



Biogas plants for urban wet waste management

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**AHUJA ENGINEERING
SERVICES PVT LTD**



Our Initiative

- ❖ **Turnkey provider** for commercial-scale **Waste-to-Biogas Plants** based on High Rate Bio-Methanation
- ❖ O&M & AMC services provided post supply and commissioning
- ❖ **Technology licensed from CSIR-IICT, GOI** and scaled-up by in-house Engineering & Manufacturing
- ❖ Solutions are scalable – **100 kg/day to 50 Tons/day**
- ❖ Recipient of Indo-US PACESETTER Award, FTAPCCI Excellence Award
- ❖ **DBT (Central Govn) Approved projects** for commercialization WITH CSIR-IICT
- ❖ Highlighted in Honorable **PM Modi Jis Mann-Ki-Baat**

AESPL : A Waste-to-Energy Company

Problem Statement

- ❖ **Organic waste management and disposal a big issue –**
 - MSW, vegetable mandi waste, food waste, slaughter house waste, etc.
- ❖ **Lack of scientific waste management solutions**
- ❖ **Landfilling, unscientific dumping pose long term environmental hazards**
- ❖ **Cost & logistics of waste transportation**
- ❖ **Lack of awareness regarding compact, easy to operate & maintain biogas plants for urban cities**

Our Solution – An In-House Waste Manager

[High-Rate Biomethanation Technology]



Generating Renewable Energy Through Waste



A 1000 kg/day Biogas Plant provides the following GREEN BENEFITS



**Avoiding
120 cylinders
of LPG
per month**



**CO₂ emissions
Avoided \equiv
Taking 2800 cars
Off the road
per month**



**CO₂ emissions
avoided \equiv
Planting 30,000
trees
per month**



**Producing
30 kL
of bio fertilizer
per month**

1 ton of food waste processed/day \equiv 1.5 C credits earned/day

1 ton food waste capacity plant \equiv 45 C credits earned /month

\equiv 550 C credits earned / year

Our Technology

- ❖ **Catering to URBAN wet waste management**
- ❖ **Compact & modular design**
- ❖ **Easy to operate & maintain**
- ❖ **Plant can process all kinds of wet waste**
- ❖ **Odourless and noiseless performance**
- ❖ **Low capex and opex**
- ❖ **App based Remote monitoring enabled**
- ❖ **Safety is inbuilt**
- ❖ **Reliable & prompt after sales service**
- ❖ **Good user experience for cooking**



Our Product Configurations

Food waste processed/ day	LPG cylinders saved /day	Plant area- sq ft	Plant area – m x m
100 kg/day	1/3 cylinder/day	150 sq ft	5.5 m x 2.5 m
300 kg/day	1 cylinder/day	450 sq ft	9 m x 4.5 m
500 kg/day	2 cylinders/day	600 sq ft	12 m x 4.5 m
750 kg/day	3 cylinders/day	675 sq ft	14 m x 4.5 m
1000 kg/day	4 cylinders/day	750 sq ft	15 m x 4.5 m
2000 kg/day	8 cylinders/day	1250 sq ft	15 m x 7.5 m
3000 kg/day	12 cylinders/day	2000 sq ft	15 m x 12 m

Our decentralized small-scale proven plants: Biogas replaces LPG/fossil fuels for cooking



100 kg/day capacity

food waste biogas plant

Replaces 5 kg LPG equivalent/day

Akshaya Patra, Chennai, T.N.



100 kg/day capacity food waste biogas plant

SCR- South Central Railways, Vijaywada

Biogas output from mixed food waste \equiv 100-120 m³/ton/day

Our decentralized small-scale proven plants: Biogas replaces LPG/fossil fuels for cooking



300 kg/day capacity food waste biogas plant
Replaces **15kg LPG equivalent/day**
CVR college of Engineering, Hyderabad



300 kg/day capacity food waste biogas plant
Replaces **15kg LPG equivalent/day**
Cap Gemini, Gachibowli, Hyderabad

Biogas output from mixed food waste \equiv 100-120 m³/ton/day

Our decentralized small-scale proven plants:

Biogas replaces LPG/fossil fuels for cooking



500 kg/day capacity biogas plant

Processes vegetable mandi waste

Erragadda Rhythu Bazar, Hyderabad.

Generates **15 kg LPG equivalent /day (Installed:2021)**

Biogas output from Vegetable Mandi waste
≅ 40-50 m³/ton/day



Our decentralized small-scale proven plants: 'Waste-to-biogas' : Replacing LPG/PNG/Boiler fuel



750 kg/day capacity food waste biogas plant
Replaces **40 kg LPG equivalent/day**
Akshaya Patra, **Puducherry**



750 kg/day capacity food waste plant at
The Akshaya Patra Foundation (Bhavnagar, Gujarat)
Generates **40 kg LPG equivalent /day**
(Installed:2018) **Area footprint: 11 m x 3.5 m**

Our decentralized small-scale proven plants: 'Waste-to-biogas' : Replacing LPG/PNG/Boiler fuel



1000 kg/day capacity food waste biogas plant
Replaces 55 kg LPG equivalent/day
Akshaya Patra, Ahmedabad



Upto 1000 kg/day capacity food waste plant at
The Akshaya Patra Foundation (Bhuj, Gujarat)
Generates ~55 kg LPG equivalent /day

Our larger scale plants

**Biogas for both green electricity
& replacing fossil fuel for cooking**

10 tons/day capacity for Vegetable Mandi Waste

Generates both **250 units electricity/day**
& **30 kg equivalent LPG** in the canteen

Bowenpally Vegetable market, Hyderabad

Upto 5 tons/day capacity for MSW & waste leachate

Generates 300 units electricity/day

Ramky Enviro – Jawaharnagar, Hyderabad





mann_ki_baat.mp4

Bowenpally vegetable market generates own green power

The 10-tonne capacity reactor was built last year at a cost of ₹3 crore

V. GEETANATH
HYDERABAD

During the coronavirus (COVID-19) lockdown and subsequent unlock, the Dr. B.R. Ambedkar Vegetable Market Yard in Bowenpally has been a hive of activity. It was not just about arrival of a variety of vegetables from near and far; a new waste-to-power plant was being tried out.

The CSIR-Indian Institute of Chemical Technology (IICT) has designed and patented the high rate biogas technology based Anaerobic Gas lift Reactor (AGR), for generation of methane-rich biogas and nutrient-rich biomethane. The reactor was undergoing trials and is now ready for launch.

Construction of the ₹3-crore 10-tonne capacity reactor was completed last year and the trial run in the last six months saw fruit and vegetable waste loads being gradually increased to full capacity to generate power. Up to 800-1,000 units of power can be generated daily by converting 10 tonnes of organic waste. The market committee hopes to generate the power it needs for lighting and other purposes through the plant courtesy off-grid supply.

"We have already begun to notice the benefits with the power bill coming down to ₹1 lakh from ₹2.5 lakh a month earlier," says market secretary L. Srinivas. Since



CSIR-IICT chief scientist Gangagani Rao inspecting the biogas plant at Bowenpally market in Secunderabad. ■SAMARISHA SINGH

the vegetable market is able to generate 3-4 tonnes a day, the remaining waste is being sourced from other bazaars and supermarkets to make up for the load to ensure the plant runs to its full capacity. The majority of the project was funded by the Centre's Department of Biotechnology (₹2 crore) and Government's Agriculture Marketing Department (₹1 crore).

There are about 20 plants working in various parts of the country and 10 more are under construction, including in Delhi and other places, with capacities ranging from 250kg to 10 tonnes a day of food waste, organic fraction of municipal solid waste market and vegetable waste etc.," explains CSIR-IICT chief scientist A. Gangagani Rao.

Within the city, such plants are under construction in vegetable markets of Alwal, Erragadda and Sarorumnagar - each of 500kg capacity while 5-tonne capacity plants are being built for Gaddiamaram and Gudi Malkapur markets. Biogas emanating from the plants is also being used to replace LPG cylinders in canteens. The project was initiated as a tripartite agreement between DBT, Telangana Agriculture Department with CSIR-IICT providing technology support. Biomethane generated through the plant can be sold as organic fertilizer too. IICT's first commercial fo-

ray into this technology, inspired by a few modern versions in Europe, was a pilot using 200kg poultry litter to generate 89kWh power and then for Alshay Patra Foundation in Bellary (Karnataka) and Ahmedabad in 2015 of 1.5 tonnes capacities. In the past five years, Dr. Rao and his team has worked on improving the efficiency of the compactor and right sizing the machinery to ensure less space is used. "Waste is a misplaced resource and an unrecognised wealth. Through this technology, we can save dumpyards in cities from piling up, provide green power and generate employment, besides preventing pollution," he adds.

GREEN | POWER

PM cites veg mart to promote power from waste

Bowenpally catches Modi's eye

T.S.S. SIDDHARTH | DC
HYDERABAD, JAN. 31

Employees, workers and vegetable vendors of the Bowenpally vegetable market were on cloud nine on Sunday after they heard Prime Minister Narendra Modi speak about them.

In his first broadcast of the year, through 'Mann Ki Baat', Modi was all praise for the efforts made by officials at the market yard. The innovative practice takes vegetable waste and converts it into biogas through a plant established on the premises.

"We have a waste-to-energy plant, which has a capacity of 10 tonnes. Our market yard generates close to four or five tonnes of vegetable waste a day. So to meet our target of ten tonnes, we get waste from other nearby fruit markets and super-



A woman dumps vegetable waste on a conveyor belt that takes them to a biogas plant and a power plant at the Bowenpally vegetable market in Hyderabad. — DC

markets," L. Srinivas, selection grade secretary, AMC Bowenpally, said.

The energy generated from waste is close to between 250 to 400 units of electricity. This energy is used to run offices, cold-room, lighting in the market, among other spaces.

"Vegetable waste generates electricity for us. We supply it to our market yard, among other places. We earlier run a power bill run-up to ₹3 lakh to ₹2.5 lakh per month. Now, using the new power, we have cut our electricity spend to ₹1 lakh per month," he said.

This project was a joint collaboration between the department of biotechnology and the state government. It was designed by IICT and executed by Ahuja Engineering.

Hindustan Times

TELANGANA |

Mention in PM's Mann Ki Baat puts power efficient vegetable market on national map

Srinivasa Rao Apparasu

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HYDERABAD: A local vegetable market that shot to prominence when Prime Minister Narendra Modi mentioned it in his monthly Mann Ki Baat radio address on January 31 is now attracting the attention of similar markets across Telangana.

The unique feature of the vegetable market, located at Bowenpally in Secunderabad, Hyderabad's twin city, is that it has a power plant that generates power from vegetable waste. Unlike other markets, where rotten vegetables are thrown away, spreading filth, the Bowenpally market looks spick and span.

Instead of throwing away the leftover and spoilt vegetables, the market management has made arrangements to shift the waste material to the power plant located about 100 metres away from the main market.

"This is the power of innovation. This is the journey of creation of wealth from waste," the PM said in his Mann Ki Baat talk.

The power plant was set up by Ahuja Engineering Services in coordination with the Telangana state agricultural marketing department at a cost of ₹3 crore. While the Centre's department of biotechnology extended financial assistance for the plant, the



The Bowenpally vegetable market has a power plant that uses vegetable waste to generate power. ■HT PHOTO

Hyderabad-based Indian Institute of Chemical Technology provided technical support.

"According to Dr Karanjani Sandeep, who heads the power plant, it has the capacity to generate 500 kilowatt hours (units) of power by converting 10 tonnes of vegetable waste every day.

"The vegetable waste is crushed into a slurry and then degraded through an anaerobic process into biogas, which is converted into electricity in the power plant," Sandeep said. The biogas is also supplied to

The power generated by the plant is more than enough to provide electricity for the entire vegetable market, besides street lights, the administrative building of the marketing department, a borewell and also for running the plant itself.

"The operational cost of the plant is around ₹1.5 lakh, it includes salaries to six employees, but if we take into account the savings in the form of power bills to the market, this is almost negligible," Sandeep said.

After the market found a mention in the Prime Minister's talk, the company has started getting enquiries from many other public and private markets in the state. "Right now, we have lined up two other markets in Hyderabad - the Gaddiamapur vegetable market and Gaddiamapur market fruit market. The scale of these plants will be bigger compared to that in Bowenpally. We shall gradually replicate it in other districts," Sandeep said.

He was jubilant that the initiative attracted the attention of the Prime Minister. "It was a pleasant surprise to all of us when he talked about the project. It is actually a part of the Swachh Bharat mission and the technology is totally indigenous. We are sure it will inspire many such plants to come up in the country," he said.

Frm dustbins to lightbulbs

Tonnes of vegetable waste being produced everyday at the Bowenpally market is now being converted into biofuel and electricity that light up the market's kitchen and stalls

RISHIMA GUPTA @Hyderabad

ALMOST 10 tonnes of waste collected every day at the Bowenpally market, which was once worthless and would end up in landfills, is now adding meaning to people's lives. More or less every ounce of the vegetable, fruit, and even flower waste collected at the market is now being used to generate around 500 units of electricity and 30 kg of biofuel.

The electricity generated is used to light up over a 100 streetlights, 170 stalls, an administrative building and the water supply network. Meanwhile, the generated biofuel is pumped into the canteen kitchen of the market.

Calling it the 'way ahead for a sustainable future' Bowenpally selection grade secretary Lokini Srinivas said, "One would have never imagined that vegetable trash can be so valuable. This is the first initiative taken up by any vegetable market in the State to convert organic waste to electricity. We had started the project al-



Vegetable waste at the Bowenpally market being converted into biofuel

500 units of electricity and 30 kg of biofuel is generated from the plant every day

most six months ago on a trial basis, which is now giving us very good results. For the bio-vegetable plant, we are using waste that is entirely generated here. We also collected veg-

etable waste from some nearby vegetable markets and supermarkets. The Bowenpally market requires around 800-900 units of electricity on a daily basis, of which 500 units are now being generated from the waste management plant."

How does it work? To initiate the process of biogas, tonnes of vegetable waste is first put on conveyor belts that carry the waste to shredders. The shredded waste is then converted into a

slurry and is put into large containers or pits to start the process of anaerobic digestion. Organic waste is eventually converted into biofuel, which has two major components, methane and carbon dioxide.

The fuel is then put into '100 per cent biogas generators' that convert the fuel into electricity, and reaches the market's electricity bulbs, explains Shiruti Ahuja, director of Ahuja Engineering, the agency that is operating the plant for the Bowenpally market.

She added that apart from generating electricity and biofuel, the plant is also generating organic manure that can be used in farming. "The biggest benefit here is the environment. Ten tonnes of waste which would have piled up on some landfills is now generating biofuel and biomass," she says.

This distributor-waste-management model is funded by the Department of Biotechnology and the Bowenpally Committee.

Man held for

Bullets recovered

EXPRESS REAL