Factors affecting efficient decommissioning and dismantling of a NPP

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Introduction

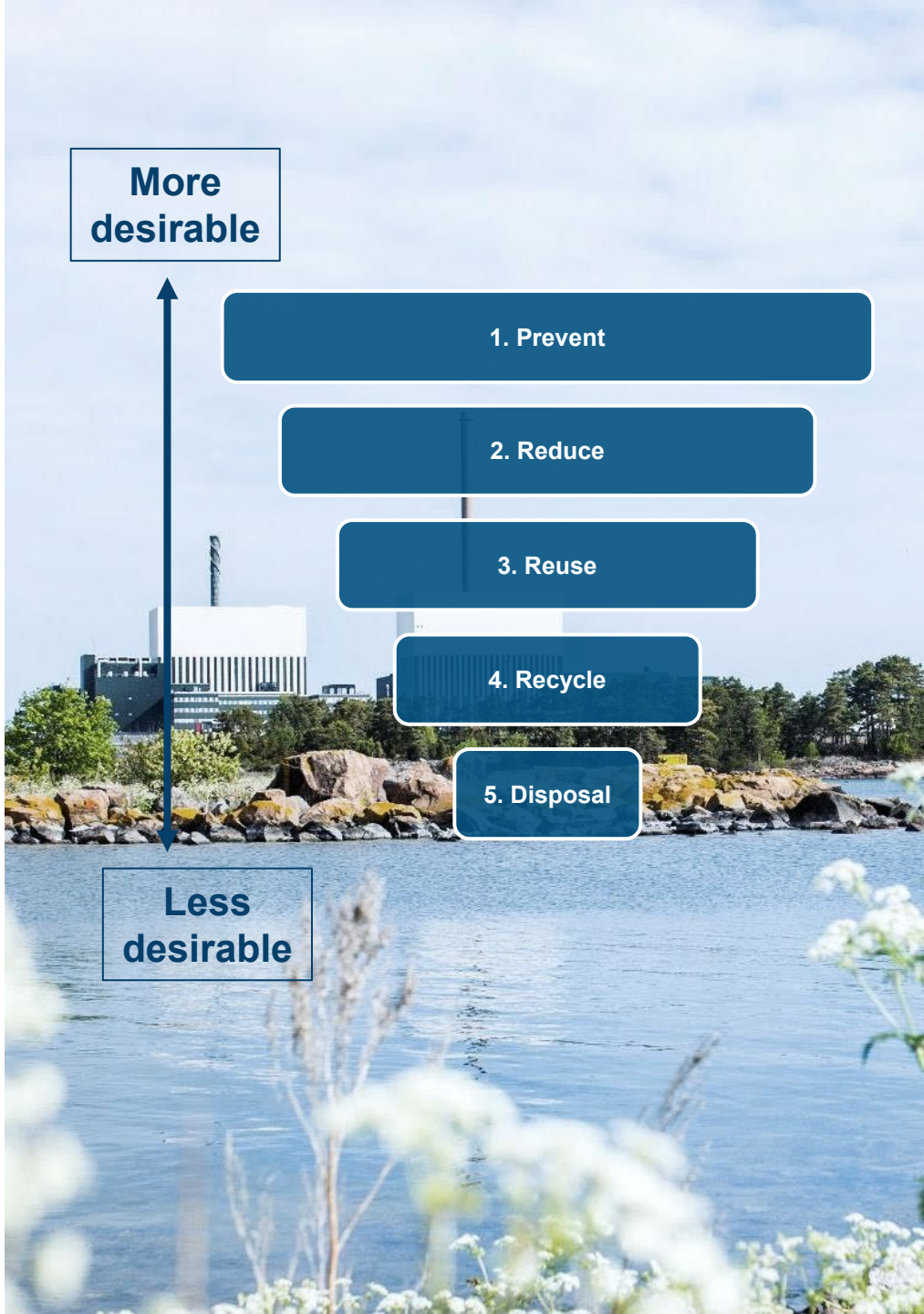
- Decommission is defined as an umbrella term including all activities that enable the nuclear facilities to be **permanently shut down, decontaminated and released from regulatory control**

- Use learnings from current decommissioning of four nuclear reactors in Sweden to find areas were decommissioning by design can positive effect:
  - **safety, efficiency and cost** by reducing workers **exposure to radiation and occupational health risk;**
  - **and reduce the amount of waste** that need to be under further control due to high radiation levels.

Waste Ladder

According to IAEA*:

- The waste distribution of all material generated by decommissioning is distributed in
  - **95% conventional waste**
  - **5%** is suitable for disposal in near **surface repositories.**
  - **0,25%** is not suitable for release from regulatory control or for near surface disposal, due to high levels of activity long-lived radionuclides; this material will ultimately be **safely disposed of in underground** disposal facilities
- Decommissioning as a complex undertaking that costs between 500 million to 2 billion dollars under a duration of 15-20 years – most it **related to the 5,25%.**



* IAEA Bulletin, April 2023

D&D Strategy

- Material inventory
- Radiological & environmentally harmful material characterization
- Analysis of alternative waste routes
- Cost/Benefit analyzes from an environmental, time assessment and radiation protection perspective
- But how can these step be affected during design, construction and operation?

Success factors for effective NDD

1) Expedient safety related documentation, e.g. SAR
2) Continuous, open dialogue with authorities
3) Design of SSC
4) Design buildings for dismantling
5) Radiological characterization
6) Facility register
7) Operations and maintenance
8) Continuous waste handling
9) Ensure competence and skills
10) Develop strategies and plans for decommissioning
11) Prepare for HSE & radiation protection
12) Understand the cultural journey
13) Waste treatment facility