Stepwise licensing of disposal facilities in Finland

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Stepwise licensing of disposal facilities in FinalInd

- Nuclear waste management framework
- Licensing process in Finland
- Steps during the spent nuclear fuel disposal licensing

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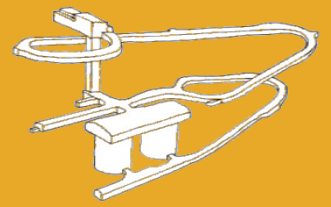
RADIATION AND NUCLEAR SAFETY AUTHORITY

Nuclear waste management responsibilities and solutions

Teollisuuden Voima Oyj (Olkiluoto)

Olkiluoto power plant

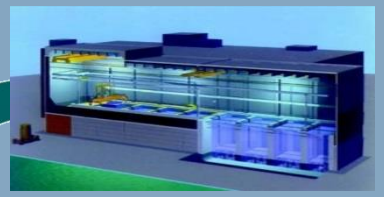
Interim storage of spent nuclear fuel



Operating waste repository

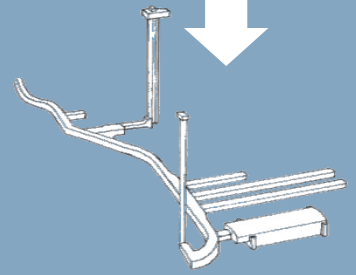
In future

Fortum Power and Heat Oy (Loviisa)



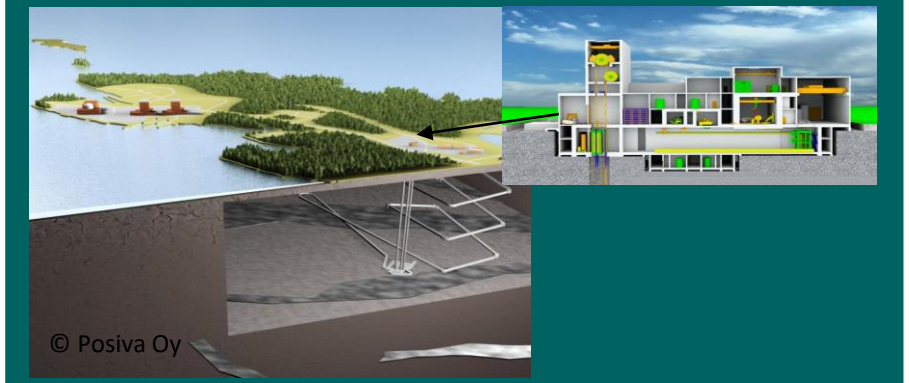
Interim storage of spent nuclear fuel

Loviisa power plant



Operating waste repository

Posiva Oy



Encapsulation and disposal of spent nuclear fuel

Fennovoima Oy (Hankikivi)

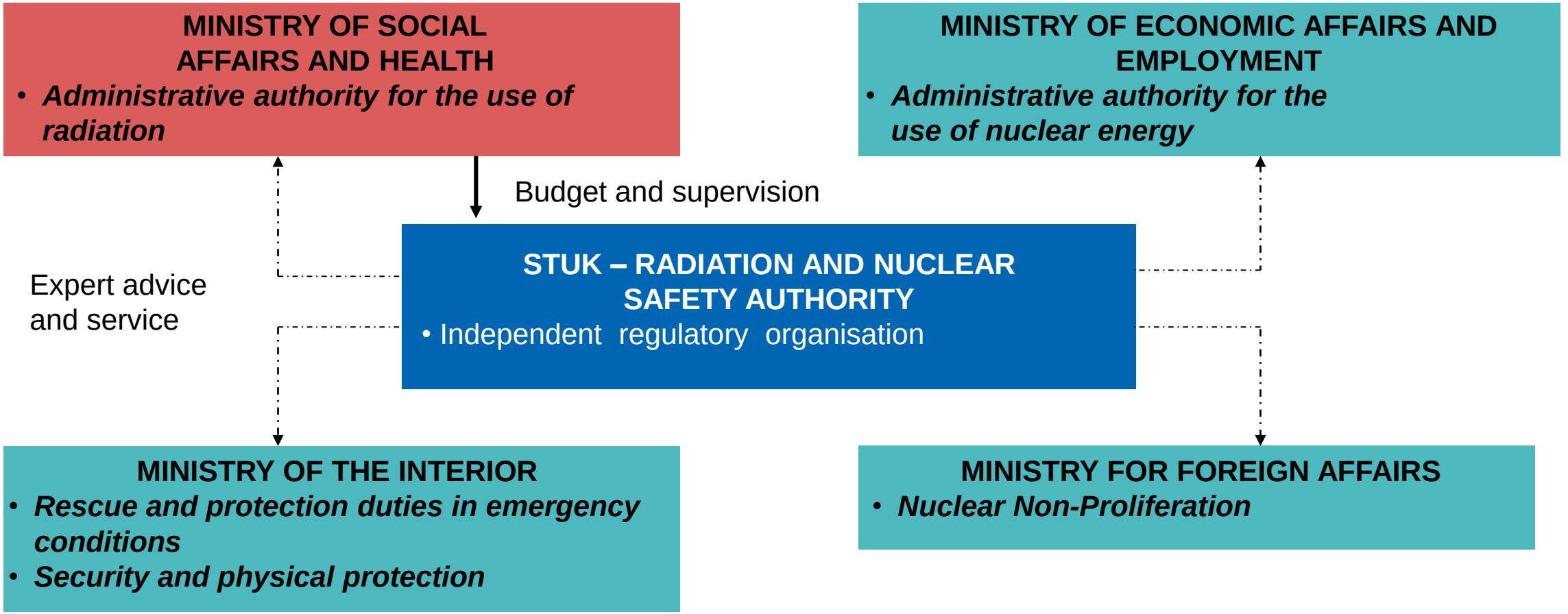
In NPP site:

- **Interim storage of spent nuclear fuel**
- **Operating waste Repository**

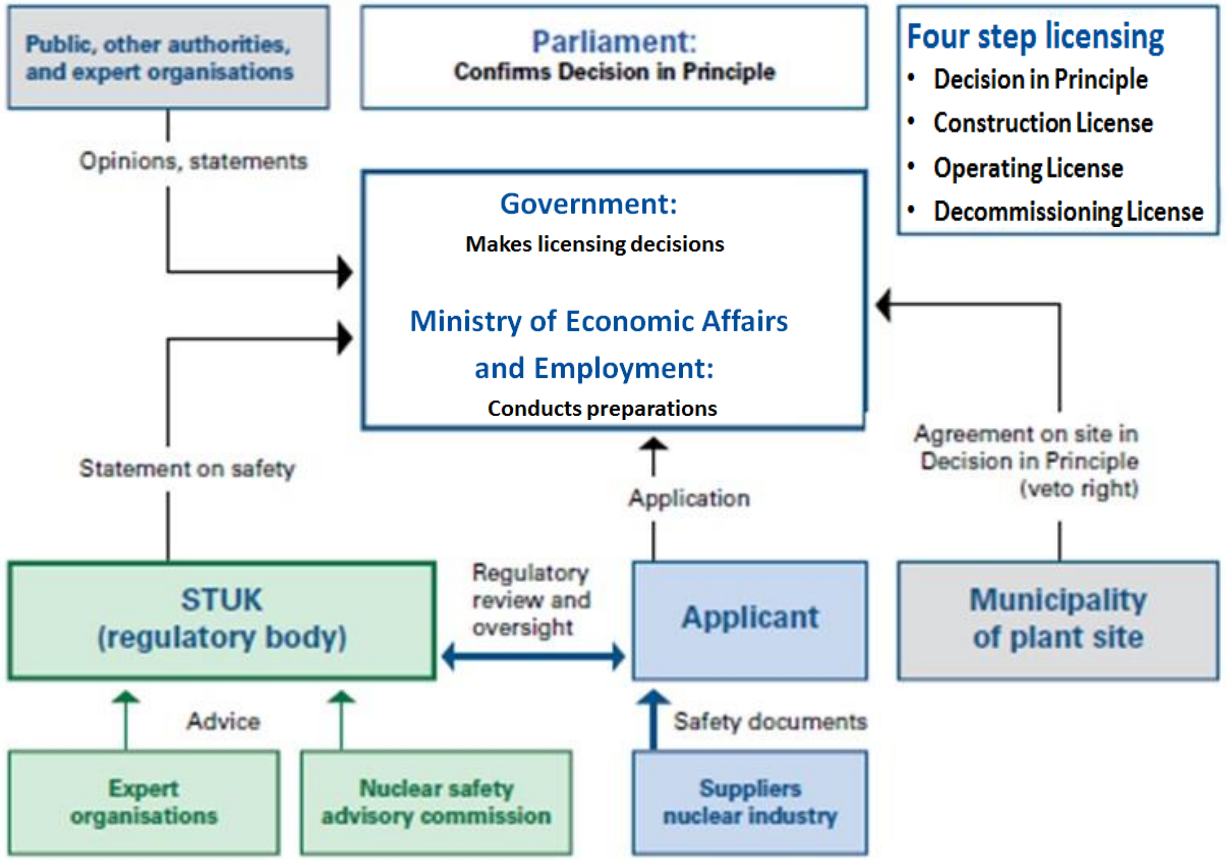
SNF

EIA programme for disposal submitted in 6/2016

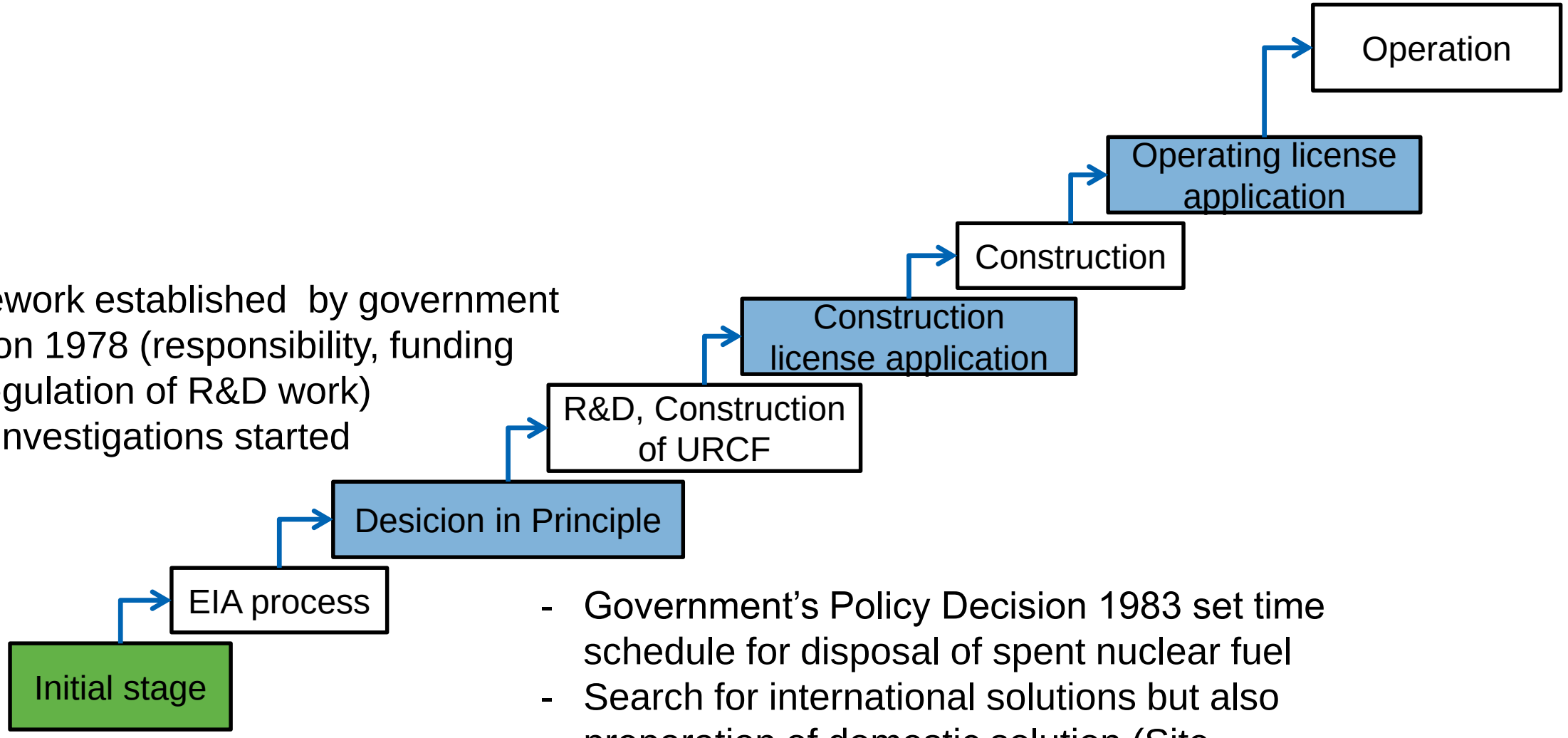
Main contacts between STUK and Ministries



Licensing framework in Finland



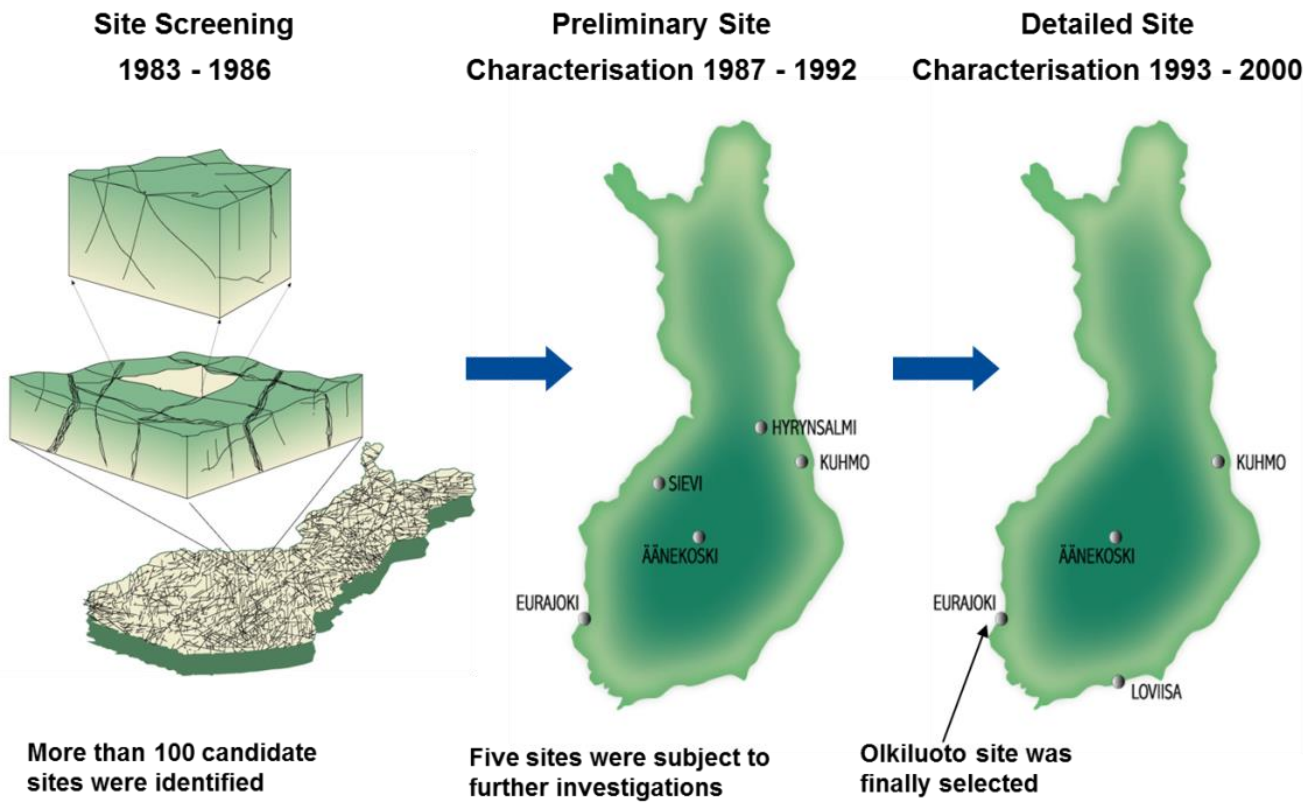
Licensing process in Finland, initial stage (1978-1983)



- Framework established by government decision 1978 (responsibility, funding and regulation of R&D work)
- Initial investigations started

- Government's Policy Decision 1983 set time schedule for disposal of spent nuclear fuel
- Search for international solutions but also preparation of domestic solution (Site selection 2000 and operation 2020)

Site selection 1983-1999



R&D plan published every third year

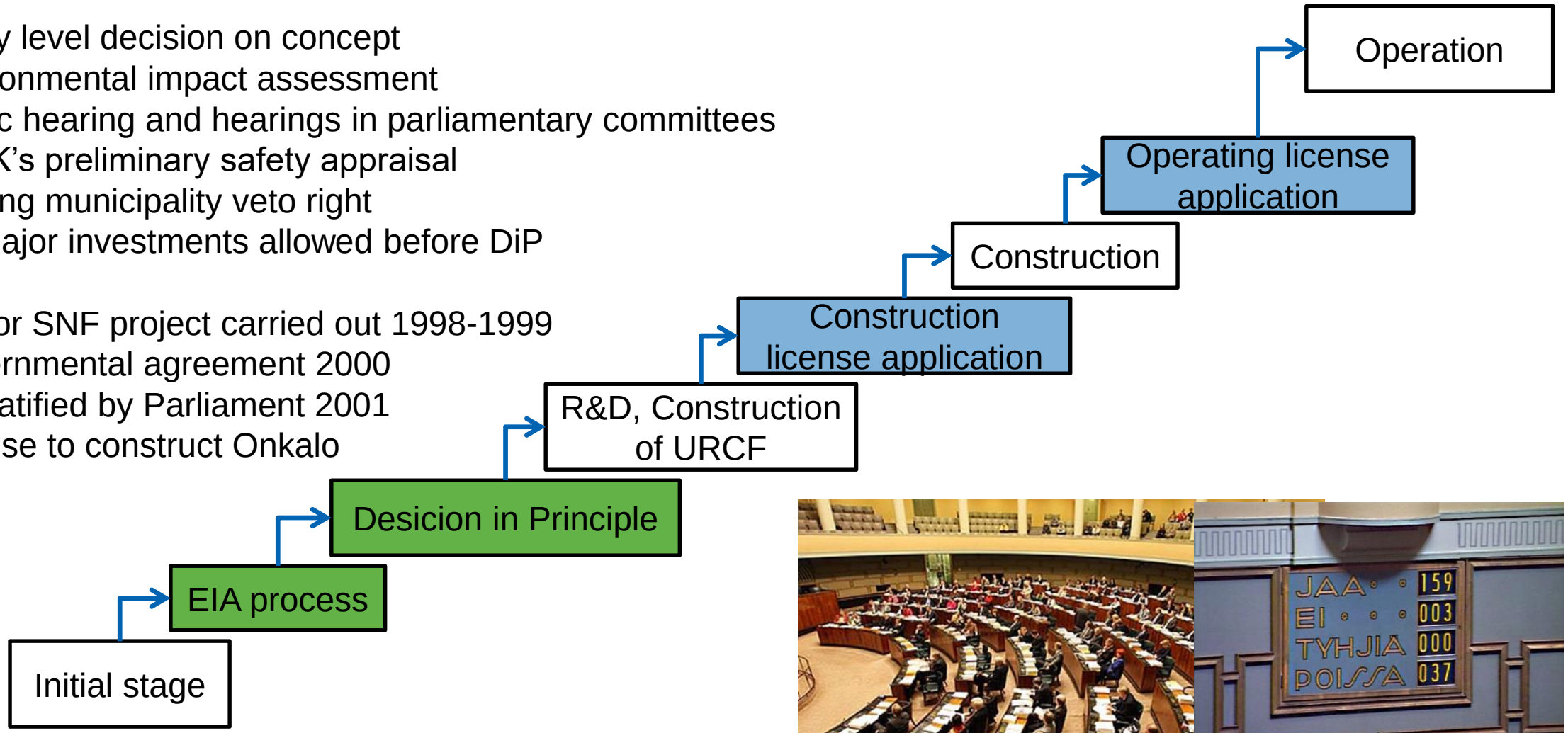
STUK reviewed safety documentation and provided preliminary opinions about site characteristics and needs for further work.

- In 1985 – safety documentation to support selection of sites for more detailed site characterization
- In 1992 – safety case based on site characterization work done for sites selected in previous phase.
- In 1996 – safety documentation based on finalized of detailed phase site characterization.
- In 1999 TILA-99 safety case for final candidate sites

Licensing process in Finland, EIA and DiP 1999-2001

-Policy level decision on concept
-Environmental impact assessment
-Public hearing and hearings in parliamentary committees
-STUK's preliminary safety appraisal
-Hosting municipality veto right
-No major investments allowed before DiP

-EIA for SNF project carried out 1998-1999
-Governmental agreement 2000
-DIP ratified by Parliament 2001
-License to construct Onkalo



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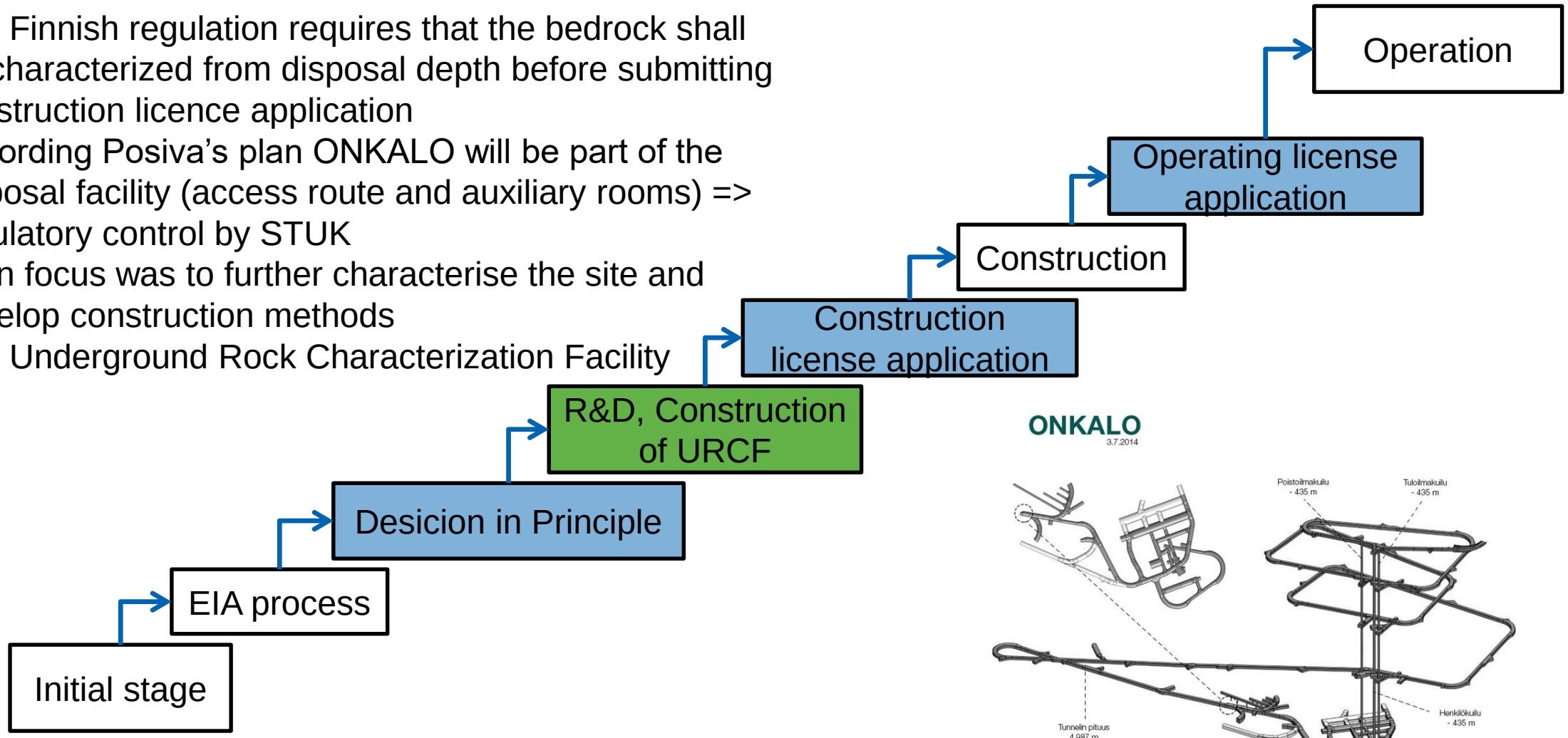
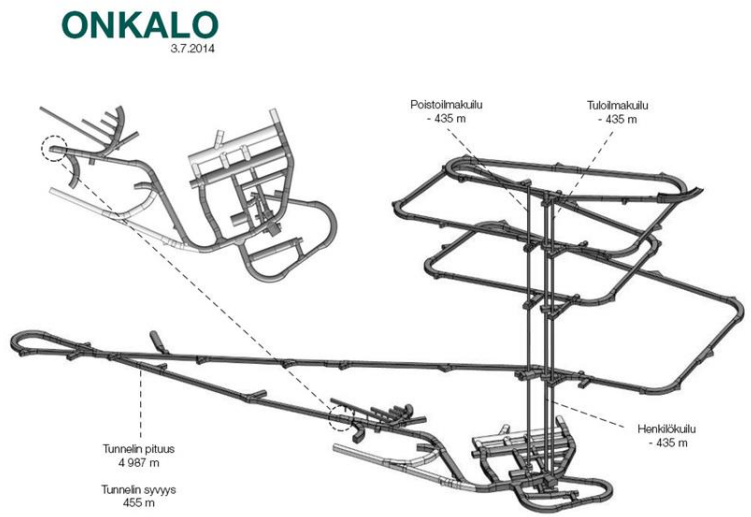
Construction of Onkalo 2004-2014

- The Finnish regulation requires that the bedrock shall be characterized from disposal depth before submitting construction licence application
- According Posiva's plan ONKALO will be part of the disposal facility (access route and auxiliary rooms) => regulatory control by STUK
- Main focus was to further characterise the site and develop construction methods
  - Underground Rock Characterization Facility



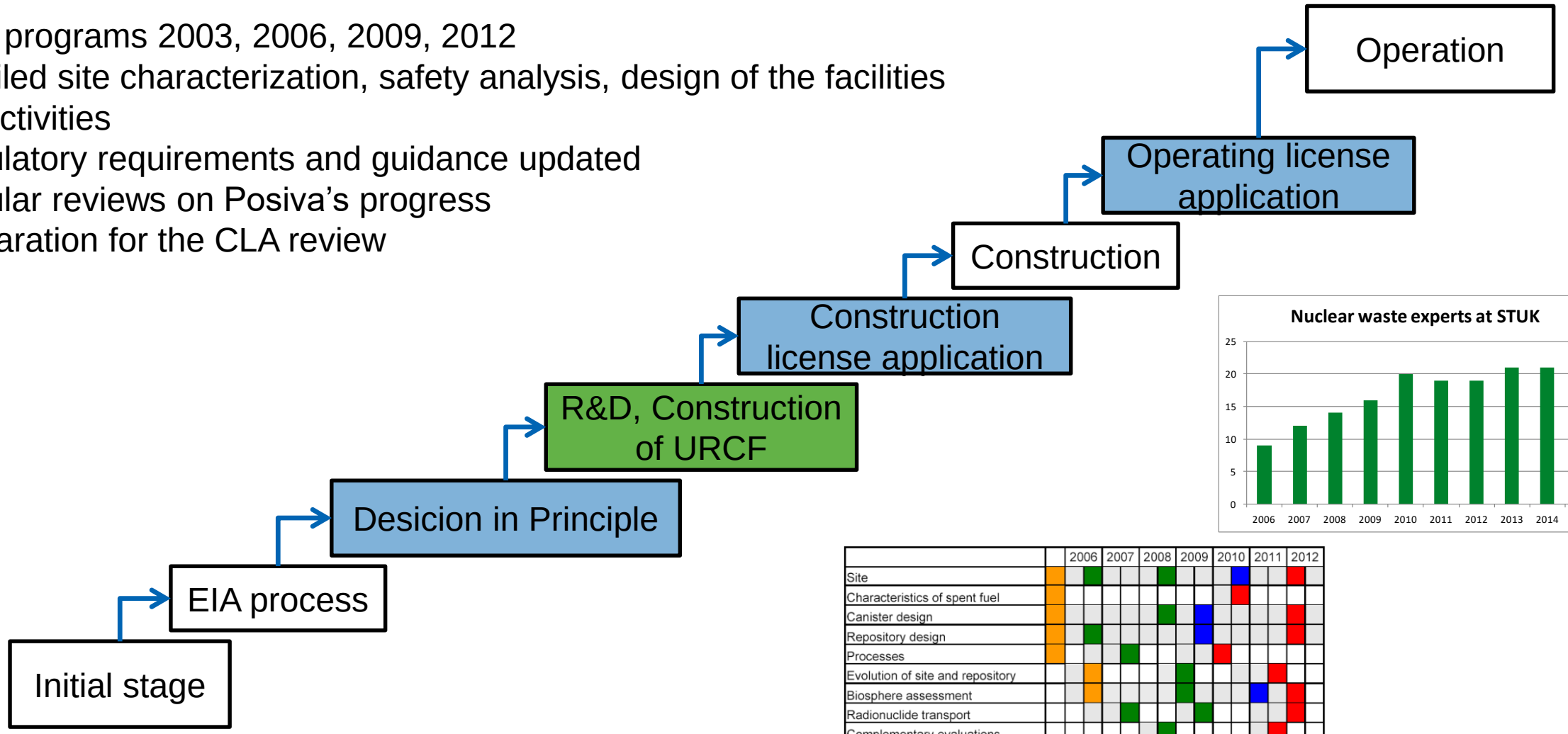


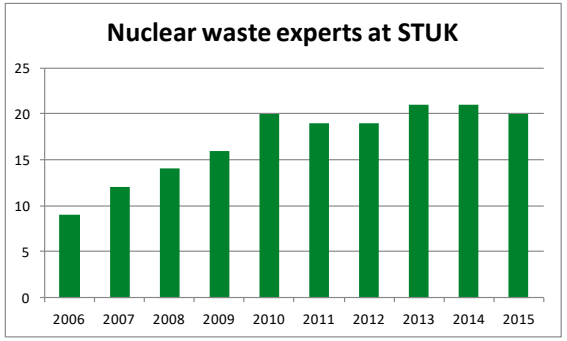
R&D work 2001-2012

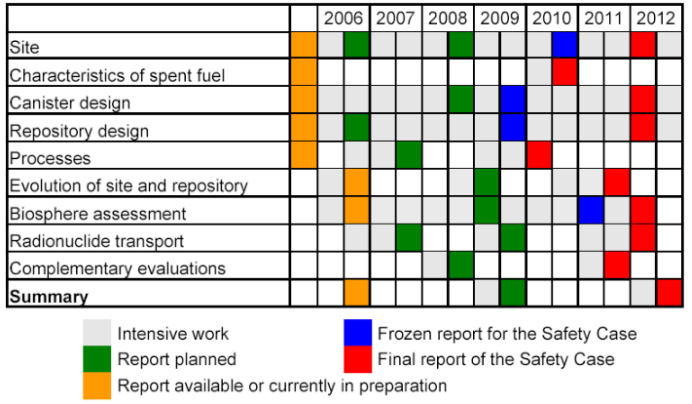
- R&D programs 2003, 2006, 2009, 2012
- Detailed site characterization, safety analysis, design of the facilities

STUK activities

- Regulatory requirements and guidance updated
- Regular reviews on Posiva's progress
- Preparation for the CLA review

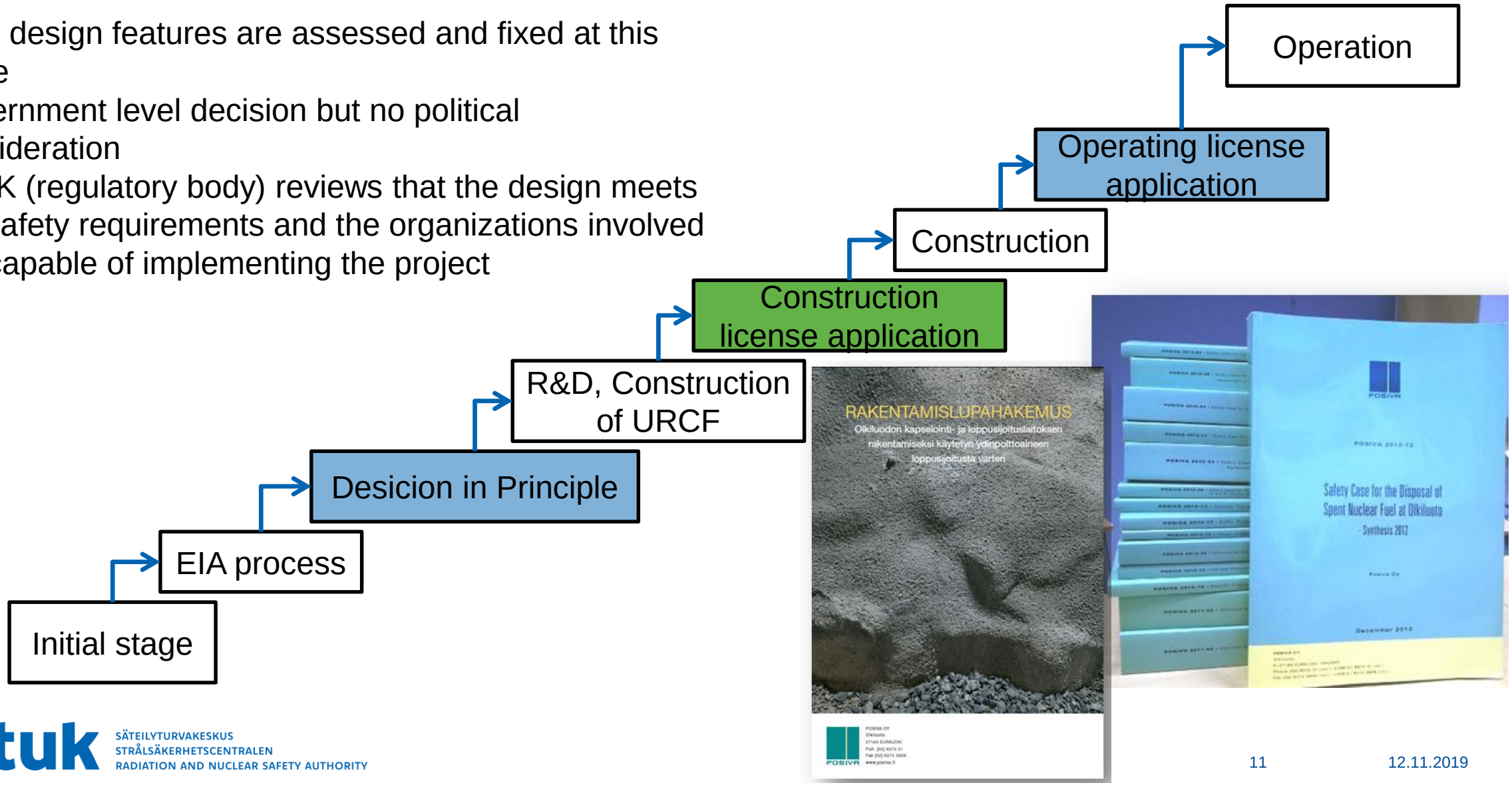






Construction license

- Main design features are assessed and fixed at this stage
- Government level decision but no political consideration
- STUK (regulatory body) reviews that the design meets the safety requirements and the organizations involved are capable of implementing the project

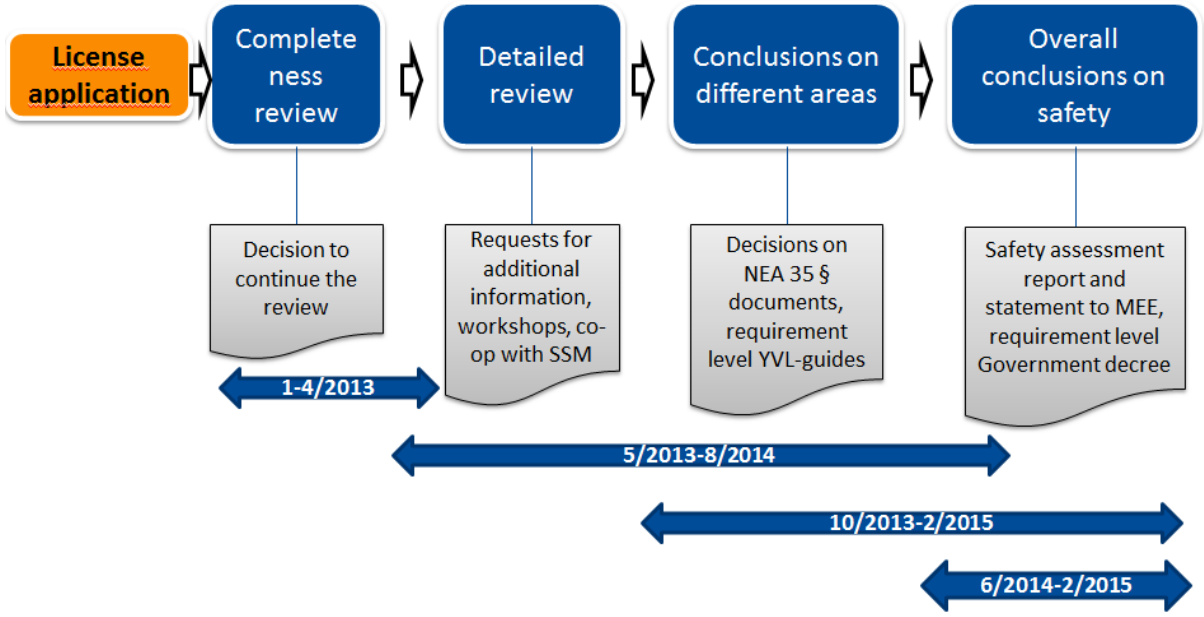


Construction license application review 2012-2015

Posiva submitted construction license application to the ministry in the end of 2012, covered both encapsulation and underground disposal facility

To STUK (Nuclear energy decree 35 §)

- Preliminary safety assessment report
- Probabilistic risk assessment of the design stage (PRA)
- Proposal for a classification document
- Description of quality management during construction
- Preliminary plans for arrangements for security and emergencies
- Plan for arranging the safeguards control
- Post closure safety case
- Applicants arrangements for the implementation of control by STUK

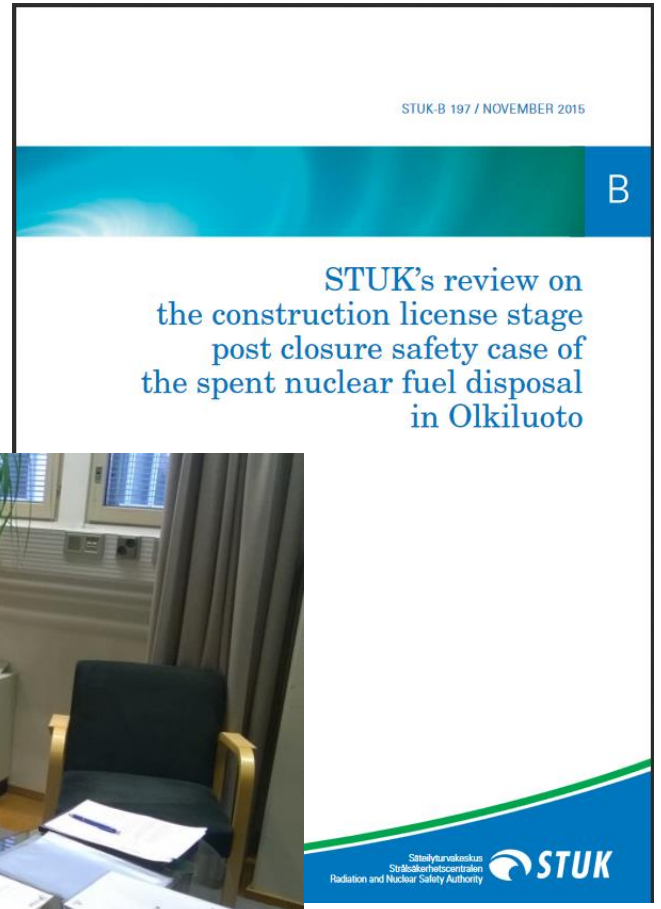


Review of the constrution license application by STUK

- STUK reviewed the CLA during 2013-2014
  - About 30 of requests for additional information
  - Documentation updated by Posiva during the review
  - STUK accepted the main technical documentation (PSAR, Post closure safety case, Safeguards, Security,…) during the review
    - **Level of safety acceptable for the construction license stage**
    - 85 requirements for Posiva
    - Plans for the future development, demonstrating underground constructability and feasibility of the EBS system, more detailed documentation on design,…
    - Set for different stages: Before start of the construction starts, during construction, in the operating license application…

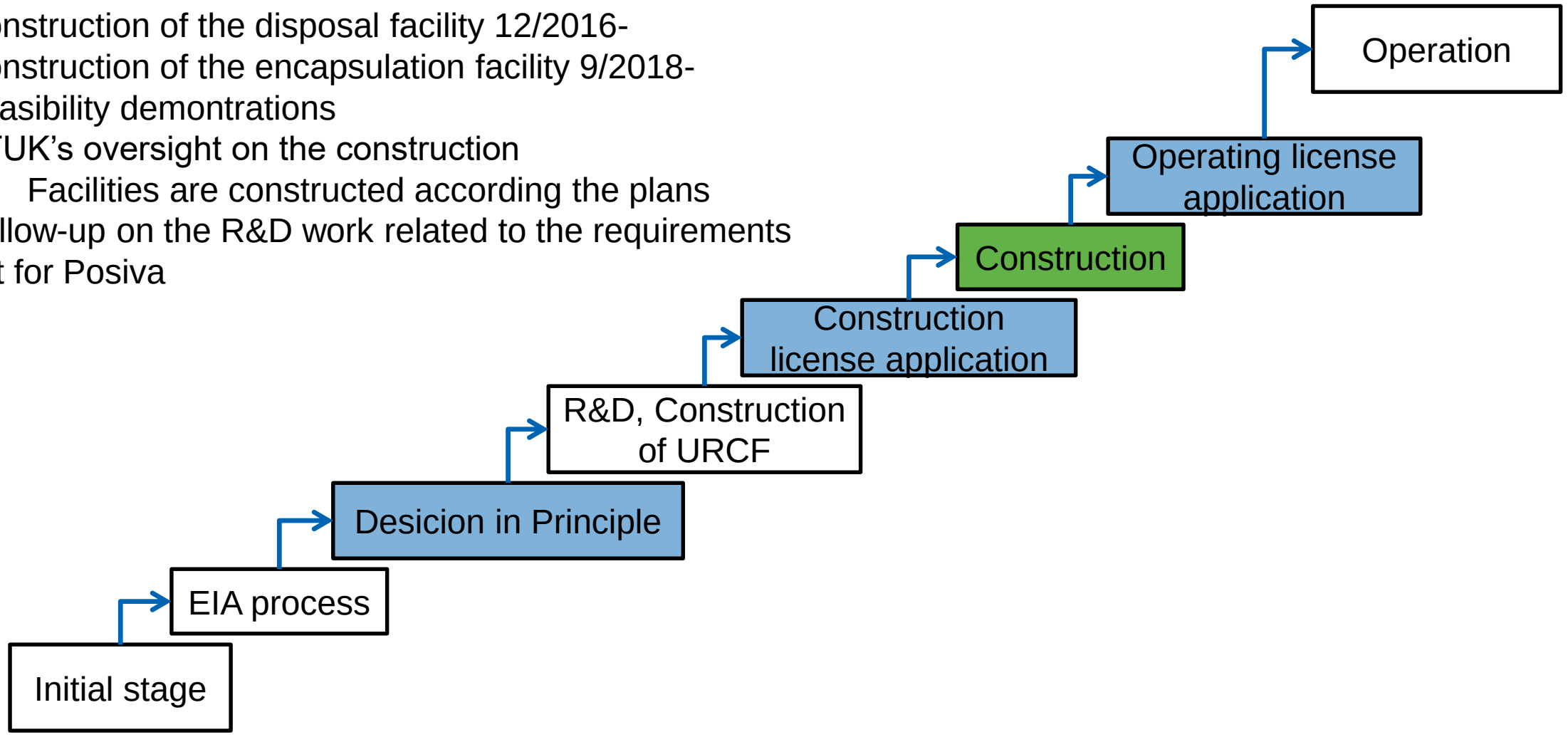
Granting construction license

- STUK submitted statement and safety assessment report to Ministry of Economic Affairs and Employment February 2015
  - Translation of the safety assessment is available in English
  - STUK press release (in Swedish)
- Main conclusion: **Encapsulation plant and disposal facility can be built safe**
- Government finished the CLA process in November 2015
  - License granted for Posiva 12.11.2015
  - MEAE press release



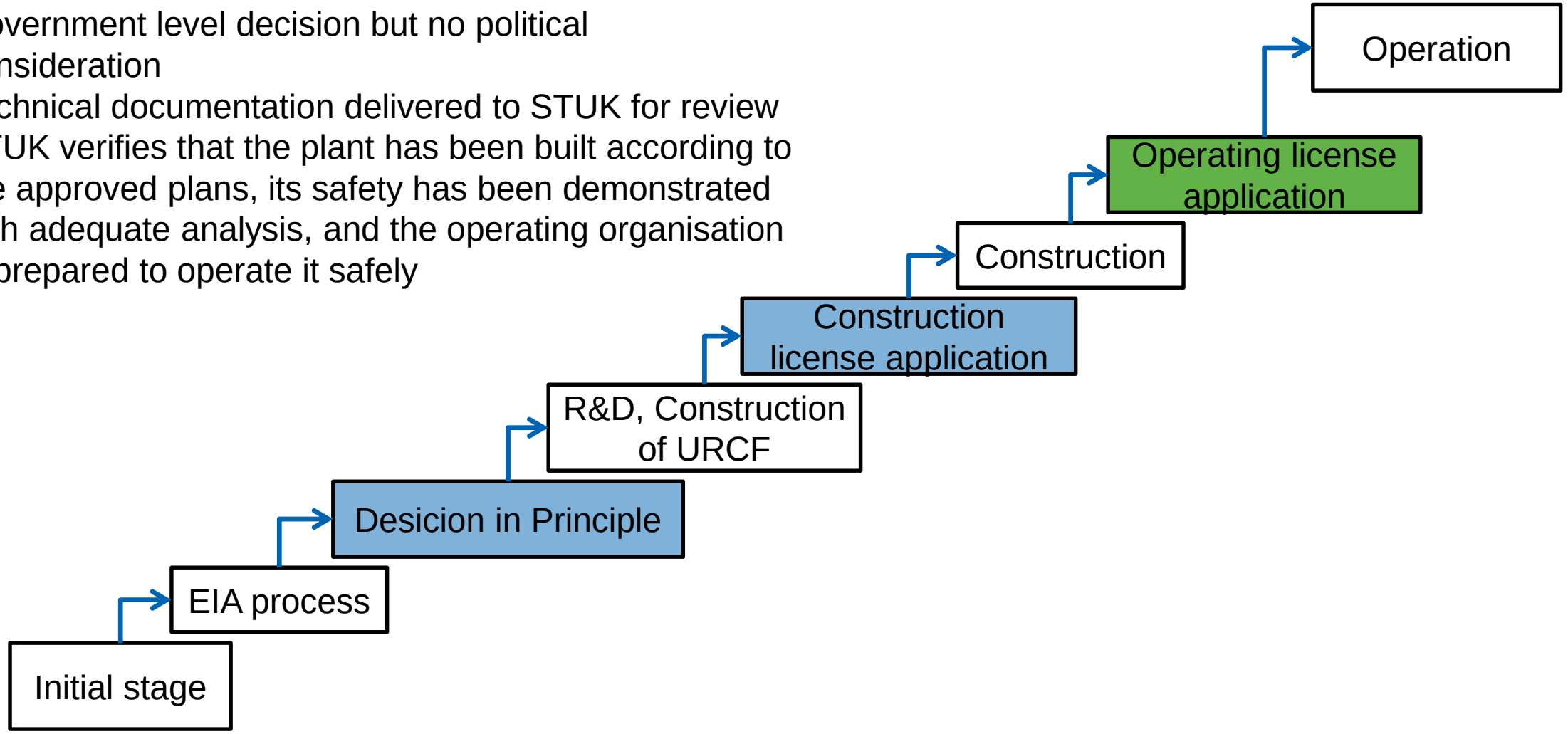
Construction phase 2016-

- Construction of the disposal facility 12/2016-
- Construction of the encapsulation facility 9/2018-
- Feasibility demontrations
- STUK's oversight on the construction
  - Facilities are constructed according the plans
- Follow-up on the R&D work related to the requirements set for Posiva



Operating license application (2022-?)

- Government level decision but no political consideration
- Technical documentation delivered to STUK for review
- STUK verifies that the plant has been built according to the approved plans, its safety has been demonstrated with adequate analysis, and the operating organisation is prepared to operate it safely



Success Factors in Finland – and Globally