



FastOx<sup>®</sup> Gasification  
Converting waste to power and profits



IN **2025** THE WORLD WILL PRODUCE **2.2** BILLION TONS OF WASTE



Data from World Bank



The background of the slide features a complex, abstract molecular structure. It consists of numerous overlapping circles of various colors (including shades of purple, pink, blue, green, and brown) connected by thin, multi-colored lines. The circles vary in size and opacity, creating a sense of depth and complexity, reminiscent of a network or a molecular model.

# WASTE CREATES **METHANE**

16% OF THE WORLD'S  
GREENHOUSE GASES

Data from EPA



METHANE **86X** CARBON  
DIOXIDE

Data from IPCC  
20 Year GWP





**CHINA POLICY LEAVES WORLD  
DROWNING IN RECYCLING**



## Sierra Energy HQ, Davis CA

- Waste to clean energy company
- Proven FastOx<sup>®</sup> gasification technology developed and tested with the US Army
- Highly profitable solution
- Significant IP (patents and trade secrets)
- Global partners to build and deliver systems
- Large pool of screened customers
- Reduces GHG by eliminating landfill methane emissions
- Experienced management team





## Funding Timeline

2004-18  
Sierra Railroad Company  
\$30M

2013  
California Energy Commission  
\$5M

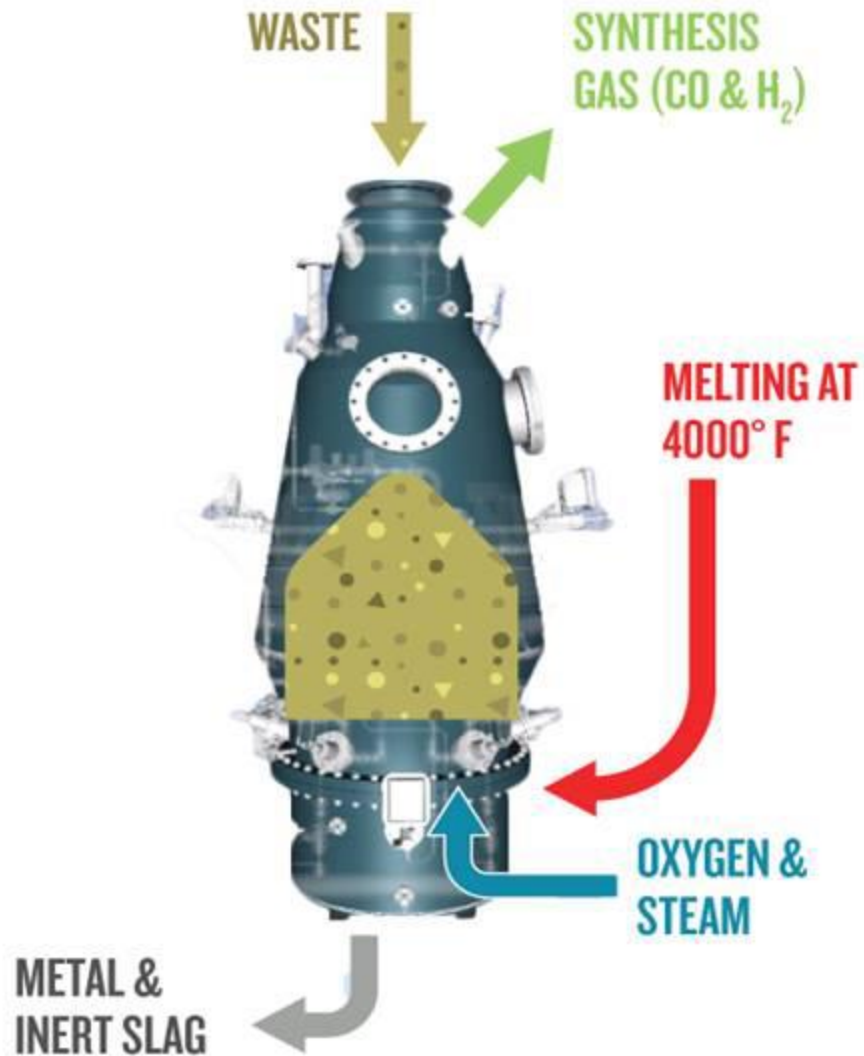
2012  
Department of Defense  
\$3M

2019  
Series A  
\$33M

# Other Waste Diversion / Conversion Technologies

Recycling	Composting	Anaerobic Digestion	Aerobic Digestion
Pyrolysis	Downdraft Gasifiers	Indirectly-heated Gasifiers	Multi-vessel, Multi-process Gasifiers
Fixed-bed Updraft Gasifiers	FastOx Gasifiers	Fluidized Bed Gasifiers	Microwave Plasma
Molten Baths	Thermal Depolymerization	Methane Capture	Incineration / Mass Burn





- No process emissions
- Handles virtually all waste
- Minimal waste processing
- Low maintenance
- Scalable
- Low parasitic load
- All outputs are salable



# Advantages of FastOx Gasification

## Robust, Fixed-Bed Gasifier

- ▣ Few moving parts
- ▣ Low maintenance
- ▣ Scaled for distributed power

## Oxygen-Blown Slagging Gasification

- ▣ High-quality syngas
- ▣ Non-leaching vitrified stone
- ▣ No dilutive nitrogen

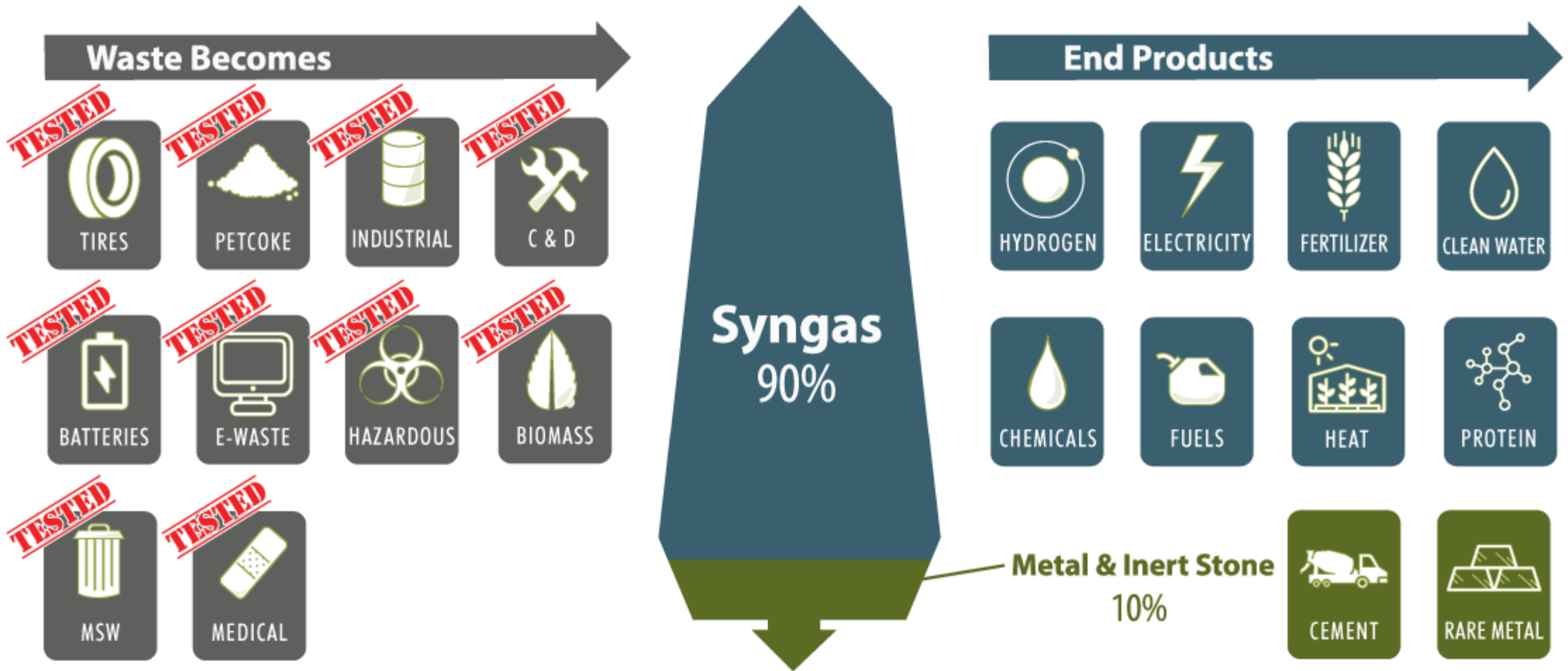
## Proprietary Tar Control Technology

- ▣ Converts disruptive tars
- ▣ Higher syngas yield
- ▣ Simplified gas cleaning



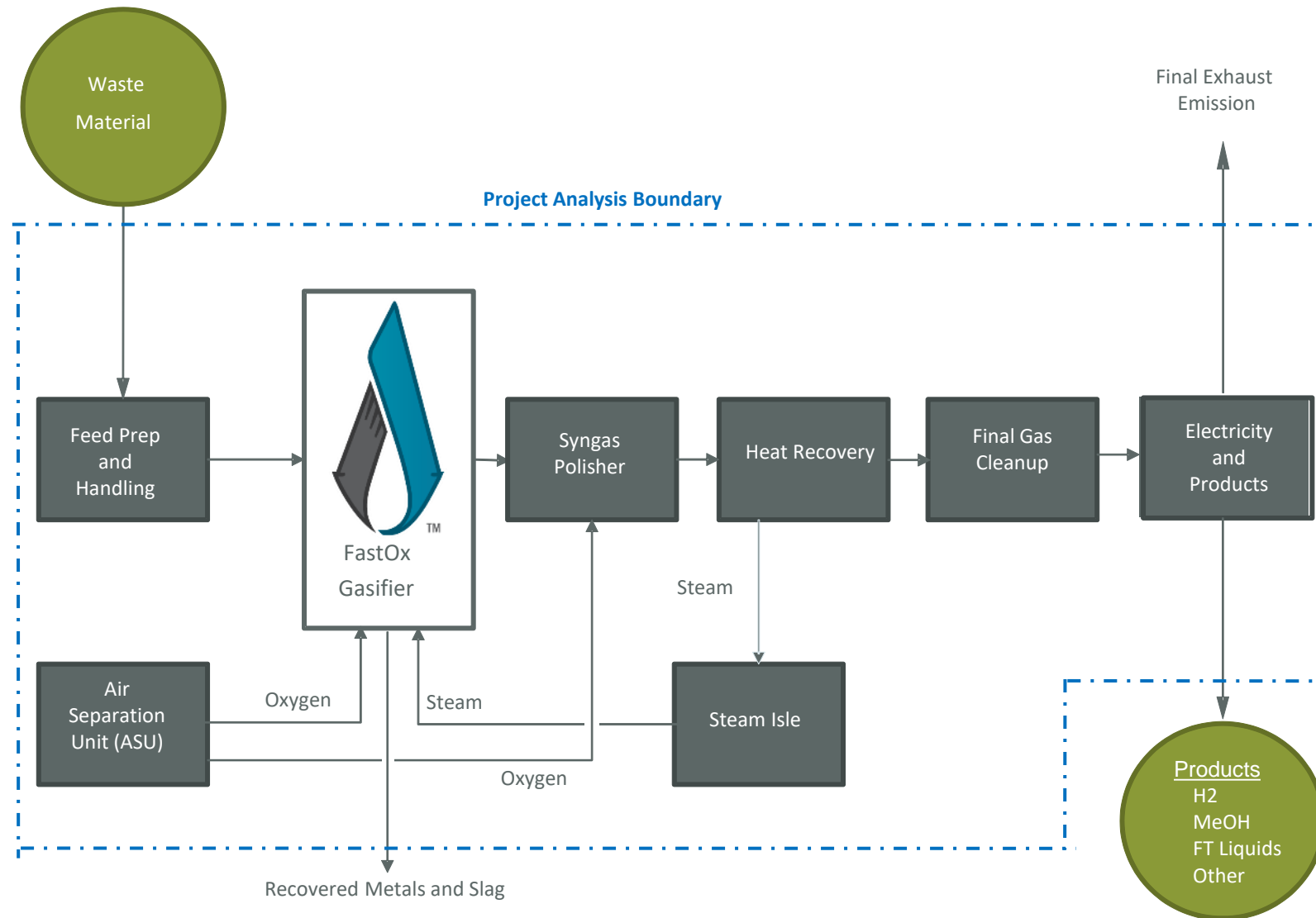


# Waste Turns into High Value Products

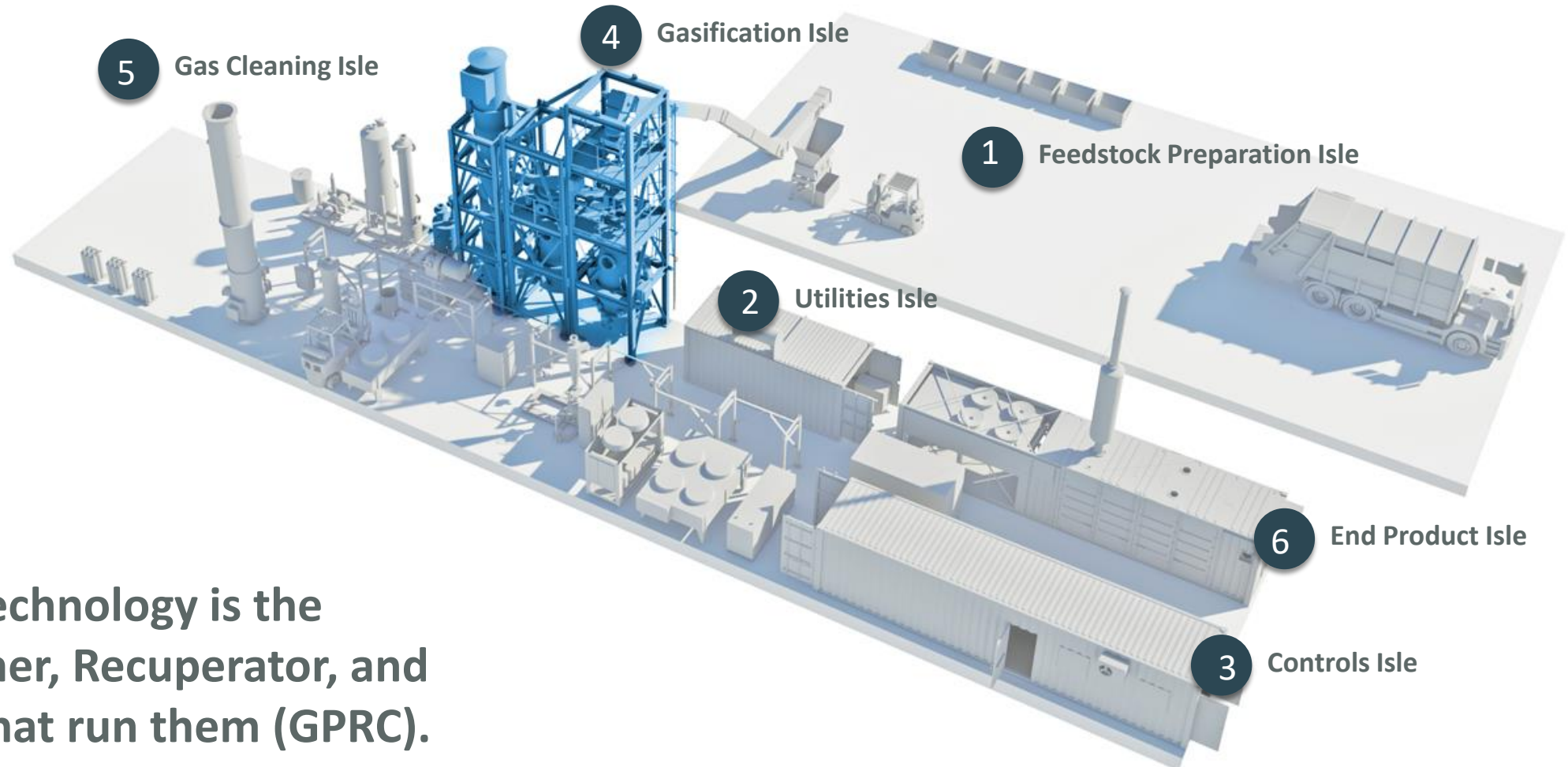




# Process Flow



# Core Technology - GPRC



Sierra's core technology is the Gasifier, Polisher, Recuperator, and the Controls that run them (GPRC).





- **FastOx Gasifier**
  - Feeding
  - Charging
  - Injection
  - Cooling
  - Tapping
- **Burners & Burner Management**
  - Including Syngas Recycling
- **Polisher**
- **Recuperator (Heat Recovery)**
- **Controls & Instrumentation**

# FastOx Facility at Fort Hunter Liggett





# Commercial-Scale Demonstration: Fort Hunter Liggett

## Status

- ▣ Gasification of municipal solid waste and wood waste

## Specifications

- ▣ Gasifier size: 10mtpd
- ▣ Footprint: 0.25 acres
- ▣ Output: electricity and liquid fuels

## Next Steps

- ▣ Operating hours, robustness & optimization
- ▣ Feedstock testing
- ▣ Continued R&D on end-products



Thank You

