

The Stockholm Talks 2013

October 2nd, 2013

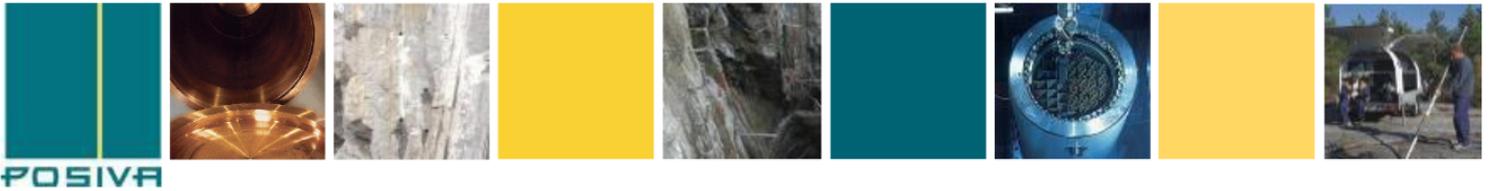
Stockholm, Sweden

# The Finnish Nuclear Waste Management Programme: Experience, Status and Views on the Future

Timo Äikäs

Posiva Oy

Finland



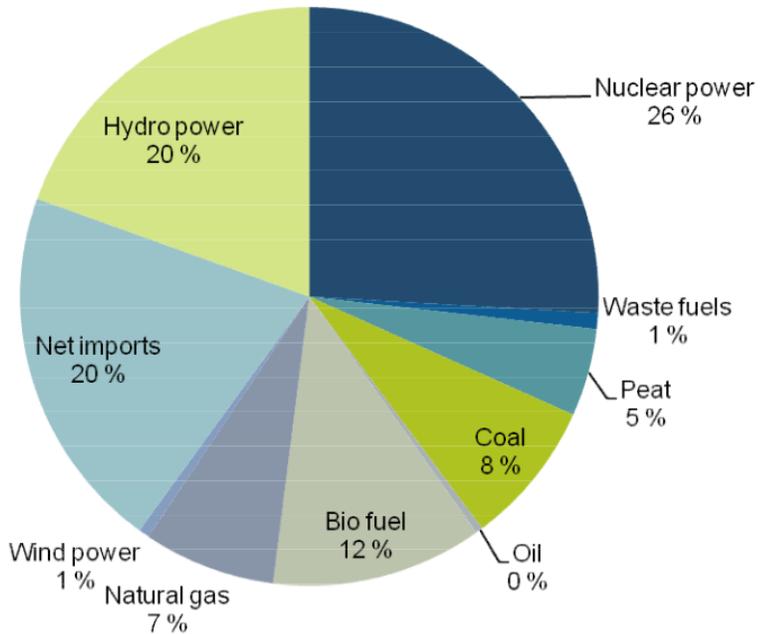
# 35 Years Ago Finland Started to Use Nuclear Power

- General policy
  - Spent fuel shall be transported abroad permanently,
  - If not possible, spent fuel should be at least reprocessed,
  - If not possible, deep geologic disposal in Finland can be considered
- Status
  - Loviisa NPP (Fortum), returned spent fuel back to Soviet Union
  - Olkiluoto NPP (TVO), without an acceptable solution concerning spent fuel
- Commitment to a long term programme
  - TVO planned and committed itself to a long-term programme for geologic disposal as part of the renewal of the operation license
- Government made a decision on goals and schedule for nuclear waste management
  - Requirement to license holders TVO and Fortum
  - Interim goals for ensuring progress
- Law
  - Revision of the law was initiated introducing stepwise licensing with “Decision-in-Principle” as a first licensing step with local and parliamentary veto rights

# Finnish Energy Policy and Nuclear Power Today

- Main drivers
  - Security of supply, self-reliance, competitiveness
  - Reduction of greenhouse gases
- Renewables and nuclear combined lead to very low CO<sub>2</sub> emissions
- Demand of electricity increases though energy consumption decreases
- Nuclear power
  - Competitiveness of nuclear is based on utilities own economic evaluations – no Government subsidies

Electricity Supply by Energy Sources 2012 (85.2 TWh)



Source: Energiatieto/Isuus ry

# Nuclear Power in Finland Today (and Tomorrow ?)

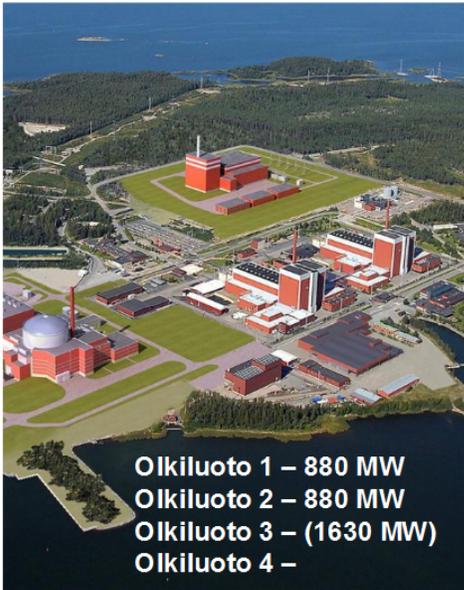
Fennovoima Oy



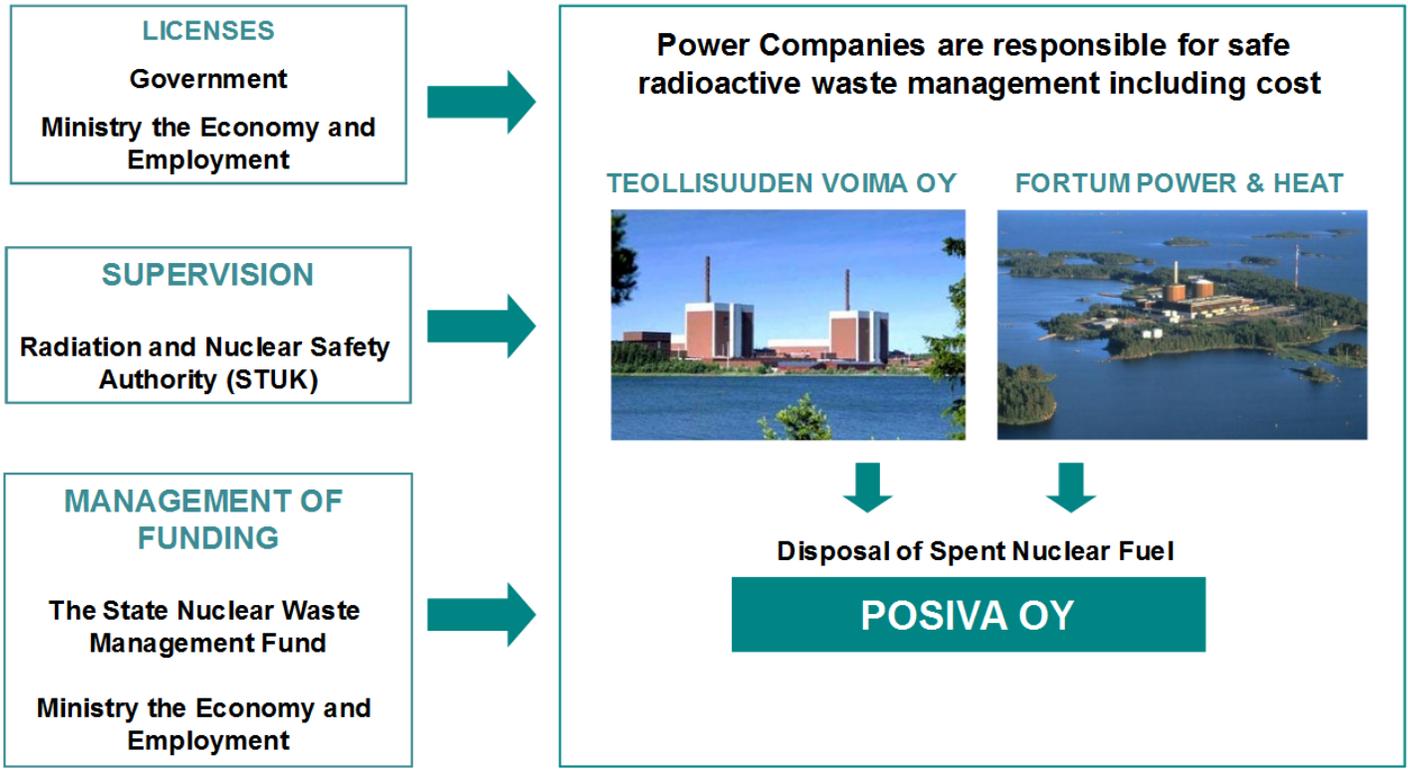
Fortum Oyj



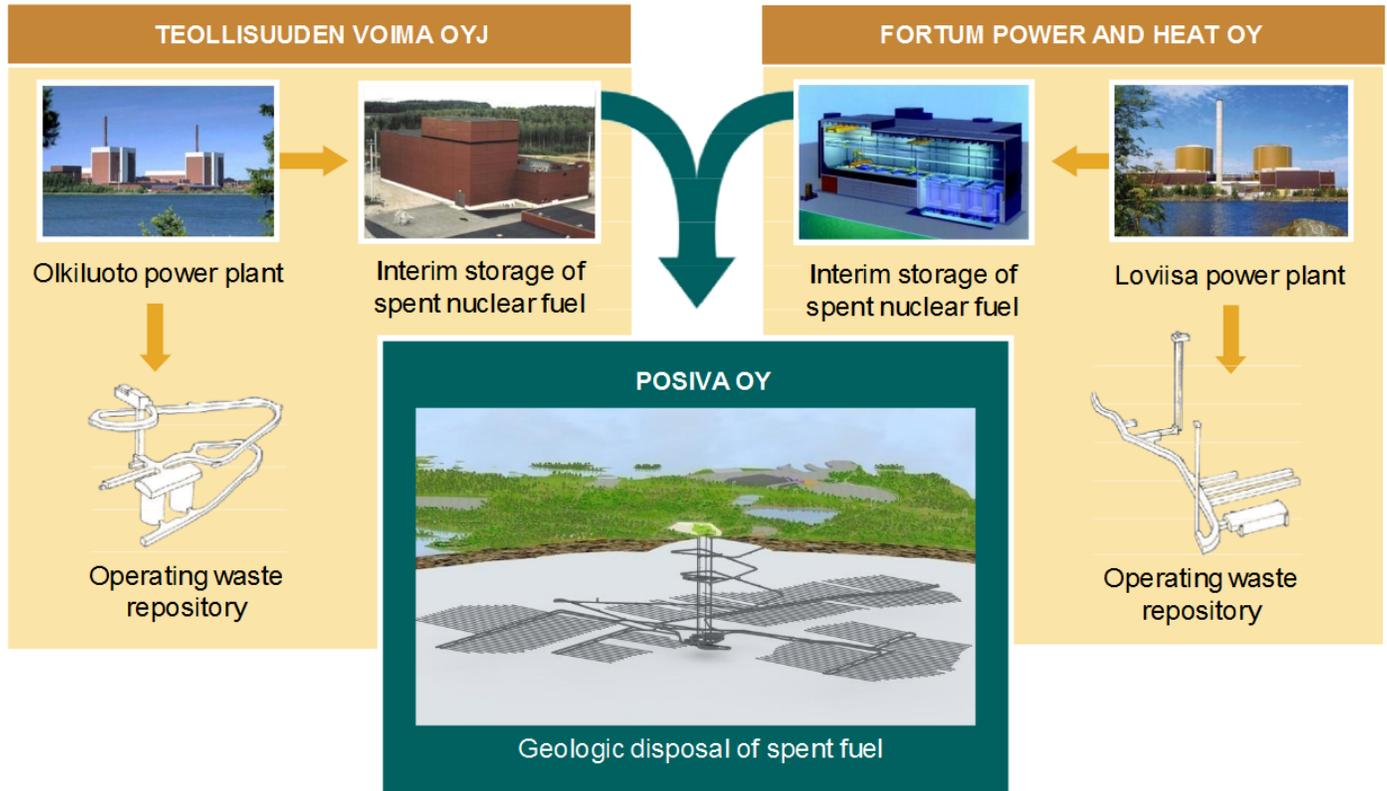
Teollisuuden Voima Oyj



# Radioactive Waste Management in Finland



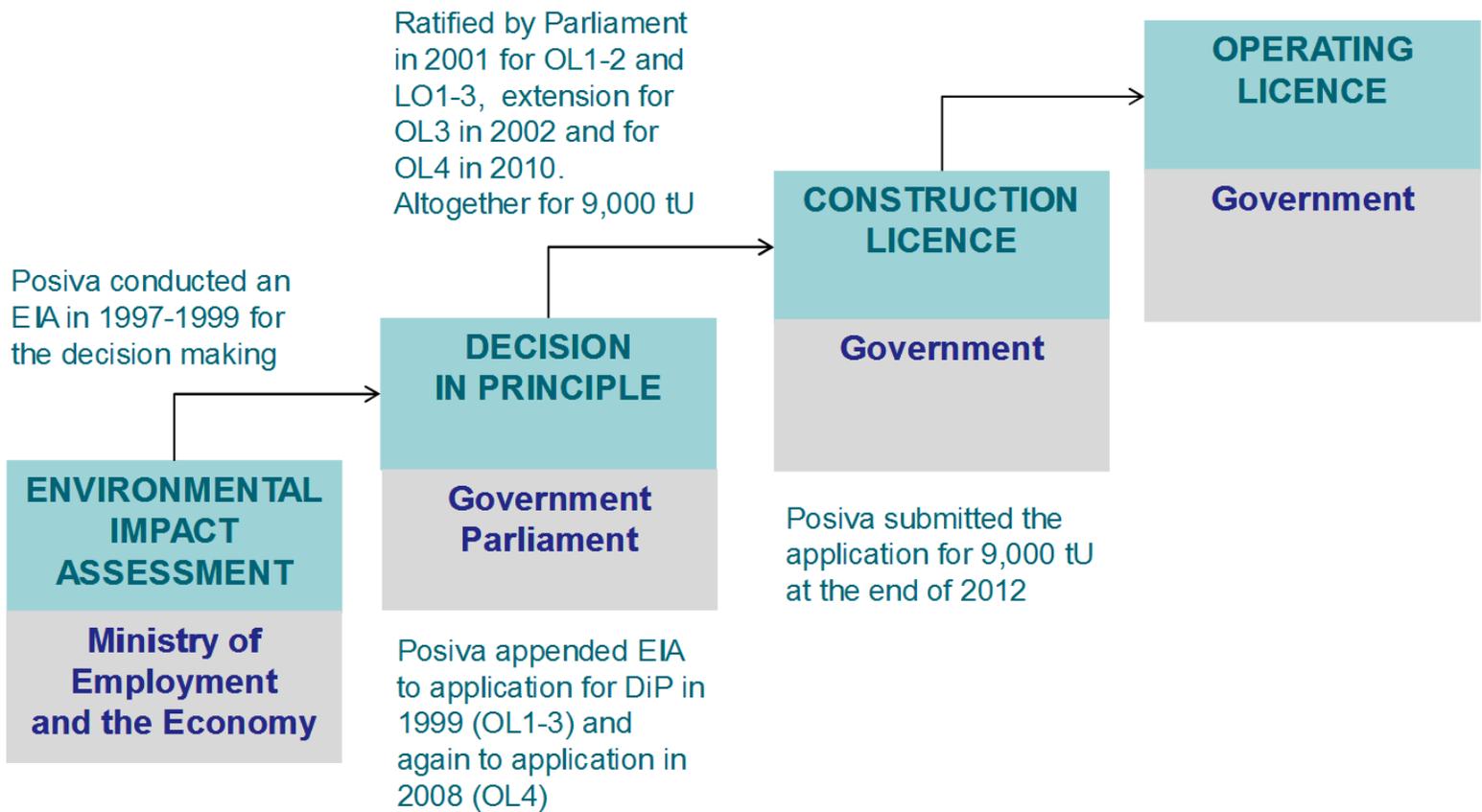
# Organisation for Radioactive Waste Management of TVO and Fortum



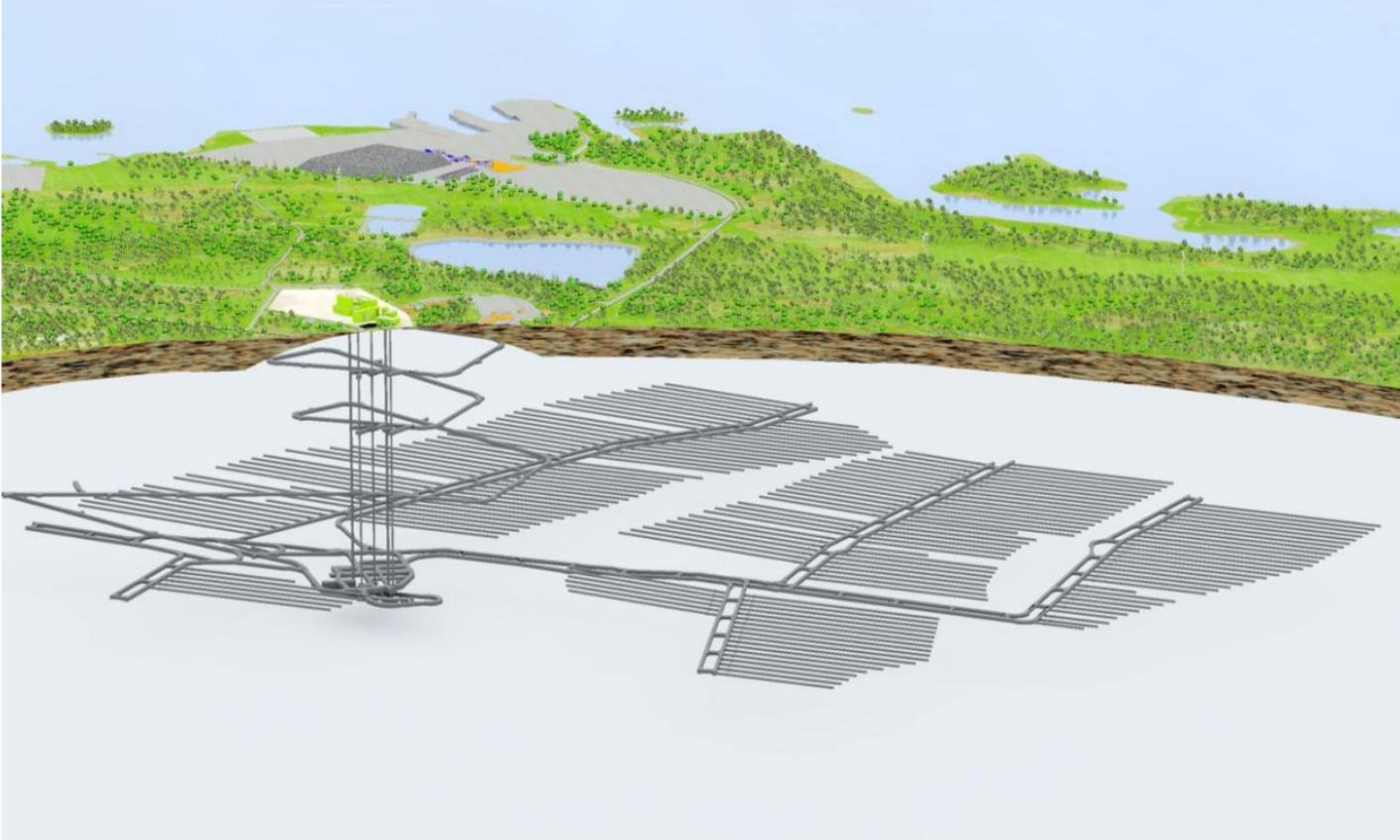
# Main Achievements in 35 Years

- Repositories for LLW/ILW have been in operation since 1990s
- Geologic disposal of spent fuel at Olkiluoto has been accepted in the decision making process in 1999 - 2001
  - Local community in 2000
  - Government Decision in (DiP) in 2000
  - Ratification of DiP by Parliament 2001
  - Key success factors
    - Open communication, transparency and high quality of the work by implementer
    - Participation of regulator (STUKK in the interaction with public
    - “Fairness” of the decision making process
- Based on the decision an underground rock characterisation facility ONKALO has been excavated (2004-2012) at the selected site for the confirmation of site properties
  - STUK has supervised the construction of ONKALO
- Disposal concept KBS-3 has been developed to a mature stage for licensing
- Construction license application has been submitted to Government in 2012
  - Expectations are that construction of encapsulation plant and deep repository could be commenced in 2015

# Finnish Nuclear Licensing Process



# Posiva's Encapsulation Plant and Deep Repository at Olkiluoto (plan for 9000 tU)



# Olkiluoto Site



# ONKALO Site at Olkiluoto



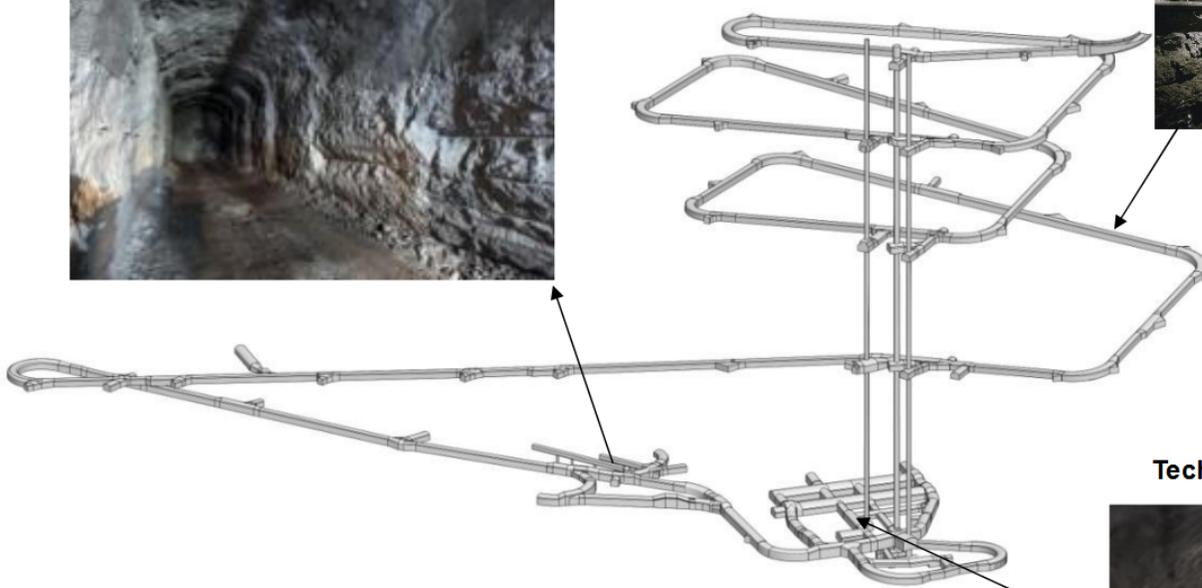
# ONKALO - Underground Rock Characterisation Facility

**Demonstration tunnels (-420 m)**



**Access tunnel**

**Technical facilities (-437 m)**



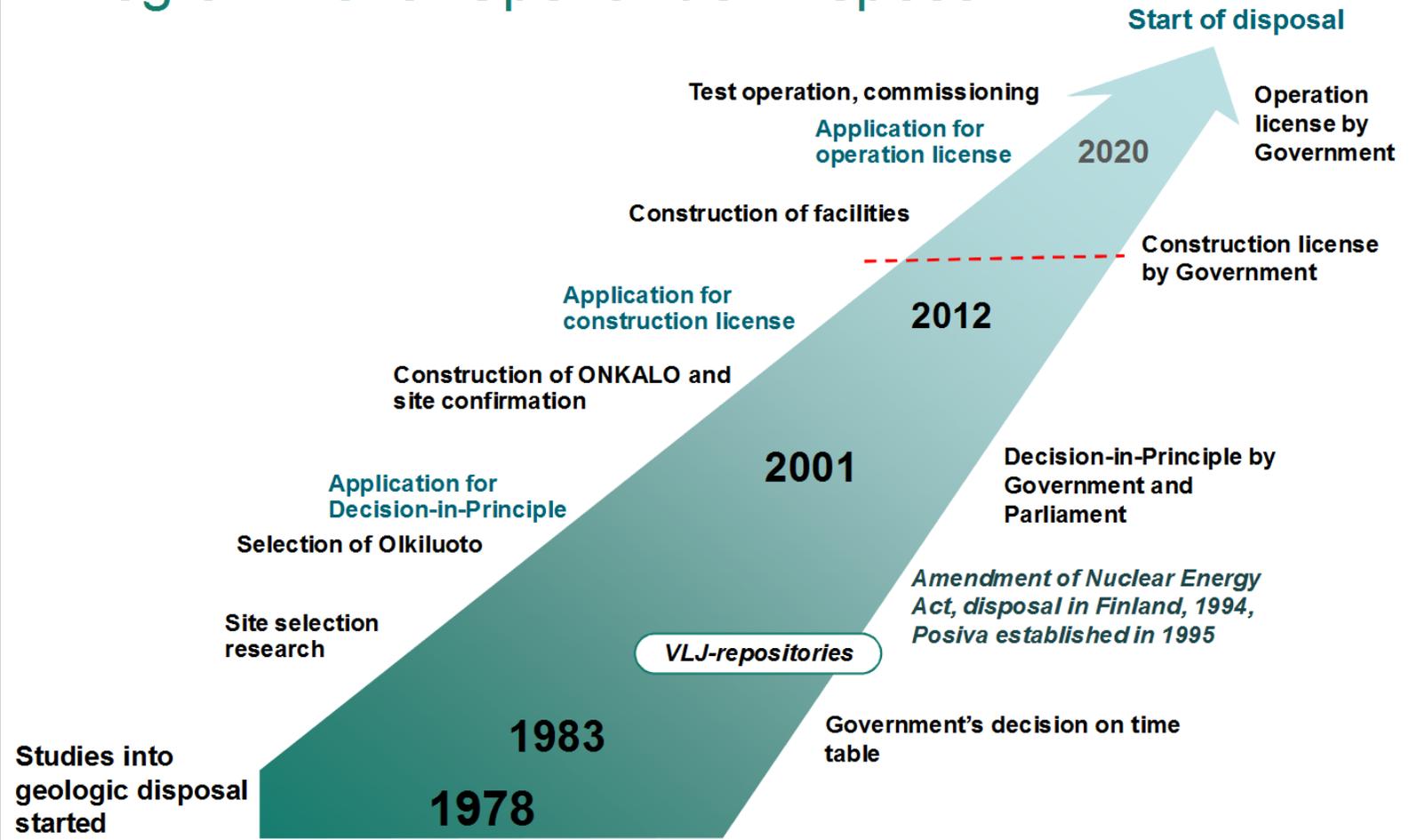
# Construction Demonstrated

## Demonstration for Boring Deposition Holes

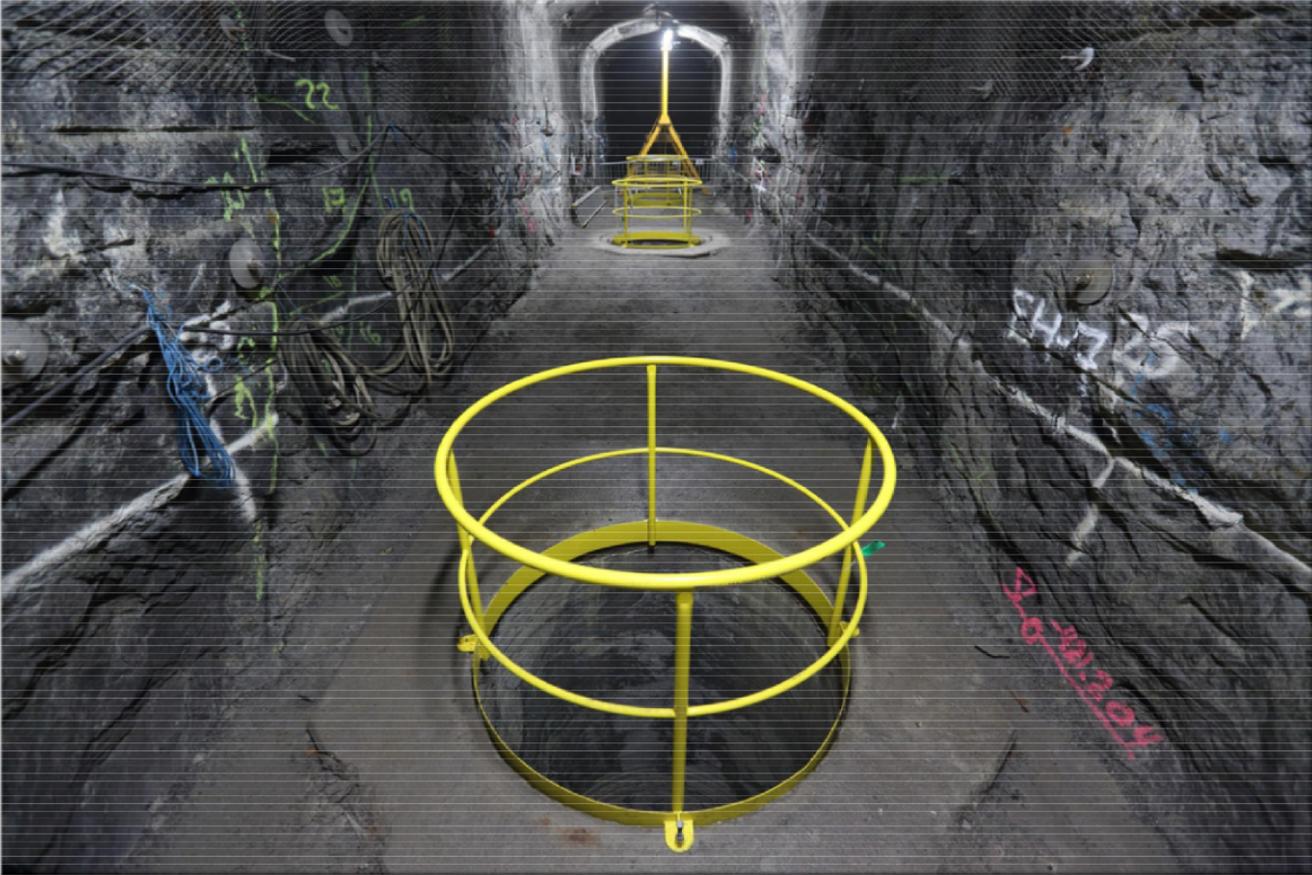
### Demonstration for Disposal Tunnel Excavation



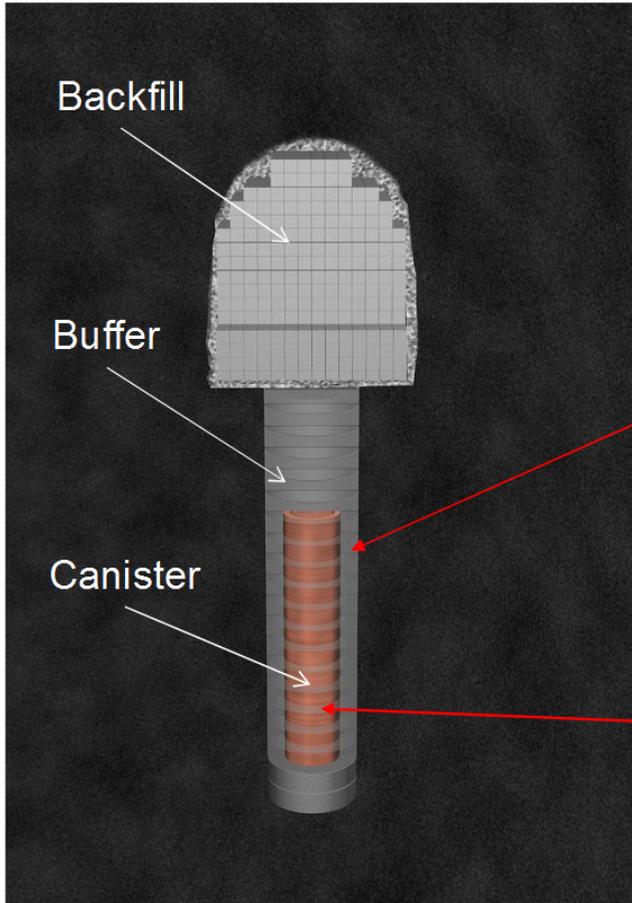
# Programme for Spent Fuel Disposal



# Next Step: Real-size Tests and Demonstrations for Operating License



# Technical Design of KBS-3 to Maturity for Implementation



Fabrication of Buffer Component



Canister Manufacturing



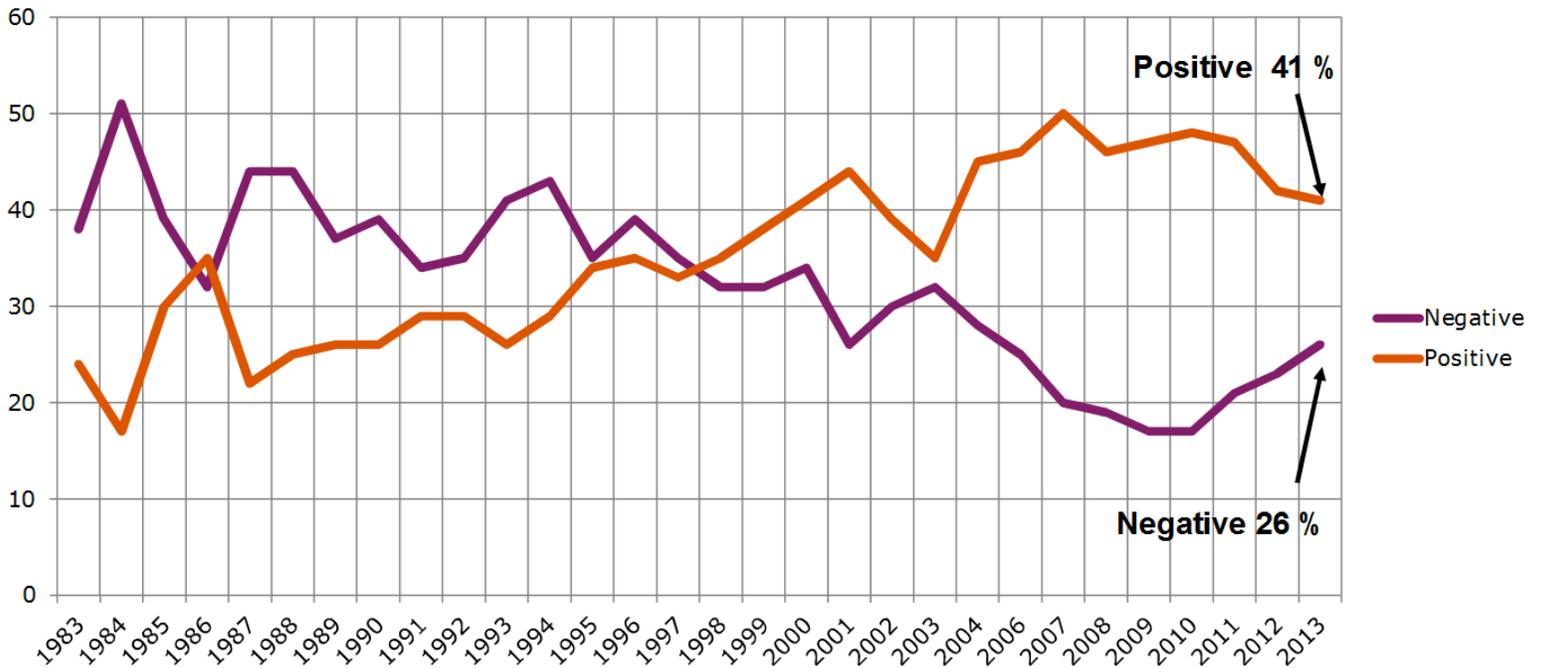
# Development of Machines for Nuclear Operation

Prototype for Bentonite Buffer Installation Machine



# Maintenance of Acceptance

## Attitudes Towards Nuclear Power in Finland



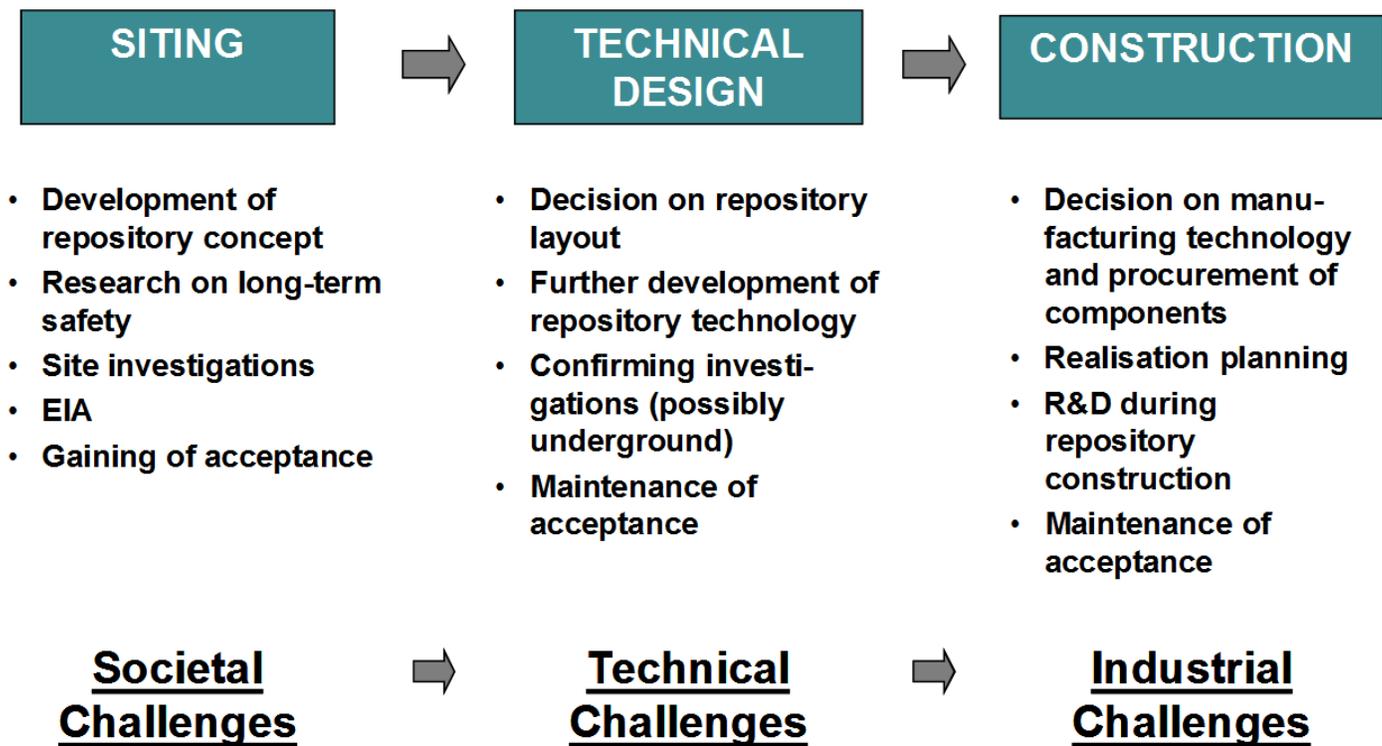
Development of pro-nuclear power attitudes in 1982 – 2013  
"What is your general attitude towards nuclear power as an energy source in Finnish conditions?" 1982-2004 Gallup omnibus 2006- telephone survey  
Source: Finnish Energy Industries and TNS Gallup Oy

# Acceptance, Public Debate – "Calm Reigns"

Posiva's construction license application, meeting organised by Ministry for Labour and Economy for public debate on September 12th, 2013



# Summary: Phases and Challenges in Developing Deep Repository in Finland





POSIVA

TIMO