Safe final disposal of used nuclear fuel in Finland

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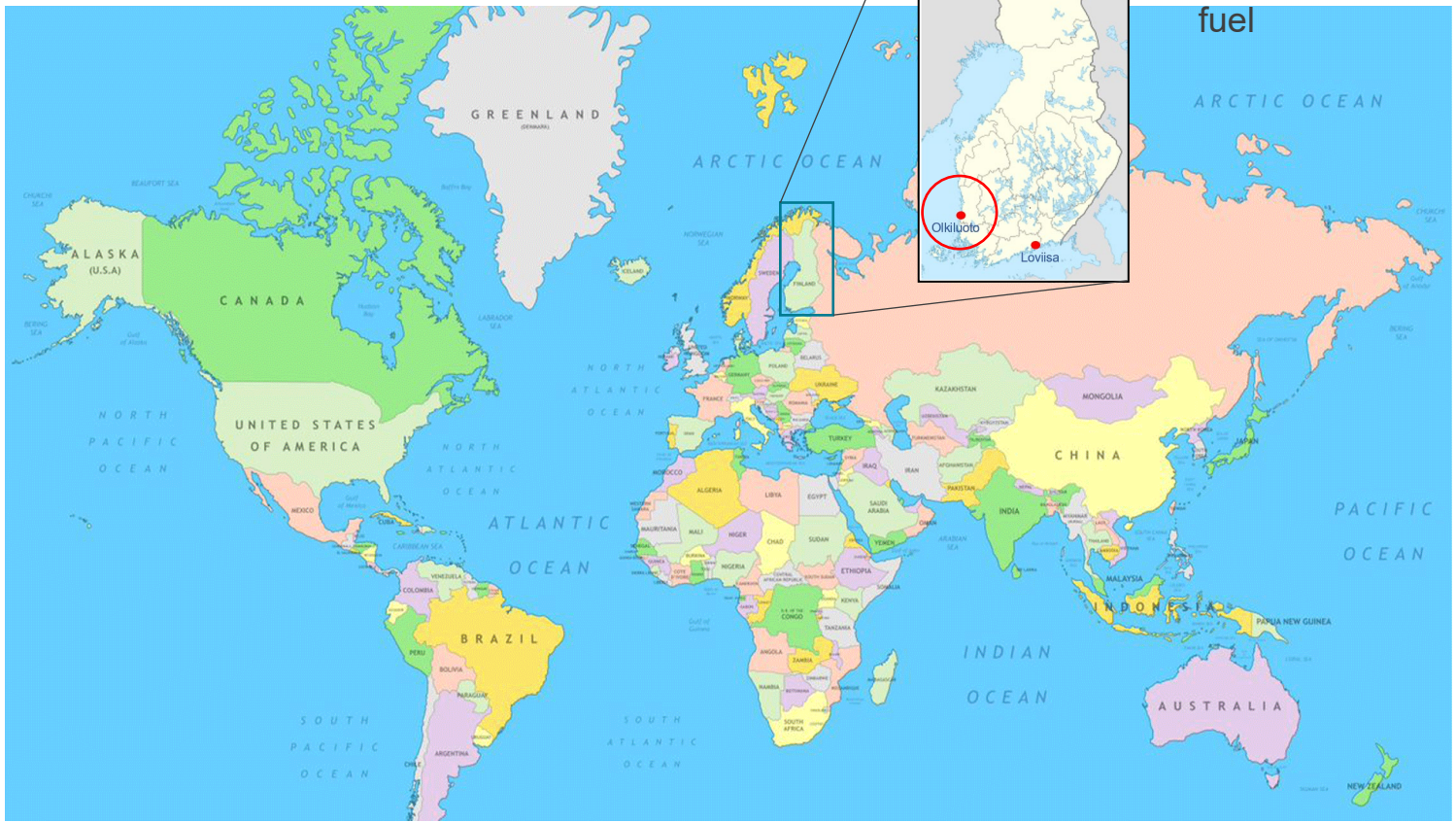
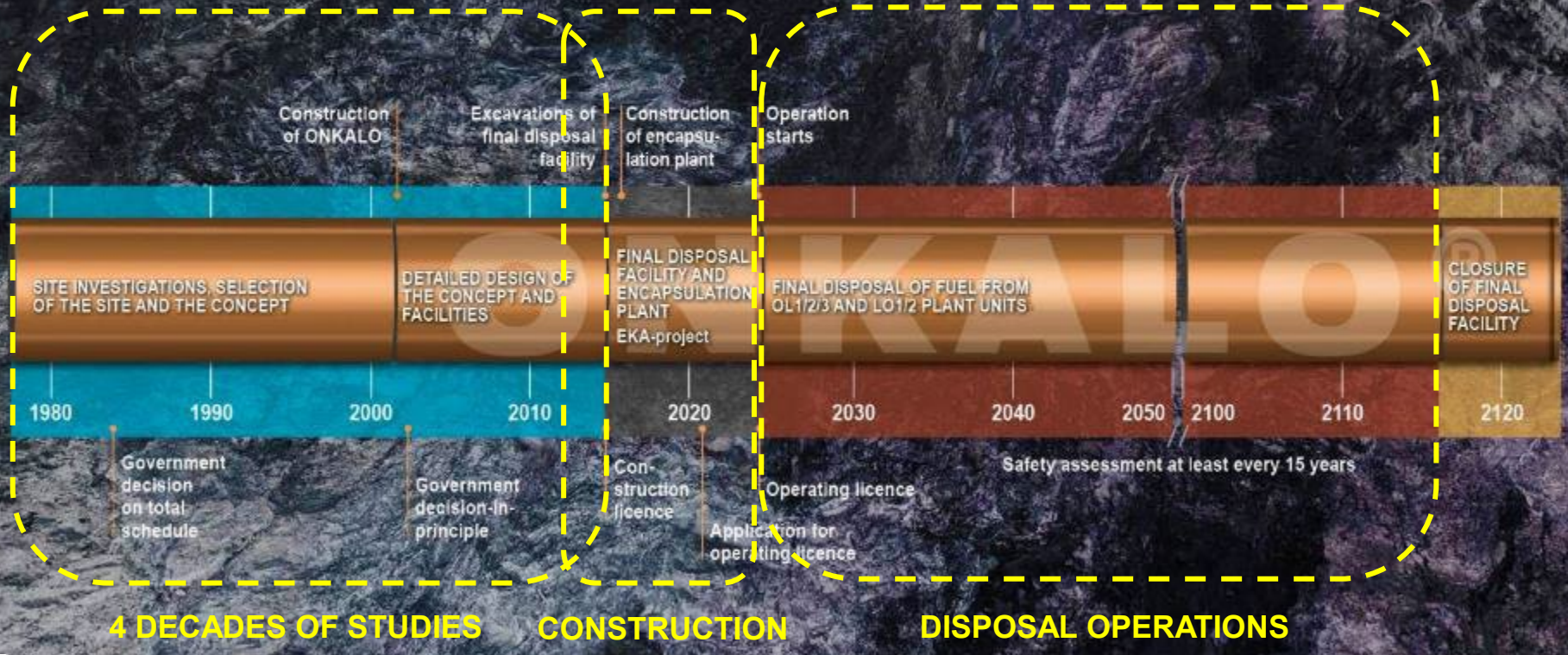
Posiva Oy

Where is Finland?



The safe final disposal will be started first in the world in ONKALO®



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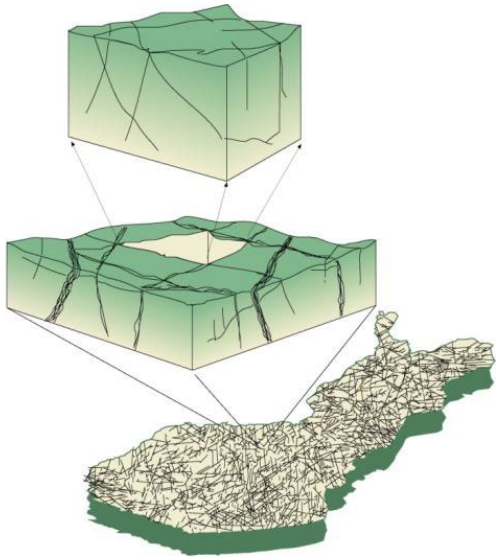
Site selection

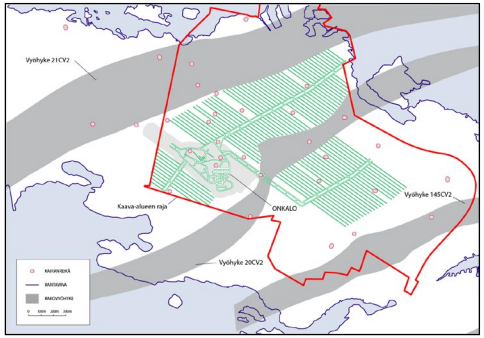
Screening and identification of potential investigation sites

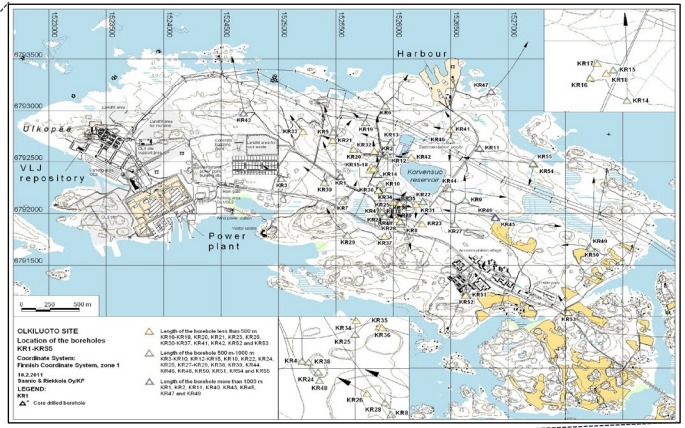
1983 -1985



More than 100 candidate sites were identified

Olkiluoto site

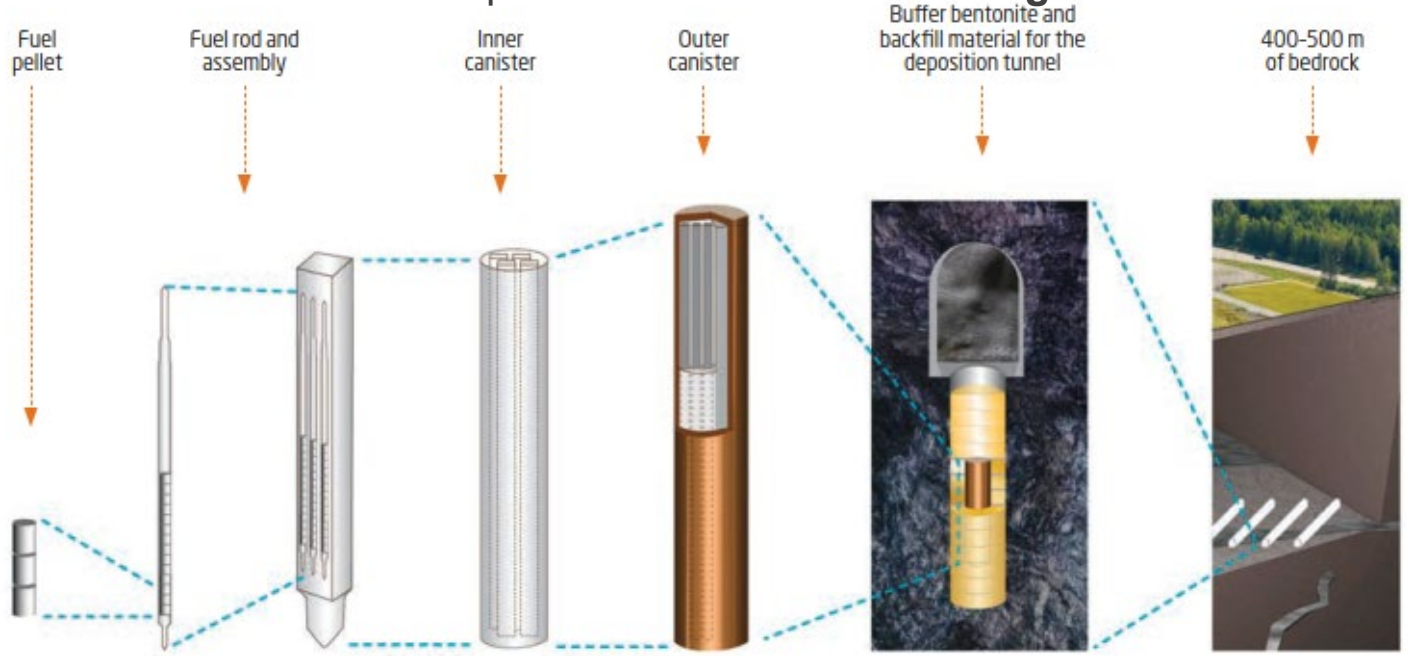




Olkiluoto

Only safe final disposal is possible

Several release barriers back up each other and ensure **long-term isolation** of used fuel



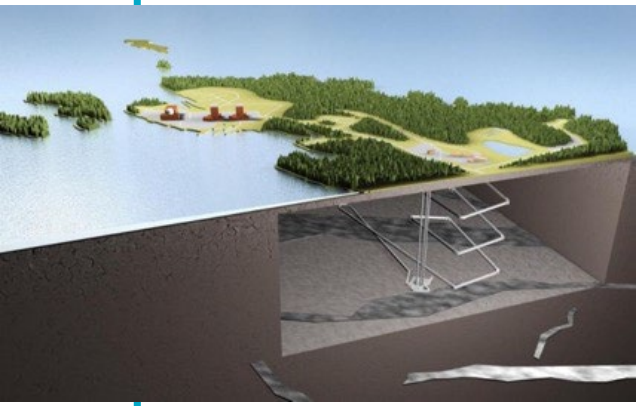
Solubility of the fuel (UO_2) in ground water is extremely slow

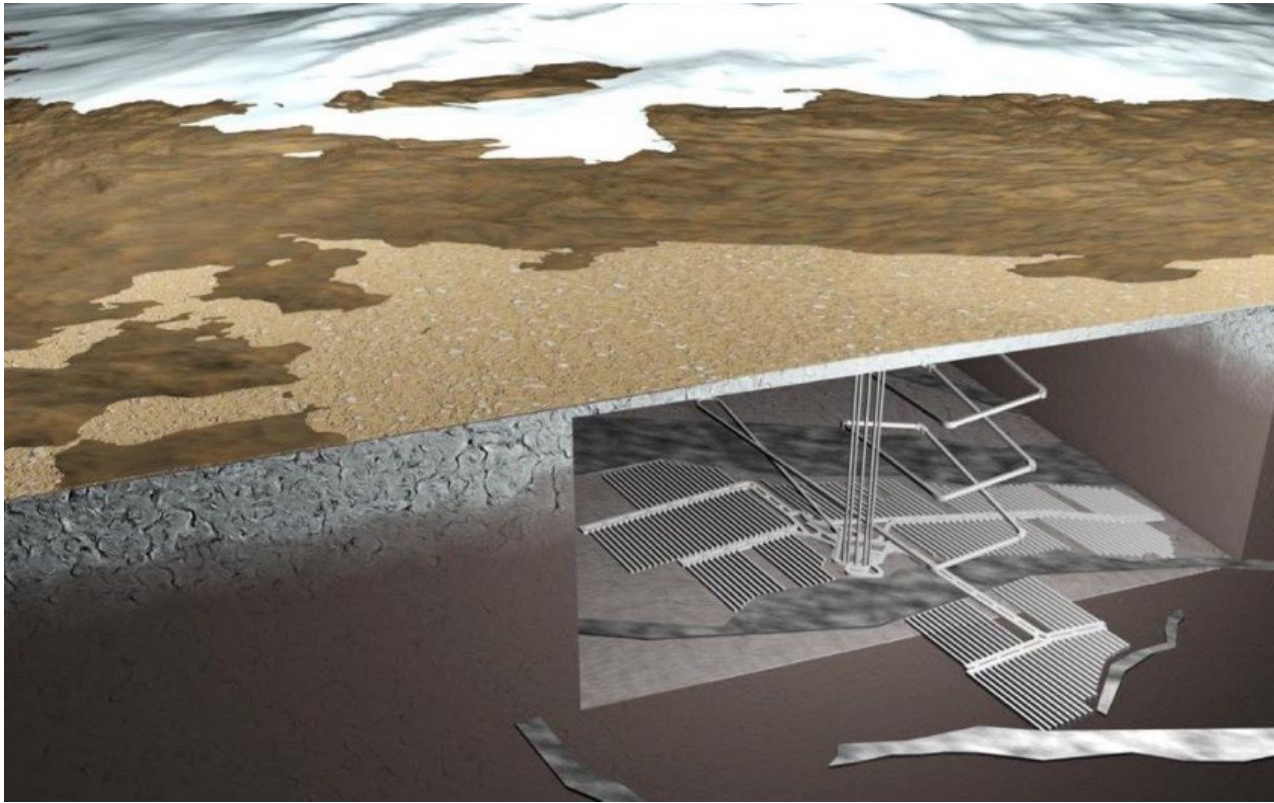
Canister contains and isolates the used fuel permanently

The clay material prevents any water movement around the container

The flow rate of the groundwater in bedrock is minor and slow.
The groundwater in the bedrock contains no oxygen and has no impact on copper.
→ All the material will virtually stay in their place in the bedrock.

ONKALO® area in the 2020s, in 4,000 years and in 100,000 years





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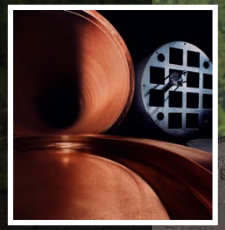
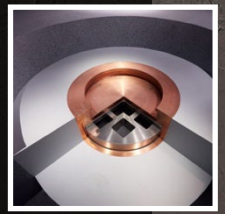
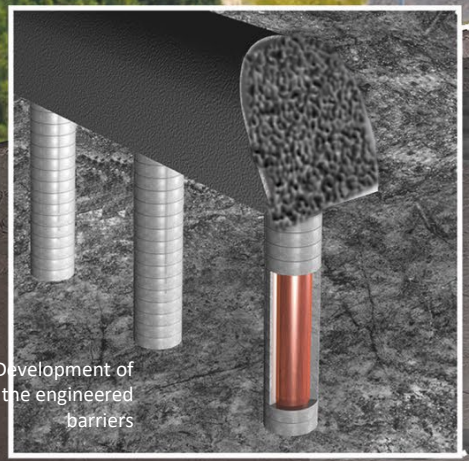
We have a solution for final disposal of used nuclear fuel

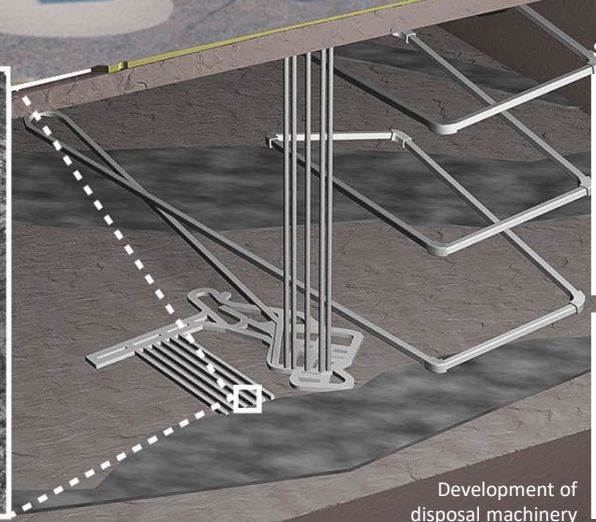
We have a significant role in climate protection as a part of the lifecycle of sustainable nuclear energy







Development of the engineered barriers



Site investigations

Development of disposal machinery

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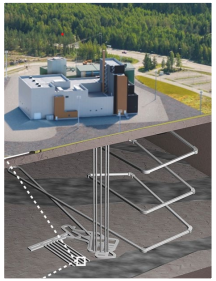
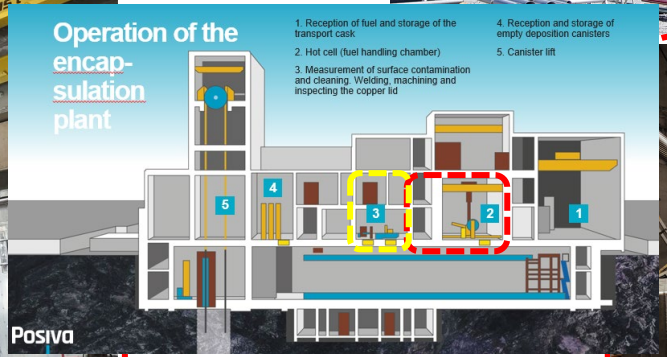
Above ground facility

Encapsulation plant



Fuel handling cell



Fuel handling cell

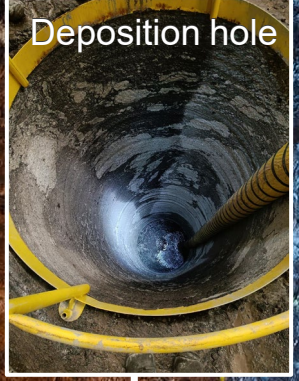
Welding station

Manipulator for maintenance work at the fuel handling cell

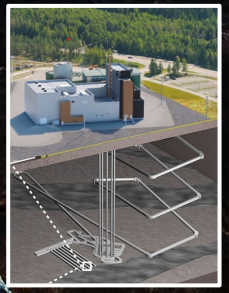
Docking stations for the canister and the fuel transport cask,
drying station for used fuel at the fuel handling cell

Underground

Final disposal facility

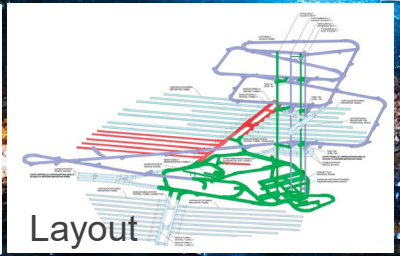

Deposition hole


HVAC works




Deposition tunnel

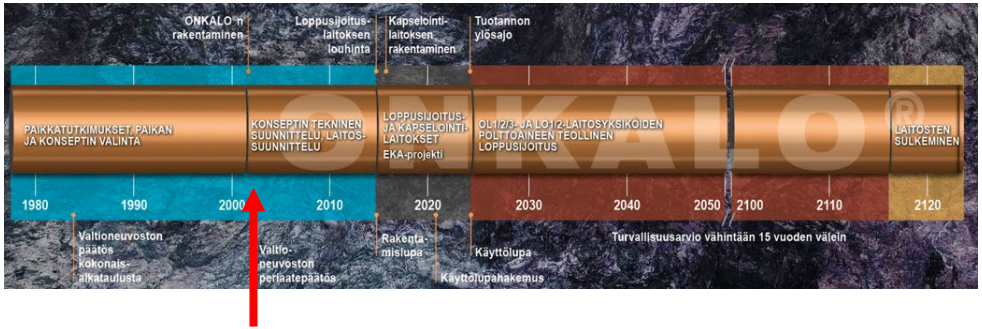

Canister storage

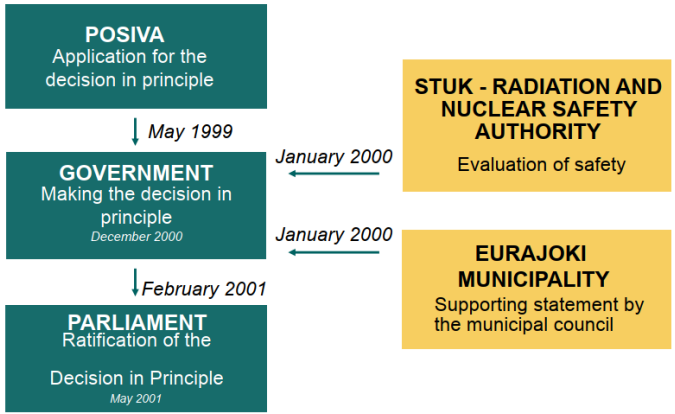

Layout

Central tunnel

Willingness: Municipal veto-voting

- According to the Finnish law, every municipality where a nuclear facility is proposed, has a veto-right in the Decision-In-Principle-process.
- Vote in Eurajoki municipality council in 2000:
  - 20 YES
  - 7 NO





Ratification of Decision in Principle in the Parliament 18 May, 2001

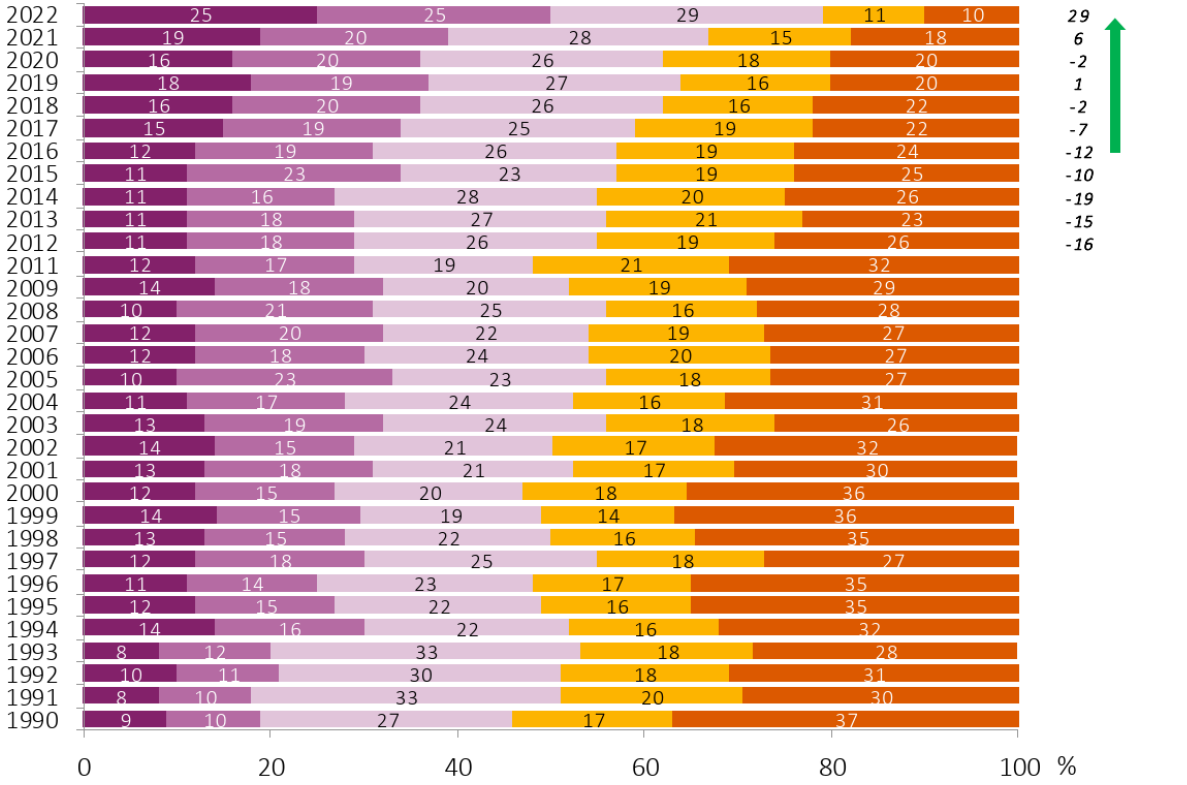
Decisive arguments in the Parliament:

- “Aiming at final disposal is a better solution than just resorting to interim storing”
- “Option for retrievability of waste canisters must be maintained”
- “The present generation has to accept responsibility for nuclear waste”

Radioactive waste can be disposed off safely in the Finnish bedrock

Nettoluku on laskettu vähentämällä samaa mieltä olevien %-osuudesta eri mieltä olevien %-osuus

Fukushima accident 3/2011



n=1000

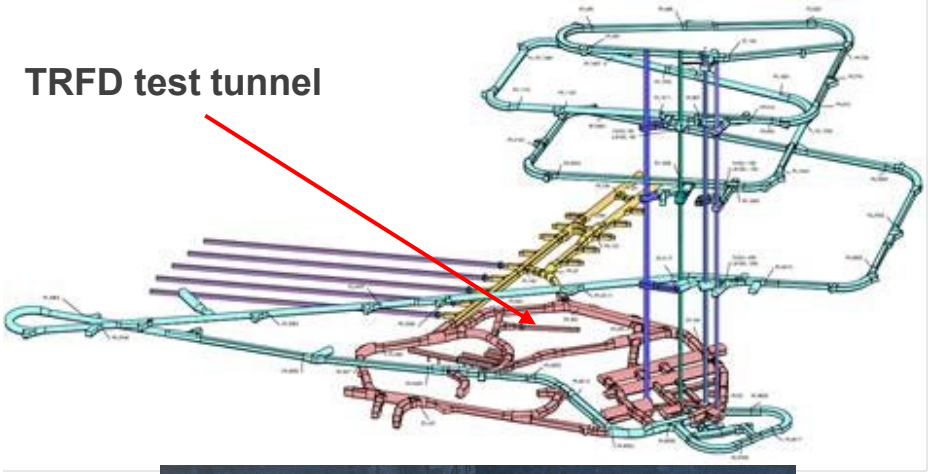

Posiva
Global leader
in final disposal

The next goal - Trial Run of Final Disposal

Encapsulation and final disposal test is carried out with the facilities, machinery, organisation and procedures, which will be used in the operation phase:

- fuel transports
- encapsulation
- final disposal
- retrieval of a ”damaged” canister

Comprises five canisters, four deposition holes and about 70 m of deposition tunnel as well as the plug of the tunnel



Canister installation machine