



AnywherEnergy™ (AE)

A Modular Energy Platform

2017 OHIO FUEL CELL SYMPOSIUM

LORAIN COUNTY COMMUNITY COLLEGE

March 30-31, 2017

Benson P. Lee

Technology Management, Inc.

Cleveland, Ohio 44108

Technology Management, Inc. (TMI)

Ohio's Oldest Fuel Cell Systems Company

About

- Private, Ohio C Corporation (Cleveland, Ohio)
- Planar solid oxide fuel cell (SOFC) technology acquired from BP.
- R&D completed. TRL-6 status.
- Multi-kilowatt class systems field-tested.
- Low cost design validated.
 - Appliance-like simplicity.
 - Size and weight of a dishwasher.
- Combined Heat and Power (CHP).

AnywherEnergy™ Features

- “Flex-fuel.”
 - Liquid and gaseous fuels.
 - Interchangeable “on the fly”
 - Sulfur tolerant.
- Load-follows changing demands.
- Modulate heat and electricity output.
- Integrated with solar panels and micro-grids.
- “Plug and Play” maintenance without special tools or equipment



AnywherEnergy™ (AE) = Flex-Fuel

(OPERATES ON EVERYDAY FUELS INTERCHANGEABLY)

Gaseous and Specialty Fuels

Natural Gas

Bloomenergy

DOOSAN





Panasonic




FuelCell Energy
Ultra-Clean, Efficient, Reliable Power



Hydrogen/Methanol

plug power

BALLARD

Oorja
Enabling Power

HPowerTech

Intelligent Energy

Propane

Protonex
a Ballard® company

Ultra ELECTRONICS

ATREX ENERGY
POWERFUL POSSIBILITIES



Liquid and Gaseous*

***Military JP-8**

***Natural Gas**

***Kerosene**

***Diesel**

***Propane**

Vegetable Oil

Used Cooking Oil

Biogas (Simulated)



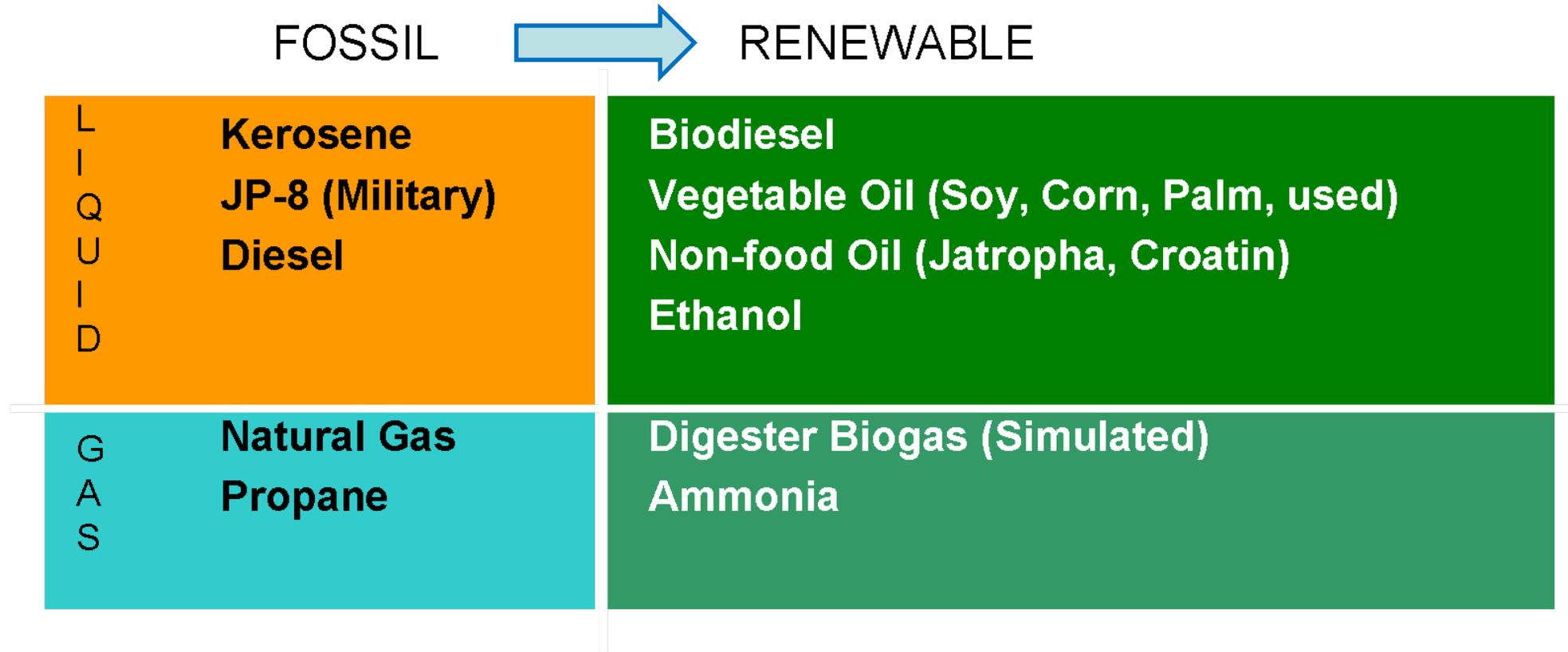
ANYWHERE ENERGY

* Fuel Desulfurization NOT required

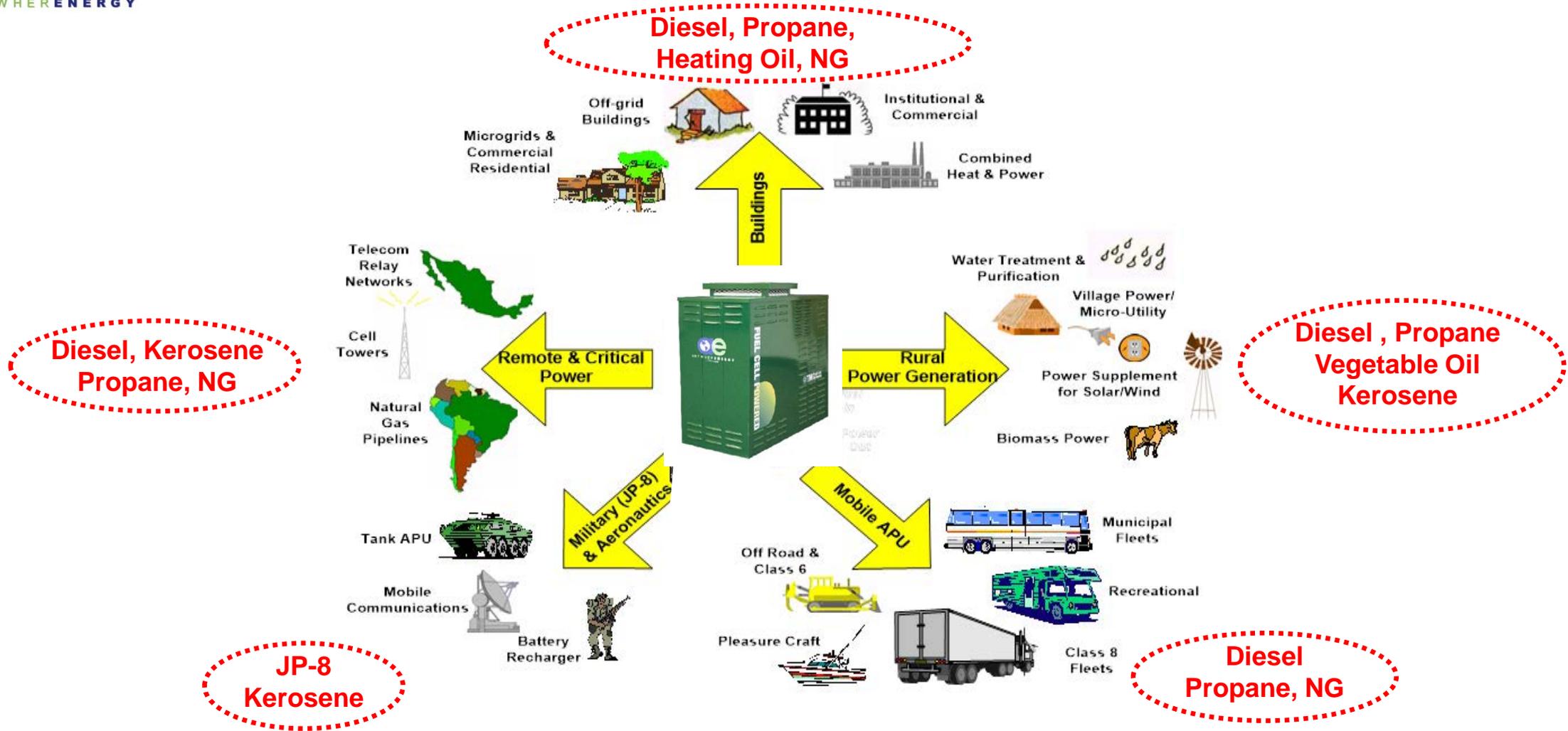


AE Fuel Interchangeability

Migration Path from Carbon to Carbon Neutral Footprint



AE Flex-Fuel → Access to Fuel-limited Markets



AE BOP System Requirements

TMI currently uses COTS

Goal: 100% duty cycle/ 5-10,000 hour MTBM

❑ Air Handling

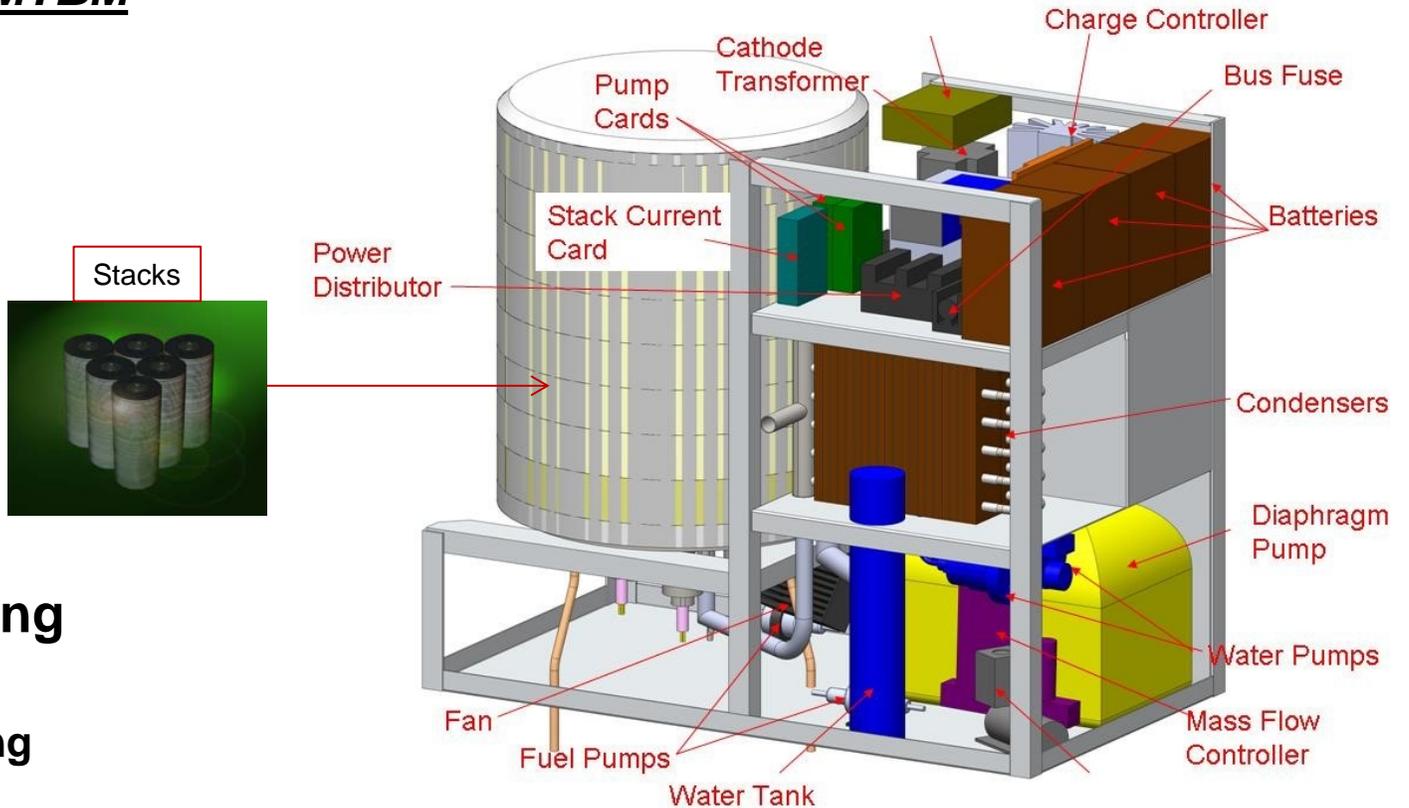
- ❑ 100-200 lpm, 3-4 psi

❑ Liquid Pumps

- ❑ Water 0-50ml/minute
- ❑ Fuels – diesel, veg. oil 0-25 ml/minute

❑ Specialty-alloy cylinders / tubing

- ❑ High Cr/Ni 800-900C
- ❑ Thin wall, 3-5” diameter, 8-12” long





AE Applications (and Supplier Opportunities)

“Looking Around the Corner”

Electrical Controls and Monitoring

- Microgrids, grid-connected and islanded
 - Distributed energy resource services
- Multi-nodal wireless networks - resilience from cyber attacks

Heat Exchangers

- Waste to fuel and biochar
 - Absorption refrigerators for vaccines
- CHP and cooling for yachts, trucks, railroad cars
 - Water purification for drinking and medical
 - Pasteurizing dairy and fruit juices
 - Autoclaving medical instruments

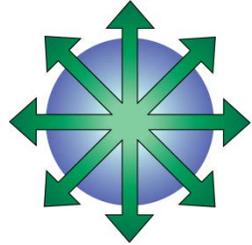
Turnkey Systems Solutions

Drop-in

- Remote medical clinics
 - Refugee camps
 - First Nations
 - Mining

Rapid Response

- Epidemic Control - Ebola
- Command and control centers
 - Disaster relief
 - National Guards - US
 - Military - worldwide



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THANK YOU ! – PLEASE VISIT OUR BOOTH !

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