



TN Nuclear Energy Advisory Council
Chris Jones, MTE President & CEO
TNEAC Member

March 13, 2024

Nuclear Current Status

- **In less than 10 years, nuclear energy in the United States has gone from a dying industry to one on the cusp of rebirth**
- **Climate change, diversity of energy supplies and an “all-of-the-above” approach are among main contributors to rebirth of nuclear energy, besides increased demand and grid stability**
- **Improved public opinion, increased bipartisan government support, industry investors giving nuclear new life**
- **DOE: We need 200GW of new nuclear generation by 2050 to meet national decarbonization targets (triple existing nuclear)**

Public Opinion – How Things Have Changed



Proud Heritage, Bright Future in TN

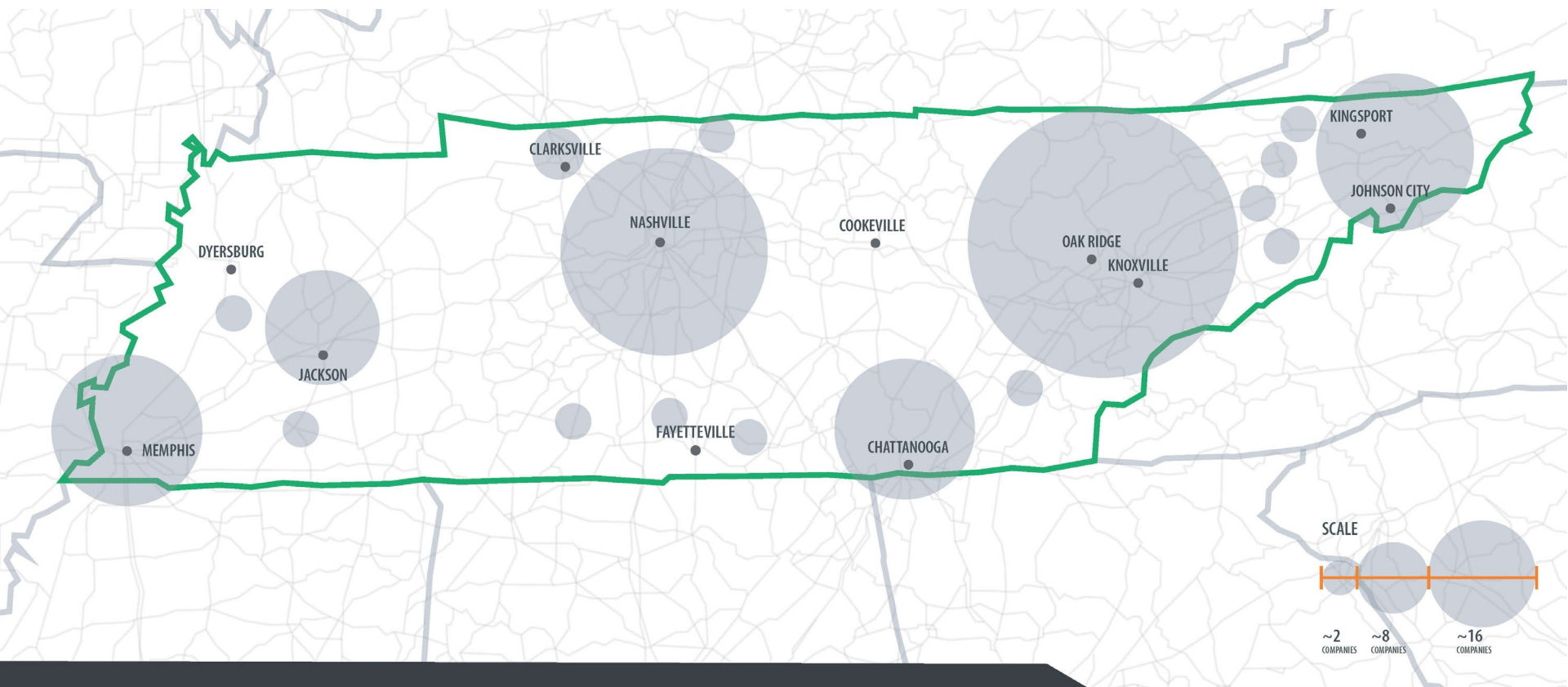


Front End Fuel Cycle
Back End Fuel Cycle

Advanced Fission
Fusion

Medical Isotopes
National Security

230 Companies - It's Not Just Oak Ridge



BUILDING THE
WORKFORCE
OF THE
FUTURE, TODAY

 **NUCLEAR IS
HERE** 

350+
NUCLEAR LOCATIONS
IN TENNESSEE

229
NUCLEAR COMPANIES
IN TENNESSEE

154
NUCLEAR COMPANIES IN
OAK RIDGE AND KNOXVILLE



Nuclear Regional Economic Impact

Approximately **37 percent** of net electricity production in Georgia, North Carolina, South Carolina, Tennessee and Virginia **comes from nuclear power**, compared to the U.S. average of approximately 19 percent.

The total annual economic impact of the five-state region is estimated to be **\$42.9 billion**, supporting 152,598 jobs, \$13.7 billion in labor income, and \$3.7 billion in annual state and local tax revenues to host communities that would not exist otherwise.

South Carolina (\$11.1 billion & 41,949 jobs)

Tennessee (\$9.8 billion & 40,286 jobs)

Virginia (\$7.1 billion & 24,704 jobs)

Georgia (\$5.3 billion & 16,241 jobs)

North Carolina (\$4.8 billion & 15,494 jobs)

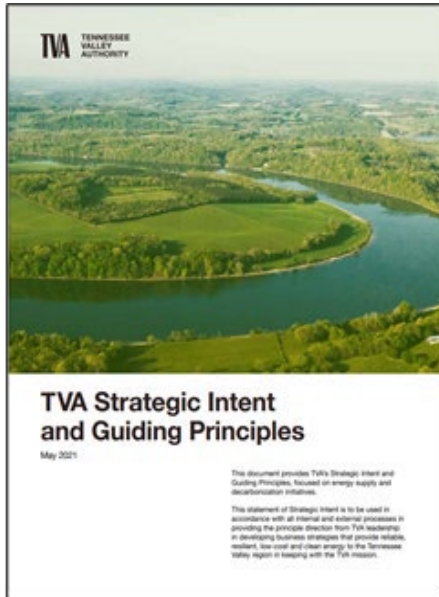
The 152,598 nuclear jobs pay an average \$89,972 wage, representing a wage premium of 65.5%

Nuclear Plants in Region

Table 1: Nuclear Power Plants in the SE United States

Plant Name	Reactors (#)	Type	Capacity (MWe)	Owner/Operator	Location	First In-Service	Last In-Service
Hatch	2	BWR	1,848	Southern (SNOC)	Baxley, GA	1975-12	1979-9
Vogtle	3	PWR	3,530	Southern (SNOC)	Waynesboro, GA	1987-6	2023-6*
Brunswick	2	BWR	2,004	Duke Progress	Southport, NC	1975-11	1977-3
McGuire	2	PWR	2,440	Duke Energy	Huntersville, NC	1981-12	1984-3
Shearon Harris	1	PWR	951	Duke Progress	New Hill, NC	1987-5	1987-5
Catawba	2	PWR	2,410	Duke Energy	York, SC	1985-6	1986-8
Oconee	3	PWR	2,667	Duke Energy	Seneca, SC	1973-7	1974-12
Robinson	1	PWR	769	Duke Progress	Hartsville, SC	1971-3	1971-3
Summer	1	PWR	1,030	SC Electric & Gas	Jenkinsville, SC	1984-1	1984-1
Sequoyah	2	PWR	2,442	TVA	Soddy-Daisy, TN	1981-7	1982-6
Watts Bar	2	PWR	2,540	TVA	Spring City, TN	1996-5	2016-10
North Anna	2	PWR	1,960	Dominion	Mineral, VA	1978-6	1980-12
Surry	2	PWR	1,696	Dominion	Surry, VA	1972-12	1973-5

TVA New Nuclear Program



TVA Board Authorizes New Nuclear Program to Explore Innovative Technology

Feb 10, 2022

Key Points –

- TVA will lead the way for advanced nuclear technology, applying a systematic approach to exploring technologies and potential locations for advanced nuclear reactors to support TVA's decarbonization goal as outlined in its Strategic Intent and Guiding Principles.
- TVA will partner with other utilities, government agencies and research institutes to mitigate costs and risks associated with advancing this new technology.
- The New Nuclear Program would also oversee a project to prepare an NRC construction license application for a light-water, small modular reactor at the Clinch River site, subject to required environmental reviews and Board approval.
- Key national, regional and industry leaders are supportive of TVA's plans for advanced nuclear technology.

BOWLING GREEN, Ky. — The Tennessee Valley Authority Board of Directors ratified approval of a programmatic approach to exploring advanced nuclear technology as a component of its decarbonization goals as discussed at its meeting on the campus of Western Kentucky University on Feb. 10, the board's first in-person meeting since the COVID-19 pandemic began.

As part of the development of innovative, cost-effective technologies that will achieve TVA's aspiration of a net-zero carbon energy future, as outlined in its Strategic Intent and Guiding

New Nuclear: SMR Developers in the US

	Name	Capacity (Mwe) / Type	Developer
1	NuScale	77 / SMR	Fluor, USA
2	SMR-160	160 / SMR	Holtec, USA + SNC-Lavalin, Canada
3	BWRX-300	300 / SMR	GE Hitachi, USA
4	Natrium	345 / Sodium FNR	TerraPower + GE Hitachi, USA
5	ARC-100	100 / Sodium FNR	ARC + GE Hitachi, USA
6	Hermes	35 / MSR-Triso	Kairos, USA
7	Xe-100	80 / HTR	X-energy, USA
8	EM2	265 / GFR	USA
9	G4M	25 / LFR	USA
10	MMR	5-10 / GFR	USNC, USA

Challenges:

- Fuel
- Supply Chain
- Cost
- Financing
- Competition
- Market
- Licensing
- Spent Fuel

Nuclear Support in Tennessee

VISION TO MAKE THE STATE A NATIONAL LEADER IN ADVANCED NUCLEAR

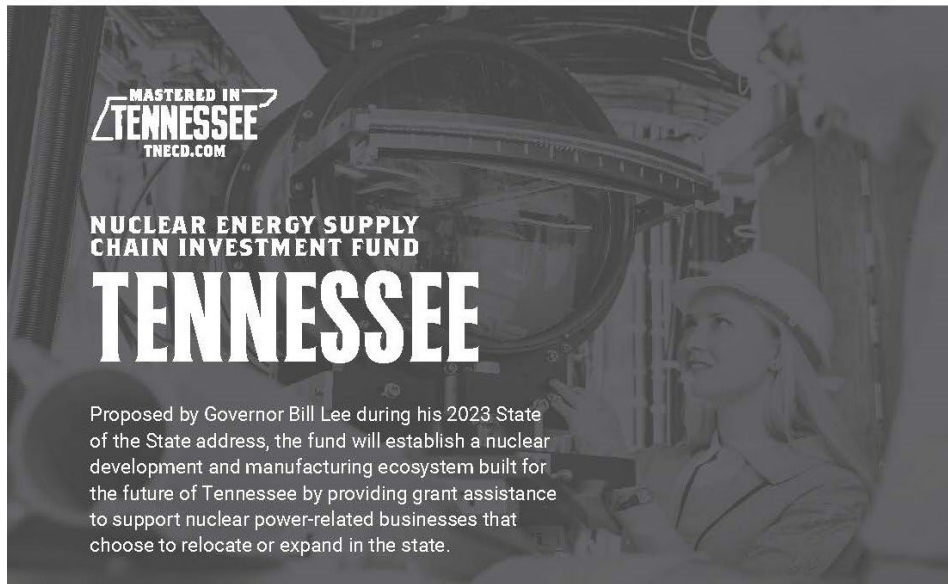
- Gov. Bill Lee and U.S. Rep. Chuck Fleischmann (R-District 3) are driving Tennessee's role in the development and deployment of next-generation nuclear power generation
- As Chairman for House Appropriations Energy & Water Subcommittee, advancing civil nuclear energy as a reliable, carbon-free source of electricity and a necessary condition for economic growth and national security is top priority for Rep. Fleischmann
- Support for nuclear comes as the carbon-free energy source enjoys growing support from both sides of the aisle
- State of Tennessee committed \$50 million to a nuclear energy fund. Gov. Lee created the **TN Nuclear Energy Advisory Council**
- TVA is actively working to engage in these opportunities to support the efforts of the Clinch River Nuclear Project & New Nuclear Program



TN ECD & TN Nuclear Energy Fund

2024 INCENTIVES

\$50 MILLION NUCLEAR ENERGY SUPPLY CHAIN INVESTMENT FUND IN THE STATE'S BUDGET



MASTERCARD IN
TENNESSEE
TNECD.COM

NUCLEAR ENERGY SUPPLY
CHAIN INVESTMENT FUND

TENNESSEE

Proposed by Governor Bill Lee during his 2023 State of the State address, the fund will establish a nuclear development and manufacturing ecosystem built for the future of Tennessee by providing grant assistance to support nuclear power-related businesses that choose to relocate or expand in the state.



TN Nuclear Energy Advisory Council

Gov. Lee's Executive Order 101 – May 16, 2023 [Link](#)

Goal: Enhance Tennessee's ability to lead the nation in nuclear energy and establish a nuclear development and manufacturing ecosystem built for the future of Tennessee and the nation

TN Nuclear Energy Advisory Council

- 22 Members, inc. private sector, public sector and academia
- Chaired by TDEC Commissioner David Salyers, P.E.

4 Work Groups

- Emerging & Existing Technologies
- Education & Workforce
- Regulatory
- Funding



TN Nuclear Energy Advisory Council

Commissioner **David Salyers**, TDEC
Braden Stover, Tennessee ECD
Director **Patrick Sheehan**, TEMA
Dr. Loong Yong, Spectra Tech
Adam DeMella, ADG Strategies
Don Moul, TVA
Jeff Smith, ORNL
Tracy Boatner, East Tennessee
Economic Council
Chris Jones, MTE
Mayor **Terry Frank**, Anderson
County
Jennifer Stone, Thompson
Engineering
Dr. **Hash Hashemian**, Analysis and
Measurement Services

Michelle Amante-Harstine,
Congressional Energy Engagement
Blake Harris, BHA Strategies
Steve Jones, Steve Jones &
Associates
Maria Korsnick, Nuclear Energy
Institute
Dr. **Padma Raghavan**,
Vanderbilt University
Ken Rueter, UCOR
Lang Wiseman, Baker Donelson
Chairman **Ken Yager**, Tennessee
Senate
Chairman **Clark Boyd**, Tennessee
House of Representatives

TN Nuclear Energy Advisory Council

Highlights since
Council's formation...

TNEAC Preliminary Report – Dec. 2023

Two (2) Timely Big Picture Strategies in the Preliminary Report

#1: Advance New Nuclear & TVA Clinch River SMR Project

- Partner with TVA to advance TVA's CRN SMR, a GE Hitachi BWRX-300 model
- *Regulatory Facilitation Team* to identify opportunities to streamline regulatory review processes; also available to address, assist w/other nuclear innovation opportunities, e.g. state regulatory framework for nuclear fusion

#2: Build Nuclear Workforce & Supply Chain

- Evaluate ECD Incentives & tax credits to fit nuclear company needs and realities
- Develop *Nuclear Innovation Site*, attract companies critical to new nuclear supply chain.
- Produce *TN Nuclear Education & Workforce Development Strategic Plan* that will identify nuclear workforce gaps (supply & demand) and how to close gaps, including leverage:
- Complete *Regulatory & Business Analysis* for priority nuclear sectors (near term, long-term)

Sec. Granholm Visits TVA CRN SMR site



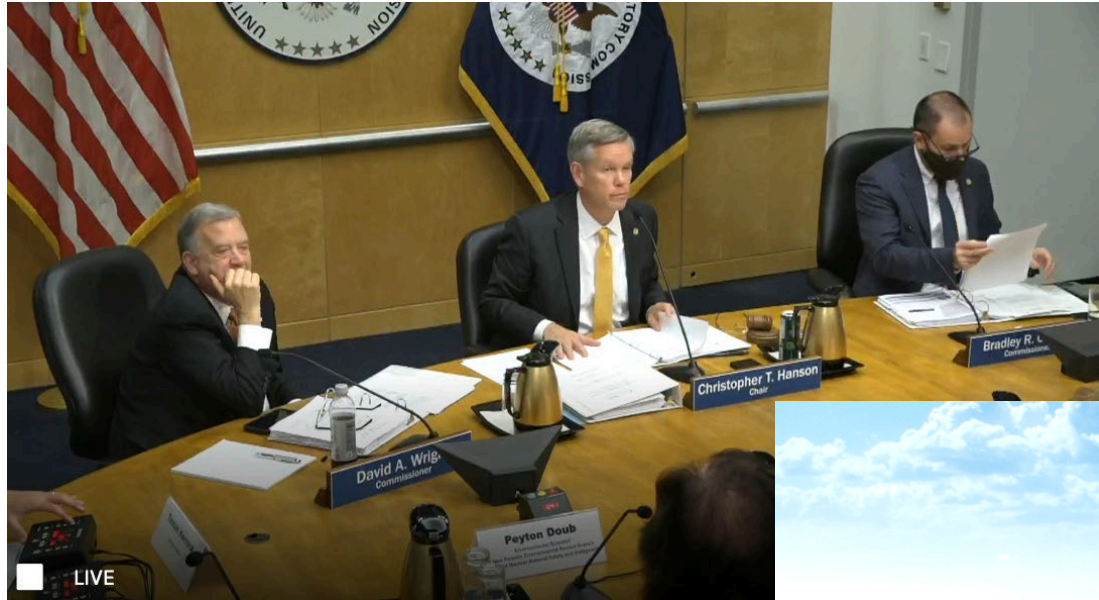
"Oak Ridge has such an important role to play in our national security and in our clean energy future. That combination makes it irresistible."



*"We're focusing on the next generation of nuclear power right here."
- TVA CEO Jeff Lyash*

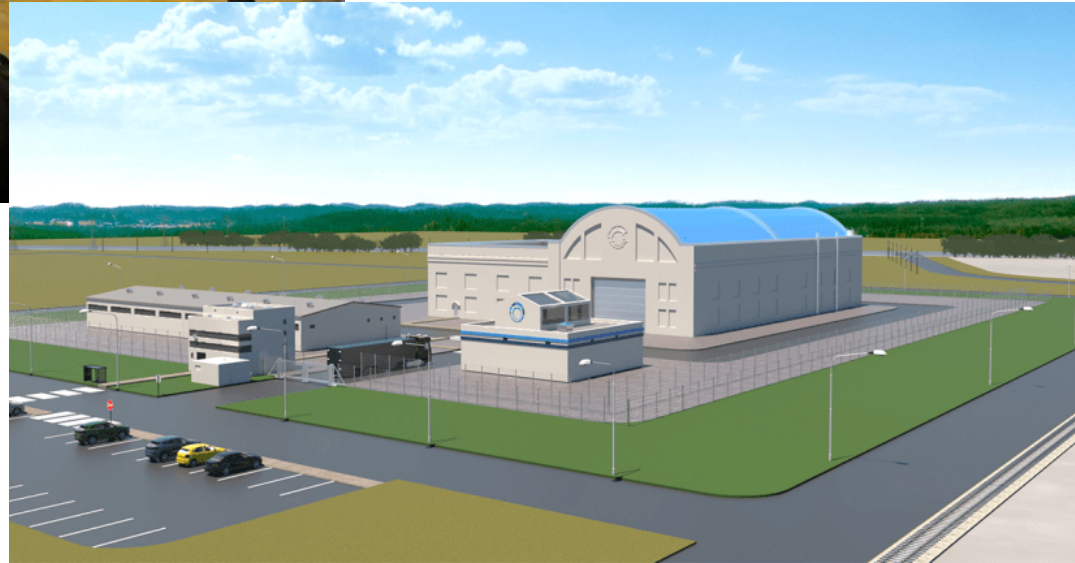
While acknowledging the challenges of deploying the first advanced nuclear reactor for our nation, Sec. Granholm noted: *"TVA has always leaned in on difficult things."*

NRC Issues Construction Permit to Kairos



Kairos Power is the recipient of the first ever Nuclear Regulatory Commission-approved Construction Permit Application (CPA) for a Gen IV (non-light water) Reactor Design.

Kairos is now able to commence building the Hermes molten salt-cooled demonstration reactor in Oak Ridge, the first advanced nuclear design approved for construction in the US in more than 50 years



Gov. Lee State of the State Address

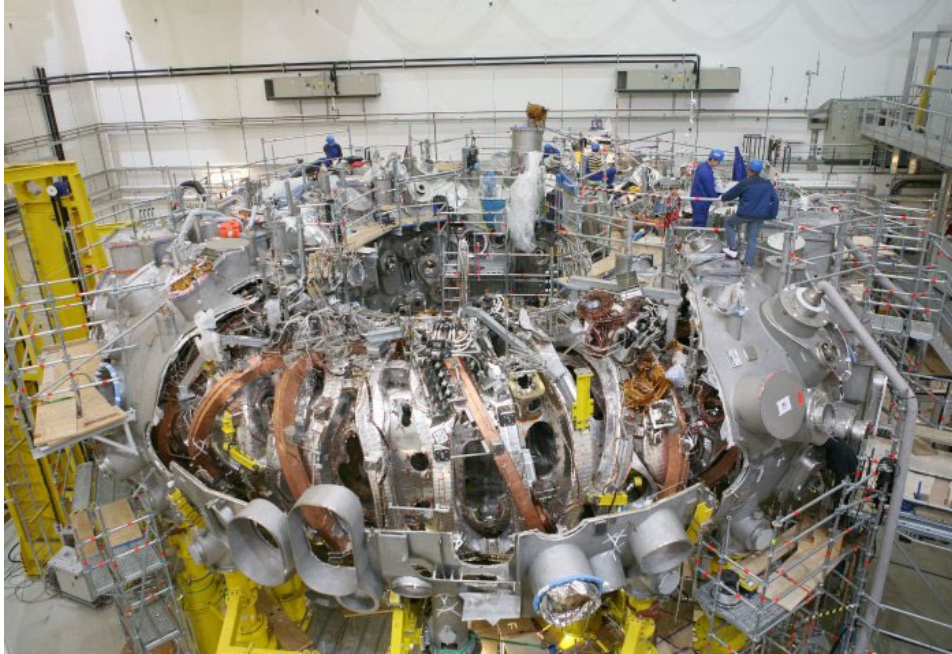
“...I have often said that a conservation strategy must include investments, not just for the environment, but for safe, clean and reliable energy for the future. Over the past year, thanks to your partnership, we have made great strides.

Along with the \$50 million Nuclear Energy Fund that was included in our budget last year, we established the Tennessee Nuclear Energy Advisory Council that just produced its first report to help guide our strategy using the knowledge, expertise and experience of some of Tennessee’s brightest minds.

And while more work needs to be done and is being done, Tennessee is well-positioned to protect the foundation laid decades before at Oak Ridge to not only lead the Southeast but lead this country into a new era of energy in America.”

- Gov. Bill Lee, February 5, 2024

Type One Energy to Receive 1st NEF Award



Gov. Lee announced Type One Energy will receive the first award from the state's \$50M Nuclear Energy Fund to help relocate their headquarters from Wisconsin, expand their East TN operations and move forward to locating a fusion prototype at the TVA Bull Run site.



Type One Energy Group aims to build *Infinity One*, the company's stellarator fusion prototype machine at the TVA Bull Run site. Construction may begin in 2025, if necessary environmental reviews, partnership agreements, permits, and operating licenses are all in hand.

Looking Ahead to Final Report

No later than October 31, 2024, the chair shall deliver to the Governor, the Speaker of the Senate, and the Speaker of the House of Representatives a **Final Report** containing, at a minimum, the following findings:

1. Recommended legislative, policy, and budgetary changes to address regulatory, workforce, or education barriers to the creation and expansion of nuclear energy facilities in the state;
2. Recommended funding opportunities for state government, local governments, and the private sector;
3. Recommended economic opportunities for a vibrant nuclear energy ecosystem;
4. Identified siting considerations;
5. Recommended storage and waste practices that continue the State's long history of protecting Tennessee's environment; and
6. Recommended federal actions that the state should pursue with federal partners and agencies.

Tennessee Will Lead

Questions? ... Thoughts?

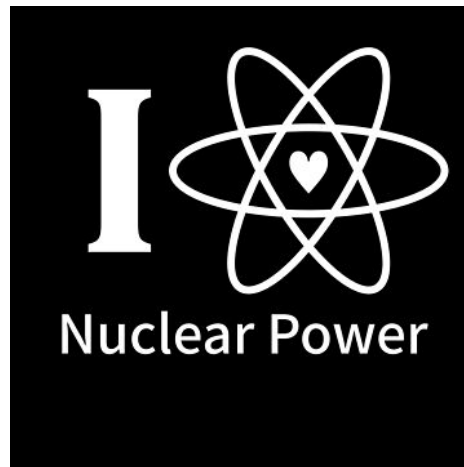
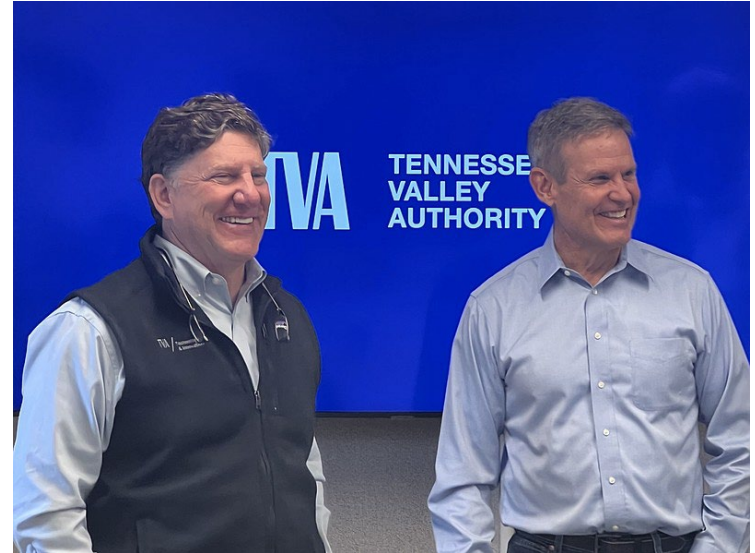


Gov. Bill Lee
@GovBillLee



No other state comes close to TN's legacy & potential to lead in nuclear energy.

Today, I signed an executive order to continue our work to make TN the #1 state for nuclear energy companies to invest & thrive, bringing more jobs & greater opportunity for Tennesseans.



Thank You