LINE Commission Meeting

Idaho Falls, ID
September 21, 2012

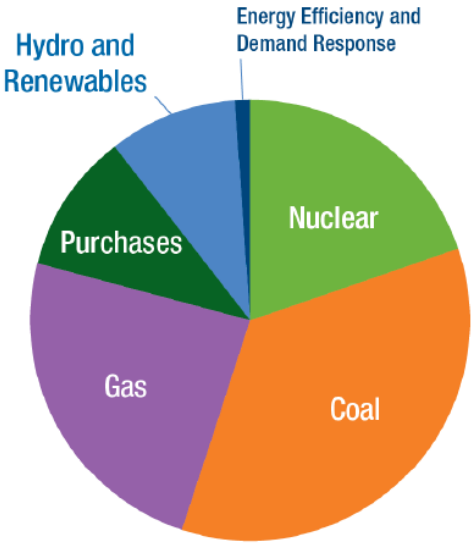
Presented by

Jim Lemons
General Manager, Reactor Engineering and Fuels
Tennessee Valley Authority

TVA Nuclear

Tennessee Valley Authority

TVA Nuclear



- A federal corporation funded entirely by power sales
- Provides electricity, economic development, flood control, and navigation
- Service Area:
  - 7-state region
  - 80,000 square miles
  - 9 million people
  - 650,000 businesses and industries
- 2011 revenue: $11.7 billion

TVA Vision

TVA Nuclear

One of the Nation's Leading providers of low-cost and cleaner energy by 2020

Low Rates

Cleaner Air

High Reliability

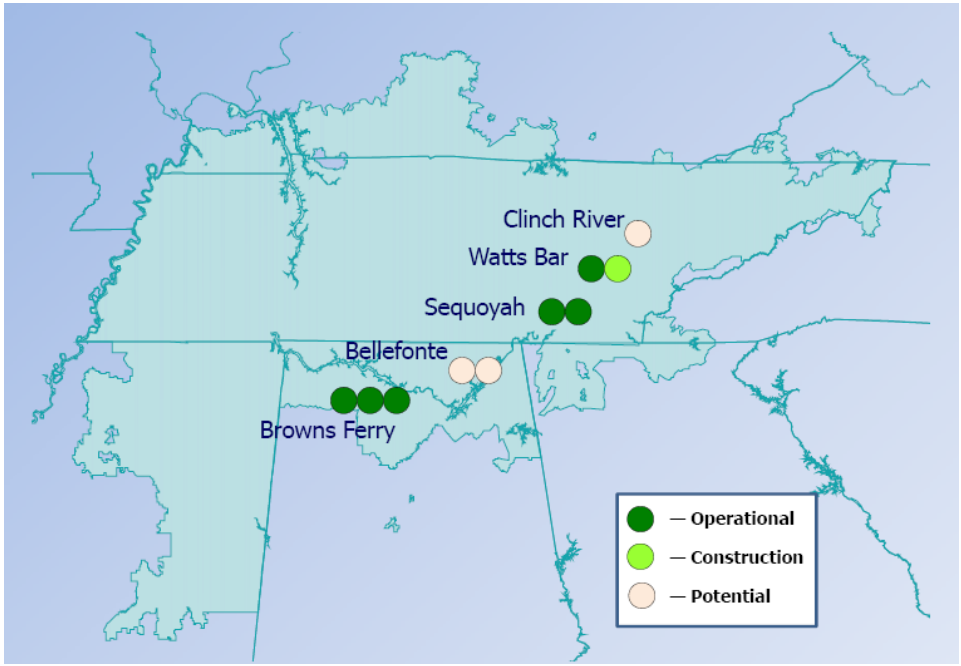
More Nuclear Generation

Responsibility

Greater Energy Efficiency

TVA Nuclear Fleet

TVA Nuclear



Six operating reactors

One reactor under construction

Additional reactors either approved or under evaluation

Browns Ferry Units 1, 2, & 3

Watts Bar Unit 1
Unit 2 – 2015

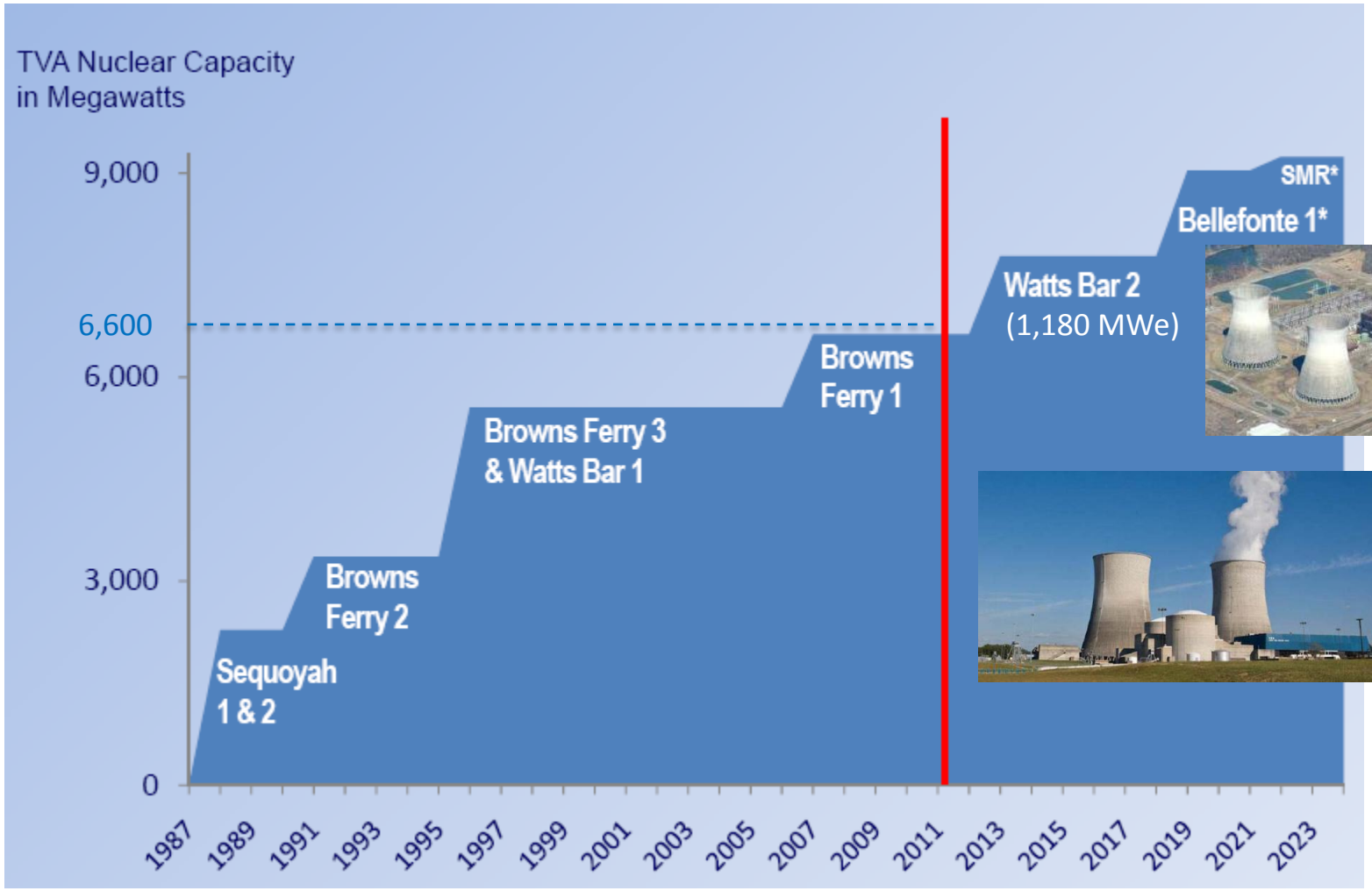
Bellefonte – Approved

Clinch River-SMR – under study

Sequoyah Units 1 & 2

TVA Nuclear Capacity

TVA Nuclear



TVA and DOE programs

TVA Nuclear

- **TVA has extensive nuclear experience with DOE programs**
  - ✓ Blended Low Enriched Uranium (BLEU) program
    - Blends down weapons program uranium into usable reactor fuel
    - Used at Browns Ferry and Sequoyah since 2005
  - ✓ Tritium production for national security
  - ✓ Consortium on Advanced Simulation of Light Water Reactors
  - ✓ Small modular reactors
  - ✓ Tails enrichment program
  - ✓ Mixed oxide fuel evaluation
  - ✓ Accident tolerant fuel design development

Enabling TVA's Vision

More Nuclear Generation

TVA Nuclear

Safe, reliable, and cost effective nuclear operations are critical!

- **Existing facilities must operate safely with no impact to the public**
- **Nuclear generation must be reliable and support the electrical transmission reliability goals**
- **Nuclear must maintain a significant cost advantage to other generation forms**

A national R&D infrastructure is necessary to achieve and maintain these goals

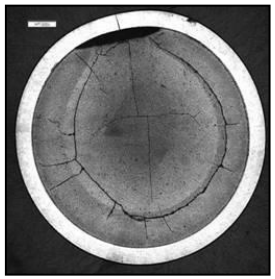
Enabling TVA's Vision

Resolve Current and Emerging Problems

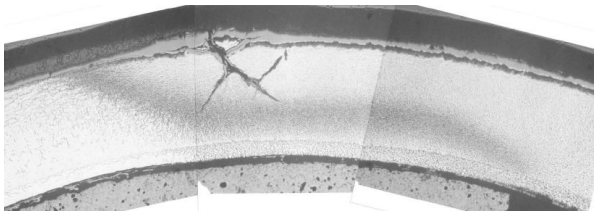
TVA Nuclear

Issues affecting fuel reliability and safety

- **Fuel leaker causal evaluations**
  - **Requires advanced inspection techniques, tools, and facilities**
  - **Necessary to preserve integrity of the 1st fission product barrier**



Missing Pellet Surface leaker mechanism identified in Hot Cell



Hot cell cladding evaluation

Poolside leaker examination

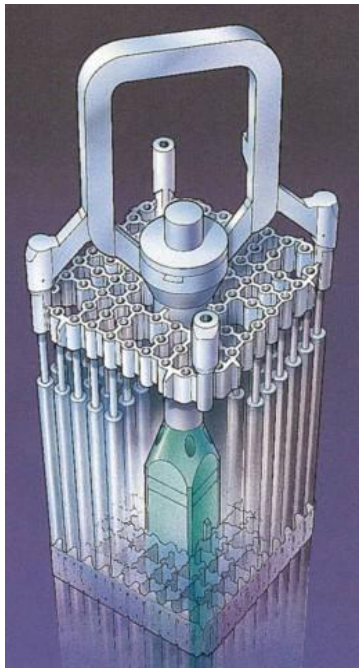
Enabling TVA's Vision

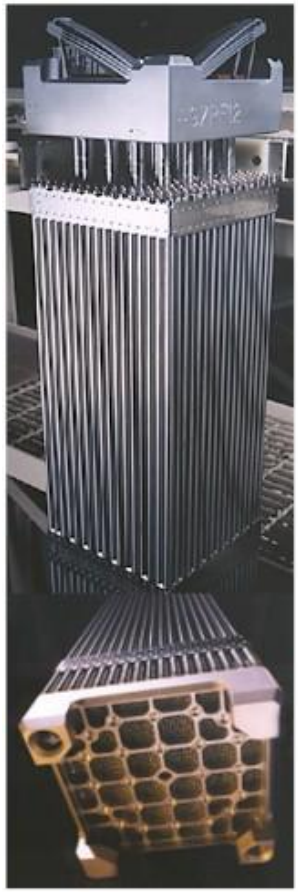
Develop More Efficient Fuel Designs

TVA Nuclear

Ensure Nuclear remains cost competitive

- **Higher fuel burnups**
- **More neutronically efficient designs**
- **Higher power capability**
- **Advanced materials**





Requires advanced testing capabilities!

Enabling TVA's Vision

Develop Accident Tolerant Fuel

TVA Nuclear

Ensure Nuclear remains safe

- **Higher heat tolerance**
- **Less hydrogen generation during beyond basis LOCA**
- **Greater coping times to core reflood**
- **Advanced materials**
- **Adds additional safety margins at the source – the fuel**

Requires extensive irradiation and materials testing!

Conclusion

To continue to develop a nuclear future, the nation needs an infrastructure to support it …

Idaho can provide this important Infrastructure!