

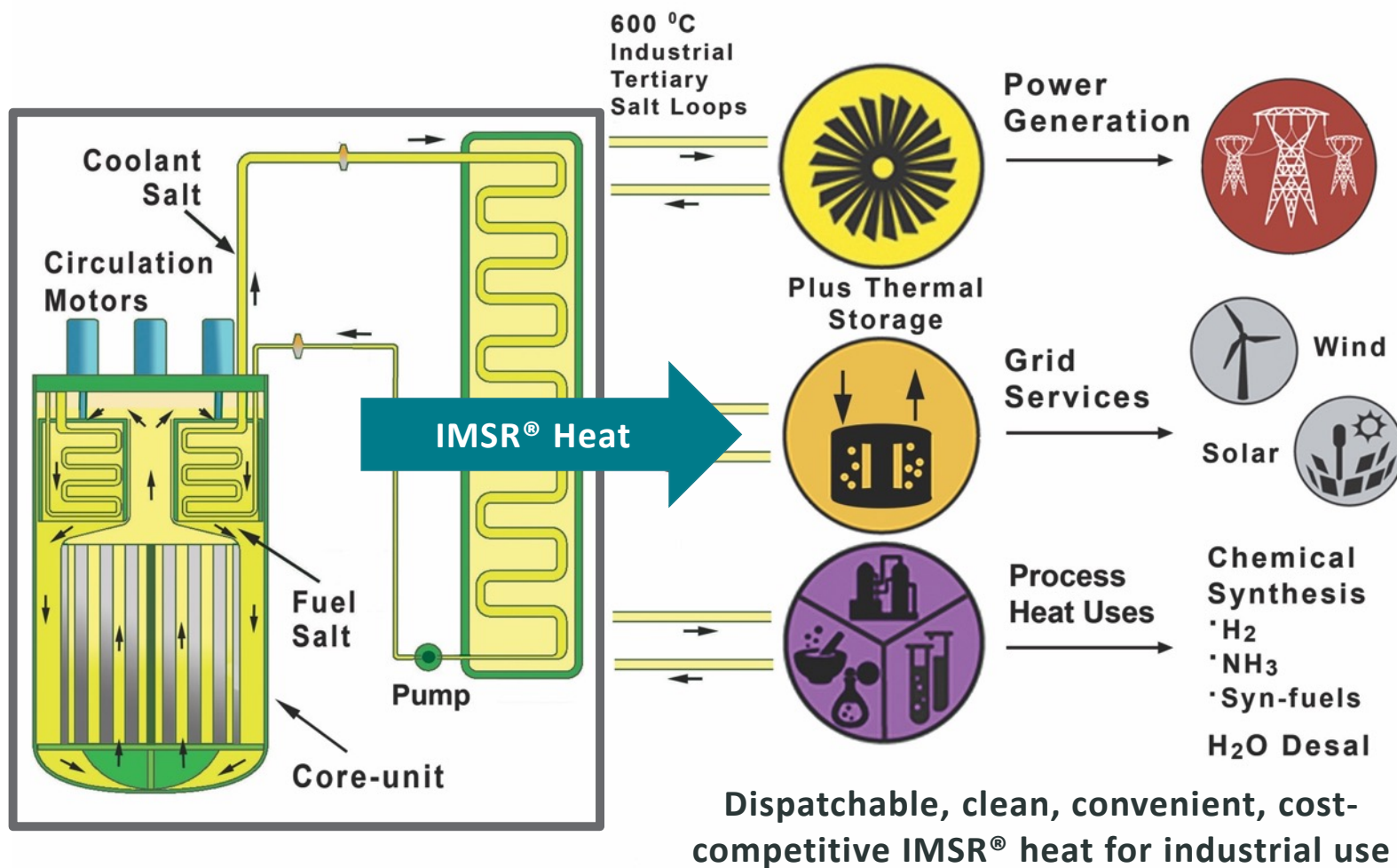
TERRESTRIAL ENERGY USA

Commercial Deployment of TEUSA's Innovative Gen IV Integral Molten Salt Reactor



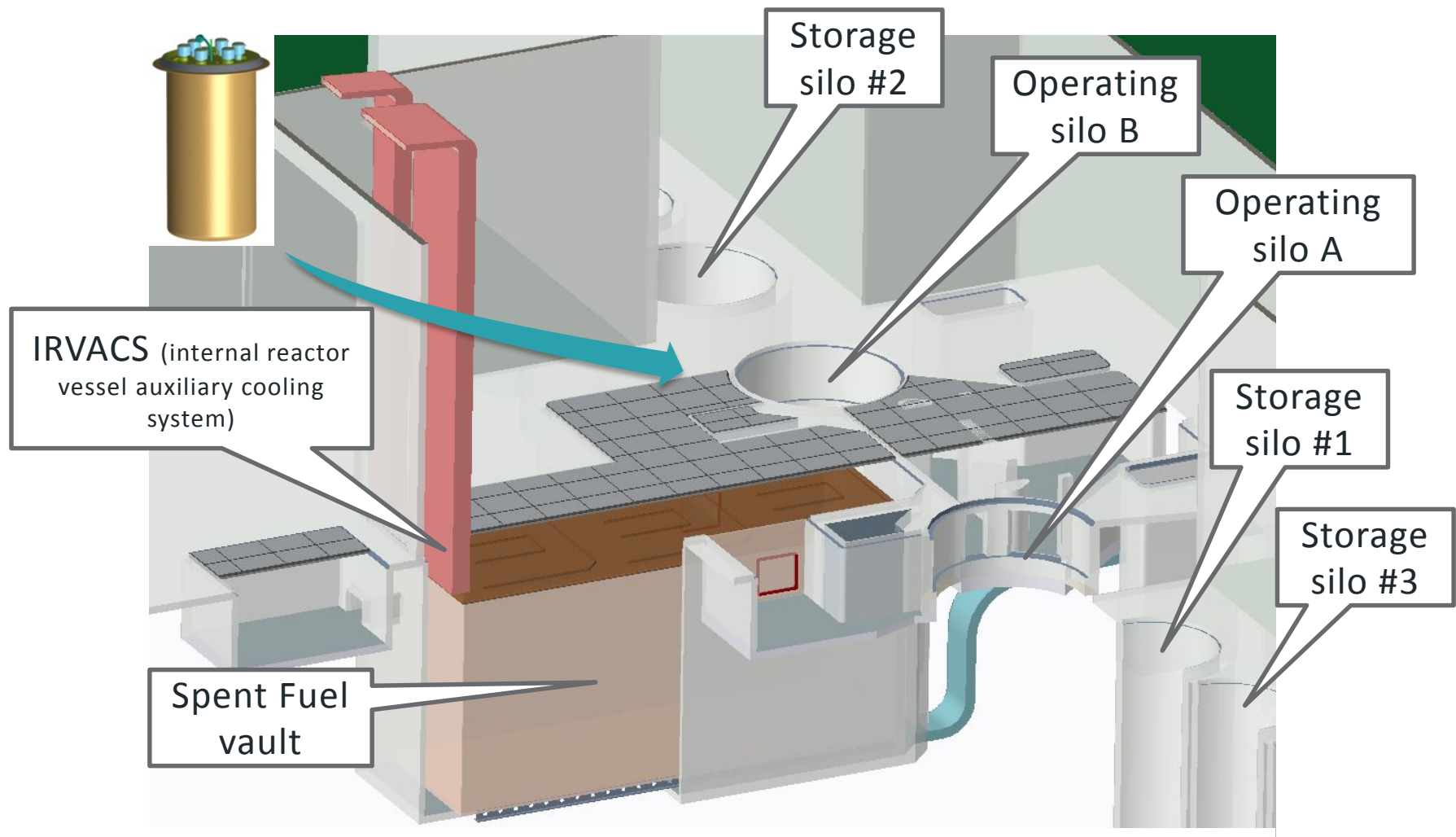
25 July 2018

IMSR® IS FOR INDUSTRIAL ELECTRIC POWER AND HEAT USE



IMSR® heat can couple conveniently with industrial users

THE SEALED AND REPLACEABLE REACTOR CORE – THE IMSR® CORE-UNIT



For simple and safe industrial operation

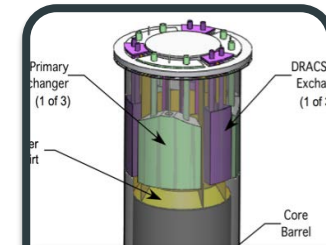
IMSR® – TECHNOLOGY PEDIGREE & READINESS

IMSR® builds on 70 years of ORNL reactor design work and relies on many demonstrated technologies.

IMSR® is a molten salt reactor system that uses:

- Fluoride chemistry
- LEU once-through fuel cycle
- Thermal spectrum
- Graphite moderator
- Integral core and PHX architecture

Conclusion: IMSR® has no remaining technology challenges



Sm-AHTR

- ORNL: 2010
- Pre-conceptual design
- Solid fueled - salt cooled
- Cartridge core design



MSRE

- ORNL: 1964-1969
- Molten Salt Reactor
- Built and operated for 18,000 hours



CONCEPTUAL DESIGN CHARACTERISTICS OF A DENATURED
MOLTEN-SALT REACTOR WITH ONCE-THROUGH FUELING

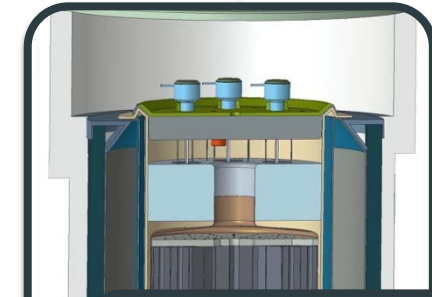
J. R. Engel W. R. Grimes
H. F. Bauman H. E. McCoy
J. F. Dearing W. A. Rhoades

Date Published: July 1980

NOTICE
It is subject to
final review

DMSR

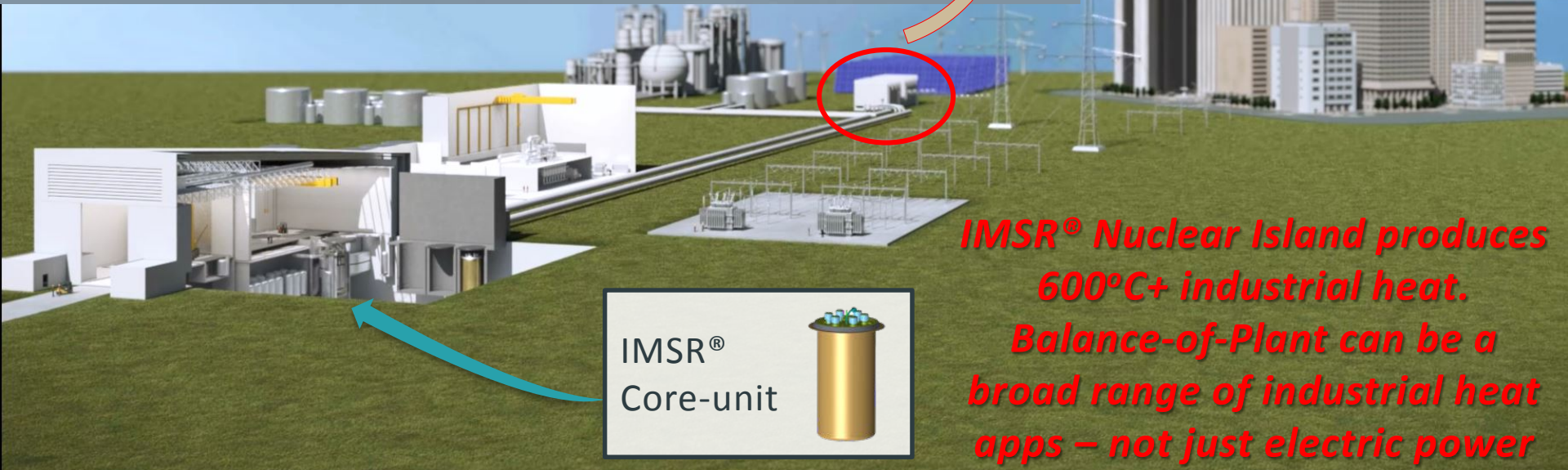
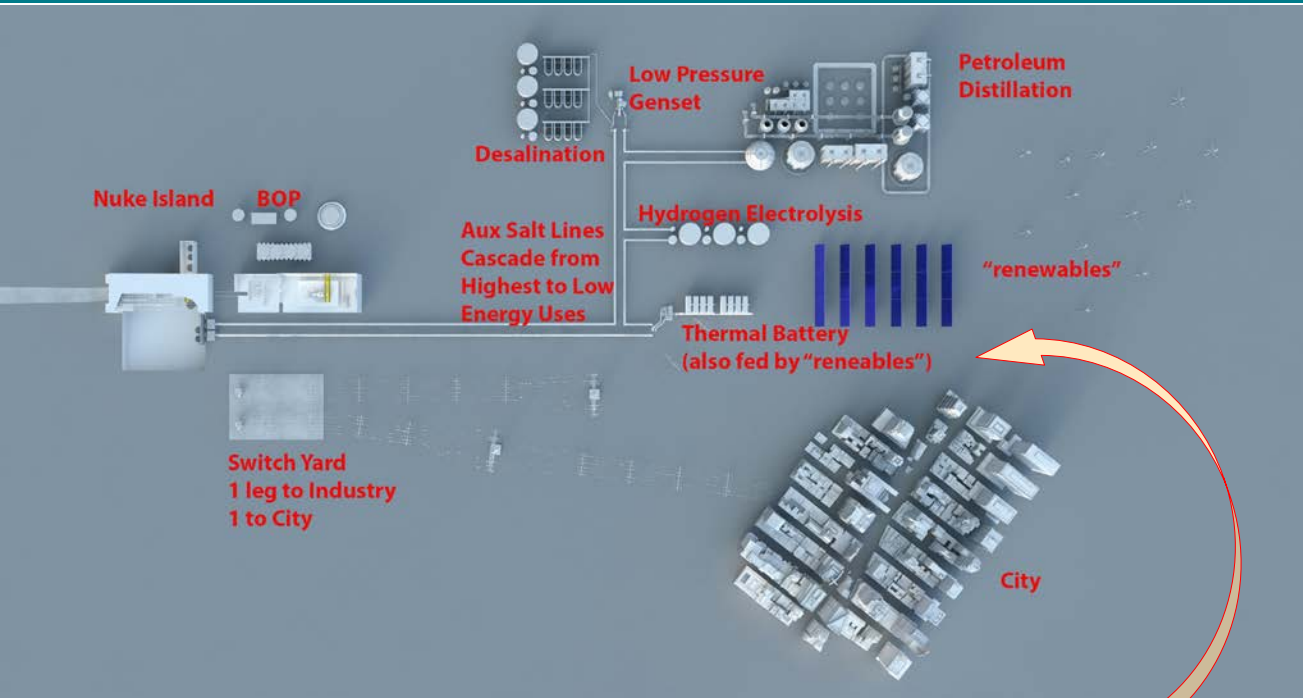
- ORNL: 1980
- Denatured Molten Salt Reactor
- Conceptual Design
- LEU fueled with once through fuel cycle



IMSR®

- Conceptual design
- LEU fueled with once through fuel cycle
- Integral core architecture

IMSR® PROCESS HEAT PARK CONSISTS OF NUCLEAR ISLAND & BALANCE-OF-PLANT



IMSR® Nuclear Island produces 600°C+ industrial heat. Balance-of-Plant can be a broad range of industrial heat apps – not just electric power

COUPLING IMSR® TO INDUSTRIAL PROCESSES

The Terrestrial Energy CEO was in the middle of explaining IMSR reactor design when the man stopped him and said,

“Hold on, this can deliver heat! The industrial sector needs heat, and wind and solar aren’t making any dent in that at all.”

“As far as he was concerned,” Irish said, “this was the great missing piece.” (Grist)

NE and NG

... the opportunity for higher market value



Commodities produced with NG

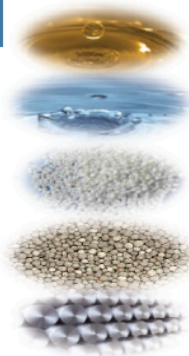
Synthetic Fuels & Lubes

Primary Chemicals

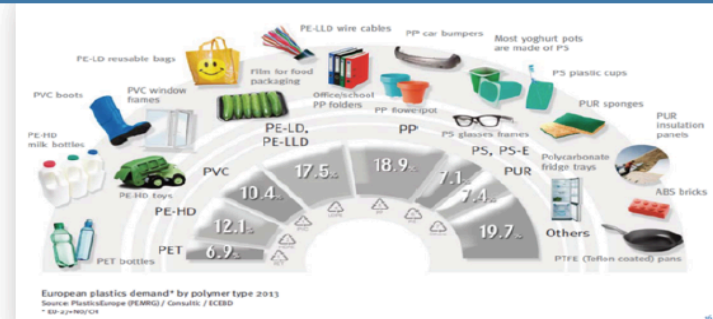
Plastics & Resins

Fertilizers

Primary Metals



Plastics Market: 50% growth projected by 2040



Acetic Acid

Ammonia

Ethyl Alcohol

Formic Acid

Melamine

Polyethylene

Acetone

Base oils-lubes

Ethylene

Hydrogen

Methanol

Polypropylene

Acrylonitrile

Butadiene

Ethylene Glycol

Isocyanates

Oxo-Alcohols

Polyvinyl Chloride

Chemical commodities produced from NG

- ❑ H₂ for FCV, fertilizers, and oil refining
- ❑ Heat & electricity for alkane activation and dehydrogenation for plastics and resins
- ❑ Syngas for methanol and direct reduced iron

Opportunity for 1,000 400 MWt reactors

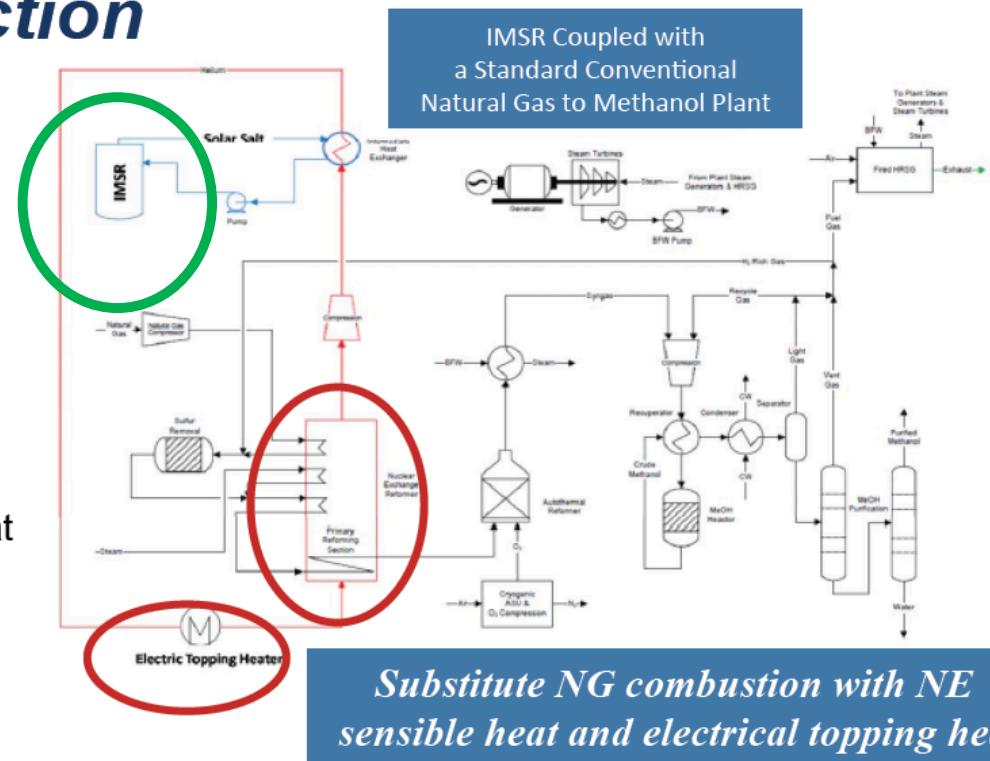
COUPLING IMSR® TO INDUSTRIAL PROCESSES

High Temperature Steam Electrolysis (HTSE) with IMSR has been a revelation
HyS has the promise to be the Killer App for IMSR



Changing Conventional Natural Gas Reforming and Hydrogen Production

- ❑ Steam Methane Reforming coupled to Small Modular Reactors (SMR²)
 - ✓ A new opportunity for hydrogen and syngas generation used in chemical feedstock and commodities production
- ❑ Thermal/Electrical coupling changes...
 - ✓ Reduce natural gas combustion for heat
 - ✓ Reduces pollutant emissions 90%
 - ✓ High temperature reactors require less electrical heating



H2@Scale CRADA is the Tool that Unlocks Vast Opportunities

A successful Hybrid Sulphur H2 outcome can only be achieved when the great technological authority of the national labs, are combined with the business power and cutting edge innovation of Southern Company and Terrestrial Energy.

The CRADA is the most effect means to combine all these forces.

The HyS Process is the type of H2@Scale CRADA project that will keep the U.S.A. the leader in Industry, and make our economy clean, safe, and prosperous for the people of the United States of America.

Terrestrial Energy USA Inc.

John Kutsch

T: +1 (312) 303 5019

E: jkutsch@TerrestrialUSA.com

www.TerrestrialUSA.com