Vision: To change the way the world thinks about nuclear energy

Mission: To commercialize a strategic and carbon-free energy technology for global industry

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INTRODUCTION TO TERRESTRIAL ENERGY

Terrestrial Energy

• Commercializing a nuclear reactor system that addresses today’s industrial market needs
  – Cost competitive reactor, particularly in States with de-regulated power markets
  – Our key commercial claim is a 4 to 5 c / kWh LCOE SMR at NOAK(10+)
  – Our SMR has strong load following capabilities

• Securing support from private investors, Fortune 100 industrial companies, governments and environmental NGOs

A proprietary Molten Salt Reactor ("MSR") design

• Integral Molten Salt Reactor ("IMSR")

• Intend to build and license the first IMSR power plant (400 MWth) in the 2020s
<table>
<thead>
<tr>
<th>Time</th>
<th>Year</th>
<th>Event Description</th>
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<td>1Q</td>
<td>2013</td>
<td>Incorporated Terrestrial Energy</td>
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| 3Q    | 2014  | Filed MSR patent applications in 59 countries  
   |       | Completed Pre-Conceptual Design Report  
   |       | Public launch to industry  
   |       | Closed Seed Investment Round |
| 4Q    | 2014  | Entered letter of intent with Canadian Nuclear Laboratories |
| January | 2015 | Entered initial collaboration with Oak Ridge National Laboratory  
   |       | Entered initial collaboration with University of Tennessee |
| August | 2015 | Commenced Phase II engineering program |
| December | 2015 | Closed $10mn Investment Round |
| January | 2015 | IMSR advanced to Conceptual Design standard |
ECO 101 – NUCLEAR NEEDS CAPEX COST INNOVATION

How do we get here?

Source: EIA. 2012
THE FUNDAMENTAL RELATIONSHIP IN NPP ECONOMICS

\[ \text{CAPEX} = \int \text{(reactor system’s Safety Case)} \]

Safety Case drives

- Cost to development
- Cost to license
- Cost to construct
- Cost to operate

- A reactor systems safety case drives CAPEX
- IMSR has a Safety Case to drive cost innovation
• Key innovation is the integration of primary reactor components
  • Reactor core
  • Primary heat exchanger
  • Pumps
• ..into a sealed reactor vessel within a compact and replaceable unit
  • For a 7-year operational life
• This integrated design promises high industrial value through
  • Inherent safety
  • Operational simplicity
  • Cost innovation
• Patent applications filed on key innovations
IMSR CORE-UNIT IN CONTAINMENT SILO

- Containment
- Primary heat Exchanger
- Flow of salt
- Pumps
- 400 MWth Core-unit
- Graphite Moderator
IMSR NUCLEAR ISLAND
CORE-UNIT IN OPERATING SILOS SHOWING STORAGE
IMSR 400 MWth (192 MWe) GENERALIZED NPP FACILITY
IMSR – SAFETY CASE

The central challenge for all reactor designers is HEAT DISSIPATION in every conceivable set of circumstances

- Central pillar of Safety Case

IMSR assures heat dissipation in every conceivable set of circumstances

- Fuel is a liquid salt and it is also your coolant
  - Convective cooling
- A small reactor (sub 600 MWth) operating a 700 °C
  - Radiative heat dissipation 9x compared to 300 °C

So IMSR cooling through natural and passive mechanisms

- No pumps and no active cooling mechanisms necessary

Strong negative reactivity coefficients of temperature

- Entirely passive shutdown Safety Case

No chemical driving forces

- Zirconium Metal-Water reactions absent

No physical driving forces

- Operates at one atmosphere

No “cliff” behavior in the IMSR’s operating profile

A simple safety case achieved through simple and passive mechanisms – mechanisms that are secure and robust
IMSR – TECHNOLOGICAL READINESS AND LICENSING VIABILITY

IMSR improves upon Oak Ridge National Laboratory’s reactor designs
  • LEU “Burner”, thermal spectrum and graphite moderated

7-year replaceable “Core-unit” design addresses:
  • Operational safety
  • Graphite and material lifetime challenges

No substantive technical issues remain for commercialization, but extensive, although standard engineering services are required

Viable, financeable licensing pathway today for first plant
  • CNSC operates a regulatory regime that is:
    – graduated
    – risk-informed
    – Principle-based

IMSR can be brought to industrial markets in the 2020’s
CONTACT DETAILS

THANK YOU

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