Hydro Genyse

A Vertically Integrated Industrial Ecosystem Fueled by MSW

2425 S Memorial Dr, Racine WI 53403 www.HYDROGENYSE.com The ecosystem is powered by a gasification system proven over a period of decades by Interstate Waste Technologies. This system is the backbone of a highly profitable and clean conversion of

waste to energy



About IWT



ABOUT IWT

IWT is a development company that privately finances, designs, constructs, and operates waste processing facilities. IWT uses Thermoselect technology, a patented process, incorporating high-temperature gasification to recycle municipal waste into clean energy and useful products.

IWT maintains offices in Middleburg, Virginia; and West Chester, Pennsylvania.

IWT contracts with a major design/build team for each project. The design/build team provides a 100% payment and performance bond and guarantee of the price, schedule, and performance of the facility.

IWT contracts with a major operations and maintenance contractor for each project. The O&M contractor provides necessary bonds and guarantees in support of their work.

Contractors currently working with IWT include AECOM, NAES, and RTP Environmental Services.

IWT PARTNER COMPANIES

AECOM

13.1 billion of revenue during fiscal year 2022

Ranked #1 in transportation design, facilities design, green design and environmental engineering by Engineering News-Record in 2022

Named one of Fortune magazine's "World's Most Admired Companies" for the eighth consecutive year."

Listed at #260 on the Fortune 500 as one of America's largest companies

NAES

NAES is the power generation industry's largest independent services provider, dedicated to optimizing the performance of energy facilities worldwide and responsible for managing more than 50,000 MW of generation. The NAES family of companies, comprising 4,000+ team members, provides an unparalleled wealth of experience in operations, maintenance, fabrication, grid management, regulatory compliance, and technical support to build, operate and maintain both traditional and renewable resources.







Projects in Japan

PROVEN TECHNOLOGIES AT COMMERCIAL SCALE

(Thermoselect) Gasification

Technology Application -Convert synthesis gas produced from MSW into clean energy

- 43 patented processes over 300 patent awards worldwide
- 30 years of operating experience
- Has reliably processed millions of tons of waste
- 7 plants operating in Japan processing MSW since 1999



About This Project

This project analyzes the economic, social and climate effect involving the gasification of MSW and the direct connection to industries that can utilize by byproducts on site.

59000 tons steel24500 tons Aluminum183500 tons aggregate

29,990 tons H2 1.3M tons Nitrogen 164,614 tons CO2 70 MW green base load electric 77M gal clean water

Unsorted municipal solid waste is the source of energy



MSW has a reliable profile and steady supply

Total MSW Generated by Material, 2018 🛛 🛛 🔂 🛃

292.4 million tons





Current Recycling operates at a huge loss in Milwaukee- this can be reversed saving millions for the municipalities

Residential Recycling Program Costs (State rpt. method)	\$ 10,783,199	\$ 10,546,217	\$ (236,983)
State Cost Sharing/Grant Revenue	\$ 2,314,142	\$ 2,311,455	\$ (2,686)
Recyclable Commodity Sales Revenue	\$ 1,010,013	\$ 1,024,906	\$ 14,893
Avoided Landfill Disposal Costs	\$ 1,082,877	\$ 1,189,447	\$ 106,571
Subtotal of offsets	\$ 4,407,032	\$ 4,525,809	\$ 118,777
Net Costs - Residential Recycling Program	\$ 6,376,167	\$ 6,020,408	\$ (355,760)
Net Cost Per Ton - Res. Recycling Program	\$ 261.92	\$ 230.61	\$ (31.31)

Efficiency Measures - Household Recycling Only

*The Comptroller's Office method of computing Household Solid Waste Tons includes garbage tons from the City's >4 unit multi-family dwelling customers, a sector not serviced by the City with recycling collection. Since the City does not have recycling tonnage figures for these customers serviced with recycling by the private sector, the resulting recycling rate is artificially low.

Gasification of waste will provide sustainable baseload power, industrial gases and economic development

Systems are modular and expandable – this project will use 6 modules

THERMOSELECT

clideo.com

The gasification process creates 29.9M KG of hydrogen and captures 164,615 metric tons CO2



This hydrogen will have the lowest cost possible

Manufactured cost of this green H2 at this site is lower than fossil fuels. Not having to super-compress, liquify or transport allows for cost effective use in fuel cells for power.

Green H2 cost	W/O Ecosystem	W / gasification
H2 Cost/ KG	\$ 7.00	\$ 2.00*

Fuel Cell cost of power: .10 / Kwh

* Utilization on site will get the \$3.00/ KG subsidy from the DOE for the first 10 years

H2 fed to the fuel cells or generators can yield 70MW of green power

29900 metric tons H2 can deliver clean power with no emissions on site

CO2 from the process is captured and liquified for sale or use on site

77M gal clean water byproduct is also captured and reused.





Heat recovery off the fuel cells can deliver 14,000 tons of cooling with an absorption chiller



Figure 2: Bloom Energy Server Delivering High Temperature Heat for a Cooling Application

Additional 18MW of cooling from a hybrid heat pump



Lake based free cooling

Free cooling by-passes the chiller and uses the cold water's stored energy.

Simple by-pass to our cooling loop allows access to all industries on the site for both comfort and process cooling.

Load = lb of water/hr x $(t_1 - t_2) = Btu/hr$ = gpm x 500 x range

Where: gpm = flow rate over the tower (gallons per minute)

range = difference between water temperature entering the tower and temperature leaving the tower





Algae system can act as a heat sink adding 1000's of tons of additional cooling while eating CO2 and cleaning water

The CO2 can be diverted to a PBR (photo bio reactor) to produce algae which converts CO2 to bio-mass.

This reactor combined with the 33M gal pond can achieve 1000's of tons of free cooling and use the heat.

This can also be used to treat wastewater on site.



This urban agricultural powerhouse can feed thousands of the same people supplying the MSW

1000's of tons of nutritional grade algae that can also feed fish.

Millions of lbs of restaurant grade fish

Urban high demand produce production all year

Processing on site



Gasifier is sized to match the waste stream



The waste stream from this entire area can feed the gasifier. This will save these municipalities millions in waste management and recycling losses.

Efficient transfer is within 30-60 miles of the site.

The site will have lower tipping fees than the landfill and can take a variety of hazardous materials for additional revenue.

Each additional industry on the site will have a disruptive cost advantage in the market:

Steel- 49,000 tons ready for end user Aluminum- 24,000 tons sorted and bailed CO2- 164,000 tons a by-product of H2 PSA method







Nothing escapes value added processing from the process





The site will attract additional business that can take advantage of the industrial gases, metals and minerals

High Purity nitrogen, and hydrogen are used in the chip industry. Their costs would be reduced when used near the site.

Value added processing on site will expand the site and result in lower cost processing of all associated businesses







Hydro Genyse CCE system is 2.91 tons negative CO₂ for every ton of MSW diverted from landfills



Hydro-Genyse Staff



Ralph Bencriscutto, President of Tower Energy International LLC. Founder of Hydro Genyse with over 30 years of experience designing and installing profitable integration of industrial process utilization of waste heat, water and energy. Tower Energy has completed over 3000 grant subsidized projects with paybacks under 2 years.



Dr. Malek Alkasrawi PhD-Chemical Engineering, MS in Biotechnology, BS Food & Dairy Technology. 30 years of experience in applied engineering research. Associate Professor Scientist, U. Wisconsin Stevens Point, Associate Lecturer, Chemistry-U. Wisconsin Parkside and Carthage College.

Languages: Arabic, Swedish, English



Dr. Stephen Lyon PhD-Social Ecology, MS Biology, BS Oceanography, BS Limnology 41 years of experience in the Public, Private and Academic sectors, including the environmental, water, food care, health care and building care industries. Languages: English, Swedish, Spanish, Russian.



Dr. Peggy James: Business Director: Dr. Peggy James (PhD 1988) Professor of Politics Philosophy and Law, analyzes social/ political challenges for inclusion/cooperation between municipal partners, including community agreements and workforce partnerships.



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