
Hydro
Genyse
A Vertically Integrated Industrial
Ecosystem Fueled by MSW
2425 S Memorial Dr, Racine WI 53403
www.HYDROGENYSE.com

About This Project

This project analyzes the economic, social and climate effect of a vertically integrated industrial commercial ecosystem that is connected directly to the output of a high efficiency waste to energy power plant.

10 MW green power generation

10,000 metric tons H2

160,000 metric tons CO2

Current direct losses on recycling- city of Milwaukee

Efficiency Measures - Household Recycling Only			
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)**

*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.

Advantages of the Circle City Industrial Ecosystem for Milwaukee

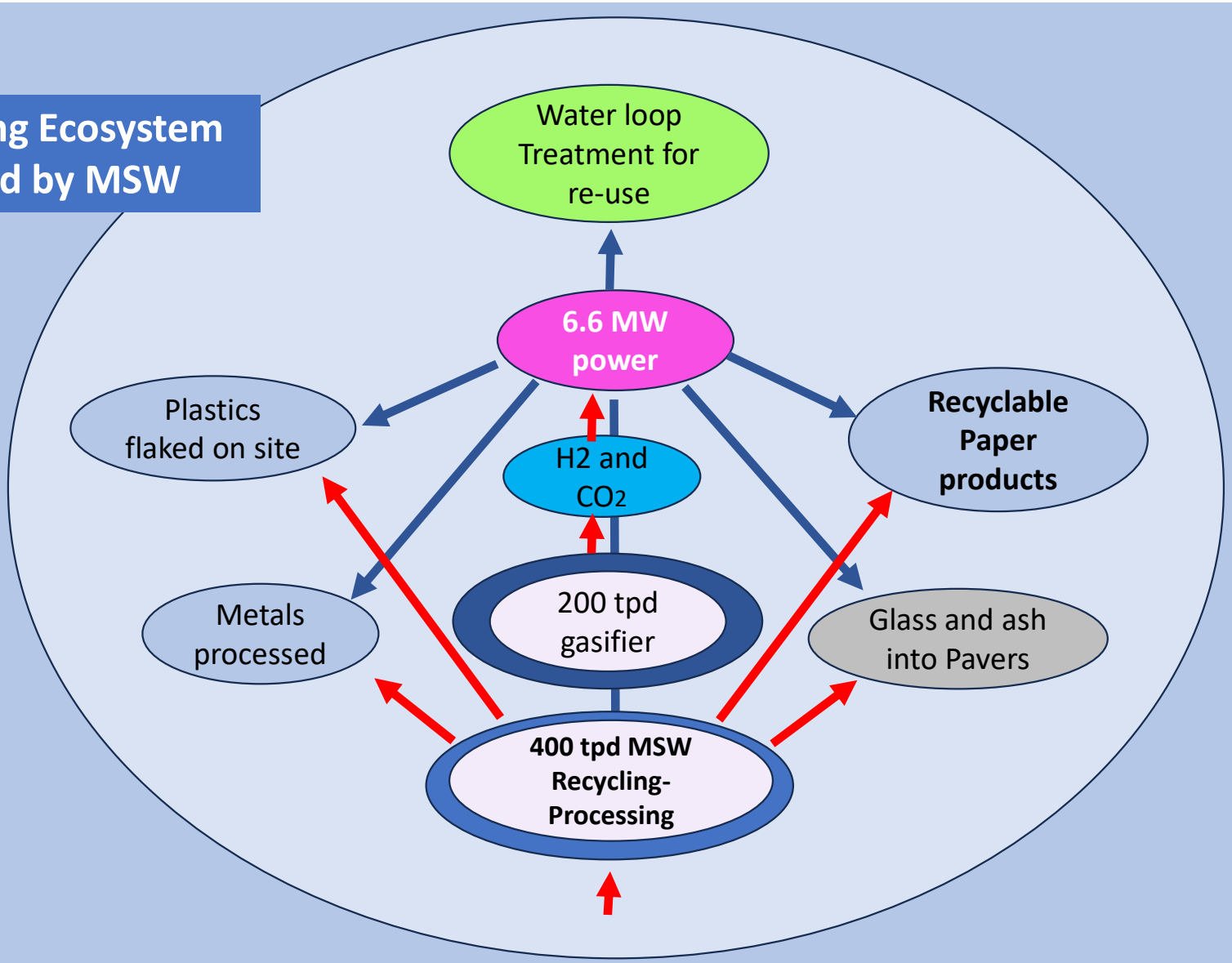
Single source pick up – cuts cost of pick up 50%

No odor or emissions- no effect on the environment

High paying job creation – with training on site

Self Generating power and heat- for entire site

Recycling Ecosystem powered by MSW



Centry City is the perfect location for job creation

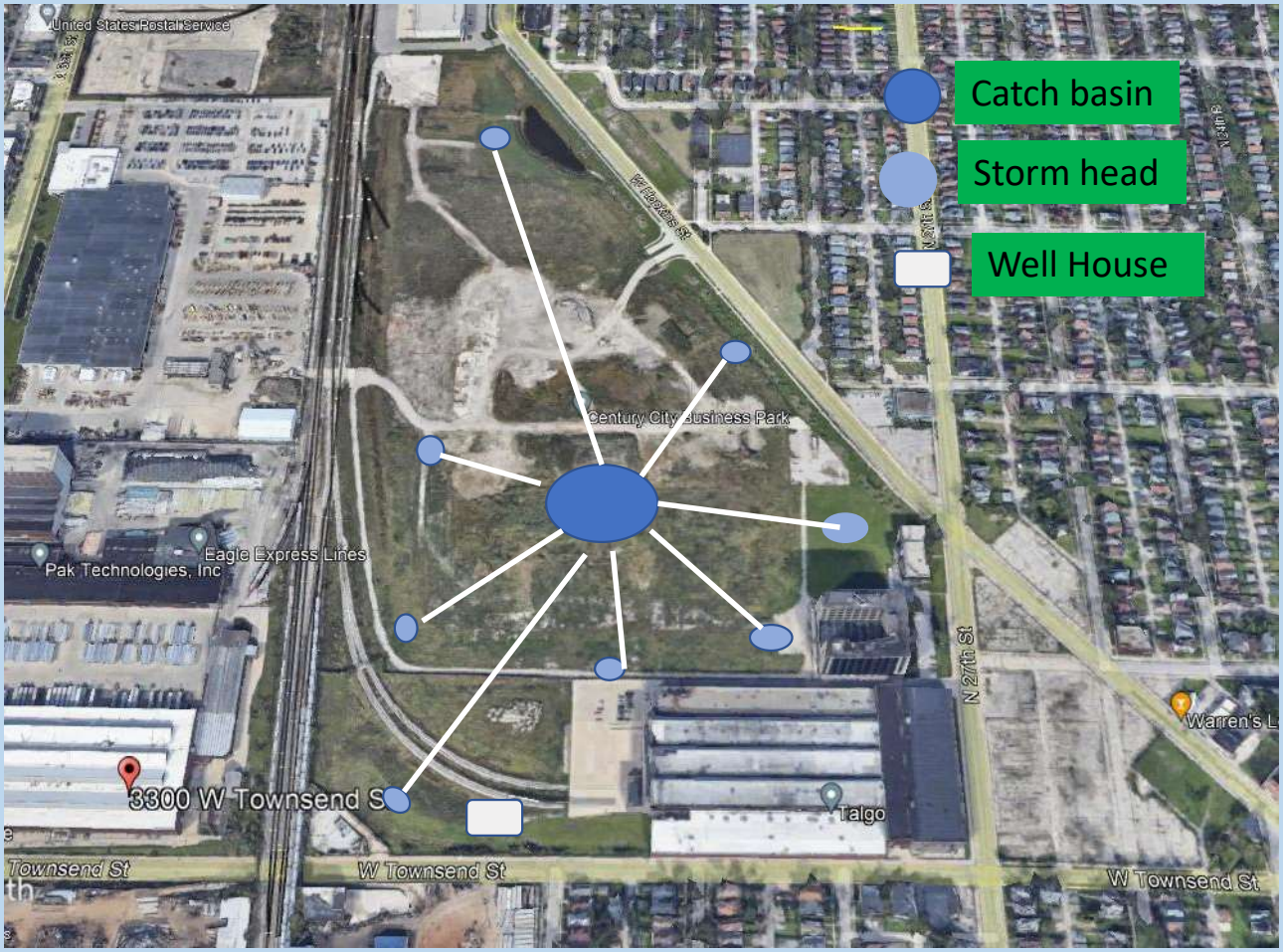
The project lies on 70 acres and can produce the following:

- Waste to Energy
- Green Hydrogen
- Green Steel
- Green Aluminum
- Paver Production
- Commercial Development
- Sustainable CO_2
- Education and Training

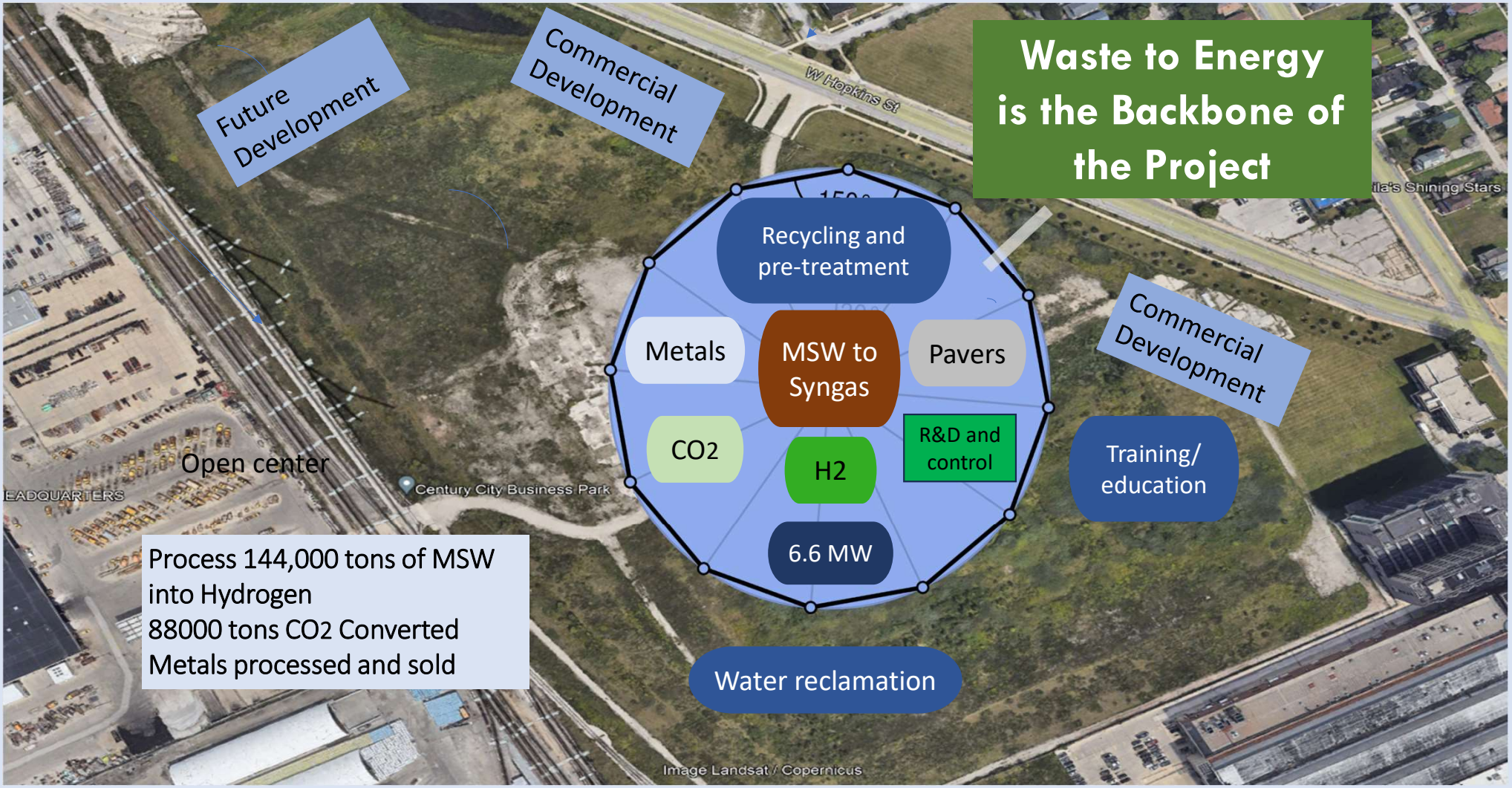
Utilizing Rainwater for Feedstock

This site will be designed to catch and use all available rainwater for cooling. This would collect 74.5M gal/ year.

A deep water well would supplement the balance.



Approx 5 acres under roof- 230,000 sq.ft.



World class automated recycling from unsorted MSW

Before the gasifier, metals, glass, plastics and recyclable papers are removed and separated for further processing on site

Metals sorted and bailed

Platics with value sorted and flaked

Glass and slag to pavers

Everything else goes to

If there’s value in it this system will find it

Unrecyclable MSW is dried and processed to EDF for the gasifier

This eliminates the landfill- permanently

Bulky and worthless waste is dried, and turned into fuel.

All this energy is turned into Hydrogen and heat for use on site.

Before Processing

After Processing

EDF is sized and dried for feeding into the gasifier

700 tons tires per year can be gasified and turned into energy with no emissions

Tires are packed with energy that can be utilized in the gasifier.

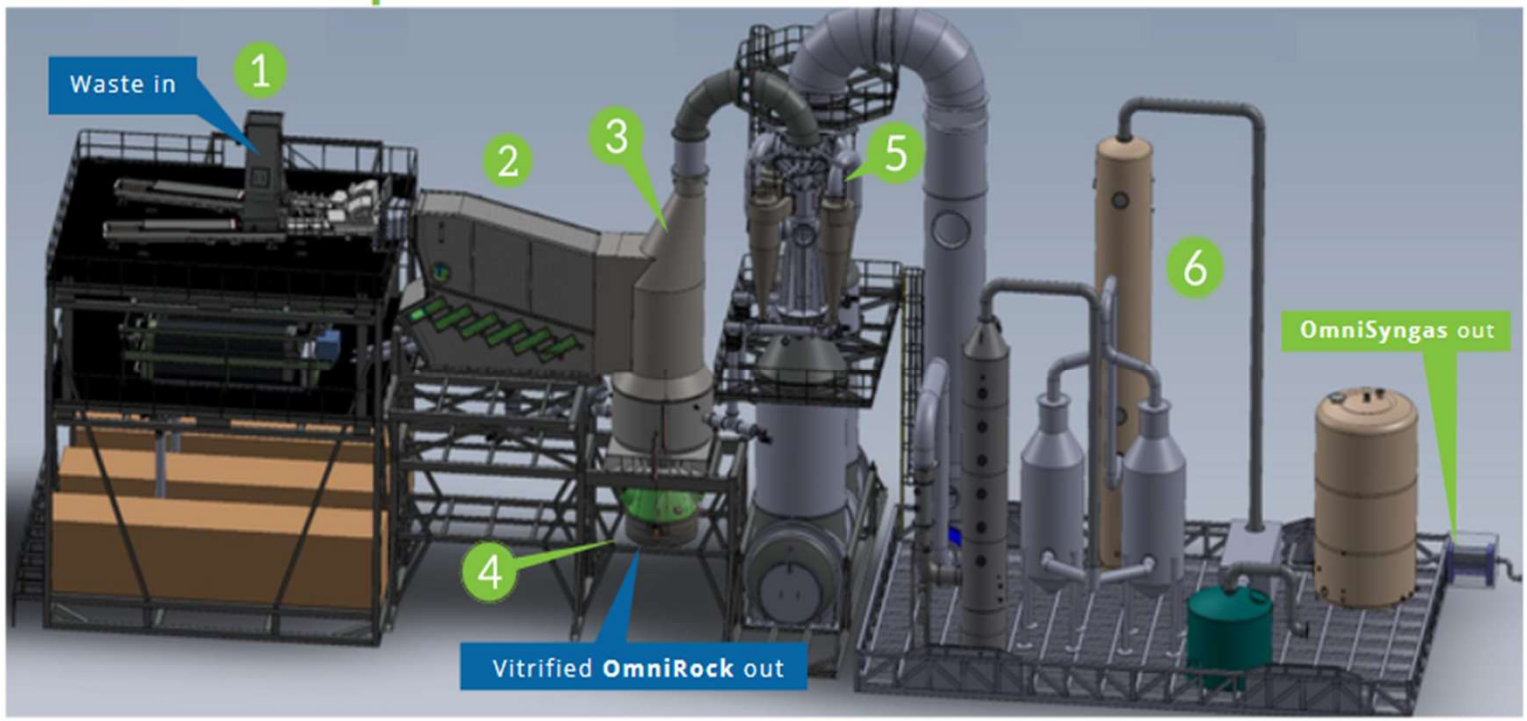
A disposal fee collected subsidizes the process.

Metals from the tires are also recovered from the bottom ash of the gasifier and recycled.

OMNI CONVERSION TECHNOLOGIES

Omni200 Thermal Chemical Conversion

Process Description

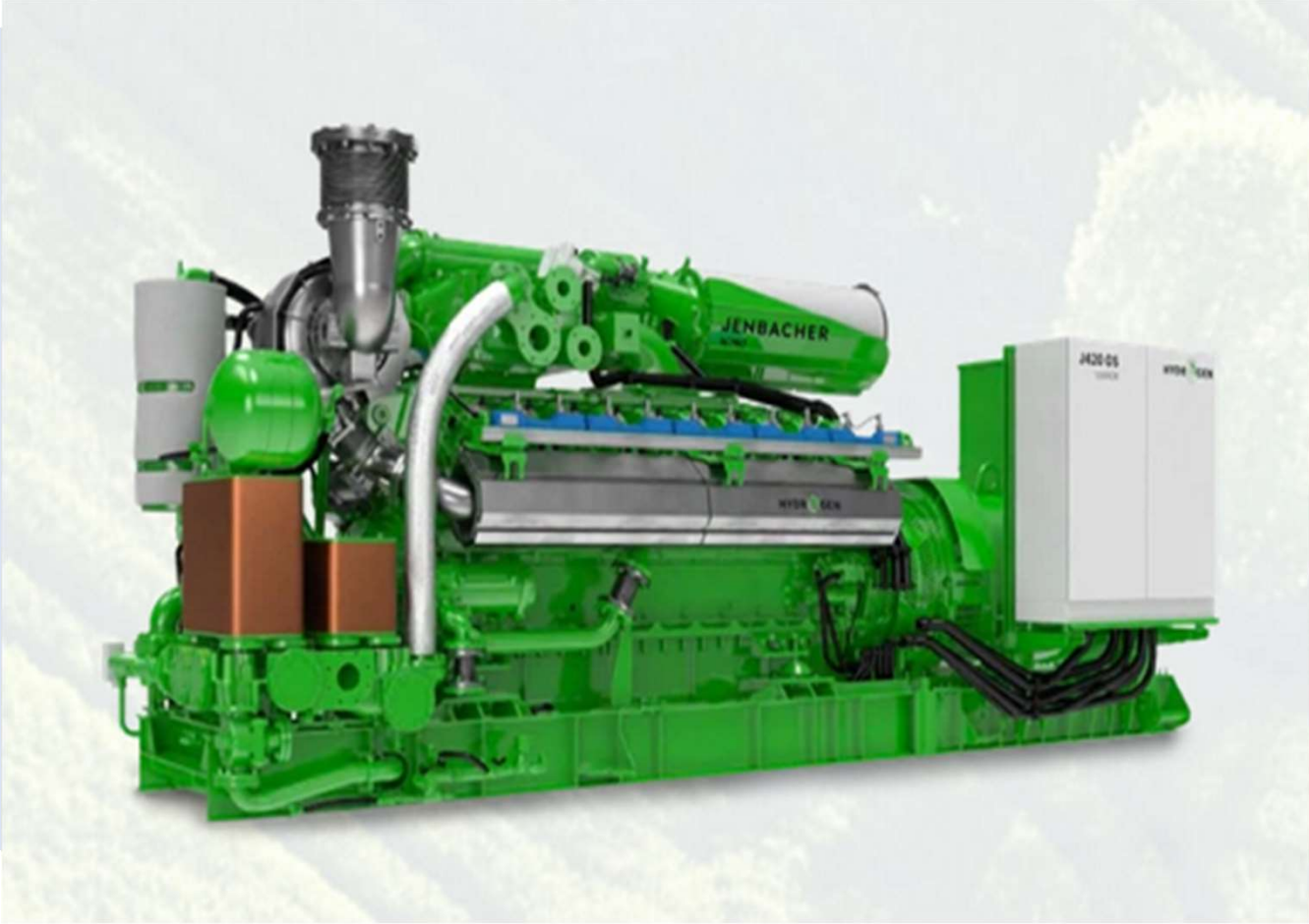


A Decarbonization Solution for the Circular Economy

MSW will be converted to 11,200 metric tons of H2 / year
This will partially be used to run 12- 1.1 MW generators

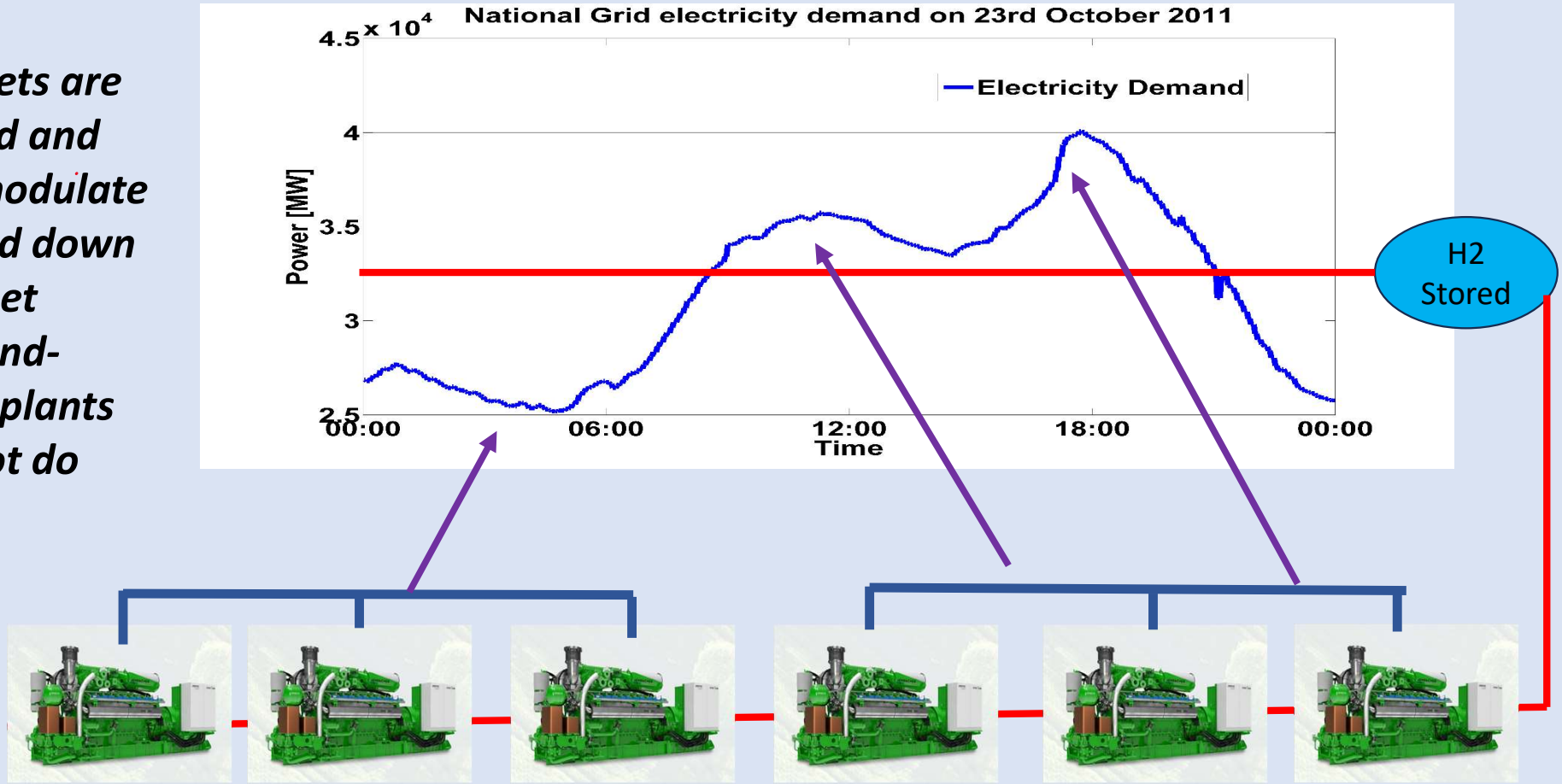
Then the waste heat will be recovered and converted back to electricity with the Rankin Cycle and refrigeration using a Vapor Absorption Cooling Technology

<u>All with no emissions</u>

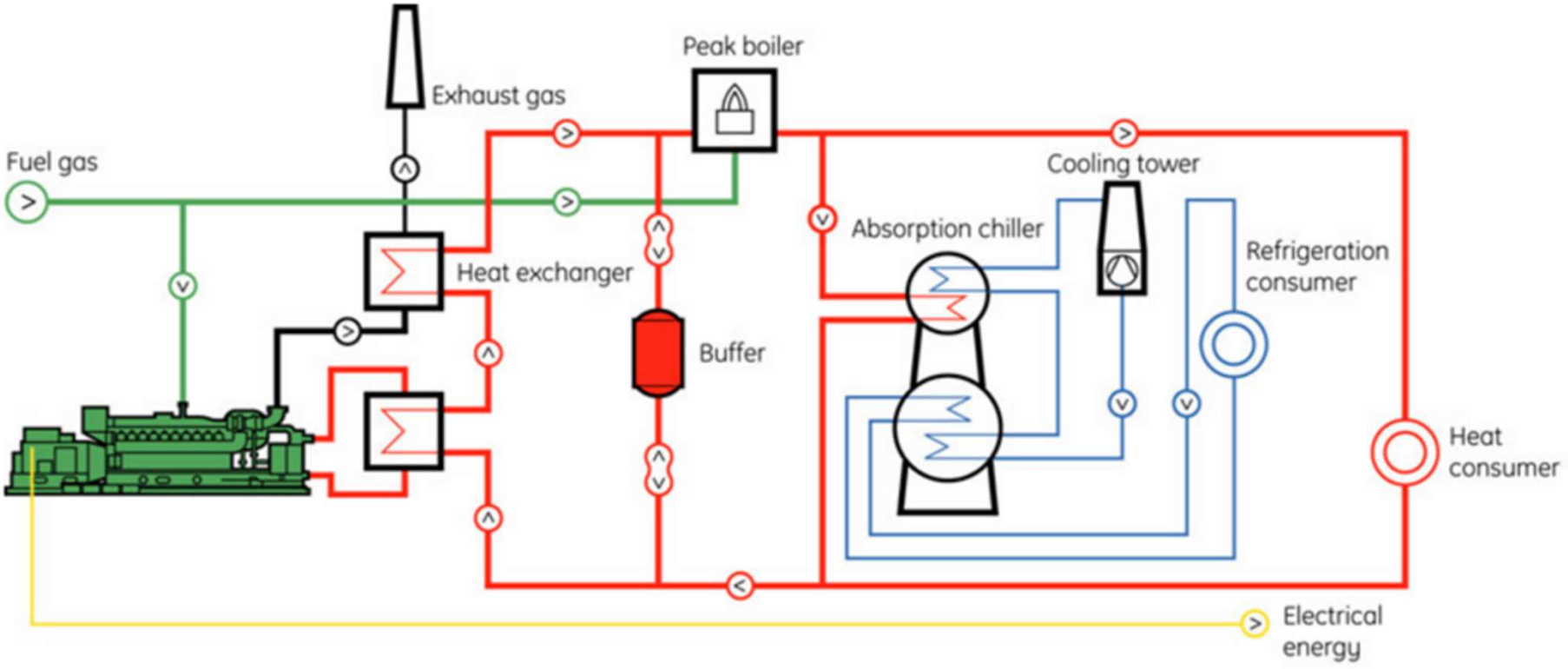


Having H2 as stored energy allows for variable output

Gen sets are staged and can modulate up and down to meet demand- large plants cannot do that



This Generator can provide Combined Cooling Heating and Power CCHP- This will chill the process cooling loop for the entire site



Advantages of the Circle City Industrial Ecosystem

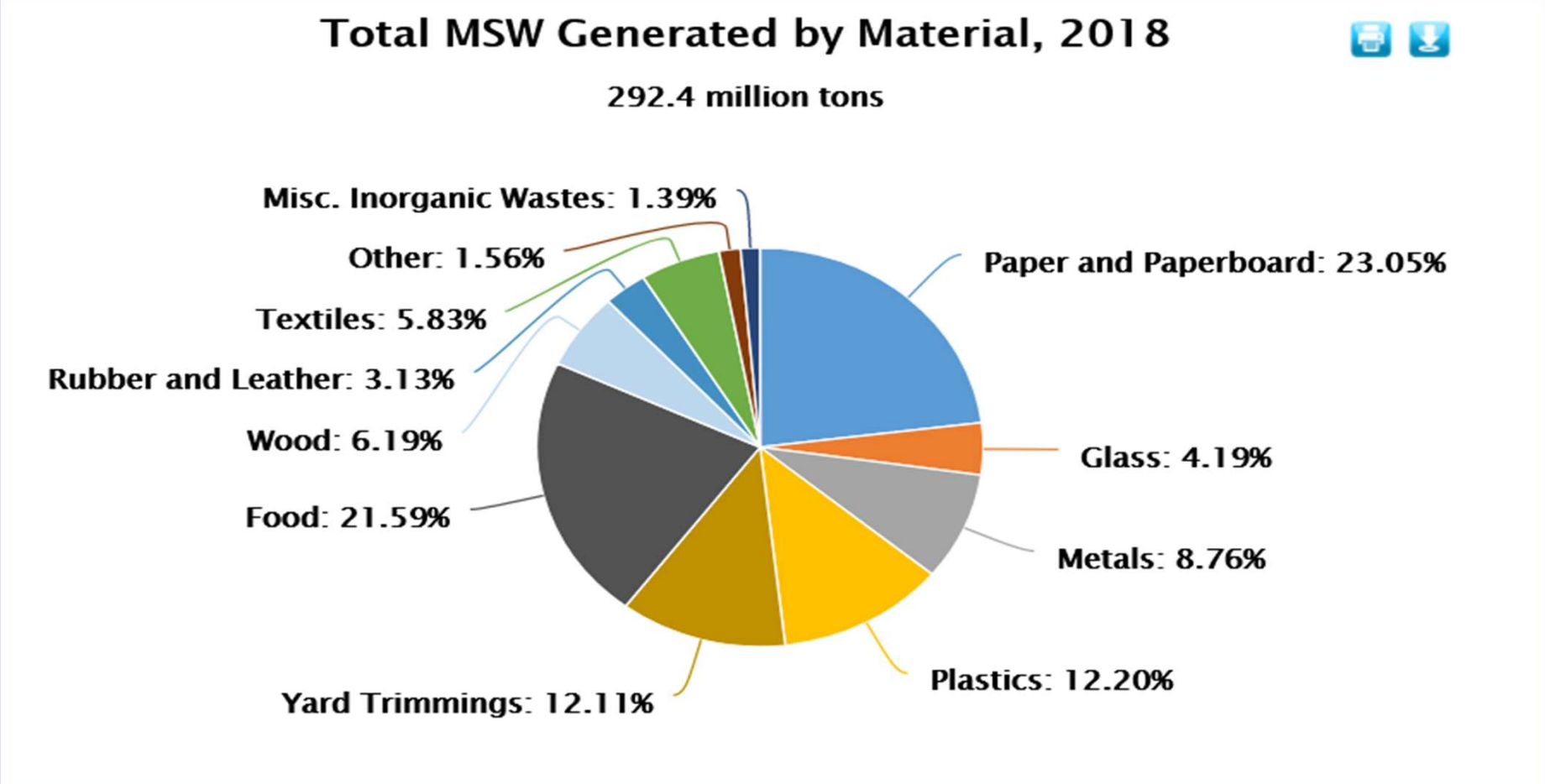
No landfilling Costs – the cost becomes revenue

80% federal subsidy – Cuts capitol costs

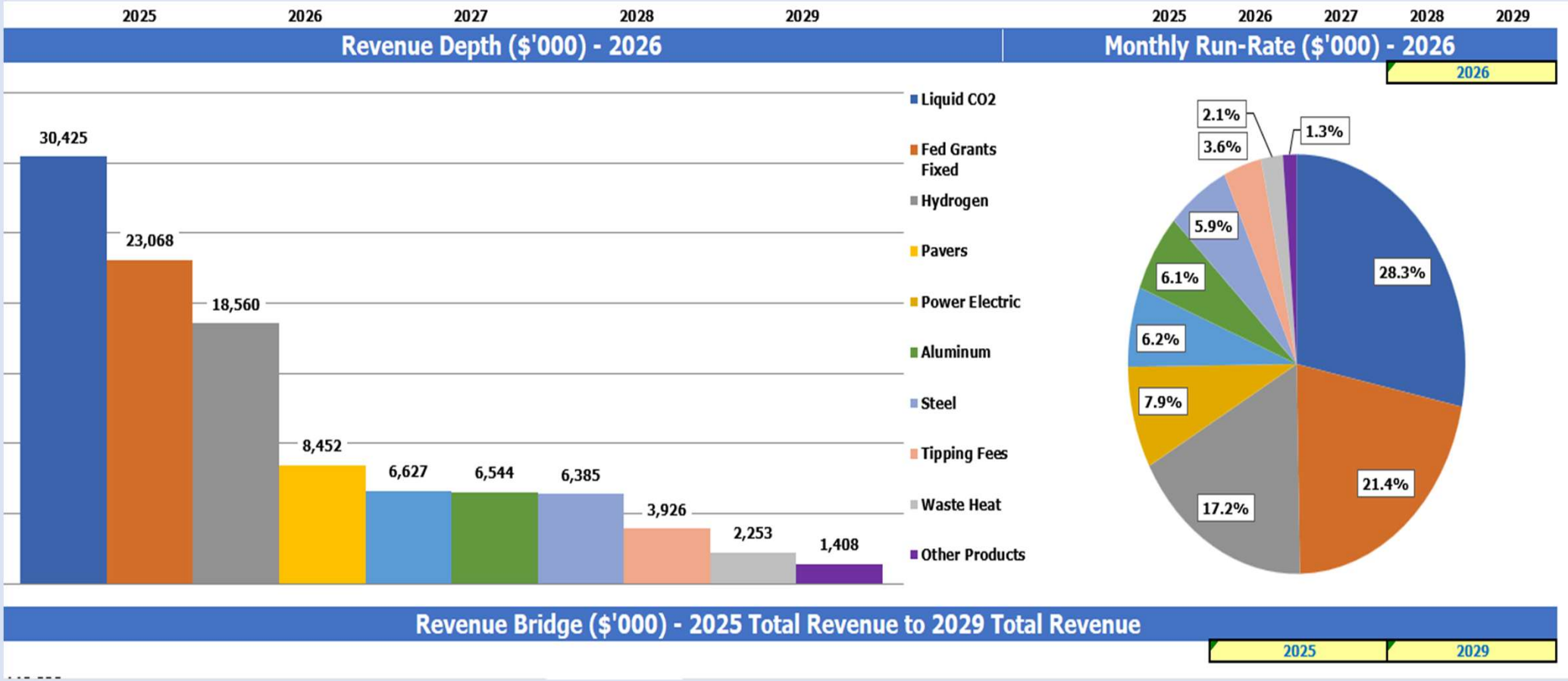
25M in running Fed subsidy/ guarantees profits

Permanent ongoing revenue/ savings for the city

Single source recycling will yield more metals



The revenue mix and ratios are variable to match market conditions and a level of value-added processing.



Waste to Energy 400 tons per day CCE Estimated Savings/ revenue

Process	Revenue	
Tipping Fees based on 288,080 tons/ year / $ 75.00	$ 21,681,000.00	
23,418 tons of steel from waste – sorted, shredded and bailed	$ 20,137,312.00	
9510 tons of aluminum - cleaned and bailed	$ 14,266,098.00	
Recycling losses averted for city per sustainability report	$ 6,020,535.27	
Haz Mat Disposal added to tipping fees	$2,091,837.00	Municipal Portion
Pavers from aggregate and crushed glass or blasting sand	$ 12,800,364.00	
Land lease income based on .5/sq/ft/year- private development	$ 630,000.00	
Water/ sewer and storm water saving from capture and reuse	$ 346,275.00	
Hydrogen used on site @ $ 3.50/ Kg with fed subsidy ($ 3.00/ KG)	$ 38,801,961.00	
CO_2 capture Fed grant of $ 60.00/ ton on 160,000 metric tons	$ 10,602.000.00	Private Partner Portion
Fed incentive for generating clean power on site	$ 1,242,150.00	
Sustainable CO_2 sales liquified 180,000 metric tons/ year	$ 53,101,000.00	

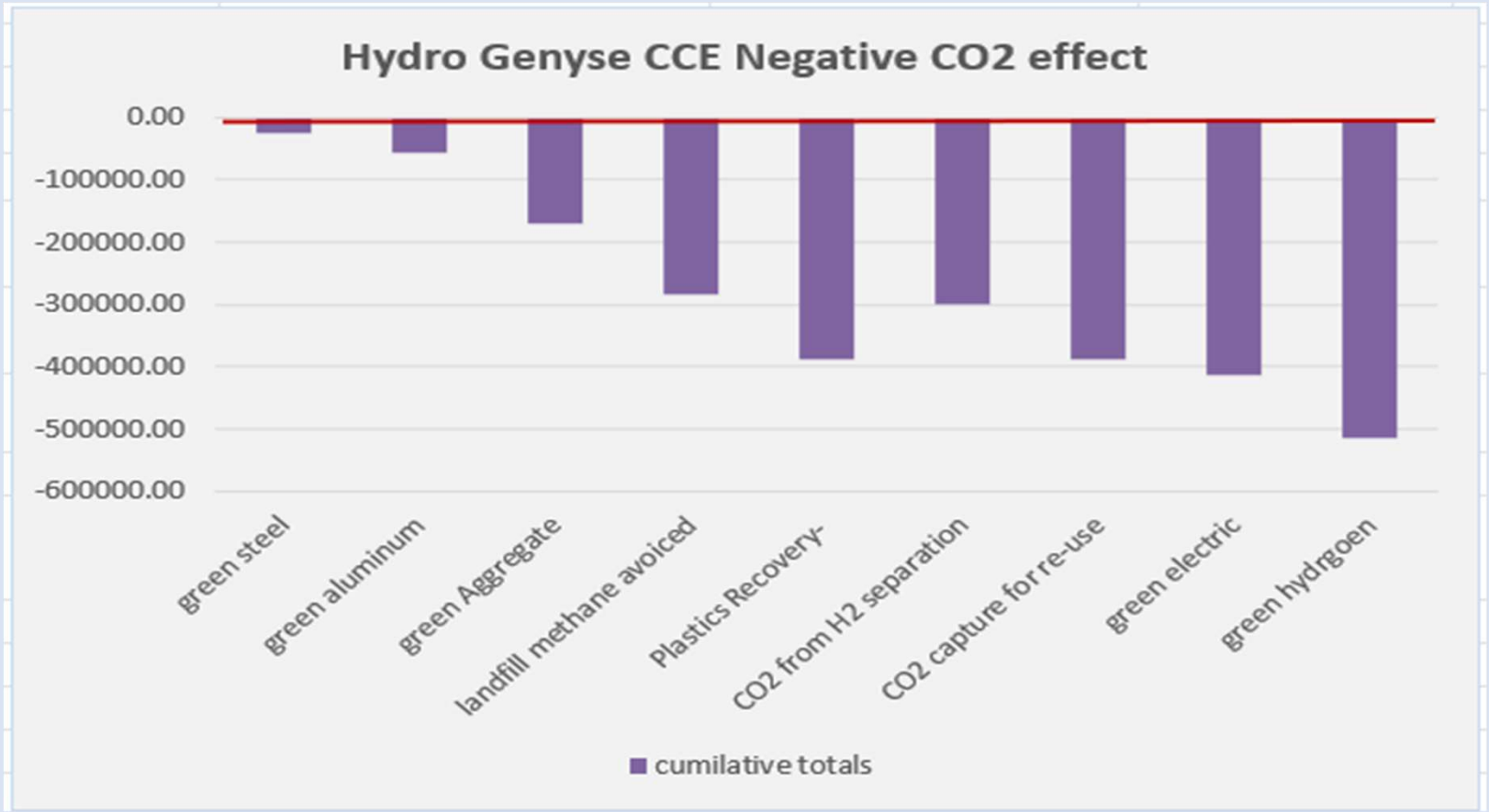
Calculated Gross Revenue	$ 210,724,260.00
Calculated IROR 35%	$ 73,753,491.00
Estimated ROI after subsidy	< 3 years
Local Economic Effect x 1.77	$ 372,981,940.00 (Energy Recovery Counsel 2018 report on local economic effect)

NB: Income from additional business is only calculated as rent except for the steel and aggregate

US cap and trade programs can generate $ 3M + per year

Hydro Genyse CCE system is 2.91 tons negative CO_2 for every ton of MSW diverted from landfills

Tons Per Year



Inflation Reduction Act Incentives

Investment Tax Credit: 50-80% of the installed cost
This can be paid in cash to municipalities or non profits

Production tax credits when in operation: 25M+/ year
Federal low interest loan on the balance – cash flow positive

https://www.epa.gov/green-power-markets/summary-inflation-reduction-act-provisions-related-renewable-energy#Monetize

5 year accelerated depreciation option

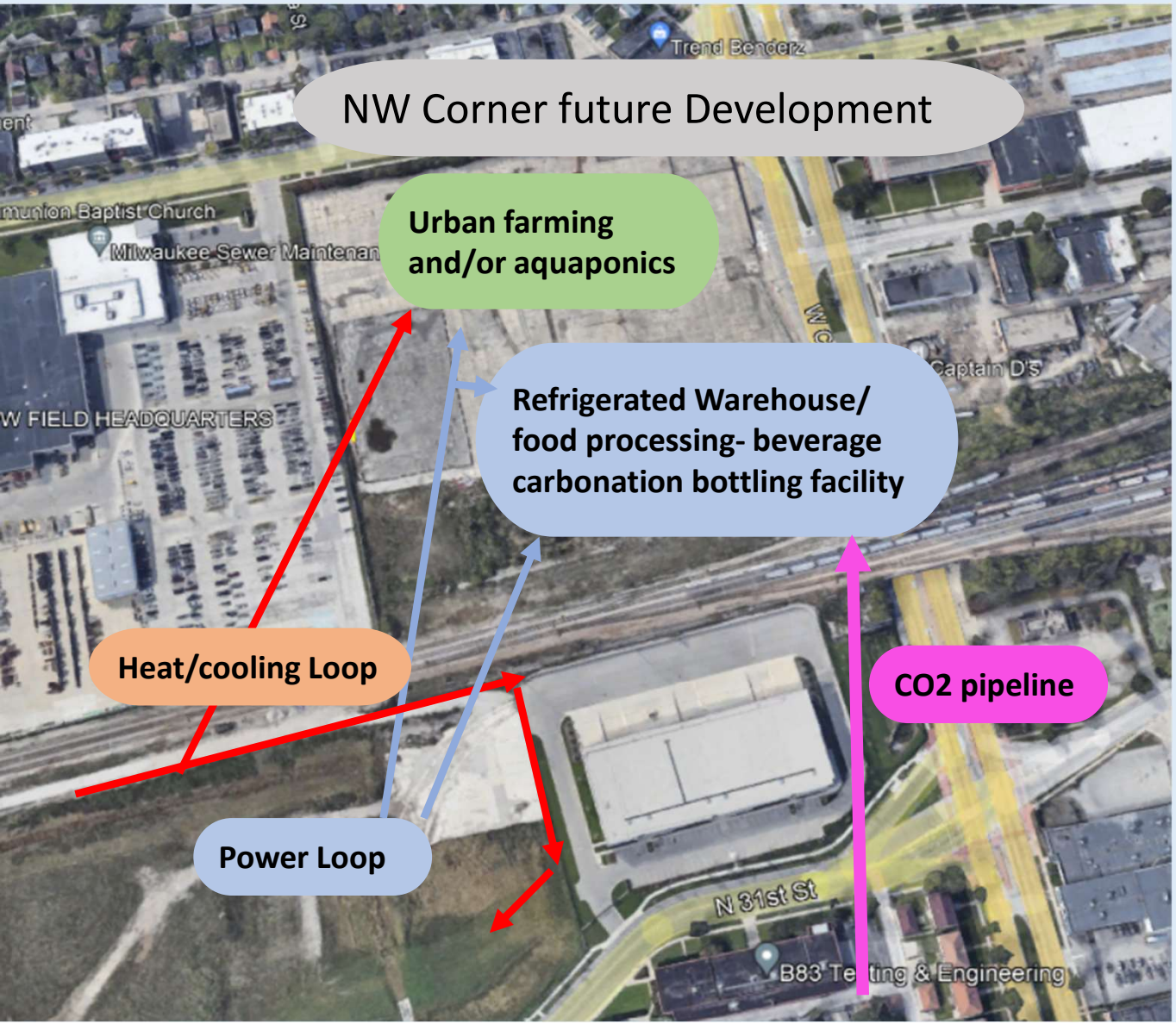
Bottom ash and crushed glass will be made into 2.3 M pavers on site generating revenue and eliminating the waste

The green CO_2 is liquified for use in applications like carbonated beverages, flash freezing, refrigeration and chips

The site will attract additional business that can take advantage of the by-products and energy

Algae, aquaponics, urban farming, refrigerated warehousing, food processing, etc. will gravitate to the site

Commercial and industrial laundry can utilize the heat and water loop and generate good jobs.



The project will attract additional development

Waste that can power urban farming all year on the NW corner. Further processing and refrigerated warehouses would be on the same site.

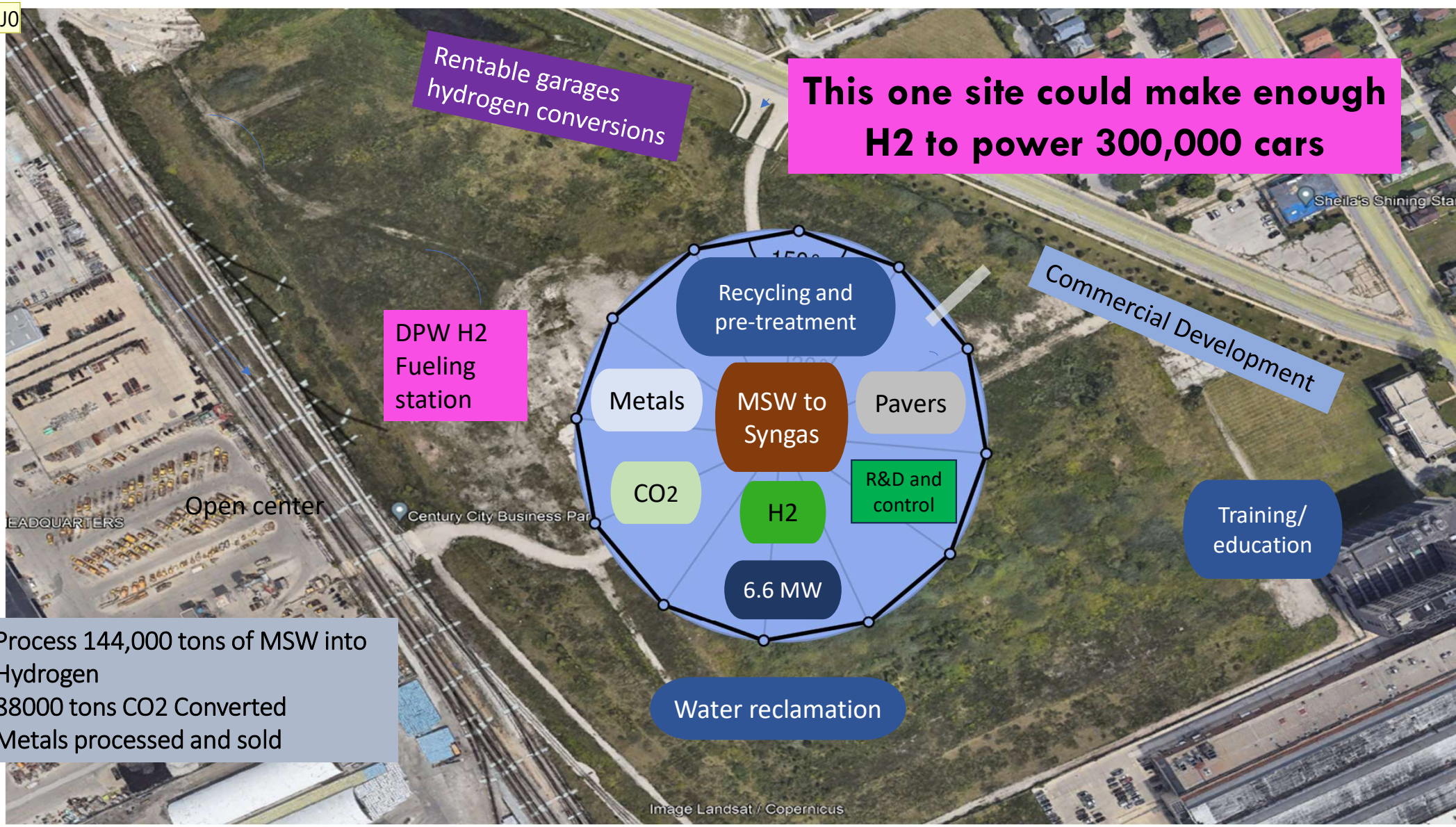
This can supply organic food for the schools and local restaurants.

With low-cost hydrogen available, national car companies will start selling the H2 fuel cell cars that are being sold in CA.

This will double margins for the hydrogen, and you will have the only Hydrogen filling stations in Wisconsin.

Additional filling stations at gas stations would be added as the market developed.

PJ0



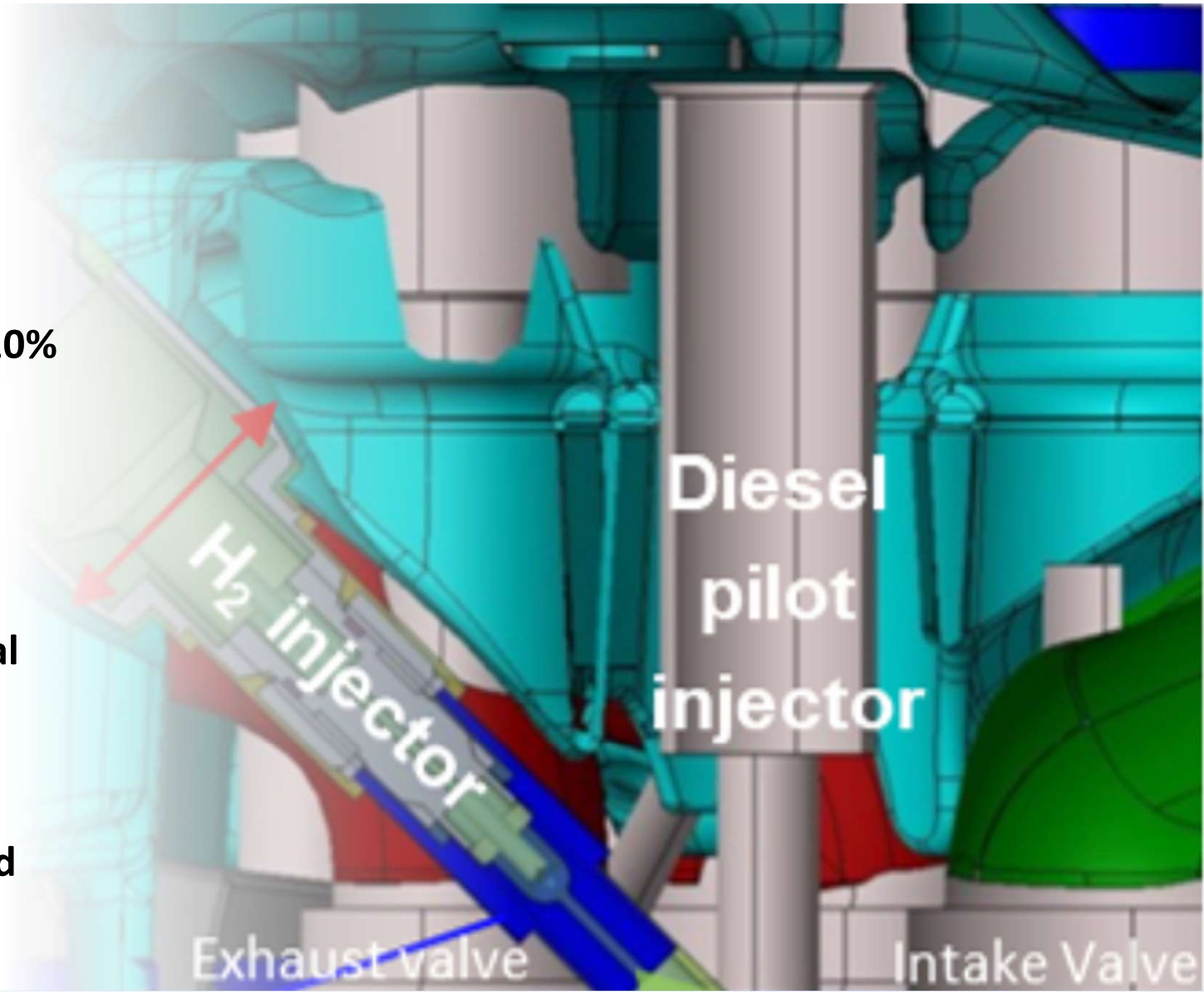
Process 144,000 tons of MSW into Hydrogen
88000 tons CO2 Converted
Metals processed and sold

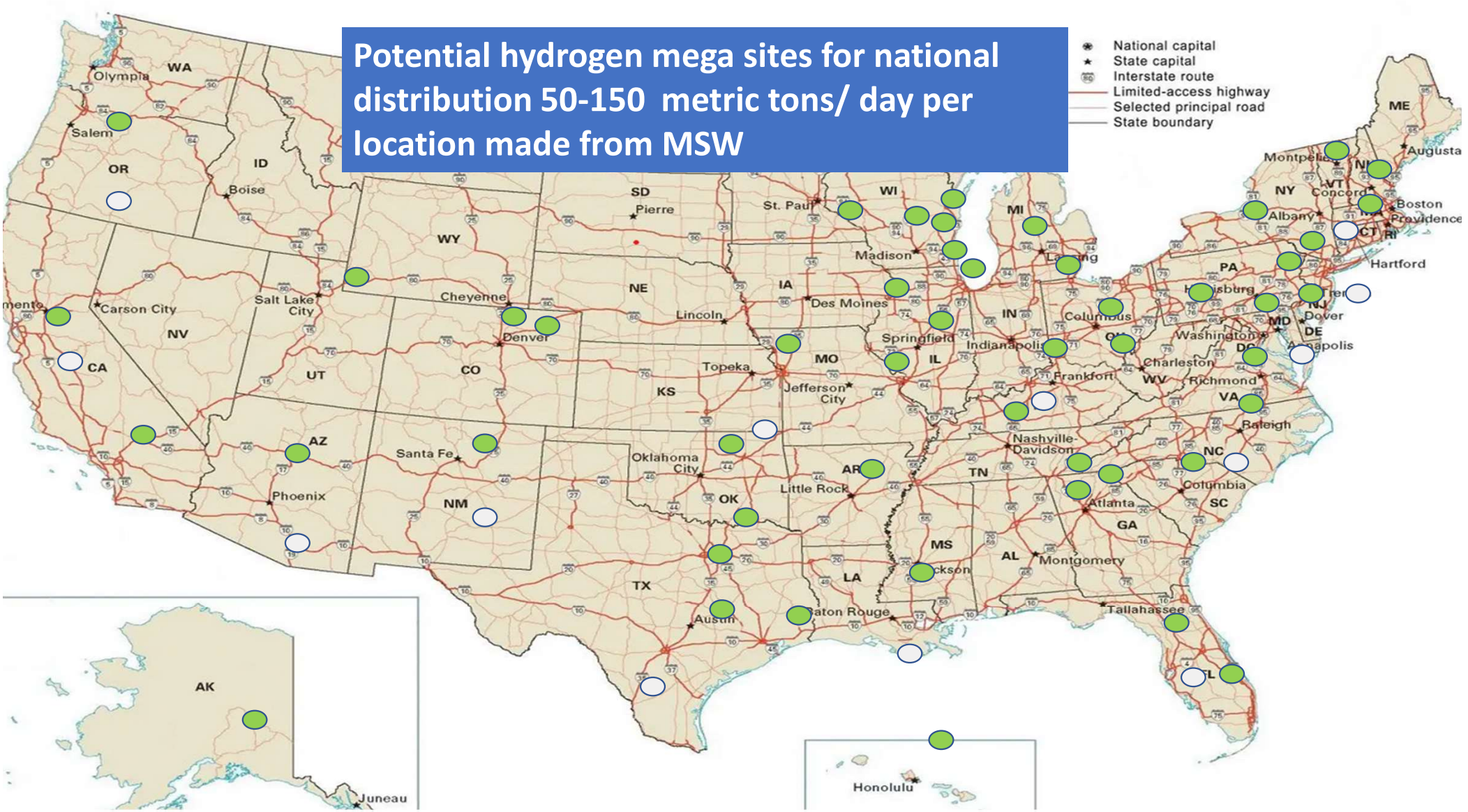
Slide 30

PJ0 500,000 what? Sq ft?
Peggy James, 2024-04-01T21:18:05.968

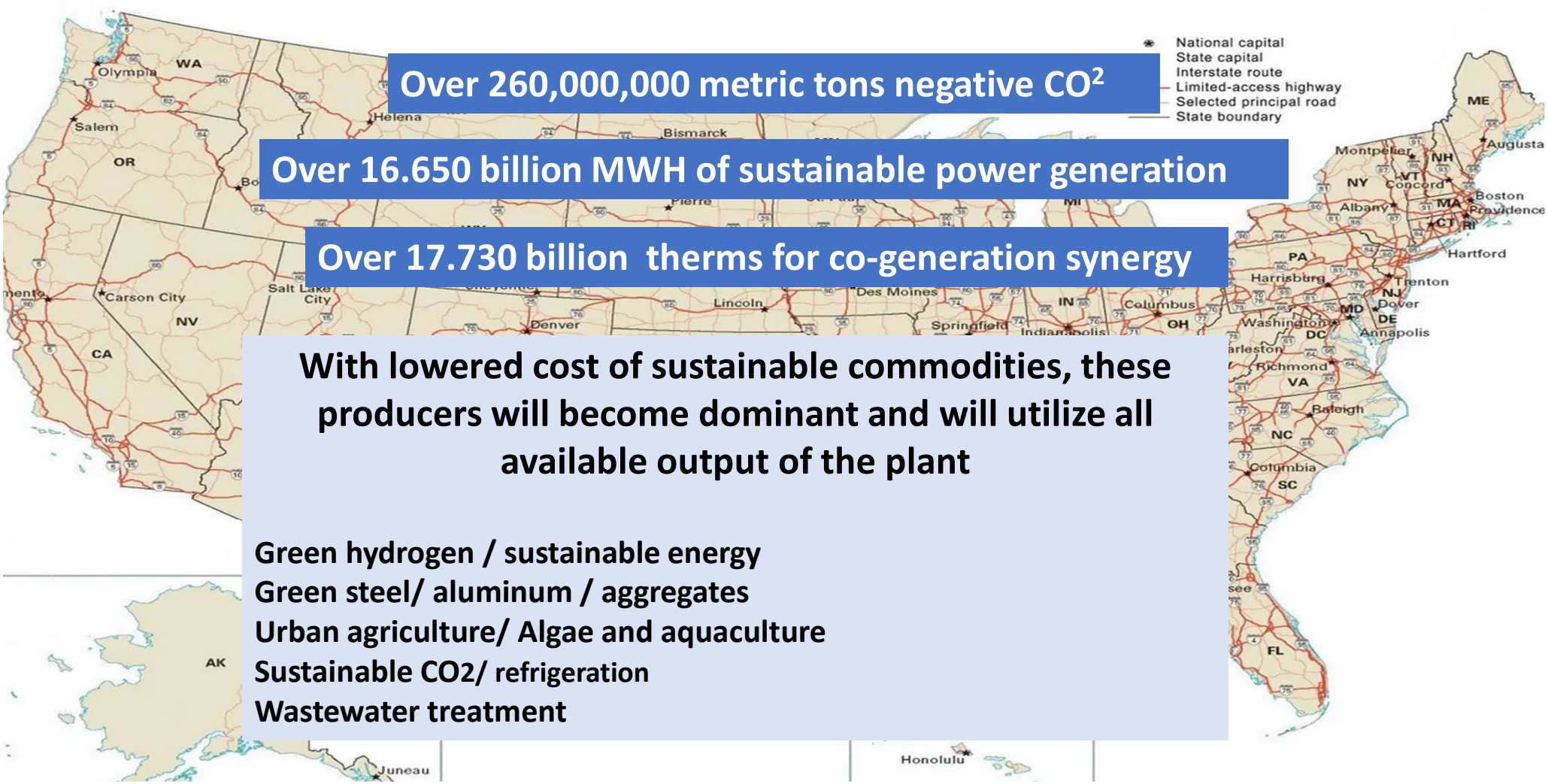
DPW truck conversions

- **Uses 90% hydrogen and 10% diesel at a cost of $ 1.00/ relative gal- <u>this will save millions on fuel.</u>**
- **Simple conversion that could generate jobs for local mechanics placed on the same site.**
- **Reduces maintenance and wear on the engines.**




Potential hydrogen mega sites for national distribution 50-150 metric tons/ day per location made from MSW
National capital
State capital
Interstate route
Limited-access highway
Selected principal road
State boundary
WA
Olympia
Salem
OR
ID
Boise
NV
Carson City
Salt Lake City
CA
UT
AZ
Phoenix
Santa Fe
NM
CO
Cheyenne
Denver
WY
SD
Pierre
NE
Lincoln
KS
Topeka
Oklahoma City
OK
TX
Austin
Jefferson City
MO
Des Moines
IA
St. Paul
WI
Madison
MI
IL
Springfield
IN
Indianapolis
Columbus
Frankfort
KY
Nashville-Davidson
TN
Little Rock
AR
MS
LA
Baton Rouge
AL
Montgomery
Atlanta
GA
Tallahassee
FL
SC
Columbia
NC
Raleigh
VA
Richmond
WV
Charleston
Washington
DC
MD
DE
Dover
NJ
PA
NY
Albany
Montpelier
VT
Concord
NH
ME
Augusta
Boston
Providence
RI
CT
Hartford
AK
Juneau
Honolulu

There are 2700 landfills in the US that could be developed



Over 260,000,000 metric tons negative CO^2

Over 16.650 billion MWH of sustainable power generation

Over 17.730 billion therms for co-generation synergy

With lowered cost of sustainable commodities, these producers will become dominant and will utilize all available output of the plant

Green hydrogen / sustainable energy
Green steel/ aluminum / aggregates
Urban agriculture/ Algae and aquaculture
Sustainable CO2/ refrigeration
Wastewater treatment

This entire area will attract new business to fuel and maintain the green economy

THE SOCIAL ECOLOGY COMPONENT (SOLVING HUMAN PROBLEMS USING A MULTI-DISCIPLINARY APPROACH) WOULD BE AS IMPORTANT AS THE ENVIRONMENTAL BENEFITS

On site education and training for advancement

Day care on site for workers

Transportation services to and from work

High quality health insurance

All paid for by revenue from the site

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

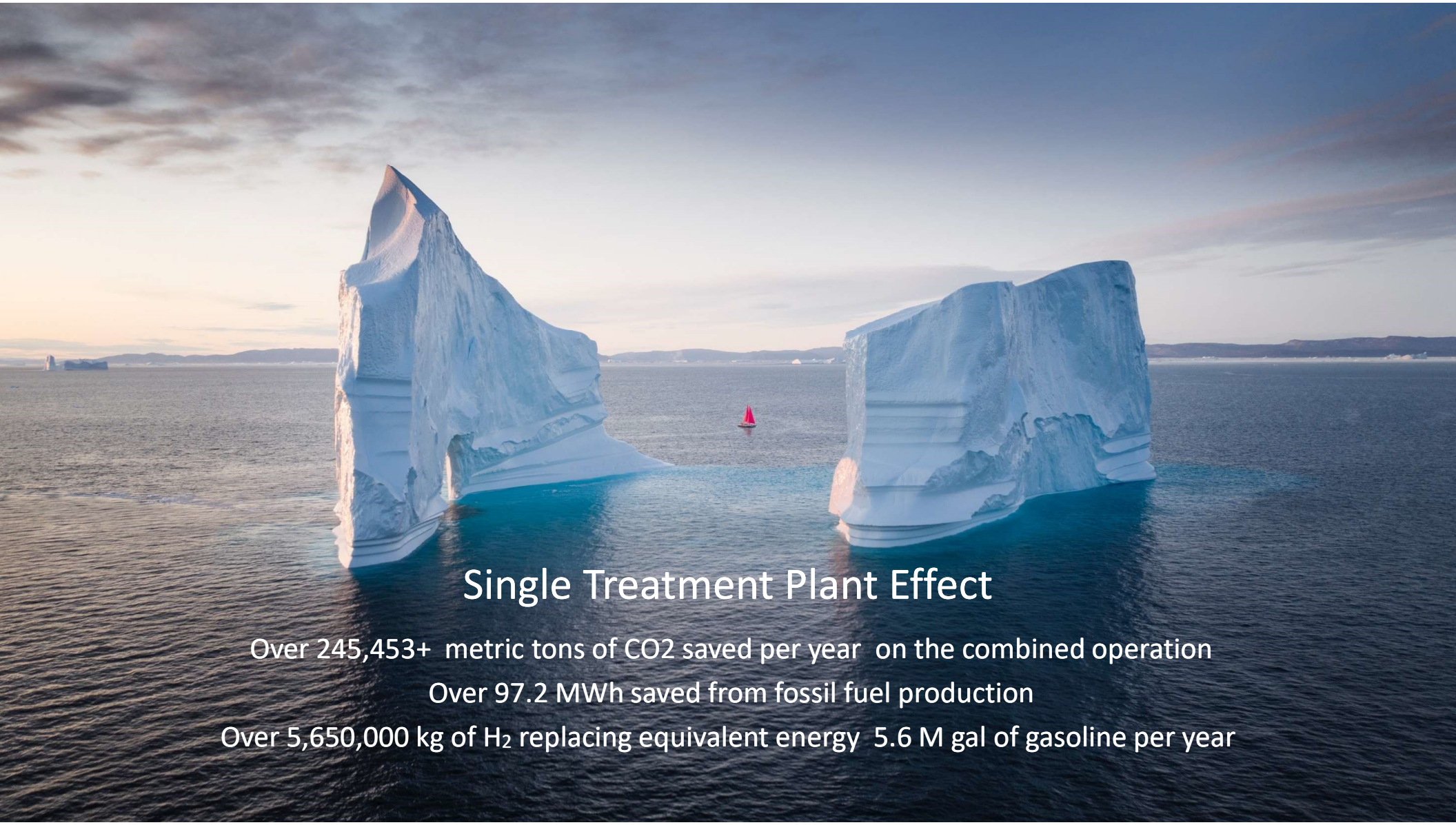
Dr. Stephen Lyon PhD-Social Ecology, MS Biology, BS Oceanography, BS Limnology
41 years of experience in the Public, Private and Academic sectors, including the environmental, water, food care, health care and building care industries.
Languages: English, Swedish, Spanish, Russian.

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.

Role of Hydro Genyse in project

Hydro Genyse can work with the city to design and organize the project for RFP's and help secure all grants and incentives

- Economic and energy balance calculations
- Contract management for site design and construction
- Operational commissioning and training
- Service and technology local contact



Single Treatment Plant Effect

Over 245,453+ metric tons of CO2 saved per year on the combined operation

Over 97.2 MWh saved from fossil fuel production

Over 5,650,000 kg of H_2 replacing equivalent energy 5.6 M gal of gasoline per year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