

# New Research Reactor Developments in Slovenia



<sup>1</sup>Jan Malec, <sup>1</sup>Vladimir Radulović, <sup>1</sup>Anže Jazbec, <sup>1</sup>Mitja Uršič, <sup>1</sup>Iztok Tiselj, <sup>1</sup>Borut Smodiš, <sup>1</sup>Klemen Ambrožič, <sup>1</sup>Anže Pungerčič, <sup>2</sup>Gilles Bignan, <sup>2</sup>Christophe Destouches, <sup>2</sup>Robert Jacqmin, <sup>2</sup>Xavier Wohleber and <sup>1</sup>Luka Snoj

<sup>1</sup>Jožef Stefan Institute, Slovenia;

<sup>2</sup>The French Alternative Energies and Atomic Energy Commission (CEA)



## MOTIVATION

- Ageing fleet of research reactors in EU
- No new general-purpose research reactors planned in EU despite plans for nuclear power expansion
- Commissioning demo and expertise buildup for NEK2
- Increase supply independence of medical isotopes in EU
- Long-term replacement for existing research reactor in operation since 1966



Practical exercises for students at JSI TRIGA

## TECHNOLOGY

- Satisfy a wide range of requirements from different users based in Slovenia and EU
- Possibility of building low-power and high-power cores in the facility
- Possibility of building a reactor that can produce commercially useful power

### **Zero-power core**

- Low burnup core
- Advanced experimental setups
- Benchmark experiments
- Study of irradiated fuel



### **Multipurpose reactor**

- Satisfy a large consortium of potential users.
- Open pool, light water reactor with advanced fuel.
- Forced convection for cooling, passive decay heat removal

**OR**

### **Research reactor with electrical power generating capability**

- Study advanced grids with co-generation of electrical power and industrial heat
- Proximity to electro distribution center, Sava river and Ljubljana is an advantage

## Conclusions/outlook

- Completed analysis with technology overview done at IJS with support of CEA in Q2 2022
- Feasibility study is underway
- Investigate possibilities for consortium reactor
- Gain commitment from stakeholders in form of financial contribution, equipment, reactor time or other
- Nuclear energy will play a key role in decarbonization
- New reactor will attract new talents and keep excellence in nuclear research in Slovenia



Existing reactor location with space for expansion