

# Biogas Forum India

E-News Letter, Volume 6, No. 2  
(January–June, 2015)

July, 2015

## In Focus...

**Biogas Powered Bus  
Breaks UK's Land  
speed Record**

**Israeli Home Device  
Turns Trash Into  
Biogas Fuel.**

**“Analyze your Biogas  
Composition at Biogas  
Development and  
Training Centre, IIT  
Delhi”**



See page no. 26 for details

#Climathon-2015  
New Delhi



Climate change is a challenge for all of us.



An intercontinental 24 hour  
hackathon-style event to find  
innovative, city-level solutions  
to climate change

## COVER STORY

IIT Delhi Organized TEQIP/QIP/CEP Short Term Course  
Programme on “Biogas Production, Purification and Power  
Generation”

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### DISCLAIMER

The views expressed by  
authors including those of the editor in  
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## Editor's Note

It gives me immense pleasure to release the Half-Yearly Newsletter of "Biogas Forum India". Biogas technologies have proved to be a ray of hope for resolving the waste management and solving energy supply problems in rural as well as urban areas in a sustainable manner



Over the last three decades biogas plants have played an important role in Indian Villages and it will also lead in urban area for resolving the problem of waste management and important link to achieve the mission Swachh Bharat Abhiyan. But, with the advancement of lifestyle even in rural areas, the aspirations of rural people are skyrocketing. Most of the villages have cattle, but the dung is mostly being used for making dung cakes for burning as fuel or as organic manure in an inefficient manner. This traditional practice of cooking using firewood keeps rural women and adolescent girls engaged, and deprives them of better education, good health and comfortable lifestyle. Generally, the energy usage also indicates the economical status of the families and thus, the scarcity of energy is becoming the cause of resentment, poor economic condition, and ultimately the migration of the rural people towards cities. Thus, there is an urgent need to address these issues in a focused manner. Biogas offers an important solution to the present energy crisis in rural areas.

Besides being a clean and important source of energy for cooking it is an environmentally green and clean fuel which can be successfully used for power generation and vehicular fuel using appropriate technology. An attempt has been in progress to prepare policy on national level for initiation of "National Biogas Mission" for installation of 10 million biogas plants across the country for all sizes of biogas plants, to draw attention of policy makers and the users for the greater use of biogas as cooking fuel, power generation and vehicular fuel applications. This issue will be of high interest and useful to our readers. Further, I need your advice and suggestions on due course to visualize installation of 10 million biogas plants in India through "National Biogas Mission".

**Virendra Kumar Vijay, General Secretary**

## President's Column

### Stage is getting set for taking a 'Leap Frog Jump' for Biogas- Fertilizer Sector

In India, under 'Swachh Bharat Mission' and 'NamamiGange- National Mission for Clean Ganga' of the govt. serious attempts are underway to handle liquid and solid wastes from cities and industries through installation of STPs/ ETPS, biogas plants based on loose and leafy biomass waste and other technology solutions, as there is no other suitable technology for handling wet biomass waste other than bio-methanation technology, as of date, which provides four in one solution of i) waste treatment ii) energy generation iii) bio/ organic fertilizer production and reducing Green-House Gas (GHG) emission.

With the shifting of human settlement in India from rural to urban and semi-urban, reduction in individual cattle holdings to more of centralized cattle locations in the form of dairies and goshalas and reduction in grazing land average collection efficiency of suitable biomass waste required for biogas-fertilizer plants can be set at about 50%. With this the Annual Biogas Generation Potential in India comes out to be 60.443 million cubic meter of raw biogas or 26.28 million tonnes of LPG equivalent. It has been estimated based on cattle dung and various other suitable biomass waste available in rural and urban areas of the country.

As enabling provisions for making biogas-fertilizer sector sustainable BIS Standard for biogas composition: IS 16087: 2013 is in place. It provides for minimum 90% methane and suitability of compressed biogas for filling in cylinders like CNG and injection in gas grid in addition to power generation and thermal and cooling applications. Ministry of Road Transport issued Gazette Notification on 16.06.2015 permitting use of Bio-CNG following the said BIS standard to be used as vehicular fuel. Ministry of Agriculture has considered organic fertilizer in its 'Fertilizer Order' and Ministry of Chemicals and Fertilizer has advised fertilizer companies to supply certain percentage of organic fertilizers along with chemical fertilizers.

Ministry of Petroleum and Natural Gas organized a National Seminar on 'Bio-Fuel Programme in India- The way forward' in VigyanBhawan on 13<sup>th</sup> July 2015 which included organic waste to fuel-biomethanation. The Ministry has also constituted a working Group on Bio-fuels, which looking into biogas sector as well. The Ministry of Road Transport is also organizing a conference on 'Green Fuel Vehicles for Transportation' in New Delhi 9-10 September 2015 in which bio-CNG is getting addressed as one of the alternate/ supplementary vehicular fuel.

The 'Biogas Forum India' (BigFIN) and Biogas Development Training Centre (BDTC), IIT Delhi has taken initiative to prepare 'National Biogas Fertilizer Mission', which is going to be the theme for the 'National Biogas convention 2015', being organized at IIT Delhi on 15-17 September 2015. The Ministry of New and Renewable Energy has agreed to include this in the agenda of the scheduled meeting with State Nodal Agencies involved in implementation of biogas programme in the country. The Ministry has also initiated an

exercise on preparation of ‘National Renewable Energy Act’ which includes biogas-fertilizer sector as well.

All the stake holders of biogas-fertilizer sector are requested to provide their input for preparation of ‘National Biogas Fertilizer Mission’ and ‘National Renewable Energy Act’ within a couple of weeks-time to get its rightful place in the renewable energy and fertilizer mix in the country.

**Dr. Atma Ram Shukla**

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

## Clean energy project to fuel growth in villages

In hubballi, Cook up a storm, albeit with cleaner, greener energy in the streets of Gokul, HaroBelavadi, Tadasinakoppa, Navalur and Gamanagatti villages in Dharwad district. Some organizations working with alternative sources of energy are planning to launch projects on fuel efficiency in these villages to reduce carbon footprint. The primary aim will be to replace firewood with biogas. The low carbon% usage development project to his constituency, explains that large portion of the population in villages still relies on highly inefficient and dirty cookstoves. The burning of firewood over a period of time affects health, particularly of women and children. Besides, it slows down the cooking process and harms the environment. Biogas an efficient alternative replacement to firewood in poor households, which uses cattle waste. Biogas produces the same amount of energy as LPG does. It is a sustainable alternative to LPG and wood or biomass.

(Courtesy: Times of India | June 29, 2014)

## MSU to convert home science faculty into green campus



At the Vadodara the Students of MS University's construction division has started work on a project which will not only resolve the long-pending water-logging problem of the faculty but also convert it into a green campus. The faculty will now have an efficient irrigation system with sprinklers, porous pipes, moisture sensors, shutoff valves, energy efficient street lights and a bio-gas plant. The work is being carried out at the expense of nearly Rs 60 lakh through the funds allocated by Gujarat government.

(Courtesy: Times of India | June 29, 2014)

## NEERI plans to generate biofuels from solid waste

In Nagpur City, CSIR-National Environmental Engineering Research Institute (NEERI) is developing a technology to generate bio-fuels like biogas by treating solid waste at community, village and small town level. The motive behind the project is to decentralize

disposal of solid waste, which has to be carried outside the city from a centralized dump yard. The project is likely to curtail logistic charges for the Nagpur Municipal Corporation (NMC).



The biogas plant treating garbage, vegetable and food waste has already been set up at Deolapar-based GovigyanAnusandhan Kendra, 65 km from the city in Ramtek tehsil, on a pilot basis. NEERI started the plant four months ago and is successfully generating biogas from all types of wastes collected from the village. NEERI has planned to set up a technology park on its premises in the city. The park will have a laboratory that will experiment with the production of bio-fuel using solid wastes in an efficient way. NEERI is also planning to set up similar plant at Panchgaon based on agriculture waste. Technology to be developed at the park will be beneficial for villages, small towns and communities. In order to make more people aware about the concept, they welcome all interested organizations and communities to visit the park. The major problem in developing such technologies is finding enough solid waste. NEERI will work out to solve the problem. This will also pave way to make the project feasible. Later, NEERI also plans to produce bio-ethanol, mainly used in vehicles, by treating agriculture waste that that is available easily. In the Deolapar-based project the reactor at the plant has a capacity to generate biogas of 20 cubic metre by treating 100kg vegetable and food waste in a day. They are working on developing three more types of reactors based on leftover food, vegetable waste and mixed waste. At a time, it may require 25-100kg of waste during which we will keep on optimizing the technology. This technology can be very suitable for hotels where on an average 5,200kg waste is produced daily.

(Courtesy: Times of India | June 12, 2015)

### **Management school installs biogas plant on campus**

In 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. 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



**FredrikaOrnbrant, Counsel General, Consulate General of Sweden visits the biogas plant installed at WeSchool**

Sweden Energy Accelerator (ISIA) at WeSchool last year. This initiative will reduce the institute's usage of LPG gas cylinders.

WeSchool had earlier conducted a roundtable 'Swachh Bharat - NayaPrayaas' to bring positive change in health, hygiene and sanitation. The school has installed solar panels at its hostels. It recycles grey water and minimizes the use of packaged water bottles. WeSchool 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: Times of India | June 9, 2015)

**Get fired up with this professor's green initiative**

The assistant professor at KLE Technological University in Hubballi has been successfully converting solid organic waste into biogas at his home for the last three months. The professor, who have for long been farming organic mangoes in Kusugal village, grabbed the opportunity to start their own eco-friendly initiative after coming across a video produced by ARTI, an NGO, on a homemade biogas generator. He bought two PVC water tanks of 1,000 litre and 750 litre capacities. He invested Rs 10,000 in buying all other required equipment. The waste generate in kitchen is produced is fed into the biogas generator. They dump kitchen waste like leftover flour and food, peels of fruits, and bengal gram as well as leaves and flowers from our 200square feet garden. The amount of waste generated by the family is low, methane is produced in low quantities. The gas is, therefore, being currently used to only heat water. They have plans to replace LPG with methane at their home soon. That initiative comes at a time when the twin cities are struggling to deal with the

mounds of solid waste produced every day. The Hubli-Dharwad Municipal Corporation has not been able to launch any concrete measure to successfully manage the solid waste.

(Courtesy: Times of India | June 6, 2015)

## **Now HP to generate electricity from waste with the help Holland**



Shimla is so far known for its hydro power generation, but soon the state would generate electricity through waste with the help of Holland. Himachal Pradesh generates estimated 300 metric tonne of waste per day which has the potential to generate 200 MW of electricity. For the effective waste management in Himachal Pradesh, Ambassador of Holland had extended help to the state urban development department. To conduct the feasibility study, Holland had provided financial assistance of 50,000 Euros. Holland had formed consortia to ensure effective waste management in Himachal Pradesh that includes experts from the fields of biogas, landfill, waste management, machinery and refused derived fuel.

Consortia based on its study have suggested generation of electricity from waste. Generate electricity from waste, options of biogas and CNG too were weighed, but they were too expensive. Urban development department said option of producing biogas for cooking through biodegradable waste was also weighed. But it was very costly as pipes were to be laid for the purpose. He said option of CNG too was weighed, but it too was costly as bottling plant was needed to be set up for the purpose. Only option viable from waste was to produce electricity. After generating electricity through the waste, it would be put on the grid for further distribution.

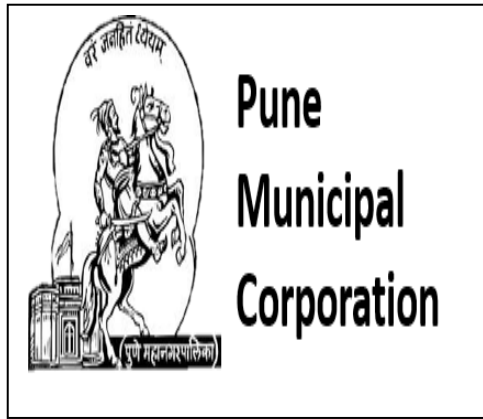
Himachal Pradesh urban development are to ensure effective waste collection for the purpose, three dustbins to collect - biodegradable waste, refused derived fuel and inert waste - would be placed underground within 100 metre of residential localities of urban areas. Biodegradable waste would be used to generate electricity, while refused derived fuel that includes polythene and clothes would be supplied to cement factories and boilers where they are sold at a price of Rs. 1800 per tonne. Inert waste collected from bins would be sent directly to landfill sites. The effective waste management, Rs. 110 crore has been sanctioned



to state under 'Swachh Bharat Abhiyan' of which Rs. 6 crore has already been received. A pilot project would be set up at Sundernagar and Dharamshala.

(Courtesy: Times of India | June 2, 2015)

### **PMC to set up 12 small garbage disposal plants**



Pune city faces problem related to garbage disposal during monsoon. The Pune Municipal Corporation (PMC) is planning to set up 12 small garbage disposal plants at various locations in the city with a total capacity of 100 tonne. The PMC has proposed to set up 12 small garbage disposal plants with a capacity of two to 20 tonneto segregate garbage at source in houses. The need to set up small garbage disposal plants was felt as the PMC has been giving biodegradable garbage to farmers for vermicomposting. But the farmers will not take the

biodegradable garbage during monsoon because it will start rotting soon and the spoilt garbage will be of no use to them. The PMC has handed over 51,000 tonne of garbage to farmers. At present, about 350 tonne of biodegradable garbage is disposed in pits in farmlands up to a distance of 75km. The number of biogas plants has been increased from 18 to 25. Currently, only 450 tonne of non-biodegradable waste is dumped at the Uruli garbage depot

(Courtesy: Times of India | June 1, 2015)

### **Soon, dhaba owners can generate energy from left-over food**



In Dehradun first of its kind endeavour, dhaba owners will soon be able to generate energy from left-over food at their eating joints. The Worldwide Fund for Nature (WWF), India, is all set to launch a pilot project in Ramnagar town wherein dhabha digesters will be provided to eatery owners. The move has been initiated to reduce dependency of domestic and

commercial users on fuel wood. A similar pilot project has been implemented in Pilibhit, Uttar Pradesh. The first biodigester will be installed free of cost at a dhaba in Ramnagar town. The dhabha digester will be procured from the Appropriate Rural Technology Institute (ARTI), a Pune-based NGO which manufactures the device. The 200litre tank costs between Rs. 40,000 to Rs. 50,000 as per its size and capacity. As part of the fermentation process, the left-over food and raw materials such as flour, besan etc. when put into the device, will generate methane as energy and this will enable dhabha owners to produce energy instead of buying wood at hefty rates.

The dhabha digester plant is compact and can be used by urban households. As many as 2,000 dhaba digesters are currently in use in urban and rural households in Maharashtra. The design and development of this simple, yet powerful technology has also won ARTI the Ashden Award for Sustainable Energy-2006 under the Food Security category. Manufacturers of the device claim that it is 20 times more efficient as the conventional system. The energy generated by mixing 40 kg cow dung and 40 kg water produces biogas. The same is produced by using 1.5 kg left-over food and 15 litres of water on a daily basis. With this, they save 100 LPG cylinders a year. The cow dung as the end product can also be used as fertilizers and vermin compost. Meanwhile, moving a step further to conserve fuel wood, WWF has also distributed bio-gas devices to 20 families at subsidized rates in Ganga Bhogpur and TallaMalla villages, situated on the Song river corridor. For each biogas plant costing Rs. 26,239, the WWF has contributed Rs. 15,000, while the remaining will be borne by a family. The device will be able to fulfil the fuel needs of a six-member family and three cattle.

(Courtesy: Times of India | June 1, 2015)

### **NMC to collaborate with German co to generate energy from hotel waste**

The Nashik Municipal Corporation (NMC) plans to generate energy from hotel waste with the help of a German company as a pilot project in the city. The scheme, along with other issues like solid waste generation, types of solid waste, wet waste to compost and biogas, organic dry waste to value added product.

(Courtesy: Times of India | June 1, 2015)

### **New renewable energy model combines solar, bio-gas and H<sub>2</sub>**

Kolkata will provide 24×7 days uninterrupted power from renewable energy sources, experts from the UK and IITs are now working together to create a new model which combines the best of solar power, biomass energy and hydrogen. The first-of-its-kind UK-India experimental Bio-CPV project on development and integration of biomass and concentrating photovoltaic (CPV) system will soon light up a remote tribal hamlet in Shantiniketan, 180 km away from Kolkata.

The problem with dependence on solar power is that sunlight is not available 24×7 hour and 365 days a year. Therefore we are integrating it with biomass so that the power supply remains continuously available. This was the first time that the three sources of green energy

would be integrated together in India. The installation work is expected to begin in October, this year and the entire model would be ready by 2016. Use solar power during the day and match it with biomass generation from local sources of organic material during the night. Hydrogen would also be used for emergency use. From the UK, experts from the University of Leeds, University of Exeter, and University of Nottingham are sharing their inputs with scientists from Visva-Bharati, IIT Madras and IIT Bombay. Pearsonpally, a tribal village of Shantiniketan, has been selected as the site for installation of the integrated energy system. Once the project is ready, around 30 houses in the village would be lighted up using the new technology. It is a pilot project to demonstrate the efficacy of such a low-cost technology for interrupted supply of power. Biomass, weeds, water hyacinth would be collected locally by villagers and mixed with cow dung so that anaerobic process can start to produce methane, which is a biogas. Hydrogen is also produced similarly but in a very small quantity. Usage of hydrogen would be a small component as there are issues with storing hydrogen which requires large space.

(Courtesy: Times of India | May 27, 2015)

### **Bengaluru: What a load of garbage!**



**Bengaluru generates around 4,000 tonnes of waste every day.**

Several stakeholders have worked together to introduce solutions to Bengaluru's garbage problems. Some of the regulations in place include the Bruhat Bengaluru Municipal Corporation (BBMP) directed bulk waste generators, which includes apartments and tech parks, to manage their waste independently. Technology and service providers are now empanelled, which make compliance for bulk waste generators easier. Dry waste collection centres are located across the city to make it easier for citizens to drop their waste for retrieval and recycling. Biogas plants have been set up to enable conversion of waste

into energy. Bengaluru generates around 4,000 tonnes of waste every day. Collectively, these regulations should have shown results in the form of litter-free streets and less waste reaching landfills. (Courtesy: Times of India | May 25, 2015)

### **Civic body plans to set up biogas plant to treat organic garbage**



The Kolhapur Municipal Corporation (KMC) plans to decompose organic waste to generate biogas at the unused dome of the old sewage treatment plant (STP) in

KasbaBawda. The National Green Tribunal's (NGT) directive of decentralizing solid waste processing, the KMC will set up the biogas facility in association with a Sangli based firm. According to the environment status report for 2013-14, around 50% of the 180 tonne waste can be converted into biogas. The civic body is looking at more such places to set up biogas plants, one in every ward. Hotels and restaurants generating organic garbage in the city will be made to sign up for the facility. They don't have enough space to dump the huge amount of solid waste that is generated. The biogas facility will help to reduce the quantity of daily waste processed. The facility will cost around Rs. 30 lakh to treat around 10 tonne of waste every day. An organization from Kaneri area collects the food waste from several city hotels and utilizes for generating biogas. The firm has to commission the plant in six months and will be entitled to sell the biogas that will be generated and it will get help from the KMC's sanitation department for collection, segregation and transportation of the waste from hotels to the plant.

Treatment of sewage at the old STP has been stopped since the new STP became operational. The old STP is ideal for setting up the biogas plant as the firm will not have to invest in building a structure. The capacity of the plant can be increased to 10 tonnes. Once every ward has a biogas plant, they will be able to treat 35% of the daily waste that is generated in the city

The KMC is following the decentralization model of waste management initiated by the Pune Municipal Corporation (PMC). The PMC has set up has 27 biogas plants with a capacity to process about 133 tonne garbage. With a population of around 5.75 lakh, the city generates around 160 tonnes of garbage that is left untreated. Experts say that waste generation has increased from 350 gram per person to around 1 kilogram per day in the last one decade and 50% of which can be treated at the source point.

(Courtesy: Times of India | May 22, 2015)



### **Going green: Infosys will spend Rs. 400 crore to become carbon neutral**

Infosys will spend about Rs. 400 crore over the next four years to achieve carbon-neutrality on commuting. The Bengaluru-based company will have to offset 3.74 lakh tonne of carbon dioxide attributed to employees' travel, and it will spend Rs 70 crore this year on initiatives such as installing solar projects for rural electrification, biogas plants and distribution of

smokeless cook-stoves in villages, besides afforestation. These will benefit communities outside of the company. Their programmes are in sync with the guidelines issued by various international agencies, including the United Nations. Infosys also announced that it is joining RE100, an elite club of global corporations such as GE, SAP, Nestle and BT with a commitment to go fully green. Infosys will commission 55 MW of solar capacity, including 40 MW in Karnataka, in the next year. It will add another 110 MW of solar capacity in the

coming years. It is already generating energy from 2.7 MW capacity solar panels on rooftops across its campuses in India. (Courtesy: Economics time | May 19, 2015)

### **Nod for 6 garbage processing units**

In Pune, the civic standing committee approved six small garbage processing units to be set up in BhavaniPeth area and it will install four units with a capacity of processing five metric tonne garbage daily and two units with a capacity of three metric tonne. The company would run these units for five years and process organic biodegradable municipal solid waste. Pune guardian minister GirishBapat had asked the PMC to take an immediate call on all proposals regarding garbage processing. The PMC will have to build around 60 to 70 small ward-level garbage processing plants in three months to deal with waste management and that plants with the capacity to take in 5 to 10 tonne garbage will process garbage at source, which will finally reduce the burden on the city's garbage disposal system. Garbage generated in the city used to be processed at the plants in Phursungi and UruliDevachi. Two plants set up in Ramtekdi are not working to their capacity leading to open dumping. The civic body also has 27 biogas plants with a combined capacity to process about 133 tonne trash.

(Courtesy: Times of India | May 5, 2015)

### **Now from milk town: A cow-dung bank**



In Ahmedabad, dairy farmers from Anand and Kheda were frontrunners during the White Revolution in the country. Now these progressive farmers have come up with an idea of creating a cow-dung bank and use it to generate biogas. A 1,500-member strong Gujarat Progressive Dairy Farmers Association (GPDFA) plans to set up the first of its kind bank to collect cow dung from over 400 villages and use it to produce biogas which would be supplied to nearby

industries. This project will not only provide additional income to the farmers from sale of cow dung and biogas, but also help in getting rid of the solid waste of cattle from the villages.

Farmers get good income from milk but they have difficulty in getting rid of the cattle dung. We have thought of a project of cow-dung bank where they can sell the dung. The animal excreta collected would then be used to generate biogas. The biogas plant will be run on a cooperative or public private partnership model. The green energy generated from the cattle dung would be sold to the industries and the byproduct from the gas plant would be used as organic manure in fields.

(Courtesy: Times of India | April 27, 2015)

### **School ground usurped for biogas unit**

In Coimbatore, the city municipal corporation had allocated eight cents of the R S Puram Corporation Higher Secondary School's land to install a biogas plant. The Coimbatore corporation had floated tenders for the construction of the plant and allocated 1.21 crore for its construction. Although the biogas plant is intended to fuel the mid-day meal scheme of the school, it will only be able to eliminate the LPG usage by nearly 50%. The corporation planned to use the sewage waste from the school to feed for the biogas plant. It was found that the feed will not suffice, the civic body planned to use the garbage collected from R S Puram market and nearby areas using corporation lorries. So the sewage from school will also be used and the garbage collected from the market around the school.

(Courtesy: Times of India | April 1, 2015)

### **Biogas plant installation will begin second week of April in Kozhikode**

In Kozhikode, the biogas plants to find a permanent solution to the disposal of waste. The civic body has received approval to set up a total of 750 biogas plants in its limit this year. They have launched the disposal of waste at the source points by popularizing pipe composting and biogas plants with the financial aid of the Kerala State Suchithwa Mission in 2013. Though it had entrusted two agencies, including Integrated Rural Technology Centre and Socio Economic Unit Foundation, for the installation of units at the houses of beneficiaries in the 75 wards, the installation of pipe composting units planned in the first phase of the scheme was stalled following non-allocation of funds to the agencies entrusted with the work. The scheme was resumed recently following complaints from beneficiaries who waited more than a year for the installation of units by remitting beneficiary fee. According to the corporation health officials, the civic body has provisions to install only 750 biogas plant units this year. A sum of Rs. 8,000 is required for the installation of the biogas plant. The civic body will provide 25% as subsidy to the beneficiaries to set up biogas plants while remaining sum is the contribution of the beneficiaries.

(Courtesy: Times of India | Apr 3, 2015)

### **Scania to construct biogas plant in Nagpur**

In 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 NitinGadkari-led ministry of road transport. Scania Company has signed a memorandum of understanding (MOU) with another Sweden company Swedfund for construction of a biogas plant in the city. 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. Gadkari has decided to rope in Scania Company for the plant and also to make available buses run on biogas.

(Courtesy: Times of India | Apr 1, 2015)

## **25 more villages to separate waste, get biogas plants**

In Coimbatore, After the success of feeding organic waste to cows and using the dung to produce biogas in Kurudampalayampanchayat, the district rural development agency (DRDA) has decided to emulate the solid waste management programme in 25 other villages in Coimbatore district that come under three panchayat blocks of S SKulam, Thondamuthur and Madukkarai. DRDA set up sheds in these villages with an initial investment of 30 lakh in each village. They have begun setting up sheds in Madukkaraipanchayat block following a similar model. They plan to add a few more innovative techniques such as equipping the electric vehicles used to collect waste from households with GPS.

There are 10 villages and 15 wards with a total population of 30,143, comprising 13,000 families with a floating population of 15,000. The unique feature of this project is the use of cows fed with vegetable waste which is converted into dung in 8 hours. A biogas plant has also been set up there under Bhabha Atomic Research Centre (BARC) run by self-help groups and NGOs under the guidance of the village panchayat officials and DRDA who support the project financially and technically. About 1.5 cylinders of biogas could be prepared from the waste and the other waste is then used for vermin compost.

(Courtesy: Times of India | Mar23, 2015)

## **CNG plant to come up on BOT mode**

In Thiruvananthapuram, Clean Kerala Company is likely to renounce the public private partnership (PPP) in setting up CNG (compressed natural gas) bottling plant to produce biogas from biodegradable waste. The plant which is proposed at Chalai will be realized on BOT (build, operate and transfer) mode. Two companies based in Pune and Bengaluru turned up for the pre-bid meeting and the company has formulated three proposals for the implementation of the project. As per the first proposal, a five tonne capacity plant shall be set up by the firm and depending on its success, the facility may be extended.

(Courtesy: Times of India | Mar 16, 2015)

## **Biogas plants to keep Kottayam clean**

In Kottayam, the trial run of two biogas plants in Kottayam municipality are started. The plants, each having a capacity to treat two tonnes of waste a day is located on the banks of Kodoor River in Kodimatha and near the Municipal Park in Nagambadam. Initially, the plant will be run for one year by segregated waste from the vegetable market. The plants were installed for treating waste generated in the municipality. The plants were installed by Malappuram-based Sun Tech Biogas which is a service provider for Suchitwa Mission. The estimated cost for setting up the plants is Rs 48 lakh, which includes the operational cost for a year.

The plant is highly mechanised, only two workers are required for its operation. The technology of the model is acquired from the Bhabha Atomic Research Centre and the company gives a lifespan of 20 years for this model. The model has a waste receiving platform where the municipality will have to bring segregated waste. The waste will be then carried to the pre-processing room in trolleys through the ramp. The waste is then grinded in the pulveriser from where it will move to pre-digester and then to the main digester. It will be then filtered and the slurry will go to the septic tank and will be released to the soft pit. Meanwhile, the municipality is planning to use the biogas generated from the plant to operate the proposed incinerators at both places. Around 5KVA of power will be produced a day from each unit," said the company official. The power generated can light 60 street lights, he added.

(Courtesy: Times of India | March 13, 2015)

### **Athipattu bio-gas plant gets go-ahead from corporation**

In Chennai, the Chennai corporation council has approved a biomethanation plant which will be set up at the Athipattu dumping ground in Ambattur where garbage has been a mounting problem.

The facility will be designed by Bhabha Atomic Research Centre (BARC). Food waste from restaurants and apartments within Ambattur will be collected and fed into the plant in Athipattu which will convert it into organic manure and gas to power electricity generation. Power production is a by-product, BARC's main objective is to generate organic manure for fertilisation. The plant can treat three tonnes of waste daily and generate 300 units of electricity and 250 to 300 kg of organic manure.

(Courtesy: Times of India | Feb 28, 2015)

### **Biogas plants show way in waste management**

In Chennai, the civic body had proposed several projects in the past for scientific closure of dumping yards in Kodungaiyur and Perungudi, but nothing has materialized so far. Meanwhile, small biogas generators set up in places like Koyambedu and Pulianthope are showing the way for efficient waste management. Neighbourhoods like Otteri, Velangadu, Vanagaram, MRC Nagar, Anna Nagar and Harrington Road are also likely to get biogas plants in the next few months. Segregation and biogas initiatives at the ward level can make streets garbage free, and reduce the amount of garbage going to the dumping yards. Every year, the civic body spends more than 400 crore on garbage collection and transportation, but overflowing garbage bins are a common sight in several localities. They have identified about 700 rag pickers to promote source segregation of waste. They will provide them training and also give identity cards so that they can collect waste from households, adding that the civic body will set up biogas plants in burial grounds and parks. Every ward should have at least three biogas plants to reduce the volume of garbage going to dumping yards. The civic body should first rope in bulk garbage generators like hotels, restaurants and other commercial establishments and collect food waste separately. The concept of segregation should also



reach residents and the civic body should encourage them through some incentives. The civic body is paying more than 1,500 per tonne for garbage collection and transportation to a private firm. The corporation should make it mandatory for private firms to segregate the garbage collected from and convert into biogas. NGO Samridhi Foundation, which promotes source segregation in T Nagar, MRC Nagar and Harrington Road. The biogas concept will be successful only with the participation of residents. The plants require biodegradable waste and it can be achieved through source segregation.

(Courtesy: Times of India | Feb 22, 2015)

## **Corporation diverts food waste from dumps, plans biogas plants to light up Chennai**

In Chennai, the Chennai Corporation was finding a way to put garbage that is choking its dump yards to good use. Biodegradable waste from hotels, marriage halls, fish and vegetable markets around Pulianthope High Road will light up 40 street lights from next week. This is the first of many initiatives planned to encourage source segregation. A biomethanation plant with technology from Bhabha Atomic Research Centre (BARC) will generate biogas from segregated food waste such as vegetable peel for the project. The two-tonne plant has a capacity to generate four cylinders of gas or 200 units of electricity using 180kg of natural manure daily

The cost of moving garbage from the streets to dumping yards can be reduced through decentralized waste management. Ideally, every neighborhood should have a biomethanation plant to promote source segregation of waste. Such type of 4-tonne plant are installed at Siruseri IT Park. Nearly 30% of the 5,000 tonnes of municipal solid waste generated in Chennai every day is biodegradable. The plan to segregate waste at garbage transfer stations and move the organic portions to biogas units can significantly reduce volume of waste reaching the city's two dumping yards, in Kodungaiyur and Perungudi.

Corporation officials said they have spent Rs. 48 lakh for the Pulianthope plant. This initiative will reduce garbage load at the landfill in Kodungaiyur. And power generated by the unit can run street lights, thus saving some money. They are setting up three-tonne plants at three more sites in Chennai. At Otteri, 40% of the work is complete while preliminary work has commenced in Velangadu in Anna Nagar. Another plant is lined up for Vanagaram. BARC officials nearly 225 such plants, each costing about 50 lakh and processing five tonnes of segregated garbage a day, have been set up across Maharashtra, Karnataka, Gujarat, Odisha and Kerala.

(Courtesy: Times of India | Feb 20, 2015)



Biogas plant market complex in Koyambedu.

## Biogas from Koyambedu market to fuel households

In Chennai, the wholesale market complex in Koyambedu which supplies fresh produce for the city will soon supply fuel to cook the produce. The biomethanation plant, which has been generating electricity from vegetable waste, will now also use waste from slaughterhouses, hotels, treated sewage sludge and banana stems to supply biogas to neighboring houses. Chennai Metropolitan Development Authority (CMDA), which set up the biogas plant along

with CSIR-Central Leather Research Institute, will work on upgrading the existing plant. The upgrade, which will be done after feasibility tests, is expected to cost around 10 lakh. They have suggested to Tamil Nadu Pollution Control Board and Corporation of Chennai on setting up an integrated solid waste management plant where we can use other waste from hotels along with the existing waste. They will also explore the feasibility of using banana stem to produce biogas.

The plant, which started in 2006 and operated through a private agency, had been generating biogas which was converted into electricity through an engine. With the market complex generating 30 tonnes of waste daily, the plant was producing between 500 units and 4,000 units of electricity. But since its launch, the plant faced glitches with the engine failing and for a few years, the biogas was not put to any use. The engine will be removed and the biogas will be supplied to people. No other plant in the country has made such an attempt to supply directly to households. In Delhi, biogas is being bottled for use in vehicles but not houses. With the present 30 tonnes of waste generating about 2,400 cubic meters of biogas, a CMDA official says the fuel can be supplied to about 2,000 households.

They took up this initiative and submitted a proposal to the CMDA. The effort will help bring down the greenhouse gas emissions, groundwater contamination and odour problems due to open dumping. Apartment complexes near the plant have been identified for the direct supply of biogas and officials plan to approach the residents and conduct a workshop. They will also check the feasibility of supplying gas either through pipeline or bottling it. Officials said the corporation also showed interest in converting slaughterhouse waste and hotel waste to biogas fuel. Before it can be supplied to households, biogas will be subjected to a procedure where the carbon-dioxide and hydrogen sulphide content is removed and the overall pressure compressed.

(Courtesy: Times of India | Feb 19, 2015)

## **Resolute PMC plans to set up 25 biogas plants**

In Pune, the civic administration has planned extensive decentralization of garbage processing in the city. Corporators had opposed garbage processing units in their localities saying that people don't want them because of the odour. Every ward must take care of its garbage. The PMC has provided for Rs. 50 crore for setting up small processing plants at the ward level. They are going to create awareness among members of the public for segregation of garbage. In the next few months, the number of biogas plants will be increased to 25. By doing this the civic body has to reduce its dependence on UruliDevachi and Phursungi garbagedepots.

The civic body was going to review processing units and acquire land in the fringes to set up processing units. A major target before the PMC is to reach all properties in the city and achieve 100 per cent door-to-door garbage collection. The PMC may introduce mechanized cleaning for arterial roads and divert manpower to other departments.

(Courtesy: Times of India | Jan 15, 2015)

## **Colleges green campuses to save environment**

In Coimbatore, the colleges are going to green in that vision the Kumaraguru College of Technology is working on increasing green patches on campus. College has a kitchen garden on six acres that supplies vegetables and greens to the hostel mess. A biogas plant turns food waste into fuel that is used in the mess kitchen. KSR Institute of Technology has a biogas and gohar gas plant. All sanitary and kitchen waste from the hostels, mess and canteen is turned into biogas that is used in the hostel mess. Colleges have installed solar panels to save 30% on their power bill every month. KSR Group of Institutions has installed a 75 kW solar panel. With two sewage treatment plants, the campus recycles almost 1.5 lakh litres water every day. It is used to water the 3,000 coconut trees on campus.

(Courtesy: Times of India | Jan 2, 2015)

## **Biogas plants for 3000 households in rural setting of Uttarakhand**

The project involves the construction of 3,000 biogas plants in households in rural areas in the state of Uttarakhand in India. By substituting wood as a fuel with biogas, greenhouse gases are being reduced. This project is in cooperation with Helvetas and WWF Switzerland and is implemented in partnership with Intercooperation Social Development India (ICSD). The use of biogas plants is helping to reduce the consumption of wood as a fuel. But it is not only carbon emissions that are being reduced; it is also expected that there will be a substantial decrease in deforestation in and around the area, an increase in carbon sequestration in these forests, better health among women and children due to less smoke in kitchens, less time spending on collecting wood, especially women, reduced methane emissions in paddy fields thanks to the application of biogas slurry instead



A view of installed biogas plant.

of undecomposed farm yard manure, improved farming productivity due to slurry application (less temporary nitrogen blockage in the soil, more easily available nutrients for top dressing), an opportunity for skilled workers to provide their services for the construction, maintenance, marketing and financing of biogas plants, and increased climate resilience among the population as earnings increase due to savings and income generation grows thanks to skill development.



A young family in front of the new cooking stove – happy to have a clean healthy and smoke free cooking experience.

The use of biogas slurry for the organic production of rice in the area is an important sustainable benefit of the project. This procedure emits less methane into the atmosphere compared to the direct use of manure. Intercooperation Social Development India (ICSD) is promoting organic basmati rice production in this area, enabling poor and marginal farmers to earn more from its premium pricing than with rice produced conventionally using chemical fertilisers. This shows that the project will contribute strongly to the sustainable development of the rural population participating in the project. Thanks to all these sustainable benefits, the project is to be implemented as a small-scale project under the Gold Standard.

The capacity of the units to be installed varies and will be decided based on the number of people and the number of cattle they own. The cost for a biogas unit will be pre-financed by WWF Switzerland to cover one third. It is likely that subsidies will be received from the Indian government or corporate sources to cover another third. Families are expected to contribute one third of the total biogas digester costs. To secure ownership, households will either provide locally available materials and labour or contribute their share in monetary terms. Carbon finance will be used towards subsidisation of the units, training, operations and maintenance, reaching people in remote areas and other activities pertaining to the project.

(Courtesy: <http://www.myclimate.org/carbon-offset-projects/projekt/india-biogas-7204/>)

### **Ministry of New and Renewable Energy, Govt. of India organized meeting of “Biogas Power Project”**

Dr. B. S. Negi, Director, Ministry of New and Renewable Energy, Govt. of India and in-charge for “Biogas Power Project” in India organized review meeting on July 09, 2015. More than 50 stakeholders, institutional professionals working in the area of biogas were participated in the programme. The meeting was chaired by Shri UpendraTripathi, Secretary, MNRE and co-chaired by Ms. Varsha Joshi, Joint Secretary, MNRE. Various stakeholders presented their report for progress of ongoing Biogas Power Projects in the country. The issues of biogas quantity and quality measurements were discussed to monitor the actual performance of installed systems in the field. For this purpose the installation of biogas flow meters and energy meter should be installed at various sites by the plant owners.

The Secretary and Joint Secretary, MNRE gave emphasis to strengthen the biogas area by strengthening of Biogas Forum India and Indian Biogas Association in the country. They suggested that all stakeholders and professionals from various academic and research institutions should be members of Biogas Forum India and Indian Biogas Association.

The issue of initiation of “National Biogas Mission” in India was also discussed and suggested that the various issues should be finalized during the time of 2<sup>nd</sup> National Biogas Convention which will be organized during 15–17 September 2015 at the Indian Institute of Technology Delhi.

## **Ministry of Road Transport and Highways, Govt. of India notified Biomethane as transport fuel**

The Ministry of Road Transport and Highways, Govt. of India has notified in their final notification “The Gazette of India” Part – II – Section 3 – sub-section (i), dated: 16 June 2015.

Now provided that bio-Compressed natural gas (bio-CNG) shall be permitted for motor vehicle as on alternate composition of the compressed natural gas (CNG) and also provided further the mass emission standard applicable to CNG vehicle under these rules shall be applicable to respective vehicle when they use bio-CNG. Bio-CNG composition meets the fuel specification for bio-CNG as per IS 16087 and meets the requirement of siloxanes max. 0.1 ppm.

# EVENTS

## IIT Delhi organized three day TEQIP/QIP/CEP Short Term Course Programme on “Biogas Production, Purification and Power Generation” during 18–20 May 2015



Short term course participants and organizing committee members of the programme.

We all are well known and aware that ENERGY is one of the most essential constituent for the economic development, social advancement, human welfare and plays a key role in enhancing the living standards of human being. A national TEQIP/QIP/CEP Short Term Course Programme on “Biogas Production, Purification and Power Generation” was conducted on May 18–20 May 2015. Total of 60 applicants were selected for their participation in the programme. The programme was inaugurated by Dr. A. R. Shukla, Prof. R. R. Gaur, and Prof. V. K. Vijay followed by their welcome and addresses. Finally the vote of thanks was given by Dr. Ram Chandra.

Dr. H. N. Chanakya, Indian Institute of Sciences, Bengaluru delivered and shared his experiences on “Biogas Production from Different Substrates including MSW”. Prof. T. R. Sreekrishnan, IIT Delhi delivered and shared his experiences on “Different Reactor Configuration for Biogas Production”. Dr. Anushree Malik, IIT Delhi delivered and shared her experiences on “Algal Biomass Based Biogas System”. Dr. Paran Gowda, Patanjali Bio Research Institute, Haridwar delivered and shared his experiences on “Biogas Plant Design and Development Experiences”. Prof. V. K. Vijay, IIT Delhi delivered and shared his experiences on “Developments in Biogas Enrichment and Bottling Technology”.

The second day of the programme started with talk of Prof. Deepak Sharma, CTAE, MPUA&T Udaipur on “Domestic Biogas System and Schemes of Govt. of Rajasthan”. Dr. G. P. Govil, New Delhi delivered and shared his experiences on “Conversion Kit for Engines

to Run on Biogas for Power Generation”. Prof. V. K. Vijay, IIT Delhi delivered and shared his experiences on “Biogas Fertilizer Projects for Purification and Bottling, and Planning of Biogas Production for Handling of Organic Waste under Swachh Bharat Abhiyan”. Shri G. L. Meena, MNRE, New Delhi delivered and shared his experiences on “National Biogas Manure Management Programme of the Govt.”. Prof. Satyawati Sharma, Head, CRDT, IIT Delhi delivered and shared her experiences on “Biogas Slurry Handling, Packaging and Marketing”. Dr. Ram Chandra, IIT Delhi, delivered and shared his experiences on “Biogas Production from Lignocellulosic Biomass”. Mr. Sandeep Garg, Green Brick Eco Solutions Pvt. Ltd., Okhla delivered and shared his experiences on “Biogas Based Industrial Experiences”. After finishing the technical session participants were made aware from the experimental facilities available in the Biogas Enrichment Laboratory through demonstration.



Prof. V.K. Vijay delivered and shared his experiences on Biogas Fertilizer Projects for Purification and Bottling.



Panel discussion on Future Directions for Biogas System Development in India

The third day of the programme started with field visit to Shri Krishna Gaushala, Ghaziabad, Uttar Pradesh. During field visit participants were able to see actual and working of large sized biogas plant and facilities available for biogas upgradation at the Gaushala. After field visit participant were back to IIT Delhi for next technical session. Prof. V. K. Vijay, IIT Delhi delivered and shared his experiences on “Power Generation from Biogas- various technologies”. Prof. P. M. V. Subbarao, Professor, IIT Delhi delivered and shared his experiences on “Design of Water Scrubbing based Biogas Enrichment System”.

Technical sessions were followed by a panel discussion on “Future Directions for Biogas System Development in India” which was chaired by Prof. R. R. Gaur, Prof. P. M. V. Subbarao, Prof. V. K. Vijay, Prof. Deepak Sharma, and Dr. Ram Chandra. During panel discussion participants shared their experiences and queries. Evaluation of the overall programme was done by the participants through “Feedback Form”. Valedictory of the programme was held after feedback applications were received from the participants. Dr. Ram Chandra presented vote of thanks on the concluding of the programme.



## IIT Delhi organized “Climathon 2015”



Coordinator of Climathon Prof. V.K. Vijay, Dr. A. R. Shukla, Prof. R. R. Gaur, Mr. Gaurav Kedia, and Dr. Ram Chandra (from left to right)

Climate-KIC is the EU’s main climate change innovation initiative and the largest public-private partnership of its kind. Climate-KIC educates the next generation of cleantech change makers, runs the world’s largest climate change startup accelerator and brings together partners on major mitigation and adaptation projects. Worldwide, there are concerns about the environment and everyone is striving for its preservation. India is such a global initiative to create the partner and the world’s six continents Climathon - 2015 held at IIT Delhi city located here on behalf of the witness. The way

many people together for some purpose participate in Marathon, similarly Climathon was held in 18 cities across six continents, to share their ideas on environmental protection where people come together.



Participants from TREI,CSE,CEC and IIT Delhi are participating in Climathon – 2015

This program was attended by various researchers and industry peoples from various institutions such as TERI, CSE, CEC and biogas Forum India. Rozita, Research Associate at the The Energy and Resources Institute (TERI), said that the goal of her group is to exit waste, which should be disposed off right there. Currently Delhi has seen the problem of garbage everywhere and the waste from homes, it is not isolated or segregate and is sent directly to dumping sites, where which produce large amount of methane gas which is highly harmful to the environment.

### **Analyze your Biogas composition in Rs 5000 at Biogas Development and Training Centre, IIT Delhi.**

Those who are interested in analyzing their biogas composition, they may send their biogas sample filled in canister or bladder. The charges for biogas composition analysis are Rs 5000 per sample. The amount according to the number of samples should be submitted by Demand Draft/ cheque drawn in the favor of 'Registrar IIT Delhi' payable at New Delhi.

The biogas sample should be send to following address:

Room No. 375, Block – III,  
Centre for Rural Development and Technology,  
Indian Institute of Technology, Hauz Khas, New Delhi-110016  
Phone: 011-2659 6351, 011-2659 6311

## Biogas Powered Bus Breaks UK's Land Speed Record



The speedy bus was painted to look like a Friesian cow /  
Reading Buses

The UK's land speed record for a regular service bus has officially been broken by a poop-powered bus. No, it's not bullpoop: It's cow manure. Reaching a top speed of 123.57 kilometers per hour (76.8 miles per hour), the bus tore around the track at the Millbrook Proving Ground in Bedfordshire for the record, which was confirmed by the UK Timing Association.

Painted black and white in the patchwork style of a Friesian cow, the vehicle named "Bus Hound" (after

the British Bloodhound supersonic car) runs on biomethane produced by the anaerobic, or without-oxygen, digestion of cow waste, which takes place inside a bioreactor. Compressed and liquefied, the biomethane is stored in seven tanks attached to the roof of the bus for a rather strange but efficient fuel.

But why the poop? Chief engineer John Bickerton said the real reason behind the land speed challenge was to highlight the sustainability and value of buses powered by cow poo. "Most importantly we wanted to get the image of bus transport away from being dirty, smelly, and slow. We're modern, fast, and at the cutting edge of innovation," said Bickerton to the BBC. "It was an impressive sight as it swept by on the track. It sounded like a Vulcan bomber." While the record is impressive, the bus needs to reach a top speed of 241 kilometers per hour (150 miles per hour) to be recognized as a Guinness World Record. Check out the video from Reading Buses below of the fast feces-fueled bus.

## Israeli home device turns trash into biogas fuel

The Western world may have grown accustomed to microwave ovens and electric burners, but the majority of developing populations still cook their food and heat their homes over an open fire. While that may seem like a more "pastoral" and healthy way to live, the World Health Organization reports that up to four million people die from the direct and indirect effects of cooking with solid fuels, like wood, charcoal and coal.



The HomeBioGas team meets with UN Secretary General Ban Ki-moon

This staggering statistic hadn't come to the attention of the Israeli inventors of the HomeBioGas system, until the information was pointed out to them by none other than United Nations Secretary General Ban Ki-moon. During a visit with Israeli President Reuben Rivlin last year, Ban expressed the global need for a sustainable and safe solution to this dire issue, naming Israel's HomeBioGas's bio-digester as a very viable answer. From trash to treasured cooking oil HomeBioGas's TevaGas (TG) device

is the first family-sized bio-digester made available on the market, which, according to Marketing Director Ami Amir, "is as easy to use as a dish-washer." For those who don't know what a bio-digester is, it takes organic material (like left-over food) and converts it into a fuel, known as biogas, through an anaerobic process carried out in a warm atmosphere. This fuel can then be used by a household for other purposes, like heating. According to Amir, this system does not even generate any foul odors.



The HomeBioGas in local area in Israel

"The basic underlying principles of bio-digester are, well biological," Amir explains, "There are bacteria or microbes that thrive in conditions where there is no air (anaerobic) that are able to break down organic matter into their components. One of the results of this process is known as biogas, a combination of methane gas and carbon dioxide." By feeding the remains of their dinner, or any organic trash for that matter, into the bio-

digester, users are able to generate clean, renewable biogas to cook three meals a day. In addition, the remaining soluble chemicals left over from the biogas breakdown process (about 10 liters according to the company) can be used as liquid fertilizers for gardens and vegetable crops, a very useful addition for agriculturalists and sustainable farmers.

While it sounds similar to composting, something many of us do already, Amir stresses that HomeBioGas's system is nothing of the sort. "Composting is feel-good, but it doesn't provide a lot of real value," mainly because many people who compost don't actually treat the organic matter themselves. He adds: "Composting generates methane that is not treated and is therefore much more harmful to the atmosphere."

The bio-digester itself is no novel innovation; The Israeli inventors of the HomeBioGas system, CEO OshikEfrati and COO Yair Teller, became familiar with cheaper home bio-digesters, but sought out a way to make them more efficient, and accessible. “People have been developing and building devices similar to ours for about 20-30 years,” Amir states of the history of bio-digester technology. However, the majority of these devices in developing countries like China and India are “very primitive and basic devices that are a pain to install and difficult to operate.”

The HomeBioGas team spent years improving on existing Indian and Chinese bio-digester models, but soon realized that underprivileged populations were in need of an entirely new model. “The intention was to develop the best product that will provide biogas from waste for the under-served populations of Latin America, Africa and Asia,” says Amir. Of course, before releasing their product to the world-at-large, the team wanted to test it out at home, which is why the first functional models of the system were introduced to a Bedouin community in Israel’s Negev Desert. Amir explains: “In these communities, there is little or no means of waste disposal and hardly any connection to utilities.”

### **For environmentally-minded First World’s too...**

HomeBioGas has launched other aid projects in the Palestinian territories, supported by USAID and the Peres Center for Peace, as well as in the Dominican Republic, where rural populations contribute heavily to the problem of deforestation, because of the need for cooking wood. “People from the Dominican Republic told us that each family destroys about ten trees a year and that usually the woman in the family is made to carry up to 6 tons of wood a year,” Amir says.

Since the company serves mainly under-resourced communities, many of its clients don’t have the funds to support the shipment of the product. This means the company needs to rely on hefty subsidies from governments and non-governmental organizations, which can be hard to come by. Yet due to a surge in awareness of environmental issues, like recycling, composting and homebiogas-ing, the company is even earning some support in developed countries like the United States, Australia and some European countries, who want the system for their own homes. According to Amir, “The need of middle class populations may not be as dire, but some still want a ‘smart can’ that can take their waste and turn it into something useful like cooking gas and fertilizer.” Currently, the system is sold separately at a price of about \$2,500 (NIS 10,000). And while HomeBioGas doesn’t have any direct competitors per say, the cheaper, simpler alternatives available in China and India represent a challenge only due to their drastically lower price.

### **Nestle powers up its factory with anaerobic digestion**

Officials of Nestle UK and Ireland have come up with a brilliant plan to reduce the company’s carbon footprint and at the same time save thousands of dollars. They installed an anaerobic digester in one of Nestle’s factories to turn waste from making sweets into energy. They have achieved our target of zero waste to landfill at their Fawdon factory, the

installation of a new anaerobic digester. The system allows us to convert a large amount of waste that would otherwise enter sewage, used as feed stock or landfill systems and generate methane and other greenhouse gas emissions.

Every day, Nestlé's anaerobic machine converts about 4 tons of food waste and over 200,000 liters of liquid waste into renewable energy and clean water respectively. Nestle is known for its chocolate products such as Baby Ruth, Smarties, and Butterfinger. The waste from making these sweets are then liquefied and injected into an airtight digester where they're decomposed by bacteria and converted into biogas. Currently, the biogas produced at the Fawdon Plant creates about 200kW of electricity, which is enough to provide about 8% of the facility's daily energy needs. Because of Nestlé's anaerobic digestion process, the greenhouse gas emissions caused by the Fawdon Plant fell by 10%. It also improved the quality of the water being discharged because of the bacteria that initially breaks down liquid waste.

### **The anaerobic digestion and gasification industry towards the EU policy in a united Mission and Vision document.**

Thermal gasification is a complementary technology to anaerobic digestion (AD) and it greatly amplifies the potential of renewable energy in the form of heat, electricity and vehicle fuel" is the lead message of the new Mission and Vision of the European Biogas Association.

The document, published and launched during REGATEC conference in Barcelona, identifies the policies and conditions to be fulfilled to fully deploy the AD and gasification potential. It is crucial that they establish a European market for common AD and gasification products: biomethane, ashes and digestate, and they facilitate cross-border trading of these three valuable goods. With the new Mission and Vision EBA kicks off activities dedicated to promotion and increase of the visibility of biomass gasification. In Brussels, the association initiated the meetings with the European Commission and DG Environment on the Commission's Communication on gasification that can be expected in the coming months. If we want gasification to grow in the future, we need to combine our efforts and to start being heard in Brussels. Biomethane, the Road to Sustainable Mobility Workshop.

### **EBA and natural gas vehicle association Europe in partnership with fiat Chrysler automobiles and CNH industrial**

Natural gas and renewable energy, specifically CNG (compressed natural Gas) and biomethane, can play a major role as a vehicle fuel in Europe. Among the advantages of CNG and biomethane are that they can help reduce greenhouse gas emissions and improve air quality, help European countries reach the 20-20-20 targets to which they have committed and meet the objective of integrating fuels from renewable sources in transportation. The conference will be an opportunity to delve into the virtuous cycle of natural gas and biomethane through a discussion with leading industry representatives and

policy makers on key questions concerning the present and future of Europe's Transport system.

- Can the combination of natural gas and biomethane strongly contribute to sustainable mobility?
- Will Europe's Agricultural Industry reinvent itself through self-sufficient and sustainable farms?
- How can these fuels positively contribute to achieving EU objectives within the political context of the Directive 94/2014/EU on deployment of alternative fuels infrastructure, the Energy Union and 2020-2030 targets (renewable energy, pollutant emissions, noise and CO<sub>2</sub>)?

The event will gather main stakeholders in this sector and the key policy officers from the European Commission and European Parliament. The event is open for EBA members only and invitees.

Sweden: More biogas is necessary for fossil-free transportation

**By 2030, Sweden can phase out natural gas in transportation and replace it with 100% biogas.**

It was said by the representatives from E.ON Gas, AGA Gas, Vehicle Sweden, Swedish Biogas and Energigas Sweden. Biogas is a unique, environmentally friendly fuel. Waste streams and residues from households, restaurants, agriculture and forestry will be a valuable resource for biogas production. The biogas will contribute not only to reducing climate impact, but also for closing the cycle, while air pollution and eutrophication decrease. Many environmental problems are tackled at the same time – efficiently and environmentally friendly.

Sweden has a unique position when it comes to biogas. No other country in the world uses as much biogas in road transport as Sweden does. Over half of the produced biogas is upgraded to biomethane. And over half of the gas vehicles are fuelled by biogas and the rest by natural gas. We have come a long way in the last 20 years. But we are not satisfied. By 2030, we want the industry to phase out natural gas in gas vehicles and go 100% biogas. Hence the need for more biogas to achieve the goal of fossil-free transportation. Sweden is a green pioneer today in biogas and CNG, for both light and heavy transport.

The following policies are required for that:

- Ambitious 2030 targets for climate friendly transport fuels: focus on replacing petrol and diesel
- Tax exemption for biogas together with reduction of the lower taxable benefit for gas vehicles – to secure the development reached so far

- Strict definition for environmentally friendly cars to promote clean fuels with low emissions – for reduced climate impact and cleaner air
- EU prioritizes gas infrastructure – to promote biogas (biomethane) and contribution to fossil free transport sector

### **Norway: €1.2 million for biogas pilot projects**

The Norwegian government has set aside €1.2 million (10 million NOK) for biogas pilot plants and research in 2015. The total budget is divided in two; where 8 million NOK is foreseen for grants. The remaining frame of two million NOK is intended for one project that will ensure monitoring and evaluation of plants that receive funding.

#### Biogas strategy

Biogas reduces greenhouse gas emissions, while helping to reduce emissions of local air pollution and noise nuisance from heavy vehicles, too. Biogas must be considered as a way to reduce impacts on climate, as the Parliament has adopted ambitious targets for national emission reductions by 2020, and the goal of transition to a low carbon society in 2050. The purpose of the biogas strategy is to increase the production and use of biogas. Pilot plants will aim to test the biogas technology based on other raw materials, apart from waste (e.g. manure), and thus contribute to future cost reductions for climate action and thereby advance future emissions reductions.

#### Criteria for applying for funding

Both new construction and existing facilities, that include a rebuilding can be awarded. Research funding can be given to one project related to measurements at the pilot plants, which should contribute to understanding and showing the effects of the plants, said Øyvind Halvorsen at Innovation Norway. Applications for funding of a pilot project with associated research should highlight how research component will be connected on the pilot project and potential learning effects.



## Useful links

- Biomethane for Transport from Landfill and Anaerobic Digestion (2015) Department for Transportation
- Discussion paper: Renewable Energy for Inclusive and Sustainable Industrial Development: The Case of Biomass Gasification (2015) by UNIDO
- Hanbook: Biogas: questions, answers and arguments (2015) by Erdgas
- Report: EurObserv'ER Biogas Report 2014(2014)
- Report: Biomethane Status and Factors Affecting Market Development and Trade (2014) by the International Energy Agency

## Upcoming Events

### 1. **EEF Global Sustainability, Environment and WasteMet Award 2015**

**Date:** 23 August 2015

**Venue:** Expo & Convention Centre, Manekshaw Centre  
Near DhaulaKuan, Delhi Cantt., India

**Website:** <http://theglobalawards.ee-foundation.org/sustainability.html>

,<http://theglobalawards.ee-foundation.org/environment.html>

And <http://theglobalawards.ee-foundation.org/wastemet.html>

### 2. **Current and Emerging Trends in Indian Biogas and Bio–fertilizer Development” (CETIBBD–2015)**

**Date:** 15-17 September 2015

**Location:** IIT-Delhi, New Delhi, India

### 3. **Cleantech India 2015**

**Date:** 2-4 September 2015

**Location:** PragatiMaidan, New Delhi, India

### 4. **9th Renewable Energy India Expo 2015 – UBM**

**Date** 23- 25 September, 2015

**Contact person;** Rajneesh Khattar

Group Director, UBM India

**Email:** [Rajneesh.khattar@ubm.com](mailto:Rajneesh.khattar@ubm.com)

### 5. **Global Conference on Renewable Energy (GCRE) Conference**

**Date:** 19 - 21 October, 2015

**Venue:** Patna, Bihar, India

**Website:** <http://www.weentech.co.uk/gcre2015/>

**Contact person:** Organising Secretary

World Energy and Environment Technology (WEENTECH) UK, is pleased to announce Global Conference on Renewable Energy (GCRE2015) organised in collaboration with NIT, Patna. Papers will be published in peer reviewed proceeding and reputed journals.

**Organized by:** NIT Patna and WEENTECH, UK

Deadline for abstracts/proposals: 31st July 2015

### 6. **International Conference on Engineering and Technology Conference**

29th to 30th December 2015

Delhi, India

Website: <http://www.mukpublications.com/ijet.php>

Contact person: Vinaykumar

The conference proceedings book with ISBN Number; CD and certificate presentation will be distributed to the conference participants at the conference registration desk.

The proceeding will be submitted for indexing in EBSCO, SCOPUS and ISI.

Organized by: MukPublications

Deadline for abstracts/proposals: 15th August 2015

7. **Biennial international conference on Power and Energy Systems: Towards Sustainable Energy (PESTSE2016)**

**Date:** 21 - 23 January, 2016

**Venue:** Bengaluru, Karnataka, India

**Website:** <https://www.amrita.edu/site/pestse2016/>

**Contact person:** K.Deepa

“PESTSE 2016” is a platform for Researchers, Scientists, Industrial professionals and Students to exchange and share their research accomplishments, achievements, and new ideas on the contemporary and emerging trends in Power & Energy system.

Deadline for abstracts/proposals: 30th July 2015

8. **Biofuels and Bioenergy: International conference and Exhibition**

**Date:** 23 - 25 February, 2016

**Venue:** Bhopal, Madhya Pradesh, India

**Website:** <https://www.weentech.co.uk/bice/>

**Contact person:** Conference Secretary

Biofuels and Bioenergy: International conference and Exhibition, 23-25 February 2016, will be organised in collaboration with Department of Chemical Engineering, MANIT Bhopal, India, Proceedings will be published with Springer Proceedings in Energy.

**Organized by:** MANIT Bhopal and WEENTECH, UK

Deadline for abstracts/proposals: 15th June 2015