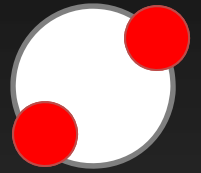


hydroGEN Technologies



Efficiently converting waste to high purity hydrogen

BOSTON
UNIVERSITY

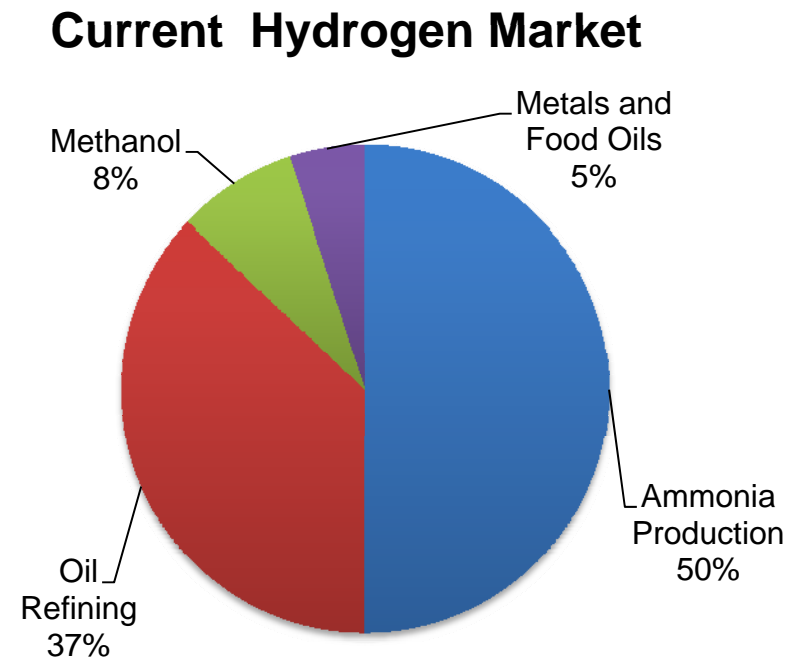
Existing Waste Management Problems

- Tipping fees
- Landfill space limitations
- Large carbon footprint
- Rising treatment costs
- Lost energy value in waste
 - Requires 10x the energy to treat it

Demand for waste to energy technologies

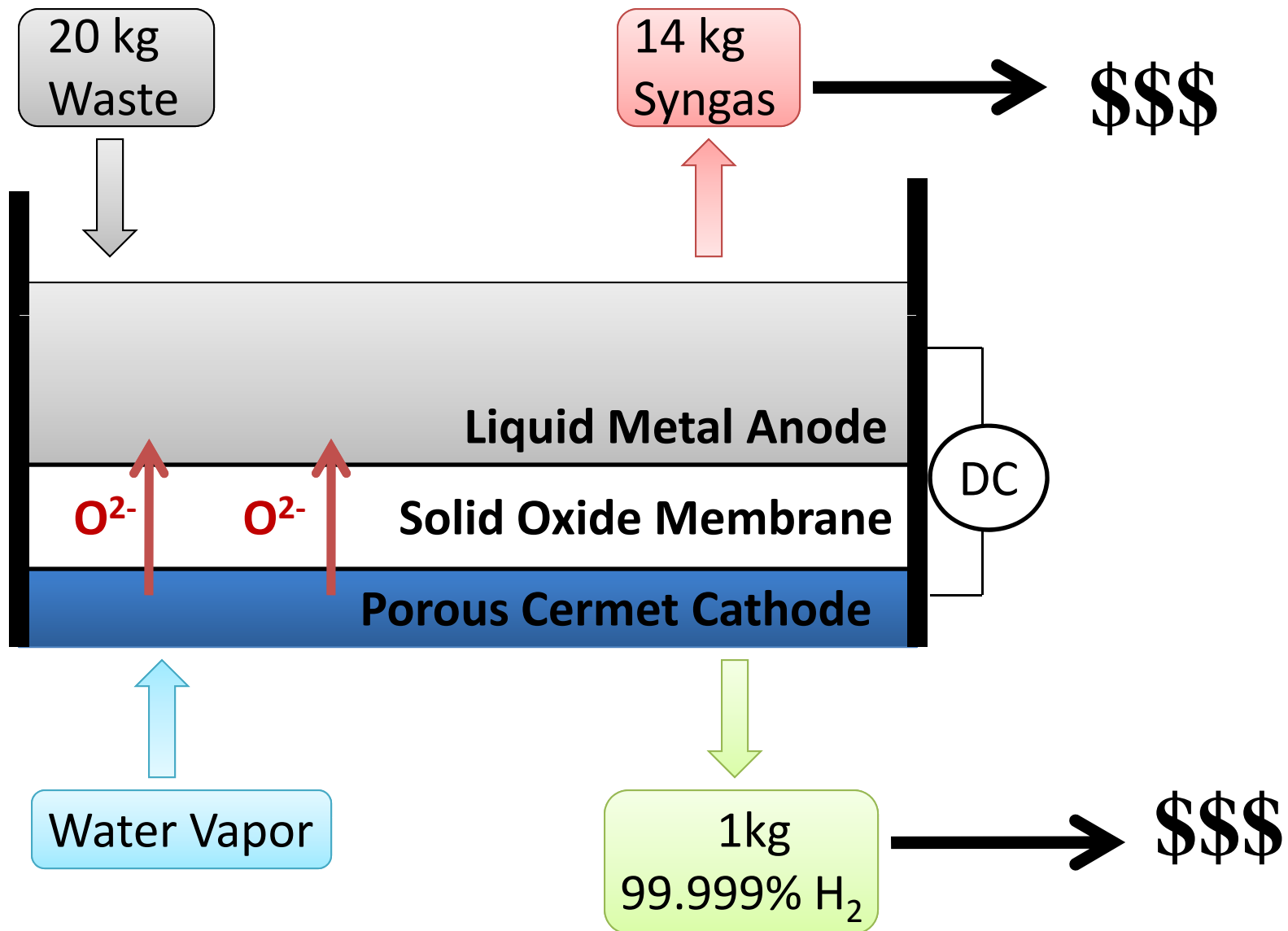
Hydrogen a 200+ Billion Global Market

- Projected 10% growth/year
 - Growth in heavy crude oil refining
- Increased clean fuel regulations
- 70-90% of new demand expected to be met by outsourced production
- H₂ production uses 10% of US natural gas

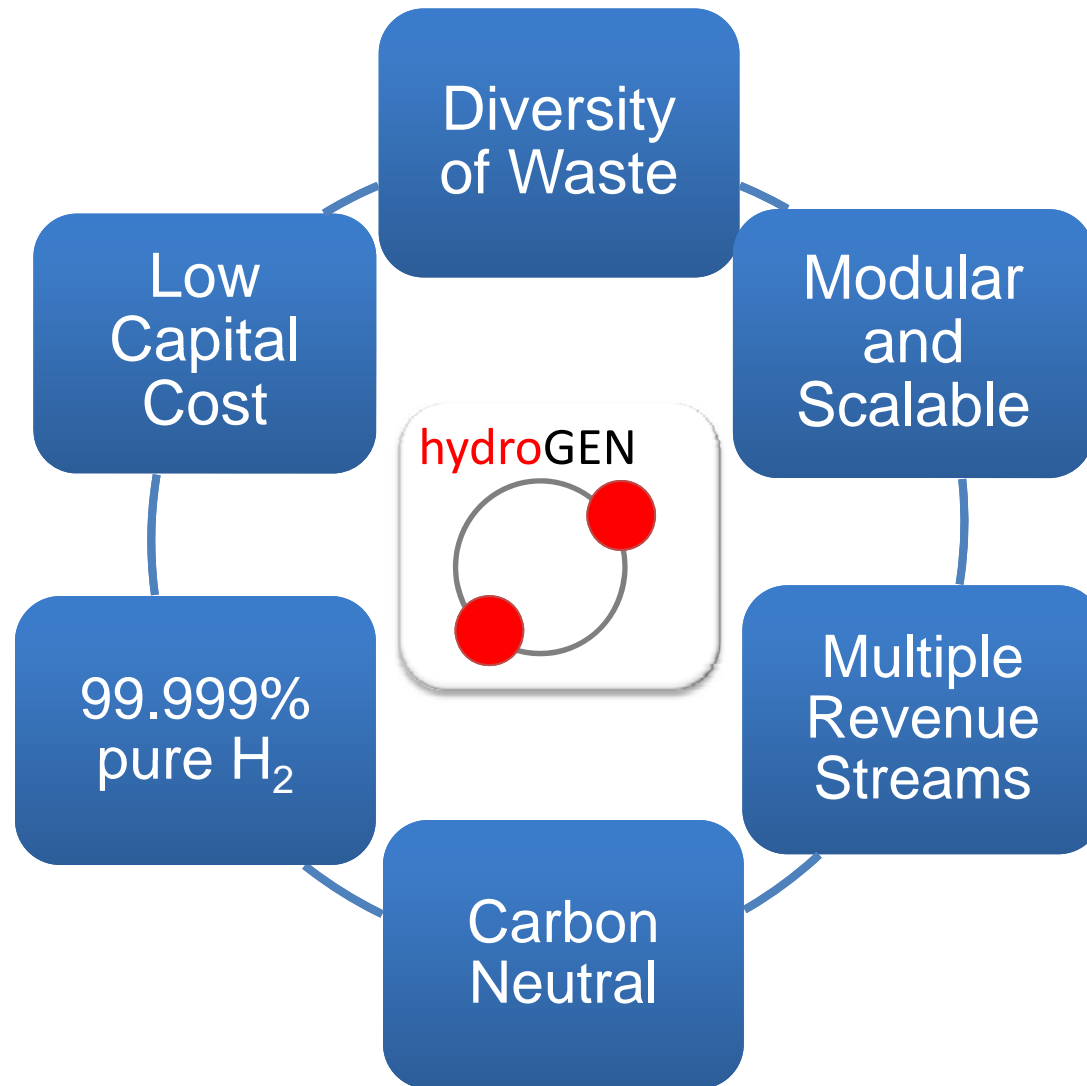


Source: University of Ontario Institute of Technology, Argonne National Labs, Praxair, DOE

hydroGEN Technology



Technology Features



Competitive Landscape

| | hydroGEN System (predicted) | Liquid Metal Gassification (Ze-Gen) | Plasma Gassification (StarTech) | Incineration |
|------------------------------------|--|--|--|---------------------------|
| Input Fuel | Water and Electricity | Thermal Energy | Electricity | Thermal Energy, Oxygen |
| Value added product | Syngas and Hydrogen | Syngas | Syngas | Steam |
| \$\$ Generated per ton of Waste | \$2,500 | \$850 | \$15 | (\$30) |

Based on \$50/kg of high purity H₂
Tipping Fees not included

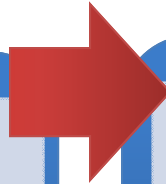
Ze-Gen quoted \$58/MWH

Market

Initial

Food Industry

- Hydrogenated food oils require high purity hydrogen
- Capable of utilizing waste produced during food process



Oil Refining

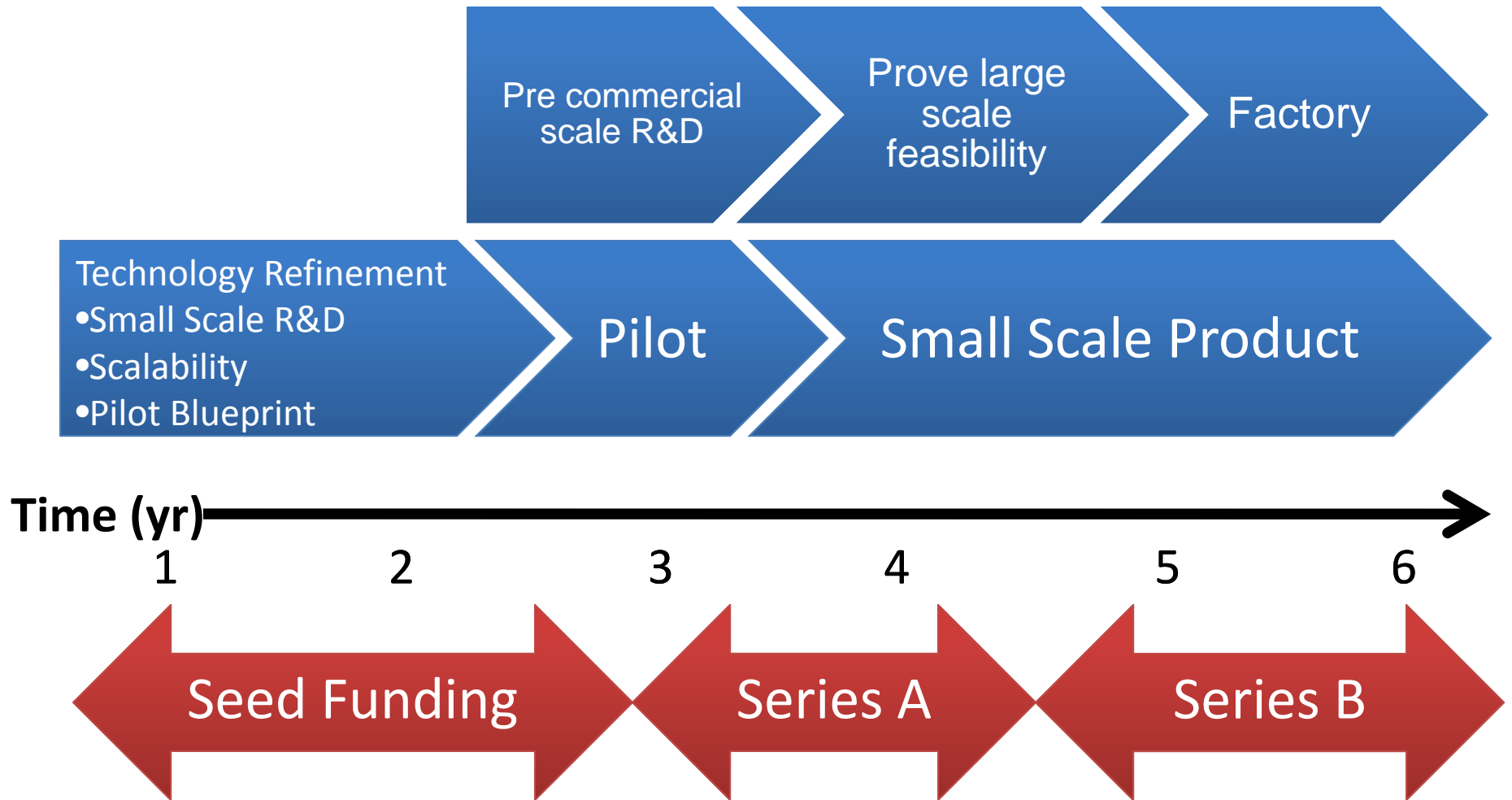
- Large market - 37% of total hydrogen market
- 1 refinery can spend \$10M/yr in waste management costs



Future

- Fuel cells
- Small scale ammonia production
- Remote power
- Large scale production

Business & Technology Timeline



Development Team

Michael Galbo

- Analyst at an emerging cleantech company
- Researched alongside co-developers, MS materials science, BA Physics

Soobhankar Pati Ph.D.

- Co-developer of the SOM System.
- Post-doc , Division of Materials Sci. and Engg. at BU.

Advisory Team

Professor Uday Pal Ph.D

- Division Head of BU Materials Science and Engineering Division / 22 years of professional and academic experience
- Developed similar technology being licensed by MOxST for metal production

Professor Srikanth Gopalan Ph.D

- Associate Professor of Materials Science at Boston University
- Ten years experience in fuel cell materials, processing and testing.

Summary

- Proven at lab scale - Patented
- Waste management cost reduction
- Produce high purity hydrogen – a higher value product
- Easily scalable and carbon neutral
- Potential for remote power

One step waste to hydrogen device