

Terrestrial Energy

- **Carbon-Free Energy for Global Industry**

- CET2022
- Nuclear energy's role in industrial decarbonization
- September 2022, Oskarshamn, Sweden

TERRESTRIAL
ENERGY

The 30% question

How do we decarbonise the 30%; the hardest to abate sectors of the economy?

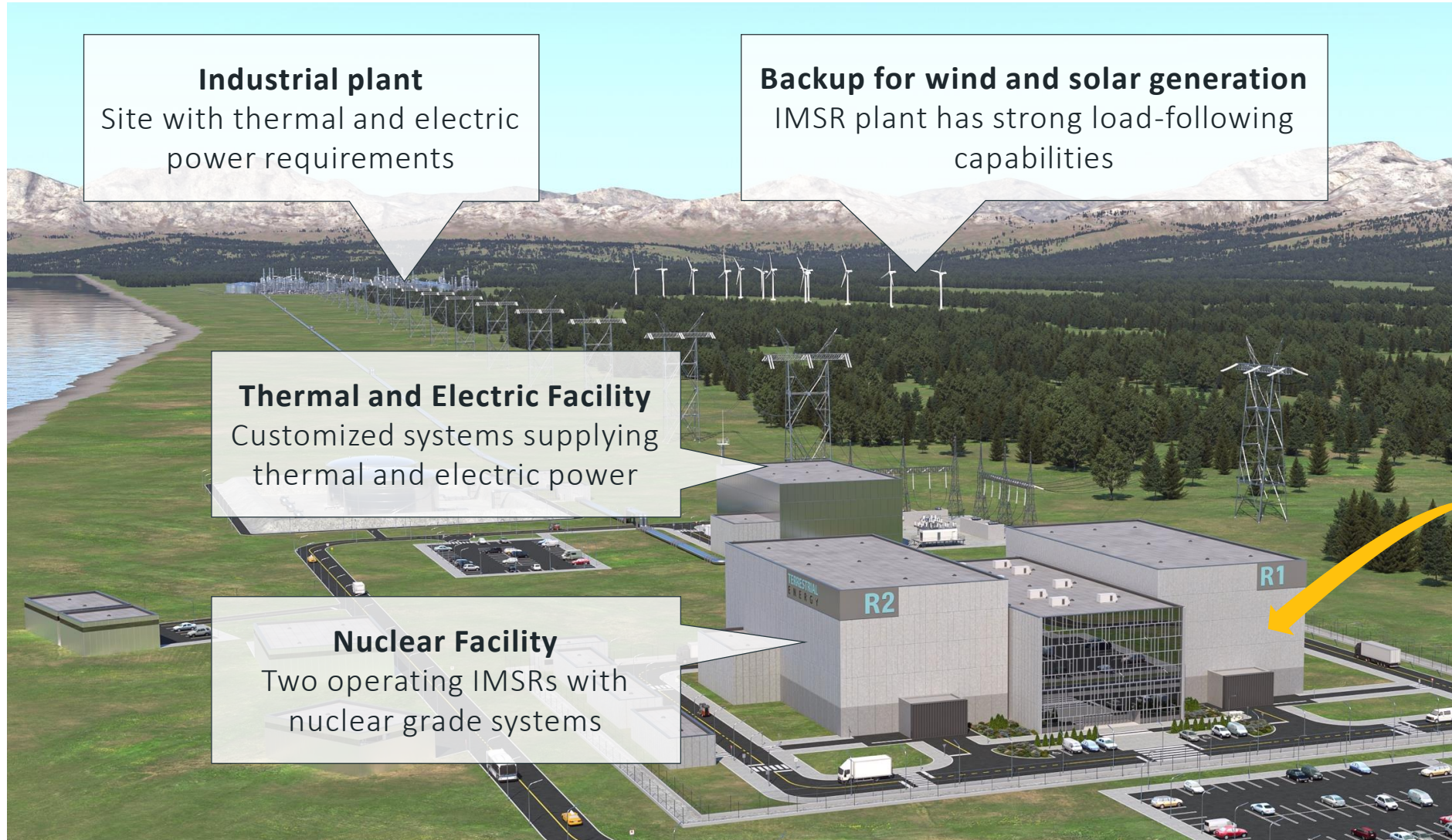
**In the race to net zero
the last mile is going to be the hardest**

Carbon-free cogeneration and grid power



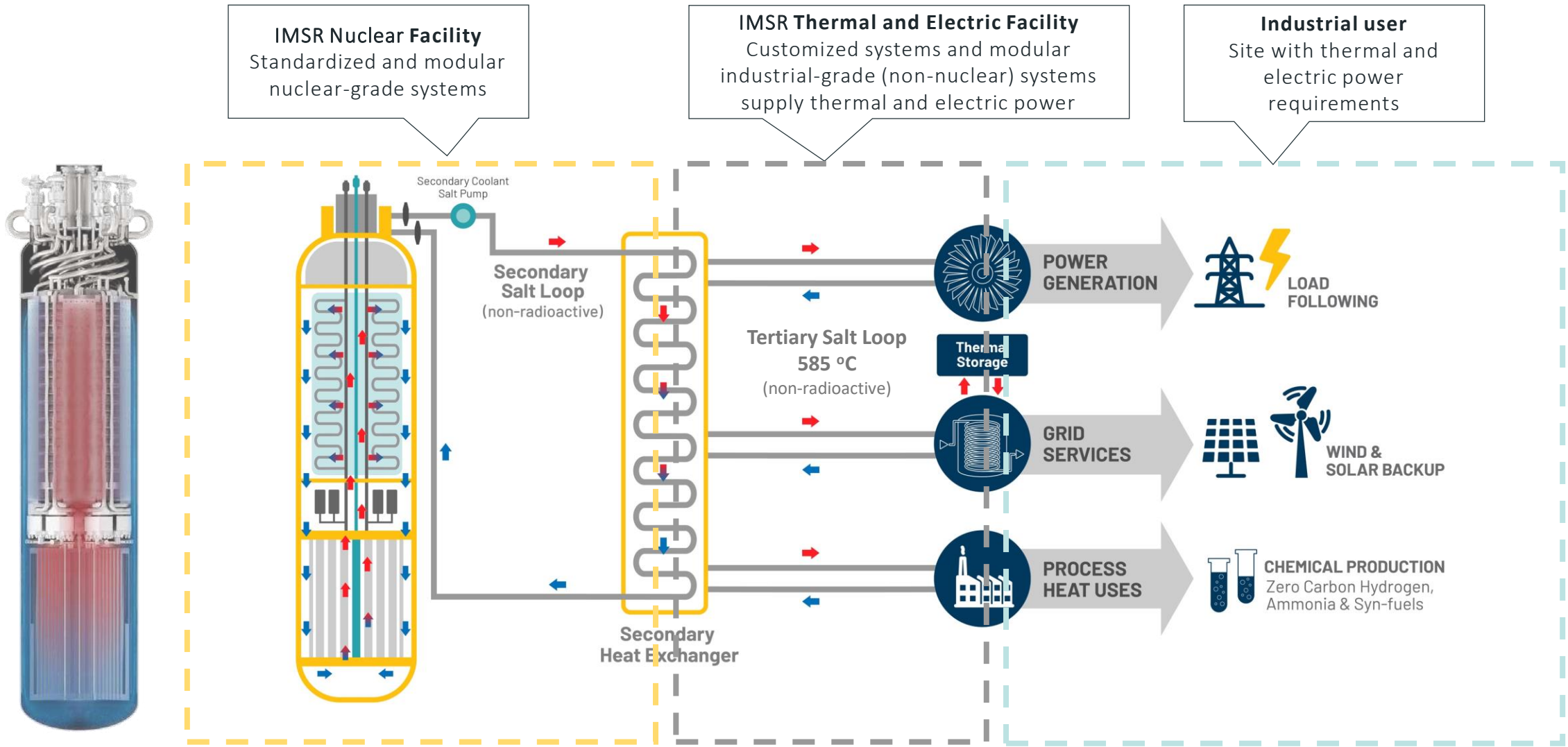
High-temperature molten salt, fission technology, at the heart of a plant designed for affordable, flexible carbon-free energy, and near-term deployment

IMSR plant supplies high-temperature industrial heat and electric power



Thermal and Electric Facility can be customized to the cogeneration requirements of an industrial plant

How an IMSR cogeneration plant works



IMSR Thermal and Electric Facility is customized to heat duties that are site and application specific

IMSR cogeneration

585 °C

IMSR generates the high-temperature heat essential for industrial cogeneration and net-zero

822 MWt / 390 MWe

Net IMSR Plant generating capacity

< \$6 MMBTU

Levelized cost of “in-furnace” thermal energy generated from IMSR operation

~50%

Increase in electric power generation efficiency compared to water-cooled-water-moderated (conventional) NPPs

< \$50 per MWh

IMSR Levelized cost of electric power generation

< 5 grams CO₂e

Full life-cycle grams of CO₂-equivalent per kilowatt-hour of electricity versus 825 for coal and 475 for natural gas

< 7 hectares

300 m x 200 m plant footprint delivers 390 MW of electric power

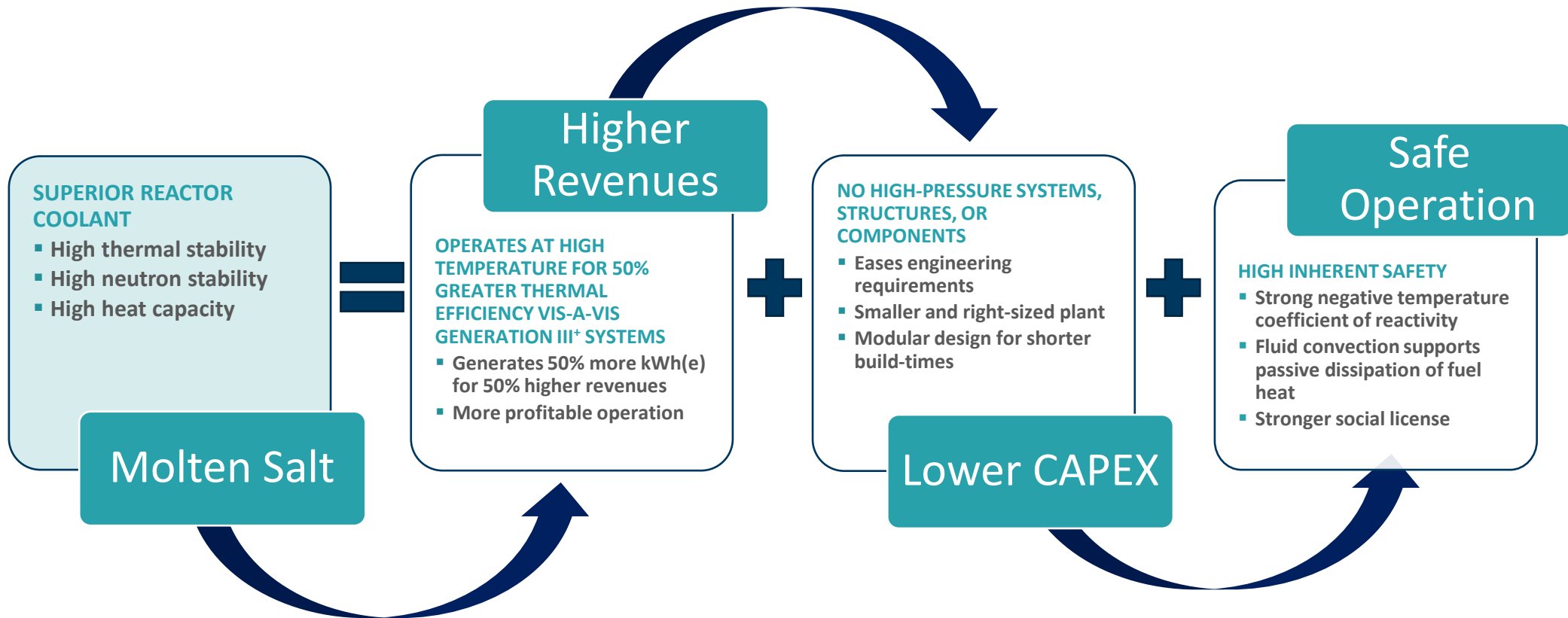
< 5% enriched LEU

Standard nuclear fuel has higher international acceptance and is available today

IMSR technology and plant design ideal for cogeneration and electric grid needs

Technology and design choices drive economics and use-cases for nuclear energy

Molten salt reactor technology permits safe high-temperature and low-pressure operation. This is essential for industrial cogeneration and economic performance

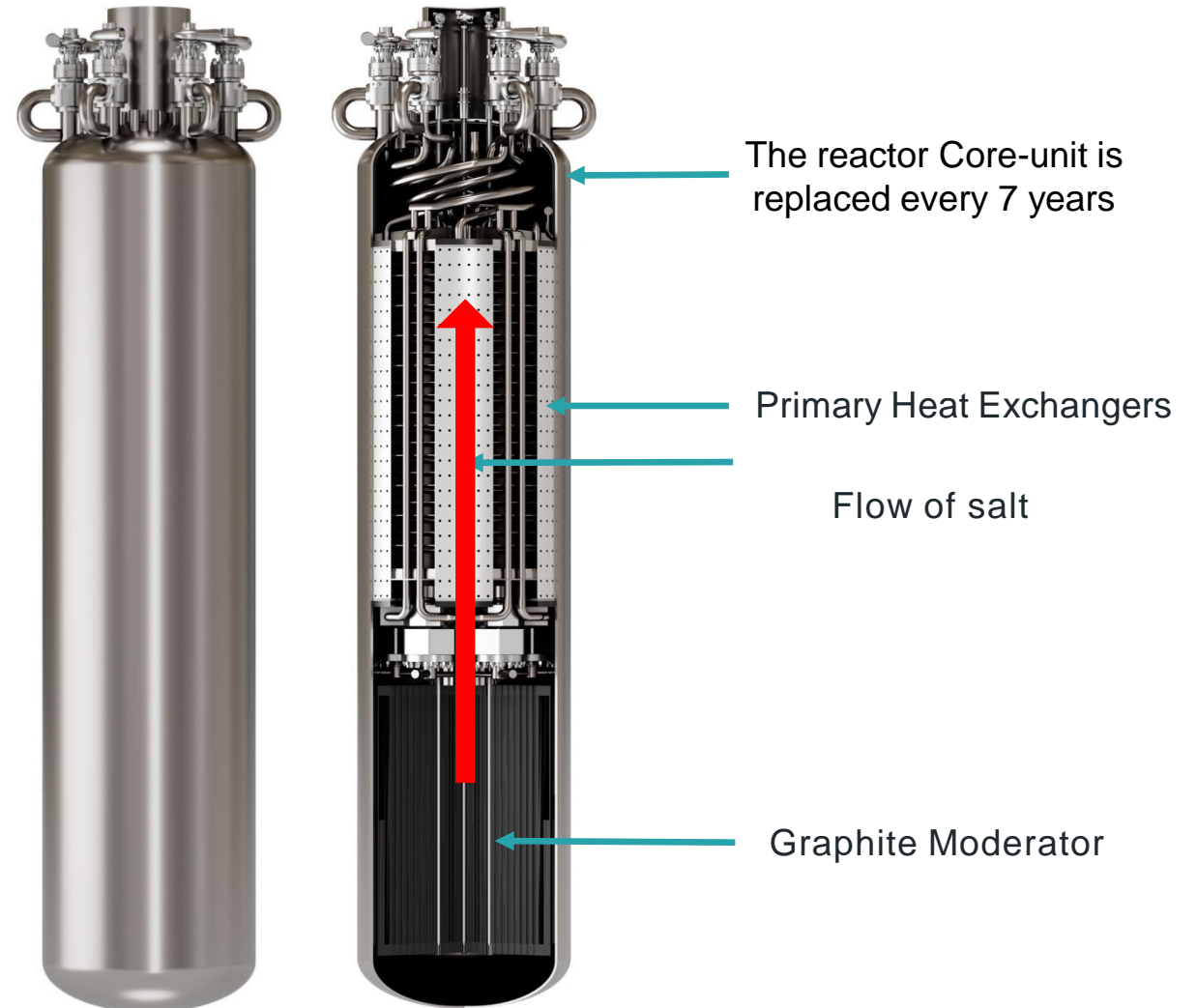


Fundamental technology advantages give clear potential to transform economics and use-case of nuclear energy in competitive energy markets

Key innovation – the sealed and replaceable IMSR Core-unit

- Key innovation is integration of primary reactor components
 - *Reactor core*
 - *Primary heat exchanger*
 - *Pumps*
- Into a sealed, compact and replaceable reactor vessel
 - *With a 7-year operating life*
- This “integral” design captures commercial value through
 - *High inherent safety*
 - *Operational simplicity*
 - *High capital efficiency*
- Patents pending and granted
 - *65 patents granted across 5 invention families*
 - *Portfolio of trade secrets*

IMSR® Core-unit and in cross-section



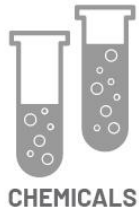
Regulatory engagement

- Regulatory program started early and with CNSC's phased Vendor Design Review (VDR) process
- CNSC's VDR scope covers all aspects of IMSR Plant construction, operation and decommissioning
 - *Commenced VDR in early 2016 and completion expected 2022*
- Commenced USNRC regulatory engagement in 2017
 - *Strategy is a 10CFR Part 52 Standard Design Approval of the IMSR Core-unit*
- Participated in a joint agency (CNSC/USNRC) collaborative regulatory review of IMSR
- Commenced International Atomic Energy Agency (IAEA) engagement in 2020
 - *IMSR security and safeguards underway with Canadian Nuclear Laboratories*



Markets for IMSR cogeneration plants

Industry



- Industrial users of cogen
 - IMSR offers a unique combination of high-efficiency electric power and 585 °C heat generation
 - *Chemical industry:*
 - Green-hydrogen production at scale and lowest cost
 - Green-ammonia, urea, fertilizers...
 - *Petrochemical industry*
 - Upgrading, refining, gas-to-liquids, synthetic transport fuels...
 - *Natural resource extraction*
 - *Steel refining*



- Electric power utility
 - *High-efficiency electric power generation*
 - Dispatchable, rapid load-following with “black start” capability for grid resilience
 - Re-powering coal power plants



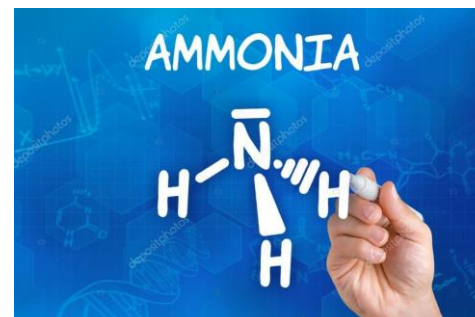
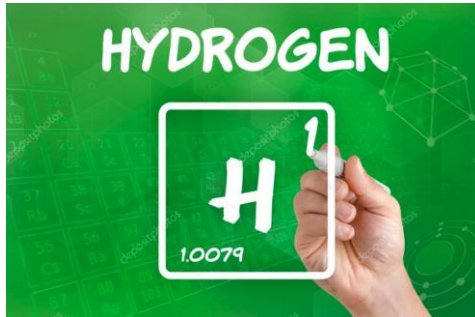
Geography



- Focused on existing nuclear capable markets
 - *With clear nuclear policy support*
 - *With clear industrial policy support for green hydrogen and green ammonia production*
- IMSR Plant deployment ready in leading markets
- Deployment support by strong business case
 - *Many use-cases from “high-quality” thermal energy supply*
 - *Customization of Thermal and Electric Facility*
 - *Levelized cost of heat: less than \$6 / MMBTU*
 - *Superior thermal efficiency (~44% net)*
 - *Levelized cost of electricity: ~\$50/MWh*

IMSR Plants enable many industries and nations to meet economic and net-zero goals

IMSR technology and design choices strongly aligned with today's needs to decarbonize industry



Terrestrial Energy is focused on industrial customers with large thermal and electric energy requirements to improve commercial-competitiveness and to achieve CO₂ targets

**IMSR is a fission
technology delivering
“high-quality” heat and electricity
at a low cost to enable an essential
pathway to Net Zero
Our technology supports decarbonization
of industry**

Join us. ↓

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