TS) used 10% and 18% with a 40 mesh physical pre-treatment, chemical pre-treatment with NaOH 8% g/g TS, and biology 5% g/vol with microbial consortium. Biogas production process was conducted over 2 months in room temperature, the test response quantitative results in the form of biogas volume every 2 days and also flame test. The result of this research shows that the highest daily production rate of biogas obtained from this study was 5.73 ml/gr TS and the highest biogas production accumulation generated at 58.28 ml/gr TS produced through a 40 mesh sieve of waste oil palm empty fruit bunch, immersion in NaOH, through solid state fermentation and C/N 30. From this research, it can be concluded that the optimum production of biogas formation occurs with the value of C/N 30, physical and biological pre-treatment, and solid state method. [Read more...](#)

(Jos et al., 2018, MATEC Web of Conferences)

### **4. Investigation of the biogas production potential from algal wastes**

In recent years, researchers focused their attention on biogas production more than ever to meet the energy demand. Especially, biogas obtained from algal wastes has become a trending research area owing to the

high content of volatile solids in algae. The main purpose of this study is to determine the biogas production potential from algal wastes and examine the effect of temperature and particle size parameters on biogas yield. A comparison was made between the biogas production potential of microalgal wastes, obtained after oil extraction, and macroalgal wastes collected from coastal areas. It was found that algal biogas yield is directly proportional to temperature and inversely proportional to particle size. Optimal conditions for biogas production from algal wastes were determined as the temperature of 55°C, a particle size of 200µm, a residence time of 30 days and an alga–inoculum ratio of 1:4 (w:w). Highest biogas yield obtained under these conditions was found as 342.59 cm<sup>3</sup> CH<sub>4</sub> g<sup>-1</sup> VS with *Ulva lactuca*. Under thermophilic conditions, both micro- and macroalgal biogas yields were comparable. It can be concluded that algal biomass is a good source for biogas production, although further research is needed to increase biogas yield and quality. [Read more...](#)

(Koçer and Özçimen 2018, Waste Management & Research)

## **5. Biogas production from food waste via anaerobic digestion with wood chips**

The uncontrolled generation of large amounts of food waste has resulted in severe environmental issues. Among various treatment methods that have been proposed, anaerobic digestion to produce biogas from food waste is a proven and environmentally friendly route for simultaneous food waste treatment and energy recovery. In this study, an effective methane fermentation of food waste by mixing wood chips with feedstock to minimize the sludge generation in the process was done. The food waste generated in an apartment complex in the Republic of Korea was used as biogas feedstock. The use of wood chips in the process increased the production of methane and hydrogen. At the food waste to wood chip ratio of 0.5, 20 mL g<sup>-1</sup> of methane and 13.9 mL g<sup>-1</sup> of hydrogen were produced for 15 days at 35 °C. The results of this study suggest the successful application of wood chips to the anaerobic digestion of food waste for producing biogas. [Read more...](#)

(Oh et al., 2018, Energy and Environment)

## **6. Upgrading Landfill gas to Biomethane: Using the WAGABOX process**

After ten years of Research and Development, Waga Energy developed a breakthrough technology to upgrade landfill gas into high quality biomethane. This technology, called WAGABOX<sup>®</sup>, *combines membrane filtration and cryogenic distillation to separate methane from carbon dioxide, nitrogen, oxygen and impurities*. WAGABOX<sup>®</sup> delivers 98% pure biomethane from landfill gas compliant with grid injection requirements. More than 90% of the methane collected from the landfill is delivered to the grid. The remaining methane (less than 10%) is burned to reduce GHG emissions associated with the GWP of methane and is used to produce heat. The process delivers ten times more energy that it consumes. The final energy yield of a WAGABOX<sup>®</sup> can be three times that of electricity generation.

[\(IEA Bioenergy Task 37, 2018\)](#)

## NEWS HIGHLIGHTS – NATIONAL

### 1. Ten new biogas plants to put Delhi's waste to good use, to cut landfill fires

Under an ambitious project to manage the biodegradable waste, 10 biomethanation plants will be set up across the city to generate biogas that will generate electricity and enriched organic manure from waste. “These plants will help to reduce the frequent fires at the landfill sites as organic waste such as dungs from dairies, horticulture waste, and fruit and vegetable waste from bigger markets are the biggest contributors in methane generation at landfill sites,” a senior north corporation official said.



**Fig. 5.** The representative image of Biomethanation plant distribution and landfill site in Delhi.

South Corporation has been made the nodal agency for the project. “The biogas generated will be used to generate electricity that will be linked to the grid,” said an official privy to the review meetings.

North Corporation will set up four such plants of 5 TPD (tonnes per day) capacity each. Similarly, South Corporation will also set up 4 plants and east Delhi will get two. The overall project for waste management under the corporations has been sanctioned by the ministry of housing and urban affairs, and is being carried

out under urban development fund. Each plant is expected to cost around 3 to 5 crore. “Overall, Rs 300 crore has been sanctioned for the project, and each civic body will get Rs 100 crore. The urban development ministry will bear 80% of the cost and the rest will be raised by the corporations.

(16<sup>th</sup> July, 2018, The Times of India)

## **2. Bio-CNG, biogas plant to be set up in Haryana gaushalas**

In a bid to ensure effective management of gaushalas (cow shelters) and make them self-sustainable and economically viable, the Haryana government has planned a slew of measures including setting up of bio-CNG and biogas plant at gaushalas. Apart from implementing waste-to-energy projects aimed at making the gaushalas self-reliant, the State Government is also set to open gaushalas in six more district prisons. “The State Government has set up a bio-CNG plant at a gaushala in Gurugram. This is first such waste-to-energy project in Haryana and set up at a cost of about Rs 4 crore. The government has also planned to set up biogas plants at all gaushalas in a phased manner in the state. Bhani Ram Mangla said that under Centre’s ‘GOBARDHAN’ scheme, biogas plant to generate electricity from organic waste, will be set up in one village in 22 districts each. The Centre’s ‘GOBARDHAN’ scheme was launched from Karnal in April with an objective of generating bio-gas from cattle dung and assist the gram panchayats who intend to set up biogas plant in their villages. On State Government’s plans to open gaushalas in more jails, the government has decided to open gaushalas in six district jails soon. There are more than 430 gaushalas and nandishalas in the state with strength of about 3.41 lakh cattle. At present, the gaushalas in the state are facing shortage of funds. Also, many gaushalas are either filled to capacity or overcrowded. In view of this, the State Government has also given in-principle approval for setting up of gaushalas and nandishalas by the gram panchayats on gau charan land (grazing land) for the rehabilitation of stray cattle in the state. The gram panchayats would be allowed either to utilize the land at their own level for the setting up of gaushalas and nandishalas or lease out the land to other agencies. Notably, the State Government has launched ‘Haryana Besahara Gauvansh Mukta Yojana’ to make Haryana stray cattle-free by the end of this month. Haryana was among the first states in the country to enact the Gauvansh Sanrakshan and Gausamvardhan Act in 2015, imposing a strict ban on cow slaughter apart from curtailing smuggling of cows outside the state. It provides

for a rigorous imprisonment ranging from three years to ten years for cow slaughter and provides for a fine from Rs 30,000 to Rs one lakh.

(19<sup>th</sup> July, 2018, The Pioneer)

### **3. BPCL becomes first oil marketing company to venture into biogas**

Bharat Petroleum Corporation Limited (BPCL) has become the first oil marketing company to venture into the biogas segment. It has begun on a micro scale with setting up a captive use plant for a food outlet in one of its petrol pumps at Bazargaon off Nagpur-Amravati highway. The company has also opened its first electric car battery charging station in the city near Kalamna.

As the industry sees the emergence of alternative fuels as a means to reduce crude prices, BPCL is also shifting focus into electric vehicles and biogas. BPCL's Executive Director (retail) Arun Singh who came for the inauguration, said there are plans to open 100 such captive use plants throughout the country in over one year. The company has bigger plans also, to further make compressed natural gas (CNG) through biogas, which can be seen as an alternative to petroleum. It is also considering to push biogas into the cooking gas segment.

However, an entire chain of logistics supply involving many stakeholders will be needed to scale up the operations for making CNG out of biogas. It takes 100 kg of bio-waste to make 4.5 kg of biogas. This if compressed at a specific count can make CNG. "The biggest challenge is ensuring availability of bio-waste at a large scale. This will require the involvement of civic bodies, NGOs and other government agencies to collect bio-waste which can be converted into gas. The company has already done its calculations, and the business can be financially viable with around 12% return on investment.

(29<sup>th</sup> July, 2018, Energy World)

### **4. BSF installs a bio-digester plant for clean water**

Under the PM's Swachh Bharat Mission (SBM), the BSF is using DRDO technique as a pilot project and has started setting up bio-digester plant. It will help to convert sewerage water and organic wastes into clean water, and even biogas can be made from it.

A bio-digester plant has been set up at BSF's 68th battalion campus on the direction of BSF Rajasthan Frontier IG Anil Paliwal at Dabla in Jaisalmer district which is a first of its kind. Now, implementation has

been started to set up such plants at other battalions of BSF Rajasthan frontier and at Indo-Pak border. The Centre has given Rs 3 crore to BSF for this. *Taking a step forward, the unit is installing the DRDO FRP bio-digester of 20,000 litre capacity for up to 400 users per day in the unit campus.*

(9<sup>th</sup> August 2018, The Times of India)

### **5. The biogas plant based on water hyacinth at Chennai**

A five-tonne capacity biogas plant that would use water hyacinth to produce fuel, and electricity subsequently, is a projects that got the go-ahead in the Chennai Smart City Ltd. The projects worth Rs 258 crore were cleared in the meeting. More than 613 acres of water hyacinth spread across water bodies in the city will feed the biogas plant, to be set up at Rs 3 crore. “It will not only help to generate biogas and electricity, but also help to manage our water bodies,” said an official from CSCL.

The Water hyacinth is removed from water bodies will be crushed and supplied to the plant, which will generate 5 tonnes of biogas every day. While the larger plan is to use the gas for power production, a source said biogas can also be used for Amma canteens, as fuel.

(13<sup>th</sup> September 2018, The Times of India)

### **6. State to provide biogas subsidies in rural areas**

The state Rajasthan, which has to meet a target of 3,700 household Biogas plants in the state under the National Biogas and Manure Management Programme (NBMMP), has announced to provide subsidies for the same. The National Biogas Policy that came into force from May 30 is primarily for rural households where cow dung is easily available. Each state is given a target to be fulfilled by March 2019. Government is planning to link the connection with the Aadhaar card of a person and to give him an identity card where the name of the village, gram panchayat will be mentioned. Along with this, the plant will be geotagged to keep a track on whether the plant is still working or was shut down after getting the subsidies. The Biofuel Authority of Rajasthan will be implementing the scheme. This is a government of India drive for green energy to connect it with the technology available to make the policy more transparent. The authority is collaborating with different stakeholders working in the state to get help in the implementation of this policy.



The government is trying to build a software where a person can register a complaint directly in case of any problems running the biogas plant. The subsidy will be around 1/3 - 1/4 of the total cost for constructing a biogas plant. Recently, 18 stakeholders and trust who have been working in this direction for a long time were called by the state government to get help in this project. They have given different figures for constructing the biogas plant in the rural areas and have started working for it too.

How to get a biogas plant subsidy:

- Fill a form mentioning - Name
- Address
- Village
- An Affidavit - that he is not getting any subsidy for such plant from some other place

(25<sup>th</sup> September, 2018, The Times of India)

## **7. Installation of 5,000 biogas plants in India**

The oil Minister Shri Dharmendra Pradhan said as many as 5,000 plants for extracting biogas from agricultural residue, cattle dung and municipal solid waste are envisaged to be set up in the country in next five years at a massive Rs 1.75 lakh crore investment. The state-owned fuel marketing companies will purchase all the bio-gas from these plants at Rs 46 per kg in a bid to cut reliance on imports for meeting oil needs.

India is more than 81 per cent dependent on imports for meeting its oil needs and the move to use biogas extracted from waste/biomass sources like agriculture residue, cattle dung, sugarcane press mud, municipal solid waste and sewage treatment plant waste is aimed at cutting that. Of the 146 million standard cubic meters per day of natural gas consumed in the country, 56 per cent is imported. In India, there is a potential to produce 62 million tonnes of compressed biogas (CBG) from wastes, and its usage would lift the share of natural gas in the energy basket from current 6-7 per cent.

As many as 5,000 CBG plants are envisaged to be set up in the private sector that will generate 75,000 direct employment. "This will involve an investment of Rs 1.75 lakh crore. Together, Rs 70,000 crore investment envisaged in rollout of city gas distribution (CGD) network in the 86 cities auctioned in the latest round,

would take the total to Rs 2.5 lakh crore, equal to the investment in the glamorous telecom sector. The Expression of Interest (EoI) is valid till 31<sup>st</sup> March, 2019 but the first CBG plant can start within this quarter.

(1<sup>st</sup> October, 2018, The Economic Times)

## 8. Youngster herd 'selfie with cow contest' in West Bengal

A group of young professionals named *Goseva Parivar* has been travelling across West Bengal to spread awareness about the economic benefits of rearing a cow and about the financial losses a family can incur by selling or slaughtering her. The cow protection campaign, which started with the 'Selfie with Gomata' contest in 2015, launched its 'Selfie with Gomata, 2018' with a rider-- save cow scientifically.

Slamming the use of force for "Gauraksha", executive member of the group, Lalit Agarwal told- "Gauraksha using religious sermons is passé now. Exercising violence means to protect cows cannot be a sustainable way of Gauraksha. We are trying to reach farmers irrespective of cast, creed and religion and explain about the financial benefits of rearing a cow.



We are also explaining what monetary loss a family would incur if they sell a cow or take her to the slaughter house. We are aiming at a complete stop of sale for slaughtering cows, but of course not through violent means. "The contest 'Selfie with Gomata' had drawn at least 10,000 entries last year and crashed the group's brand new app. "So, this year the entries would be received through Whatsapp, Twitter, Instagram and Facebook," said Abhishek Singh, the in-charge of the contest. "The primary reason of conducting this contest is to impart knowledge to people and make them aware of the benefits of protecting cows. Not for once have we mentioned any religious connection with Gomata or brought in references of Hindu gods and goddesses."The group claims that despite working with several organisations, it has never experienced any political influence or resistance in West Bengal while holding training camps in villages. "We have installed 70 bio gas plants in four districts –West Midnapore, Bankura, Purulia and Burdwan. In more than hundred villages, we have already set up camps and are also connecting city groups to farmers for better bovine trade.

We are trying to make farmers understand that milk is not the only thing they can get from a cow. Cow urine and dung are the main products that they should use. Since the price of LPG gas and fertilisers are soaring, they can use biogas and fertilisers made from cow dung. Even though we do not sell cow urine, we have taught them to process and filter cow urine to use it as medicine. We have got a positive response from many Muslim families as well,” said Agarwal.

(12<sup>th</sup> November, 2018, The Economics Times)

## **NEWS HIGHLIGHTS – INTERNATIONAL**

### **1. The Pacific Community exploring the potential for the use of biogas in Pacific**

The regional technical organisation the Pacific Community or SPC says biogas generation would fit the needs of the Pacific. The SPC is hoping to kick off a pilot programme using biogas generation in Tonga in 2019. The organisation led a delegation, including Tonga's Energy Minister, to Germany to explore the use of plant and animal waste to generate electricity, gas and heat.

The SPC's Akuila Tawake said biogas generation would be highly beneficial for Pacific people. "Biogas generation is not only generating power. Also, they harvest the heat coming off the generator as well as the generation of harvesting methane gas for cooking purposes."

He also said biogas generation would suit Pacific climates. "Because of the weather in Europe, they only harvest the corn once a year, and then they harvest the corn for their substrate supply that feeds the biogas digester for one whole year.

Akuila Tawake said a technical group from Germany would visit Tonga early next year to conduct a feasibility study there.

(26<sup>th</sup> September, 2018, [RNG](#))

### **2. Nature Energy to utilise excess CO<sub>2</sub> in biogas agreement**

Renewable energy firm Nature Energy announced in a press release that it had entered into a partnership with biogas producer Strandmøllen A/S where both will collaborate to recycle excess CO<sub>2</sub> from the 'world's largest' biogas plant in Esbjerg, Denmark. CO<sub>2</sub> emissions from the plant will be reduced by 70% compared with a conventional biogas plant.

According to the release, when the construction of Nature Energy's 'world's largest' biogas plant in Korskrø near Esbjerg is completed, Strandmøllen will build one of the 'world's first' CO<sub>2</sub> plants which makes it possible to purify and condense excess CO<sub>2</sub>, prior to which has been difficult to make use of.

“When the construction of the Korskro biogas plant is completed, 40% CO<sub>2</sub> will be taken to process, which would otherwise have been emitted into the atmosphere, and use it for, for example, carbon dioxide in soda. This means that significantly less carbon dioxide needs to be produced using fossil energy, and it increases our possibilities of becoming green winners on the financial bottom line, the environmental bottom line and the climate bottom line.” Nature Energy’s biogas plant is expected to be completed at the beginning of 2019 and Strandmøllen’s CO<sub>2</sub> plant will deliver its first supply of CO<sub>2</sub> during the summer of 2019.

(16<sup>th</sup> October, 2018, Bioenergy Insight)

### **3. Biogas Plant for the bathroom launched for the World Toilet Day**

Headquarter in Israel and founded in 2012, HomeBiogas is a company that specialises in the manufacturing of small-scale biogas systems that convert organic waste into renewable cooking fuel. And on the 19<sup>th</sup> of November it announced the launch of its new product, The Bio-Toilet. The Bio-Toilet can be attached to HomeBiogas’ biogas system which then enables the human waste from the toilet to be converted into cooking fuel. The process doesn’t require a connection to the sewage or water grid, so makes for a well-designed and clean system. HomeBiogas CEO and co-founder Oshik Efrati told *News Every day* that the UN’s sustainable development goals challenged them; “We took our solution, the HomeBiogas 2.0, which converts food waste into cooking fuel, and thought about how we could take advantage of that existing technology for the important goal of allowing all humans in earth the right to a decent, safe and clean toilet.”

The distinctive feature of the Bio-Toilet is that it doesn’t require large, underground and complex infrastructure to function. It is also nearly maintenance-free. This is because the toilets manual pump dispatches of the waste directly to the HomeBiogas appliance to be processed into methane, and then turned into cooking fuel. The Bio-Toilet itself is compact and transportable as it can be packed into one box. It can be installed indoors as well as outdoors as long as the bio-digester is located up to 7 meters away from it.

(19<sup>th</sup> November, 2018, Bioenergy Insight)

### **4. Japan generates electricity by recycling waste food**

Japan has introduced a new technology to generate electricity by recycling waste food. JFE Engineering Corporation has established a new company called "J Bio Food Recycle" with the cooperation of wholly-owned subsidiary, JFE Kankyo Corporation, also in joint project with East Japan Railway Company and JR East Environment Access. This project began as food recycling business by converting to biogas beginning in August 2018.

Hajime Oshita, President of JFE Engineering Corporation said: "By using industrial and food wastes from public facilities such as station buildings and meat manufacturing plants, we have been able to provide integrated service including collection of wastes, waste disposal, power generation and sale of electric energy. Such Projects are still hardly seen in Japan. This project is like harmonising three keywords -- Environment, Energy and Recycling -- and this project is based on the idea of trying to effectively utilise all resources."

In this project, 80 tons per day of food waste will be treated by microbial fermentation, and electric power will be generated by using methane gas created in this process as fuel. Food wastes from food factories and train station buildings will be crushed and separated into category including organic matter and other type of waste items like plastic container and wrapping paper. After that, segregated organic matter will undergo moisture adjustment and will be sent to fermentation tank where organic matter will be fermented by microorganism digestion, and bio-gas will be generated. Then, biogas generated by methane fermentation will be supplied straight to gas holder. It is stored here in order to provide stable power generation. Electricity will be generated by gas energy sent from gas holder and sold as renewable energy. In a briefing session, director of J Bio Food Recycle "Satoru Udagawa" spoke about the concept and future plan of this project.

(22th November, 2018, Energy World)

### **5. Belgium's first biomethane Produced in Bright biomethane system**

Belgium's first biomethane-to-grid is a fact. The Bright Biomethane installation at Energy Conversion Facility 'IOK Afvalbeheer' in Beerse, Belgium successfully produced Belgium's first sustainable biomethane and injected into the natural gas grid of net operator Eandis.

A double first for Bright Biomethane: the first project in Belgium and the first biomethane plant of the country. The biomethane system uses membrane technology to upgrade the biogas to 91 Nm<sup>3</sup> biomethane

per hour, equivalent to the annual natural gas consumption of 350 households. The Bright Biomethane system is an easily expandable system, ensuring that enough biomethane is produced in the future to provide gas for around 1,000 families. The biogas is produced from the anaerobic digestion of garden, fruit and vegetable waste (GFV) from more than half million residents of the Kempen area. [Read more...](#)

(27<sup>th</sup> November, 2018, Biogas World)

## **6. Global Biogas Power Plants Market to Witness Fabulous Growth by 2025**

Global Biogas Power Plants Market forecast to 2025 offers detailed overview of Biogas Power Plants industry and presents main market trends. Biogas Power Plants business research gives historical and forecast market size, demand and production forecasts, end-use demand details, price trends, and company shares of the leading Biogas Power Plants producers to provide exhaustive coverage of the Biogas Power Plants. Biogas Power Plants Market reports gives complete Information about Industry including its Definition, Applications and Manufacturing technology, company profile, product specifications, capacity and production value. This Biogas Power Plants market research study provides estimates for Global Biogas Power Plants Forecast till 2025. Biogas Power Plants Market report is a skilled and in-depth analysis by specialists on the present state of the Biogas Power Plants business. Global Biogas Power Plants industry report focuses on the main drivers and restraints for the key players and present competition status with growth prospects. Biogas Power Plants market research report provides the most recent business information and business future trends, permitting you to spot the product and end users driving revenue growth and profit. [Read more...](#)

(26<sup>th</sup> December, 2018, Techno Biz News)

## UPCPMING EVENT

Sl. No.	National	International
1.	<b>International Conference on Sustainable Environment and Energy</b> 21-22 February, 2019 Hindustan Institute of Technology & Science, Chennai, India	<b>International Conference on Green Energy &amp; Expo</b> 7-8 March, 2019 Singapore
2.	<b>Renewable Energy Expo</b> 21-23 February, 2019 Chennai Trade Centre, Chennai, India	<b>7<sup>th</sup> Nordic Biogas Conference</b> 9-10 April, 2019 Oslo, Norway
3.	<b>Global Summit on Waste to Energy</b> 28 Feb-1 March, 2019 New Delhi, India	<b>Quebec 15<sup>TH</sup> Biogas and Bioenergy Conference</b> 8 <sup>th</sup> May, 2019 Center Des Congres, 1325 Daniel Johnson O Saint-Hyacinth Canada
4.	<b>Current and Emerging Trends in Biogas, Biomethane (Bio-CNG) and Bio-fertilizer Development</b> <b>“CETBBD–2019” - An International Conference &amp; Exhibition</b> 13–15 September, 2019 Indian Institute of Technology Delhi Hauz Khas, New Delhi – 110016, India	<b>2<sup>nd</sup> International Conference and Exhibition on Industrial Methane Measurement</b> 22–23 May, 2019 Ahoy Exhibition Centre, Rotterdam, Netherlands
5.		<b>2019 the 3rd International Conference on Sustainable Energy Engineering</b> 24-26 May, 2018 Sanghai, China
6.		<b>14<sup>th</sup> World Bioenergy Congress and Expo</b> 6-7 June, 2019 London, UK
7.		<b>The World Biogas Summit</b> 3-4 July, 2019 NER Birmingham, UK

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