Rethinking Nuclear
Can We Change the World’s
Cumulative Carbon Emissions Soon Enough?

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Venture Capital Return Profile 1995 - 2009
636 Investments
$1,200 MM Cost / $3,000 MM Value - 2.5X

Can you get into the “Big” Ideas?
Private Capital Ecosystem for US and Canadian Privately Funded Nuclear Efforts

• Approximately $1.6+ billion invested in last 10 years
• Professional Investors:
  • Venrock, NEA, RedPoint, Charles River, Lux Capital, Founders Fund, Braemar, Intellectual Ventures, Khosla Ventures, The Wellcome Trust, RussNano, Chrysalix, SDTC, Mithral, Y-Combinator
• High Net Worth Individuals – Gates, Bezos, Samberg
• SWF: Saudi, Russian
• Corporates – Lockheed, General Atomic, Fluor, Toshiba,
• Existing Industry Strategic Partners
  • Many are circling
  • Do they have the “innovators dilemma”
• Nuclear utilities engaged in discussions
• Prototype Testing Announced: TerraPower (China), ThorCon (Indonesia) and Terrestrial (Canada)
• **Industrial MOUs signed in TerraPower (China) and ThorCon Power (Indonesia)**
Funded Nuclear Efforts: Advanced Reactor Nascent Industry
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<tbody>
<tr>
<td><strong>Infrastructure Style Construction</strong></td>
<td>Westinghouse AP-1000 GE-Hitachi/Areva (Korea/China/Russia)</td>
<td>TerraPower TWR</td>
<td>Site Excavation Only</td>
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<td><strong>Factory Manufacture</strong></td>
<td>NuScale (Reactor Module)</td>
<td>GE-PRISM UPower (Reactor Module and Whole Plant)</td>
<td>PBMR Areva NGNP General Atomic EM² (Reactor Module and Whole Plant?)</td>
<td>Terrestrial Energy ThorCon Transatomic Moltex (Reactor Module and Whole Plant)</td>
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<td><strong>Service and Fueling</strong></td>
<td>Repair? Centralized Fuel Processing</td>
<td>Upgrade and Repair No Refueling</td>
<td>Upgrade and Repair Continuous Refueling</td>
<td>Upgrade and Repair By Swap Out Continuous Refueling Centralized Fuel Processing</td>
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<tr>
<td><strong>Reactor Physics Impact</strong></td>
<td>Hi P/Low Temp Water</td>
<td>Atm P/Hi Temp Liquid Metal Sodium</td>
<td>Hi P/Hi Temp He Gas</td>
<td>Atm P/Hi Temp Na/Be/Li Salts</td>
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Nuclear Must Be Cheaper Than Coal... Maybe Even Natural Gas ($< 0.05/kWh by 2025)

Uncertain, Lumpy Investments and Technology Cost Curve Forecasts

- Asian Pulverized SC Coal
- North America CCGT
- Gen-III+ LWRs
  - AP-1000 & NuScale
- Gen-IV SFRs
  - PRISM, TerraPower, & UTILITY
- Gen-IV MSRs
  - ThorCon, Terrestrial, and Transatomic
- Gen-IV HTGRs/GFRs
  - GA & Areva NGNP

Cost per kWh vs Time
Nuclear Must Be As Scalable as Coal
(50-100 GWe/yr by 2030)

Build Everything on an Assembly Line
Make Everything Repairable & Upgradeable On Site

- Reactor yard produces 150--500 ton blocks. About 100 blocks per 1GWe plant.
- Blocks are pre-coated, pre-piped, pre-wired, pre-tested.
- Focus quality control at the block and sub-block level.
- Blocks barged to site, dropped into place, and welded together.
- No major repairs or upgrades on-site...ship the block back to the yard.

100 GWe/year yard block diagram; 2,000,000 tons steel per year