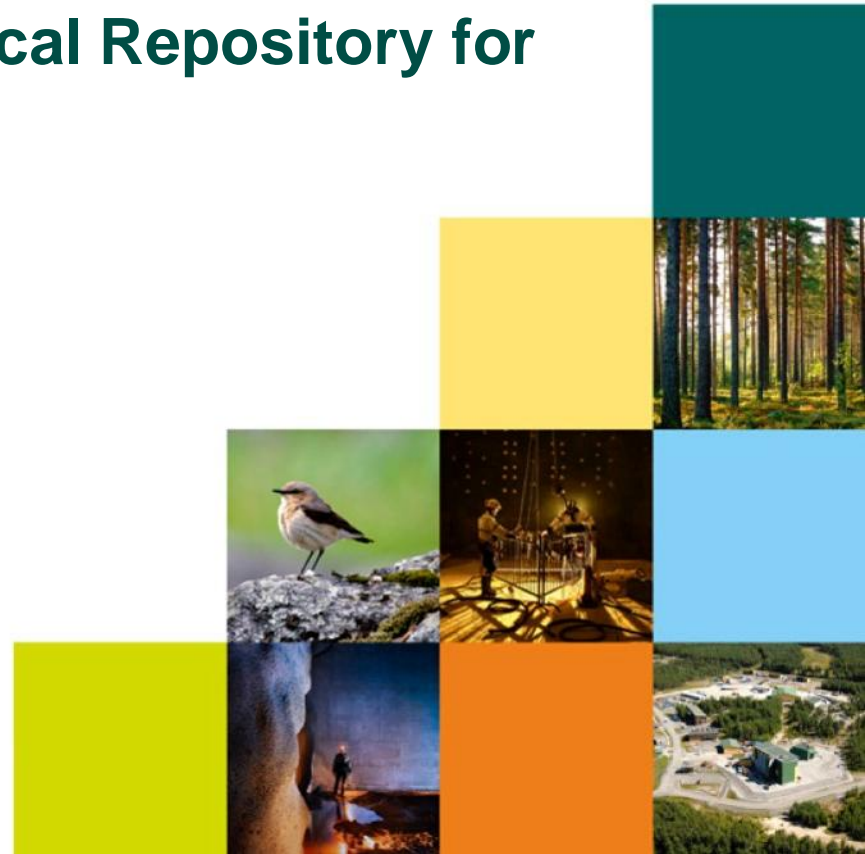


# Posiva's journey: from approval to construction of the world's first Deep Geological Repository for spent nuclear fuel

September 16, 2019

Mika Pohjonen





# Posiva Oy

## Mission

*Safe and cost efficient final disposal of spent nuclear fuel for our owners*

## Vision

*Forerunner in industrial final disposal of spent nuclear fuel*

- § Established in 1995
- § Private company, owned by Finnish NPP operators TVO and Fortum
- § Turnover 73 M€ (2018)
- § 90 staff + in addition expertise from partners





# Posiva Solutions Oy

- § Provides tailored expert services related to final disposal of spent nuclear fuel in collaboration with an extensive network of partners
- § Expertise is based on Posiva's decades-long experience in design, research and development
- § Established in June 2016, subsidiary of Posiva



**ONKALO® - world's first Deep Geological Repository under construction**



# Complete Nuclear Waste Management on one island – Olkiluoto, Finland



## SPENT FUEL INTERIM STORAGE FACILITY

Cooling of fuel assemblies removed from reactor building in water pools excavated in rock

DECOMMISSIONING WASTE REPOSITORY  
Space reservation for decommissioning waste

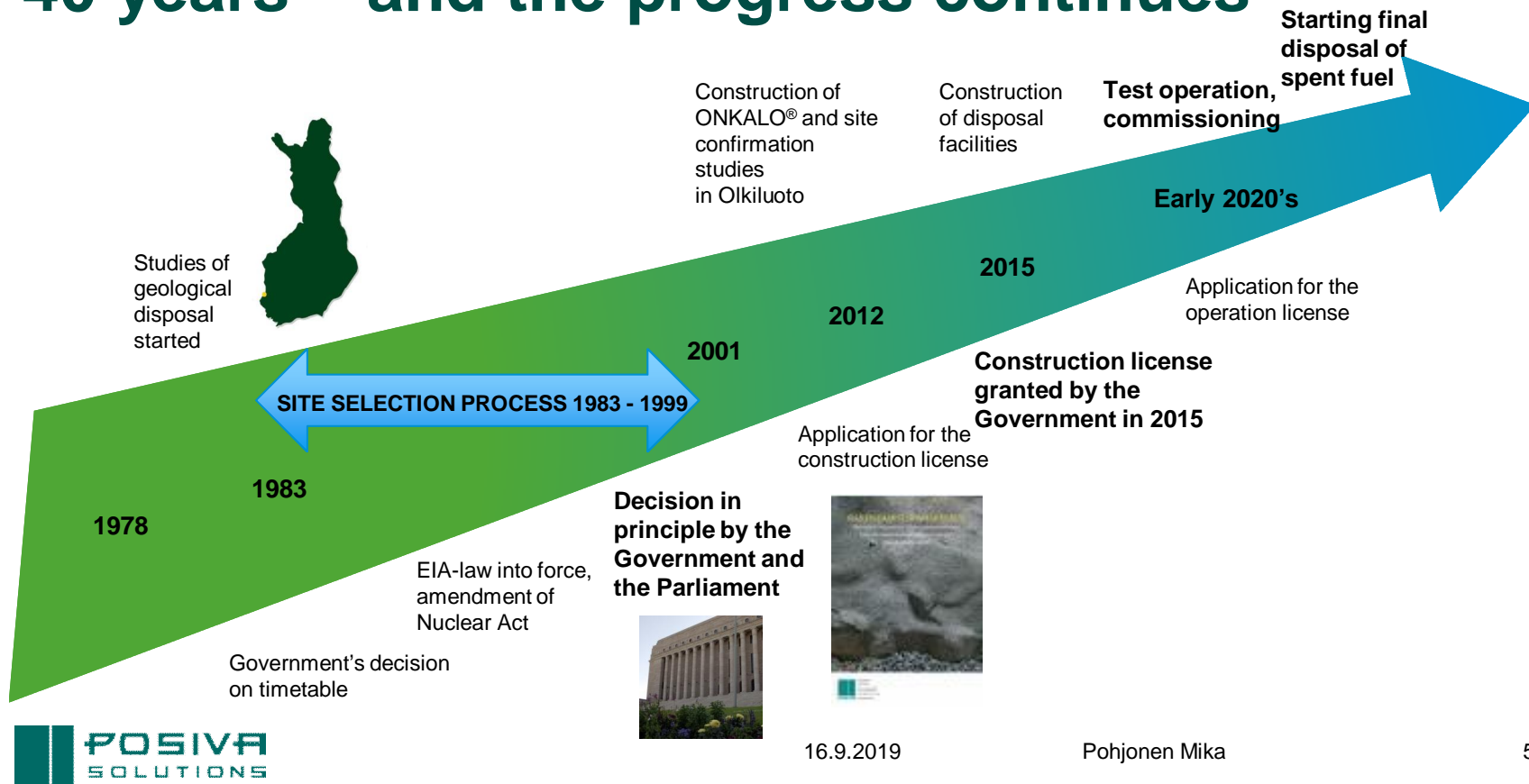
OPERATING WASTE REPOSITORY - VLJ  
Final disposal of intermediate and low level waste

## SPENT NUCLEAR FUEL REPOSITORY

- The underground research facility ONKALO®
- Construction license for the final disposal facility was granted in 2015 and construction began in December 2016



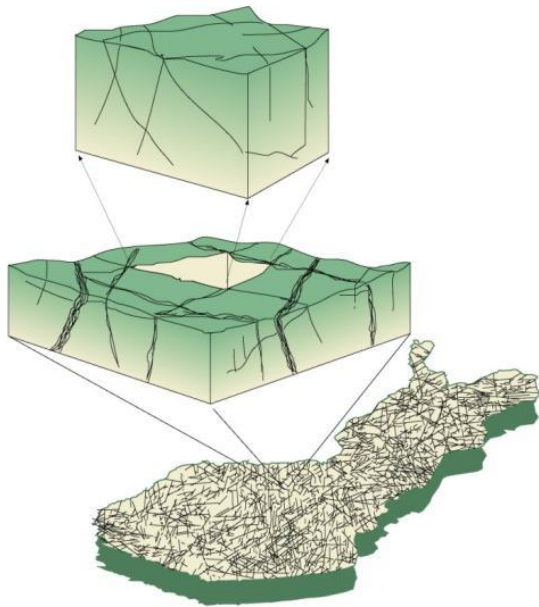
# Posiva's program has progressed already for 40 years – and the progress continues



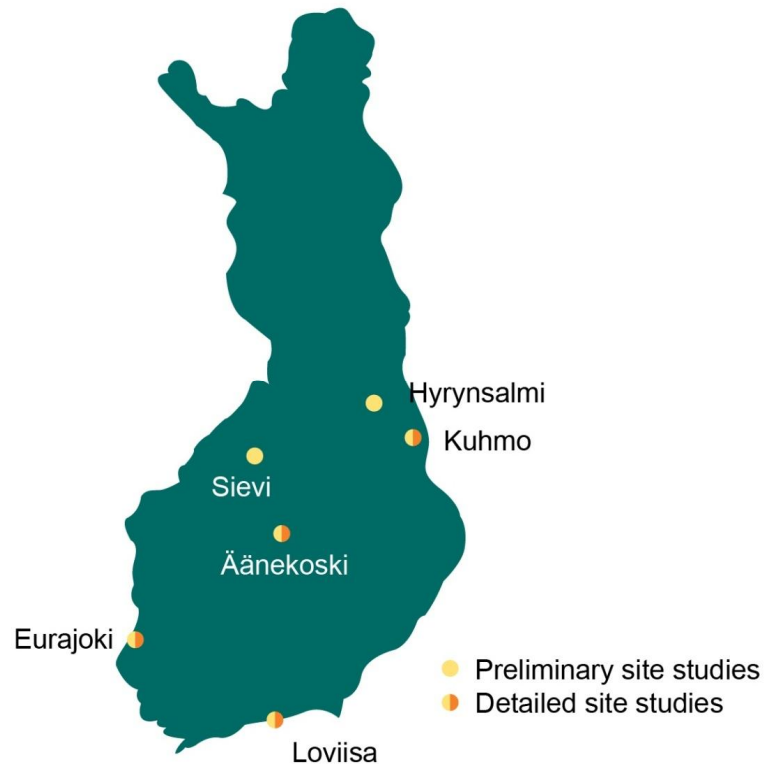


# Site selection research program 1983 – 2000

## Site Identification phase 1983 - 1985



**More than 100 candidate sites were identified**





# Posiva as a corporate citizen in Eurajoki region and in Finland





# Everyone is an important stakeholder





# Interactive cooperation with the community since the start of operation

- § Municipal Cooperation Group since 1970s →
- § Local school cooperation and Science and technology camps for elementary school children
- § Close cooperation with universities and institutes of different levels
- § Versatile means and media for fast and open communication
- § Sponsoring sports, culture, science and non-profit activities in the neighbourhood.





# Decision in Principle in the Parliament 18 May, 2001





# Municipal veto-voting

§ Vote in Eurajoki municipality council in 2000:

§ 20 YES

§ 7 NO



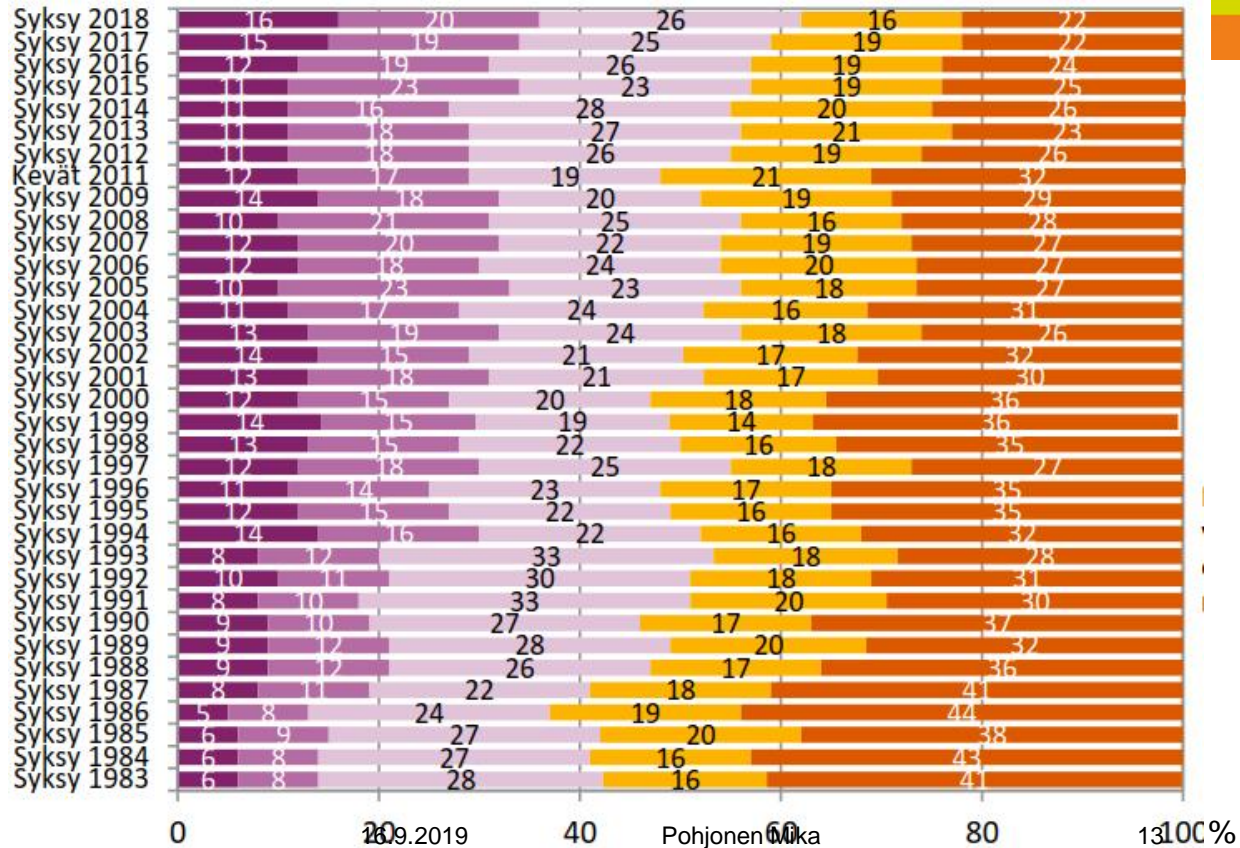


One question in the annual poll by the Finnish Energy association 1983 – 2018:

“Nuclear waste can be safely stored in a final repository in the bedrock of Finland - do you agree?”

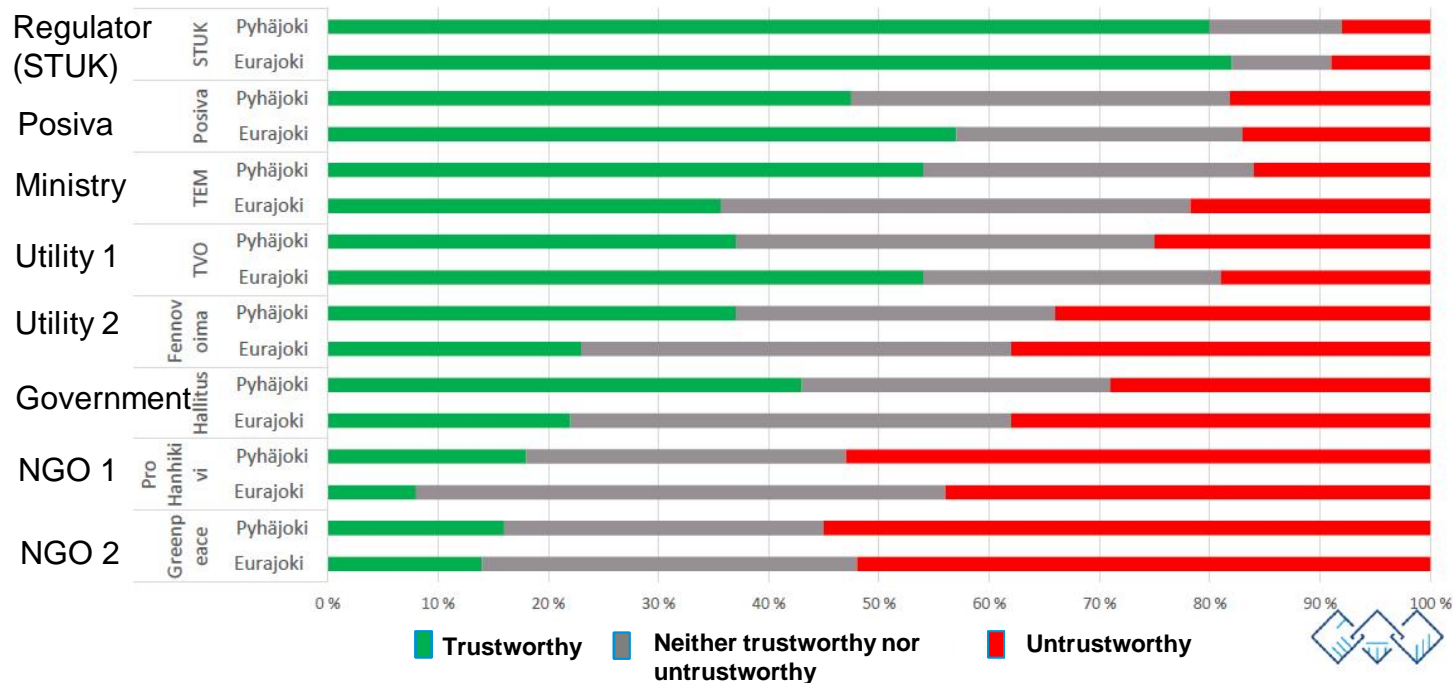
“Syksy” =  
“Autumn”

■ Agree completely ■ Somewhat agree ■ Difficult to say ■ Somewhat disagree ■ Disagree completely





# The public trust in different actors in questions concerning nuclear waste management. Opinions of residents in Eurajoki and Pyhäjoki municipalities in 2017.





# Three “shafts of success”

## Trust and transparency

– it takes years to earn the trust, and only minutes to lose it – we do not risk this under any circumstances

**Independent and trusted authorities.**

**Clear processes, responsibilities and roles.**

**People’s own good, long experience of reliable, employing, tax-paying and transparent nuclear industry**

## Public acceptance of deep geological disposal of spent nuclear fuel



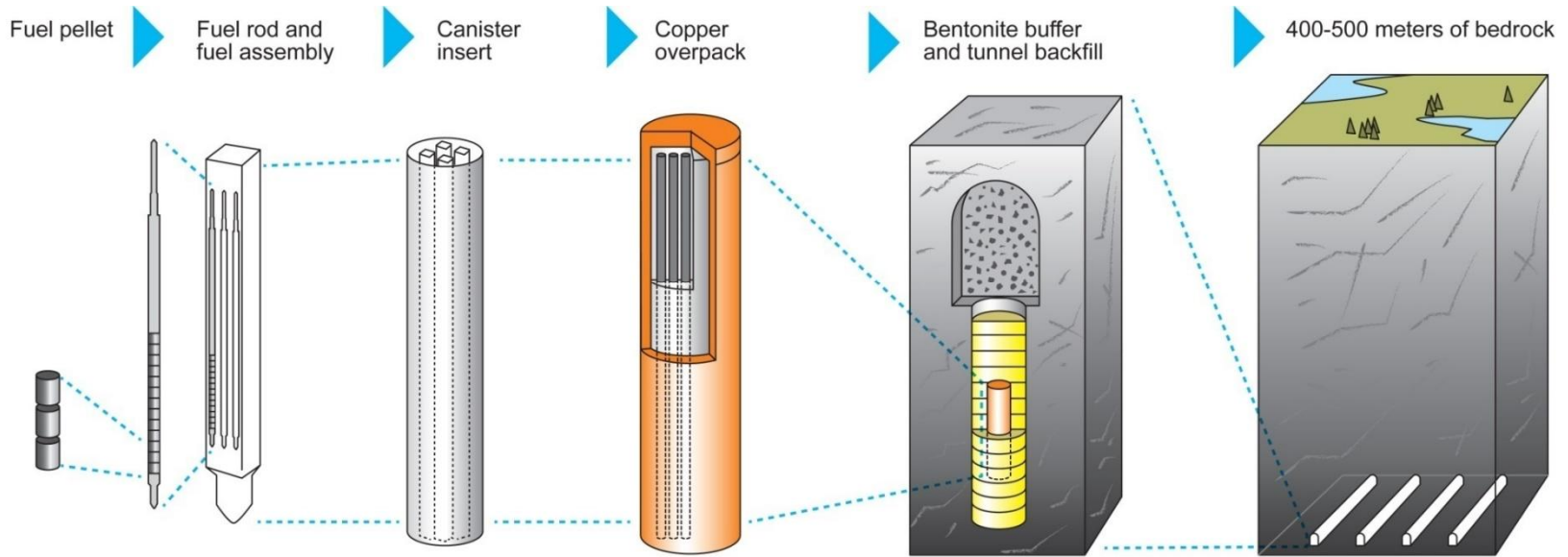
# The present status of the project





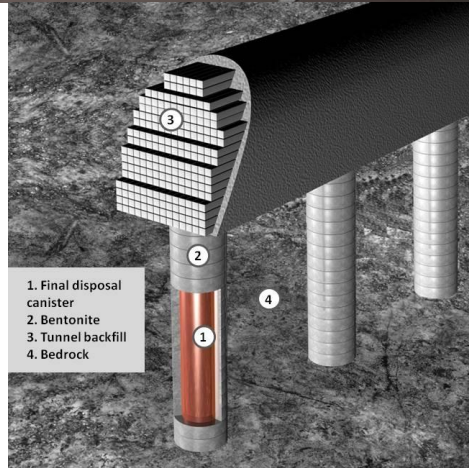
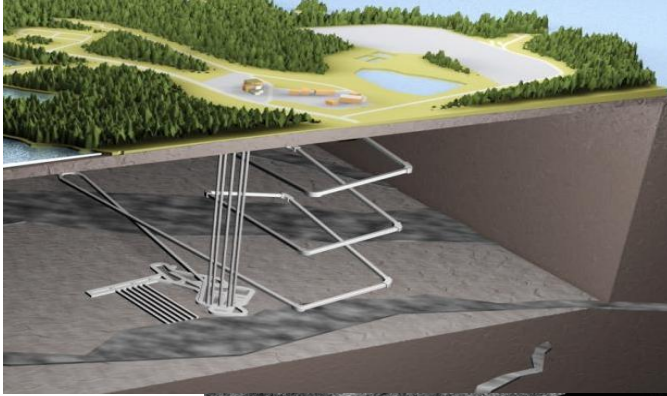
# Only safe final disposal is possible

- § The principle of final disposal:  
Several release barriers back up each other and ensure long-term safety.



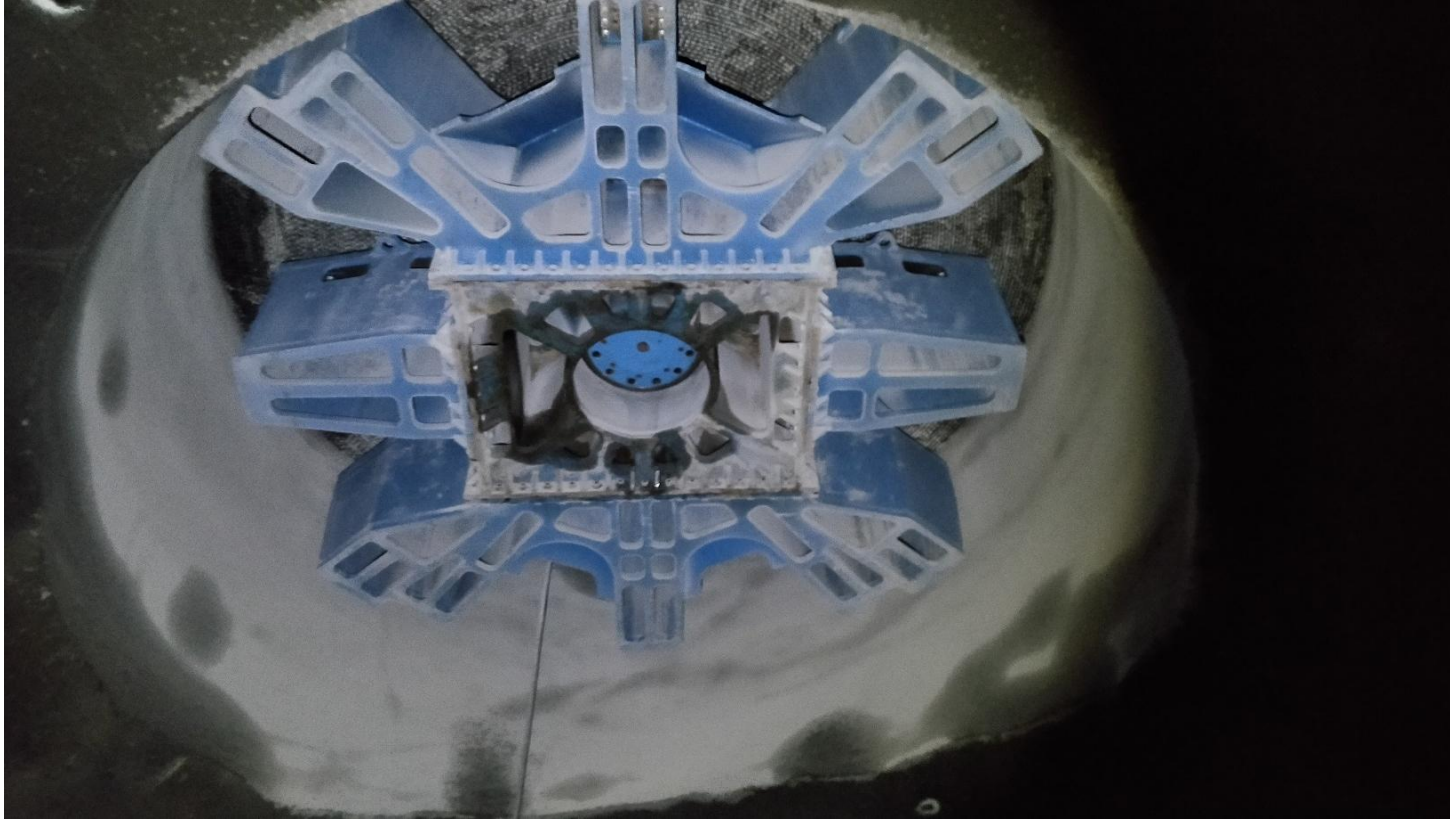


# Construction of above- and underground facilities started in 2016





# Raise boring of the canister shaft April 2018 – March 2019





# Encapsulation plant construction (summer 2018)





# Encapsulation plant main equipment ordered

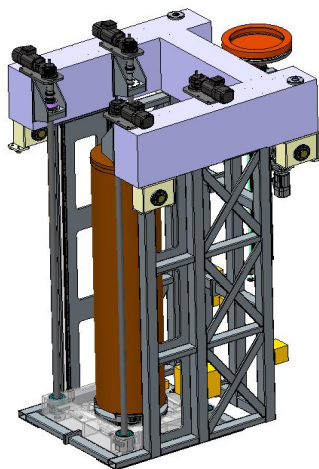
Constructions Industrielles de  
la Mediterranee SA (CNIM)



Transport cask  
vehicle



Spent fuel  
transport vehicle



Canister  
transport car

NKM Noell Special  
Cranes GmbH



Bridge crane



# Visualization of the encapsulation plant



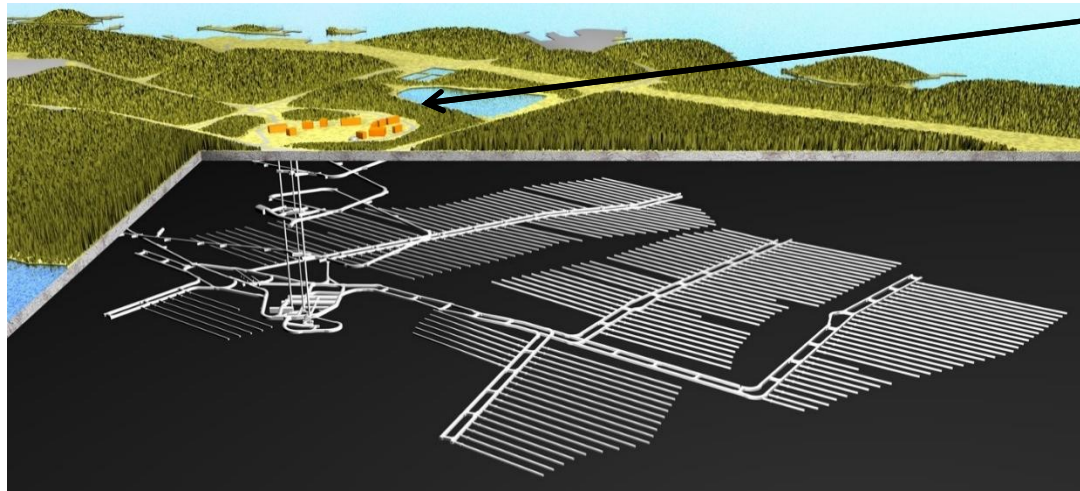
16.9.2019

Pohjonen Mika



# Final disposal facility around 2120

- § Repository capacity is 6500 tU (about 3250 canisters)
- § Depth of the tunnel system -400-450 m and the extent is about 2 km<sup>2</sup>
- § Construction and operating time approximately 100 years
- § The volume of the cave about 2 million m<sup>3</sup>
- § Tunnel length about 60-70 km





# Full Scale In-Situ System Test 2018 - 2019

- § Full Scale In-Situ System Test (FISST) has been installed in ONKALO® demonstration area at the disposal depth of 420 metres
- § Installation started in June 2018 and was ready in May 2019
- § Design, installation and comprehensive monitoring of EBS components:
  - § 2 copper canisters (with heating equivalent to the fuel decay heat)
  - § buffer in two deposition holes
  - § about 50m backfill
  - § deposition tunnel plug
- § ***NWMO (CA) and RWM (UK) are participating***





# FISST-preparation, canister and clay components





# FISST-preparation in ONKALO®





PL  
4350

PL  
4300

Thank you!

More information:

web: [www.posiva.fi](http://www.posiva.fi)

youtube: search "posiva final disposal"