Strategic Alliances & Innovative Supply Chain
Key Aspects for a Successful Deployment

18th INPRO Dialogue Forum
on Partnerships for Nuclear Development and Deployment
IAEA

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Firstly, we hope all participants, organizers and their close ones are well and healthy.

A sincere and profound appreciation to INPRO & the IAEA for their most valuable invitation. As well as a great recognition to INPRO for their exceptional work.
We will only reach our goals for **decarbonisation** if the alternative is **cheap** enough and scales **fast**.

**VISION**
Transform energy markets and **out-compete fossil fuels** to create a bright future with abundant clean energy for everyone.

**UNPRECEDEDENTED OPPORTUNITY**
Executing a rapid **worldwide deployment** of the Compact Molten Salt Reactor via **shipyard serial production** of power barges.
GETTING TO MARKET FAST AND SCALABLE

Seaborg's technical edge
Simple and scalable product

Roll out and partners
Getting to market
SEABORG’S TECHNICAL EDGE
SEABORG IN A NUTSHELL

Developing
The Compact Molten Salt Reactor

- Small modular nuclear reactor
- Mass produced
- Deployed on barges
- 200-800 MWe power barges
Company overview

- HQ in Copenhagen, Denmark
- Business office in South Korea
- Scaling to 80 employees in 2021
- Partnerships with shipyards, nuclear and heavy industry
The fluoride salt contains the radioactive elements:

- No release of gases
- Very low solubility in water
- Below 490 °C it is a rock
The Seaborg CMSR

1. **Cannot** melt down or explode
2. **Cannot** release radioactive gases to air or water
3. **Cannot** be used for nuclear weapons
4. Operates for **12 years without refueling**

SAFE, CHEAP AND CLEAN NUCLEAR
Seaborg’s Compact Molten Salt Reactor

Inherently Safe
THE SEABORG SOLUTION
- LIQUID MODERATOR

**NaOH**
(sodium hydroxide)

- Liquid from 318°C to 1388°C; excellent chemical stability; low viscosity; decent heat capacity; very affordable.
- Efficient moderator with 10 times the slowing-down power of graphite, about 1/2 that of water.
- Experience and knowledge exist from use in other industries.

1st patent published
MODULAR CMSR POWER BARGE
24 years operational life time

2 empty CMSR compartments for the second 12 year fuel cycle.

Steam Turbine with generator and condenser.

2 CMSRs for the first 12 year fuel cycle.

Compartments below turbine with auxiliaries for steam generation, power transmission and the CMSR.
TURNKEY FLOATING POWER PLANT
The CMSR Power Barge

Flexible, convenient and fast:
• **Standard designs** with 200/400/600/800 MWe
• Fully commissioned **at shipyard**
• **First power barge delivered in 2025**

<table>
<thead>
<tr>
<th></th>
<th>Length [m]</th>
<th>Thermal output [MWt]</th>
<th>Electrical output [MWe]</th>
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<tbody>
<tr>
<td>2x CMSR</td>
<td>98.4</td>
<td>500</td>
<td>200</td>
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<tr>
<td>4x CMSR</td>
<td>160.8</td>
<td>1000</td>
<td>400</td>
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<tr>
<td>6x CMSR</td>
<td>223.2</td>
<td>1500</td>
<td>600</td>
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<tr>
<td>8x CMSR</td>
<td>285.6</td>
<td>2000</td>
<td>800</td>
</tr>
</tbody>
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24 years of operation will save between **33.600.000** and **43.600.000** tons of CO₂

24 years of operation will save between **67.200.000** and **87.200.000** tons of CO₂

24 years of operation will save between **100.800.000** and **130.800.000** tons of CO₂
Delivering energy
Centralised construction, worldwide distribution

Power plant construction

- Sub-supplier's components to Seaborg
- Seaborg's CMSR
- Shipyard's barge with CMSRs, auxiliary systems and fuel
- Customer's power to the grid
- Negligible system integration costs
- Customer's heat to industry or process
- Zero emissions

Build supplier network
Partner with facility for CMSR assembly
Supply of CMSRs for the power barge construction
Fully commissioned power barge for the customer
BUSINESS CASE – ELECTRICITY, HYDROGEN OR HEAT

10 barges by 2028

Construction contract
5 firm power barges (1 GWe)
5 options (1 GWe) declared within 1 year

Construction finance
- Korean Development Bank
- Export-Import Bank of Korea

 Constructed by
- Shipyard Partner

Fuel
- Nuclear Operator

Joint ownership
- Energy Major(s)
- Financial Partners
- Maritime Operators
- Nuclear Operator

Operators
- Maritime Operator
- Nuclear Operator

Instalments
- Contract 20%
- Production start 20%
- Shipped 20%
- Commissioned 40%
TRANSFORMING THE WAY WE PROVIDE ENERGY
Cutting cost from construction to production

Shipyard construction
- Serial production
- Turnkey power plants
- Lump-sum contracts
- Staged financing

Power Barge delivery
- Lead time
- Consistent quality
- Limited site preparation
- Fully commissioned at shipyard

Power Barge operation
- Fuel logistics
- Manning
- Simple operation
- Moveable asset
- Decommissioning

Significant cost reduction

Unit economic levers
- Utilize economies of multiples
- Lump-sum contracts
- Contracting model from shipping
- Modular turnkey power plants
- Scalable production
- Competing on market terms
- Pricing on demand
World energy consumption

- **Oil**: 37.8%
- **Gas**: 14.9%
- **Coal**: 11.0%
- **Biofuels & Waste**: 11.7%
- **Electricity**: 20.8%
- **Heat**: 3.3%

Electricity by source

- **Coal**: 36.4%
- **Oil**: 3.1%
- **Gas**: 23.3%
- **Nuclear**: 10.4%
- **Hydro**: 15.6%
- **Wind**: 5.3%
- **Solar**: 2.7%
- **Other renewables**: 2.4%
- **Other**: 0.9%
- **Renewables**: 0.5%

Source: IEA World Energy Outlook, 2019
ABUNDANT, CHEAP AND CLEAN ENERGY

200 Power barges per year by 2035

Develop in Denmark

Build in South Korea

Power the World

Electricity
- Replacing coal and gas power
- Solving grid stability
- Powering hydrogen production

Heat
- Clean process heat for industry
- Production of ammonia
- Production of fresh water

ABUNDANT, CHEAP AND CLEAN ENERGY
Thank you!

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