



VILLAGE ENERGY WATER AND ORGANIC MANURE

VEWOM™

A PRELIMINARY PROJECT REPORT FOR

POC I

by shishir tamotia, lotus 22 talpuri 'a' bhilai -

490009

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri ‘A’ - A bottom-up Gandhian process as the first Proof of Concept.

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Protagonists' Profile

- 1. Shishir Tamotia, Retd CEO, Ispat Energy Limited, Mumbai**
Lotus 22/1 Talpuri A, Bhilai – 490009 (C.G.)
+91 97542 97300 / 98198 89972

Chairman & Managing Director, VEWOM™

a. Qualifications:

MBA (Australian Graduate School of Management) , Life Fellow of the Institution of Engineers, India and Member, All India Management Association, B.E. (Elect) from Madhav Institute of Technology & Science, Gwalior,

b. Snapshot

Mr. Tamotia is an expert in Gandhian methodologies to improve social and physical environment in the country. He has designed and developed process for production and distribution of Piped Natural Gas at site, sub-soil water level improvement, replacement of chemical fertilizers with organic manure, processes to combine different processes with agricultural wastes. He has created innovative processes involving local villagers based on Gandhian Gram Swaraj economics termed as VEWOM™. Strategy to manage local processes using village manpower has also opened new opportunities of training in villages.

Expert in innovation and design of Applications.

He has also been conducting courses on Corporate Sustainability as faculty at IIM Calcutta and various NTPC establishments. Previously he has held senior management roles in leading energy companies including CEO – JSW Green Energy, the Chairman Central India Power Company, *CEO – Ispat Energy, Director – Maharashtra State Electricity Transmission Co and several executive positions at NTPC including Chief, Power Management Institute, Noida.

2. VK Arora, Retired MD & CEO, Bhilai Steel Plant, Bhilai
62/5, KPS Road, Nehru Nagar (E), Bhilai
Mob. 94252 39104

Director, VEWOM™

Qualifications

BE (Mech) from Madhav Institute of Technology & Science, Gwalior,

Snapshot

Mr. Arora is an expert in steel production and management of steel plants with significant experience in steel plant operations and projects. He has in the steel industry for almost 50 years both in India and abroad. He held the position of MD and CEO, Bhilai Steel Plant, the flagship plant of SAIL (Steel Authority of India Ltd – A Government of India Enterprise) in 2010 -11. He also led the operations of the Essar Zimbabwe since 2012 where he later took over as Advisor to guide their 3 Million Tons Per Annum Steel plant at their Iran facility between 2015 - 16.

Expert in steel and Waste Management.

- a. Having Served as CEO and MD at the Bhilai Steel Plant in Chattisgarh, India, Director on board of Bhilai JP Cements Ltd in 2010-11 and holding senior management positions including Director on the board of M/S Earthstahl Pvt Ltd and VEWOM™ Enterprises Pvt Ltd.
- b. Shri Arora was honoured as Eminent Engineering Personality of the year by the Institution of Engineers, India at Kochi, in 2010.

3. RD Goyal, Retired, Director (Proj), GAIL, India
B4 Sector 92, Noida -201304
Mob: 98116 37764
Rdgoyal54@gmail.com

Director, VEWOM™

a. Qualification

M Tech Production Engineering (IIT Roorkee), B.E. (Mech), Madhav Institute of Technology & Science, Gwalior,

b. Snapshot

Shri RD Goyal was a Director (Projects) at the GAIL (A government of India Enterprise) till 2014. He also led at the highest management level in other major gas and fertilizer companies such as Avantika Gas Ltd, Gujarat State Energy Generation Ltd., GAIL Gas Ltd, Brmhaputra Cracker and Polymer Ltd. Ratnagiri Gas and Power Pvt Ltd, Bhagyanagar Gas Ltd.

Having led the project teams at GAIL (Gas Authority of India Ltd), and many of the subsidiary companies Mr. Goyal is an expert in conceptualising and developing Gas networks throughout the country. He also was instrumental in creating new methodologies to ensure reimbursement of proper compensation to people who were affected by the construction of large gas pipelines throughout the country as part of Piped Natural Gas supplies to many cities and towns in India. He has thus always worked to improve social and physical environment in the country.

Having worked both with the Gas Transportation and Chemical Fertilizers Shri Goyal is well aware of the issues faced by the gas company and also the environmental problems faced by the farmers with the use of chemicals to improve farming output.

He is also a believer in Bottom-up methodologies to ensure complete reach in the country.

Expert in innovation and design of Gas networks.

Previously he has held senior management roles in leading gas companies including Director (Projects) – Gas Authority of India Ltd. (A Maharatna Enterprise under Ministry of Petroleum and Natural Gas).

4. Atul Sharma, J-96 Parijaat
Talpuri, ‘B’ Bhilai West -490009
Mob: 72239 45543
Atul.sharma@vewom.com

Director, VEWOM™

c. Qualification

HSSC, MP Board of Secondary Education, Bhopal

d. Snapshot

Shri Sharma has been supervising the crushing activities at various stone crushers in Gwalior since February 2005 till April 2022.

The job involved supervision of about 50 personnel in the office who were involved in various plant activities that including selection of the rocks, blasting transporting, crushing, liaison with various statutory authorities. Blasting requires a specialised skills hence as plant in charge he was required to coordinate closely and ensure complete safety. As Plant in charge his specific jobs have been as under:

HR management

- Managemnt of inventory including purchase and store
- Weigh bridge control
- Spares and reordering level management
- Store Issue and stock level monitoring
- Maintenance of Crushing and Earth Moving Machinery

Having worked as plant in charge for over 18 years Shri Sharma has quite high skills in managing various facets of plant operations, safety, maintenance and up keep of complex equipment.

5. Prashant Panda, Mob: 77719 50007
Prashant.panda@vewom.com

Director, VEWOM™

a. Qualifications

B Tech (IT), Visharad in Music from Khiaragad University,
Visharad in Music from Sarv Bhartiya Sangeet-O- Sanskriti Parishad,
Certified in Graded Course from Trinity College of Music, London,

b. Snapshot

Expert in IT Solutions, Preparing specifications for Procurement of various equipment required for Anaerobic Digestion systems, Storage of Bio Natural gas in Balloons, Pipe Lines to transport the gas to individual households. Preparing Comparative Statements for the procurement and other Project Management Activities.

He also possesses over Two and half years exposure to the work in C&I materials required for remote sensing of the gas and water circuits. He thus has acquired significant capabilities in Tele Sensing and remote control.

Shri Panda has been also experimenting with Music and plant growth as a hobby. Shri Panda has been participating in hundreds of stage event in Chattisgarh and outside the state and has been performing on musical episodes of regional and national TV channels.

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri 'A' - A bottom-up Gandhian process as the first Proof of Concept.

At a Glance

Based on the Gandhian Principles of “Gram Swaraj”, this project is the “Proof of Concept” developed at an urban township in the state of Chattisgarh.

Human being is a social animal that calls for interdependence of its people. This interdependence makes the society robust and allows man to achieve unthinkable such as occupying lands of others. Alexander was one example who tried to occupy a the whole world but failed probably due to the courage shown by the Indian rulers present at the periphery of India across the river Sindh. Muslim invaders in India were other example of such conquest starting from the 8th Century ending only in 1947.

Mohan Das Karam Chand Gandhi was probably the most visionary person born in the nineteenth century who led India's independence movement for over three decades and forced the British rulers to leave India.

Post independence Jawahar Lal Nehru became the Prime Minister of India who instituted systems of democracy and proved to the world that India could be one of the most powerful nation on the planet earth. He did visualize a great India along with modern technologies and laid foundation for a country strong on the science and technology to be run by its people. He was singularly responsible for running the country for seventeen years and laid foundation for a democratic India. However mainly due to the circumstances and the wars thrust over the country he instituted Top-down systems where the country is run by Parliament and a body of chosen people by the Prime Minister who is continuously responsible to the Institution, called Parliament.

However in the process Gandhi Ji's principle of Gram Swaraj was left out.

VEWOM™ is an effort to bring “Gram Swaraj” back into focus and ensure that the independence is preserved to a much higher level than just through a few elected people the Parliament. This process is a proof of providing a comfortable life for the villages and refusing any financial aid from the governments at the top that include state and the centre. It will thus empower the Village Panchayats to work independently without much economic / political assistance from the top.

Gandhi Ji did demonstrate the possibility of providing decent clothing to the villages by using a spinning wheel at the individual level and the traditional technology possible to prepare clothes for the villages. VEWOM™ is an advancement to use village level technology to produce Piped Natural Gas etc at the village level.

Historical

Discovery of Bombay high in 1974 became very important event since it also brought Natural gas as one important source of energy in India. Prior to this availability of Natural gas was only limited to western and north eastern part of India where oil fields existed. Government of India formed a new company by name GAIL (Gas Authority of India limited). Pipeline was laid from offshore connecting Bombay to Delhi inland where the gas served a useful substance for power generation on one hand and kitchen energy in the form of PNG (Piped Natural Gas) on the other. PNG consists of Methane and CO₂. The gas is lighter than air hence does not collect in the kitchen if leaked. It also is less flammable for which different design of burners are deployed. Natural gas thus found its utility in a big way in the kitchens. Being a very clean, safe and cheap source of energy, it has completely replaced LPG in all the towns where PNG is available.

LNG (Liquified Natural Gas) is being imported and many LNG stations are setup in the country along the coastal areas. along the coast at Dahej, Dabhol etc on the west and Kaveri basin on the east coast. A network of Pipelines inside the country now exists in the southern part of the country while the availability of Natural gas in northern India is quite limited.

During the Gandhi centenary year India saw the introduction of biogas as a household name. It was based on the design that would use two or three animals that were generally available in each household in the Indian villages. Anaerobic digestion of cow-dung produces a mixture of CH₄ and CO₂. Methane being a hydrocarbon it could become a source of energy in the kitchens. The gas is lighter than air hence would leave the kitchen if released accidentally more over it is not highly inflammable.

Biogas therefore is a source of natural gas (CH₄ Plus CO₂) that could be easily produced at home by the use of an anaerobic reaction. It is absolutely safe and could be used both for heat as well as lighting in the villages. Government promoted its use by way of providing subsidy to the user. It was quite a revolutionary idea since prior to this the cow-dung was being used in quite an inefficient manner. Biogas made the kitchen cleaner and efficient. It is thus a household name in the village.

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The innovation for which a patent has been applied by the chairman, VEWOM™ is the use of low pressure balloons that could be stored by the side of the digestors as well as on the roof top of each free standing house.

Other innovation is the recycling of the agro wastes such as rice husk and wheat straw. Organic manure helps recycle all the agro waste as Organic manure that becomes an extremely good source to improve soil fertility. It also adds to longevity of the soil which with the use of chemicals forces the farmer to leave the farm every third / fourth year hence improves productivity significantly.

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Sources of Raw Materials

An Expression of Interest was received from The Nagar Nigam, Risali for which agreement is being drafted now. This report is part of that Agreement. Nigam has committed to provide a kitchen waste of 30 Tons per day. Nigam's rates are dependent upon the government rate for cowdung which is at Rs 2,000 per ton. Hence that is the basis of our calculations.

A market survey was conducted by VEWOM from where it was established that the market rates are not more than Rs 500/- per Ton.

Another survey was conducted to collect green leaves from the forest area within the township. This is thus conclusively established that a rate of Rs 2000/- per ton would definitely be achieved to source the raw materials.

Apart from the above there are following additional sources of the raw material:

1. Bhilai Nagar Nigam
2. Durg Nagar Nigam
3. Rice Mills in the vicinity
4. Sabji Mandi, Durg and Supela

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Marketing Arrangement

The Project is based on the EoI with Risali Nigam who is in control of the township at Talpuri 'A'. An Agreement is being signed which is currently held up for the signing of a Lease and License Agreement with the Bhilai Steel Plant.

It is expected that about 60% of the residents in the township, Talpuri A would sign the gas purchase Agreement in line with the agreements of the electricity board.

Balance gas would be filled up in the balloons meant for street Hockers who purchase LPG at almost four times the cost of LPG being supplied to households.

It is expected that the Hockers would be queuing for the gas purchase. A scheme to generate enough customers is being developed separately.

Draft Agreement with the Risali Nigam is attached at Annexure 'A'

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri ‘A’ - A bottom-up Gandhian process as the first Proof of Concept.

Directors’ Profile

- Shishir Tamotia
- VK Arora
- RD Goyal
- Prashant Panda
- Atul Sharma

Share holding Pattern

1. Mr Shishir Tamotia	40%	20,00,000/-
2. Mrs Mamta Tamotia	30%	15,00,000/-
3. Mr Suresh Kumar	20%	10,00,000/-
4. Mr VK Arora	1%	50,000/-
5. Mr RD Goyal	1%	50,000/-
6. Mr Prashant Panda	1%	50,000/-
7. Mr Atul Sharma	1%	50,000/-
8. Unallocated	6%	3,00,000/-
Total Initial Equity		50,00,000/-

Project Division and financing

Project would be taken up in three phases as under:

Phase I

Gulmohar – 192 Apartments

Phase II

Tulip and Lily East – 205 Houses

Phase III

Lotus and Rose – 195 Houses

Total Houses proposed for construction at the time of booking by the Housing Board

Currently available – 612

Being constructed now

Tulip – 20

Total Houses available now - 632

Drawbacks and limitations

Anaerobic digestion is a reaction that takes long time to commence and couldn't be started / stopped at will at an instant. It takes about 45 days to initially start and then 15 days with every feed. Biogas plant is thus not a very useful source since there is always a gap between demand and supply at any instant.

A Community digester deployed with pipes to each individual house could answer the problem of demand & supply mismatch hence this project.

About the Project

Shishir Tamotia, an energy specialist applied for an international process patent by name VEUOM® (Village Energy Unit & Organic Manure) in 2018. VEUOM® is a registered trade Mark of the author, Shishir Tamotia residing at Lotus 22, Talpuri, Bhilai – 490009, CG, India. After significant research and thought process it was established theoretically that the process could fulfil significant part of the energy needs of country (India) using VEUOM®. It could thus be useful in replacing coal as the main source of fuel today. The slush released from the digestors would also be processed with agro-wastes to produce considerable amount of Organic manure that would displace chemical fertilizers being used currently. All the commonly available agro-wastes such as Rice husk, Wheat straw and Sugar cane rind need be tried and results tabulated for reference.

Considering the sub-soil water level going down every year it was felt that saving of agricultural water need be included hence the trade name VEWOM™ (Village Energy Water and Organic Manure).

Nagar Nigam, Risali came out with a tender based on VEWOM™ process in the month of November 2022. On evaluation offers were received from two parties and the choice was based on the offer of VEWOM™. An Expression of interest was received by VEWOM™ subject to receiving NOC's from various organizations. VEWOM™ is in the process of obtaining the NOC's and it is likely that an agreement would be signed between VEWOM™ and Risali Nigam in April 2023.

Concept & Process

The VEWOM™ Process is based on using methodology that includes using anaerobic digestion in place of composting the kitchen waste and cow-dung. The cow-dung is mixed with Kitchen waste and fed in to the digester. The bacterial reaction takes minimum 15 days to commence production of the gas which is a mixture of methane and carbon di Oxide. The gas is scrubbed that would remove gases such as H₂S and part of CO₂ .

Gas so obtained is stored in large balloons. The capacity of storage is equal to 24 Hours production. The gas is then forced into the pipes of appropriate size which connects to the distribution network. Specially designed blowers are used for this purpose.

The whole production and distribution network is connected to the control room either through a wired or wireless connection to the computer at the control room. The control room would be managed round the clock by trained operators. Control room would have display screens for the gas, water and Organic Manure.

Organic Manure is produced by mixing agro-wastes with the digester slurry which is then left for few days for sun drying. Organic manure will then be dispatched to farms for sale. It would be beneficial since it replaces the use of chemical fertilizers.

Borewell water would be passed through a sand filter before being subjected to cation and anions. The plant to be designed to ensure potable water which then would be fed into Water pipelines. The connection to each house would be provided through electronic meters that would communicate the flow to the central computers online.

Gas and water bills would be generated monthly on staggered dates for different consumers. Interconnection of 750 KW solar PV panels with the grid would supply solar power to the colony grid.

Systems would be created and expected to be followed by each individual house hold.

Cow dung, Kitchen waste and fallen leaves are often found in large quantities being left uncared and abandoned. Other than the above the agro-wastes such as wheat straw, rice husk and “sugarcane rind” cause significant pollution.

Currently at SLRM, Rua Bandha all the kitchen waste after segregation is mixed with cowdung and processed for composting.

Treating Talpuri 'A', a gated township on the Durg - Utai main road with over 600 residential dwellings could be

My efforts to convert all the bio-degradable wastes being generated in the country in to usable kitchen gas have led me to conduct extensive research when I came to the conclusion that Gandhian model of Gram Swaraj would probably be the best way to undertake work in this direction. My work in this field also led me to apply for a process patent in 2018 known as VEUOM® which is pending for approval with the Indian patent office in Bombay.

I also decided that kitchen gas has to be treated as an asset and its management should be carried out by running three shift operations and flaring should be avoided to the extent possible. VEUOM® design thus incorporates control centres manned by operators in all the three shifts to ensure maximum utilization by created safe storages at many points.

Organic Manure is always a very profitable venture along with the anaerobic digestors being used for production of biogas. It also converts significant amount of agro-waste into a high quality organic substance to substitute chemicals as fertilizer.

My subsequent work in the field of water for agriculture brought startling revelations in terms of inadequacy of water for various purposes such as agriculture, domestic and industry.

My work in the Maharashtra's Electricity Transmission company in 2006 also made me aware of the hardships farmers face due to the policy of free electricity to one agricultural pump being provided by all the distribution companies in the company. They therefore have worked out systems to keep the agriculture pumps running thorough out the night thus wasting sub-soil water that is the main source of depleting sub-soil water in the country. It was therefore a good idea to also add agricultural water monitoring and control that is being fed in to the villages, thus the word VEWOM™ which was later taken as a trademark by me.

There are thus three main input material for the proof of concept being developed at Talpuri 'A' with the help and support of Nagar Nigam, Risali.

- 1) Green waste (Cow-dung, Kitchen waste and green leaves etc)
- 2) Water in the ratio of 1:1
- 3) Agro-waste (Wheat straw, Rice Husk, green leaves etc.)

There are many advantages offered by PNG (Piped Natural Gas) over the current practice of using LPG (Liquified Petroleum Gas) in the Indian kitchens including

- i) Safety of people in the kitchen since LPG being heavier than air and highly inflammable offers great risk in case of any leakage.
- ii) PNG is less flammable and lighter than the air hence is advisable for use in the kitchen

I have conducted extensive thought processes and came to a conclusion that using VEWOM™ would be possible to convert

it has thus been decided to conduct two projects known as POC I (Proof of Concept I) and POC II as under:

Viability (POC I)

It has four parts, viz

- i. Conversion of Cow-dung and Kitchen waste being collected by the Risali Nigam in to usable PNG.
- ii. Treatment of raw water before supplying it to the Talpuri A township
- iii. Procurement of Agro-waste and converting it into organic manure using the slurry from the anaerobic digester
- iv. Organizing funds on commercial basis.

POC II

At village Patora, District Durg (Chattisgarh)

Once POC – II is established, the project will be implemented at all the 304 villages in the district of Durg. The main difference in this project is the ownership and initiative being taken up at the level of smallest administrative units such as Nigams in the urban context and village Panchayat's or 'Gauthans' in the context of rural areas.

Timeline

- Implementation of Gandhian bottom-up model in the villages in India.

- *Time bound (2 years) growth project in 304 villages in Durg district of Chattisgarh.*
- *Covering basic needs of water, organic manure and piped natural gas supply to each house.*
- *With a return on investment of 12%.*
- *Providing employment to over 15,000 youths in the villages in CG.*
- *Total funds – About USD 1000 Crores*
- *Funded (debt - 85%) by multilateral banks such as World Bank, ADB etc.*
- *Equity – Government, Businesses & Villagers (very small part)*

Gandhi advocated “Gram Swaraj,” meaning “village set up to produce and administer all its basic needs using all the local resources”. He used spinning wheel for his personal clothes and had a wish that each individual should do that. However, he was completely against the wastage of any resource.

Village, Energy, Water, and Organic Manure (VEWOM™) is a comprehensive implementation of the “Gram Swaraj” model, applied to the provision of gas and electricity at the village level. The VEWOM™ process combines management of water and organic manure to provide gas and electricity, using a proprietary technique for water management at the village level.

Each farm receives water just sufficient to meet its needs. VEWOM™ incorporates a sophisticated monitoring strategy to manage all three resources. Indeed, the waste slurry produced in the biogas plant is recycled as organic manure thus doing away the chemicals used to improve soil fertility.

VEWOM™ is thus a zero-waste process and fulfils the complete need for energy in the village. The system is managed by a group of villagers, working in three shifts using a dedicated control room set up for the purpose.

Quotes were obtained from the following vendors in the country:

- a. M/S Mandal Biogas Equipment, Durgapur
- b. M/S Artana Biogas Systems
- c. M/S Sumedh Bapat Biogas Systems, Pune
- d. M/S Luckytech Industries Pvt Ltd, Sioen Belgium for the storage balloons
- e. M/S Mintu Mathy, Calcutta
- f. M/S Urja Bio Systems, Pune

Application & Benefits

- i. VEWOM™ could be deployed in all the 304 villages in the Durg district.
- ii. VEWOM™ would replace a huge amount of current coal consumption.
- iii. VEWOM™ would replace much imported LPG currently used for cooking.
- iv. VEWOM™ can be implemented easily and in a very short time.
- v. A two-stage pilot would be run at a cost of about Rs 4.5 Crores & 8 Crores respectively at Talpuri, Bhilai and Patora, in Chattisgarh. The project can be scaled up to full implementation in all 304 villages in the Durg district (CG).
- vi. Implementation in 304 villages of Durg district will cost ~ INR 1000 Crores.

History of Biogas plants in India

Cow-dung was being used as a source of energy in India for ages. The cow-dung cakes known with different names such as “Upale” or “Kande” etc was in use in the kitchen for cooking. It was introduced and promoted heavily by the Government of India in 1969, i.e. the Gandhi Centenary year. It was a breakthrough since it made the kitchen relatively cleaner.

Anaerobic digestion is a reaction that takes about 15 days hence its utility was limited since it could not match the demand with supply at individual household level. The demand of household fuel is driven by the number of people eating on a particular day which varies quite often.

Its utility thus got diminished due to a limited amount of energy it produces on one hand and the use of LPG (Liquified Petroleum Gas) on the other.

Biogas plants therefore could not really take off as a source of energy in the kitchen in India.

Shed and Building for the plant

Anaerobic digesters are self contained and do not need a protection from sun. On the other hand high temperature could some time increase the output.

However a shed is proposed to house the ancilliary equipment such as scrubber / blower etc. A small shed of the dimension (10x15 M) would be constructed for the purpose with provision for setting up the computers and three large screens one each for Gas, Water and Organic Manure.

Product Development

LPG is an extremely useful substance and provides highly inflammable gas and easy to use medium. It consists mainly of two hydrocarbons, i.e. Butane and Propane. Both these gases once compressed become liquid. Stored in steel cylinders it could be transported quite easily. It thus became very popular source of energy.

However, a highly pressurised substance in the kitchen offers significant risk to human life. Once released the gases being heavier than air stay put in the kitchen. Even a small spark

Also kitchen waste and other types of green waste could also be used along with Cow-dung. Kitchen-waste contains much higher amount of TDS (Total Dissolved Solids) and hence provides higher amount of gas than the cow-dung.

Logic of setting up a Community Gas Plant

Biogas however suffers from a very significant drawback, i.e. the mismatch between demand and supply. Anaerobic digestion is a reaction that takes about 15 days and once started it could not be stopped hence it is again a wasteful use of available energy resource.

Innovation being proposed as a brand VEWOM™ offers a comprehensive solution for energy, water and the organic manure at the village level. Community biogas unit would replace the individual plants, the gas produced would be scrubbed to remove traces of H₂S that is generally present in the Biogas. The gas would be stored in the balloons sufficient to store 24 hour of production. A Blower would feed the gas to the pipeline laid throughout the village community. Each house would receive PNG so developed. Meters to measure the gas would be connected that would provide the consumption at each house. Meters to contain remote sensing unit that would feed data online to a control room provided in the village. Control room would be manned 24 hours using trained boys / girls from the village itself. Each house would also be provided with a small ballon to store 1 Cu M of the gas. Any extra gas that is now available would be compressed and stored in high pressure ballons to be made available to hockers who currently use LPG cylinders.

Water pipeline would also be run along with the gas to supply water to individual house. This water would also be metered and billed.

The slurry discharge from the digester would be mixed and dried with Agro-waste such as Rice- husk, Wheat straw and sugarcane rind etc. It would thus serve as complete recycling of all the agricultural activities in the village. Organic manure so produced would be bagged and sold to the farmers thus replacing the current subsidy being offered by the central government.

Market

India has about 650,000 villages. The village economy is driven by agriculture. Cows are loosing utility hence though reducing in terms of their use in the villages though it still is an animal that is revered in the Hindu society hence significant number of cows are available in the villages. In the VEWOM™ kitchen waste is also mixed that provides a good improvement on the amount of gas produced at the village level. The gas produced by kitchen waste would be treated and supplied as PNG which is a very sage and clen fuel.

Indian economy is still driven by agriculture and about 50% villagers depend on agriculture as their main source of income.

Customers

Every household in Talpuri A, Talpuri B & Maroda is a potential buyer of the product (Gas or water) since it offers a cheaper and safer source of kitchen fuel and /or treated water. Availability of imported PNG has already made a complete sweep on the kitchen fuel in urban areas hence it is quite natural to assume that the people in villages would switch over to PNG.

Provision of 24x7 safe & clean water to each house hold at a cost comparable to current flat rate system is the aim of the project. It is envisaged that the project would ensure following benefits to the Risali nigam area townships:

Metered water supply to each house hold at a cost lower than the present flat rate adopted in the three townships of Talpuri A, Talpuri B and Maroda sector.

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Financials

Capital

Biomass Plant –	INR 39,120,480
Fencing	INR 1,063,140
Water	INR 7,950,000
VEUOM® Patent	INR 481,336
VEUOM™ Consultancy	INR 481,336

Total – I **INR 49,096,294**

Annual Income

Biomass Plant	INR 62,323,168
Water	INR 7,950,000
Total Income -I	INR 70,273,168

Expenses

Solar Annual	INR 0
Biomass Plant	INR 1,956,024
Annual Cow Upkeep	INR 6,720,000
Annual Veterinary	INR 1,400,000
Annual Cow Food Etc	INR 560,000
Annual Cow's drinking Water	INR 159,000
Total Annual – I	INR 10,795,024
VEUOM Patent	INR 481,336
VEWOM Consultancy	INR 481,336
Lease Rental to BSP	INR 161,594
Total Annual – II	INR 1,124,267
HR	INR 3,446,500
Total Annual Ops (I+II+HR)	INR 15,365,791

Total Annual Income	INR 70,273,168
Total Annual Expenses	INR 15,365,791
Total Annual Profits	INR 54,907,378

Rol $54,907,378 / 49,096,294 = 128\%$

Investment **INR 49,096,294**

About Biogas Plant

Biogas or gobar gas is a combustible gas.

It is produced through the anaerobic breakdown of waste biomass.

The biogas plant consists of the following parts:-

1) Inlet or charge pit:- for passage of slurry into the digester. The raw material used is cattle dung, farm refuse, organic waste.

2) Digester:- cylindrical tank which is airtight, above which is present a floating gas holder of metal with an outlet of gas and pit for removal of sludge.

Here the organic wastes get solubilized into simpler substances called monomers (solubilisation).

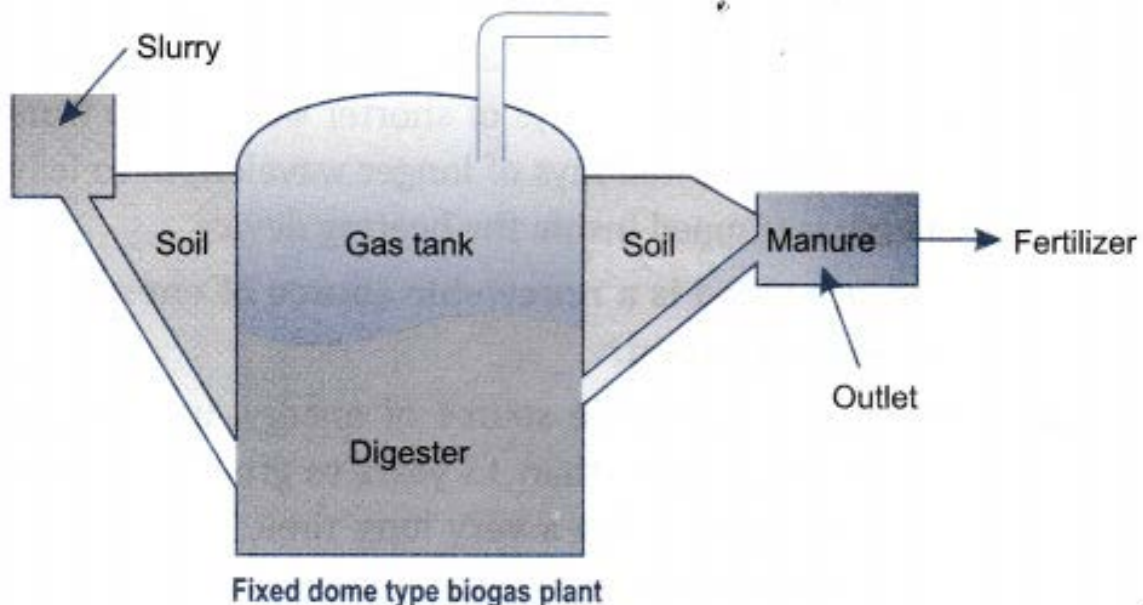
Monomers change to organic acid by fermenting microbes (acidogenesis).

Organic acid mostly formed is acetic acid.

Methanogens become active and act on components of microbial digestion and form methane gas (methanogenesis).

3) Outlet:- consists of sludge which is used as manure.

The methane gas formed in this process is used for cooking and lighting.



Key Risk Factors

Technology Risk – Since Biogas is already a proven technology there is no risk posed at the technology level. The benefits of PNG (Piped Natural Gas) over LPG (Liquefied Petroleum Gas) are already well established world over. Natural Gas is essentially Methane and Co₂, both the gases are lighter than air hence do not pose the risk to human lives by way of collection on the ground in the kitchen. LPG is a combination of higher Hydro carbons, e.g. Propane and Butane. Both these gases are heavier than the air and hence remain concentrated on the floor if leaked. The presence of Propane and Butane in the kitchen is a great hence need be discouraged.

Economic – The return on the investment of the order of 128 % per annum is an insurance for any financial organization. Also a contract exist with the local Council (Risali Nagar Nigam) that would ensure both the supply of raw material and the market for the gas and water.

Gandhian Gram Swaraj – Accelerated Growth

Gandhi Ji advocated Bottom-up development, however we were constrained to adopt Top-down due to the war started by Pakistan in 1946 – 48 when India was forced to spend on Arms development and other pressing needs such as “Poverty Alleviation”. The patent applied by the author advocates maximum profit to be limited to 4%. The difference between Profits before Tax and Depreciation etc is to be shared with four neighbours. This would form Equity for the neighbours. Thus if the PBT is to be calculated after deducting 4% from the profits . This is then shared with four to five neighbours. Assuming that each village shares the 1/4th of the profit with the neighbour that would form equity for the project to be undertaken by the neighbours. A proven process along with the equity would attract many financial institutions to come forward with debt. This thus becomes a chain (1x4x4.....). No village would borrow money for equity at the same time growth would be exponential. This will thus take the country to accelerated growth.

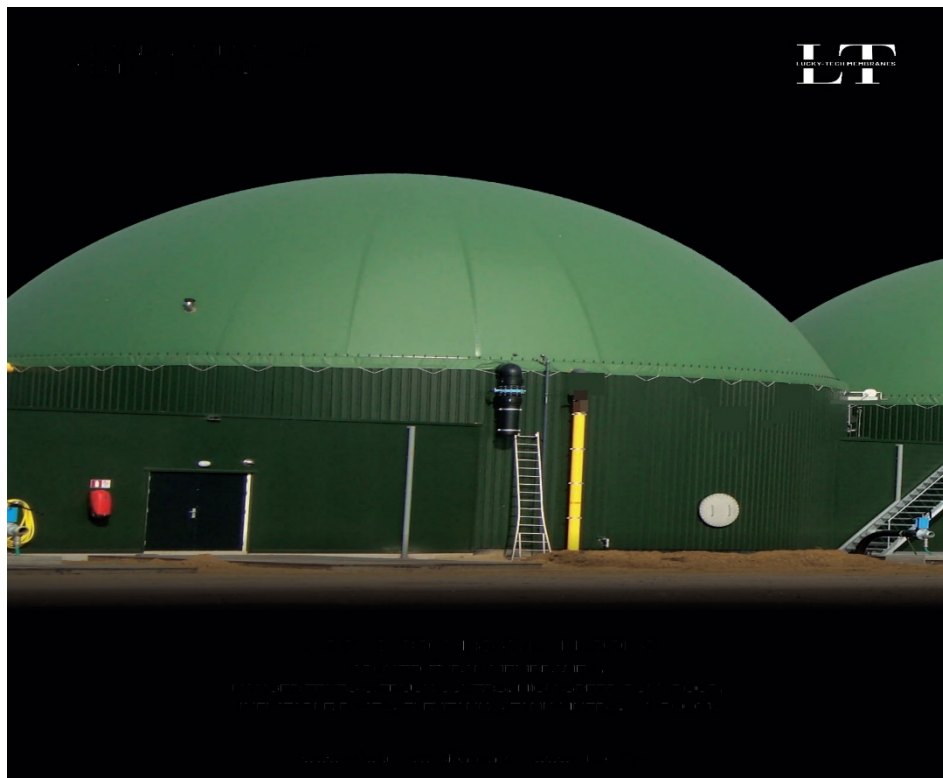
Social – Availability of following amenities to the people in the villages offer distinct advantages:

- 24 Hour water supply to each farm in the villages
- Each house would be given 24x7 treated water on a very reasonable charge basis
- All stray animals would be provided proper drinking water facilities
- All stray animals to be kept under a fence with proper arrangements for their food and ensure road safety
- At least 50 villagers to be provided high quality jobs

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri ‘A’ - A bottom-up Gandhian process as the first Proof of Concept.



An Existing Modern community Digester



Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri 'A' - A bottom-up Gandhian process as the first Proof of Concept.

Estimated Plant Data for POC I (May vary slightly)

S No	Description	Quantity	Remarks
1	Appropriate capacity fixed dome type Biogas plant	4	4x 5Tons per day
2	Blower to supply gas to about 600 residential units	1	
3	Scrubber to clean H ₂ S and CO ₂	1	
4	CPVC Piping along with requisite pipe fittings	1 set	
5	Metering devices, Telecom equipment etc	1 set	
6	Control Room equipment including PC's to store data	1 set	
7	OM Processing equipment	1 set	
8	Miscellaneous Equipment	1 set	
9	Fire Fighting equipment	1 set	
	Investment Ph I	About 1.5 Crores	

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FUNDING NEED

S No	Description	Quantity	Date
1	Phase I (1.5 Cr)	1x 5TPD digester + Storage Balloon + Scrubber+ Piping for 500 Houses	15 th Feb2024
2	Phase II (3 Cr)	3x 5TPD digester + Storage Balloon + Scrubber+ Piping for 150 Houses	15 th June 2024
3	Total	Balance of Plant	31 July 2024

Sources & availability of raw materials:

Kitchen Waste is available in plenty in Bhilai / Durg / Rajnandgaon area. A contract has already been signed with the Risali Nigam for the supply of 30 Tons per day of the kitchen waste. Risali Nigam has assured supply of collected and segregated waste on daily basis.

Durg Bhilai area has three municipal corporations while it has 304 villages. Each village is served by a Panchayat and Gothan where cows are looked after by a samiti set up specifically for the care of the cows.

There are quite a few rice mills that produce significant amount of rice husk which is used in the current process as a raw material. Bhilai town was established around 1957 as dwelling units for over 80,000 employees and associated contractors. The manpower was designed to employ huge number of workers in line with the design philosophy of USSR. Russian steel plants were designed to accommodate not only the steel production but all the ancillary products. Rails were manufactured almost since the beginning and it became the chief source of railway infrastructure which hitherto was imported in India. With the advent of time the employee strength has been reduced to less than one fourth of the original that left significant houses unoccupied hence large areas remain vacant. Plant resorted to tree plantation in the vacant areas in the nineties. These plants have now grown to full length trees hence the township is now practically situated within a forest.

Following are the main ingredients for the Proof of concept:

- Cow dung collected by the Risali Nigam
- Kitchen Waste collected by the Nigam
- Forest waste collected by the Nigam
- Rice husk etc collected from the mills
- Wheat straws collected from the farms

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri 'A' - A bottom-up Gandhian process as the first Proof of Concept.

Details of marketing arrangements:

An Agreement has been signed with Risali Nigam in Bhilai already which includes receipt of raw materials up to 30 Tons per day. Correspondingly the amount of gas produced per day would be close to 1300 Cu Meters per day.

This would thus need the requirement of about 650 dwellings in Talpuri A.

Sufficient provision has been made for filling up the balloons for the hawkers. Any excess gas available would be stored in small balloons for street vendors (hawkers)

Three Corporations have already expressed interest in the VEWOM™ and are likely to award contract based on the Risali Nigam agreement

Experience of the directors in present business

VEWOM has five directors with huge experience described at page 2 to 7 above.

It would be observed that cumulative experience of all these directors would be over 150 years in very senior positions at the steel plants, energy companies and villages. The VEWOM® is a patent (applied) by the Chairman of the company, VEWOM™ Enterprises Pvt Ltd. It is likely to change the presently popular Top-down model of growth to the Bottom-up model that would benefit in following ways:

1. Huge employment opportunities for the people in villages
2. Fast implementation of the project activities
3. One of the directors is an IT graduate who has significant experience in IT applications and project implementation
4. One director has worked as the Managing Director at Bhilai Steel Plant with over 20,000 employees where the project is currently under implementation
5. One Director has worked as director projects at GAIL (Gas Authority of India Ltd) the largest gas company in the country.
6. One director has worked in international companies in Australia and USA

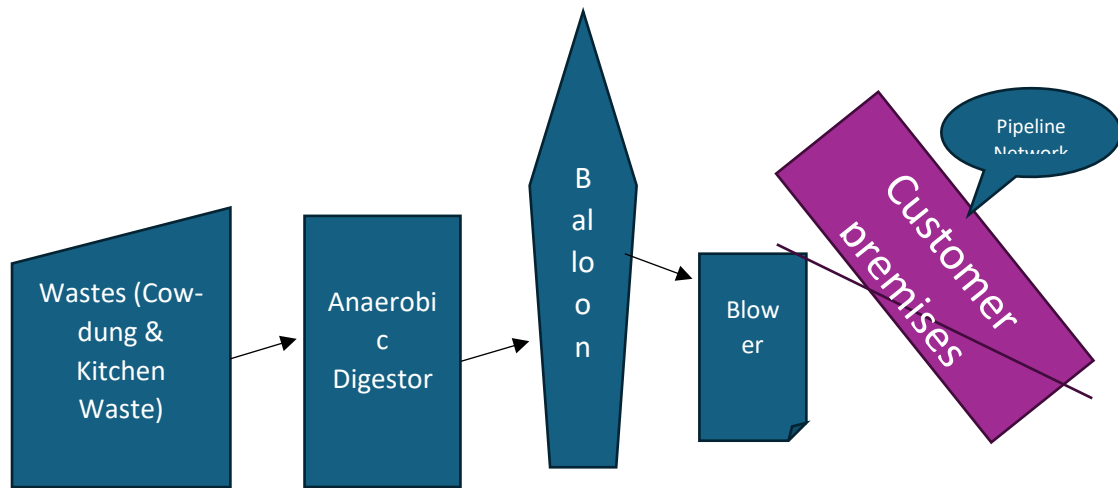
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Time line

	1 st April 24	14 Apr	28 Apr	13 May	27 May	10 Jun	24 Jun	8 Jul	22 Jul 24
	Fort Night 1	Fort Night 2	Fort Night 3	Fort Night 4	Fort Night 5	Fort Night 6	Fort Night 7	Fort Night 8	Fort Night 9
Design Finalise	H								
Approvals									
Nigam									
BSP									
Fire									
CREDA									
Environment									
Project Funding									
Proj Implementation									
Commence raw material receip									
Commence production									
Sales contracts									

Village Energy Water and Organic Manure for India (VEWOM™) – Risali waste processing centre at Talpuri 'A' - A bottom-up Gandhian process as the first Proof of Concept.

Process flow diagram



Flow Chart – VEUOM® Process

Notes