NuScale Power
Safe, Economic, Scalable, Proven Nuclear Technology

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## Everything Changed Except Business Risk

<table>
<thead>
<tr>
<th>Old Nuclear</th>
<th>New Nuclear</th>
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<tbody>
<tr>
<td>Every plant is “First of a Kind”</td>
<td>NRC “Design Certification” standardizes plant designs for 20 years</td>
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<tr>
<td>Separate licenses for Construction and Operation</td>
<td>Combined Construction &amp; Operating License issued before construction begins</td>
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<tr>
<td>Capacity factors ~ 70%</td>
<td>Capacity factors routinely exceed 90%</td>
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<tr>
<td>Active safety systems require emergency power to operate</td>
<td>Passive safety systems rely on natural circulation</td>
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<tr>
<td>All plants &gt; 1000 MWe requiring large financial commitment</td>
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</tbody>
</table>
USA Market Driver – Aging Infrastructure

Coal
- 330 GWe from 1,112 coal-fired power plants
- 50 percent are more than 40 years old
- 230 plants canceled totaling 104 GWe

Nuclear
- 100 GWe from 104 plants = 20 percent of total U.S. generation
- NRC licenses expire and retirements begin in 2029. All plants retire by 2050

Renewables
- For wind and solar the best sites are gone
- Intermittency an increasing issue on all grids
Drivers for Small Modular Reactors

Safety
- Smaller size and simplicity of design result in greater opportunities to enhance safety. Not subject to large LWR scenarios – large break LOCA, SBO
- Natural circulation for passive “always-on” cooling

Reduced Business Risk
- Less capital at risk for a shorter period
- No longer a “bet the company” decision

Economies of Small
- Less to design, engineer, license, build, operate, maintain, decommission
- Extensive modularity and off site manufacturing of complex components

Broad Accessible Market
- True scalability – from 45 MWe to 540 MWe in a single nuclear plant
- Multiple applications: commercial power, desalination, district heating.
NuScale Corporate Overview
NuScale Power History

- Oregon State University builds ¼ scale test facility to support Certification of the AP600 and AP1000 without requiring a “prototype” (1990s)
- NuScale design (MASLWR) and test facility originally developed under DOE funded program with co-sponsors in 2000-2003
- OSU refined and developed the design with proprietary improvements (2004-2007)
- NuScale Power Inc. formed in June 2007. Tech-transfer agreement with OSU provides exclusive use of the Integral System Test facility and patents.
- 2008 – 2011
  - Establish Executive Team and staff of world-class engineers
  - Gain commitment from US NRC to support licensing
  - Secure support from US Congress and US DOE
  - Secure funding from Fluor Corporation
NuScale Power Background

- October 2011: Fluor entered as major investor
- April 2012: Teamed with SCANA/SRS for potential 1st project
- May 2012: FOA Application submitted to US DOE
- June 2012: Full scale HFE control room simulator operational
Fluor Overview

♦ Acquired majority interest in NuScale – October 2011.

♦ One of the world’s leading publicly traded engineering, procurement, construction, maintenance, and project management companies

♦ #124 in the FORTUNE 500 in 2011

♦ More than 1,000 projects annually, serving more than 600 clients in 66 different countries

♦ More than 42,000 employees worldwide

♦ Offices in more than 28 countries on 6 continents

♦ Nearly 100 years of experience

Fluor Corporate Headquarters
Dallas, Texas

♦ Revenue: $20.8 billion

♦ New Awards: $27.3 billion

♦ Backlog: $34.9 billion

♦ Investment Grade Credit Ratings: S&PA-, Moody’s A3, Fitch A-
Innovative PWR Technology
Elegantly Simple Innovative Design
Safe and Scalable

- 12 x 45 MWe Reference Plant = 540 MWe
- Each module is independent, installed and refueled sequentially
- Reactor vessel integrated into steel containment vessel installed below grade in 4 million gallon pool
- Integrated NSSS transported to site by truck, rail or barge
Reference Plant Design 12 x 45 MWe

Standard design for utility scale power plant clusters 12 modules to produce 540 MWe

Each module is installed, operated and refueled individually.
Independent TG Sets for Each Module

- Skid mounted
- Easy to transport
- Controlled fabrication
- Fast onsite installation
- Off-the-shelf models currently available
- Direct coupling to steam turbine, allowing a much safer water- or air-cooled design
• Site boundary is 330 meters x 360 meters (12 hectares) “inside the fence”
• All cooling options available.
Incremental Build Out

Initial Installation (270 MWe)

Installed: 6

Power Modules

Cooling Towers

Turbine Building and 6 Turbine Generators
Incremental Build Out

Initial Installation (270 MWe)

Turbine Building and 6 Turbine Generators

Power Modules

Installed: 12

Incremental Expansion (540 MWe)

Cooling Towers
Plant Safety
Added Barriers Between Fuel and Environment

Conventional Designs
1. Fuel Pellet and Cladding
2. Reactor Vessel
3. Containment

NuScale’s Additional Barriers
4. Water in Reactor Pool (4 million gallons)
5. Stainless Steel Lined Concrete Reactor Pool
6. Biological Shield Covers Each Reactor
7. Reactor Building
**Extensive Siting Options**

- **Robust Seismic Design**
  - Designed for potentially higher seismically-active areas
  - Structure composed almost entirely out of concrete, with well arranged shear walls and diaphragms which provides for high rigidity
  - Significant portion of the structure located below grade partially supported by bedrock
  - Large pools filled with water help dampen seismic forces
Stable Long Term Cooling

Reactor and nuclear fuel cooled indefinitely without pumps or power

WATER COOLING

BOILING

AIR COOLING

No Pumps • No External Power • No External Water

Decay heat removed by steam generators and DHRS (3 Days)

Decay heat removed by containment (30 Days)

Transition to long-term air cooling (> 30 Days)

TIME = POWER =

1 sec 10 MWt
1 hour 2.2 MWt
1 day 1.1 MWt
3 days 0.8 MWt
30 days 0.4 MWt
Indefinite <0.4 MWt
Reduced Core Damage Frequency

Source: NRC White Paper, D. Dube; basis for discussion at 2/18/09 public meeting—on implementation of risk matrices for new nuclear reactors.
Pathway to Commercialization
NuScale / NRC Engagement

- Initiated first formal iPWR NRC pre-application project in April 2008 (Project 0769)
- Conducted 10 meetings to date; 6 meetings remaining in 2012; more in 2013
- Submitted 7 reports to date (2 topical reports, 5 technical reports); 8 additional submittals committed for 2012; more in 2013
- Scheduling NRC observations of extensive testing programs at integral effects facility (OSU) and major separate effects facilities (fuel, HCSG)
- NRC developing Design Specific Review Standards for NuScale and mPower
Testing For Safety and Operation

Fabricating and Testing Major Components
- Steam Generator
- Handling Equipment
- Control Rod Drive Mechanisms
- Passive Safety Systems
- Valves
- Inspection Equipment
- Fuel Bundles
- Main Control Room

Separate Effect Tests
- Fuel Assembly Flow Testing
- Fuel Grid Structural Crush Testing
- Fuel Rod Critical Heat Flux Testing
- Containment High Pressure Condensation
- Steam Generator Heat Transfer Evaluation
Suppliers and Strategic Partners

- General Dynamics Electric Boat
- Huntington Ingalls Industries
- Oregon Iron Works, Inc.
- Curtiss Wright
- Fluor
- MPR
- Studsvik
- Ares Corporation
- Siemens
- Konecranes
- Morgan Lewis
- Talisman International, LLC
- Enercon
- OSU
- Saic
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