



Strål
säkerhets
myndigheten

Swedish Radiation Safety Authority

Overview of Sweden's national programme for management of spent nuclear fuel and radioactive waste

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Swedish Radiation Safety Authority (SSM)

Outline

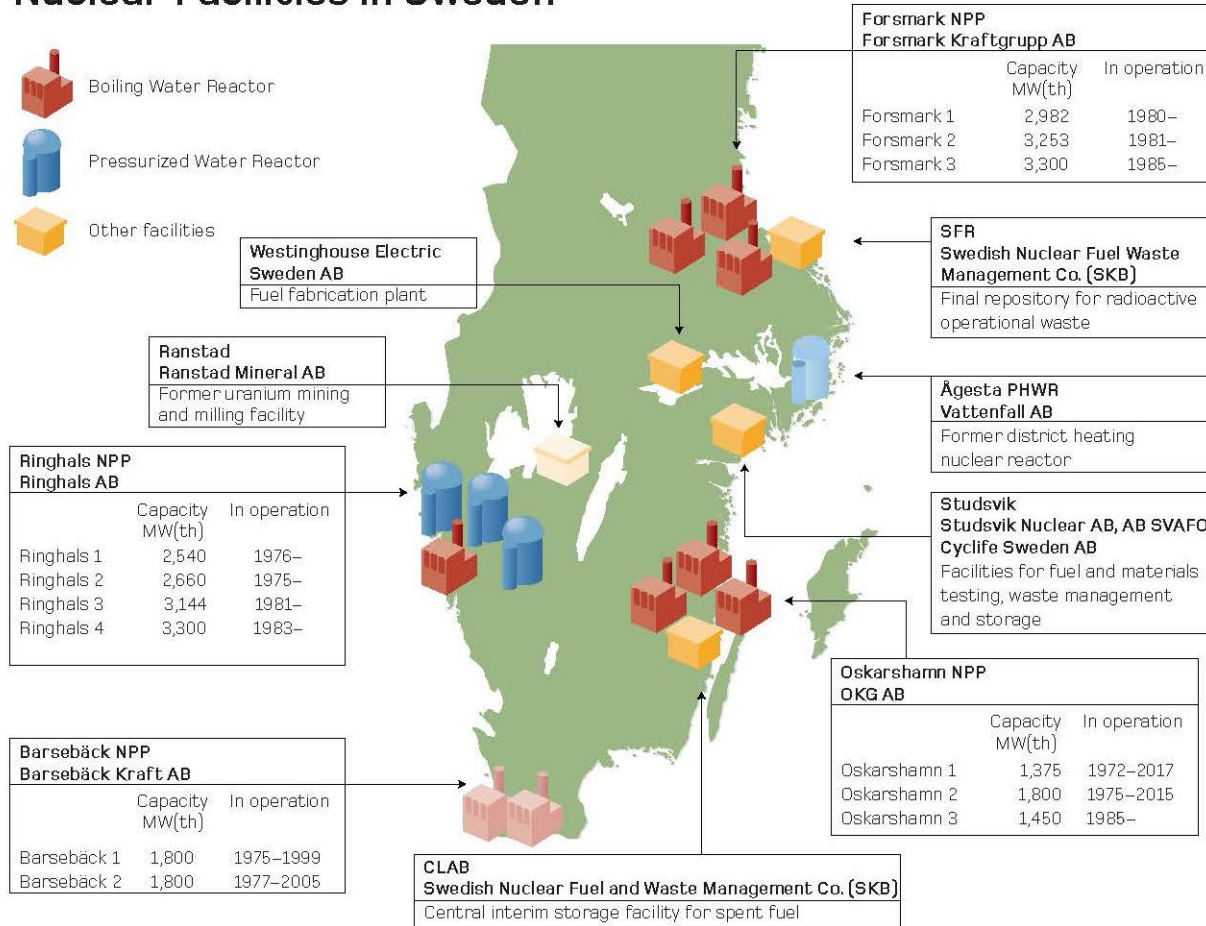
1. Nuclear facilities
2. Legal and regulatory framework
3. Current and planned nuclear waste facilities
4. Licensing review of a spent nuclear fuel repository
5. Success factors & future challenges





Nuclear facilities in Sweden

Nuclear Facilities in Sweden



- ➔ Eight reactors in operation
- ➔ Four closed down reactors
- ➔ Central interim storage facility for spent fuel (Clab)
- ➔ Final repository for short-lived LIL waste (SFR)
- ➔ Fuel factory (WSE)
- ➔ Research reactors under decommissioning (Studsvik)
- ➔ Waste treatment and materials testing facilities (Studsvik)
- ➔ Closed down uranium extraction facility (Ranstad)



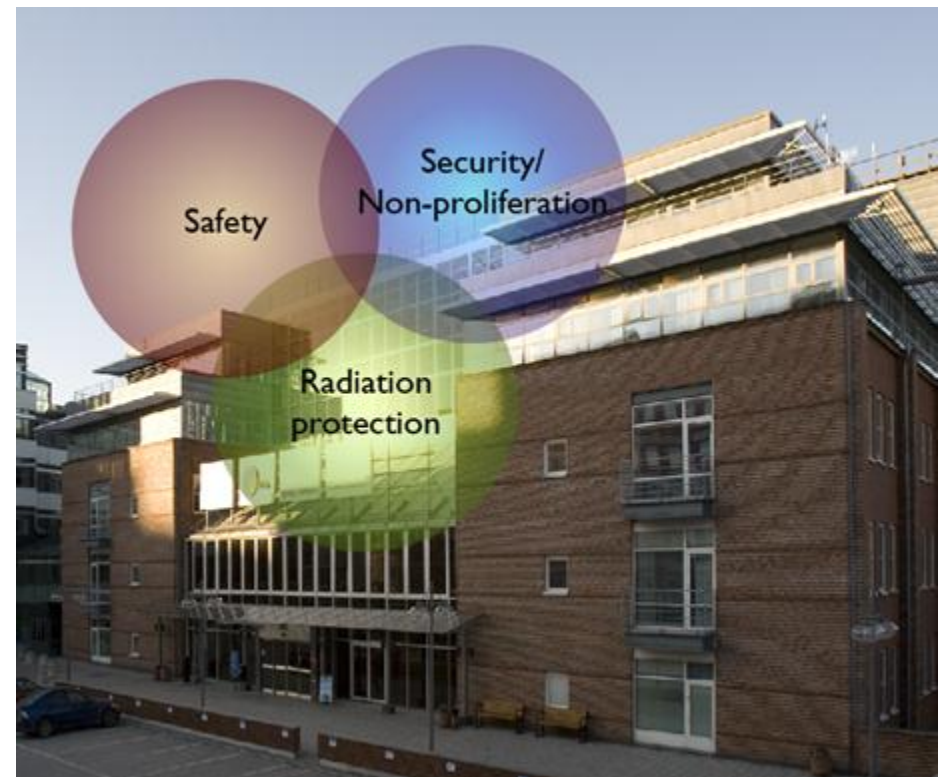
National policy

- The licensees have the prime responsibility
- The strategy for spent fuel is direct disposal in Sweden
- All costs are covered by revenues from nuclear energy
- The power plant licensees have common obligations for
 - Research and development of disposal solutions
 - conducting cost calculations a basis for payments(fees) to the Swedish nuclear waste fund



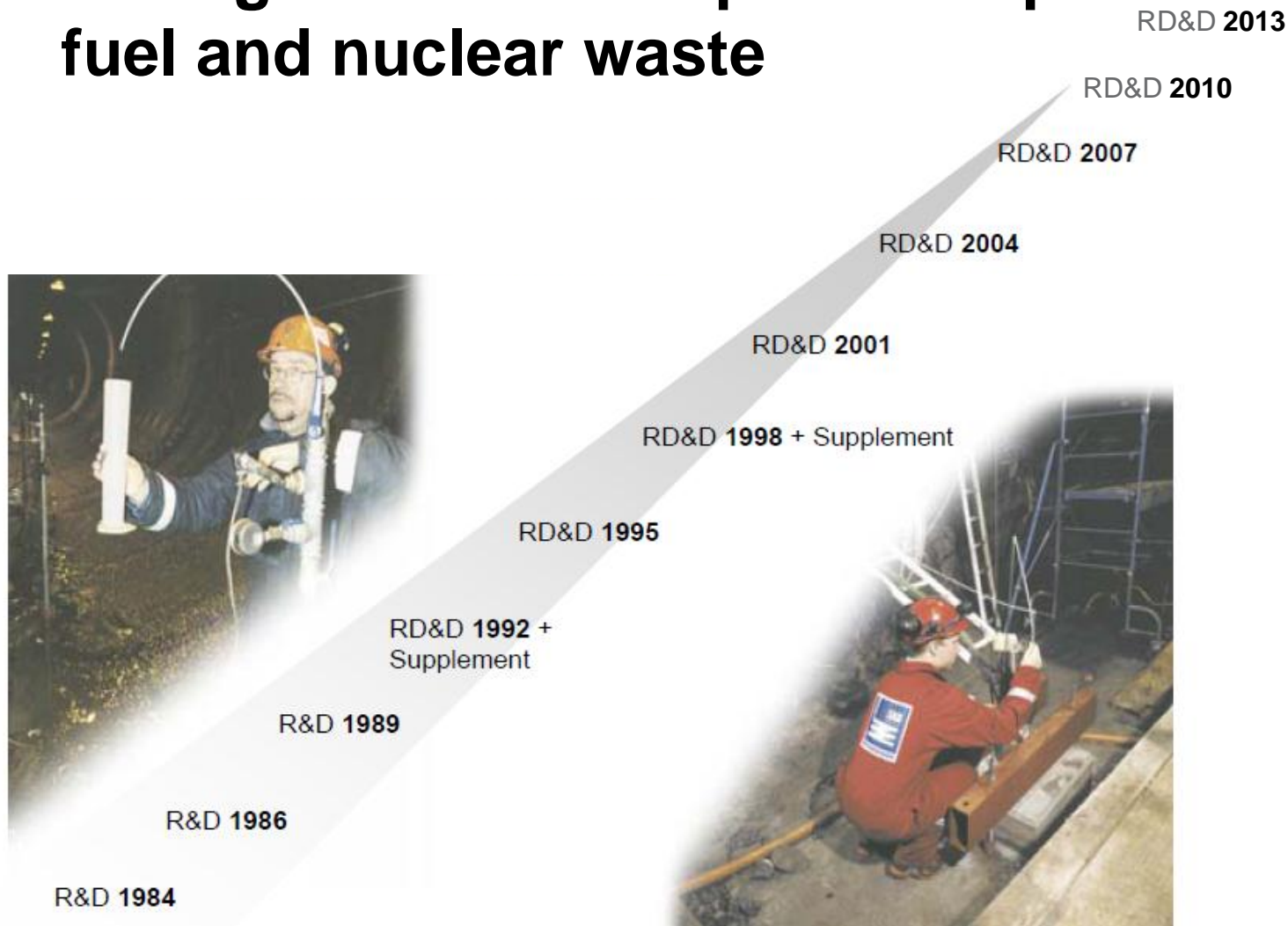
The Swedish Radiation Safety Authority (SSM)

- Regulatory authority
- Licensing authority
 - SSM decisions
 - Government decisions
- Supervisory authority
 - Reviews
 - Inspections
 - Enforcement
- Authority for emergency preparedness and response
- Expert authority



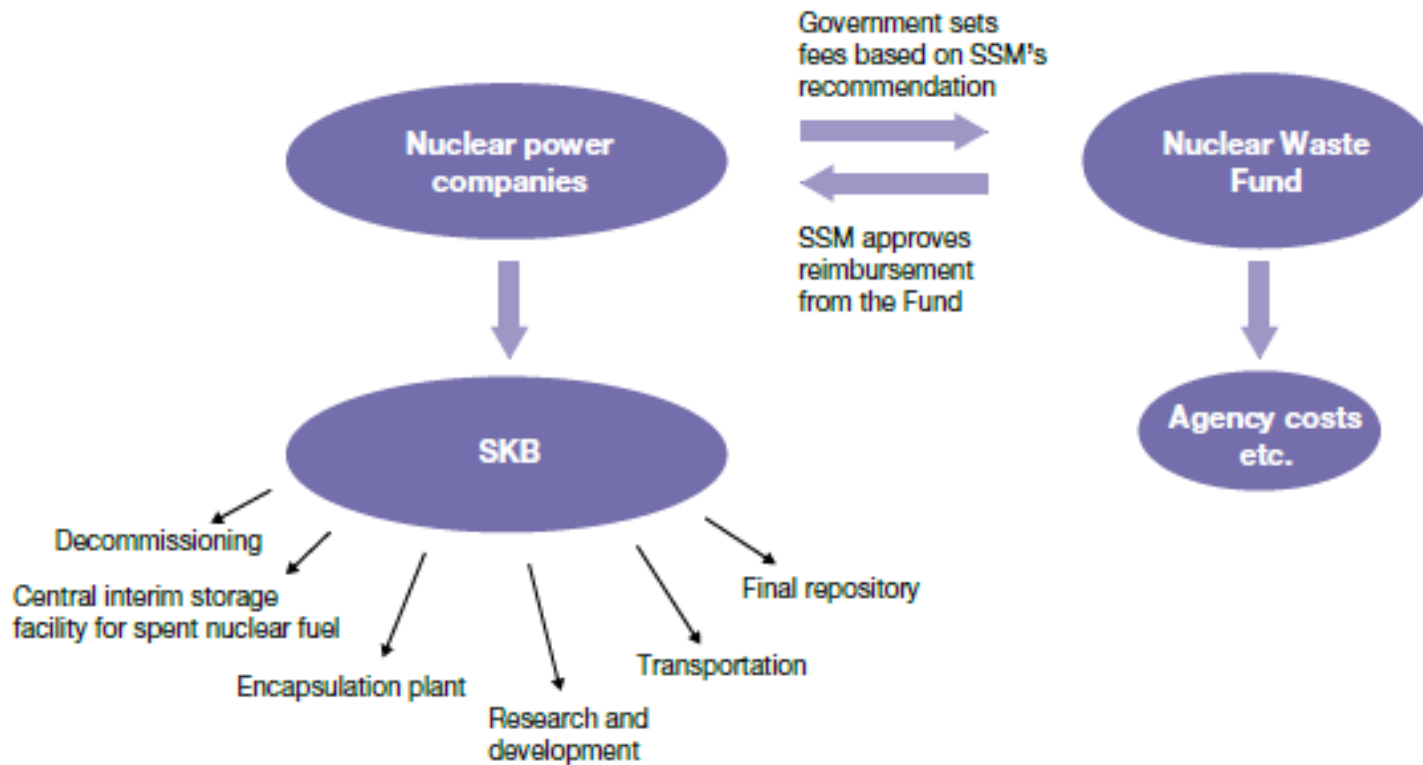


A long-term RD&D-programme for the safe management and disposal of spent nuclear fuel and nuclear waste



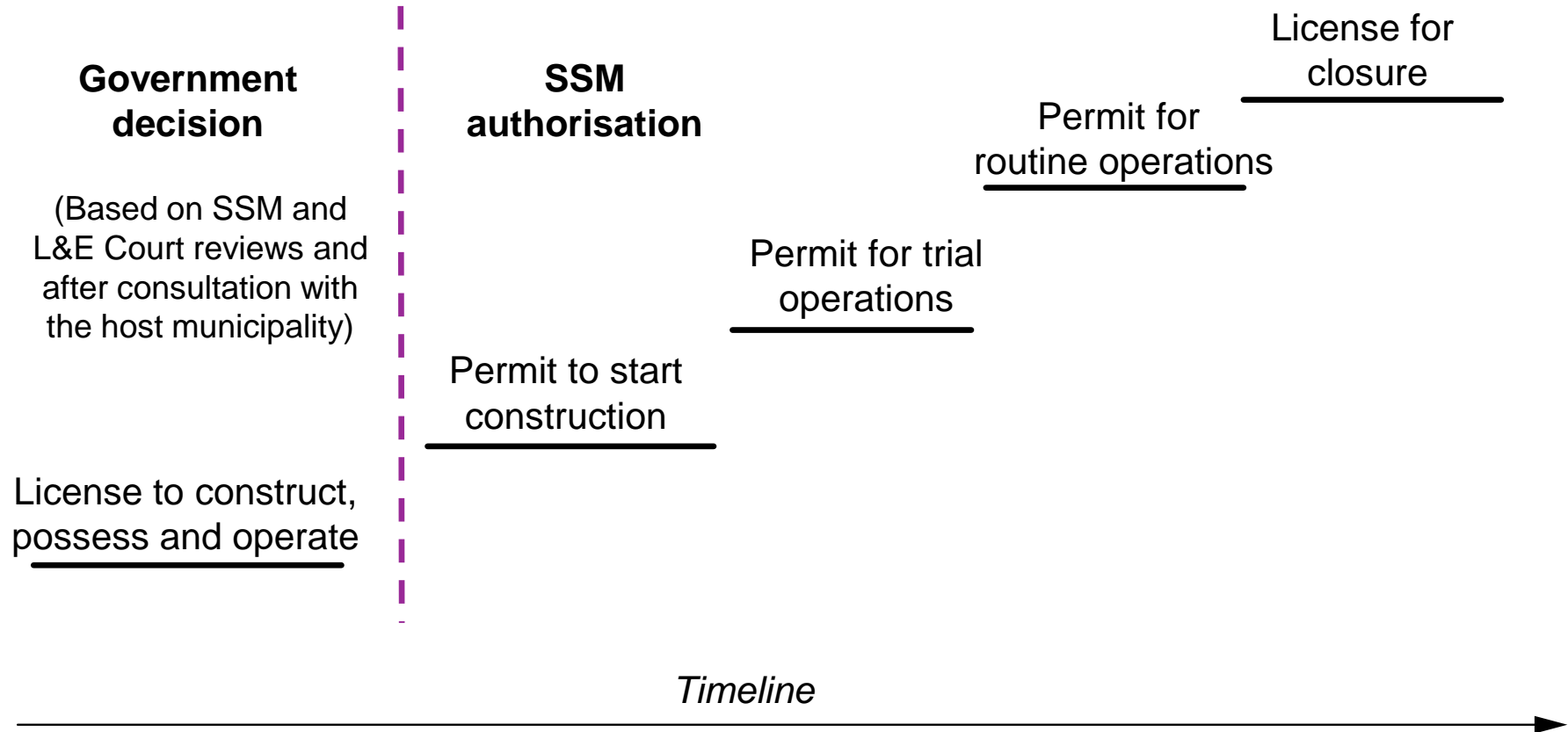


The Financing System – Nuclear Waste





A step wise licensing process





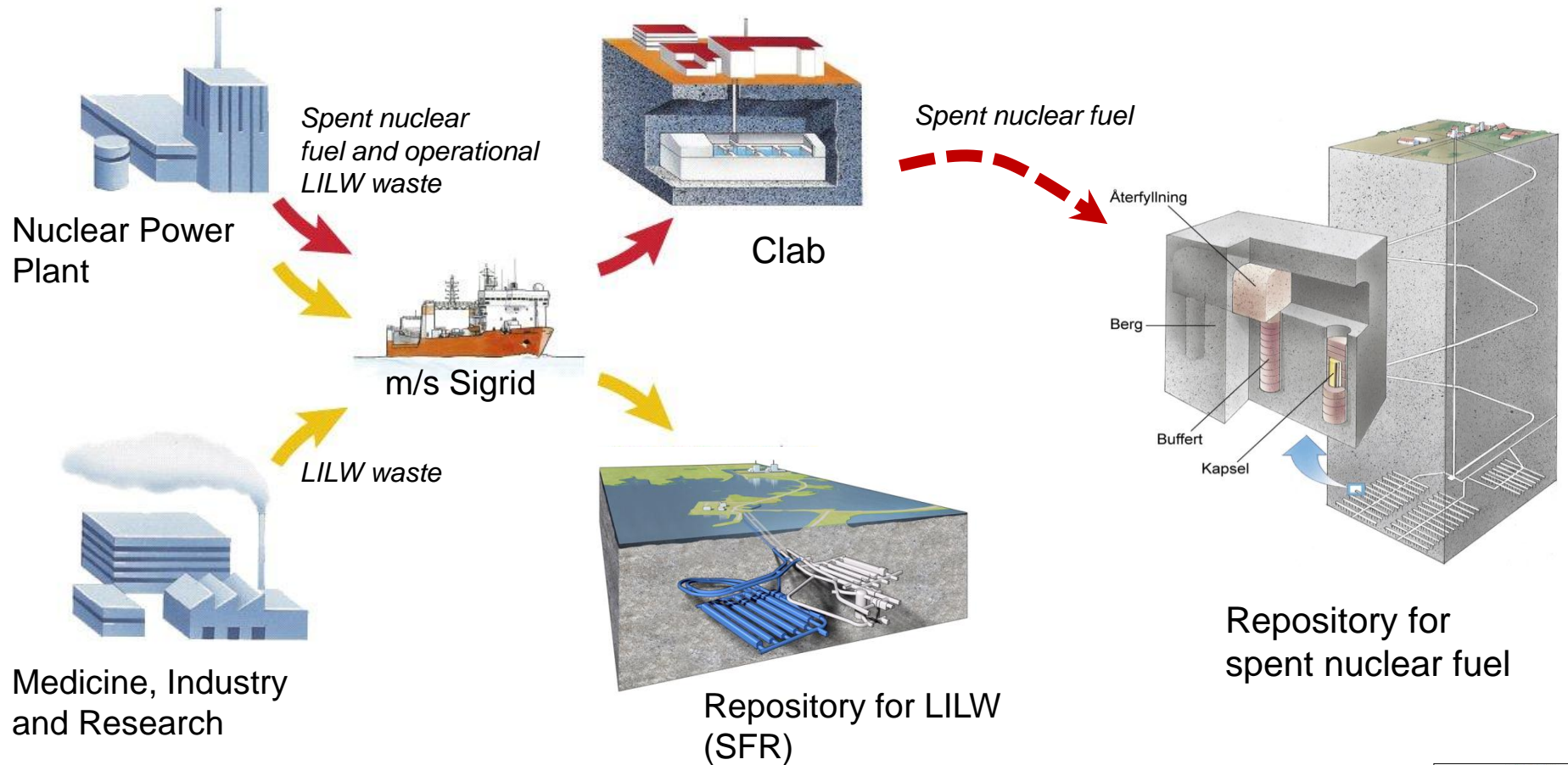
Legal provisions for transparency and public participation

- RD&D programme consultations over 30 years
- Open and predictable step-wise siting and licensing process
 - Environmental Impact Assessment consultations
 - Active involvement of stakeholders with financial support to municipalities and NGO's
- Local communities right to veto Government licensing decision
- Integrity and independence of the regulator
- Public insight into regulatory activities
- Right to access information





SKB's Waste Management Facilities





The interim storage facility (CLAB) for spent nuclear fuel

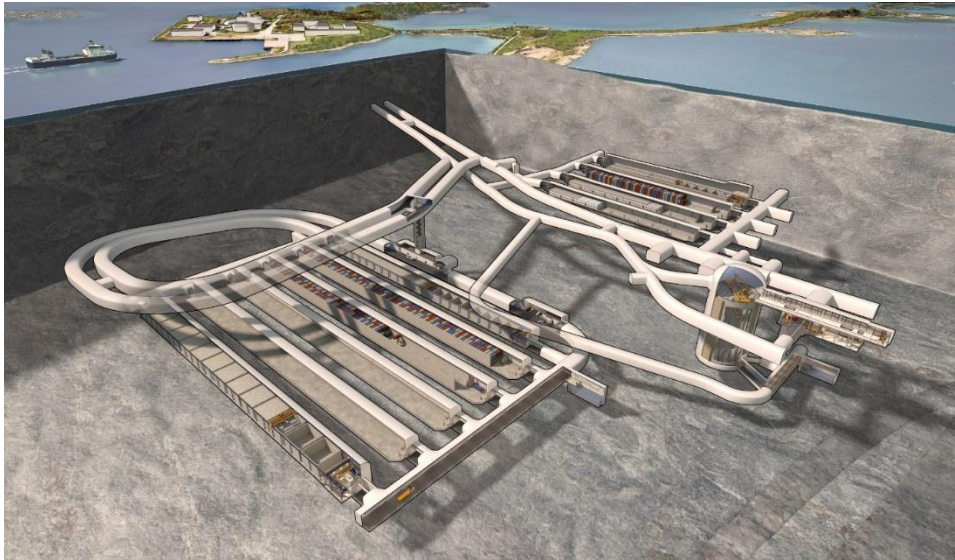


Source: SKB

- Located at Oskarshamn NPP
- Start of operation 1985
- SKB license holder 1997
- Wet storage 30 m below surface
- Receiving capacity 300 tU/y
- Licensed for 8 000 tU
- Application for 11 000 tU
- Current inventory ~6 000 tU



Final repository for shortlived operational LILW - SFR

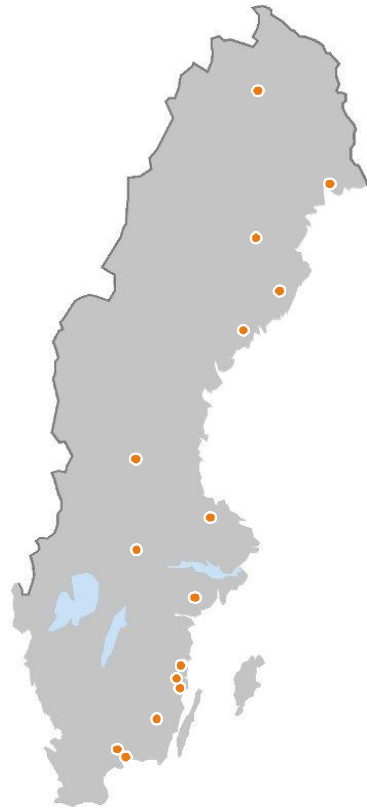


Source: SKB

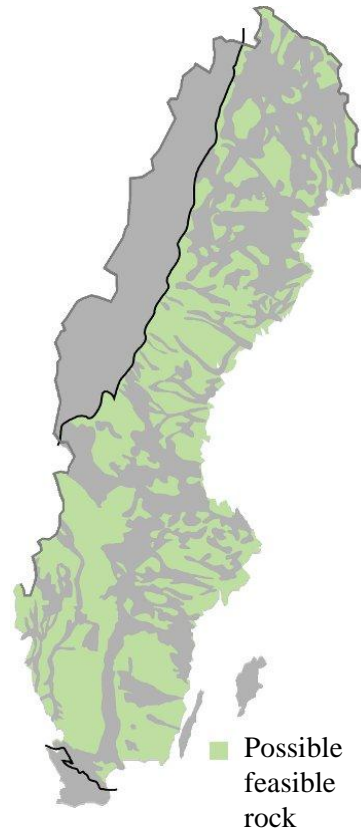
- Located near Forsmark NPP at ~50 m depth
- Operation started 1988
- Storage capacity 63 000 m³
- License application for extension of SFR to accommodate decommissioning waste (additional 130 000 m³) submitted in December 2014



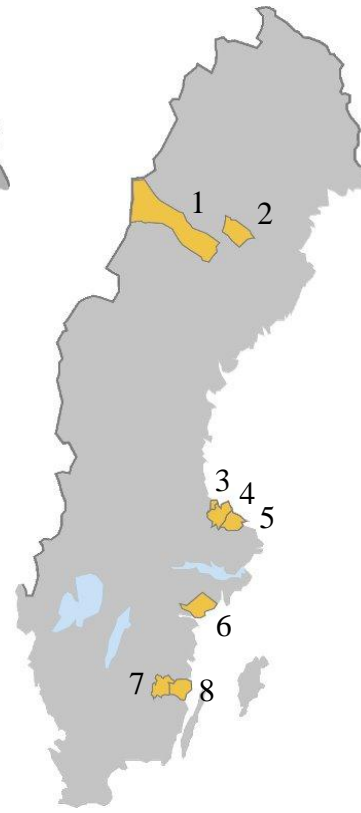
More than 30 years of research, technical development, siting, site investigations and stakeholder dialogue



**Early site investigations
1977–1985**



**Regional studies
1990s**



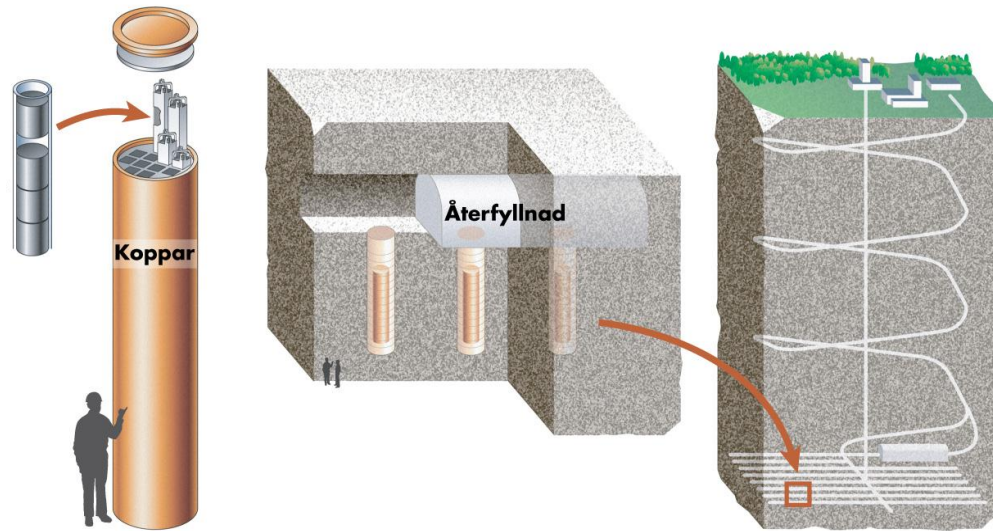
**Feasibility studies
1993–2002**



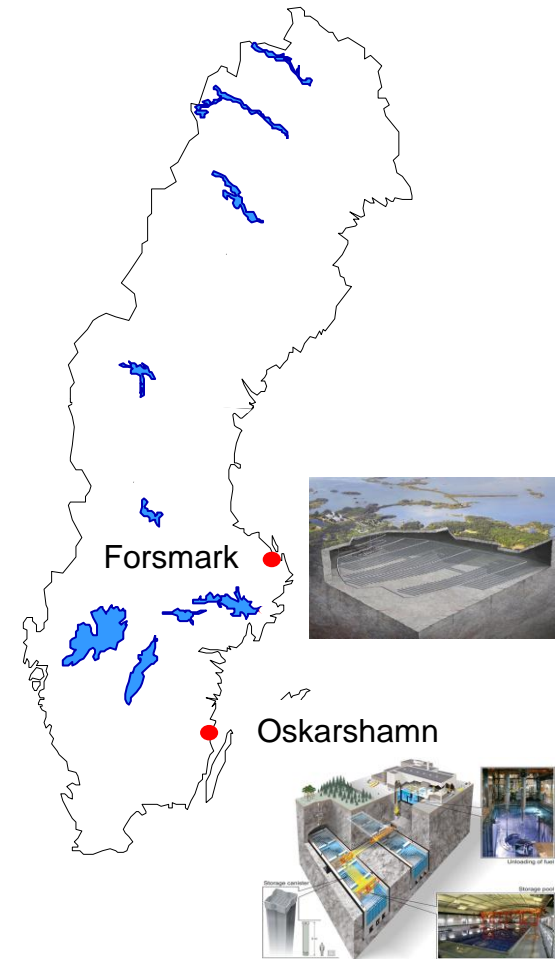
**Site investigations
2002–2008**



SKB's license applications submitted 16 March 2011

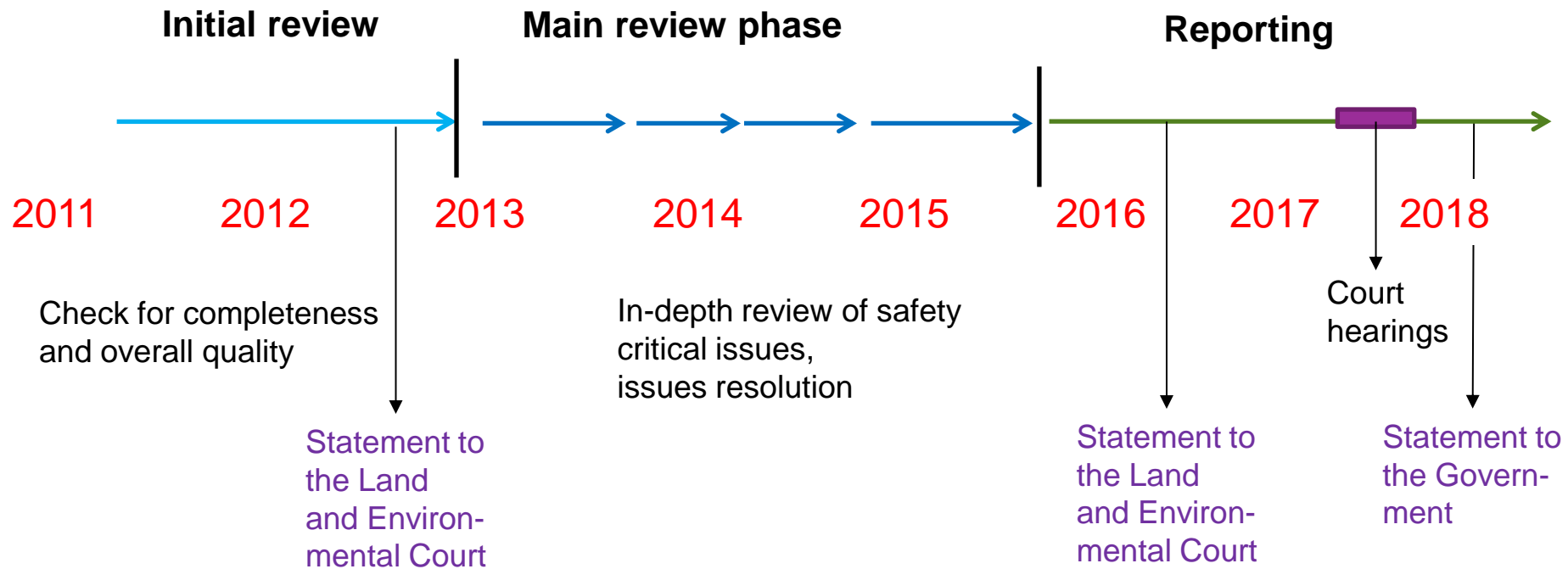


- Spent fuel repository at Forsmark
- Encapsulation plant in Oskarshamn
- 12 000 tons of spent nuclear fuel





The review process





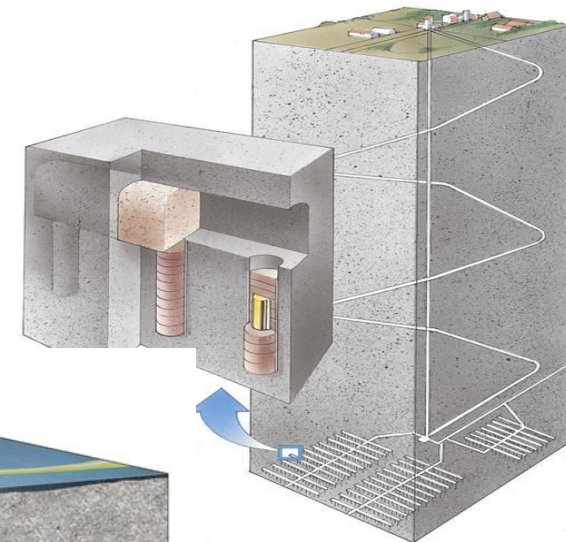
Success factors

- Continuity in waste management programme
- Clear division of roles and responsibilities
- Clearly defined step-wise licensing process
 - Provisions for stakeholder involvement
- Openness and transparency
 - Trust in the regulator



Regulatory challenges

- Moving from a phase of R&D to licensing and construction
- Decommissioning of reactors
- Revision of legislation and regulations
- RECENT NEWS: relocation of SSM



Source: SKB





Ds 2017:51

Sweden's sixth national report under the
Joint Convention on the safety of spent
fuel management and on the safety of
radioactive waste management



Sweden's implementation of the obligations
of the Joint Convention

Sweden's 6th national report under the Joint Convention

www.ssm.se

Thank you for your attention



Shallow land burials for VLLW



- Forsmark NPP
 - Licensed capacity: 17 000 m³
- Oskarshamn NPP
 - Licensed capacity: 10 000 m³
- Ringhals NPP
 - Licensed capacity: 10 000 m³
- Studsvik
 - Licensed capacity: 1 540 m³

Source: SKB

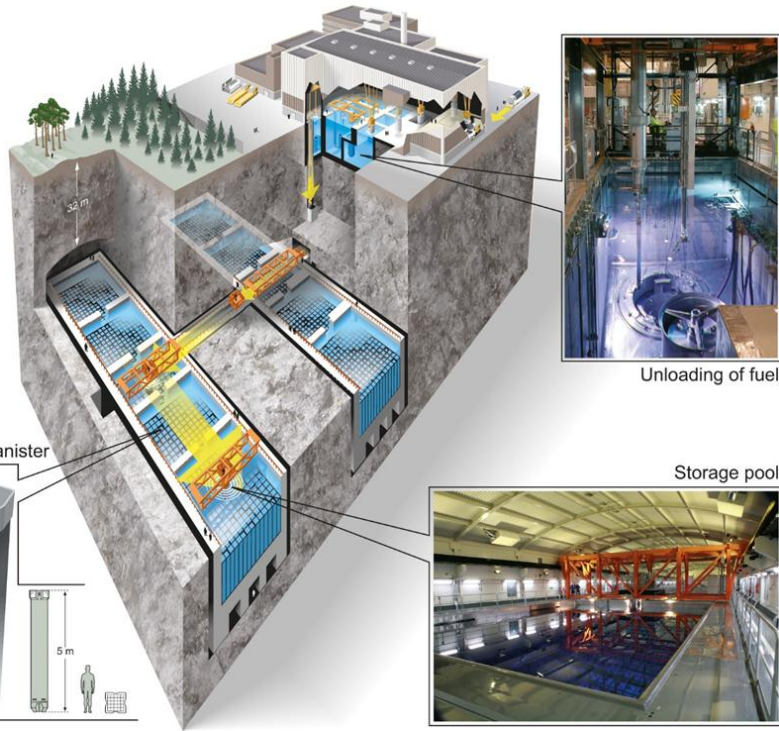


Developing a competent and independent regulatory competence

- Reviews of SKB's RD&D programme
 - Preliminary safety reports, site investigations
- Regulatory research programme
 - geosciences, engineered barriers
 - independent safety assessments
- International peer reviews



The KBS-3 disposal system under licensing review



Encapsulation plant in Oskarshamn

Repository in Forsmark

