BIOGAS FORUM INDIA

(BigFIN)

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Sh. Piyush Goyal, Hon'ble Minister of State for Power, Coal, New and Renewable Energy, GoI, addressing the National Biogas Convention 2015 at IIT Delhi

National Biogas Convention 2015, IIT Delhi

Prof. V.K. Vijay Showing the mobile biogas purifiction unit to Sh. Piyush Goyal

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From the Editor's desk

Biogas Forum India's journey entered in the 7th year. The publication devoted exclusively to keep the members latest news about different segments of biogas research and development sectors. We have attempted to add a tinge of freshness and vivacity to the letter every time. The new year of 2016 comes with a new hope and challenges in clean environment sector.

Recently, we have witnessed the Delhi government's odd-even scheme in the first two weeks of January. This huge amount of biodegradable biomass or municipal solid waste now has become a big challenge for the farming community and city corporations as they have to fetch a major portion of their budget to get rid it off. Generally, the easiest way for this is burning but this is not a scientific way to convert it in useful forms and also creates very high level of pollution in the environment. If this organic waste can be converted in useful forms of energy through scientific way then not only it will reduce the dependency on conventional sources of energy without damaging the environment. The conversion of this biomass and biodegradable waste to biogas is an alternative source of energy and simultaneously contributes to building a sustainable environment. This can be a very good solution of waste management as the majority of waste can be converted into energy and there will not be a requirement of huge dumping sites in the cities.

Ministry of New and Renewable Energy is working on a plan for a national biogas mission in India which targets to tap potential of biogas technologies and promote use of biogas as an alternative for cooking, power generation, enrichment and bottling and for automotive applications etc. This is with an aim to installation of one crore Biogas plants across India in all sizes and types through "**National Biogas Mission"**. This plan will not only help to make country more secure in its energy requirements but will also contribute in proper waste management which can be linked to *Swachh Bharat Abhiyan* an initiative taken by the Hon'ble Prime Minister of India. This program will serve its purpose to promote biogas energy in India which may replace large amount of petroleum imports and save foreign currency along with utilization of locally available biomass resources in the country in a sustainable development approach. The biogas sector can provide large employment in rural areas and at the same time, providing gas, power and organic fuel for tractors and other vehicles and biofertilizer for organic farming.

Hon'ble Prime minister of India Mr. Narendra Modi has kicked off the ambitious *Startup India* Movement on 18th January, 2016. The government programme aims to fill gaps in the economy for the growth and development of startups and will aim to boost digital entrepreneurship at the grassroots. The government is expected to earmark around Rs 2,000 crore for the initiative. The potential of the same can be tapped for the National biogas Mission if young entrepreneurs can gear up for the challenges to come on the way of clean and sustainable solutions of energy.

I am eagerly waiting for your feedback and responses and want to hear some zigzag from the young next generation entrepreneurs for a new start-up program in National biogas Mission.

Virendra Kumar Vijay

General Secretary, Biogas Forum-India (BigFIN)

President's Column

- **Workable Business Model for Biogas- Fertilizer Sector is a Need of the Time**

Inauguration of National Biogas Convention
*By Hon'ble Minister, **Sh. Piyush Goyal***
Minister of Power, Coal, New and Renewable Energy, on September 15, 2015

Biogas-Fertilizer Plants are unavoidable tool for treating wet biomass waste, generating gaseous fuel, producing organic fertilizer and reducing pollution. It is, therefore, investment is required from all the four stakeholders getting benefitted from biogas-fertilizer plants. Unfortunately, these plants have been considered, generally, only as gas plants and the gas generated is highly insufficient to make it commercially viable.

For the four outputs of biogas-fertilizer plants, financial provisions are made in five to six different govt. Ministries/ Departments, namely Ministries of New and Renewable Energy (MNRE), Urban Development, Agriculture, Rural Development, Chemicals and Fertilizer and Petroleum and Natural Gas directly or indirectly. However, there is no simple mechanism to consolidate the financial provisions of different Ministries and make available for the biogas-fertilizer sector.

Historically, a lot of efforts have been by different Ministries. MNRE changed the name of biogas plants to biogas-fertilizer plants. The Sub-Group for the 12thPlan for MNRE recommended installation of biogas-fertilizer plants mandatory by the producers of wet biomass waste. MNRE is currently making efforts for preparing **'Biogas- Fertilizer Mission'**. But till today we continue to remain at the place from where we started in 1960s and that these plants are economically unviable, when we look at from the basis of only one output.

The crux of the matter is that it requires huge investment from National and State exchequer in the form of innovative and bold policy and easy finances to make the biogas-fertilizer sector commercially viable, similar to the provisions of 'National Solar Mission'.

- **The key word is Mandatory:**
  - i) Making **INSTALLATION** of Biogas- Fertilizer Plants MANDATORY to the wet biomass waste generators (individuals, institutions and industry),
  - ii) Making **PURCHASE of biogas** generated from Biogas- Fertilizer Plants MANDATORY for public and private sector Gas companies/ Gas utilities,
  - iii) Making **PURCHASE of Organic fertilizer** produced from Biogas- Fertilizer Plants by public and private sector FERTILIZER companies, and
  - iv) Making **INVESTMENT** of 30-50% of the financial provision of local bodies/ municipalities for waste handling as MANDATORY towards installation of Biogas-Fertilizer Plants.

There is an immediate need for **MNRE to prepare a Cabinet Note for making a Policy for MANDATORY provisions** as suggested above and some more relevant aspects of creating a business model for the biogas- Fertilizer sector.

Dr. Atma Ram Shukla
President, Biogas Forum-India (BigFIN)

BIOGAS IN NEWS

Biogas plant fuels 123 homes

Amravati: Situated amid the lush green hills, Paivihir is a small and remote tribal village in Chikhaldara tehsil of Melghat. The villagers had to face difficulties in collecting dry firewood for cooking during monsoon. But now, families in all the 123 hutments no longer have to worry, for the gram sabha has installed a community biogas plant at an expenditure of about 40 lakh to tide over the problem. Today, stoves in all these 123 houses do not go cold as the entire village is reaping the benefit of the project."This is a very good project undertaken by the village," lauded guardian minister Pravin Pote, who recently paid a visit to the village to inspect it. He was all praise for the villagers who did plantation on 193 hectare forest land in the village under right to forests act. The gram sabha also undertook water conservation and MRGS works in the village which not only increased the water level in the region but also the water storage. As a result, grass too grew in abundance, leading to growth in milk production, said village head Pournima Upadhyay."I have no doubt very soon Paivihir will become an ideal village in Melghat," asserted the guardian minister who suggested undertaking similar projects in other villages of Melghat too. He also promised the villagers to provide cows of Gir breed as per their requirement. Melghat MLA Prabhudas Bhilawekar, collector Kiran Gitte, SDO Rathod, project officer Ramesh Mawasi, Panchayat Samiti Chairman Dayaram Kale and tehsildar Kamble ensured that the project would see its logical end. Korku-dominated Payvihir, which got its name from an old step-well in a farm here, had also received the United Nations Development Programme (UNDP) biodiversity award in 'decentralized governance' category in 2014. The award was for proper management and exploitation of forest land under community forest rights (CFR), setting an example of community conservation efforts while trying to ensure livelihood as well.

(Courtesy: The Times of India. August 27, 2015)

Biogas plant may soon make Bijnor villages self-reliant

Meerut: A biogas plant, which uses agricultural waste and cow dung to produce methane and electricity, is set to come up in the premises of Barkaatpur sugar mill, bringing hope to villages of Bijnor district that they will soon become self-sufficient with regards to cooking gas and power supply.

The plant is being built as part of a project that has been initiated in the agrarian belt jointly by the bio energy cell, panchayat raj department and United Nations Children's Fund (UNICEF) to rid villages in the area from the twin problems of power supply and LPG shortage.

"India is a primarily agrarian economy and produces huge quantities of biodegradable waste, which if harnessed effectively, can be an inexhaustible source of raw material for a biogas plant," said Manish Kumar, Project Officer, Panchayat Raj Department. Named BMC-UNICEF model, the project will be implemented throughout the state in future, even though Bijnor has taken the lead. With the status of a cottage industry, the initiative has found takers in 200 villages that have expressed willingness to get these plants installed."It takes Rs 53,575 to build 10 square meter plant, while a 200 square meter plant that can cater to 50 families can be set up for Rs 20.37 lakh" said R K Pandey, project officer, New and Renewable Energy Development Agency (NEDA)."One can earn a monthly profit of Rs 63,000 from the project. The plants require fresh waste every week and have a lifespan of 20 years," Pandey also said. Khadi Gram Udyog has been roped in to provide subsidies to villagers to set up the plants. The gas produced can be filled into cylinders to serve as a cost effective alternative to LPG. Sources said the biogas will be two-and-a-half times cheaper than its traditional counterpart and one cylinder lasts at least 25-30 days for a family.

(Courtesy: The Times of India. July 9, 2015)

Scania paves way to Vishvaraj for biogas project

Nagpur: With already three mega projects of Nagpur Municipal Corporation (NMC) in its pocket, city-based Vishvaraj Infrastructure Limited (VIL), a company said to be close to Union minister and city MP Nitin Gadkari, will be setting up biogas plant, the gas from which will propel the proposed city buses. Earlier, Swedish bus manufacturer Scania Commercial Vehicles India Private Ltd was to set up the plant and also run its own buses on biogas. Scania told TOI it along with another Swedish organization IVL will only share expertise in the project. "Vishvaraj Group will produce raw biogas. Swedfund (another Sweden-based company) will fund the project based on the recommendation of IVL. We are a commercial vehicle manufacturing company, so the focus will not be in producing biogas but to share expertise on upgrading biogas to vehicular fuel and its usage in environment-friendly buses," the company said. Scania is running one ethanol-run bus in the city in association with Nagpur Municipal Corporation (NMC) and ministry of road transport and

highways (MoRTH) of which Gadkari is minister. Following Gadkari's suggestion, NMC had launched pilot project of ethanol-run bus. Now, NMC and Scania have proposed to run 55 more ethanol buses in the city. NMC had submitted proposal with the Centre, seeking funds to purchase the costly ethanol-run buses. Also, NMC and Scania had planned to run buses based on biogas and biodiesel. NMC had started preparing detailed project report to execute the project. Taking the plans into consideration, Scania had planned to set up biogas plant based on sewage treatment at the NMC's Bhandewadi dumping yard. On March 31, Scania went on to sign MoU with Swedfund for constructing the plant right in presence of Gadkari.VIL chairman Arun Lakhani told TOI, plant to produce raw biogas would be set up at sewage treatment plant (STP) to be constructed by the company for NMC. "We have finalized designs etc related to the STP with installed capacity of 200 million litres per day (MLD). We had planned to generate power from methane to be produced at the STP. Now talks are going on with Scania for the biogas plant. We will construct biogas plant in case plan materializes with Scania. We are about to start construction on the project," he said. Lakhani said search was on for finding sources who could purchase treated sewage water. "Treating sewage and using it for other purposes than drinking will ultimately save precious raw drinking water. Methane is going to be produced with treatment of sewage. Therefore we are planning to go for biogas and it will also help NMC run the eco-friendly buses," he said. Actually, NMC has not received any plan from any private company for setting up biogas plant. With VIL coming into the project, there will be no need to even submit a proposal with NMC. VIL had obtained work order to set up the STP on deferred payment basis. There is provision in the agreement itself for VIL to go for biogas plant or any by-product based on sewage treatment. It would have been difficult for Scania or any other private player to set up plant as it had to go through long process of NMC. The biogas plant will be beneficial for the city and the civic body as it will make use of methane which is otherwise going waste. NMC at its STP with capacity of 80 MLD is wasting methane for years now. Now the plant will be replaced with the new STP to be constructed by VIL. Besides, the city will get yet another eco-friendly bus project. As like ethanol-run bus pilot project, biogas plant and buses to run on it will be the nation's first project.

(Courtesy: The Times of India. September 15, 2015)

Anekal residents sit on a big gas cylinder

Bengaluru: It's a bizarre scene at an abandoned quarry in Lakshmipura, Anekal, 25 km south of Bengaluru. Crevices of the flattened earth in a part of the quarry spew gas that ignites at the light of a match. Rainwater collected in nearby pits boils and the heat in the area is perceptible. The gas bubbling out is the highly combustible and toxic methane. On Monday morning, an even more bizarre scene played out as several residents came to the open ground and started boiling water and cooking rice and egg in aluminium utensils by simply lighting a match on the ground.

This was their way of highlighting the BBMP's apathy. Residents alleged that the fire and smoke is due to unscientific dumping of the city's waste at the quarry till recently. They said after dumping organic waste here, authorities piled layers of soil on it to flatten the earth. "We were able cook the rice and egg, which means what is beneath our village is a big gas cylinder," said Vijay Kumar, a local resident.

However, experts had a not-so-simple explanation. They say the site was meant only for non-degradable waste such as plastic and e-waste but instead organic waste was dumped."The carelessness of authorities led to the dumping of degradable waste, including food. Once the area was covered with soil, the degradable waste inside started decaying and produced methane. Naturally the gas wanted to escape. The recent rain gave it that option by coming out of crevices," said Kiran P. Kulkarni, an environmentalist, who has been working with villagers. He said this worked just like a biogas chamber installed in households. "In Mandur, we have a similar problem but so far we have not seen gases escaping," he added.

(Courtesy: The Times of India. July 21, 2015)

Punjab Energy Development Authority organises workshop on Biogas and manure management

Ludhiana: Punjab Energy Development Authority (PEDA) organised a workshop on National Biogas and Manure Management Programme (MBNNP) for northern states at Punjab Agricultural University, here on Tuesday. This workshop was attended by representatives

from different northern states of the country and the participants were urged to set up biogas plants in rural areas of their respective states.The workshop was inaugurated by G L Meena, Director (Biogas), MNRE, Government of India. While speaking on the occasion, he informed that the government is providing a subsidy of Rs 9000 for the setting up of a biogas plant. He said with the setting up of biogas plants, several LPG cylinders can be saved.Anupam Nanda, Senior Manager, PEDA, Ludhiana and H S Sandhu, Senior Manager, PEDA, Chandigarh stated that with the setting up of one biogas plant, 1.5 LPG cylinder can be saved. They said that people interested in setting up of these plants can apply in the office of Additional Deputy Commissioner (Development)

(Courtesy: The Times of India. Dec 30, 2015)

Scania to construct biogas plant in Nagpur

Nagpur: Swedish bus maker Scania Commercial Vehicles India Private Limited has decided to construct a biogas plant in the city. The biogas will be produced with the help of methane being generated while treating sewage water.Scania Company, which launched the nation's first ethanol-run bus in the city with the help of Nagpur Municipal Corporation (NMC) and city MP Nitin Gadkari-led ministry of road transport and highways, has inaugurated its first bus manufacturing plant near Bengaluru in Karnataka on Tuesday. At the same occasion, Scania Company has signed a memorandum of understanding (MOU) with another Sweden company Swedfund for construction of a biogas plant in the city. Gadkari was present at the time of signing the MOU.Managing director of Swedfund Anna Ryott and president and CEO of Scania Commercial Vehicle Martin Lundstedt signed the MOU. According to the MOU, the biogas plant will be constructed jointly by the two Swedish companies. The biogas will be utilized to run the vehicles, especially city buses. Scania Company has already engaged Swedish consultant IVL to submitting a report on the proposal.Gadkari has been directing NMC time and again to utilize methane being produced from waste at the sewage treatment plant situated at Bhandewadi. Now, Gadkari has decided to rope in Scania Company for the plant and also to make available buses run on biogas.

(Courtesy: The Times of India. April 1, 2015)

Management school installs biogas plant on campus

Mumbai: The country's leading scientists and technology experts rejoiced when they gathered to boil a pot of milk at an institute in Matunga recently. What made this routine act

so special was that the fuel came from a new biogas plant that has been installed on campus. The Welingkar Institute of Management Development and Research (WeSchool) in Matunga recently installed a biogas plant. It was inaugurated by Dr R A Mashelkar who was accompanied by Prof Dr J B Joshi, former director, UDCT, and journalist Bharat kumar Raut. The unit will use the wet waste generated in the cafeteria to produce clean energy that can cater to a part of its energy requirement.The six cubic meter installation comes from Cleantechcompany that had participated in the India Sweden Energy Accelerator (ISIA) at WeSchool last year. This initiative will reduce the institutes usage of LPG gas cylinders. Prof Dr UdaySalunkhe, group director said, "We expect that our young managers should become responsible citizens by not merely responding to change but proactively transforming society."WeSchool had earlier conducted a roundtable 'Swachh Bharat - NayaPrayaas' under the leadership of Mashelkar which hopes to bring positive change in health, hygiene and sanitation. The findings were presented to the Expert committee on Water and Sanitation set up by the Central government. The school has installed solar panels at its hostels. It recycles grey water and minimizes the use of packaged water bottles. School has stopped the practice of offering flower bouquets to guests at functions. It does not keep toilet paper either. The college draws inspiration from the Centre's Swachh Bharat Abhiyan.

(Courtesy: The Times of India, June 9, 2015)

PMC to revive non-operational bio-gas plant at a cost of 25L to light up 100 street lights

Navi Mumbai: Panvel's street lights will soon be lit using bio-gas, as the municipal council is planning to restart the defunct bio-gas plant soon. PMC is planning to light up about 100 street lights by using a grant of Rs 25 lakh.

The PMC chief officer Mangesh Chitale said, "Approximately 100 street lights can be lit up after the plant becomes functional." The limit is set at 100 since the plant has capacity to only provide energy to light that number of street lights, said officials.

The sanitary department head Dilip S. Kadam said that they are getting the grant for the plan under the 14th finance commission. The best plan on how to use the bio-gas to light up the street lights will be selected from the roadmaps being prepared by four consultants. The plant was earlier handled by the PMC works department but the responsibility has been handed over to the sanitary department. A newly-appointed engineer is currently assigned to take up the revival task further. The bio-gas plant was started in 2008 and remained till 2013.

The bio-gas plant set up was mandatory to process the municipal solid waste under Solid Waste Management Act 2000. The plant was constructed at a cost of Rs 18 lakh.

The civic body also opted to sell the bio-gas at the local level to generate money but failed to get positive response from the hotel and cooperative housing societies it had approached. Since we did not get a positive response, it led to the plant's closure. Approximately 5metric tons of garbage collected per day from hotels was used to make the bio-gas," said Kadam. The PMC also ended up wasting bio-gas generated for over five years due to no takers. Latif Shaikh, a PMC councillor alleged that the administration failed to keep the bio-gas plant functional."The garbage used in the bio-gas plant earlier is now sent to the dumping ground in Taloja. Even the gas generated was not used for any purpose and just released into the air", said Shaikh. He added that the administration never quantified the amount of bio-gas produced from the garbage.

(Courtesy: The Times of India. October 23, 2015)

Bengal gears up for cheaper biogas option, may drop LPG usage.

Bengal: Middle class and lower middle class families in Bengal, who are overly dependent on LPG for their cooking, can, breathe a sigh of relief as a new cheaper alternative may be available some time from now. Phoenix India Research & Development Group has set up a plant at Gunduba village under Birbhum's Dubrajpur police station and will be supplying biogas cylinders to distributors in the state. So, residents will be able to get their cooking gas for just Rs 300.Incidentally, this is the first time that a biogas plant has been set up in eastern India to provide cooking gas to residents at a very cheap rate. The plant, which is about 260km from Kolkata, was inaugurated on Friday afternoon by Swapan Banerjee, eminent sports administrator and brother of chief minister Mamata Banerjee."We are one of the prime companies working in the field of renewable energy. Our specialty is to produce biogas at the lowest price to middle class households in addition to creating employment. One biogas cylinder is equivalent to 14.2 kg of LPG," said Jyoti Prakash Das, the chairman of Phoenix India Research & Development Group. He added, "We have plans to set up 19 such plants in the 19 districts of the state by 2020." The company set up its first biogas plant at Gujarat in 2008.The Gunduba plant will produce methane using cow dung and other degradable substances. Sources said the cow dung and other bio-degradable substances are dumped in a big tank with equal amount of water and kept for three days. When it starts to take a thick liquid form, it will be kept in 10 big tanks — 15

feet each — from where the gasses are produced. These gases will be scanned through machines and only methane will be stocked in six huge balloons. Then, the methane will be filled in cylinders for domestic use. Methane (CH4) is a colourless, odourless, non-toxic and flammable gas and is the most simple of all hydrocarbons. Methane is a greenhouse gas that is produced through the breakdown of plant materials in landfills, swamps and marshes.

"For 15 cubic metre gas, consumers will have to pay Rs 300 per cylinder. This gas is also fuel efficient," Das said. With the help of local villagers from nearby villages, Phoenix India Research & Development Group has created a cow dung bank. "We have decided to pay Rs 2 for 1kg of cow dung," a senior official of the group said. This plant will produce 3,000 cylinders of biogas per day, which will be distributed in several parts of the state. As the cylinders are made with FRB material, they are light in weight than the conventional LPG cylinder. According to the company, at present they have distributors at Nadia, Hooghly, North and South 24-Parganas, East and West Midnapore, Murshidabad and Birbhum districts. Later, they will scout for distributors in other districts.

(Courtesy: Hindustan Times,August 23, 2015)

Biogas mission proposes to take 'green fuel' to urban homes

MNRE to scale up funding for R&D in renewable energy from next year

As the Centre gears up to launch the National Biogas and Fertilizer Mission, alternative fuel from organic waste may make inroads into the homes in the urban pockets of the country."Biogas is a clean energy option which has huge potential to emerge as a major alternative fuel, especially for cooking gas and power generation. As the biomass and wastes generated in big quantity is left unused, we aim to come out with technologies that can be adopted in homes for their energy needs," said Varsha Joshi, Joint Director, Ministry of New and Renewable Energy, New Delhi. Speaking at a session on biogas production and power generation at the 103rd Indian Science Congress here on Wednesday, she said the mission's draft, with objectives and guidelines were being prepared. The mission aims to promote biogas initiatives in a big way across the country. Ms. Joshi said the MNRE would be scaling up its funding on the research and development on renewable energy, including biogas. Though the penetration of LPG in rural areas might have slowed down the biogas movement, the Ministry aims to touch millions of people with renewable energy technologies for providing clean energy options like biogas, she added. Ms. Joshi said biogas can create

economic opportunities as the surplus energy can be sold, and improve living conditions of women in rural areas. However, there are certain issues which need to be looked at through innovations at various levels for improving their sustainability, she noted.“There are certain problems that can be overcome to help women in villages operate plants on their own. There are also issues for making the structures of the plants durable to prevent damage,” she explained. Ms. Joshi said the MNRE would invite new technologies and solutions from experts for making biogas a reliable fuel, especially in villages. “We want the best brains to come and help us with innovations and new applications, for making biogas a commercially viable option.”Ms. Joshi said the mission would help people innovate ideas for bringing down the cost of biogas plants. The Joint Director said there was a need for improving technologies and management for the effective use of biogas for decentralized power generation. ***The MNRE is promoting biogas projects for power generation in capacitiesof 3 kW to 250 kW.***

Fulcrum dives into biogas sector

“Energy infrastructure firm says biogas is becoming an important part of the UK energy mix”, by Jocelyn Timperley. Energy infrastructure firm Fulcrum has announced it is to target the UK's expanding renewable market by providing pipes to link anaerobic digestion (AD) plants to the gas network. The new venture, which will see Fulcrum fit pipes to feed biogas into the UK gas distribution network, marks an expansion of its core business of linking homes and businesses to the gas network."Biogas is becoming an important part of the UK's energy mix and there is real potential for it to take an even greater role in the future," Martin Donnachie, Fulcrum's chief executive, in a statement. The Sheffield-based firm has previously delivered a series of high profile projects, including providing gas infrastructure for the Olympic Park, Athletes Village and the Olympic Cauldron for the London 2012 games. It is also contracted by British Gas to provide connections to properties until at least 2018.

Donnachie said Fulcrum's gas infrastructure experience means it is well placed to also support AD operators in the construction and commissioning of new plants. "Our track record in the gas industry, together with our excellent working relationship with the Gas Networks, will be of real benefit to the sector and support its ambitions to increase its contribution to the UK's energy requirements," he said.

Biogas is methane rich gas created from the anaerobic digestion of sewage, food and industrial waste.

Figures released by DECC last summer showed AD capacity outside of the water industry increased by nearly a third during 2014, from 164MW to 216MW. Meanwhile, industry insiders say the recent increase in funding for biogas projects through the Renewable Heat Incentive (RHI) scheme could result in a major rise in the number of AD plants in the coming years from the 40 currently to around 180 by 2021.

(Courtesy: The Hindu, January 7, 2016)

Mahindra inaugurates bio-CNG plant

Mahindra & Mahindra on inaugurated a bio-CNG facility here to create carbon neutral ecosystem at Mahindra World City (MWC).Spread over 1,000 square metres, the facility will convert eight tonnes of food and kitchen waste generated daily at MWC, into 1,000m3 of raw biogas, Mahindra & Mahindra said in a statement. Further the raw bio gas can be enriched to yield 400kg/day of purified CNG grade fuel which is equivalent to a 200 kW power plant, the statement said "As a by-product four tonnes of organic fertiliser will be produced per day. The green energy (bio CNG) can be effectively used to replace CNG as automotive fuel and LPG for cooking purposes as well as to power street lights at MWC," it added.

(Courtesy: The Hindu, January 2, 2016)

Mahindra inaugurates bio-CNG plant at Mahindra World City

Spread over 1,000 square metres, the facility will convert eight tonnes of food and kitchen waste generated daily at Mahindra World City.

Chennai: Mahindra & Mahindra today inaugurated a bio-CNG facility in Chennai to create carbon neutral ecosystem at Mahindra World City (MWC). Spread over 1,000 square metres, the facility will convert eight tonnes of food and kitchen waste generated daily at MWC, into 1,000m3 of raw biogas, Mahindra & Mahindra said in a statement. Further the raw bio gas can be enriched to yield 400kg/day of purified CNG grade fuel which is equivalent to a 200 kW power plant, the statement said.

Mahindra & Mahindra inaugurated a bio-CNG facility to create carbon neutral ecosystem at Mahindra World City. (Representative picture)

"As a by-product four tonnes of organic fertiliser will be produced per day. The green energy (bio CNG) can be effectively used to replace CNG as automotive fuel and LPG for cooking purposes as well as to power street-lights at MWC," it added.

(Courtesy: Economic Times, January 2, 2016)

Dr. Harsh Vardhan, Minister of Science and Technology and Minister of Earth Sciences, GoI, India visiting the CRDT IIT Delhi stall at India International Science Festival (IISF 2015), at IIT Delhi

Prof. Kshitij Gupta, the officiating director of IIT Delhi welcomes to Chaudhary Birender Singh, Hon'ble Minister of Rural Development, Panchayati Raj, Sanitation & Drinking Water. GoI, in National Biogas Convention under Unnat Bharat Abhiyan at IIT Delhi.

BIOGAS RELATED ARTICLES

Urban backyards go green with biogas

Urban India is yielding to Prime Minister Narendra Modi's appeal to give up LPG subsidy to allow penetration of cleaner energy among the poor using wood as fuel. However, there are certain people in Delhi and the NCR who are turning their class-X science lessons on biogas — an alternative fuel from organic waste — into a reality to save LPG and conserve environment in a city, which produces over 8,000 MT of Municipal Solid Waste per day, including organic kitchen waste, half of which piles up at already saturated landfill sites. The government is also working on a "Biogas Mission" to push home scale biogas plants and work towards standardisation and including waste such as from poultry, etc, too. The mission has a target of installing one crore plants across India against the current 48 lakh. While many in urban settings would scorn at the idea of installing a biogas plant at home as it requires to be fed with cow dung and waste, there are some who are setting a precedent. Shyam Sunder Aggarwal, now in his late 70s and the owner of an engineering company, has a biogas plant at his house in north Delhi's posh Civil Lines area. The plant was installed around four to five years ago and is now producing enough biogas for an average family of four. His staff at home use a biogas stove to cook meals. "The plant is fed everyday with 10 kg cow dung, water and kitchen waste. The cow dung is bought from nearby cowsheds. This mixture is fermented inside the fermentation tank converted into slurry through which methane gas and carbon dioxide gas are released," he shares. Dr. Upasana Singh, a resident of Noida, also installed a biogas plant in her house some two to three years ago. Today, she is using biogas while the rich manure produced as a by-product enriches her plants and lawns. The MCD has a ban on dairies just about anywhere in the cities but its official says cattle can be kept at home for purposes such as biogas plant by meeting requirement of space and waste disposal. *While many in urban settings would scorn*

at the idea of installing a biogas plant at home as it requires to be fed with cow dung and waste, there are some who are setting a precedent.

OX2 Wins Concession for One of Sweden's Largest Biogas Plants

OX2 will take over NSR's biogas plant outside Helsingborg on January 1, 2016. The plant has a capacity to produce around 80 GWh of biogas and 140-150,000 tons of bio fertilizer per year. OX2, best-known for its position in wind power in the Nordic region, is also active in other areas within renewable energy, and bioenergy is one of its important focus areas. As of 1 January, OX2 will take over the operation of NSR's biogas plant, including 13 of the employees. Biogas produced from municipal solid waste and other organic bi-products from local industrial food producers and farms will be used to fuel local and regional buses in public transportation.OX2 develops, constructs, finances and manages renewable energy plants in northern Europe. We are a driving force in the transition towardsa sustainable energy sector, offering financial investors as well as large energy users the opportunity to invest in and own renewable energy. OX2has realized a significant part of the large-scale onshore wind power projects in the Nordic region. The group has operations in Sweden, Finland, Norway and Poland.NSR is owned by six municipalities in north-west Skåne: Bjuv, Båstad, Helsingborg, Höganäs, Åstorp and Ängelholm, a region with a total population of 225,000. NSR's recycling plant in Helsingborg is the main facility, where most of the waste from the region is processed. The region has a further four recycling plants. NSR also operates facilities for paper recycling and dealing with hazardous waste.

BMW to Power South Africa Plant with Biogas from Manure

BMW AG's car-assembly plant in South Africa is doing its bit to help the German carmaker edge toward a global target to supply all its production with renewable energy: It's getting some of its power from biogas made from cow manure. The company has agreed to a 10-year deal to buy as much as 4.4 MW of electricity from a biogas plant about 80 kilometers (50 miles) from its factory north-west of Pretoria, the South African capital. Surrounded by land where about 30,000 cattle graze, the operation runs off gas emitted by a fetid mixture of dung and organic waste ranging from sour yogurt to discarded dog food. The deal with Bio2Watt (Pty) Ltd., the closely held company that operates the power plant, was struck to bring Munich-based BMW a step closer to its renewable target, according to the carmaker's South Africa spokesman Diederik Reitsma. The biogas facility, when ramped up to full

capacity, will represent 25 percent to 30 percent of the electricity consumption at BMW's factory, he said in an interview at the car plant. "We are a big consumer, so that's a lot," Reitsma said. "It's waste no longer wasted."

BMW already purchases about 51 percent of its energy from renewable energy sources, according to the company. In South Africa, the carmaker may consider other clean-energy sources including solar for the Rosslyn factory, which was BMW's first foreign plant when it was established in 1973. The facility produces more than 60,000 3-Series sedans a year for local and export markets and produced its one-millionth vehicle in February.

For local food and waste companies, supplying the station is a convenient and environmentally friendly way to get rid of organic waste that the government is seeking to divert from landfills. The plant also receives waste from several large food companies, according to Bio2Watt Chief Executive Officer Sean Thomas."You are looking at around 500 tons of waste coming onto the site every day being processed at the plant," Thomas said. "A lot of the consultants, the waste companies, are knocking on the door."

Fresh Manure

At full production, the Bio2Watt plant will get daily manure deliveries – "as fresh as possible," according to Thomas – of about 160 metric tons. The site's other primary feedstock is paper sludge from the local unit of U.S. toilet-tissue maker Kimberly-Clark Corp., while the rest is a hodgepodge of fruit and vegetable leftovers, fat from restaurants, abattoir waste, yogurt, dog food and expired carbonated drinks. Beefcor (Pty) Ltd., the meat-supply company that owns the feedlot around the biogas plant, sees providing manure to Bio2Watt as both a cost-effective and environmentally friendly way of disposing of waste, Managing Director Robin Watson said by phone on Friday. While BMW is purchasing power generated at the biogas plant, the energy will be fed into the local grid owned and operated by Eskom Holdings SOC Ltd., the state power utility, which then connects to the auto plant via the city of Tshwane's electricity distribution network. Tshwane, the local metropolitan area where both factories are located, will facilitate the billing process. The reliance on the local power grid means Bio2Watt can't guarantee security of energy supply to BMW if Eskom schedules blackouts in the area, Thomas said. The utility, which supplies about 95 percent of South Africa's electricity, imposed rolling power cuts through the winter this year as the utility carried out maintenance at its aging plants after years of underinvestment.

And the stench? After some time at the site, "you don't smell it anymore," said Thomas, who visits the project at least once a week. "The problem is if you go to a meeting afterwards, it's in your clothes, it's in everything."

Resource Base for Biogas Plants

Anaerobic digestion is the natural biological process which stabilizes organic waste in the absence of air and transforms it into biofertilizer and biogas. Almost any organic material can be processed with anaerobic digestion.Anaerobic digestion is particularly suited to wet organic material and is commonly used for effluent and sewage treatment. This includes biodegradable waste materials such as waste paper, grass clippings, leftover food, sewage and animal waste. Large quantity of waste, in both solid and liquid forms, is generated by the industrial sector like breweries, sugar mills, distilleries, food-processing industries, tanneries, and paper and pulp industries. Poultry waste has the highest per ton energy potential of electricity per ton but livestock have the greatest potential for energy generation in the agricultural sector.

Agricultural Feedstock

- Animal manure
- Energy crops
- Algal biomass
- Crop residues

Community-Based Feedstock

- Organic fraction of MSW (OFMSW)
- MSW
- Sewage sludge
- Grass clippings/garden waste
- Food remains
- Institutional wastes etc.

Industrial Feedstock

- Food/beverage processing
- Dairy

- Starch industry
- Sugar industry
- Pharmaceutical industry
- Cosmetic industry
- Biochemical industry
- Pulp and paper
- Slaughter house/rendering plant etc.

Anaerobic digestion is particularly suited to wet organic material and is commonly used for effluent and sewage treatment. Almost any organic material can be processed with anaerobic digestion process. This includes biodegradable waste materials such as waste paper, grass clippings, leftover food, sewage and animal waste. The exception to this is woody wastes that are largely unaffected by digestion as most anaerobic microorganisms are unable to degrade lignin. Anaerobic digesters can also be fed with specially grown energy crops such as silage for dedicated biogas production. A wide range of crops, especially C-4 plants, demonstrate good biogas potentials. Corn is one of the most popular co-substrate in Germany while Sudan grass is grown as an energy crop for co-digestion in Austria. Crops like maize, sunflower, grass, beets etc., are finding increasing use in agricultural digesters as co-substrates as well as single substrate. A wide range of organic substances are anaerobically easily degradable without major pre-treatment. Among these are leachates, slops, sludges, oils, fats or whey. Some wastes can form inhibiting metabolites (e.g.NH3) during anaerobic digestion which require higher dilutions with substrates like manure or sewage sludge. A number of other waste materials often require pre-treatment steps (e.g. source separated municipal organic waste, food residuals, expired food, market wastes and crop residues).

Envi-Tec Biogas signs contract for 633-kW biogas plant in the state of New York

Export hit biogas scores in the USA

Lohne, 29 October 2015 – From Germany to the world: With the signing of a new contract for the construction of a biogas plant, EnviTec Biogas is continuing its steady growth in the United States. From the point of view of dairy farmers Jake Swyers and Jon Rolf of Adirondack Farms LLC, the decisive reason was the successful operation of the

EnviTec facilities in New York State that were commissioned in 2013 and 2014. The quality of the biogas and efficiency of the process have been proven with two years of data for Lawnhurst. This proven track record is most important to most dairy farmers when investing in this technology.

"During the inspections of our Lawnhurst Farm project, which has been awarded the title of Biogas Project of the Year, and the Noblehurst Farm project, we impressed our new customers with the performance of the digesters and our technical designs", says Lars von Lehmden, managing director of EnviTec Biogas Anlagenbau GmbH & Co. KG. With a planned electric capacity of 633 kilowatt-hours (kW) and a commissioning date in September 2016, the plant will be operated using the liquid manure of more than 2,800 Holstein cows. "The resultant green energy is sufficient to provide electricity to more than 400 households, along with the farm", says Steve McGlynn, managing director of EnviTec Biogas USA Inc., which is headquartered in Stanley, New York. Part of the construction of the biogas plant is being financed through subsidies provided by the New York State Energy & Research Development Agency and Unites States Department of Agriculture. "The attempts to make renewable energies accessible to as many customers as possible are also supported by the local energy supplier, New York State Electric & Gas", explains McGlynn.

About EnviTec Biogas

EnviTec Biogas AG covers the entire value chain for the production of biogas, including the planning and turnkey construction of biogas plants and biogas upgrading plants as well as their commissioning. The company takes charge of biological and technical services on demand and also offers full plant and operational management. In addition, EnviTec also operates its own biogas plants. In 2011, EnviTec Biogas expanded its business operations into the direct marketing of upgraded biomethane as well as the marketing of green electricity and balancing energy. EnviTec Biogas AG currently has a presence in 14 countries. In 2014, EnviTec generated revenues of EUR 163.4 million and an EBIT of EUR 6.3 million. The EnviTec Group currently has about 350 employees. EnviTec Biogas has been listed on the Frankfurt stock exchange since July 2007.

The use of this product leads to the breakthrough again. Within only three weeks we could operate the waste water fermentation plant at full load. My assumption, micronutrients are only necessary in depleted waste waters, seemed to be confirmed with this second experience in using micronutrients.

As I was mainly concerned with the fermentation of waste in the following time, I forgot the micronutrients again. Even as I had considerable problems with foam formation and increased acid concentrations in the biogas plant Fürstenwald/Spree, which I operated from 1998 to 2007, I rather assumed an inhibition by the high ammonia concentrations than a lack of micronutrients.

Only in 2006, when we inexplicably detected a strong increase of propionic acid in the digester at a fairly moderate loading rate of 3.5kg oDM/cbm/d in a newly constructed plant processing maize silage, I remembered the successes, which I had with the use of micronutrients and I also remembered the producer of the liquid fertilizers. Together with him we developed a micronutrient solution, adapted to the use in plants processing renewable raw material, which we brought to the market in 2007.

The use of this product was very successful. So we could manage digester loading rates of 10kg oDM/cbm/d without problems with the fermentation of renewable raw materials. Interestingly, the addition of micronutrients also made an impact in plants with a considerable quantity of liquid manure. The biological process became more stable and the biogas yield increased slightly.

Today, we distribute this further developed product under the brand name Acinor 1000 in Germany, Eastern Europe, South America and South-East Asia. At a correct dosing, in different plant types of various manufacturers with diverse substrates a stable biogas process with a very high biogas yield is achieved, even at a high loading rate.

If you have questions, please leave a comment or contact me. I will collect the questions and answers in a special article.

BTS Biogas: 1 MW biogas plant developed for Chiesa

The BTS Biogas plant is set up for processing waste and sub-products coming from farming and cattle herds.

Chiesa is based in Asola, Northern Italy, where it occupies more than 400 ha of land sub-divided into 5 agricultural businesses, all self-owned, and a herd of over 2,500 heads of beef cattle. In 2012 the company decided to enter the market of renewable energy and enlist BTS Biogas for the design, construction and then maintenance of a 1 MW plant.

“The choice of installing a biogas plant was taken as an extension of the traditional agricultural and animal husbandry activities. Our aim was clear: to use the waste and sub-products which we already have here,” said Stefania Chiesa, the owner. “Having a herd of

2,500 cattle means that we have a great quantity of manure. But not only that: our 400 ha of cultivated terrain generate a large quantity of sub-products. For exactly this reason, we decided in 2012 to install a biogas plant, which gives us the ability to further exploit our farming and husbandry activity by producing clean energy and a precious improver, digestate."

The plant is supplied with maize silage, poultry manure, stable manure and slurry and seasonal products such as apple and tomato pulp, olive pomace, potatoes, peels and grape marc. Entering products pass through the Bioaccelerator^{R} pre-treatment system, a pulse reactor chopping the products and sub-products in entry, considerably improving energy performance. The anaerobic digestion of the products continues to perform excellently with an average production of 23.748 kWh of electrical and thermal energy per day; the digestate is used in part as a natural fertiliser in the company's fields and in part is sold on to other agricultural companies.

Chiesa has in fact installed a drying plant: a novel digestate post-treatment technology that solves the problem of liquid spillage. In particular, the system further optimises the biogas plant with production of a high-value fertiliser representing a further source of income for the company.

"We chose BTS Biogas because it is recognised as a reliable company both during plant design and construction stage and in the following management stage," commented Stefania Chiesa. "The biological maintenance of the plant means we have Jody Grazia of BTS Biogas constantly available. This is an extremely precious service because she works with us to evaluate the efficiency levels of our plant and constantly offers help in the selection of the optimal recipe."

"With our technical assistance service we can keep the Chiesa plant performance unaltered over time and guarantee maximum biological and economical efficiency," said Michael Niederbacher, CEO of BTS Biogas.

The Bio-CNG dispensing system into vehicles at IIT Delhi.

GOVERNMENT INITIATIVES FOR PROMOTION OF BIOGAS

1. Implementation of National Biogas and Manure Management Program (NBMMP) during 12th Five Year Plan Government of India sanctions the implementation of Central Sector Scheme, the National Biogas and Manure Management Program (NBMMP) during the 12th Five Year Plan in all the States and Union Territories.
2. Continuation of Biogas Power (off-grid) program during 2013-14 and the remaining period of 12th Five Year Plan

Under technology demonstration of new RDD&D Policy of MNRE during the year 2008-09, the Ministry took up a new initiative for bottling of biogas to demonstrate an Integrated Technology-package in entrepreneurial mode on medium size mixed feed biogas-fertilizer plants (BGFP) for generation, purification, bottling and piped distribution of biogas. Under the demonstration phase, the Ministry has sanctioned a Central Financial Assistance (CFA) upto 50% of the cost (excluding cost of land) for a limited number of such projects for implementation following an entrepreneurial mode on reimbursement basis. 14nos. BGFP projects with aggregate capacity of 23,116 cum/day have been sanctioned.

Gathering at National Biogas Convention under Unnat Bharat Abhiyan at IIT Delhi.

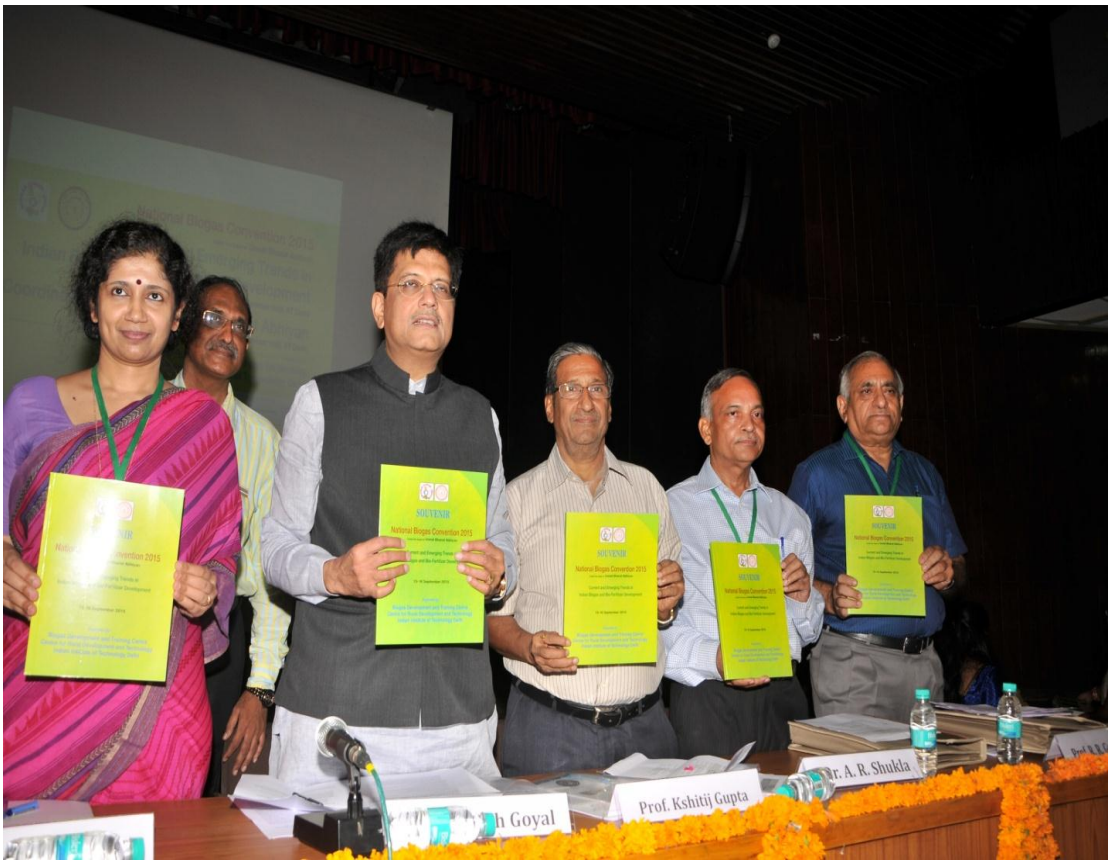
INTERNATIONAL BIOGAS NEWS LINKS

- http://www.truckinginfo.com/news/story/2016/02/clean-energy-fuels-doubles-renewable-natural-gas-sales.aspx
- http://www.environmental-expert.com/news/yet-another-solution-to-the-industrial-wastewater-treatment-sector-647752
- http://www.puv.fi/en/news/to_build_a_biogas_plant_or_an_incineration_plant-that_is_the_questiong/
- http://www.treehugger.com/renewable-energy/make-your-own-diy-biogas-digester.html
- http://www.climatechangenews.com/2016/02/08/worlds-first-cactus-powered-plant-opens-in-mexico/
- http://www.thestar.com.my/business/business-news/2016/02/06/sarawak-wants-delay-on-biogas-plant-rule/
- http://www.jns.org/news-briefs/2016/2/1/israeli-biotech-firm-installs-renewable-energy-unit-at-ugandan-orphanage#.VsQDa7R961s=
- http://www.bioenergy-news.com/display_news/10121/Asia_Biogas_begins_commercial_operation_at_Thai_biogas_plant/
- http://www.news24.com/SouthAfrica/News/cows-hold-solution-to-sas-power-crisis-says-ufs-researcher-20160127
- http://www.irishtimes.com/business/economy/asia-biogas-starts-renewable-project-in-thailand-1.2509722
- https://renewables.seenews.com/news/tanzania-to-invest-usd-4m-in-biogas-digesters-programme-510516
- http://allafrica.com/stories/201601250113.html
- http://www.theguardian.com/environment/2016/jan/16/colorado-grand-junction-persigo-wastewater-treatment-plant-human-waste-renewable-energy
- http://www.baltic-course.com/eng/energy/?doc=115305

UPCOMING EVENTS

International	National
1. ACI's 5th Annual Gasification Summit 2. 23 – 24 March, Rotterdam, The Netherlands 3. EBA Circular Economy Workshop 6 April, Brussels, Belgium 4. RENEXPO Western Balkans 2016 20 – 21 April, Belgrade, Serbia 5. REGATEC 2016 10 – 11 May, Malmö, Sweden 6. III Alternative Fuels World Fair 18 – 21 May, Bologna Fiere, Italy 7. Biogas Science 2016 21 – 24 August, Szeged, Hungary 8. Nordic Biogas Conference 7 – 10 September, Finland EBA Conference 9. 27 – 29 September, Gent, Belgium BIOGAS Convention and EnergyDecentral (with BIOGAS Trade Fair) 10. 15 – 18 November, International trade	1. International Conference on Emerging Trends in Engineering, Technology and Science 4th to 5th March 2016 Hyderabad, India 2. International Conference on Environment and Ecology 7th to 9th March 2016 Coimbatore, Tamil Nadu, India 3. 2nd International Seminar on Utilization of Non-Conventional Energy Sources for Sustainable Development of Rural Area (ISNCESR-16) 17th to 18th March 2016 Bhilai, Chhattisgarh, India 4. IEEE International Conference on Energy Efficient Technologies for Sustainability ICEETS-2016 7th to 8th April 2016 Nagercoil, TamilNadu, India 5. International Conference on Emerging Trends in Engineering 12th to 13th May 2016 Karkala, Karnataka, India 6. International Conference on Energy Access in Rural Areas, 15th to 17th September, IIT Delhi, New Delhi, India 7. International Conference on Water: From Pollution to Purification, 12th to 15th December 2016

fair for innovative energy supply, Hanover, Germany (Biogas Convention)	Kottayam, Kerala, India 8. 2nd International Conference on Bioinformatics, Biochemistry and Bioscience 24th to 25th October 2016 New Delhi, Delhi, India



Sh. Piyush Goyal, Hon'ble Minister of State with Independent Charge for Power, Coal, New and Renewable Energy in the Government of India along with Ms Varsha Joshi, Joint Secretary, MNRE, GoI, Prof. V. K. Vijay, IIT Delhi, Prof. Kshitij Gupta, the officiating director of IIT Delhi, Dr. AR Shukla and Prof. RR Gaur releasing 'Souvenir' of National Biogas Convention under Unnat Bharat Abhiyan at IIT Delhi, September, 2015.

Governing Body of the Forum

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