

**Transforming Waste into
Clean Energy in a Sustainable Manner**

The Company

- **A joint venture company between:**
 - Clean Energy Enterprises Inc. (CEE), a Delaware company, headquarters in Southern California
 - Japan Blue Energy Co., a Japanese technology developer
- **Proven Waste-to-Hydrogen technology.**
- **Ways2H Inc. is headquartered in Long Beach, CA:**
 - Engineering
 - Construction
 - Commercial Development (system sales)
- **Systems available now**



Creating Value out of Waste

Improving Waste management, producing clean Hydrogen

- Unlike solar or wind, our systems are predictable, continuous and creatively solve another major environmental issue
- Small size distributed systems improve waste logistics and provide a clean decentralized conversion of waste to energy.
- Cleaner than incineration, addresses landfill diversion mandates
- Ways2H overcomes the issues associated with conventional gasification.



A Waste-to-Energy solution

Engineered, refined and enhanced in Japan

- Developed by Japan Blue Energy Co.
- Organic waste, including plastics, into hydrogen
- Over 16 years development, 3 generations of test size units built, tested and enhanced
- 4th generation currently in operation in Joso, Japan, treating sewage sludge and other waste streams
- Small to medium size, truly decentralized solutions to optimize feedstock or hydrogen logistics
 - 1 t/day capacity transportable solution
 - Stationary 24 t/day standard design.



Photo courtesy of JBEC / Tsubasa Engineering

Proven Technology Since 2005

Prototype Development

Complete WO patents portfolio



Over 6000 Operation Hours and
Data Collection Version 4.0



Transportable & Fits in
Containers



Gasification that Works



V1 - 2005



V2 - 2006



V3 - 2013



V4 - 2018

Input & Output

A Local, Decentralized Approach to Various Organic Waste Streams Management and Clean Energy Production

Plastics



Medical and other hazardous waste



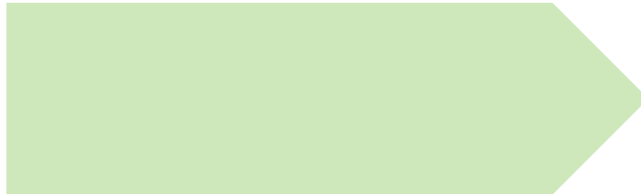
Biomass



Sewage
sludge



Municipal Solid Waste



Clean Energy Production



Hydrogen gas

The Process

Various feedstock streams

Because of its unique features, and unlike other solutions, Ways2H handles plastics, but also:

Biomass, Sewage Sludge, Food Waste, Wood, Paper, as well as the typical mix of these, known as Municipal Solid Waste (MSW).

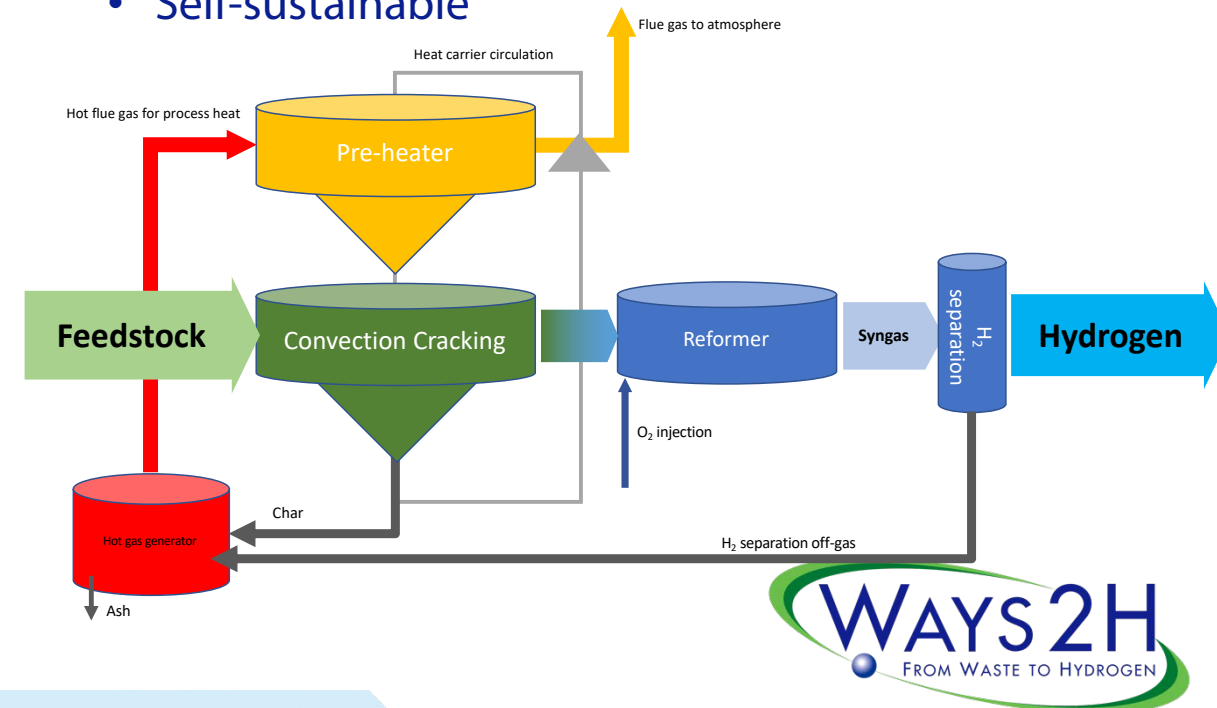
Emissions compliance

List item	USEPA Standard	European Standard	Ways2H Actual Emissions
Particulate Matter – Dust (mg/m ³)	24	5	0
Dioxins/Furans (ng/m ³)	13	10	0
NOx – nitrogen oxides (ng/m ³)	500	200	48
CO – Carbon Monoxide (mg/m ³)	100	50	0
HCl – Hydrogen Chloride (mg/m ³)	29	10	7.08
SO ₂ – Sulfur Dioxide (mg/m ³)	31	50	4.2
Hydrogen Fluoride (mg/m ³)		4	0
Lead (mg/m ³)	.2	0	0
Mercury (mg/m ³)	.08	.02	0
Cadmium (mg/m ³)	.02	.05	0

Inherently clean and reliable

Proprietary breakthrough design using heat carriers to decompose the waste stream.

- Low emissions
- Various feedstocks
- Self-sustainable





Predictable, on-demand hydrogen-based power.

- Renewable power production anywhere, a third pathway from solar/wind and biogas



Renewable, potentially carbon-negative hydrogen fuel

- Hydrogen production for the clean mobility markets
- Keeps solar/wind power available for expected Battery Electric Vehicles charging stations power demand



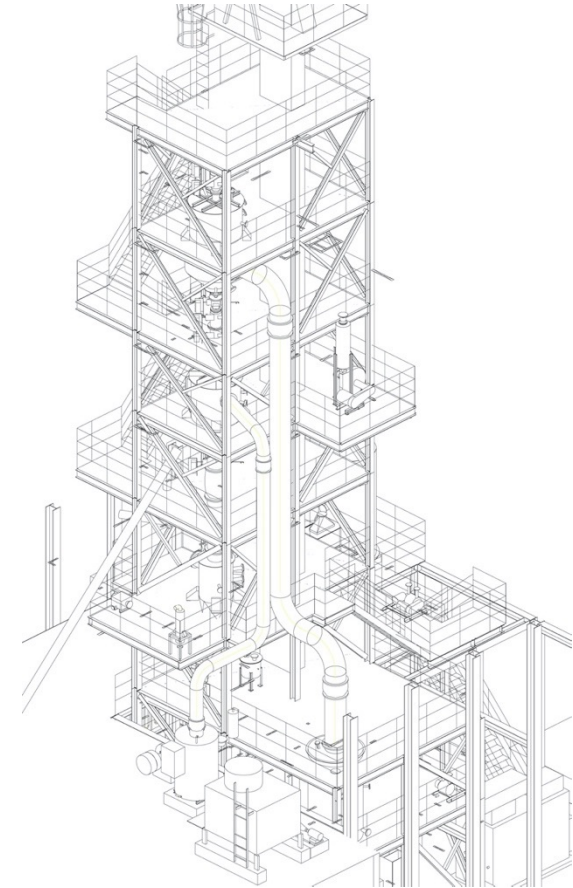
Beneficial on-site processing of waste

- To address off-grid communities demand for power
- Because some of this waste, such as medical waste, is hazardous
- Because off-site processing is a costly solution and landfilling or incineration are no longer acceptable to the public eye
- Because true recycling is a very limited option



Engineering and Construction

- **North America Engineering Procurement & Construction by Sacré Davey Engineering**
 - Headquartered in Vancouver, B.C. several locations throughout Canada and the US.
 - Technology-led full-service engineering company.
 - Extensive experience on biomass gasification projects as well as hydrogen handling.
- **Carefully selected EPC firms in other regions.**
 - Privileged relationship with only a few partners, keep engineering know-how to restricted audience
 - Local vendors / partners for better service and efficiency



AGM-5, Small Scale Solution

- Fully functional, 1 ton per day continuous treatment capacity.
- Fits into containers for portability
- A distinct product, semi-mass production, for specific markets
 - Military operation in the field
 - Emergency relief
 - On-site medical waste processing
- Hydrogen production
 - One ton per day biomass feedstock yields 50 kg hydrogen per day
 - 12 Fuel Cell Vehicle full tanks or
 - 40 kW generator (with an integrated fuel cell)



TODA Corporation / Japan Blue Energy

Case Study: Two Output Options

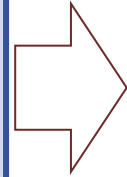
Organic MSW

(metals and inerts removed)

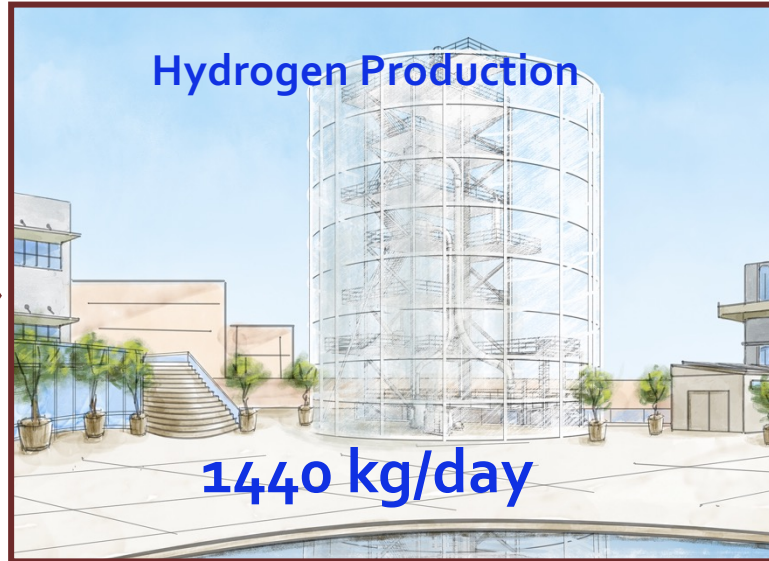
30 t/day @ 20% moisture or:

24 t/day (Dry basis)

Hydrogen contents: 1,550 kg



Hydrogen Production



1440 kg/day



Fuel Cell Vehicles



FCV

280 full tanks served
per day

Power Generation

SOFC

1.3 MW Electricity
0.6 MW Heat



Recognition



S&P Global Platts

Ways2H was nominated as an Emerging Technology of the Year Finalist focused on developing a solution to address energy transition to cleaner fuels.



Fast Company Awards

Ways2H was nominated as a World Changing Ideas Finalist as an innovative idea to create clean power.



Solar Impulse Foundation

Ways2H has been labeled as one of the Efficient Solutions with a positive impact on the environment and quality of life.



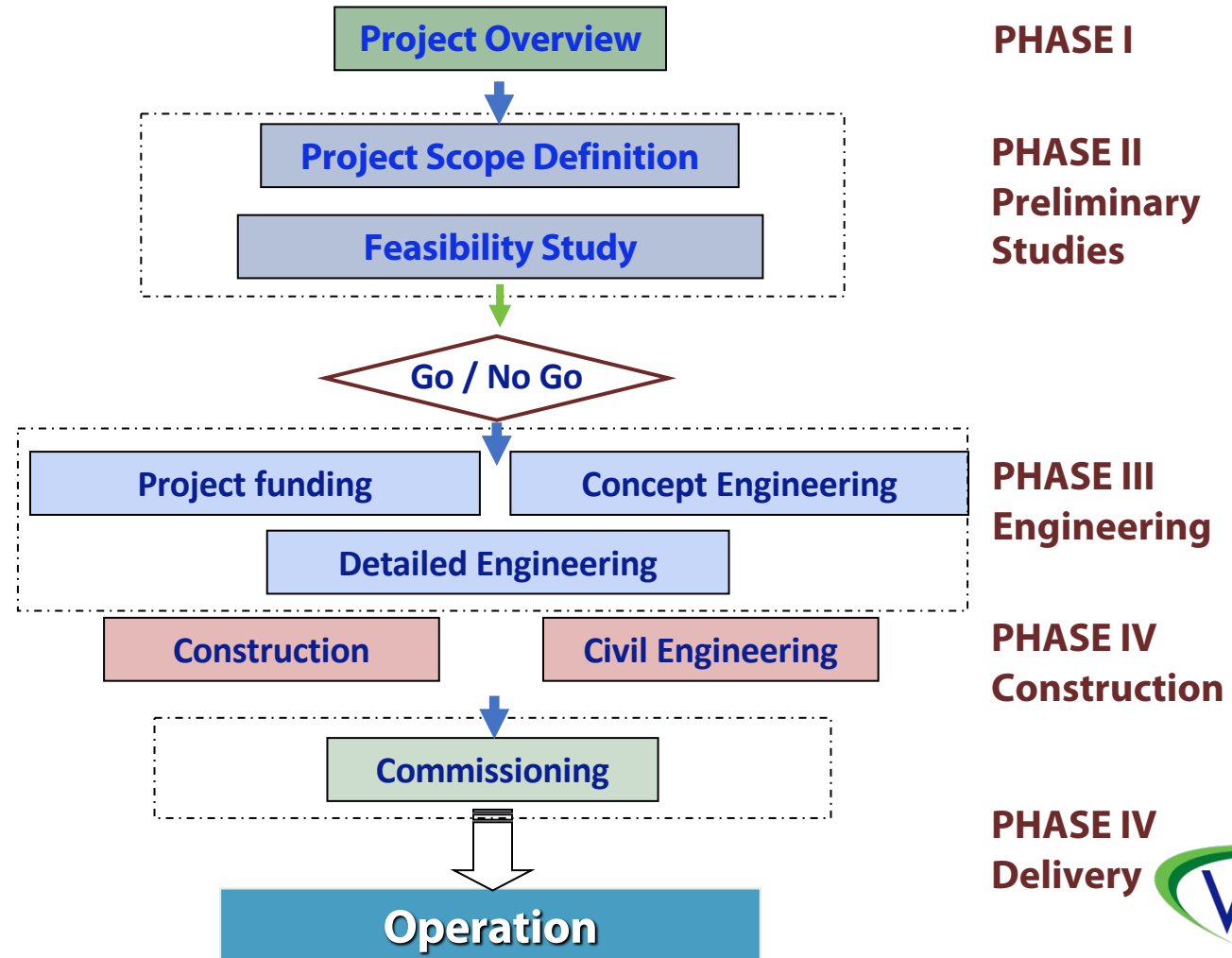
H2 Hub Airport

Ways2H was selected, along with 10 other companies, to initiate the hydrogen infrastructure at Paris CDG Airport.



Project Execution

- Full support throughout all the project phases, from concept until operation.
 - Feasibility Studies
 - Engineering
 - Procurement, Construction and Assembly
 - Commissioning
- Post-delivery maintenance and remote operation
- Access to third party project financing available (conditions apply)





WAYS2H
FROM WASTE TO HYDROGEN

**For additional information
please contact:**

Jean-Louis Kindler, CEO
+1 (562) 414-4151
jlkinder@ways2h.com