



**enVerde LLC**

***Solving Waste Problems • Making Clean Energy***

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CEO and Founder

Prepared for the

LA California Alternative Technology Advisory Subcommittee (ATAS) of the  
Integrated Waste Management Task Force



In the beginning...

# enVerde's Background



enVerde was formed to leverage our collective knowledge and experiences for profitable social good.

- **7 people**
- **220 years of energy and chemical industry experiences**
- **Global technical and business acumen**

We searched the world for economic & environmental solutions to important problems

- **209 technologies and business cases reviewed**
- **We studied the successes and failures in cleantech first**
- **#210 was the answer-developed at the University of Minnesota**

enVerde has outstanding partners and a growing network of interested parties with diverse applications

# enVerde Overview

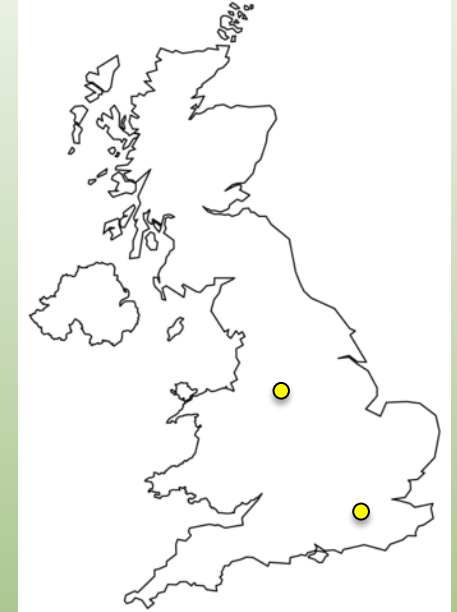
United States



Italy



England



Headquartered in Minneapolis

Team Located in US and Europe

Primarily Former Mobil and ExxonMobil Employees

# enVerde-Business Case Study

4.9

Pounds of  
Waste  
Generated  
Daily Per  
Person

1.4+

Billion

PEOPLE WITHOUT READY ACCESS TO  
ELECTRICITY

Energy  
Demand to  
2X by 2050

WE DO NOT HAVE THE RESOURCES  
TO MEET THE DEMANDS LET ALONE  
DOING SO SUSTAINABLY

# enVerde's Purpose

**Problem:** How Do We Economically Meet Energy Needs While Helping the Environment?



Wood



Plastics



Landfills



Syngas  
(CO and H<sub>2</sub>)

**Solution:** Use Wastes to Create Clean Energy with enVerde's Process Technology (eVp)

# enVerde's Purpose

**Problem:** How Do We Economically Meet Energy Needs While Helping the Environment?



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Earth's Resources are Being Used @ 170% Annually

(1960 = 75%)



Syngas  
(CO and H<sub>2</sub>)

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# Intellectual Property



## Differentiating Technology

Not Typical Gasification

Successful  
Commercialization



Exclusive  
Commercialization  
Rights

Catalytically-  
Driven

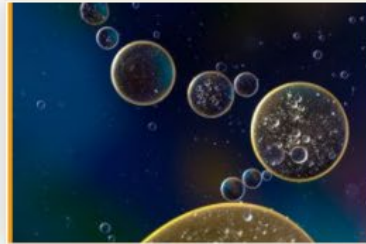
2 Patents  
in Place-  
U MN



# enVerde's Raw Materials

## Organic Feedstocks

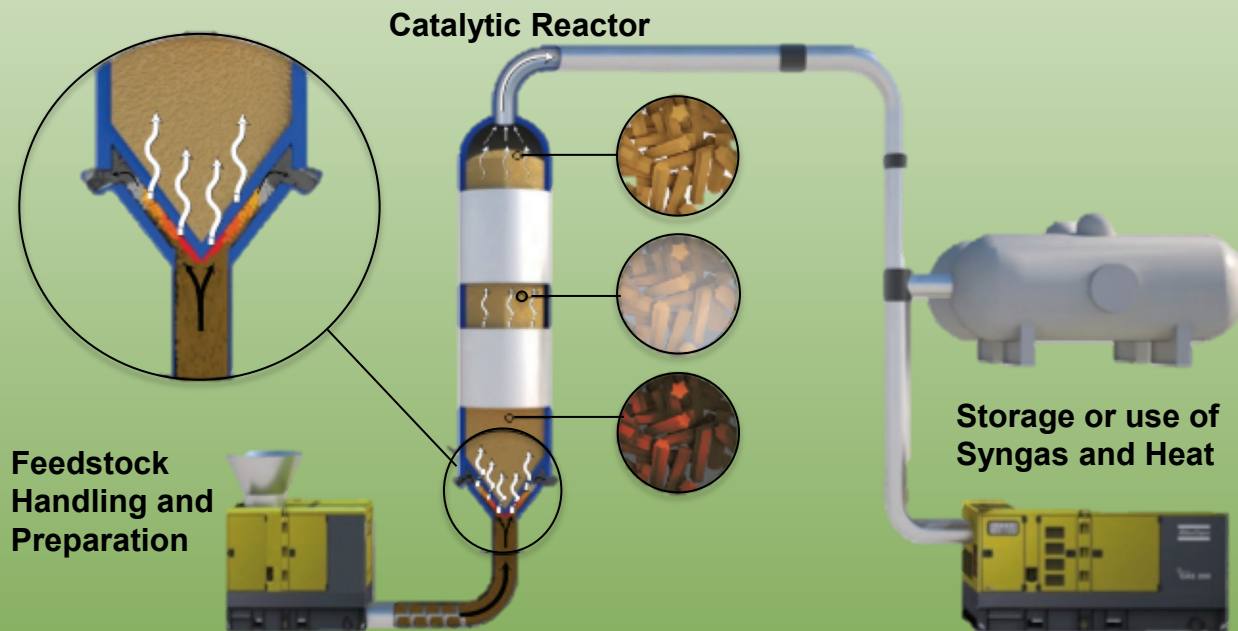
Woody biomass, oils, chemicals, paper, crop residues/food wastes, and plastics are all plentiful examples of carbon-based ("organic") feedstocks enVerde can transform into syngas.



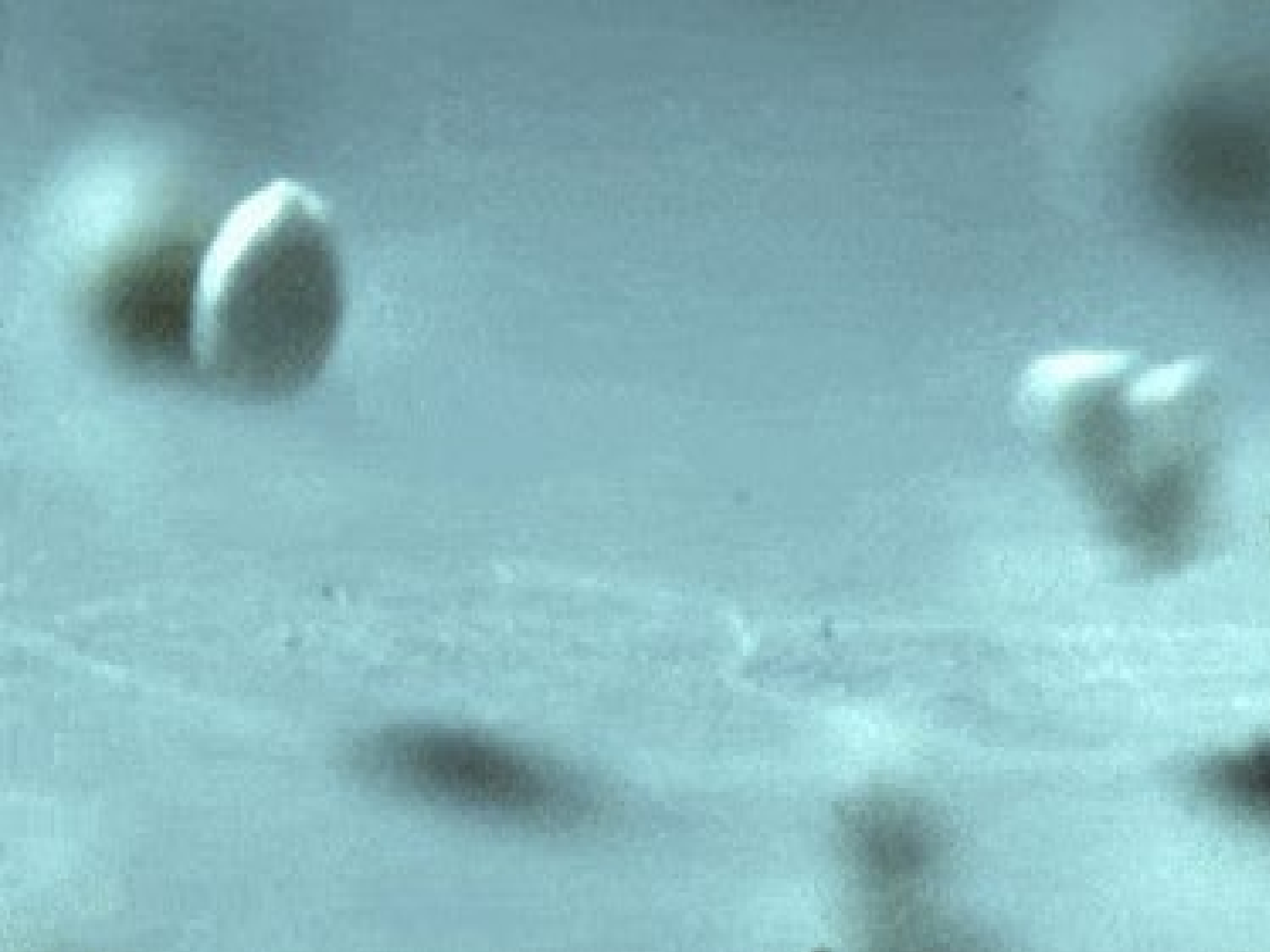
# enVerde's Process (eVp) Technology

## Advanced Thermochemical Gasification Using Catalysts

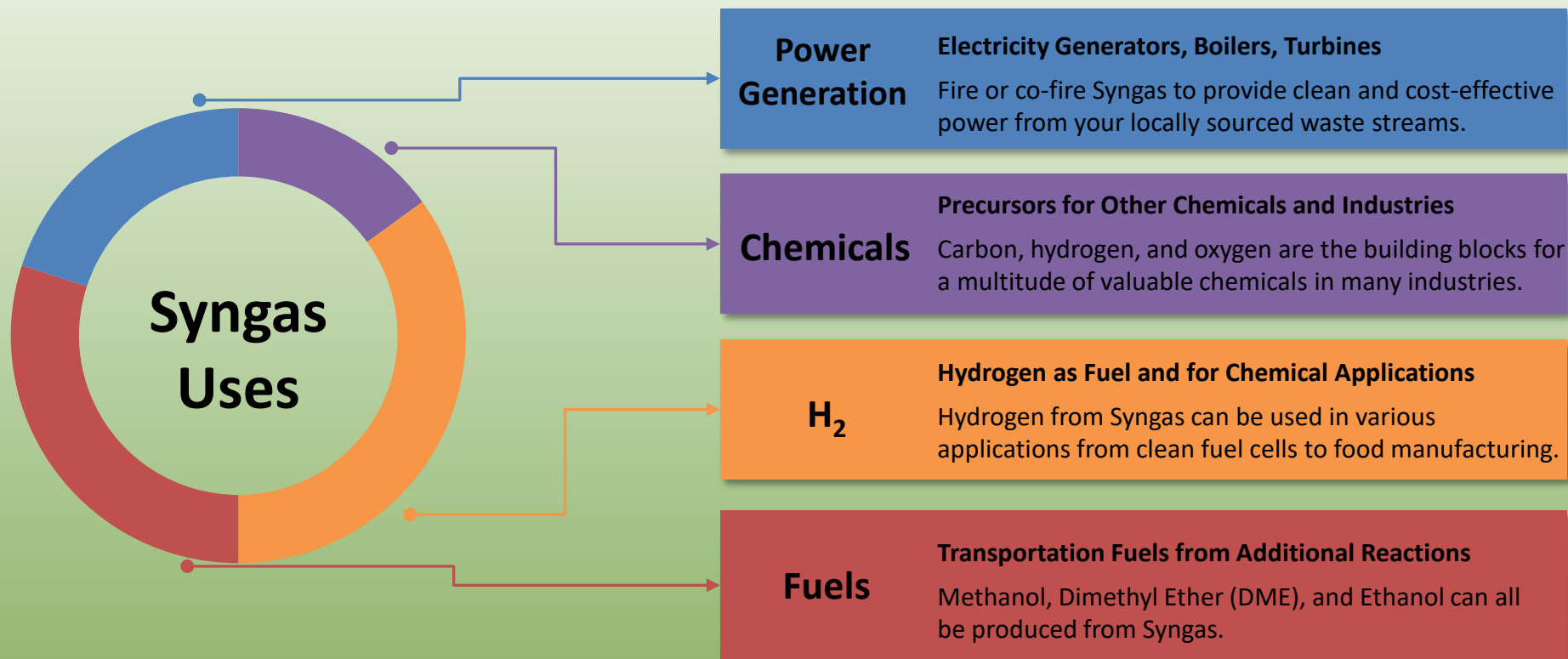
*A process that breaks down carbon-based materials chemically and by heat in a controlled environment using a catalyst system.*



enVerde's process is very **exothermic**-we can use the heat from the reaction as another energy source (e.g. combined heat and power-CHP-applications)



# Applications



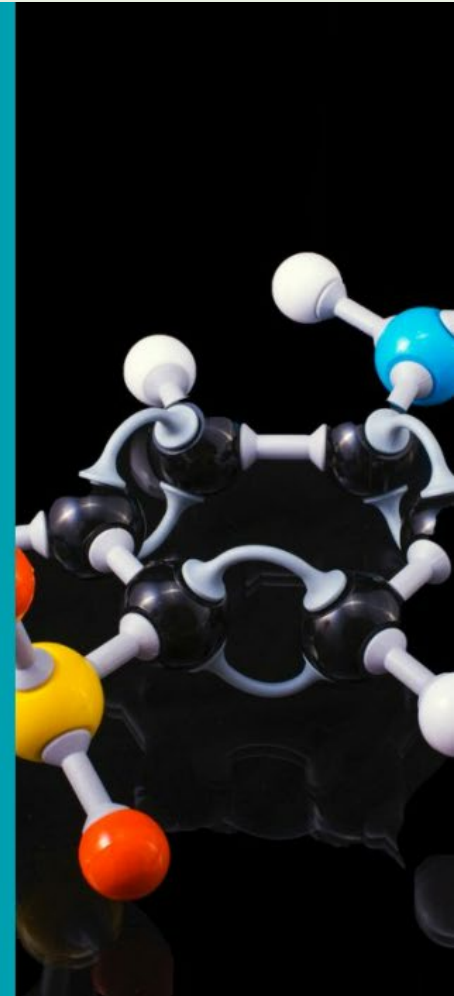
Syngas in its purest form is comprised of carbon monoxide (CO) and hydrogen (H<sub>2</sub>)

# enVerde and Hydrogen

enVerde's eVp Process

## Pathway to Green Hydrogen

- 1 Syngas as a Direct Source  
Hydrogen can be separated from syngas through known methods such as membrane technology
- 2 Syngas as an Electrolysis Fuel  
An "on demand" way to generate hydrogen
- 3 Syngas as a Precursor to Hydrogen Carriers
  - Methanol
  - Ammonia



# enVerde Competitive Advantages

1 Scalability/Mobility

2 Applications

3 Costs

4 Feedstock Flexibility and Availability

5 Environmental and Social Impacts

# enVerde's Market Breadth and Impacts

*We offer customized solutions to match customer needs through our enVerde Syngas Platform:*

*Power, Heat, Fuels, Chemicals or a Combination*



Agricultural



Industrial



Commercial



Municipal



Military/Government



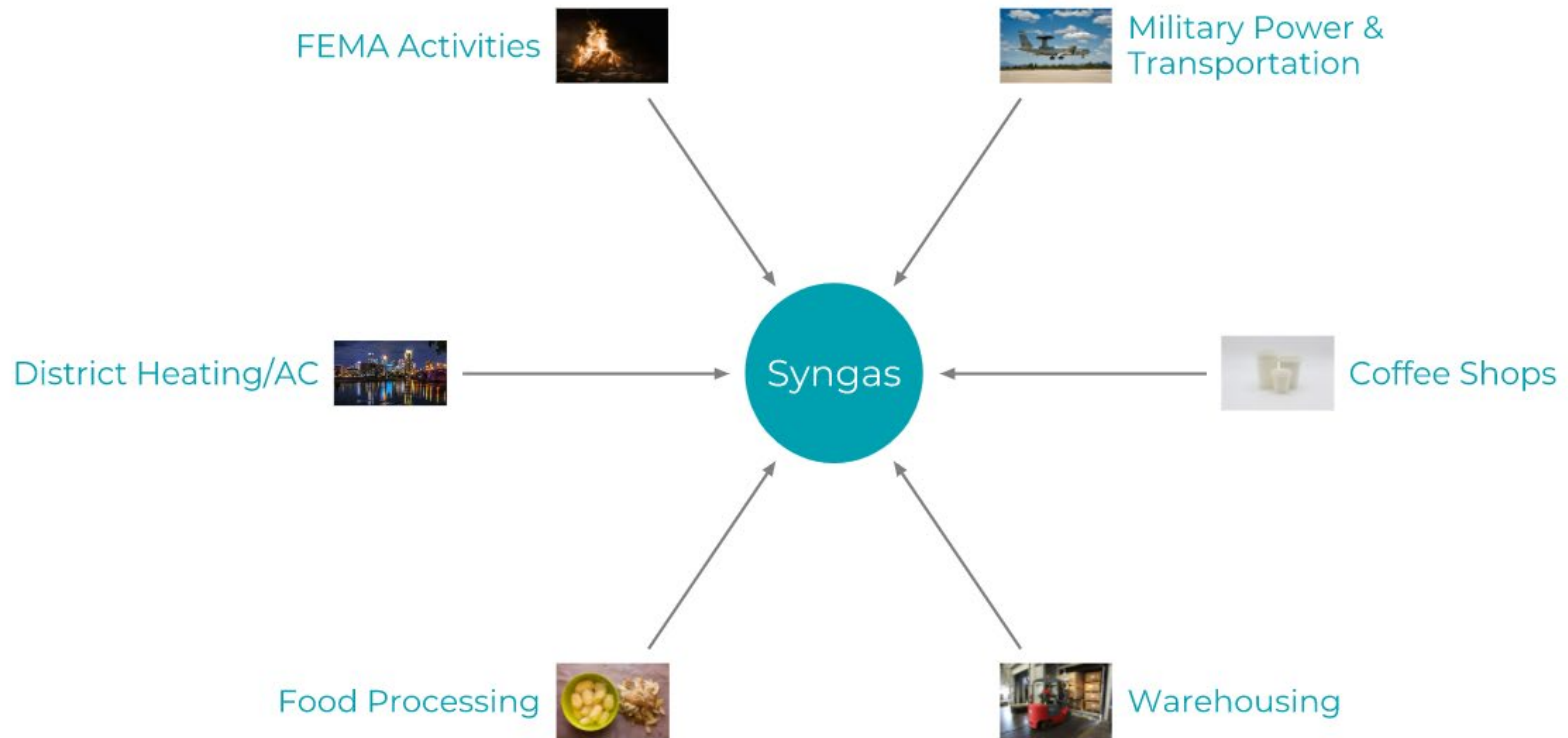
Transportation



Social

# enVerde's Market Opportunities

## A Multitude of Applications

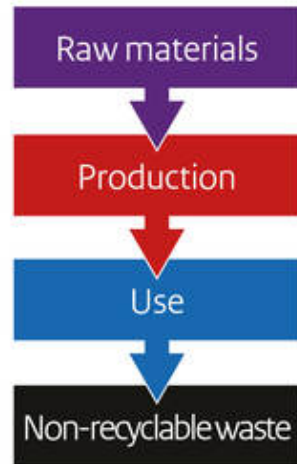




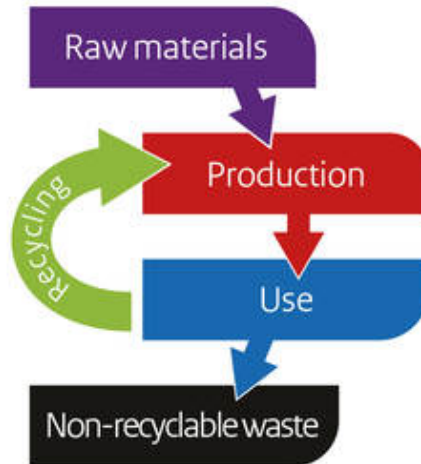
# enVerde's Market Opportunities

## From a linear to a circular economy

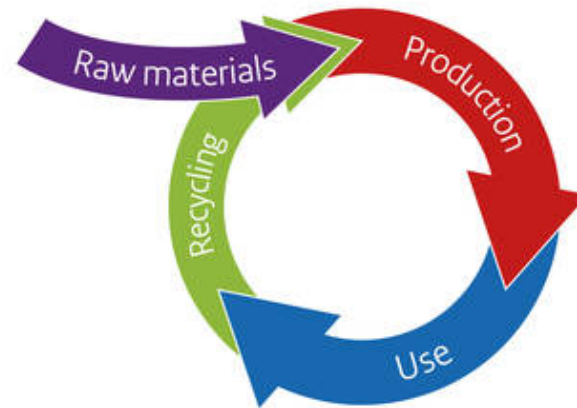
Linear economy



Reuse economy



Circular economy



# Business Development



enVerde has conducted extensive Customer Discovery research with over 100 engagements

# enVerde's Business Model

Customer Driven Performance

Transition from an Operating  
to a Licensing Model

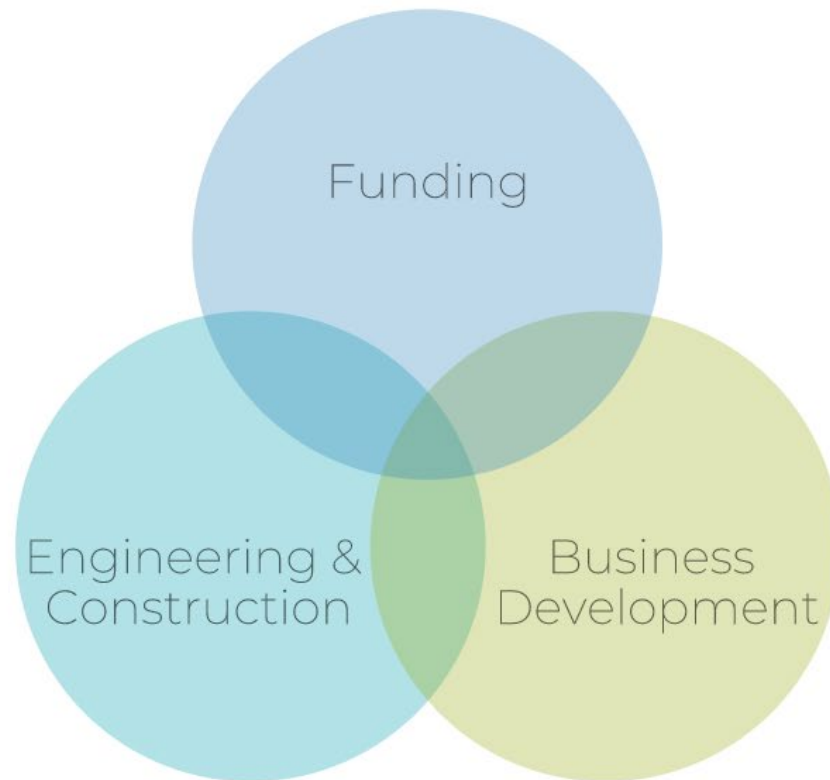
Phase 1: Operate and Maintain Assets

Phase 2: License the Technology

Allow the customer to determine the best pathway to integrate our technology.

# enVerde's Next Steps

## Successful Commercialization



# enVerde Management Team



Dave Goebel  
CEO and Founder



Dr. Andrea Festuccia  
Chief Scientist & Engineer



Nancy Durand  
Business & Operations Leader



Chuck Fortman  
Supply Chain Leader



Dr. A. Russell Hoge  
Lead Advisor



Dr. Paul Dauenhauer  
Advisor



Iqbal Vohra  
Advisor





**enVerde LLC**

**Thank You!**

**Dave Goebel**

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