

October 14, 2020

**Kemal Pasamehmetoglu**

Executive Director,  
Versatile Test Reactor Project

# Versatile Test Reactor

Solving global energy challenges through science

# About the Versatile Test Reactor

- 2018 –Department of Energy establishes VTR program after several studies highlight need.
- 6 national labs, 19 universities & 10 industry partners
- DOE 413.3B – Process for development of major systems projects.



## Did you know?

*The VTR project is led by Idaho National Laboratory on behalf of DOE's Office of Nuclear Energy.*

# VTR Milestones

## 1<sup>st</sup> Major Milestone

**Critical Decision 0 achieved in 2019, focused on needs of:**

- Commercial developers of advanced nuclear energy technologies
- National security interests
- Scientific community

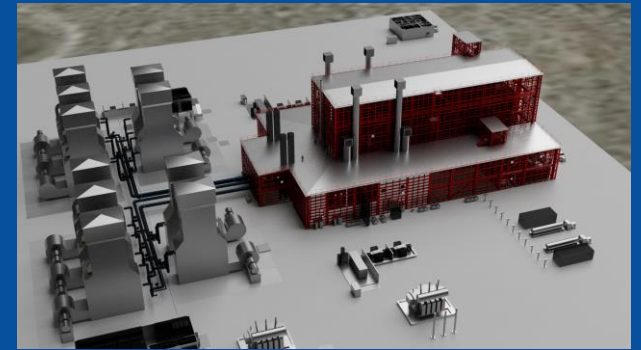
## 2<sup>nd</sup> Major Milestone

**Critical Decision 1 achieved in September 2020, focused on:**

- Analysis of alternatives
- Conceptual design and conceptual safety design
- Cost and schedule ranges

# What is VTR?

- A test reactor for the development of advanced materials, fuels, instrumentations and sensors.
- Strictly used for research and development.
- Will generate high energy neutrons at higher concentrations (neutron flux) to support a different class of reactor designs under development.
- Advanced Test Reactor produces moderated (low-energy) neutrons to support testing needs for the Navy and current nuclear technology.
- Conceptual design is a sodium-cooled pool type reactor with power of 300 MWth; larger improved version of EBR II.



# Cost and Schedule Range Approved at CD-1

Cost Range	CD-0	CD-1
Point Estimate	\$4,500 M	\$3,600 M
Low End of Range	\$3,000 M	\$2,600 M
High End of Range	\$6,000 M	\$5,800 M

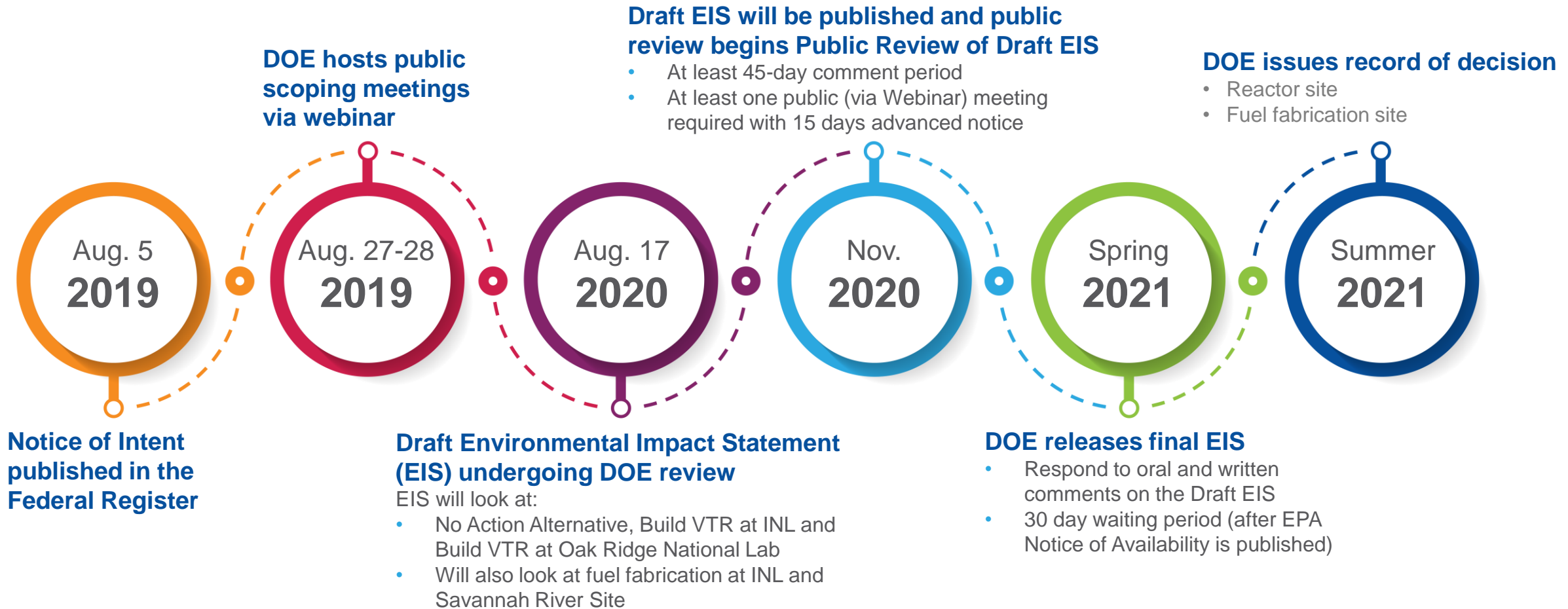
## Did you know?

*The target start-up date for VTR*

is **2026** with a **5-year**

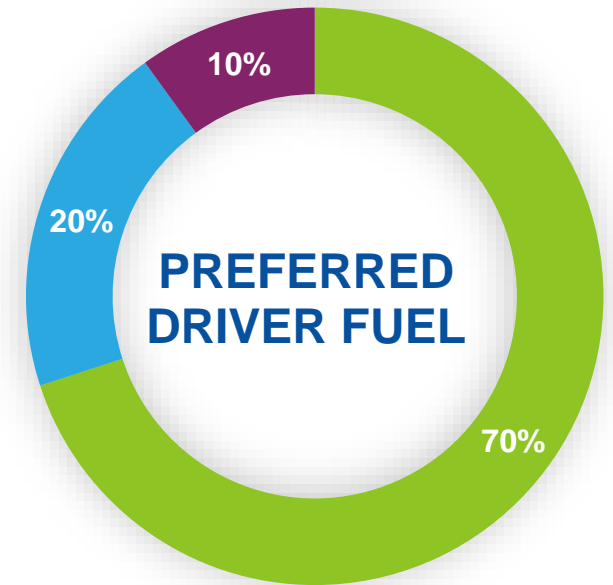
*contingency.*

# VTR: National Environmental Policy Act



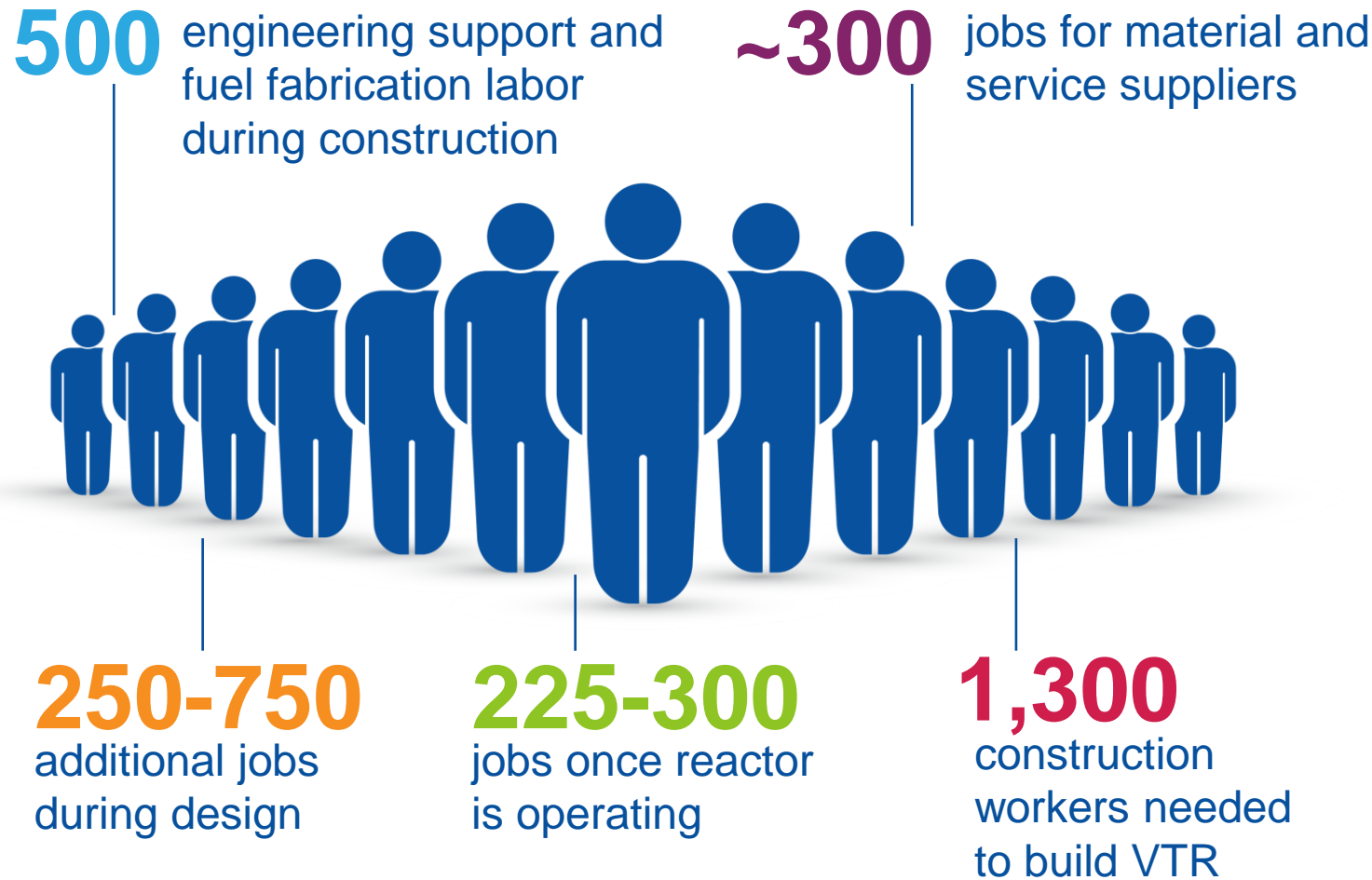
# VTR: Nuclear Materials Management

- Preferred driver fuel is a metallic fuel alloy (*similar to EBR-2 fuel*).
- MOU signed between DOE Office of Nuclear Energy and Nuclear National Security Administration to source plutonium and transfer material to fuel fabrication site.
- ~4000 pounds of heavy metal needed per year for fuel fabrication.
  - 880 pounds will be plutonium (*could be closer to 1,100 pounds in early phases*).



■ Uranium ■ Plutonium ■ Zirconium

# National VTR: Potential Job Opportunities



*VTR is a one-of-a-kind scientific research facility that will draw scientists and technology developers from around the country world. This along with VTR related workshops, conferences, seminars, etc., will considerably boost local economy in community in which the reactor is located.*



# Summary & Conclusions

- When operational, VTR will be the world's premier fast spectrum test reactor allowing technology developers and scientists access to state-of-the art capabilities.
- VTR will provide the missing piece of research and development infrastructure and help will re-establish U.S. as the global leader in nuclear energy innovation.
- Even in early design phase, VTR is making an impact on nuclear energy innovation.
- VTR will be authorized and operated under the DOE authority, working closely with the Nuclear Regulatory Commission (NRC).
- There is considerable international interest among our nuclear energy allies.



# Questions?



For more information, visit [www.inl.gov/vtr](http://www.inl.gov/vtr).



Idaho National Laboratory