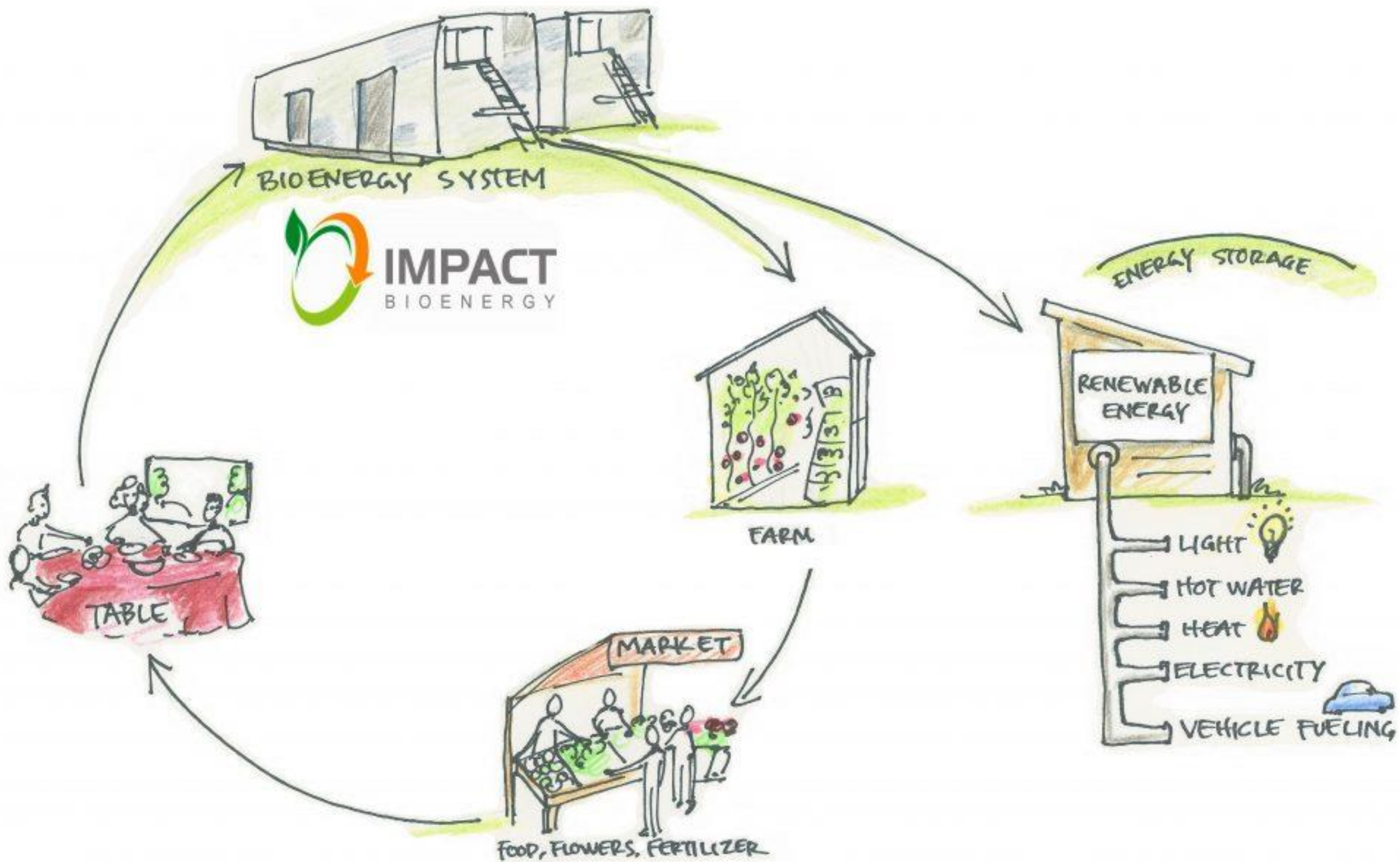




Distributed Bioenergy Solutions

Low-Carbon Space Heating Symposium

May 12, 2017







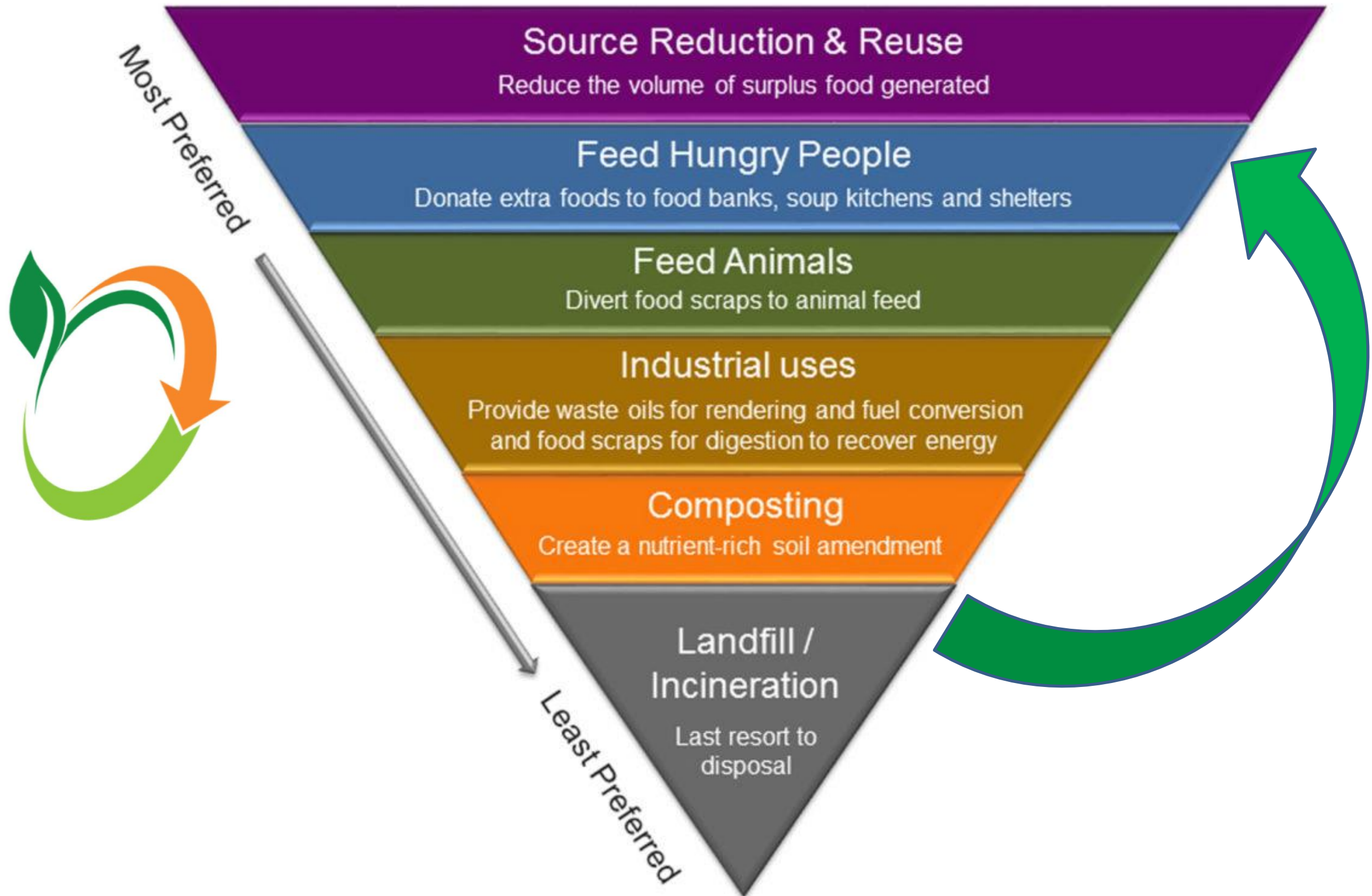








Food Recovery Hierarchy



Source Reduction & Reuse

Reduce the volume of surplus food generated

Feed Hungry People

Donate extra foods to food banks, soup kitchens and shelters

Feed Animals

Divert food scraps to animal feed

Industrial uses

Provide waste oils for rendering and fuel conversion and food scraps for digestion to recover energy

Composting

Create a nutrient-rich soil amendment

Landfill / Incineration

Last resort to disposal

FOOD WASTE IN

LIQUID WASTE IN



HORSE

Highs-solids Organic-waste
Re-cycling System with
Electical Output

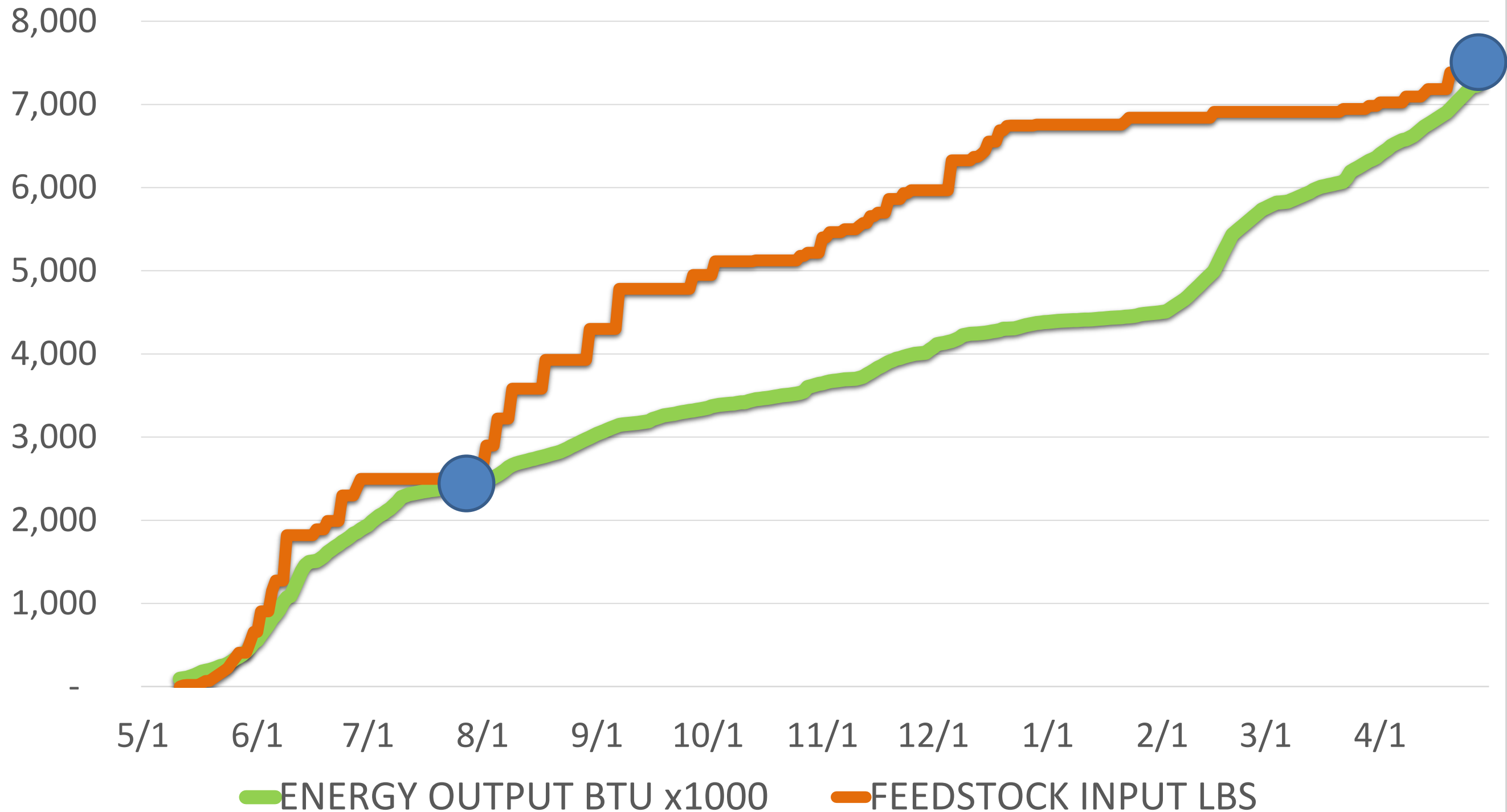


FERTILIZER

FUEL

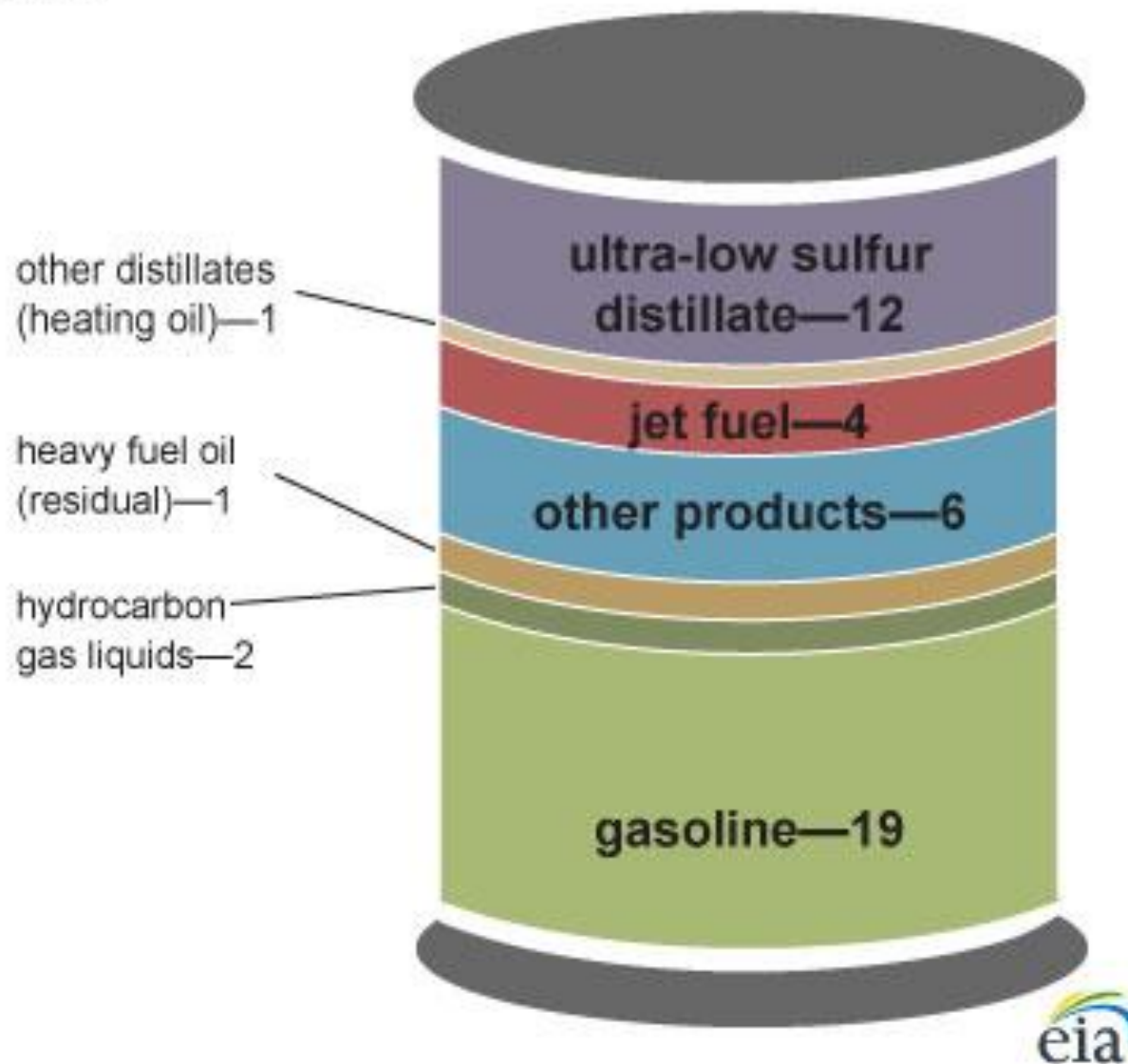
Mass Input & Energy Output

May 2016 - April 2017



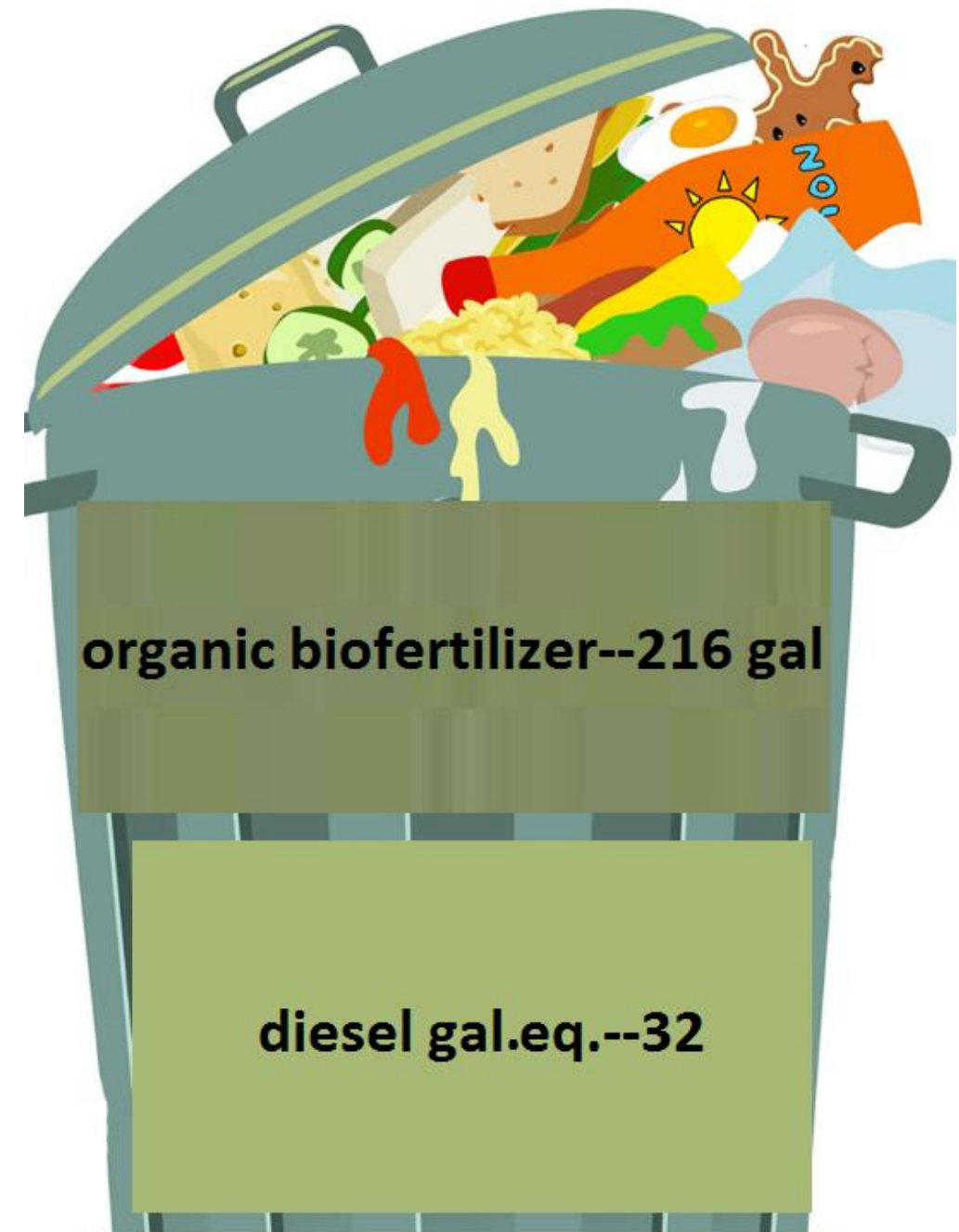
Petroleum products made from a barrel of crude oil, 2015

gallons



Note: A 42-gallon (U.S.) barrel of crude oil yields about 45 gallons of petroleum products because of refinery processing gain. The sum of the product amounts in the image may not equal 45 because of independent rounding.

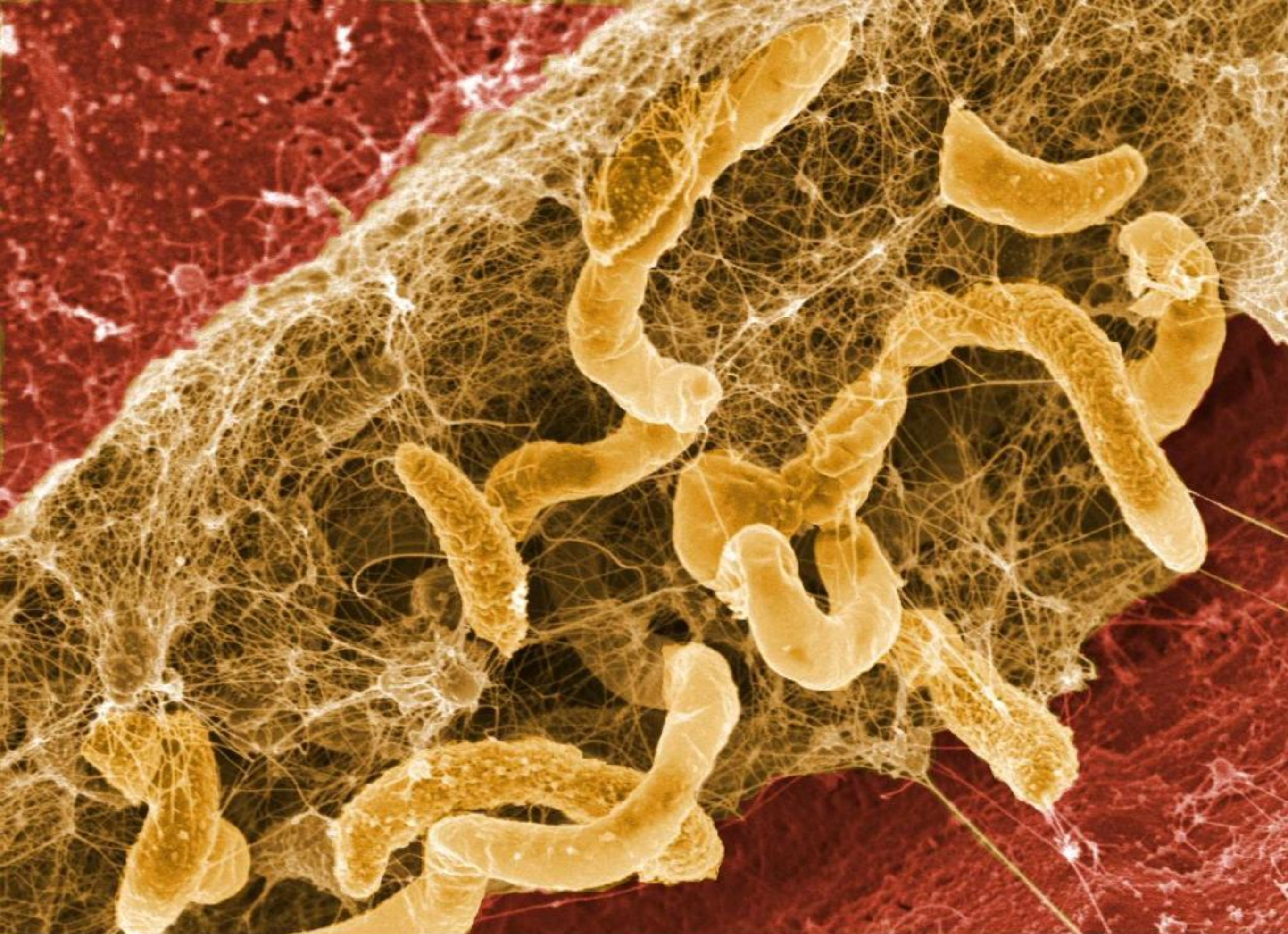
Source: U.S. Energy Information Administration, *Petroleum Supply Monthly*, February 2016, preliminary data for 2015



~ 5,000,000 low-carbon
renewable BTUs
~ 50 therms



IMPACT
BIOENERGY



x10000

2 μ m

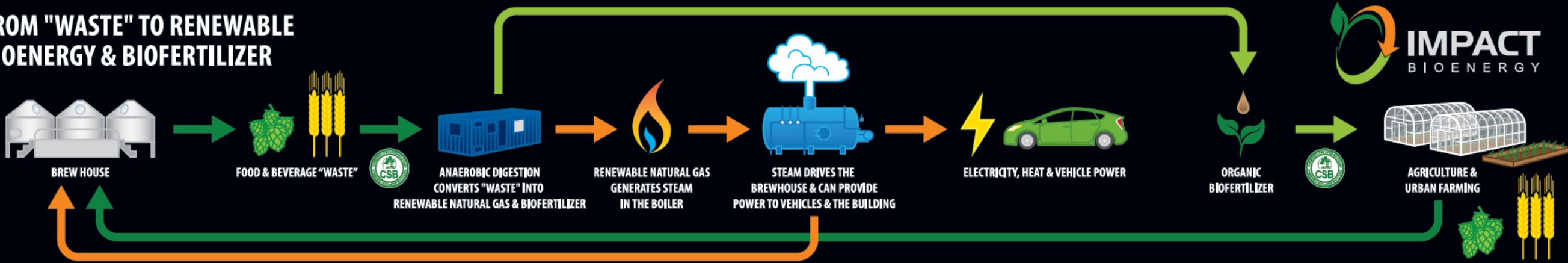
2.00kV

6m



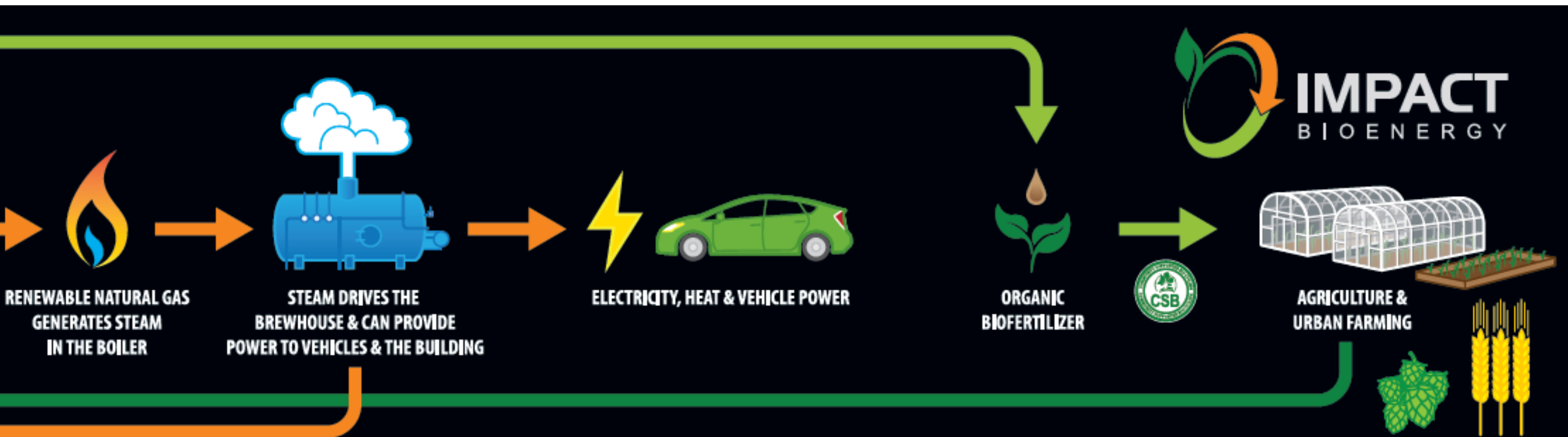
BREWDEW

FROM "WASTE" TO RENEWABLE
BIOENERGY & BIOFERTILIZER



FROM "WASTE" TO RENEWABLE BIOENERGY & BIOFERTILIZER





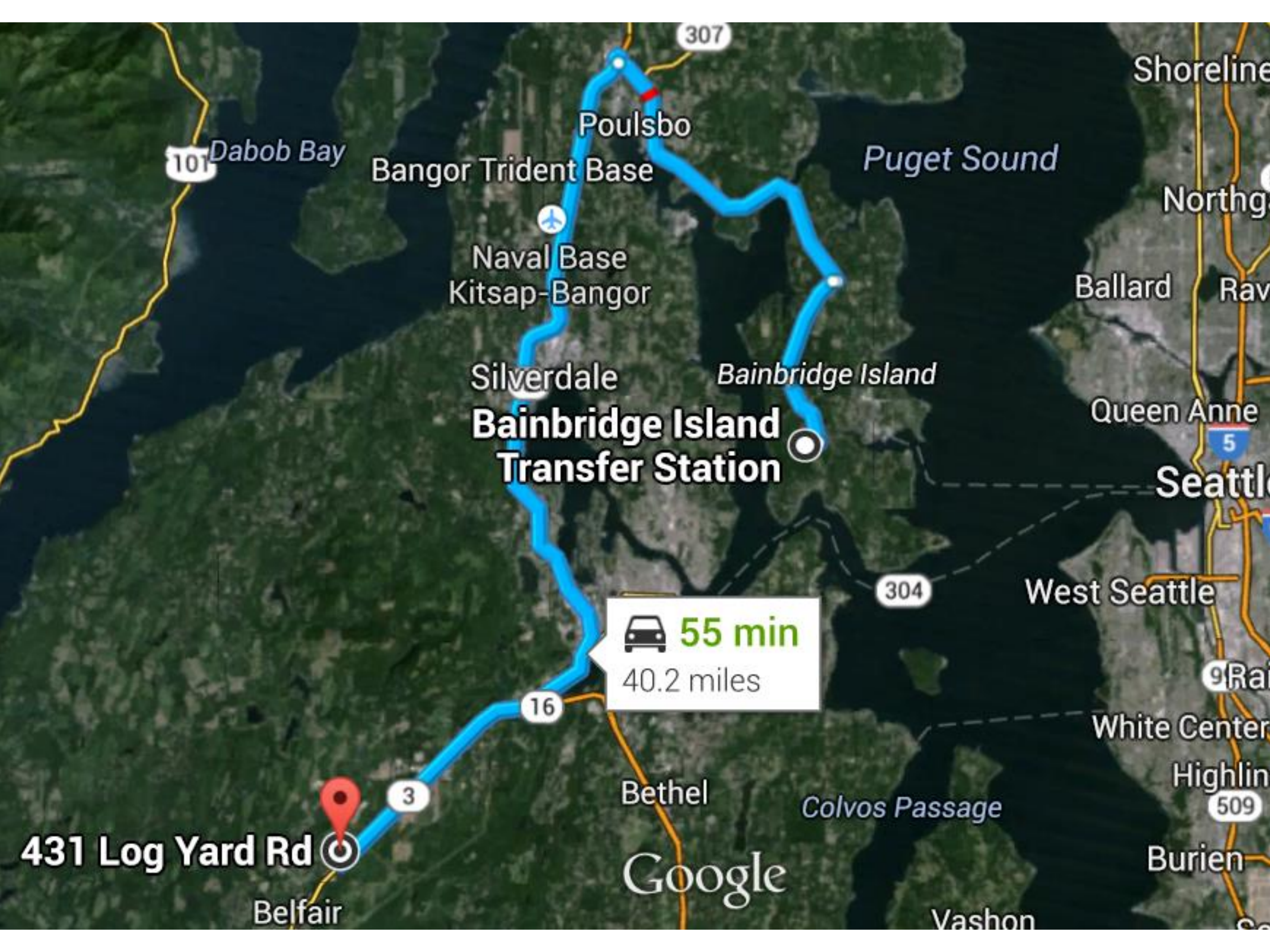
Run, horse, Run!
"Small acts, when multiplied by millions
of people, can transform the world"

The Pacific Sea - Marine Ecology Center Project

Cambridge Island Marine Ecology Center Project



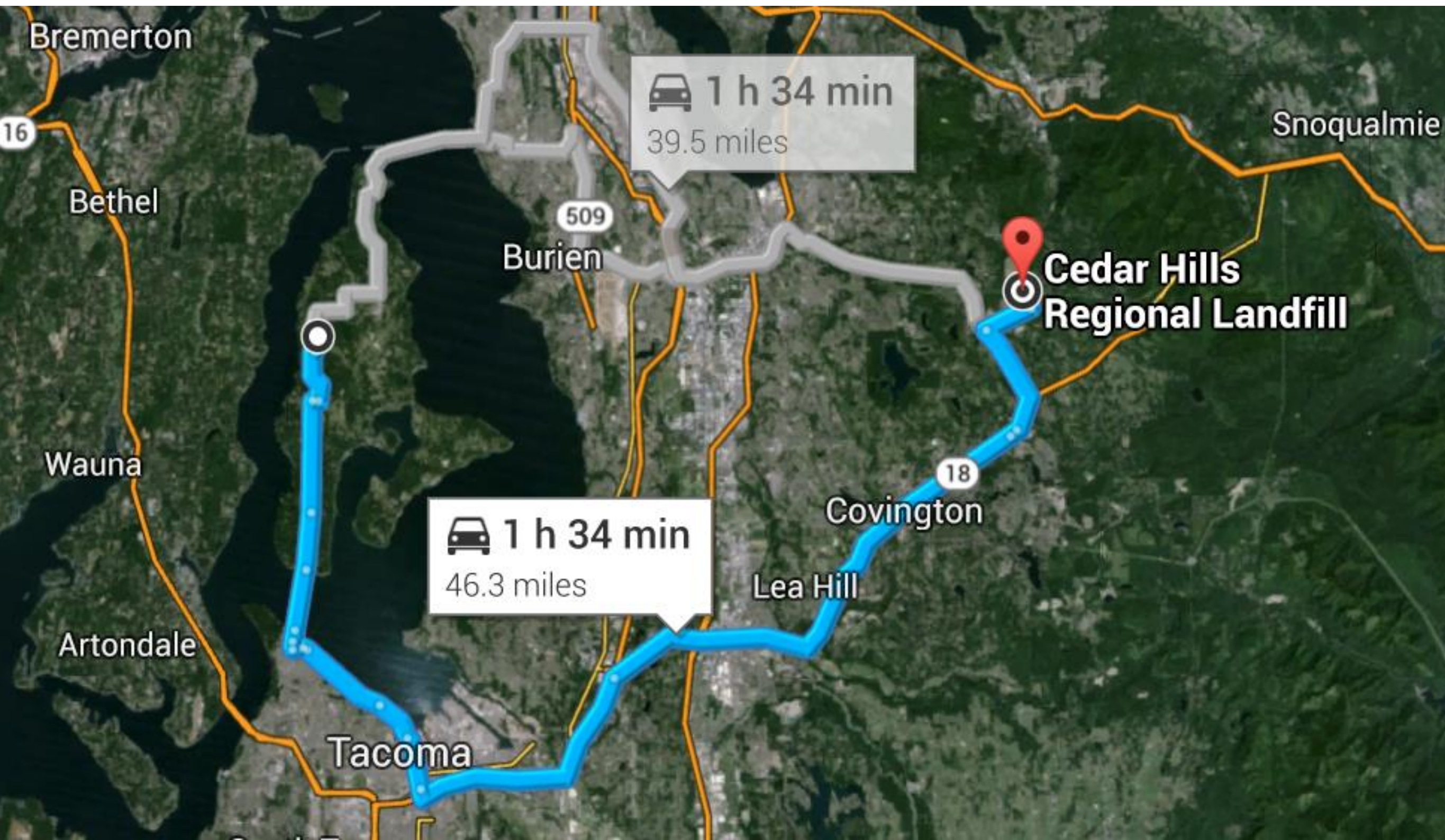
NATURAL SOUND ENERGY



431 Log Yard Rd

Bainbridge Island
Transfer Station

 **55 min**
40.2 miles



FOOD WASTE IN

LIQUID WASTE IN



10 lbs.



FERTILIZER OUT



**2 kWh-e
4 kWh-h**

ENERGY OUT

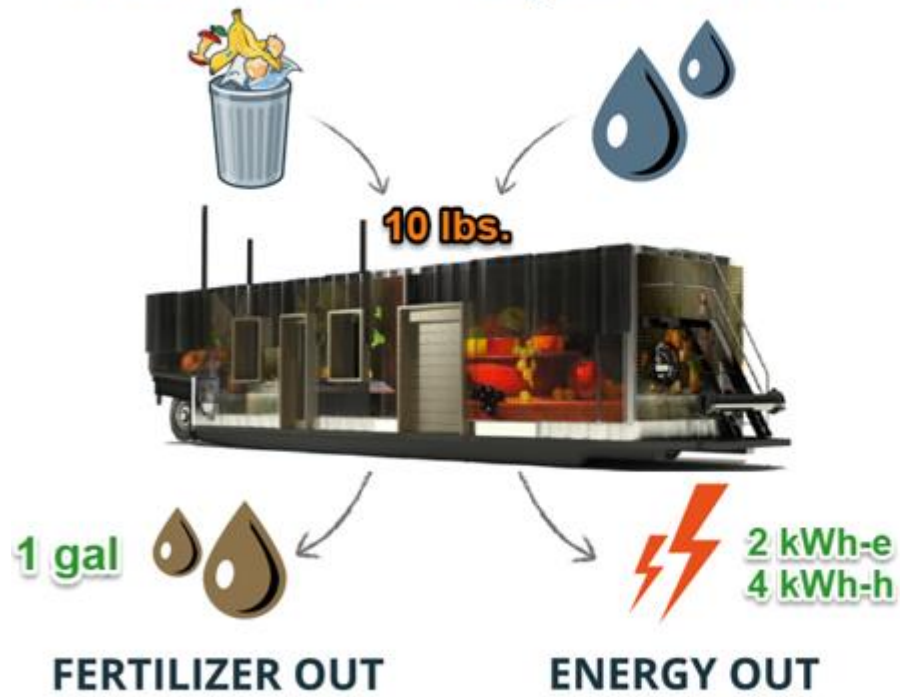
- 175 tons/year



- 875,000,000 BTU
~ 8,750 therms
- 40,000 gal organic
biofertilizer

FOOD WASTE IN

LIQUID WASTE IN

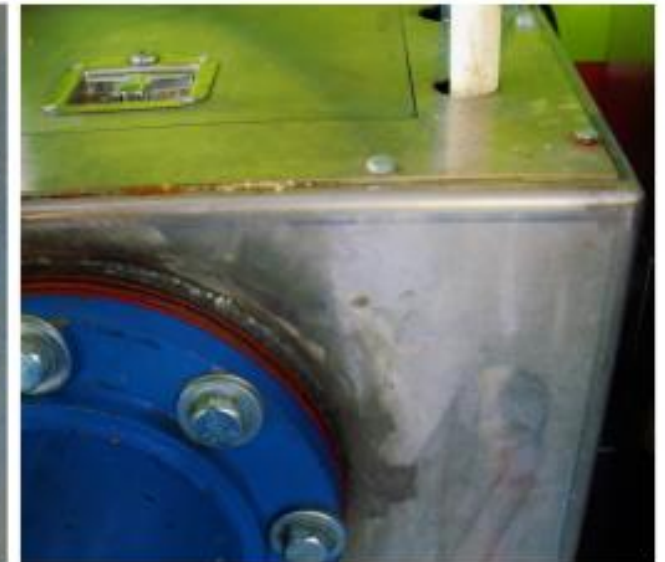


• 175 tons/year



• 875,000,000 BTU
~ 8,750 therms

• 40,000 gal
organic
biofertilizer



Enclosed Feeding & Mixing

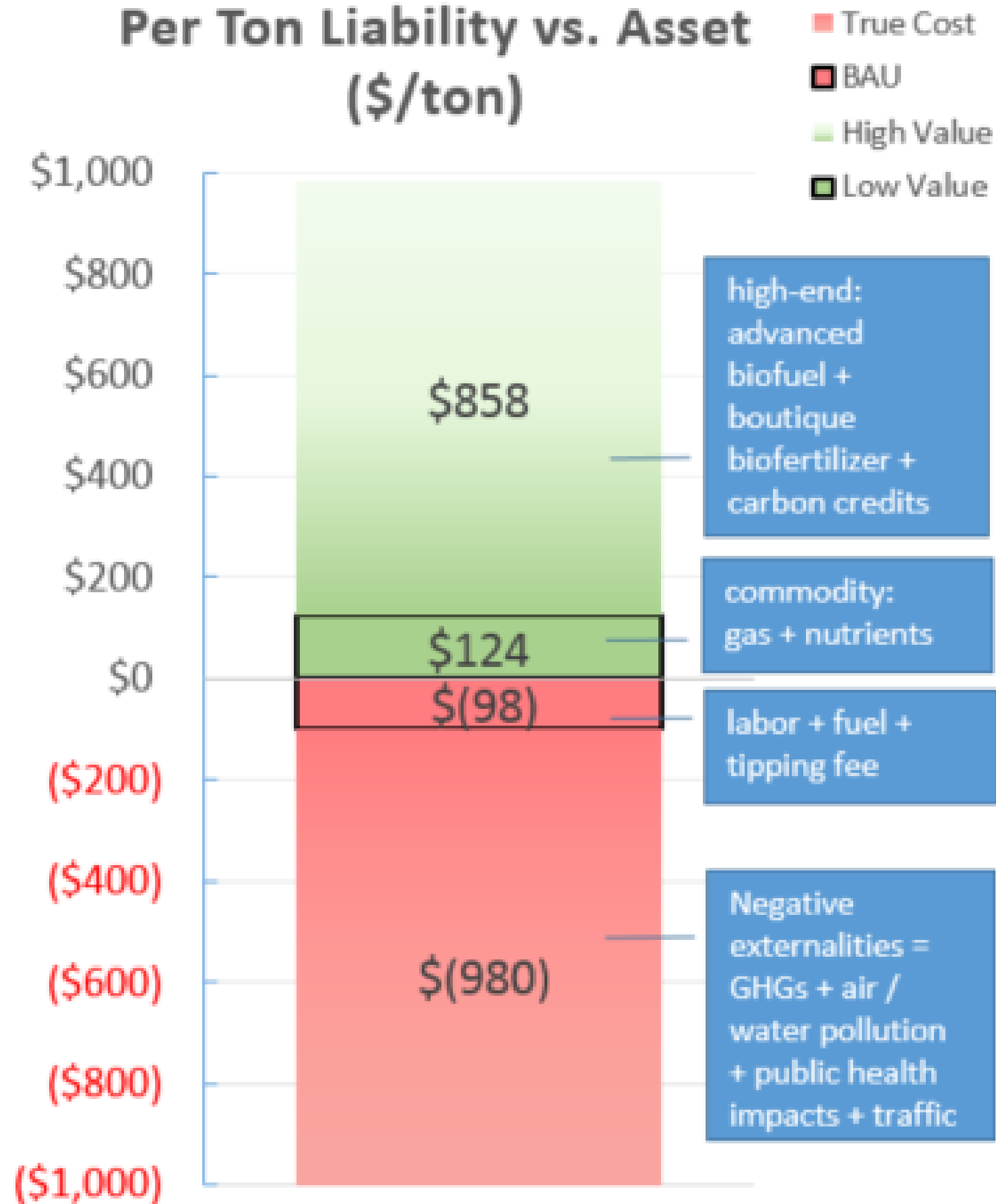


Insulated Digestion



Integrated Gas Collection & Storage

Per Ton Liability vs. Asset (\$/ton)



~925 tons per year



Metrics: [Yesterday](#) | [Last 7 days](#) | [This week](#) | [Last week](#) | [This month](#) | [Last month](#)

[+ Reorder Metrics](#)

1,497,573 

lbs

Biocycled

27,871

therms

Bioenergy

116,207

gal

Biofertilizer

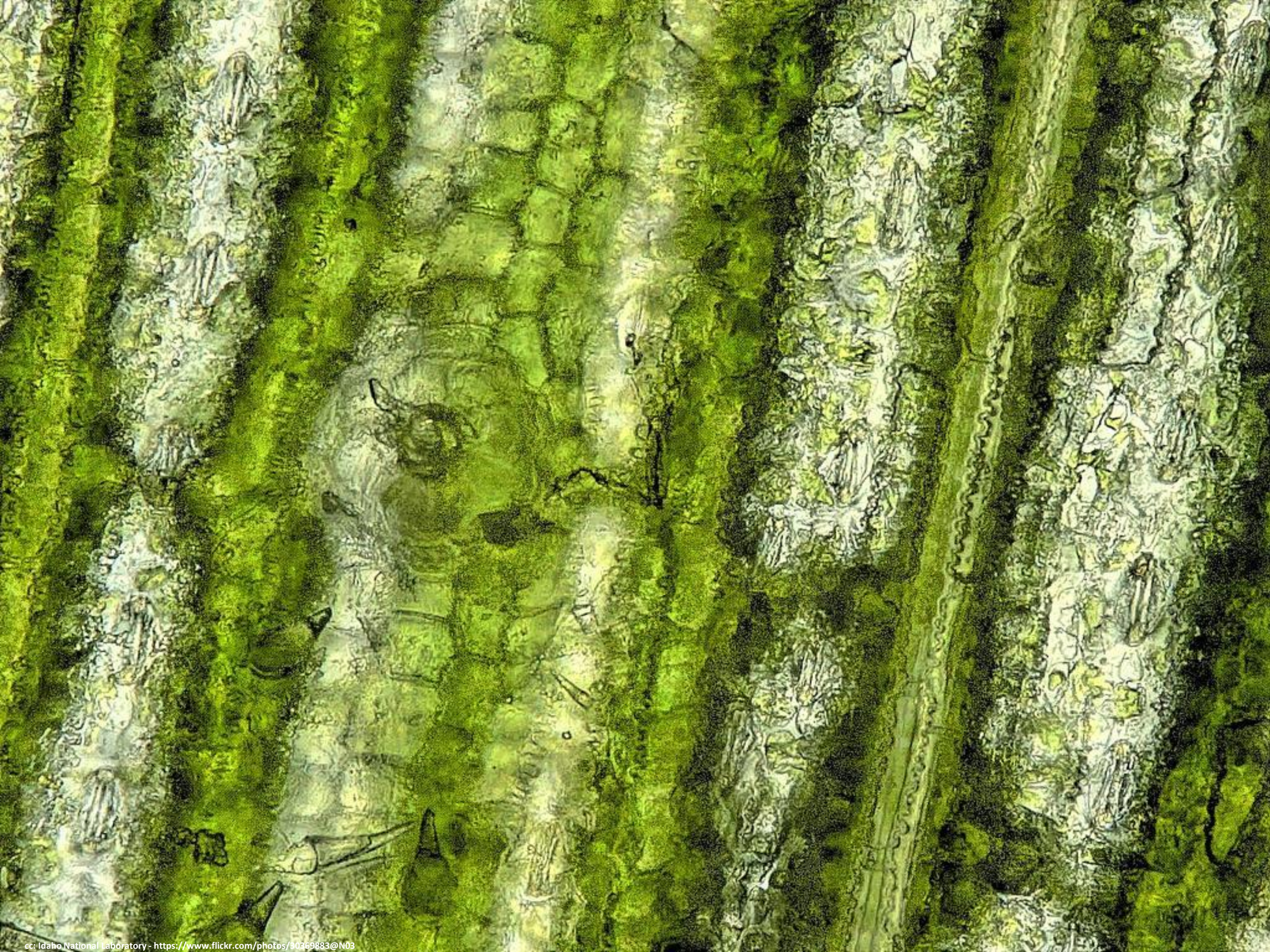
\$196,420

1,750 MTCO2

Avoided











University Bioenergy Impact Challenge
(UBIC...as in ubiquitous)



Thank you

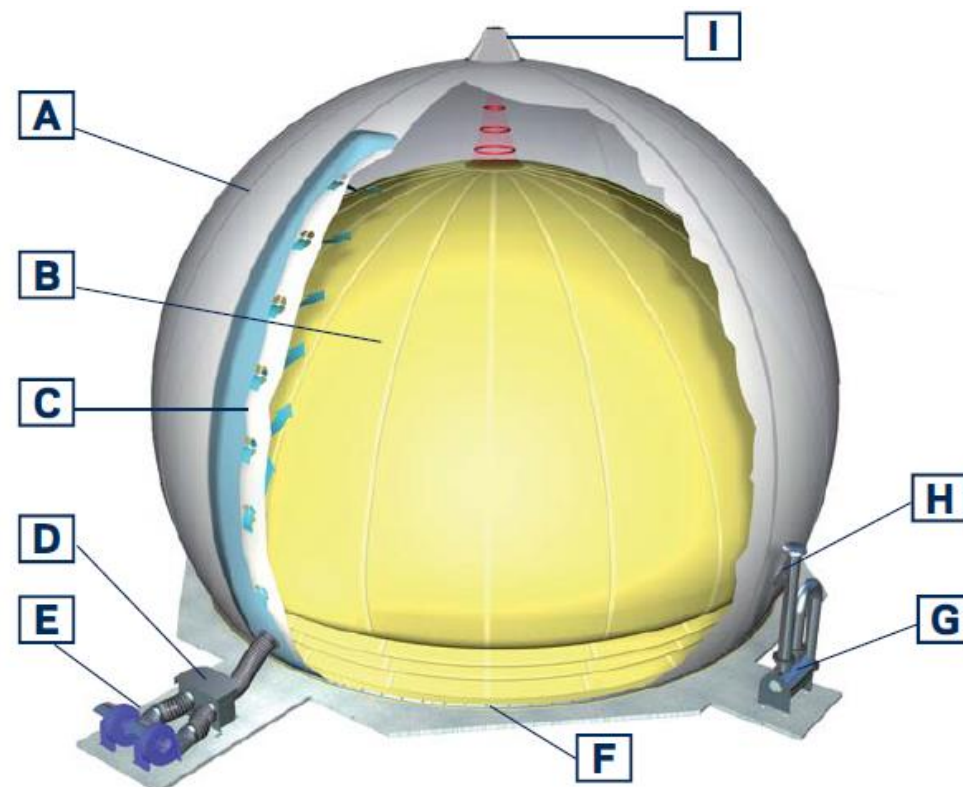
srirup.k@impactbioenergy.com



IMPACT

B I O E N E R G Y

Right-sized Systems



- A** Outer membrane **B** Inner membrane **C** Air Flow System **D** Air maintenance valve
E Support air blower **F** Anchor ring **G** Safety valve **H** Inspection window
I Level meter