THE TUNISIAN NUCLEAR POWER PLANT (NPP) PROJECT

ADEL TRABELSI

NATIONAL CENTER OF NUCLEAR SCIENCE AND TECHNOLOGY (CNSTN)
ABOUT TUNISIA

➢ Population: 12.3 million (2022)
➢ Area: 163,610 km²
➢ GDP: 51.3 billion US $ (2023)
➢ Unemployment rate: 17.7% (2023)
➢ Inflation rate: 9.3% (2023)
➢ HDI: 0.732 (2022) 5th in Africa

✓ Rate of national electrification (99%)
✓ Total electricity Capacity: about 5944 (2022) 97% from fossil fuels
✓ 25 power plants using Natural Gas (CC, ST and GT)
✓ Peak Load 4640 MW (2023)
✓ Grid Connection: Algeria, Libya and Italy (future)
• Continuous Energy Deficit since 2001

• National Resources Limited and in decline
STATE OF THE ELECTRICITY SECTOR IN TUNISIA

- Natural gas: 49%
- Oil: 40%
- Biofuels and waste: 10%
- Wind: 1.1%
- Solar PV: 0%
- Hydro: 0.3%
- Other sources: 1.3%

Total Energy: 20,941 GWh

- Natural gas: 94.8%
- Oil: 0.2%
- Other sources: 1.3%
Energy mix without externalities
NPP challenges for Tunisia

- Upfront Financial Investment
- Local expertise
- Geopolitical and Security Issues

- Grid Stability vs fluctuating demand
- Transmission infrastructure upgrades
- Intermittency of Renewables and grid management.
Why SMRs could meet Tunisia needs

- **Scalability and Flexibility**: gradually build up its nuclear capacity
- SMRs can be integrated into existing electrical grids with relative ease.
- Cost-Effectiveness without high upfront investment
- Support for **Renewable Expansion** and Reduced Environmental Impact
- SMRs could provide the necessary energy for **desalination** plants, helping to address water scarcity issues locally
National nuclear power programme stakeholders

Prime Minister

Ministry of High Education and Scientific Research
  - CNEA

Ministry of Energy and Mines
  - CNSTN
  - STEG

Ministry of Health
  - CNRP

...
The mission of the SMR-ETF is to:

- **Gather Technical Information** on SMR designs, capabilities, and requirements.
- **Assess the feasibility of SMRs** for Tunisia, including technical suitability and financial costs.
- **Engage Stakeholders** and **Develop Implementation Strategies**
- **Deliver Recommendations** to aid decision-making.
Tunisian Infrastructure Development Programme

1. Plan
   Prefeasibility studies:
   Considerations before a decision to launch a nuclear power programme is taken

2. Prepare
   Feasibility studies & bid process:
   Preparation work for the construction of a NPP after a policy decision has been taken

3. Construct
   Construction Activities to implement a first NPP

4. Operate
   Maintenance and continuous infrastructure improvement

- Tunisian government decision to consider the NP Nov. 2006
- Site studies
- Safety, Security and radiation protection
- Techno-Economic PF studies
- Legal & regulatory infrastructure
- HR development & communication
- Strategic Action Plan
- Feasibility studies
- Bidding process
- Governmental decision GO/No GO

Tunisian Infrastructure Development Programme
Siting

Exclusion criteria + authority’s consent

Classification criteria:
- Heat sink cooling
- Seismicity,
- Housing density

SMRs may offer more flexibility for site selection
Legislative framework

Achievements:
• The project of the nuclear law (3S and liability included)
• The law creating the National Nuclear Energy Agency (NNEA)
• The law creating the Tunisian Nuclear Safety Agency (TNSA) (RB)
• Reviewed by IAEA (Office of Legal Affairs) and the French RB ASN

Ongoing action: Decrees being written by a national commission

The nuclear law is waiting for promulgation by the parliament
Safety, security and radiation protection studies

- Identification of appropriate nuclear safety criteria
- Definition of TOR related to environmental impacts assessment
- Emergency plan preliminary study
- Radiation protection study
STEJ hired 40 young engineers (10/year) to pursue nuclear engineering at INSTN France.

They integrated the NPP project team with other general engineers hired after their studies in France.

A study was conducted, to identify competencies needed for all phases of the nuclear programme. In second step, a strategic study is elaborating to define how to provide, develop and maintain these competencies.
Next steps

- 2026-2027: PFS report finalized
- 2028: Self evaluation process
- To be planned: INIR mission

INIR
Integrated Nuclear Infrastructure Review Missions
Thank you for your attention