CARBON FREE POWER PROJECT OVERVIEW

Payson City Presentation

June 17, 2015

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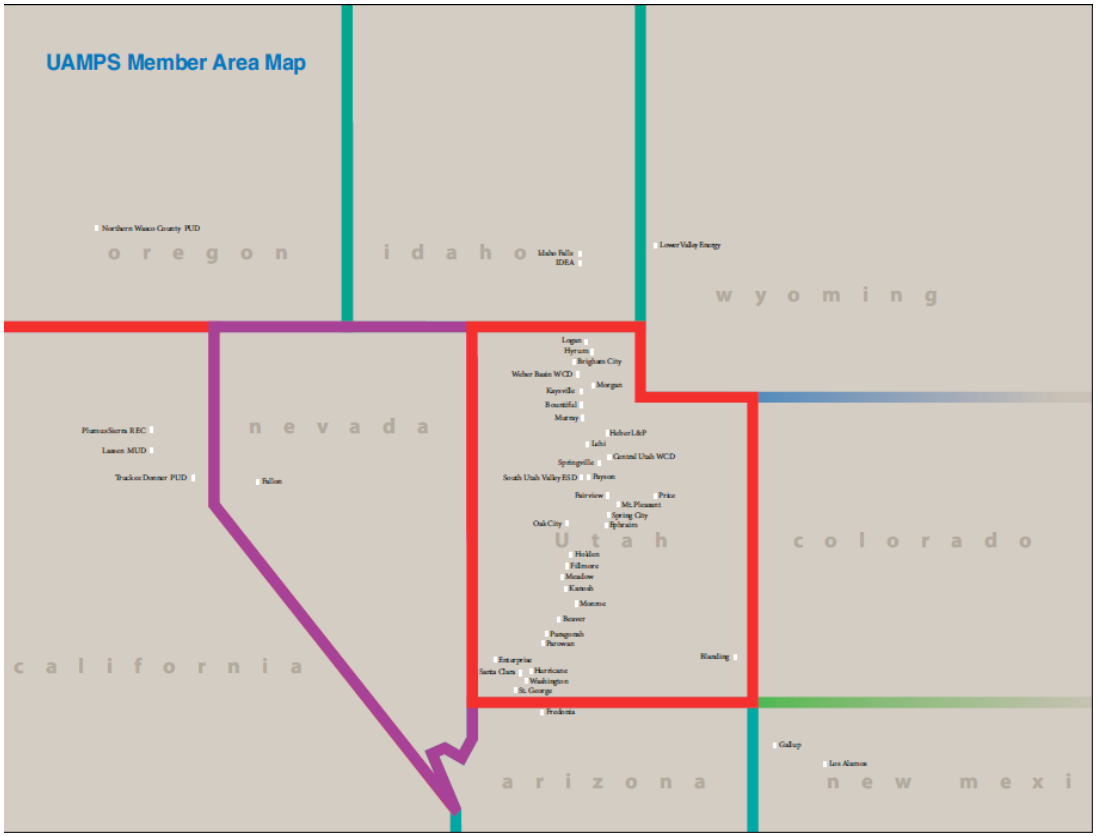
Description of UAMPS

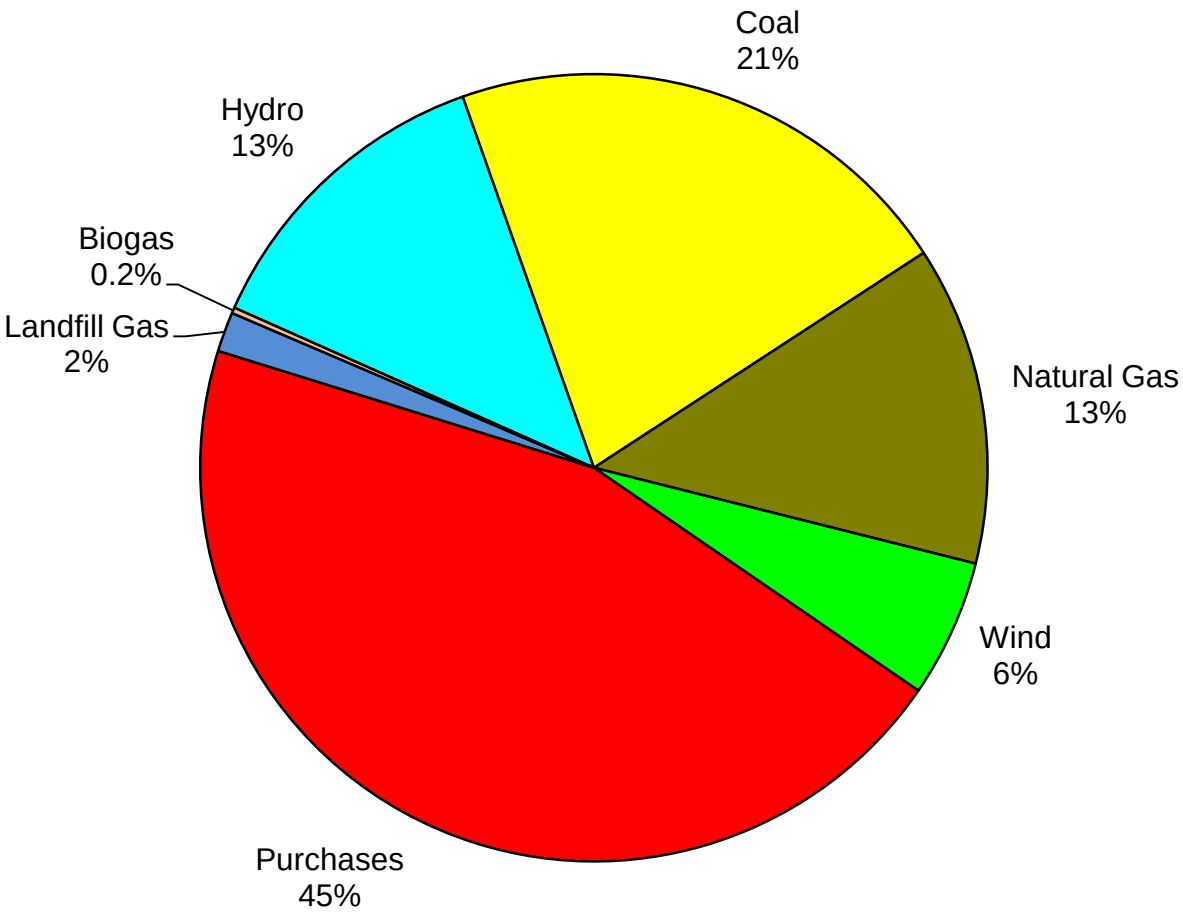
- Energy Services – Interlocal Agency.
- Project-based.
- 45 members.
- Not-for-profit.



UAMPS Existing Resources

- Coal
  - Intermountain Power Project 253 MW
  - Hunter II 65 MW
  - San Juan 35 MW
- Gas 141 MW
- Hydro 275 MW
- Renewable 78 MW
- Member Internal Generation 232 MW
- Market (mostly sourced from Coal) 255 MW

UAMPS: Resource Type - 2014



Why SMRs?

- CFPP development is a hedge against carbon regulation and other Clean Air Act regulation.
  - EPA's Clean Power Plan (aka 111d Rulemaking).
  - Regional Haze Program under Clean Air Act (focus on NOx, SO2, and particulate matter).
  - Ozone regulations.
- Replacement for coal plants reaching end of economic life.
- Balance existing resource portfolio.
- Load following capabilities to integrate renewables.

UAMPS Recent Project Experience

- Nebo Project, Payson Utah.
  - 141 MW combined cycle gas.
    - With associated 138 kV and 46 kV substations and transmission.
    - June 2004.
- Horse Butte Wind Project.
  - 57.6 MW wind farm.
    - 32 Vestas V-100 1.8 MW wind turbines.
    - Substation and associated facilities.
    - August 2012.
- Veyo Heat Recovery Project.
  - 7.8 MW heat recovery generation project.
    - Adjacent compressor facility for Kern River Gas Transmission Company.
    - Scheduled to be online Fall of 2016.

UAMPS Project Development

- Creation of financing mechanisms to reduce capital costs.
  - Tax exempt financing.
  - Creative use of tax incentives.
  - Engagement letters with financial firms at development phase.
- Use of expertise for maximum project benefits.
  - Development of detailed financial modeling.
  - Specialized consulting organizations.

Carbon Free Power Project (CFPP)

- Developed through UAMPS' Smart Energy resource planning process.
- Includes emphasis on:
  - Energy Efficiency measures,
  - Recognition and development of distributed generation, especially solar generation, within member systems, and
  - Development of SMR generator using NuScale technology.
    - Preliminarily Idaho National Laboratory identified as having suitable potential sites for the CFPP.
      - Value of existing site characterization work.
      - Consistent with original mission for the lab.
- Anticipated Commercial Operation Date=Late 2023 for the first module.

Existing CFPP Development Agreements

- Teaming Agreement (Parties=UAMPS, Energy Northwest, NuScale).
  - UAMPS lead in developing site for the Project.
  - Energy Northwest has a right of first offer to be Operating Agent for the project—currently operates Columbia Generating Station in Hanford, Washington.
  - NuScale as technology provider.
- Interlocal Agreement (Parties=UAMPS and Energy Northwest).
  - Energy Northwest providing consulting services to UAMPS in support of NRC licensing preparation.
- Region of Interest Consulting Agreement (Parties= Enercon & UAMPS).
  - Conduct site selection work pursuant to NRC regulations.

CFPP TEAM

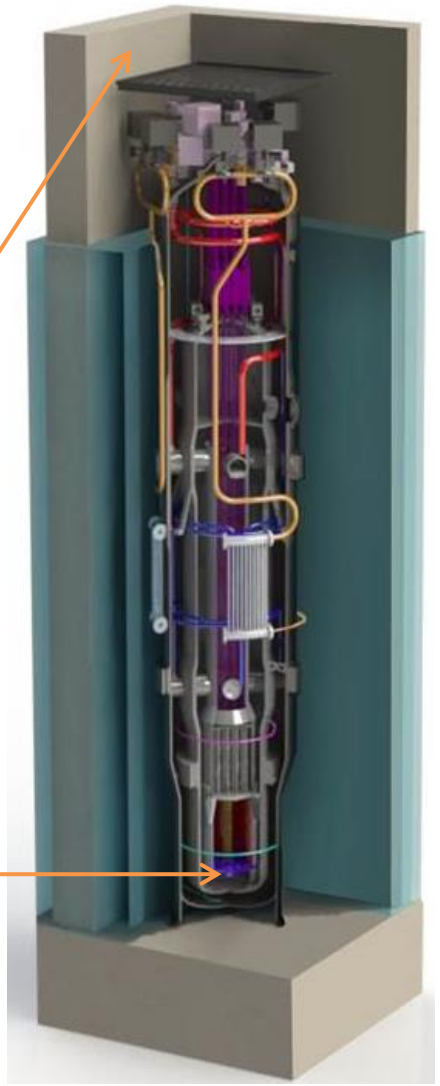
- NuScale—OEM Provider.
- Fluor Corporation—EPC Contractor.
- Enercon—Siting Consultant.
- Energy Northwest—Operator.
- Hogan Lovells—NRC & DOE Counsel for UAMPS.
- Other consultants and legal advisors with particular expertise.
  - Givens Pursley—ID water and environmental counsel to UAMPS.
- Banks.
  - Bank of America Merrill Lynch.
  - BMO Capital Markets.
- Other consulting work as needed.

NuScale technology videos

- http://www.nuscalepower.com/overviewofnuscalestechnology.aspx
- Safety video: http://www.nuscalepower.com/triplecrown.aspx

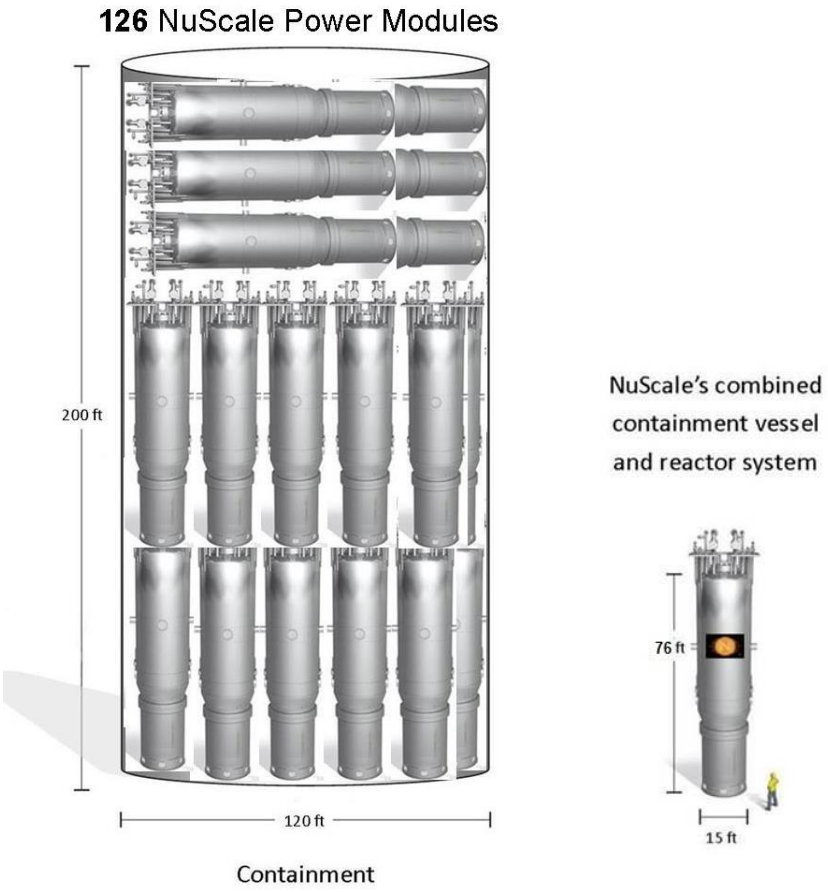
What is a NuScale Power Module?

- A NuScale Power Module (NPM) includes the reactor vessel, steam generators, pressurizer and containment in an integral package that eliminates reactor coolant pumps and large bore piping (no LB-LOCA).
- Each NPM is 50 MW and factory built for easy transport and installation.
- Each NPM has its own skid-mounted steam turbine-generator and condenser.
- Each NPM is installed below-grade in a seismically robust, steel-lined, concrete pool.
- NPMs can be incrementally added to match load growth - up to 12 NPMs for 600 MW total output.

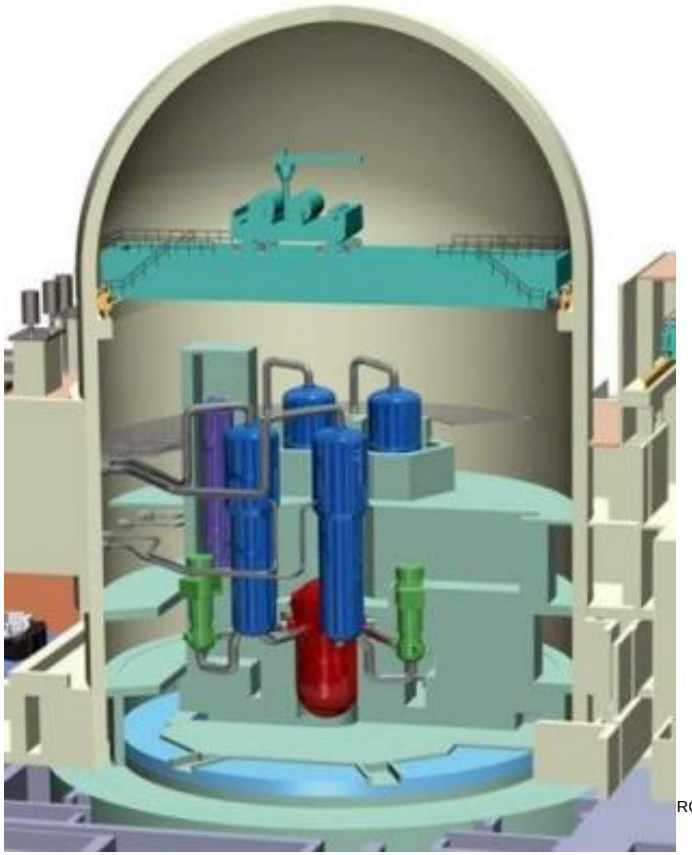


Size Comparison

Comparison size envelope of new nuclear plants currently under construction in the United States



Typical Pressurized Water Reactor



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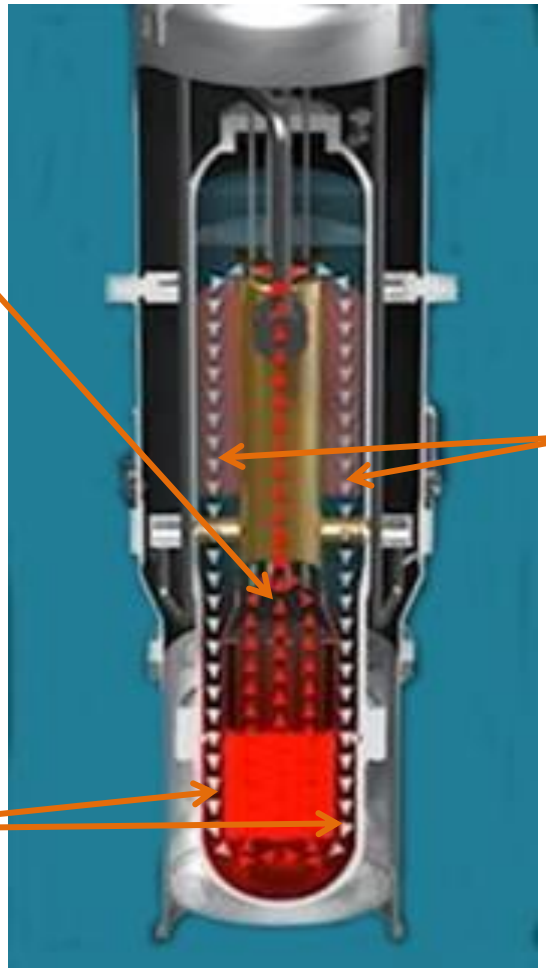
Coolant Flow Driven By Physics

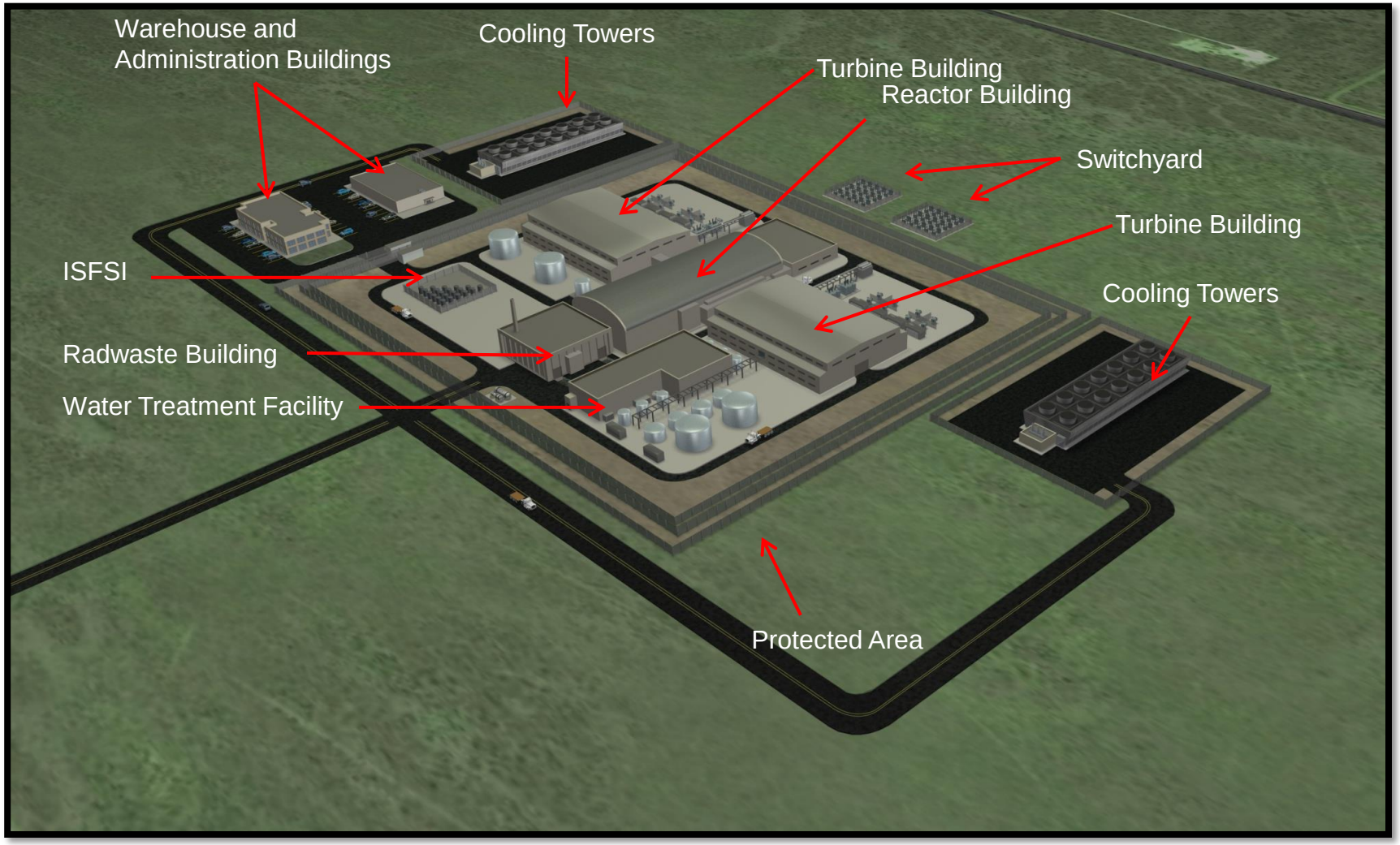
***Convection* – energy from the nuclear reaction heats the primary reactor coolant causing it to rise by convection and natural buoyancy through the riser, much like a chimney effect**



***Conduction* – heat is transferred through the walls of the tubes in the steam generator, heating the water (secondary coolant) inside them to turn it to steam. Primary water cools.**

***Gravity* – colder (denser) primary coolant "falls" to bottom of reactor pressure vessel, cycle continues**

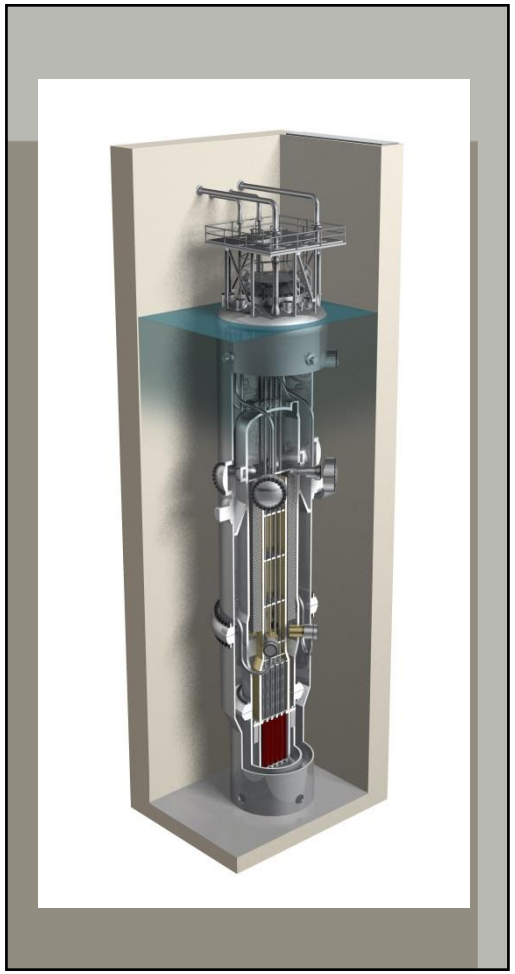
Site Aerial View



NuScale Announces Major Safety Breakthrough

Wall Street Journal April 16, 2013

- NuScale design has achieved the “Triple Crown” for nuclear plant safety. The plant can safely shut-down and self-cool, indefinitely, with:
  - **No Operator Action**
  - **No AC or DC Power**
  - **No Additional Water**
- Safety valves align in their safest configuration on loss of all plant power.
- Details of the Alternate System Fail-safe concept were presented to the NRC in December 2012.



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Load Following

- NuFollow Capability of NuScale SMR Technology:
  - Taking one or more modules offline for extended periods of low grid demand or sustained wind output,
  - Maneuvering reactor power for one or more modules during intermediate periods to compensate for hourly changes in demand or wind generation, or
  - Bypassing the module's steam turbine directly to the condenser for rapid responses to load or wind generation variations.

Construction Summary Costs

Overall EPC Overnight Plant Costs

($1,000,000)

ITEM	2014 Dollars
Power Modules (FOAK Cost plus Fee, Transportation, & Site Assembly)	$ 848
Home Office Engineering and Support	$ 144
Site Infrastructure	$ 60
Nuclear Island (RXB, RWB, MCR)	$ 538
Turbine Island (2 buildings with 6 turbines each)	$ 350
Balance of Plant (annex, cooling towers, etc)	$ 225
Distributables (Temp. Bldgs., Field Staff, Const. Equip., etc.)	$ 545
Other Costs	$ 185
Total Overnight Price	**$ 2,895**

$ 5,078 per kWe net

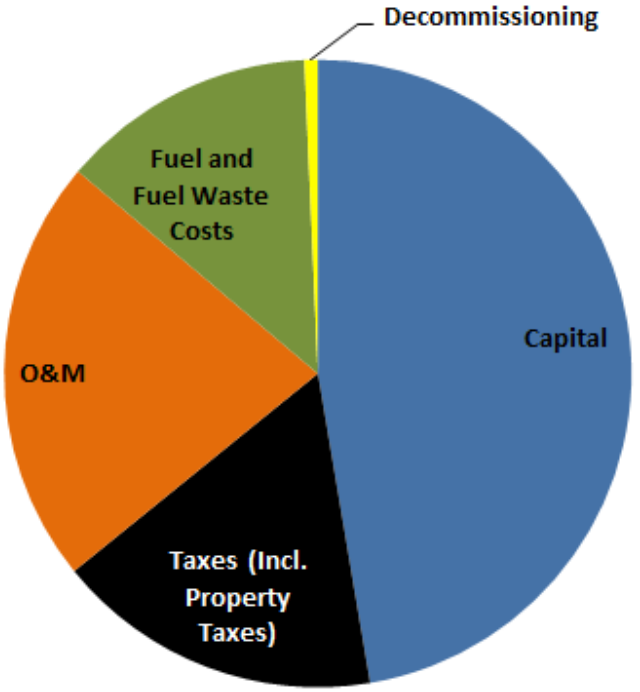
Note: Delivered costs shown are in 2014 $'s.

NuScale Levelized Cost of Electricity Estimates (LCOE)

NuScale LCOE results of $93-$106/MWhr (2015 $'s)

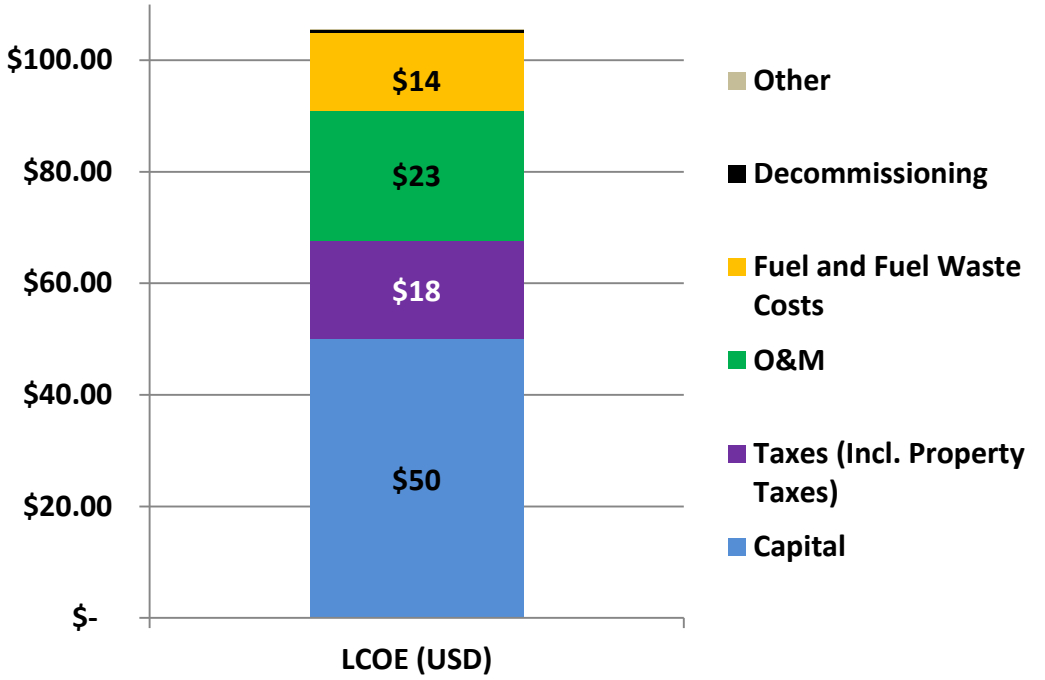
Key Assumptions:

- Financing is 55% debt (@5.5%) and 45% equity (@10.0%).
- Modeled as a 40 year project life, but the plant is designed for 60 years
- Excludes owner's costs such as:
  - HR and management infrastructure, central office
  - COLA, permits, NRC and ITAAC inspections, and legal fees
  - Switchyard
  - Owner's project development costs
  - Owner's engineering services (post-COLA)
  - Owner contingency
- Including an estimate of owners costs would add ~ $6/MWhr



LCOE Breakdown

Levelized Cost in 2015 US Dollars



FOAK with Regulated Utility Financing (IOU)

- 55% debt at 5.5%, 45% equity at 10%

$ 106 USD

FOAK with Municipal Financing

- 100% debt at 3.5%, no equity

$ 72 USD

Note: Capital costs reflect the Fluor SE estimate completed in 2014.

PROJECT FORMATION

CFPP Project Formation

- Step 1—Move CFPP out of Resource (June 2015).
  - Resource PMC approves the formation of a CFPP Project pursuant to the UAMPS Joint Action Agreement and Bylaws and approves the form of the CFPP Site Phase.

CFPP Project Formation (cont.)

- Step 2—Project Formation (September 2015).
  - Participants execute CFPP Siting Phase Agreement with designated Site Share Percentage (SPS).
  - CFPP PMC established and Participants agree to pay for CFPP Preparatory Costs based on SPS.
    - Needed to complete ongoing investigation for site prior to making application for a combined operating license.
  - DOE funds to provide cost reimbursement for CFPP site development costs up to 50%.
  - Only those Participants that originally execute the CFPP (Open-Enrollment Period) will benefit from DOE funds (Sec. 8—Addition of New Participants).
    - New participants that desire to purchase an Orphan Site Share, may pay a Buy-In Amount without recognizing the benefit of the DOE funds.

CFPP Project Formation (cont.)

- Step 2—continued
  - Participants will have the right to convert SPS to a Power Sales Contract
  - SPS Participants have the right to sell their SPS to other UAMPS members through a first right of refusal process.
  - Cost recovery of investigation based on SPS.
  - SPS Participants have ownership of the investigation work product.

CFPP Project Formation (cont.)

- Step 3—CFPP budget adopted: PMC adopts a budget to proceed with Phase I work (September 2015)
  - Off-ramp for Participants—remaining Participants are committed through Phase I, budget increase of greater than 20% or when PMC terminates by majority vote

CFPP Project Formation (cont.)

- Step 4—Phase II Budget: PMC determination to proceed with Phase II (Late Fall of 2015).
  - Off-ramp for Participants--remaining Participants are committed through Phase II, budget increase of greater than 20% or when PMC terminates by majority vote.

CFPP Project Formation (cont.)

- Step 5--Termination of CFPP Siting Phase Agreement (April 2016).
  - Transition into PSC based on criteria associated with Entitlement Share (87% subscription based on project output); or
  - Termination of CFPP.

CFPP WORK PLAN

NRC Licensing

- UAMPS plans to submit a Combined Operating Licensing (COL) application in Q4 of 2017.
  - 39 month NRC review period.
    - NRC will compile an Environmental Impact Statement (EIS) analyzing the impacts of constructing, operating, and decommissioning the CFPP on the human environment.
  - Pre-COL Application submittal activities.
    - Region of Interest process.
    - Site Characterization work for potential sites.
    - Pre-engagement work with NRC on licensing issues unique to NuScale's technology.
  - NRC license for on-site spent fuel storage generated by CFPP.
- NuScale to submit Design Certification Application (DCA) in mid-2016 to NRC.
  - Process by which NRC approves a certain technology.
  - 39 month review period.

Region of Interest ("ROI") Process

- ROI strategy:
  - Overview: Focus on southeastern Idaho and to the extent practicable the INL footprint in defining the Region of Interest.
    - UAMPS has engaged Enercon to conduct ROI process.
      - INL staff to participate in ROI process.
    - UAMPS to meet with NRC to discuss definition of ROI.
    - Complete ROI and site selection process by October 2015.
  - Legal Considerations:
    - Reasonable range of alternative sites at the end of ROI process to be analyzed in NRC's EIS and as part of DOE's NEPA analysis to ultimately issue site use agreement to CFPP.
    - Consistency with applicant's purpose and need statement.

USE Agreement

- UAMPS and DOE intend to enter into a use agreement in the Fall of 2015.
  - Use agreement would serve as the vehicle to allow UAMPS to explore certain sites at INL.
  - Final site for CFPP would not be designated in the use permit until after NRC NEPA is complete.
    - NEPA strategy—DOE conditionally agrees to the future actions pending NRC completing its permitting process.
  - Other Provisions:
    - Site Access.
    - Security Plan.
    - Emergency Planning.
    - Licensee Control of CFPP Facility.
    - Fuel Transport.
    - Spent Fuel Storage—on site storage covered under NRC COL issued to CFPP.
    - Decommissioning.
    - DOE Orders.

Questions?