



सत्यमेव जयते  
Government of India

# Environment Technology Verification (ETV)

April 2022



cGanga  
Centre for Ganga River Basin Management and Studies  
Indian Institute of Technology Kanpur



NMCG  
National Mission for Clean Ganga  
Ministry of Jal Shakti, Government of India



Centre for Ganga River Basin Management and Studies  
Indian Institute of Technology Kanpur



## National Mission for Clean Ganga (NMCG)

NMCG is the implementation wing of National Ganga Council which was setup in October 2016 under the River Ganga Authority order 2016. Initially NMCG was registered as a society on 12<sup>th</sup> August 2011 under the Societies Registration Act 1860. It acted as implementation arm of National Ganga River Basin Authority (NGRBA) which was constituted under the provisions of the Environment (Protection) Act (EPA) 1986. NGRBA has since been dissolved with effect from the 7<sup>th</sup> October 2016, consequent to constitution of National Council for Rejuvenation, Protection and Management of River Ganga (referred to as National Ganga Council).

[www.nmcg.in](http://www.nmcg.in)

## Centre for Ganga River Basin Management and Studies (cGanga)

cGanga is a think tank formed under the aegis of NMCG, and one of its stated objectives is to make India a world leader in river and water science. The Centre is headquartered at IIT Kanpur and has representation from most leading science and technological institutes of the country. cGanga's mandate is to serve as think-tank in implementation and dynamic evolution of Ganga River Basin Management Plan (GRBMP) prepared by the Consortium of 7 IITs. In addition to this it is also responsible for introducing new technologies, innovations and solutions into India.

[www.cganga.org](http://www.cganga.org)

## Acknowledgment

This document is a collective effort of a number of experts, institutions and organisations who have helped develop and implement the Environment Technology Verification (ETV) programme. We are thankful to our national and international partners including trade bodies, embassies, innovation agencies, universities and other entities that channel company and technology introductions to the programme. Contributions to the photographs and images for this document by individuals or entities are gratefully acknowledged.

## Suggested Citation

Environment Technology Verification (ETV) by cGanga and NMCG

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or

**National Mission for Clean Ganga (NMCG)**

Major Dhyani Chand National Stadium, New Delhi 110 002, India



गजेन्द्र सिंह शेखावत  
Gajendra Singh Shekhawat

## MESSAGE

जल शक्ति मंत्री  
भारत सरकार  
Minister for Jal Shakti  
Government of India



**D**ecades of under-investment in crucial infrastructure such as water supply, wastewater treatment and solid waste management, has left India's cities and towns bereft of important utility services. The Government has recognised this need and has embarked upon a major investment programme across all the sectors. In the Ministry of Jal Shakti we are delivering the Jal Jeevan Mission and the Namami Gange programme.

Both these are underpinned by technology as the foundation layer. This is because India's pathway to providing utility infrastructure has to address its unique situation — that vast majority of the population is not able to afford expensive utility services, that highly congested towns and cities make it difficult to dig underground infrastructure and that requirement to roll out infrastructure in a short span of time requires an economic partnership with the private sector via PPP models.

Therefore, the choices of technologies we bring in becomes paramount. It is for that reason we have implemented the ETV process. The process is careful in its selection of technologies with preference towards decentralised systems, it is robust in its due-diligence by having the best in class technical experts from our most eminent national institutes and developmental where we support technology companies by helping them adapt the solutions to Indian conditions, introducing them to the entire ecosystem of partners in the country, linking them to various Government programmes such as Make in India, Start-Up India and offering our research innovation infrastructure to enhance the IP.

The ETV programme is already beginning to deliver successfully and will be an exemplary innovation and technology commercialisation process not just in India but around the world in the very near future.

**(Gajendra Singh Shekhawat)**





जी अशोक कुमार, भा.प्र.से.  
महानिदेशक  
राष्ट्रीय स्वच्छ गंगा मिशन  
**G Asok Kumar, IAS**  
Director General  
National Mission for Clean Ganga

## FROM THE DIRECTOR GENERAL'S DESK

भारत सरकार  
जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग  
**Government of India**  
Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation



**T**he ETV programme has made great strides in identifying, onboarding and progressing a multitude of technologies. This would not have been possible without first developing an eco-system of partners that helped indigenisation of the technologies, and subsequently of those that helped in implementing the solutions. The scale up of the ETV programme will only be possible through strategic partnerships and as we plan the expansion of the ETV programme, we have three major aspirations:

First, to make the Namami Gange programme as the foremost innovation partner to technology proponents from around the world. The critical challenge that companies face when introducing their technologies in the Indian market is not so much around adaptation of the technology, but lack of enabling environment of policies and economic framework necessary for large scale adoption of the technologies. The Namami Gange programme, through various impact projects, not only offers opportunity to showcase the technologies but also develop the right economic model that can be further adopted into a progressive policy framework. The One City One Operator model is one such example of the right policy model that enabled the implementation of decentralised treatment systems.

Secondly, we are working towards applying these innovations to a number of core as well as allied sectors. Core sectors are wastewater and industrial effluent treatment, data and information systems whilst the allied sectors are agriculture, solid waste management, waste to energy, resource recovery, circular economy, inland navigation, sustainable forestry and sustainable hydropower. For this we need to work closely with NITI Aayog and partner with numerous ministries, government departments and public sector enterprises. These include but are not limited to Ministry of Environment, Forests and Climate Change, Ministry of Housing and Urban Affairs, Ministry of Agriculture, Ministry of Petroleum and Natural Gas, Ministry of Power, National Disaster Management Authority, Inland Waterways Authority and many others.

And finally, our third major aspiration is to partner with countries, multi-lateral agencies and diaspora around the world. Recently, through the Ganga Connect exhibition in the UK we were able to reach out to a range of partners including technology companies, scientists, investors and members of the Indian community. We were also able to participate in the side events of the COP-26 dialogue in Glasgow. In the coming years we hope to partner with many more nations to launch the Ganga Connect Exhibition that will help forge a great collaboration to address some of the greatest environmental and climate challenges the world is facing.

**G Asok Kumar**

राजीव रंजन मिश्रा, भा.प्र.से.  
भूतपूर्व महानिदेशक  
राष्ट्रीय स्वच्छ गंगा मिशन  
**Rajiv Ranjan Mishra, IAS**  
Former Director General  
National Mission for Clean Ganga

## FOREWORD

भारत सरकार  
जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग  
**Government of India**  
Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation



**T**he vision for Namami Gange programme is to restore and rejuvenate all the rivers and tributaries in the Ganga river basin. This is by far the largest environmental rejuvenation programme in India and one of the largest in the world. Transforming of river ecosystems requires not just an enabling policy framework but also use of modern technologies. And for that reason, we are very proud to have developed and instituted the Environment Technology Verification (ETV) process as one-of-a-kind initiative within the country that acts both as an accelerator and a launch platform to address some of the toughest environmental challenges that India is facing.

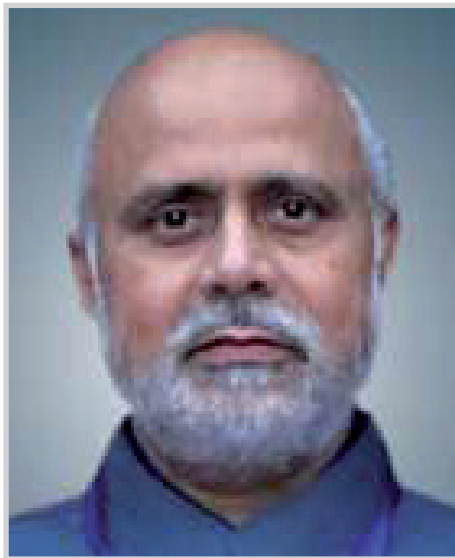
A very important and unique aspect of the ETV programme, in addition to solving the environmental problems, is its focus on delivering impact for society. Environment focused technology companies today must also look at the social and societal aspects when implementing their solutions. Technology must not only be for the elite or urban dwellers, but also must reach out to the vast majority of India's population that lives in its rural areas where people do not easily get access to modern innovations particularly those in the environmental sectors. In the ETV programme we have tried to embed the element of making technology access inclusive for all, and in doing so offering livelihood opportunities to those who are the most deserving.

I hope that the programme grows from strength to strength in years to come and wish it all the very best.

**Rajiv Ranjan Mishra**



## PREAMBLE



**Vinod Tare**

Founding Head, cGanga and  
Professor, IIT-Kanpur

India is uniquely placed in addressing the global environmental problems. The Ganga River basin is most unique in that it has many bio-geo-physical variations, available in a single river system, are typically only seen in separate rivers or river basins. Through the ETV programme, we are able to offer the Ganga as well as other Indian River Systems as a laboratory to not only just Indians but also to innovators around the world who would like to test and try out their solutions in this unique setting.

The ETV process is not a pass or a fail certification process. It was designed as a developmental programme right from the outset. Companies when entering the market with new solutions require all the support and handholding they can possibly get. It is for that reason we have opened-up the use of infrastructure and knowledge available in the national institutions to all ETV candidate companies.

Our vision is that ETV programme also spring-boards technologies to different parts of India and as well of the world, as the water and environmental problems we are trying to solve in the Ganga River system are not unique to just it alone, but are issues that the world is trying to grapple with. India would like to play its part as a responsible nation that considers climate and environmental issues integral to its cultural and developmental ethos.

**Vinod Tare**



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Ministry of Jal Shakti, Government of India

## **NAMAMI GANGE AND ETV**



**DP Mathuria**

Executive Director – Technical,  
National Mission for Clean Ganga  
(NMCG)

In the initial years of the Namami Gange programme, focus was very much on conceptualizing and grounding centralised sewerage infrastructure which was the critical need of the time. However, the programme, as being comprehensive river rejuvenation framework, is now expanding to include major tributaries and drain networks with its own peculiarities. This will require technologies in the decentralised infrastructure segment, many of which are currently enrolled in the ETV programme. Additionally, interdisciplinary aspect of water resource management are also being looked holistically and therefore has also included sustainable agriculture and sustainable hydropower as some of new segments of the ETV programme. These two sectors majorly impact the hydrology of river system and its dynamic as well.

India, as a Nation, is also moving towards evidence based policy making and for that having data & information systems to underpin the efforts of delivering on good environmental governance remains very important. The data & information segment in the ETV programme has numerous technologies ranging from decision support systems, flood inundation modelling, remote sensing and advanced sensor solutions that provide real time information and assessment of water related infrastructure in this time domain.

Finally, the riverine ecosystem and infrastructure is also being looked within as system approach with focus on energy source. The third important segment for the ETV programme enables the acceleration of energy and resource recovery. We have recently enrolled technologies that can generate biofuels, biogas and hydrogen from waste streams in cities and rural areas.

**DP Mathuria**



## ETV PROGRAMME: GENESIS & SCOPE



**Sanmit Ahuja**  
Expert Member, cGanga

The idea of a formal ETV programme came about in the year 2017 during the 2<sup>nd</sup> India Water Impact Summit (IWIS) when a number of participants in the innovation policy roundtable strongly suggested the need of a structured programme to provide a pathway to the Indian market for various environmental technologies from around the world.

The ETV programme formally launched in 2018 by enrolling 15 companies from various nations. Since then the programme has evolved into a great accelerator and now has more than 40 technologies enrolled in it with many having graduated successfully by implementing and launching their solutions commercially in the Indian market.

Since the programme conducts due-diligence on multiple levels such as scientific, technical, operational, engineering, financial and social impact, it has also developed a phenomenal pool for corporates and investors to source their investment targets from.

The ETV programme is expanding its technology sourcing efforts by partnering with countries, trade bodies, universities and incubators from around the world. It is also increasing its internal capacity in order to accelerate the pace of technology roll-outs and support it can provide to the various candidates enrolled in the programme. We are proud to share the news that many other Ministries and Government Departments in India (and around the world) are now looking at the constitution and success of the ETV programme as a model framework to use national infrastructure projects as hotbeds of innovation.

**Sanmit Ahuja**





## Introduction to the Environment Technology Verification (ETV) programme

In the last decade, the world has seen a significant surge in investments into technology and innovation. A trend that was seeded in the early 2000s, an era that set off the digital revolution. In the years to come many sectors including the environment sector that have benefited hugely from expanded investment horizons.

However, despite this welcome positive trend, the rate of technology transfer and commercialisation has not increased commensurate with the level of investments going into development of the underlying technology. The reason being that skills needed to develop or invent a new technology are very different from those required to bring the innovation to market. Furthermore, the approaches taken to bring technology to market differ when doing so in developed countries from when deploying the technologies in developing countries.

The design of the ETV programme looked at various complexities and challenges when designing methods and approaches to accelerate the introduction of global innovation to large markets such as India. These have been summarised below:

### 1. Regulatory and compliance standards

A strong regulatory regime is the back-bone of the growth of the environmental sector, and lack of it or a lax regime discourages new technology adoption. The regulatory environment in India is very different from the developed world. Although for most part the compliance standards are as stringent if not more stringent than the rest of the world, the penal enforcement of the regulation may not be as strict. Therefore, the introductions of new technologies, particularly those that require a strict compliance, has been relatively slow.

The ETV programme provides a channel to formally engage with the regulatory authorities to share global best practices and standards, particularly when newer technology introduction requires amending or expanding standards or even introducing new ones.

### 2. Indian price points

Many companies when introducing their technologies to the stakeholders and decision makers in India, often find themselves unable to answer the questions around “price-points” at which they will roll out their solutions in the Indian market. Suggestions of same or similar price points as prevailing in other developed markets or their home countries is often met with a polite unacceptance. This is because, India is a fairly price sensitive market and municipal administrations or urban local bodies have limited resources.

The ETV programme encourages companies to adopt the “Make-in-India” to bring the costs down. This approach not only unlocks the huge market potential in India, but also enables the country to act as a spring-board to a large number of other emerging economies in Asia, Africa and Latin America.

### 3. Technology assessment

Many decision makers, particularly those in the municipal sectors, find it difficult or unable to conduct proper due diligence of the technology as they do not have the means or the resources.



The ETV programme utilises some of the global best practices when assessing technologies:

- a.** Technology Readiness Level (TRL) scores – that assesses where the technology is in its evolution.
- b.** Commercialisation Readiness Level (CRL) scores – that assesses how far has the company developed its commercial offerings.
- c.** Impact Scores – that assesses what is the overall Environmental, Social, Governance (ESG) impact of the technology solution

The assessment is done by subject matter academic, technical and commercial experts selected from around the country.

#### **4. Growth in Digital Technologies but data and data-security remain a key concern**

There has been a marked increase in the number of technological solutions being offered that have a strong digital analytical offering. However, these the uptake of these technologies can only prosper if there is availability of appropriate data and that generated datasets are managed by capable institutions that are designated safe harbours by the government.

The ETV programme offers to technology companies a partnership with national institutions for developing data generation as well as data management framework.

#### **5. Navigating the Indian market**

Majority of the international companies or for that matter even Indian companies find it challenging to navigate the Indian market. This could be for multiple reasons including but not limited to: not enough market intelligence available in public domain, lack of a widespread and trained cadre of senior managers from the sector, lack of venture finance, unclear revenue models, concerns of over intellectual property management and others.

The ETV programme helps the companies navigate through the market conditions by providing insights, analysis and recommendations.

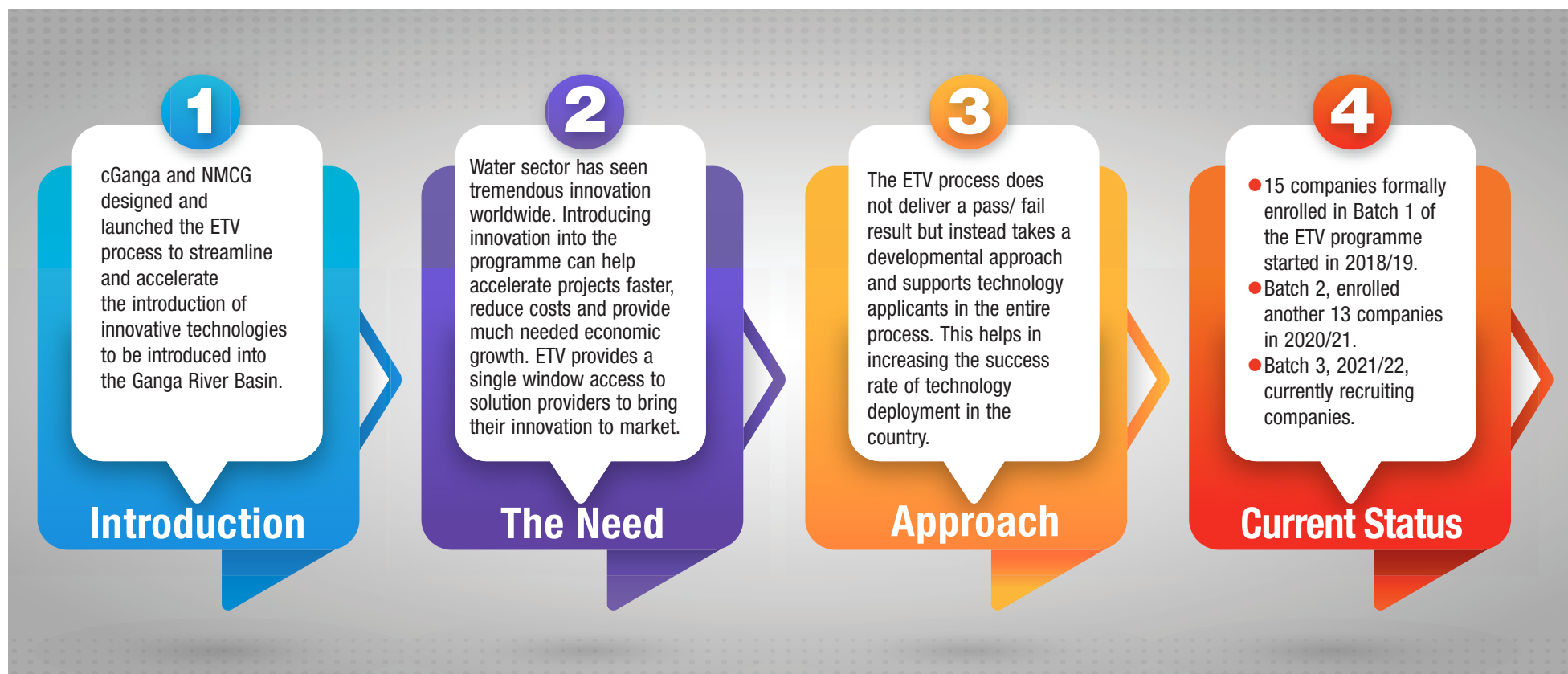
#### **6. Development Approach needed**

Many innovative solution providers are small and medium companies who do not have the resources to simultaneously explore multiple market opportunities. At the same time, India needs to attract latest innovations to the country if it has to address its environmental issues. Therefore, a gate-keeping approach does not work for the nation. The ETV programme very much takes a developmental approach in not rejecting the companies if they don't meet the requisite criteria, but help them in moving along the programme by offering help at multiple points in the journey. This includes:

- Helping companies in making introductions to the eco-system of engineering companies, partners, clients and experts
- Helping develop the right commercial model
- Helping introductions to investors
- Marketing and outreach support

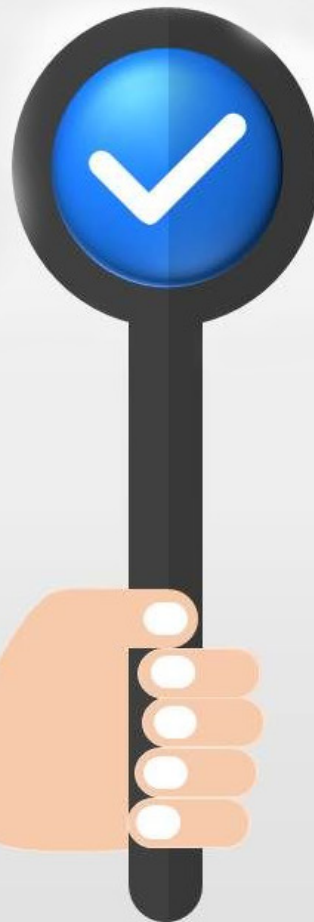


# Environmental Technology Verification (ETV)



# Criteria

- Proven novel and innovative solution
- Not currently implemented in India
- Needs a large scale demonstration platform
- Open to manufacturing / assembling in India
- Collaboration with Indian partners or have presence on the ground
- $TRL > 5$  |  $CRL > 5$



- Solution is widely deployed in India or globally
- Wants just market entry
- Not open to manufacturing / assembling in India
- $TRL < 5$  |  $CRL < 5$
- This is not a R&D process

# ETV Programme

## CURRENT SEGMENTS

The ETV programme shall address issues in a range of segments. For the 2019-2021 phase, the segments are:

### Decentralised Systems

- Municipal wastewater treatment
- Industrial effluents treatment
- Bio-remediation systems
- Drinking water supply systems

### Data and Information (Digital)

- Data Generation – remote sensing, sensors etc.
- Data management and handling
- Data analytics – AI, ML etc.

### Ancillary Services

- Solid Waste Management
- Sustainable Agriculture
- Sustainable Hydropower
- Energy Recovery / Hydrogen
- Water Resource Management etc.
- Inland waterways

## GOVERNANCE

- ETV evaluation process is managed by a panel made up of a permanent committee and additional expert members.
- The permanent committee is made up of representatives from: cGanga | NMCG | NEERI
- Expert members are selected from eminent institutions and industry. The selection is based on the topic / technology class.

## PROCESS

The panel reviews the technology applicant and assessment is made on five criteria:

1. State of Technology Readiness Level (TRL)
2. State of Commercialisation (in India) Readiness Level (CRL)
3. Value for money
4. Overall impact
5. KPIs / Criteria for successful evaluation of the pilot

- KPIs are mutually defined as what constitutes success.
- The project cost is underwritten by the Government which is re-imbursed on successful execution of the pilot. See ETV Funding and Commercial Framework section for more details.



# ETV Key Benefits

## Pilot Project

Getting access to a pilot project is one of the biggest benefits of the ETV programme. It is either very difficult for new technology proponents to secure projects as they are always asked to show reference site in the country of application (India in this case).

## Developmental Role

Unlike many of the other ETV assessment processes and programmes in India and globally, this process is more developmental. It doesn't deliver a pass or fail certificate but really helps the companies in identifying the gaps in their proposition and supports them in plugging those gaps.

## Highly Subsidised Technical Assessment

In most cases a technical assessment exercise can cost significant sums to the technology company. In this case the Government of India massively subsidises the assessment cost.

## Project Cost Re-imbursement or Conversion to Service Contract

At the end of successful technology demonstration, the technology company has the option to recoup the funding through cost re-imbursement or through conversion of the project into a service contract. Either ways this commitment makes it easier for the companies to secure funding for the pilot.

## Access to Eco-System and Additional Support

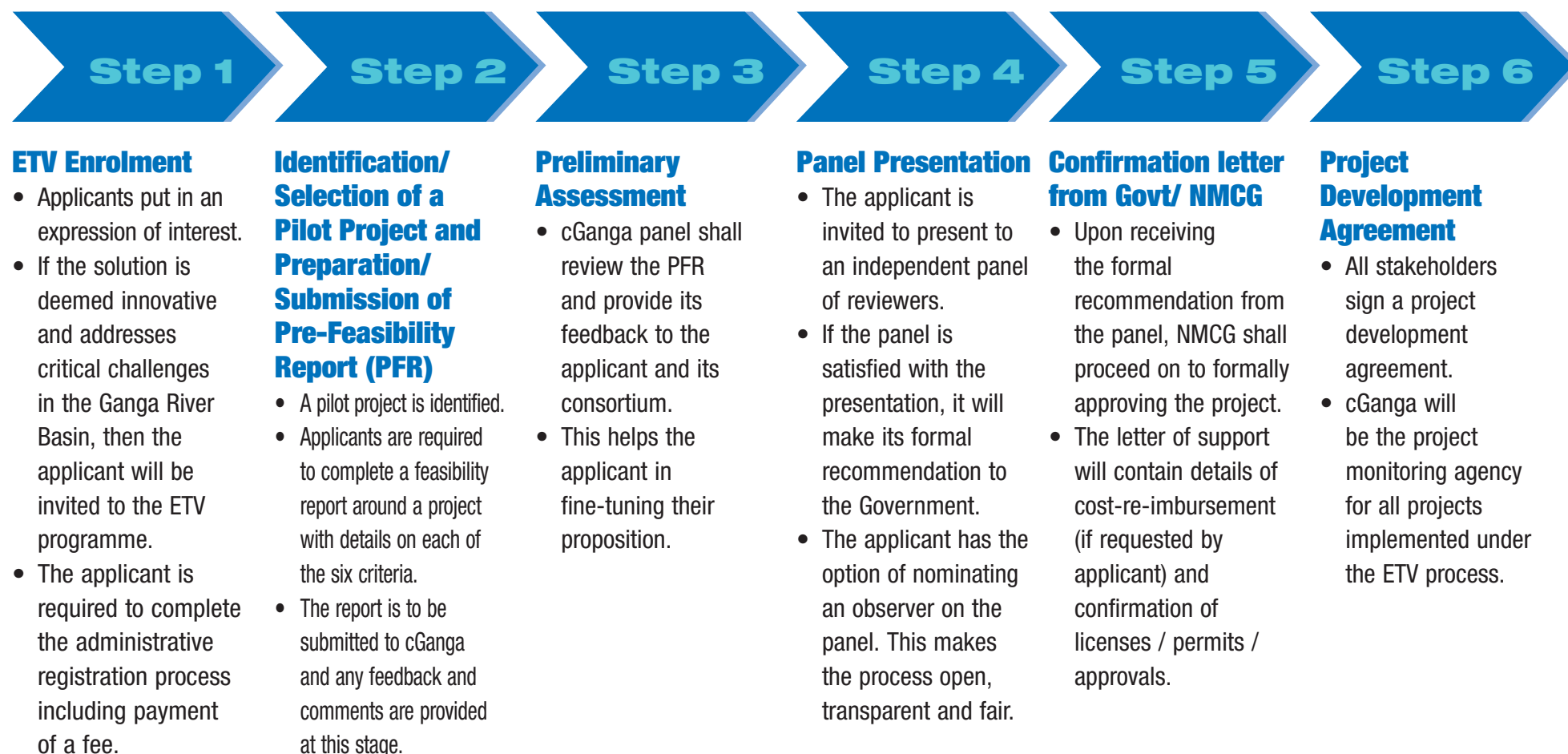
The programme supports companies by providing access to a range of experts, grant and funding programmes, potential technology partners and other Government and private sector support initiatives.

## Acceleration

This is one of the fastest technology acceleration processes in the environment sector shortening the commercial cycles for the technology companies.



# ETV Process



# ETV Eco-system Support



The ETV Programme supports applicants to partner with established Indian companies that can help in bringing their solution to Indian market. See ETV Acceleration Process.

**INDIAN STRATEGIC PARTNERS**

**1**



The programme strategically links into Government of India's flagship "Make in India" initiative that helps companies to establish their manufacturing and assembly lines in India.

**MAKE IN INDIA**

**2**

**#startupindia**

The ETV programme attaches a start-up team to every technology that enters into the process. This gives new entrepreneurs a platform to launch novel ideas and innovations to market as well as a team to work with in India for the ETV applicant.

**START-UP INDIA**

**3**



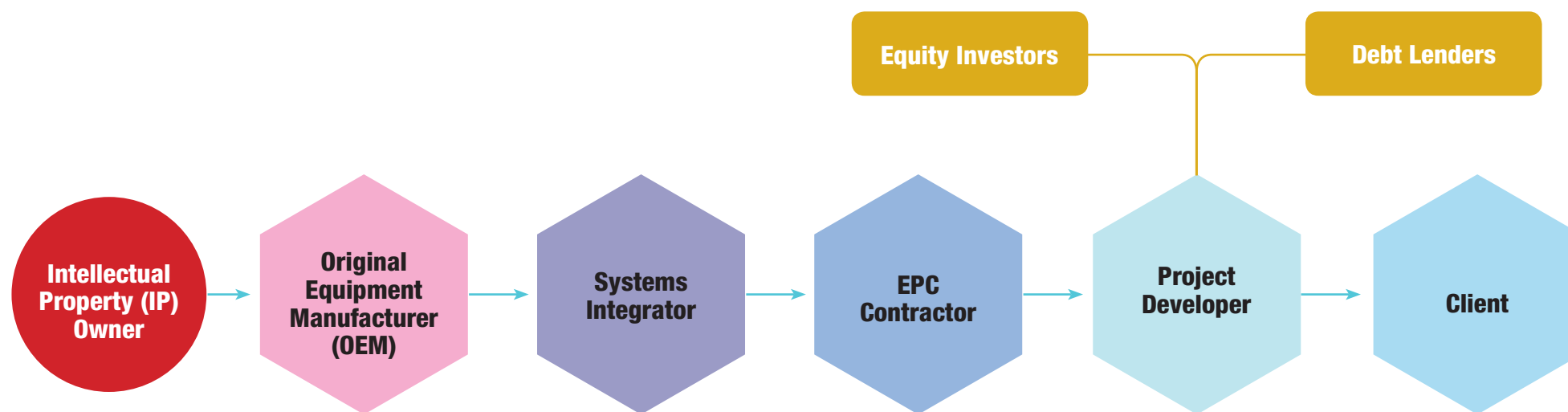
Qualified and successful ETV applicants can tap into financing for the pilot / demonstration projects from select partner funds. See ETV Funding.

**INVESTOR NETWORK**

**4**

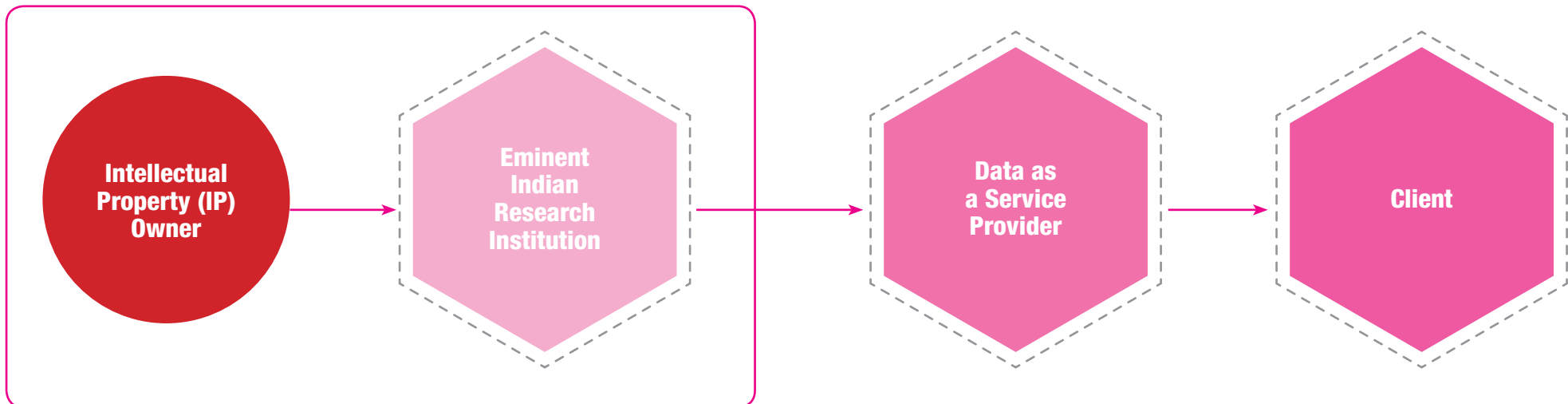


# ETV Acceleration Process: Engineering Based Solutions



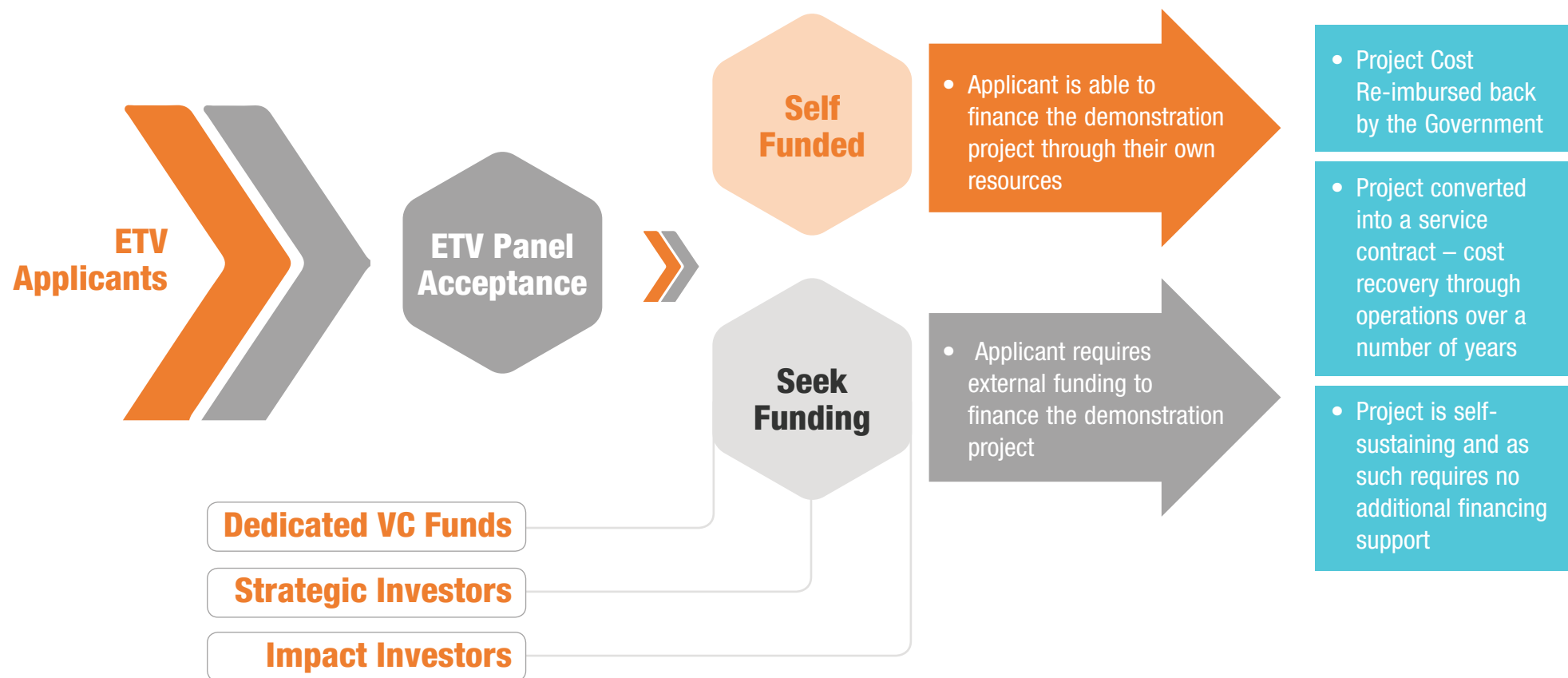
- There are 7 key stakeholders in accelerating an engineering based solution to market.
- The above illustration lists out the various functions involved in the process.
- Each actor can deliver one or more functions.
- If the project is in a PPP format then the project developer will contract with the client in BOO / BOOT model. If the project is Government funded then the EPC contractor will contract with the client and there is no role for the project developer.

# ETV Acceleration Process: Data Based Solutions



- Data safety and security is the most critical factor in the ETV process for a data focused applicant.
- The above illustration lists out the various functions involved in the process.
- Partnership with an eminent Indian research institution can solve the data security issue. The collaboration also allows development of new IP.
- The new IP is then utilised by a Service Provider trusted by the Government Authorities to offer data-as-a-service.

# ETV Funding and Commercial Framework





# ETV Roadshows

## International Roadshows

- cGanga organises numerous international roadshows. The Roadshows for year 2020 have all gone digital with the physical format commencing again in the year 2022.
- Planned digital/physical roadshows: 2022 schedule to be announced soon.

## India Water Impact Summit

- Every year we invite new technology companies to present and showcase their solutions at the India Water Impact Summit, which is the flagship event of cGanga / NMCG.
- Organised physically and virtually every year in December (as part of the India Water Impact Summit).



Roadshow to New Zealand, 2017



Roadshow to Scotland (UK), 2018



Roadshow to Slovenia, 2018



Roadshow to London (UK), 2018

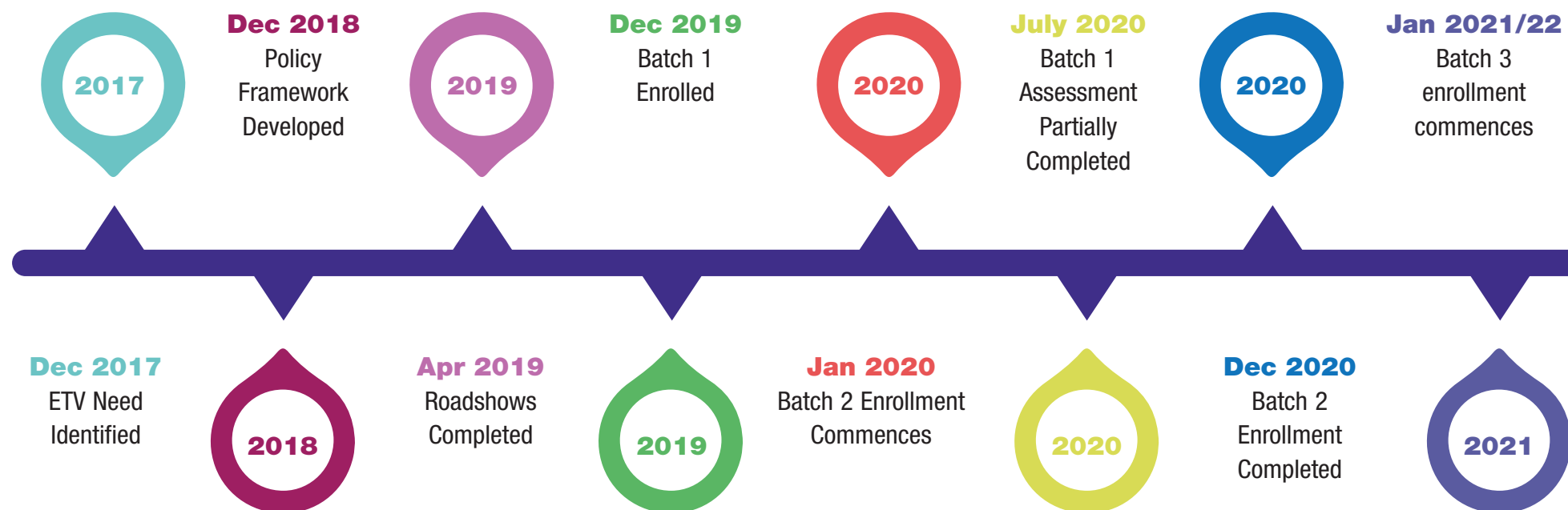


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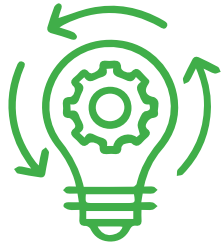
NMCG  
National Mission for Clean Ganga  
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# ETV Programme Rollout





Centre for Ganga River Basin Management and Studies  
Indian Institute of Technology Kanpur



# Innovation in Ganga

Innovation plays a key role in the Namami Gange programme. The programme is being used as a platform to both attract technologies from around the world as well as indigenously develop new innovations.

**The Environment Technology Verification (ETV) framework is a unique mechanism to streamline and accelerate the introduction of innovative technologies in the water sector to be introduced into the Ganga River Basin. ETV process provides a single window access to solution providers to bring their innovation to market.**

**Currently over 30 technology companies from 12 countries are enrolled in the ETV process.**

## Success Cases



### Soil-less membrane farming | Japan

National Mission for Clean Ganga (NMCG) and The Centre for Ganga River Basin Management and Studies (cGanga) introduced the first Hydro-Membrane based farming system in India. The IMEC hydro-membrane farming systems utilize a special membrane that replaces soil as substrate. Developed by Mebiol Inc, Japan, the world's first Hydro-Membrane based Farming Technology address some of the serious issues such as water scarcity, reduction of arable land due to soil degradation and contamination and climate change.

### Waste tyre recycling using UHPW | UK

**Ultra High-Pressure Water-jet (UHPW)** is a pathbreaking technology that uses ultra high-pressure water (UHPW) streams to pulverise scrap tyres into premium value rubber power. It is a zero-waste process and the product generated can be used in high-tech industries such as (automotive industry, tyres, cement, asphalt producers, hose with other processes it is more energy and time efficient.











## Innovation Segments

- Decentralised wastewater treatment systems
- Solid waste management
- Aquifer management
- Waste to biogas/biofuels
- Waste to hydrogen
- Satellite based mapping
- Drone and sensor based mapping
- AI based data and information systems
- Sustainable agriculture
- Sustainable hydropower
- In-situ wastewater remediation
- Chromium legacy dumps remediation
- Bio-remediation of ground water



















# ETV: Decentralised Wastewater Treatment

Company	Country	Batch	Technology
	 Spain	1	<ul style="list-style-type: none"> <li>Decentralised industrial effluent treatment.</li> <li>GV Soluciones long experience in water treatment for industries has a range of specific solutions for several industrial sectors, as well as the capacity to design custom equipment.</li> <li>Containerised system saves on costs, space, time to deploy.</li> </ul>
	 USA	1	<ul style="list-style-type: none"> <li>Decentralised municipal wastewater treatment, recycle and zero liquid discharge.</li> <li>Containerised system saves on costs, space, time to deploy.</li> </ul>
	 UK	1	<ul style="list-style-type: none"> <li>Low-carbon technology converts unwanted and low-value biological material into high-value renewable chemicals, sustainable biofuel, and other commercially and environmentally valuable commodities.</li> <li>Distillery effluent and waste converted to butanol, ethanol and acetone.</li> </ul>
	 Norway	1	<ul style="list-style-type: none"> <li>Advanced Pre-treatment technology for managing sludge.</li> <li>Thermal hydrolysis processes for advanced treatment of sewage sludge and bio-degradable waste.</li> <li>Thermal hydrolysis is a process technology applied in wastewater treatment plants with anaerobic digestion.</li> </ul>

# ETV: Decentralised Wastewater Treatment









Company	Country	Batch	Technology
	 UK	1	<ul style="list-style-type: none"> <li>The Lyndon Water uses a naturally occurring process to separate wastewater into clean water suitable for agricultural use and a useable high protein biomass.</li> <li>Production plants can be easily installed and later relocated offering a low-cost method to bring sanitation and water to growing demand which has little access to normal infrastructure.</li> <li>Advanced anaerobic treatment for wastewater.</li> <li>Develops aquaculture water body.</li> <li>Self-Sustaining.</li> </ul>
	 USA	2	<ul style="list-style-type: none"> <li>Biological and safe treatment of sewage, industrial waste, open water remediation and sludge digestion.</li> <li>Can be effectively used in natural waterways such as rivers, lakes and bays.</li> <li>Producing clear and odorless water, eliminating the need for chlorination.</li> <li>The BioCleaner's compact form can be easily fitted in existing sewage treatment plants that allow other facilities to benefit from its advantages making it the easiest and most economical solution to all water cleaning needs.</li> </ul>
	 UK	2	<ul style="list-style-type: none"> <li>Uses a Novel Reactor (DGC) for Effluent Treatment, Biogas Upgradation, Chemical Reactions and Gas Scrubbing.</li> <li>The system saves on operating costs and can be employed where space is a constraint.</li> </ul>

# ETV: Decentralised Wastewater Treatment





Company	Country	Batch	Technology
	 Poland	2	<ul style="list-style-type: none"> <li>Optimizing the work of the biological part of a communal and industrial wastewater treatment plant.</li> <li>Transforming bio-waste into high quality fertilizers.</li> </ul>
	 India	2	<ul style="list-style-type: none"> <li>Solution converts water into reducing agent and decomposition process speeds up resulting in oxidization of solids in water, generating oxygen.</li> </ul>
	 USA	2	<ul style="list-style-type: none"> <li>The technology offers the handling including drying and complete disposal of sludge in the same system with net neutrality in water and energy consumption.</li> <li>Generates the system power for self-sustainment and distilled water is also recovered as value added product.</li> </ul>
	 Denmark	2	<ul style="list-style-type: none"> <li>Aquaporin Inside® Forward osmosis (FO) is a next generation water treatment and waste minimization solution.</li> <li>Utilizing nature's own water purification channels (the Aquaporin proteins).</li> <li>Treating wastewater using membrane process.</li> <li>The wastewater treatment using Membrane technology and uses FO (Forward Osmosis) during the cleanup process.</li> </ul>









# ETV: Data and Information

Company	Country	Batch	Technology
	 Slovenia	1	<ul style="list-style-type: none"> <li>Satellite based remote sensing.</li> <li>High Resolution Imaging.</li> </ul>
	 UK / USA	1	<ul style="list-style-type: none"> <li>Artificial Intelligence System for data helps in creating a decision support tool and system for predicting water usage patterns, costs, impact, disaster, demand-supply curves etc.</li> </ul>
	 UK / India	1	<ul style="list-style-type: none"> <li>The solution provides an aggregation and trading platform dedicated for waste including: dung, biomass, solids, sludge, ash and any other waste that has an intrinsic resource recovery value.</li> </ul>
	 UK	1	<ul style="list-style-type: none"> <li>Topolytics' system through its advanced visualization creates a meta-map of the commercial and industrial waste.</li> </ul>







## ETV: Data and Information

Company	Country	Batch	Technology
 <b>VGB Maribor</b>	 Slovenia	1	<ul style="list-style-type: none"> <li>Surface / Ground water and flood modelling tool with a strong emphasis on inundation visualization. This tool builds upon existing open source modelling tools and bolts on to them, the visualization tools help policy makers and urban planners on potential damage and implications of flooding.</li> </ul>
 <b>TAKELEAP</b> <small>WE MAKE IT HAPPEN</small>	 UAE	2	<ul style="list-style-type: none"> <li>Uses AI / ML technologies creating and enabling brands to enhance customer engagement.</li> <li>Applications are VR, Charbots, Robotics, 360 degree live streaming etc.</li> </ul>

## ETV: Ancillary Services







Company	Country	Batch	Technology
 <b>BOSON ENERGY</b> <small>THE IMBY COMPANY</small>	 Luxembourg	1	<ul style="list-style-type: none"> <li>Decentralised solid waste management.</li> <li>Converts waste into electricity and thermal output (incl. cooling).</li> <li>Combustion of waste to produce heat, to produce steam and to produce power.</li> </ul>
 <b>Mebiol</b>	 Japan	1	<ul style="list-style-type: none"> <li>Soil-less membrane farming.</li> <li>Reduces water consumption in irrigation by 70%.</li> <li>No agricultural runoffs.</li> <li>World's first hydrogel membrane based agro-technology to address some of the serious issues that our world communities' face today regarding food shortage, water scarcity and land contamination.</li> </ul>
 <b>Exo-Cubic Solutions</b>	 UK / Germany	1	<ul style="list-style-type: none"> <li>Recycles special waste materials such as tyres, plastics etc and recovers energy or material resources from it.</li> <li>Exo-Cubic (Patent-Pending) technology deploys Ultra High-Pressure Water (UPHW) jet pulverisation to completely deconstruct the tyres constituent elements enabling full recycling.</li> <li>Using only high-pressure water to decompose scrap tyres into 100% clean fine rubber powder – for direct use in production of new tyres, engineered rubber goods, general rubber goods manufacturing, civil engineering applications and delivering 100% clean steel for re-production and clean textile elements.</li> </ul>

## ETV: Ancillary Services





Company	Country	Batch	Technology
	 UK	1	<ul style="list-style-type: none"> <li>Advanced anaerobic treatment for sludge and biodegradables.</li> <li>Blue Sky Bio's patented industrial anaerobic fermentation system, the Hygen Bioenergy Reactor (HBR) is capable of breaking down any non-lignin (woody) organic material into its basic monomer format (&lt;100um).</li> <li>An optimised environment where then mother nature can generate bioproducts.</li> <li>With improved control of each stage of the degradation process, high output production of competitively priced, bio-alternative products become available.</li> </ul>
	 Canada	1	<ul style="list-style-type: none"> <li>UV disinfection technology for secondary treatment of treated sewage.</li> <li>TrojanUV specializes in the design, manufacture and sale of pressurized and open-channel ultraviolet (UV) disinfection systems for municipal wastewater, municipal drinking water and environmental contaminant treatment applications.</li> <li>They have the largest installed base of UV systems in the world and are committed to reducing water stress and maximizing this invaluable resource for current and future generations.</li> </ul>
	 UK	2	<ul style="list-style-type: none"> <li>Uses controlled environments and data-driven (AI/ML) agriculture radically improving farm efficiency, reliability and sustainability.</li> <li>Uses less water and produces high quality cotton.</li> </ul>







## ETV: Ancillary Services

Company	Country	Batch	Technology
	 UK	2	<ul style="list-style-type: none"> <li>Specialized in the field of odor control and ventilation for the waste sector, water industry and various industrial sectors.</li> <li>OSIL have developed a range of unique odor control and removal solutions that deliver exceptional performance, high reliability, excellent cost effectiveness and strong environmental protections.</li> </ul>
	 UK	2	<ul style="list-style-type: none"> <li>Converting mixed waste to sustainable, environmental fuels.</li> <li>Eliminating waste and producing Hydrogen revolutionizing Waste Management.</li> <li>Reverting waste back to its elemental parts, minerals (solids) and gas.</li> </ul>
	 Hungary	2	<p><b>WATER RETAINER</b></p> <ul style="list-style-type: none"> <li>Water retainer (WR) is designed to achieve the effective water management and is vital for soil health and good crop yields.</li> <li>It is made from food industry by-product of vegetable origin, with a high content of organic matter.</li> <li>It has absorbent, moistening and surfactant substances.</li> <li>WR is a water-soluble liquid, which is sprayed onto the surface of the soil.</li> <li>It also reduces evaporation loss whilst also absorbing humidity from the air to the soil.</li> </ul>

## ETV: Ancillary Services

Company	Country	Batch	Technology
	 India	1	<b>RUBBER DAM TECHNOLOGY</b> <ul style="list-style-type: none"> <li>Rubber dam is a novel concept for water management technology and it is designed and developed by Indian Rubber Manufacturers Research Association (IRMRA), India.</li> <li>In comparison to the conventional heavy concrete structures and metallic structures for restricting the water flow in the river and storage of water, inflatable reinforced rubber compartments are used in the rubber dam.</li> <li>When totally deflated they became flat and lay on the basement of river and when inflated by filling water takes an elliptical shape initially, when fully inflated forming a very stable and tough structure.</li> </ul>
	 Sweden	1	<b>HYDRODEMOLITION</b> <ul style="list-style-type: none"> <li>Hydrodemolition technology removes concrete using water pressure of up to 3000 bar, for long-lasting, high quality repairs. It creates no micro-cracks and leaves an ideal bonding surface for the fresh concrete.</li> <li>Conjet's concrete hydrodemolition robots use a high-pressure water jet, which travels over the concrete surface at a constant speed, taking advantage of the concrete's permeability to create an overpressure that breaks it apart.</li> <li>The high-pressure water jet technology create a rough surface optimal for bonding of new concrete without creating any micro-cracks or damage to the remaining structure. At the same time, the hydro demolition technique leaves the rebar intact and cleaned from rust and corrosion.</li> </ul>

## ETV: Ancillary Services

Company	Country	Batch	Technology
	 USA	3	<ul style="list-style-type: none"> <li>• Drinking water made from sunlight and air.</li> <li>• The SOURCE® Hydropanel is a technology that incorporates multiple patented inventions alongside proprietary trade secrets, making it a one-of-a-kind renewable water technology that uses the power of the sun to extract clean, pollutant-free drinking water from the air.</li> <li>• Collected water is then mineralized for ideal composition and taste, making premium-quality drinking water a readily available resource.</li> </ul>
	 India	3	<p><b>GREEN CREMATION SYSTEM</b></p> <ul style="list-style-type: none"> <li>• Reduces wood consumption; Uses Cow dung briquettes.</li> <li>• 70% reduction in emissions.</li> <li>• Reduces time required for cremation.</li> <li>• Cremations are done in closed chambers like in electric crematoria but allows all Hindu rituals to be performed.</li> <li>• Approximately 90-95% harmful emissions are trapped using advanced emission control systems.</li> <li>• Cost per cremation reduced from INR 3,500 – 4,000 to INR 1,500 – 1,600 permitting all rituals including Kapal Kriya.</li> <li>• Eliminates the need for tall chimney and all commonly used burning means such as wood, cow dung logs, natural gas or electricity can be used.</li> </ul>



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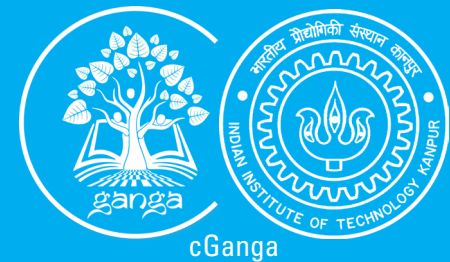
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