



Impact Bioenergy's mission is to change the paradigm and get food waste to be recognized as a valuable community resource, enable thriving local circular economies, and make a significant impact on the long-term sustainability of our environment.

## OVERVIEW

# Vashon Bioenergy Farm

The Vashon Bioenergy Farm (VBF) is a community-scale bioenergy system on Vashon Island, Washington. For every 60 to 80 pounds of “waste” that would otherwise have been long-haul exported, Impact Bioenergy’s NAUTILUS generates one gasoline gallon equivalent (GGE). The NAUTILUS “upcycles” up to 8,000 lbs. of commercial food waste per day from the Island Spring tofu factory and potentially others. This is enough to fuel a small fleet or provide heat & power for more than 40 homes.

The NAUTILUS AD 185 series modular anaerobic digester is a systemic and holistic community solution for colocation at or near a source of organic waste and nearby energy loads. The close proximity conserves energy that would have been expended for transport and processing of materials, and centralized power generation. A lifecycle assessment of the NAUTILUS underscores its carbon-neutral intensity and net-positive energy value propositions (net carbon-negative when utilized as renewable fuel for vehicles). The NAUTILUS offers a virtual-pipeline that adds resiliency and augments intermittent renewable energy like solar or wind. Biogas is continually generated and is storable for use when needed. It can generate heating, cooling, electricity, and vehicle fuel.



The VBF NAUTILUS employs a unique integrated biogas upgrading system to generate renewable natural gas (RNG) that is stored with state-of-the-art Adsorbent Natural Gas (ANG) technology where it is compressed to up to 250 psi. With ANG storage, Impact Bioenergy demonstrates economically viable pathways to the lowest carbon intensity fuel that avoids high costs, low storage efficiency, and safety concerns associated with conventional approaches. The VBF fueling station provides up to 125 GGE of CNG vehicle fuel per day.

VBF also reclaims over 2,000 pounds of nutrients and 300,000 gallons of water annually for rich, probiotic plant food to promote the healthy growth of the community’s own food, flowers, and landscape. This enables the replacement of chemically-based fertilizers with locally produced organic fertilizer.

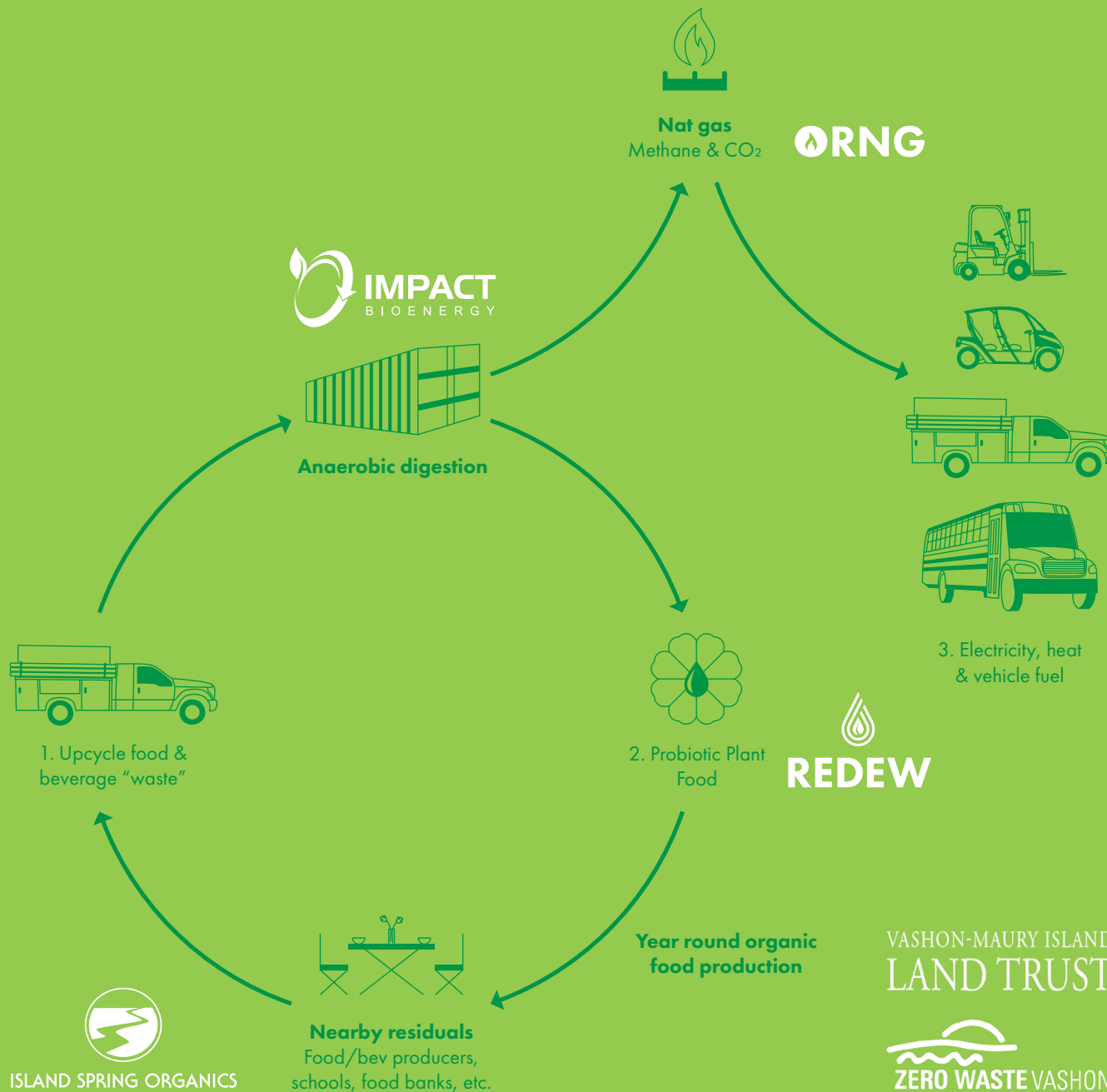
### At a Glance

<b>MODEL:</b>	<b>NAUTILUS AD185-3</b>
<b>INPUT:</b>	
Food Waste:	<b>1,500 tons/year</b> <b>8,000 lbs./day</b>
<b>OUTPUT:</b>	
Max. Biogas Volume:	<b>21,500 ft<sup>3</sup>/day</b> <b>(600 m<sup>3</sup>/day)</b>
Max. Generation Capacity:	
Electricity:	<b>50kW, or</b>
Vehicle Fuel:	<b>125 GGE/day</b>
Plant Food:	<b>950 gal./day</b>

### Why it matters

*The U.S. throws away 38 million tons of food every year. If we cut that waste in half through better management and utilization, and if the remaining 19 million tons were processed locally through a distributed network of Impact Bioenergy HORSE and NAUTILUS bioenergy systems, the results would be astounding and transformative. That food “waste” could generate 9TWh of electricity, enough to power 860,000 U.S. households, or 530 million gallons of gasoline equivalents of CNG vehicle fuel, eliminating fossil fuels for over 800,000 cars. Additionally, we would reclaim 4 billion gallons of water, enough to fill more than 6,000 Olympic-sized swimming pools, and capture 26 million pounds of plant food nutrients for use on flowers, vegetables, landscaping, and organic crops while displacing chemically based fertilizers. This would result in a direct reduction of over 3 billion pounds of carbon, per year, just for the U.S., all while adding over 10,000 jobs suitable for the 21<sup>st</sup> century!*

# Converting Community Food "Waste" to Community Resources *with zero-waste*



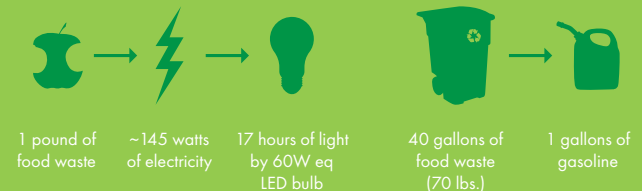
## Who can use a bioenergy system?

Impact's modular bioenergy systems, the HORSE (25 to 175 tons/year) and NAUTILUS (185 to 1,500 tons/year), are sized to match the available food and beverage "waste" at or near the host, minimizing the capital cost, transportation, and footprint of anaerobic digestion.

## What do they generate?

### Renewable Energy

The bioenergy systems offer distributed, base-load energy and heat production, providing energy independence and resiliency. The energy can be stored to balance intermittent renewables such as solar and wind, to reduce power demand charges, and to address disaster preparedness.



## Organic Soil Amendments

The NAUTILUS reclaims the nutrients and water, creating a rich probiotic plant food that promotes the healthy growth of your and your community's own food, flowers, and landscapes. It replaces chemically-based fertilizers with locally produced probiotic plant food soil amendments.