The Westinghouse Small Modular Reactor

Building on 125 Years of Innovation
Westinghouse Delivers

For more than 125 years, Westinghouse has delivered on its promises. Now when the world needs nuclear energy in a size to suit more diverse applications, Westinghouse is ready to answer again. Comprising the best technical and nuclear minds and experience, the Westinghouse small modular reactor (SMR) team is set to deliver once more. The Westinghouse SMR will be deployed in 2022, setting the new precedent for nuclear safety, innovation and flexibility.

Westinghouse is the world’s leader in nuclear power, and that experience increases our commitment to personnel and nuclear safety and designing quality into every product and service. Westinghouse experience and expertise remain unmatched in licensing new technology, and the SMR will follow the same path.

NexStart Alliance and Westinghouse

Working Toward a Common Goal

The Westinghouse SMR team is working with The NexStart SMR Alliance, a consortium of current and prospective nuclear owners and operators, cooperative, municipal and investor-owned electricity providers, and public enterprises.

Their common goal? Working to advance energy security, which means working toward Westinghouse SMR design certification and eventual deployment of up to five Westinghouse SMRs at Ameren Missouri’s Callaway Energy Center.

Alliance members provide feedback on the Westinghouse SMR program and design, which is implemented immediately. This maximizes utility benefits and leads to the best and safest SMR design.

www.nexstartalliance.com

“Ameren Missouri, our alliance and the entire state of Missouri stand ready to capitalize on this important project that will also help create a cleaner energy portfolio for our state and our country.”

- Warner Baxter,
President and CEO of Ameren Missouri
Less is More
The Westinghouse SMR...

- Produces the most power using the least amount of material
- Leaves behind a small carbon footprint
- Relies on only about 15 acres
- Stands alone
- Requires no shared systems or components

Alternative Applications

- Electricity generation and industrial process heat
- Desalination or water purification
- Co-generation applications
  - In the petrochemical industry for combined heat and power
  - In residential applications using electricity and district heating
- Improved energy security and reduction in the overall life cycle carbon footprint when used to provide power for liquid transportation fuel from resources of oil sands, oil shale and coal-to-liquid applications

Economic Benefits

- The Westinghouse SMR has the potential to create tens of thousands of jobs for Americans
- Total capital costs will be greatly reduced: the Westinghouse SMR requires very short construction times and low upfront costs, resulting in a faster return on investments
- The Westinghouse SMR is the ideal size for replacing aging fossil fuel fleets
Speed to Licensing

The Westinghouse SMR utilizes technology already licensed and tested by the U.S. Nuclear Regulatory Commission (NRC), resulting in an expedited licensing approval schedule. The Design Certification Application (DCA) is planned for the second quarter of 2014.

“The Westinghouse SMR fuel design began in 2011 and is based on the proven Robust Fuel Assembly (RFA) technology used in the fuel for the four Westinghouse AP1000® nuclear power plant units currently under construction in China, as well as the four AP1000 units being built in Georgia and South Carolina, the first new nuclear power plants to be built in the U.S. in over a generation. Additionally, the RFA technology has been used successfully in more than 50 reactors over the last 15 years.”

Modularity: How does it work?
Modular, factory built components allow for rapid construction and deployment

Best-in-Class Safety for a Better Tomorrow
The Westinghouse SMR offers:

- Passive safety features designed to shut the plant down automatically and keep it cool without human intervention or AC power for seven days
- Reduced fuel, resulting in reduced radioactivity amounts released in the case of an accident
- Passive heat removal with on-site water inventory, which relies on the natural forces of evaporation, condensation and gravity
- Underground containment
- Innovative, integral design eliminates a number of accident scenarios
- Improved energy security and reduction in the overall life cycle carbon footprint when used to provide power for liquid transportation fuel from resources of oil sands, oil shale and coal-to-liquid applications

Gravity. Sometimes the best ideas are just that simple.
Clean Energy Comparison

- **Average Wind Power**: 225 MWe on 60,000 acres of land
- **Average Solar Power**: 225 MWe on 2400 acres of land
- **The Westinghouse SMR**: 225+ MWe on only 15 acres of land

Innovative Load Following Capabilities

- The SMR is capable of economically handling the unique challenges of providing baseload power on smaller grids and those with non-steady power sources
- The SMR utilizes the Westinghouse mechanical shim (MSHIM™) operating strategy to follow grid changes
- MSHIM allows easy transition between load follow and baseload operation with minimal operator interaction
- Operational costs are lowered due to minimized chemistry change requirements
- Daily load follow can be performed from 100% to 20% power at a rate of 5% change per minute; in continuous load follow, the plant can perform load changes of ±10% power at a rate of 2% per minute

Westinghouse SMR Technology at a Glance

- **Electric Output**: >225+ MWe
- **Reactor Power**: 800 MWt
- **Design Life**: 60 years
- **Fuel Type**: 17x17 RFA, <5% enriched UO2
- **Total Site Area**: ~15 acres
- **Passive Safety Systems
- **Rail, Truck or Barge Shippable
- **Compact Integral Design
- **Simplified System Configuration Standardized, Fully Modular Approach
- **Minimized Footprint, Maximized Power Output
- **24 Months between Refueling

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