

Finnish Approach to Nuclear Waste and Competence Management

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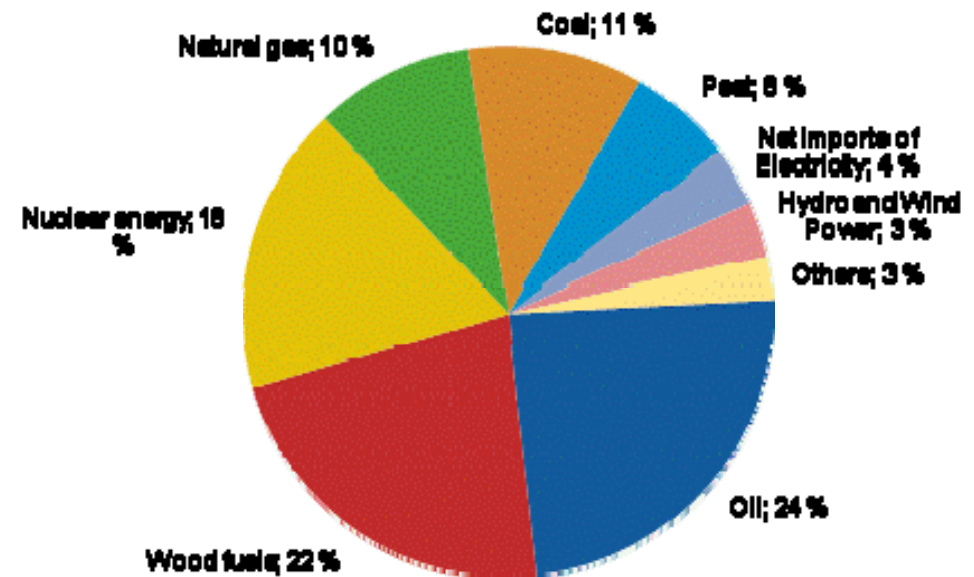
Director General - Energy Department
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The main drivers of the Finnish energy policy

- Security of supply, self-reliance, competitiveness (important because of geography, climate and energy intensive industries)
- European 20 – 20 – 20 targets by 2020
- Reduction of greenhouse gases

Total energy consumption 2011



Source: Statistics Finland, Energy supply and consumption



Finland has ambitious targets with renewables and nuclear energy

- Share of renewable energy will grow to 38 % by 2020
- More than 3/4 of the renewable energy comes from sustainable forestry and is produced in CHP plants
- Finland will double to 20 % the EU bio fuel target of 10 % - bio diesel coming also from wood
- 4 nuclear reactors operating, 5th under construction, positive Decisions-in-Principle by the Parliament for two more reactors
- If all realized they will produce 60 % of electricity
- Competitiveness of nuclear is based on utilities own economic evaluations – no Government subsidies
- Renewables and nuclear combined lead to very low CO₂ emissions



Current share of nuclear power of the electricity production almost 30 %



Fennovoima:
(Hanhikivi 1)

Talvivaara

TVO: 2 x BWR 860 MW (net)
Olkiluoto 1 7,4 TWh
Olkiluoto 2 6,9 TWh
(OL3 – EPR, 1630 MW)
(Olkiluoto 4)

Fortum: 2 x PWR 488 MW (net)
Loviisa 1 4,0 TWh
Loviisa 2 4,0 TWh

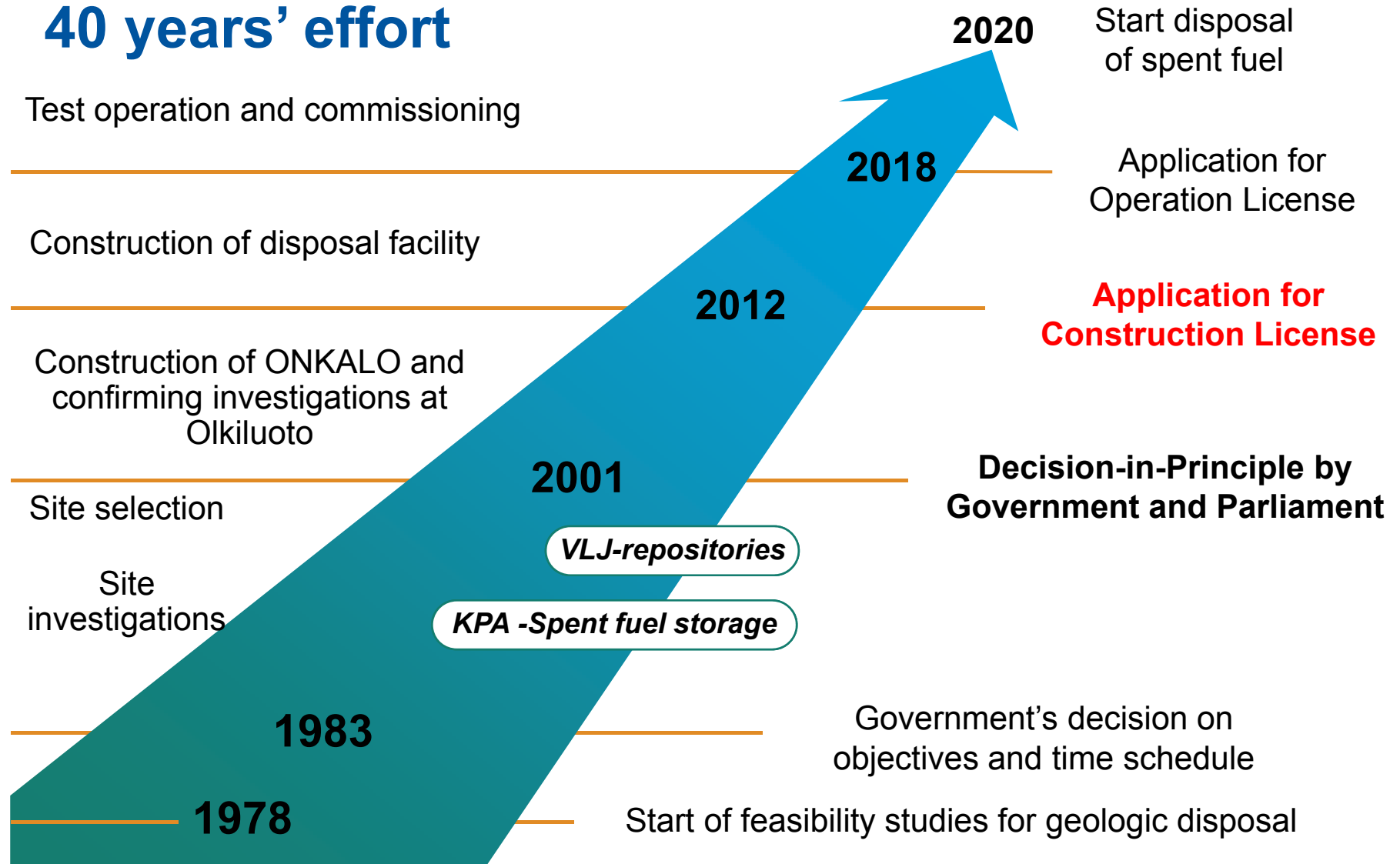
- Fuel: no front-end facilities, potential uranium extracting (Talvivaara Sotkamo Oy) from 2013
- No reprocessing of spent fuel – ban to import/export nuclear waste (since 1994)

Nuclear waste management policy

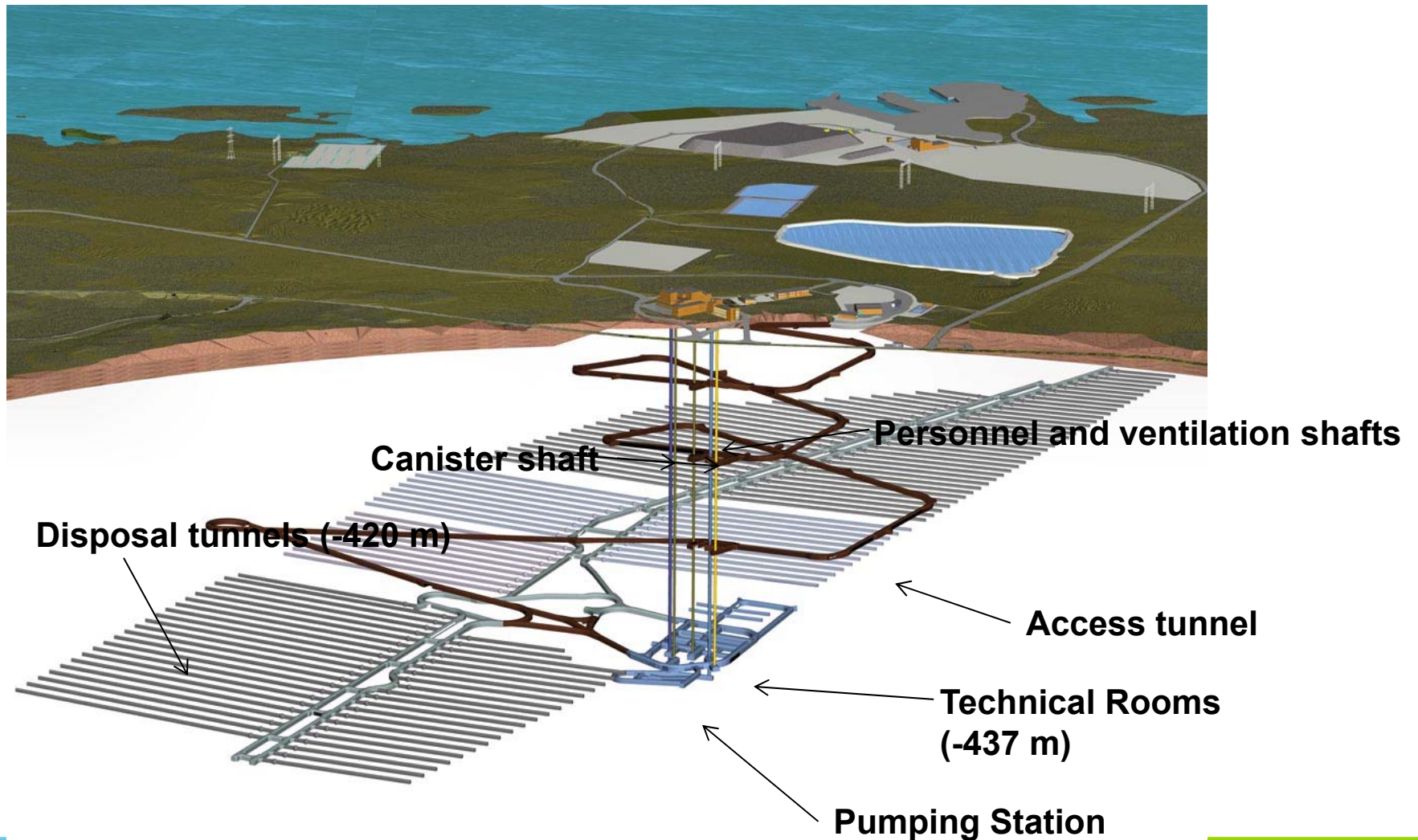
- Finnish nuclear waste management policy was formulated in 1983
 - licensees must be prepared for carrying out final disposal in Finland in a safe and environmentally acceptable way in case international central repositories could not be utilized
 - envisaged the start of final disposal of spent fuel around 2020
- Nuclear Energy Act in 1994 defined that nuclear waste generated in Finland shall be permanently disposed of in Finland
 - Act also defines that foreign nuclear waste cannot be disposed of in Finland
- Utilities have the responsibility of taking care of the nuclear waste management
 - Fortum and TVO established in 1995 Posiva-company which is dedicated in the nuclear waste management



40 years' effort



Underground repository for the spent nuclear fuel



Success factors

- The national responsibility in the nuclear waste management has been one of the key factors enabling favorable public acceptance for TVO Olkiluoto 3 construction and two new build projects (Olkiluoto 4 and Fennovoima, Hanhikivi 1)
 - Parliament members have been in position to support reduction of CO₂ emissions through new nuclear applications which are used in safe and responsible manner including the nuclear waste management
- The waste management policy can be considered as cornerstone for successful implementation of the final disposal of spent nuclear fuel and of whole Finnish nuclear energy programme



Working group on Nuclear Competence

- Working group (WG) was founded on 2010 by Ministry of Employment and the Economy to assess Finnish infrastructure
- Task of the working group was to review
 - current human resources in nuclear energy sector and future needs
 - status of education and training in nuclear sector
 - possibilities for Finnish companies to contribute to major nuclear power plant projects
 - research infrastructure
 - guidelines for participating in international research on nuclear safety
- Vast survey to almost 300 Finnish organisations
- Report was published in March 2012

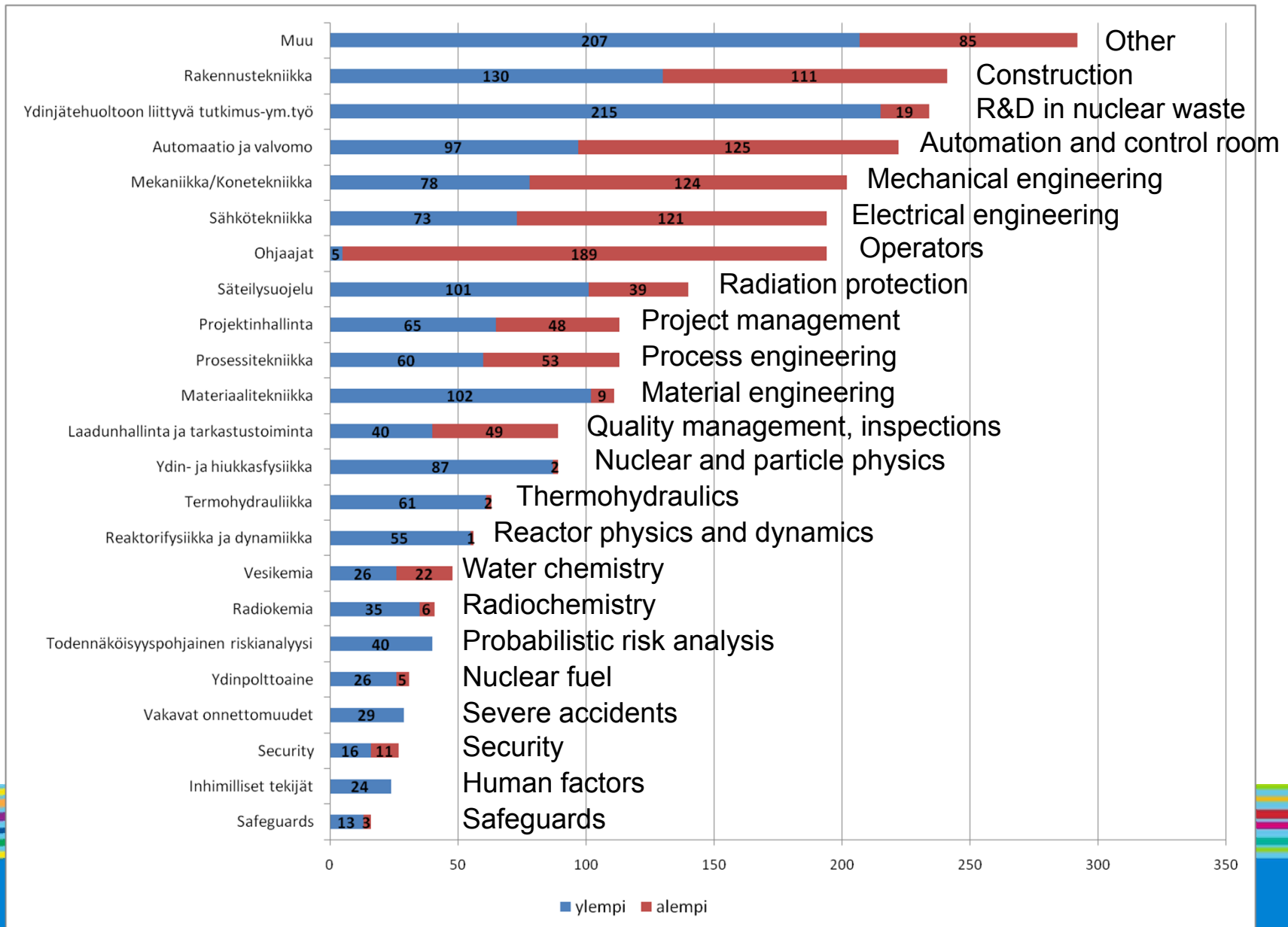


WG Results:

- The need of human resources will increase 38% until year 2025
 - About 39% of the current personnel in nuclear industry in Finland will retire before year 2025
- the need of new personnel with knowledge of nuclear industry is 2400 persons until year 2025

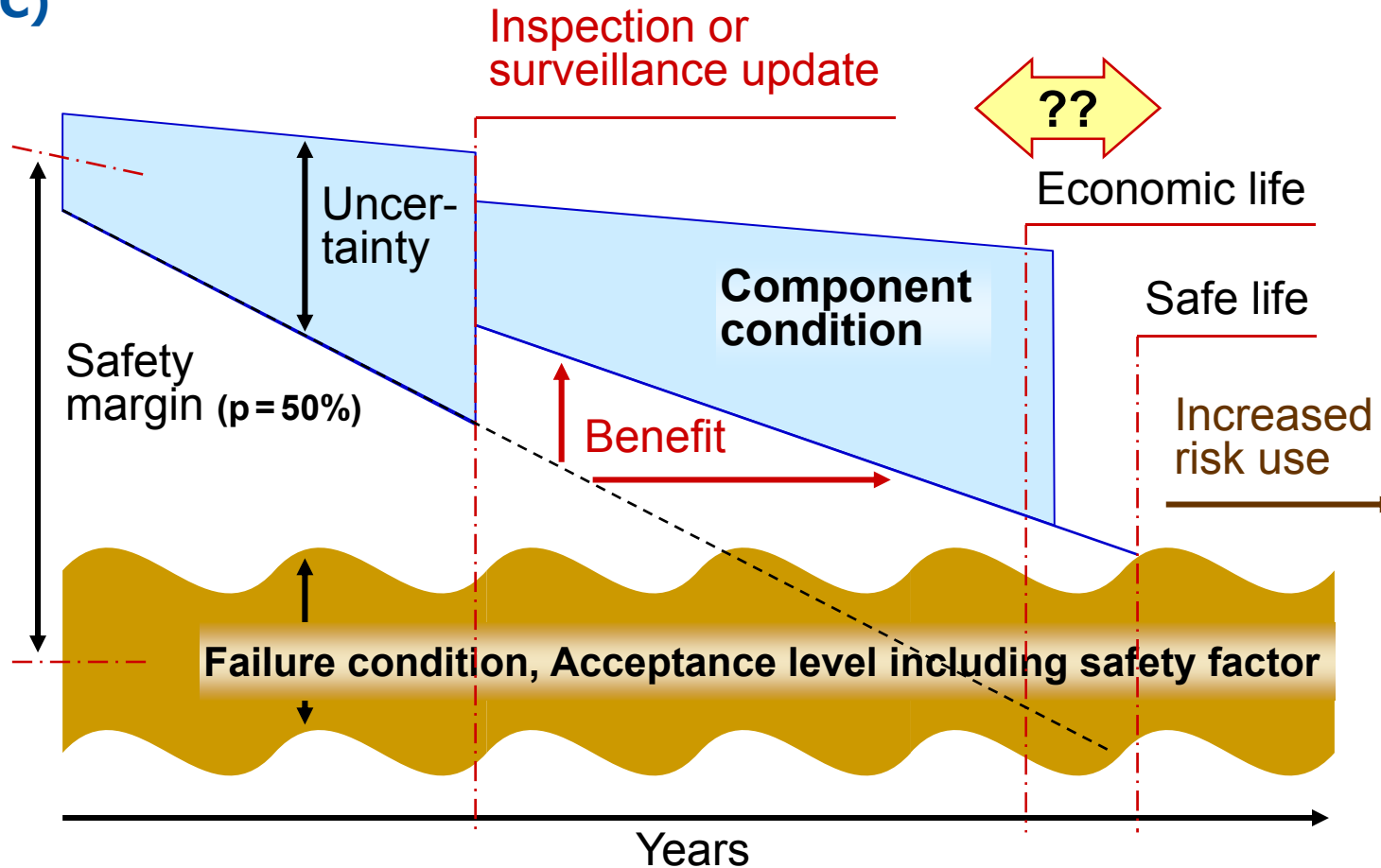


Human resources in different areas



R&D investments and operation

Challenge: Assure safety of any System, Structure and Component (SSC)



IAEA DG Amano verifying ONKALO



TYÖ- JA ELINKEINOMINISTERIÖ
ARBETS- OCH NÄRINGSMINISTERIET
MINISTRY OF EMPLOYMENT AND THE ECONOMY

Thank you!



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