

# Posiva's FSW plans

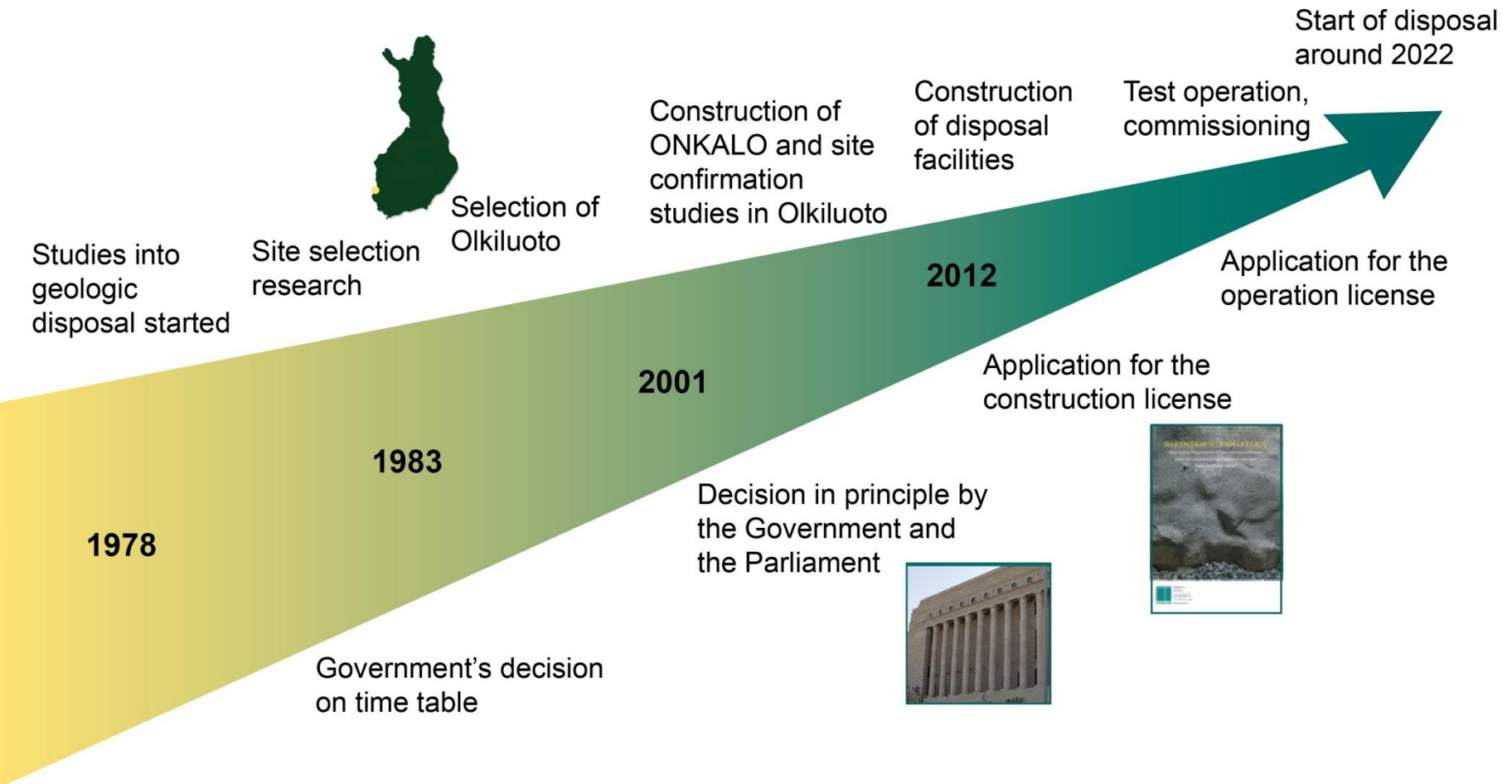
Welding system



# Posiva Oy

- Established in 1995
  - Ownership: Teollisuuden Voima Oyj 60 %, Fortum Power and Heat Oy 40 %
- Mission: Final disposal of spent nuclear fuel of the owners and other tasks of expertise within nuclear waste management
- Gradual change from a R&D company to an implementing organisation
  - Organisation adjusted according to changing demands
  - Long-term planning of the organisation ongoing
- Steadily developing staff
  - Own staff roughly 120 persons coupled with extensive use of contractors
  - Total employment effect of the final disposal over 300 persons
- Turnover
  - 2013: EUR 63,2 million
- ISO 9001 Certificate in 2008, ISO 14001 Certificate in 2010

# The Steps of Final Disposal

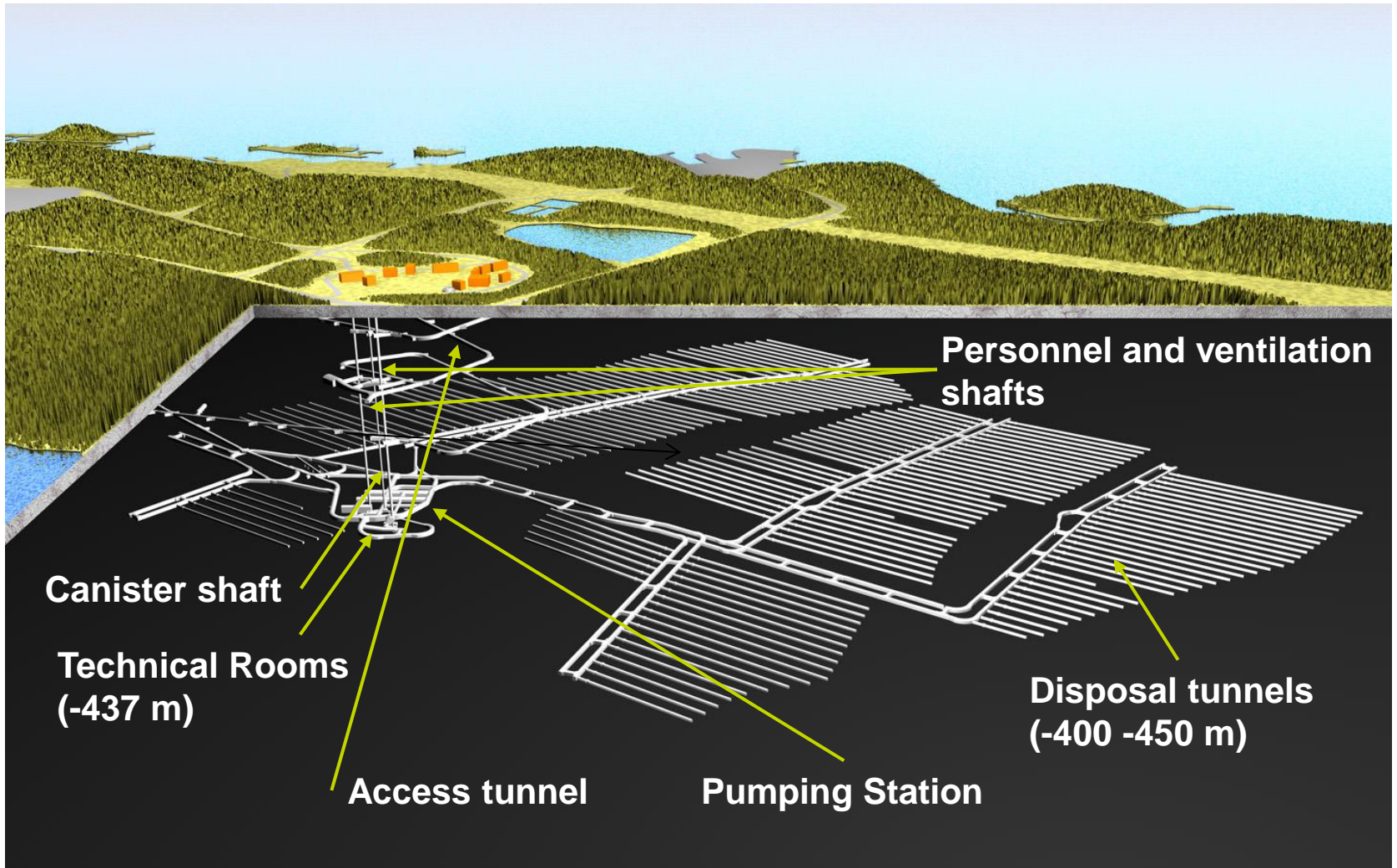


# Olkiluoto Site in Eurajoki in Western Finland

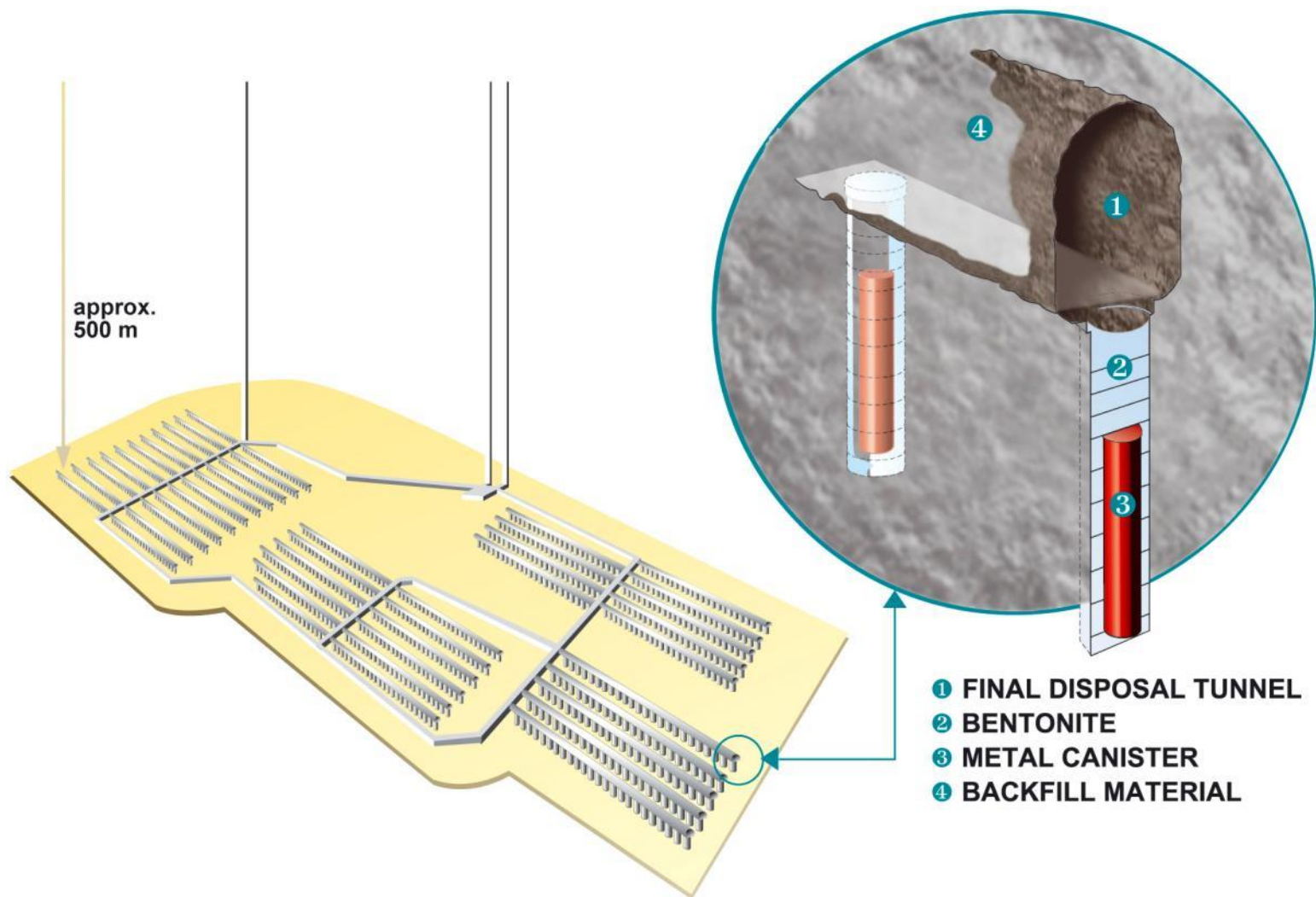




# Deep Repository



# Isolation principle



# Posiva's own preliminary timetable until year 2022

	2015	2016	2017	2018	2019	2020	2021	2022	2122
<b>Welding system</b>									
Preliminary design of the welding system									
Detailed design of the welding system									
Manufacturing of the welding system									
FAT (factory acceptance tests)									
Installation of the welding system to encapsulation plant									
SAT (site acceptance tests)									
<b>Development work of the welding process</b>									
<b>Qualification, training and acceptance</b>									
Operators									
Welding process									
Welding system									
<b>Operations as part of the encapsulation plant and comissioning tests</b>									
<b>PUSH THE BUTTON</b>									
<b>OPERATION AND WELDING NUCLEAR WASTE CANISTERS</b>									

# Detailed design period

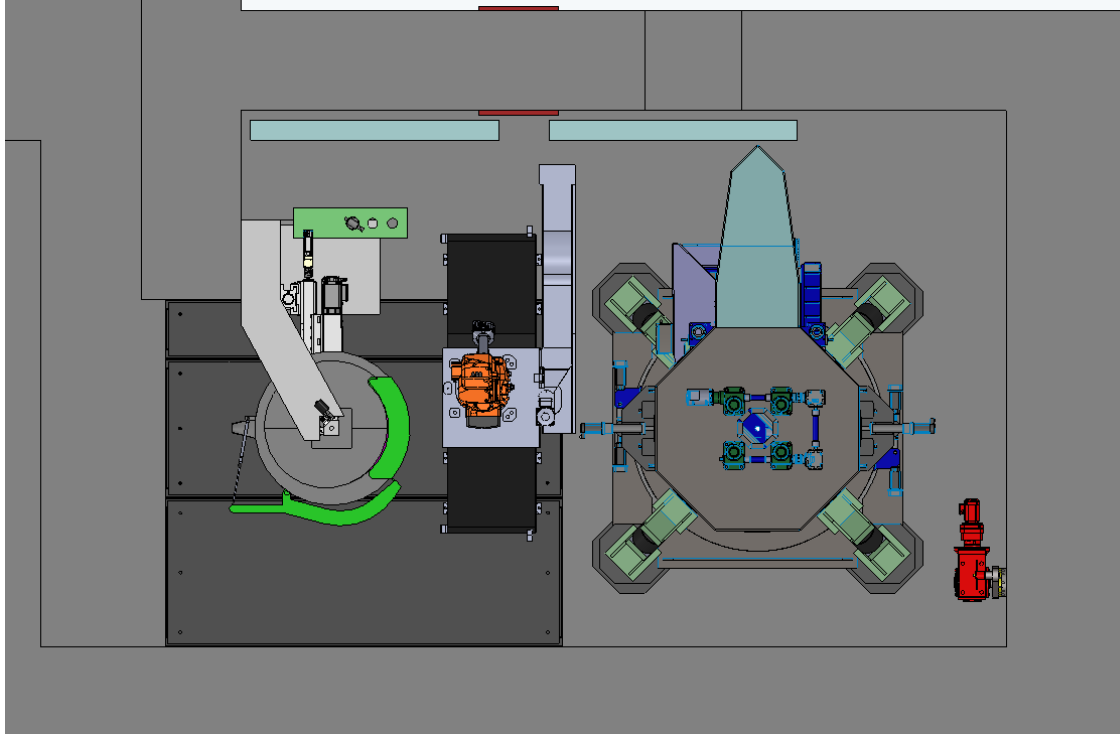
## Content of the work:

- Finalizing of the welding systems operation concept, safety systems, constructions and its subsystems including all related matters for the operations and welding period as part of the encapsulation process
- All workshop drawings, electrical and pneumatic charts, details for manufacturing and maintenance work and installation plans
- Welding systems interfaces to other systems at the encapsulation plant
- Construction plan including determined documentation
- Specifications of the chosen components for electrical and mechanical systems

**Design documentation shall fulfill requirements for CE marking.**



# Multi-purpose room

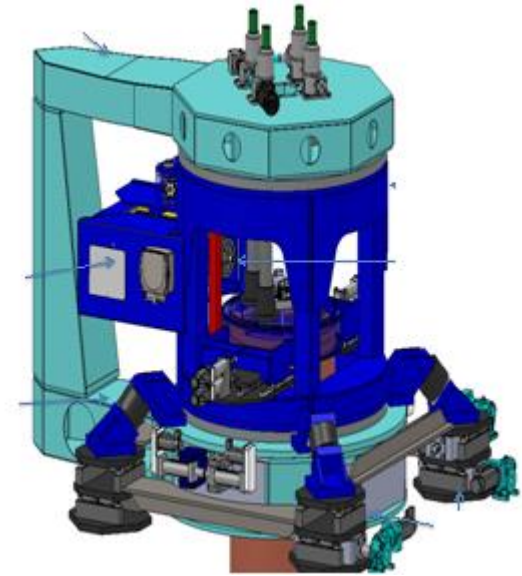


Area: 10 m x 6 m -> 60 m<sup>2</sup>  
Wall thickness: 800 mm  
Floor thickness: 1000 mm

# Overview of the Posiva's welding system and encapsulation plant



1. Receiving and storage area for new canisters
2. Fuel handling cell
3. Copper lid welding chamber
4. Weld inspection
5. Canister surface cleaning area



Parameter:	Value/unit:
Outer dimensions of the welding system	3.32m x4.50m x 4.3m
Total weight of the welding system	22000 kg

# Control system

## 1. Primary System Control, CNC:

- Interface/ handshaking with transfer trolley and lift system.
- Canister and lid clamping and unclamping.
- Control of the spindle, all axis and welding function.
- Data acquisition.

## 2. Secondary (redundant) Control, PLC:

- Unclamp lid-lift mechanism.
- Unclamp main canister clamp.
- Retract FSW plunge axis.

# Possible failures or disturbances at the welding system

Noted failure cases that must be tolerated or prevented:

1. Quality of the weld does not fulfill set demands
2. Disturbances at the process, for example power failure
3. Lid Gripper or clamping system failure
4. Control system failure
5. Hardware failure

Possible disturbances:

1. Failure of the lid placement hardware
2. Overvoltage and electromagnetic phenomena
3. The canister falling out of the welding chamber
4. Collision
5. Fire, flood, seismic phenomena, explosion at the plant or toxic gases



# Future development projects with SKB

Most critical matters for implementing to future welding system:

- Depth controller
- Gas shielding solution and scope at the welding system

Kiitos  
Thank you

