TVA & Advanced Nuclear Energy
THE CLINCH RIVER NUCLEAR PROJECT AND ADVANCED NUCLEAR TECHNOLOGY PROGRAM

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SHAPING OUR ADVANCED ENERGY FUTURE WORKSHOP

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TVA Mission

BUILT FOR THE PEOPLE OF THE VALLEY

ENERGY
- Electricity at the lowest feasible rate and highest feasible reliability
- Stewardship of the natural resources for best use by the public

ENVIRONMENT
- To attract and retain good jobs and capital investment in the Valley

ECONOMIC DEVELOPMENT

1933 - TVA ACT SIGNED
Innovating out of economic depression

1940s - HYDRO
Largest hydropower construction programs ever undertaken in the US to support power needs during WWII.

1950s - FOSSIL
Rise of inexpensive coal power to meet Valley demands. Innovations in fertilizer and land management techniques established model for modern agriculture extension services.

1960s - NUCLEAR
To address challenges with burning coal and increasing energy demand, TVA constructs the nation’s first GE BWR-4 nuclear plant at Browns Ferry.

1970s - PUMPED STORAGE & GAS
TVA continues to innovate to meet peak daytime demands through pumped storage at Raccoon Mountain. TVA also begins producing power by simple cycle combustion turbines (gas).

2020+
TVA’S ENERGY SYSTEM OF THE FUTURE
To reduce carbon emissions and support increasing electricity demands, TVA is pioneering emerging technologies in advanced nuclear, solar, pumped storage, and battery storage to create the Energy System of the Future.

INNOVATING FOR THE PEOPLE OF THE VALLEY

ENERGY
- Electricity at the lowest feasible rate and highest feasible reliability

ENVIRONMENT
- Stewardship of the natural resources for best use by the public

ECONOMIC DEVELOPMENT
- To attract and retain good jobs and capital investment in the Valley
Generation Capacity vs. Carbon Reduction Goals

LEVERAGING ADVANCED NUCLEAR TO MEET BOTH OBJECTIVES

TVA needs to add generation capacity while reducing carbon by 2050.

TVA’S ENERGY SYSTEM OF THE FUTURE

CARBON-FREE OPTIONS

Advanced Nuclear | Small modular reactors (SMRs) are a safe, reliable, and flexible source of carbon-free power.

Hydro | TVA is working to extend the life of the existing hydro fleet and evaluating new pump storage and pumped back capabilities.

Carbon Capture | Gas can be combined with carbon capture technology for a net-zero effect.

Solar | A renewable form of energy from the conversion of sunlight to electricity.

Battery Storage | Can be combined with solar to support peak demands.

Hydrogen | Technology is in development.
TVA’s Nuclear Power and Construction Experience

OUR EXPERIENCE & EVOLUTION POINT TO ADVANCED NUCLEAR

• TVA operates the third largest nuclear reactor fleet in the U.S.

• TVA’s Watts Bar Unit 2, the nation’s first new nuclear generation in 20 years, entered commercial operation in 2016

• At any given time, TVA has around 900 active projects totaling $12 Billion in approved funding for construction and refurbishment projects for coal and gas plants, hydro-electric dams, and transmission infrastructure across the Tennessee Valley.
Clinch River Nuclear Project

TVA'S FIRST ADVANCED NUCLEAR SMALL MODULAR REACTOR

PROJECT LOCATION

Oak Ridge, TN

FOR ILLUSTRATIVE PURPOSES ONLY
Clinch River Nuclear Decision Gate Process

**Phased Decision Approach to Reduce Risk and Costs**

Board Authorization required to proceed beyond Decision Gate (DG) for each phase. Enterprise evaluation criteria to support recommendation to the CEO and Board.

**Phase 1**
- Planning Begins (~2 years)
  - Design
  - Licensing
  - Estimating

**Phase 2**
- Project Begins (~2 years)
  - Submit Permit
  - Finalize Design
  - Construction Planning

**Phase 3**
- Construction Begins (~5 years)
  - Obtain permit
  - Build
  - Test
  - Transfer to Operations

Potential Off-Ramp or Timing Delay

DG #1
- DG #2
- DG #3
TVA’s leadership in technology innovation provides a pathway to net-zero carbon emissions.

TVA has the nuclear and construction experience and talent to support small modular reactor (SMR) development and deployment.

TVA’s Clinch River site is approved by the Nuclear Regulatory Commission for SMRs.

TVA’s Decision Gates will ensure the timing of deployment is right.

TVA’s Advanced Nuclear Program will inform future SMR decisions and potential deployment locations across the Tennessee Valley.