



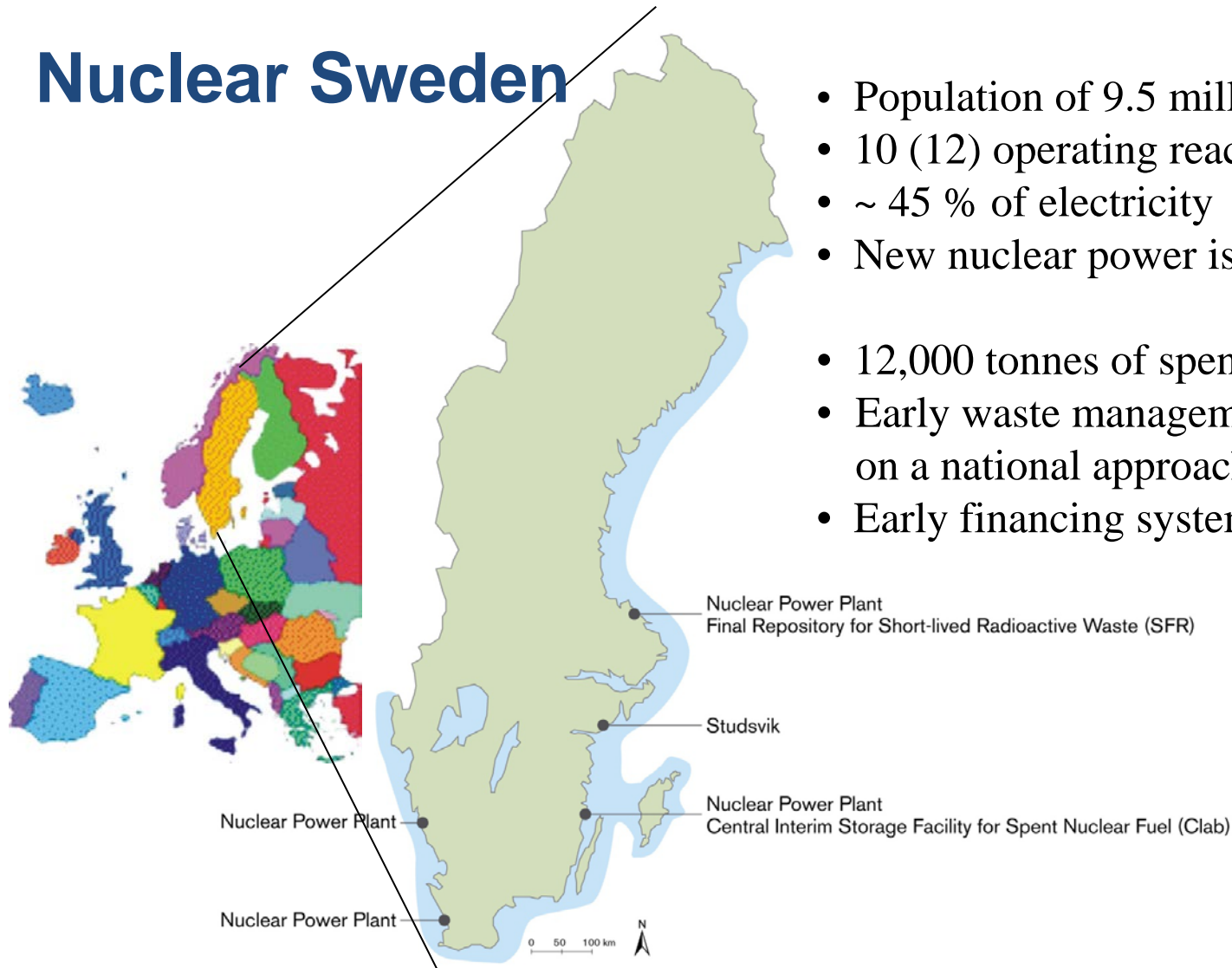
SKB International AB

SKBs experience of Siting, Licensing and Public Communication

**Magnus Holmqvist
President, SKB International AB**

**Presentation at METI – Radioactive Waste Disposal Technology Working Group,
November 20, 2013, Tokyo, JAPAN**

Nuclear Sweden



Clear and defined responsibilities for radioactive waste in legislation

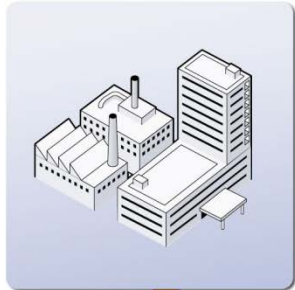
- The owners of the nuclear power plants are responsible for handling and final disposal of spent fuel and radioactive waste
- The owners of the nuclear power plants are responsible for all costs associated with handling and final disposal of spent fuel and radioactive waste
- The responsibility of the state is to make sure that the owners of nuclear power fulfil their obligations and that they take the full responsibility for managing the spent fuel and radioactive waste

The owners of the NPPs has given SKB the task to manage and dispose of the waste. SKB is jointly owned by them.



The Swedish system – SKB's responsibility

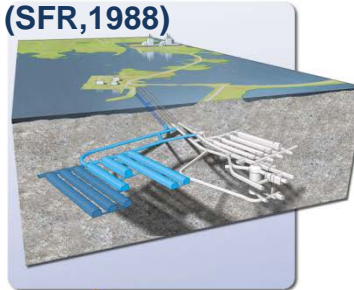
Medical care, industry
and research



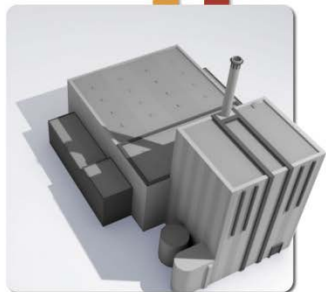
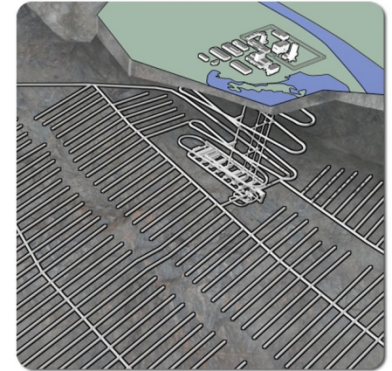
Operational waste

Spent nuclear fuel

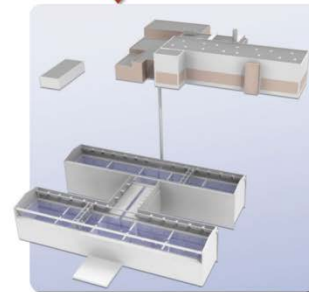
Final repository for short-lived radioactive waste (SFR, 1988)



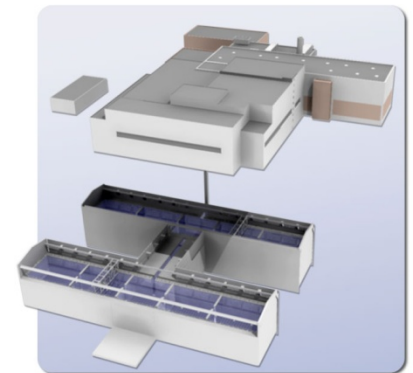
Final repository for spent nuclear fuel in Forsmark



Nuclear power plant



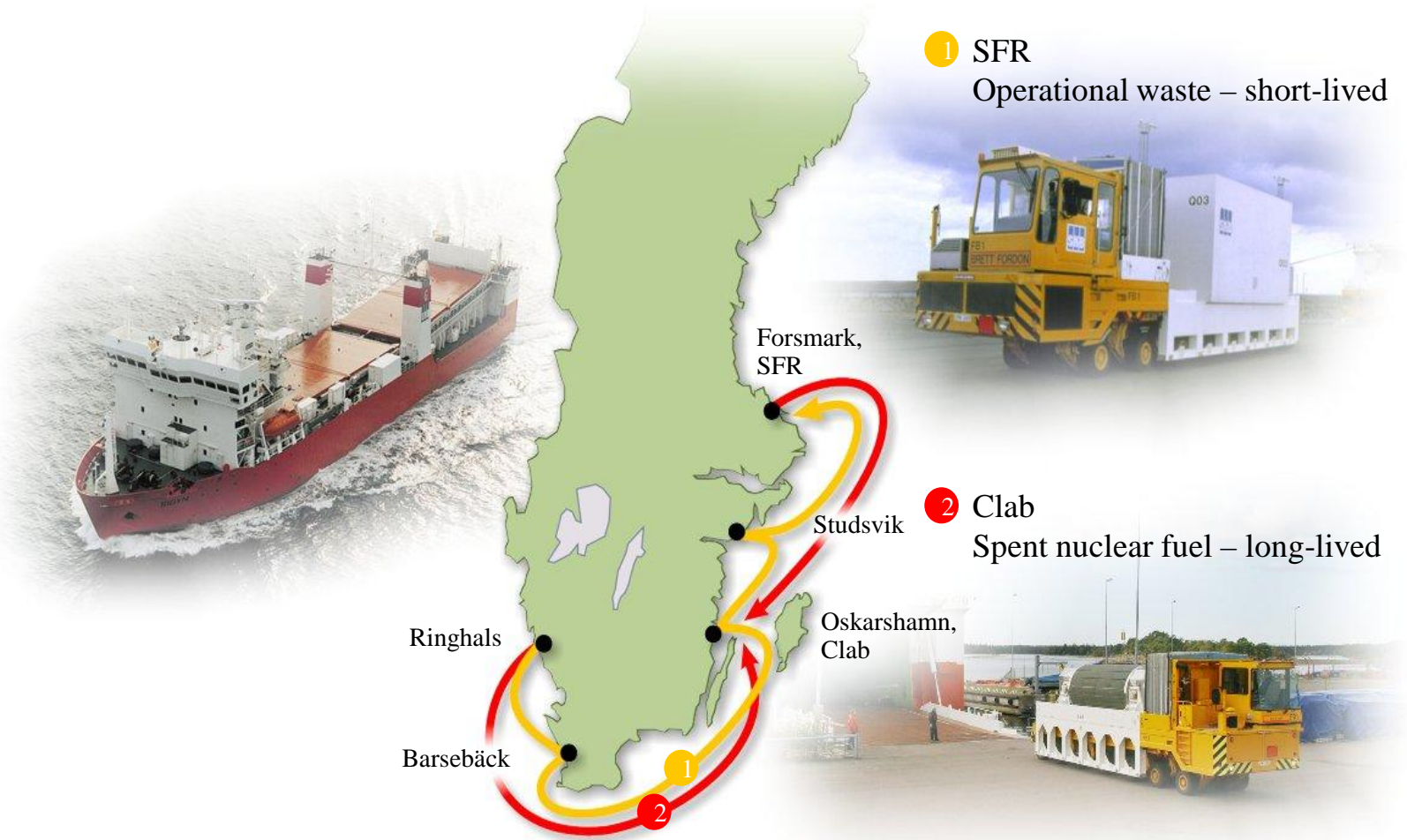
Interim storage for spent nuclear fuel (Clab, 1985)



Encapsulation plant in Oskarshamn



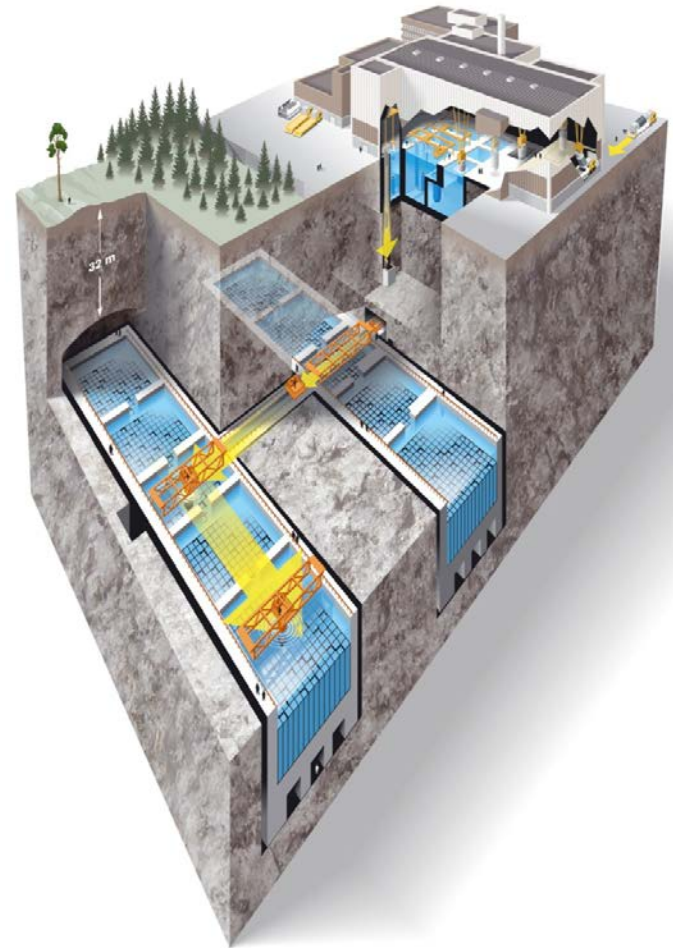
Transports with m/s Sigyn (1982)



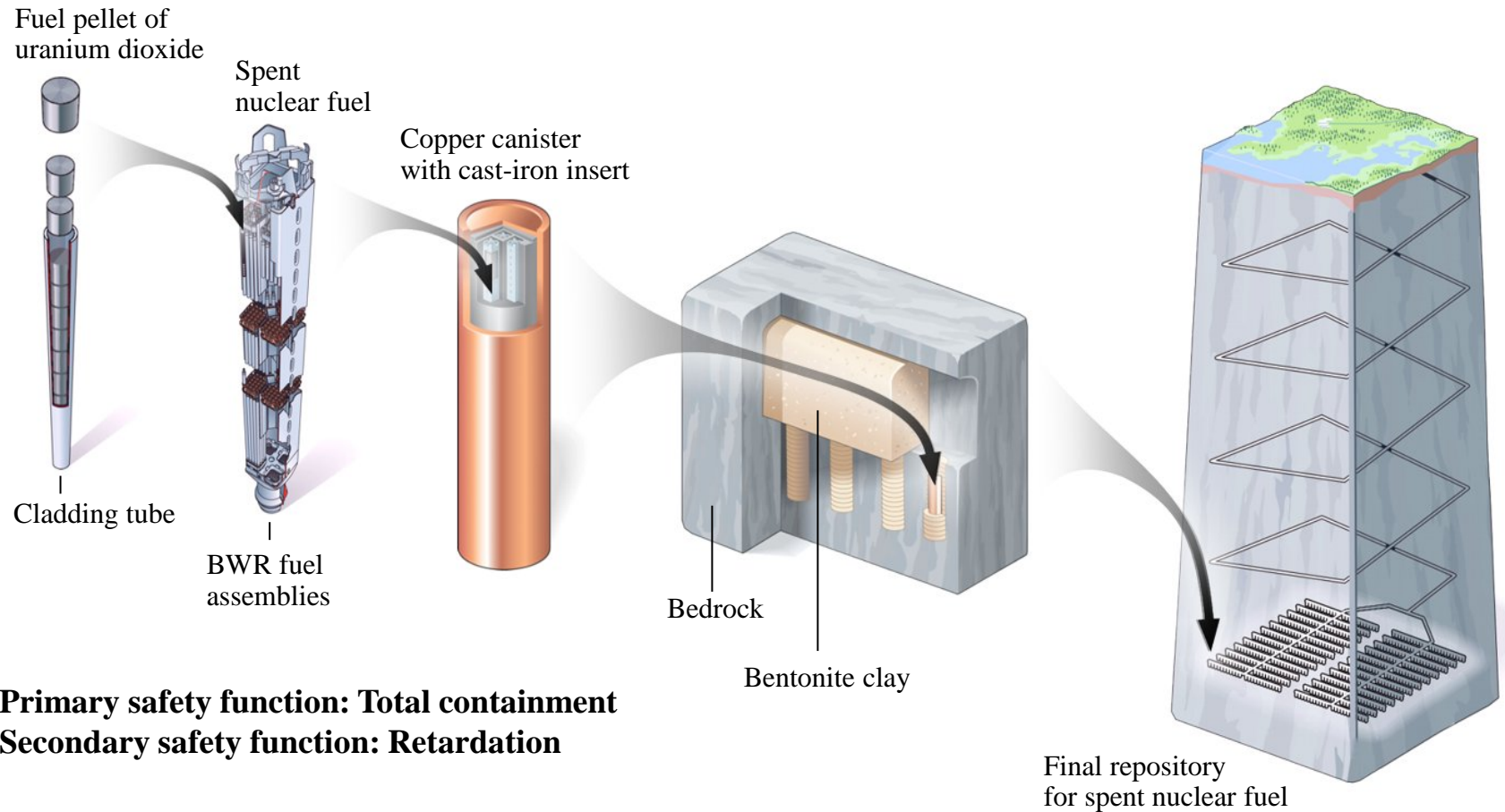
Final Repository for Short-lived Radioactive Waste, SFR, at Forsmark (1988)



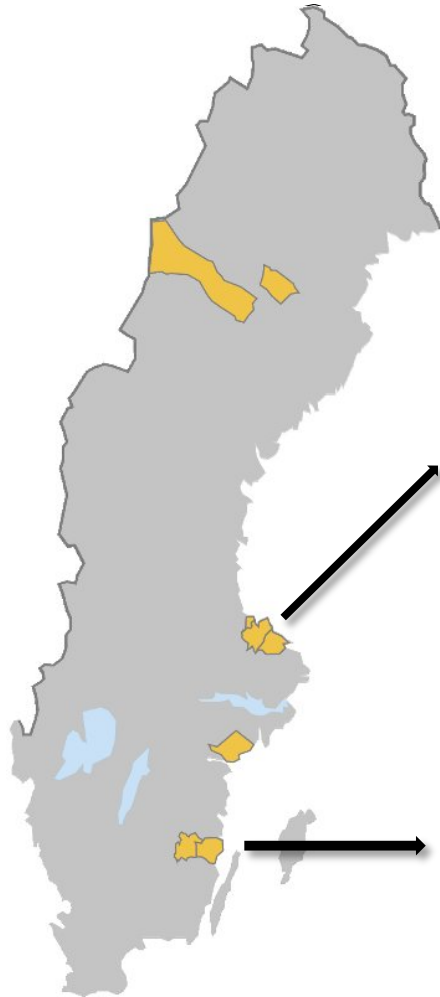
Clab - Central Interim Store for SNF, at Oskarshamn (1985)



SKB's method for disposal of spent nuclear fuel - KBS-3 (1983)



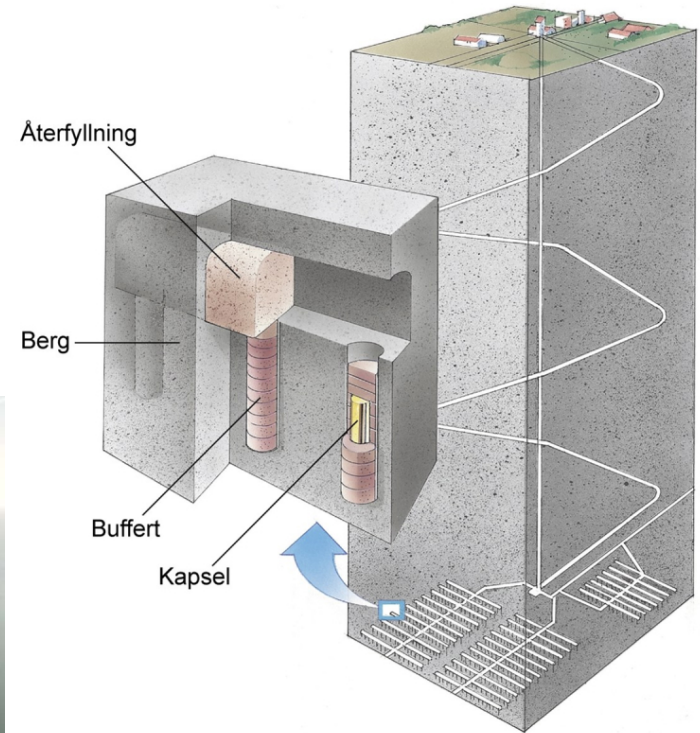
Site selection – Licence applications



Deep repository in Forsmark

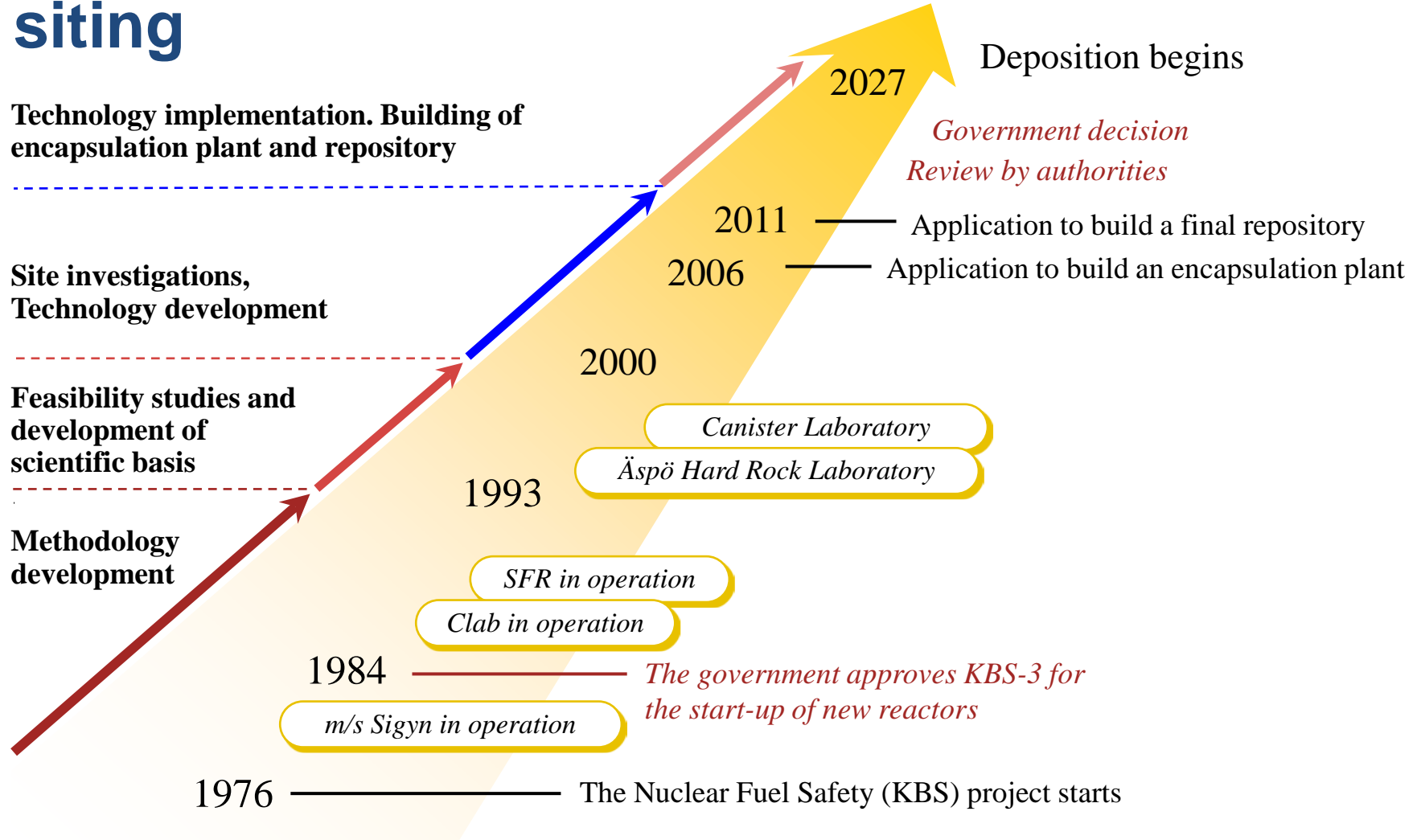


Encapsulation plant in Oskarshamn



Licence applications in March 2011
Review process ongoing

40 years of research, development and siting



RD&D programmes basis for Government decisions on future development

RD&D 2010

RD&D 2007

RD&D 2004

RD&D 2001

RD&D 1998

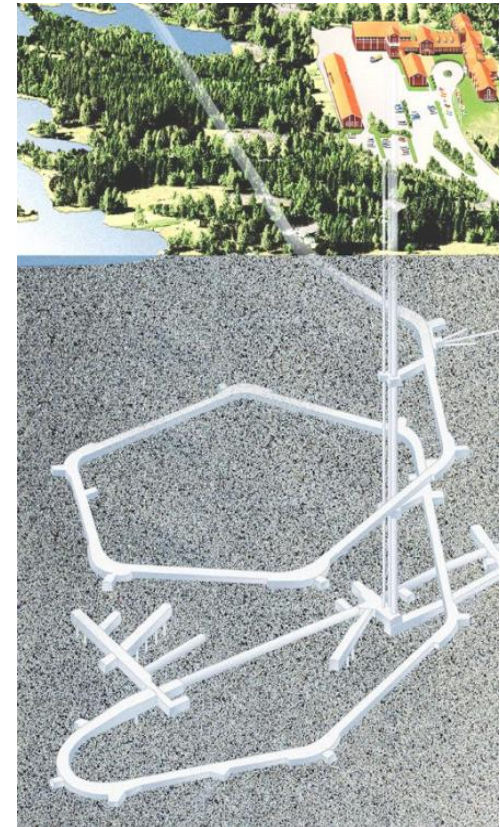
RD&D 1995

RD&D 1992

R&D 1989

R&D 1986

R&D 1984



RD&D programmes – extensively reviewed by stakeholders

- RD&D programmes are normally reviewed by about 40 scientific and other organisations, including authorities and NGO:s
- RD&D programmes are presented every third year and constitute a mean for regular updates to and feed-back from authorities, scientific communities, affected municipalities and others
- The reviews are requested by the Swedish Radiation Safety Authority (previously the Swedish Nuclear Inspectorate) that consider them in their own review as a basis for their recommendation to the Government
- The review process results in a guiding decision by the Government



Analysis of long term safety

Results and conclusions

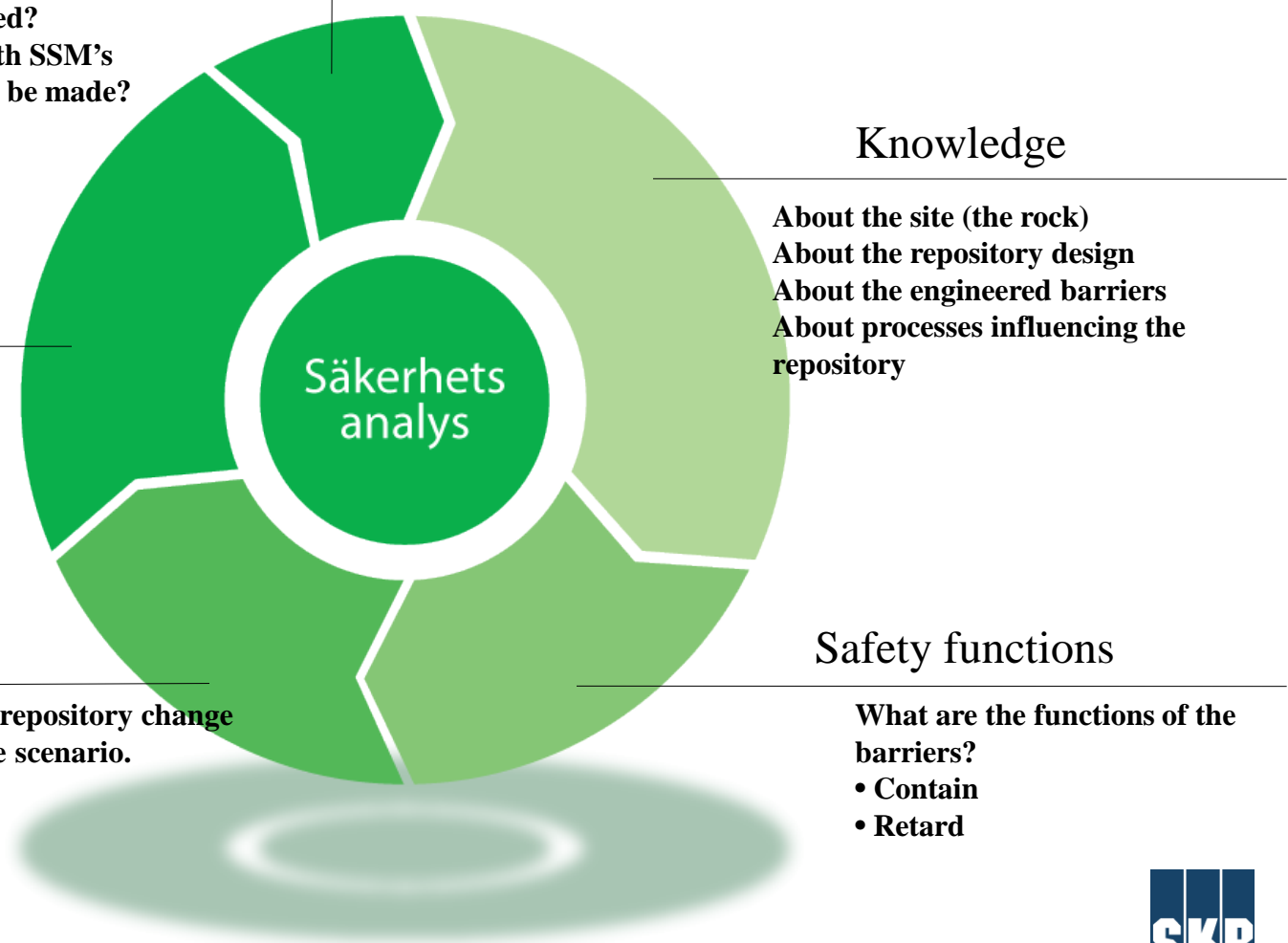
Are the safety functions fulfilled?
What is the risk? Compare with SSM's
criterium. Can improvements be made?

Scenarios

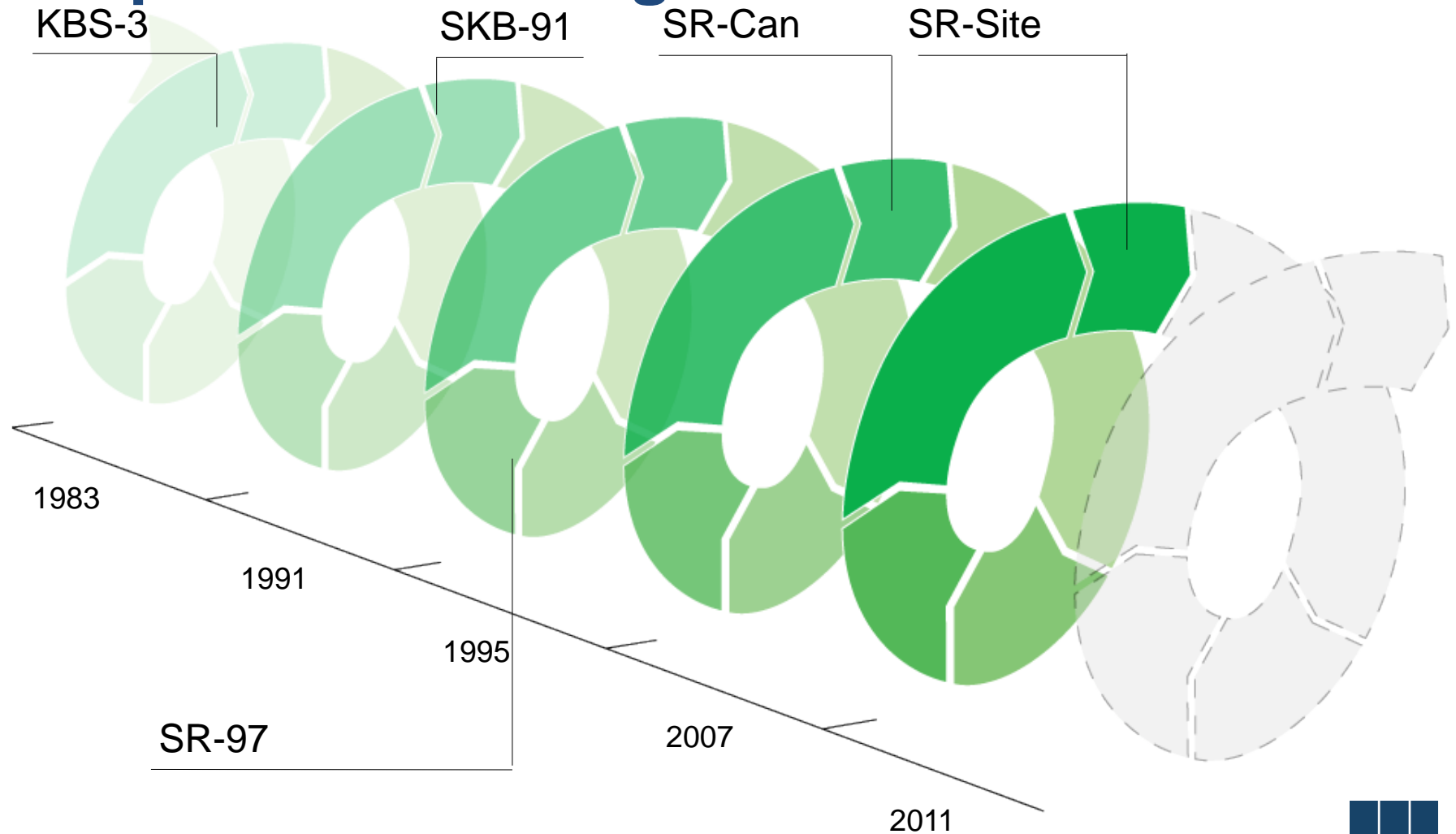
Can a worse barrier
degradation than the reference
case be considered?
What can go wrong?
Human intrusion?
What are the consequences?

Analysis

How will the conditions in the repository change
with time? Develop a reference scenario.



Recurrent safety assessments provide deepened knowledge



SKB laboratories essential for improved scientific understanding and technical development



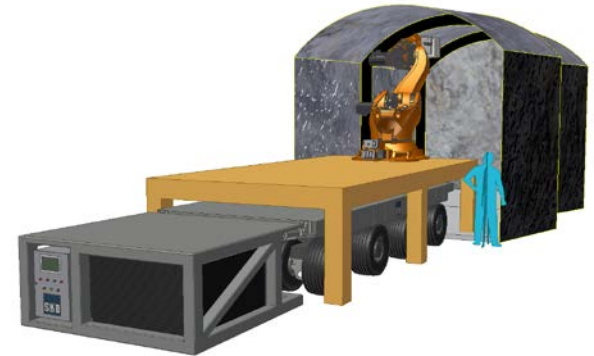
Canister laboratory, in operation since 1998



Äspö Hard Rock Laboratory, in operation since 1996



Bentonite laboratory, in operation since 2007



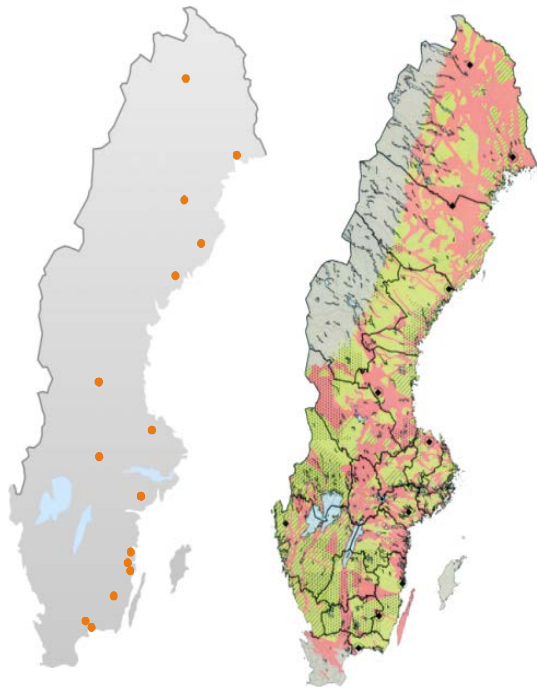
Siting process



Siting of a repository for spent nuclear fuel

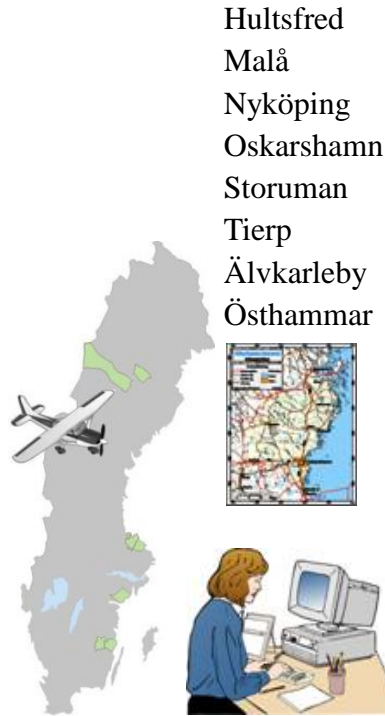
Knowledge accumulation

Siting process



Study sites
1977-1985

General siting studies
1997-1999



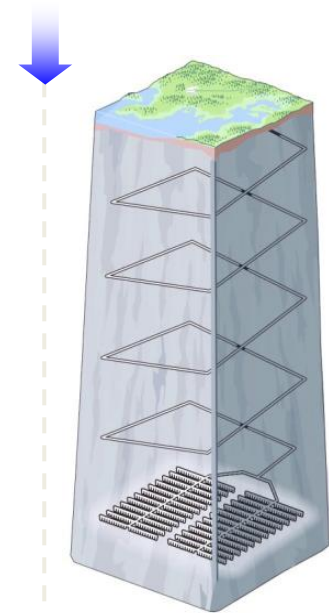
Feasibility studies
1992-2000

Oskarshamn (Laxemar)
Östhammar (Forsmark)



Site investigations
2002-2007

Decision on site 2009
Licence application 2011

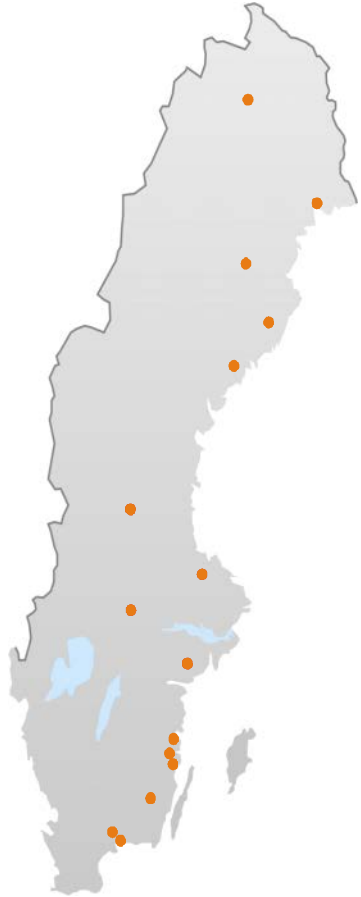


Licensing
ca. 2011-2015

Construction
ca. 2017-2024



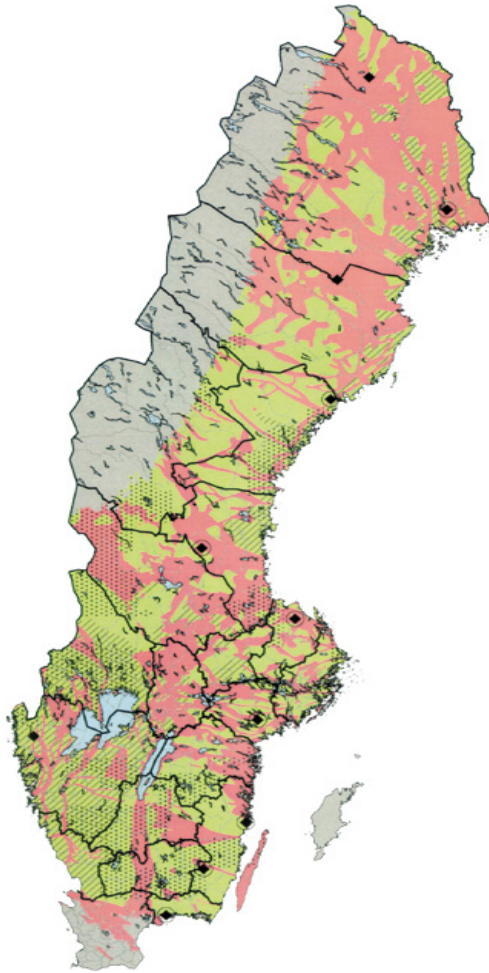
Early experiences: Protests against drilling were common at the study sites



Almunge 1985

© Bengt Backström, Upsala Nya Tidning

Suitability of bedrock for spent nuclear fuel repository



Probably suitable bedrock



Probably unsuitable bedrock

SKB:s conclusion:

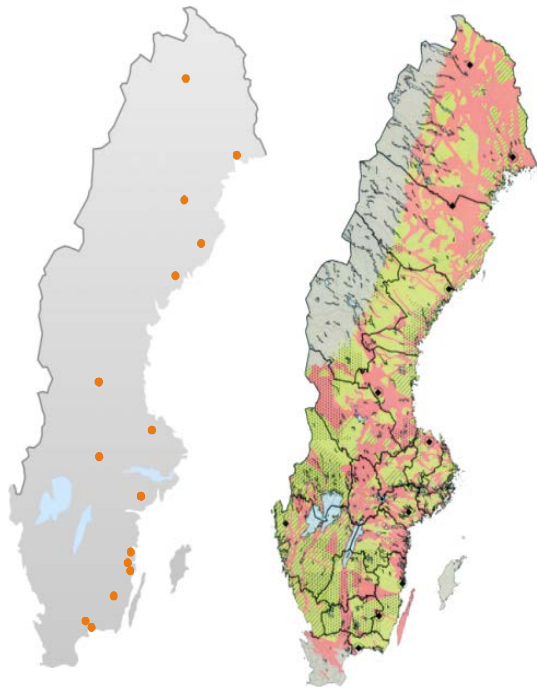
A suitable bedrock for a repository could probably be found in most parts of Sweden providing the search area is large enough.

Without a local acceptance it is not possible to establish a repository.

Siting of a repository for spent nuclear fuel

Knowledge accumulation

Siting process



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1977-1985

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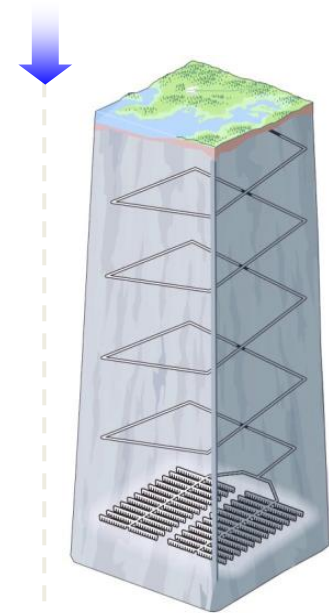
Hultsfred
Malå
Nyköping
Oskarshamn
Storuman
Tierp
Älvkarleby
Östhammar

Oskarshamn (Laxemar)
Östhammar (Forsmark)



Site investigations
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Licensing
ca. 2011-2015

Construction
ca. 2017-2024



Government decision at the start of feasibility studies

In RD&D 1992 programme, SKB proposed a site selection process based on voluntary participation of municipalities with potentially suitable bedrock

On the basis of an extensive review, the Government stated in its decision regarding RD&D 1992 programme:

- SKB should conduct 5-10 feasibility studies
- SKB's proposed siting criteria is applicable
- The EIA process is important
- Municipalities in which SKB conducts feasibility studies can receive up to 2 million SEK per year for costs associated with the feasibility study



Open Solicitation Process

- Started in 1992 with a letter to all 290 municipalities inviting them to obtain information about a repository.
- 13 showed an interest. Two were selected for feasibility studies.
- After feasibility studies – local referendum with negative outcome. Not enough public support raised during a 2 – 3 year process.

Requested participation process

- Also based on voluntary participation
- Municipalities with nuclear activities and neighbouring municipalities
- 8 feasibility studies performed
- 4 were proposed for further studies
- 2 withdraw, 2 remained, Östhammar and Oskarshamn



Feasibility study – a way to find mutual interest

A feasibility study provides a broad picture of a repository project through paper studies on:

- Geological conditions
- Technical possibilities – transport, local supplies
- Environmental impact
- ***Economical influence on the community***
- ***Social aspects of a repository***

Extensive interactions with stakeholders during the feasibility study



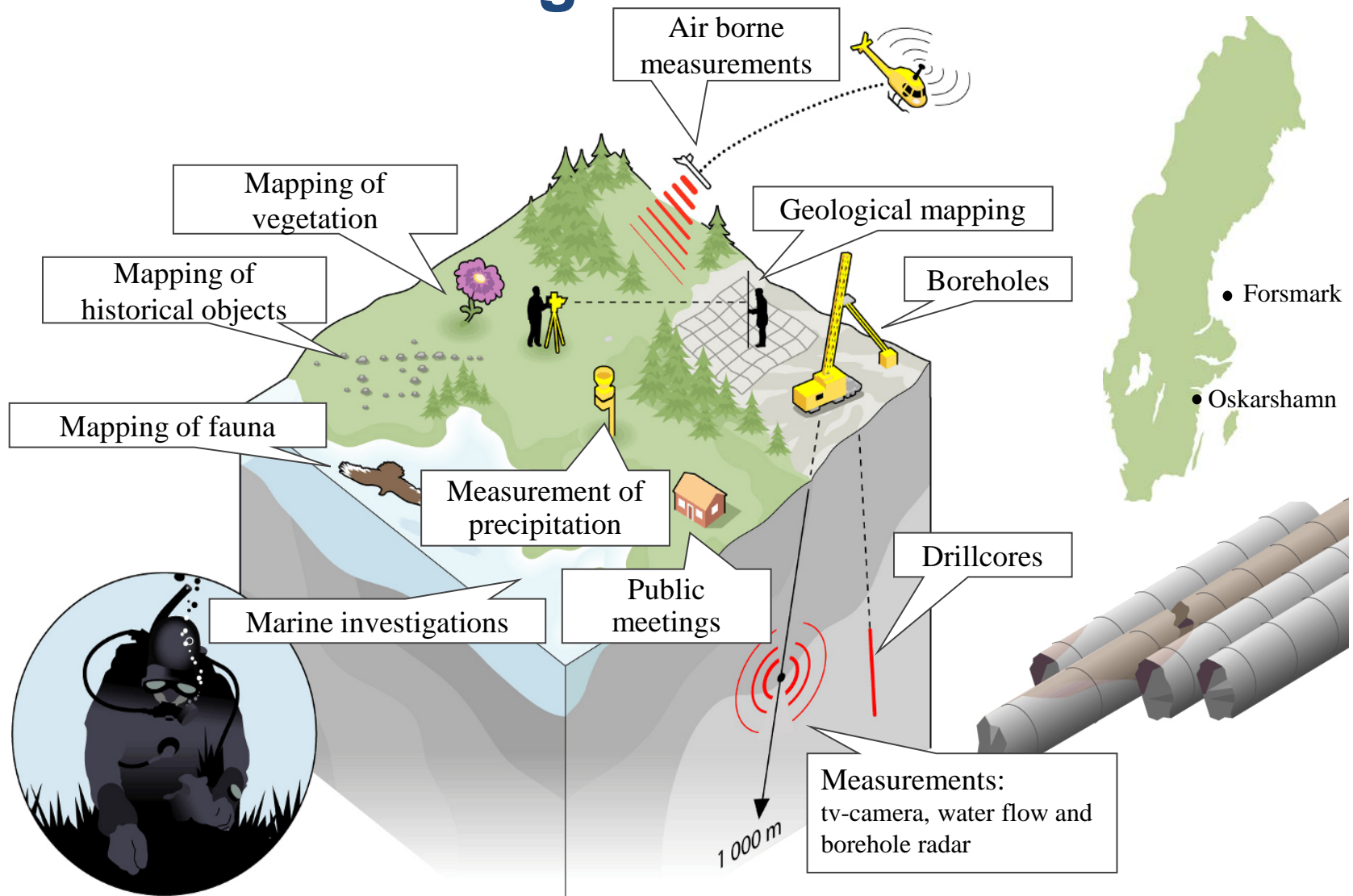
Expected positive effects of a repository

The establishment of nuclear facilities is generally regarded as positive in the affected municipalities and many expect similar effects of the repository

- Direct jobs at the repository and SKB administration
- Influx of highly educated personnel – increase in cultural activities, etc
- Local procurement – more jobs in local businesses
- Improved infrastructure
- Improved health care
- Improved quality in schools
- Spin-off effects – creates future jobs



Site Investigations 2002-2008

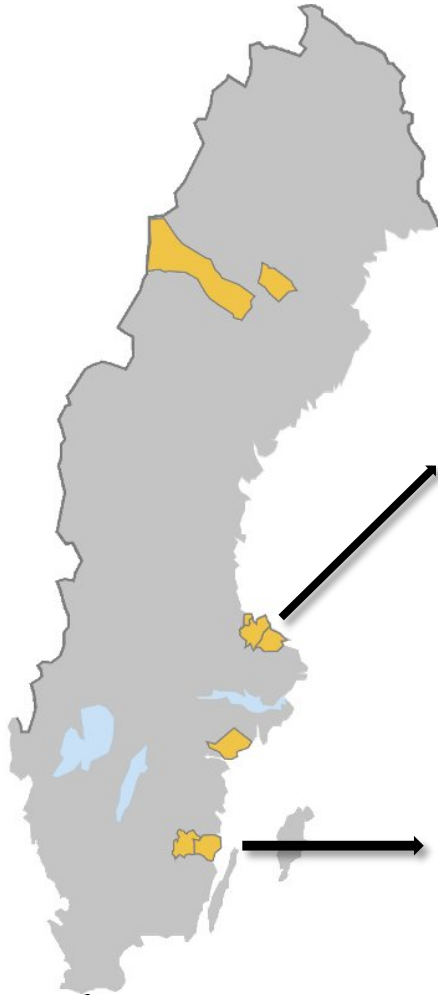


Site selection



- I. SKB will select the site judged to provide the best opportunities to achieve the purpose of the project, i.e. the safe long-term deposition of spent nuclear fuel
- II. If ranking according to I) is indecisive, SKB will select the site that from other aspects is judged to be the most favourable for accomplishing the project

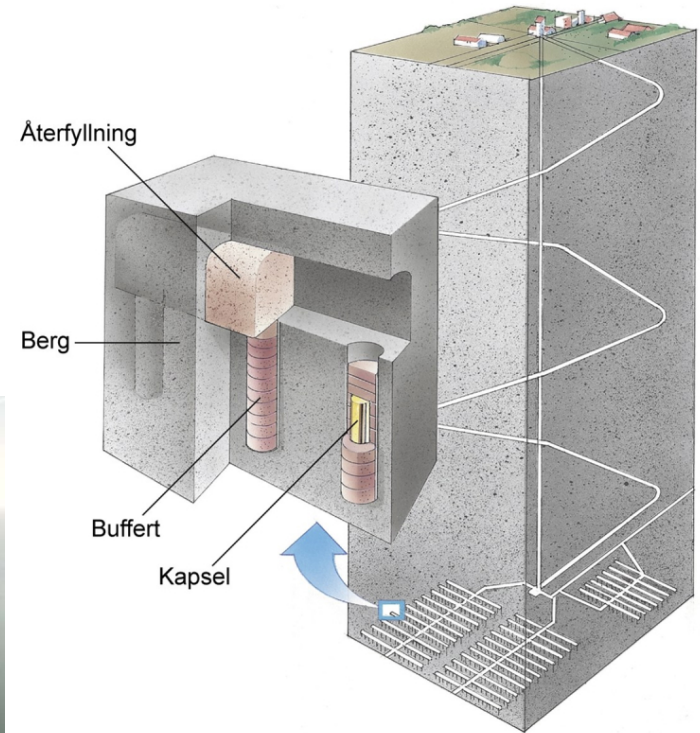
Site selection



Deep repository in Forsmark



Encapsulation plant in Oskarshamn



Licence applications in March 2011



Added value programme



Östhammar and Oskarshamn co-operated on the siting of the repository



Photo: My Laurell Östhammarsmedia

- Safety is the main siting criteria
- No winner - no loser
- Request for added values in respond to solving a national problem
- 75 % of the added values to the municipality not receiving the repository

Mayors Jacob Spangenberg, Östhammar (left) and Peter Wretlund, Oskarshamn (right).



Added value programme

October 2007	Joint letter from Östhammar's and Oskarshamn's municipalities (ÖS/OS) to SKB
April 2008	Cooperation agreement ÖS/OS
November 2008	Declaration of intent SKB and SKB's owners
March 2009	Framework agreement SKB/SKB's owners and ÖS/OS
June 2009	Site selection
Initiation of added values projects Realization of projects	



Added value programme

- Total 2 billion SEK over 15 years, 25 % to Östhammar (“winner”), 75 % to Oskarshamn (“looser”)
- Legal agreement between SKB, power companies and two local municipalities
- Support to projects of common benefit to the parties, e.g.:
 - Education, research and local business
 - Development of tourism
 - Improved roads, ferry terminal
 - Housing development
 - Business development
 - Special investments in the field of energy
 - Further development of SKB's laboratories in Oskarshamn
- Studies of future local work force demand and new enterprises.



Public acceptance



What is needed to get public acceptance

- Clear and stable roles and responsibilities in the nuclear waste management programme
- Successful operation of existing nuclear facilities – a clean record
- Demonstrate that all measures required are taken to gain the necessary scientific and technical knowledge
- Support from the national political establishment
- Support from the waste generators – the nuclear power plants
- Transparent siting process with respect to local democracy
- Confidence that the repository will be beneficial to the local community



Clear roles and responsibilities

The Financing Act (1981) and the Nuclear Activities Act (1984)

- The owners of the nuclear power plants are responsible for the management and final disposal of radioactive waste
- The owners of the nuclear power plants are responsible for all costs associated with the management and final disposal of radioactive waste
- The responsibility of the state is to make sure that the owners of the nuclear power plants fulfil their obligations and that they assume the full responsibility for the management of the radioactive waste



Roles

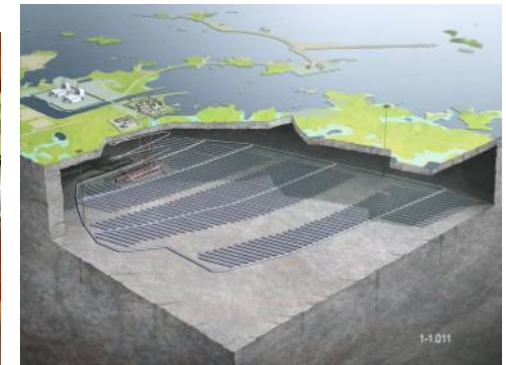
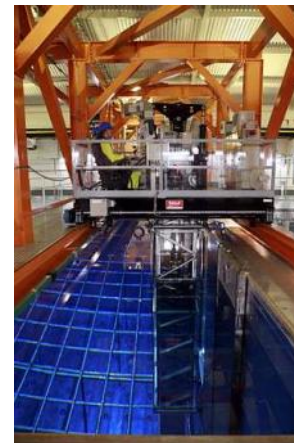
- SKB (the power industry) is responsible to propose solution and site
- The authorities, independent experts answering to the government and the public, responsible to review license application and approve or reject
- The municipality and the local public knows best about local conditions and how they like to form their future. Makes the final decision based on the authorities recommendation/decision
- The government is independent and responsible to approve/disapprove RD&D plans and licence application based on the recommendations of the authorities, environmental court and municipality decisions



Two ways of perceiving a repository

A nuclear waste dump bringing misfortune to present and future generations

A clean industrial establishment for protection of present and future generations bringing benefits to society and the local community



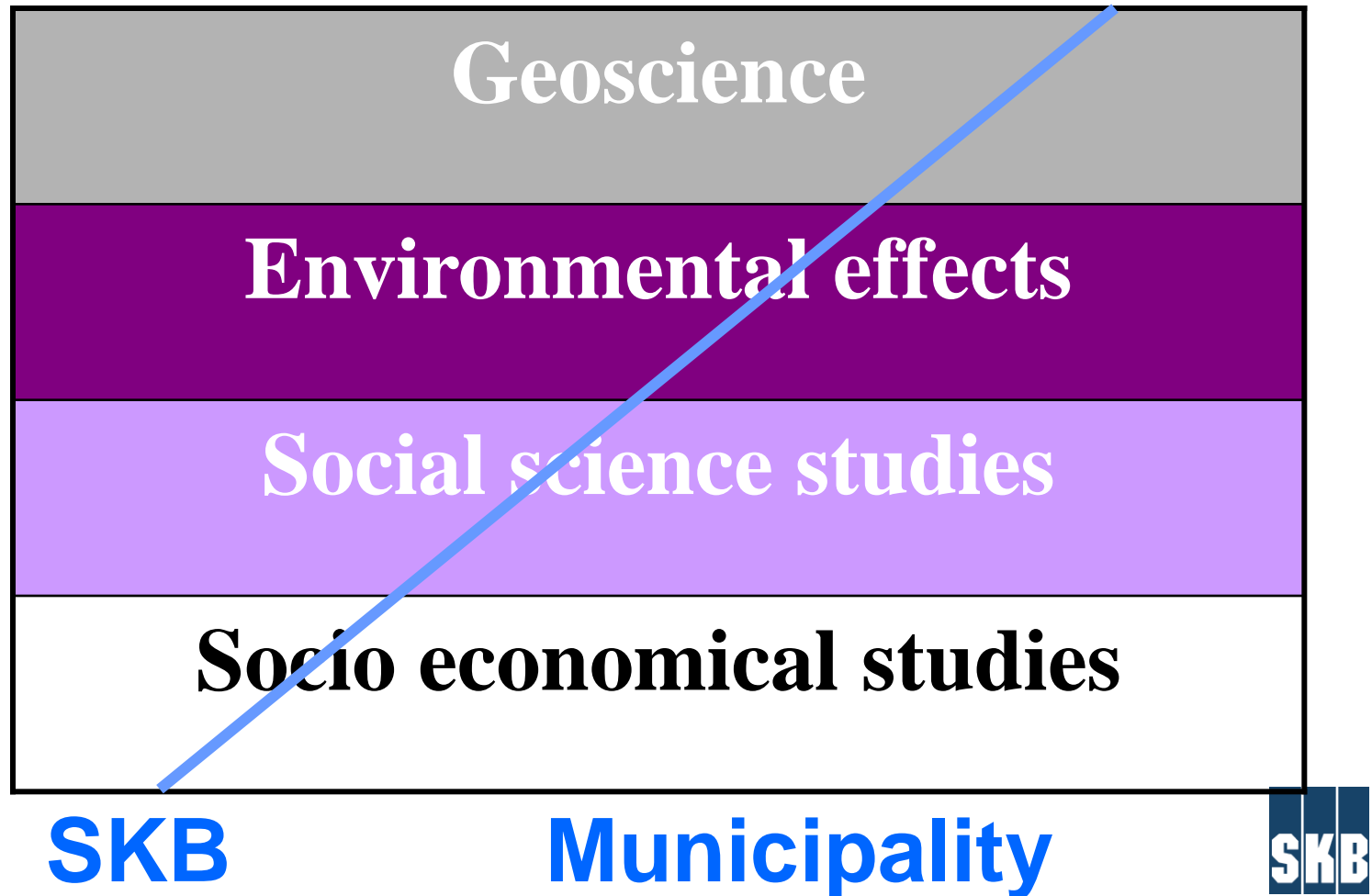
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- Improved health care
- Improved quality in schools
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Investigation programme-level of influence



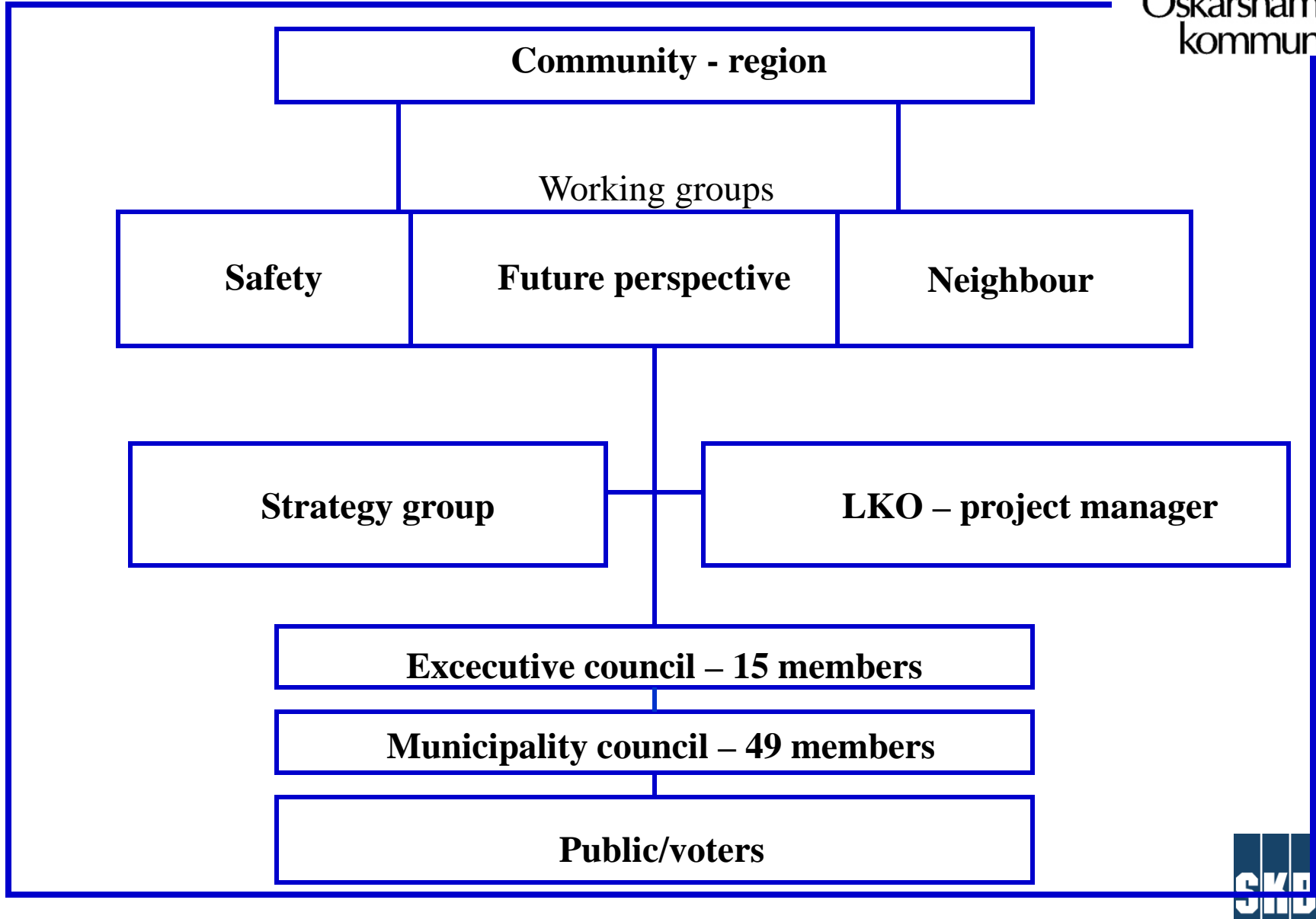
Societal studies

Examples:

- Potential effects on tourism and image
- Local supply study - goods and services
- Socio economic effects in case of a final repository system
- Local receiving capabilities
- EU and other countries waste
- Potential effects on real-estate prices



LKO organisation



LKO – the Oskarshamn model

- **Openness and participation** - Everything on the table – real influence
- **The EIA process** - Development of basis for a decision by parties together – decisions independently
- **The Council is our client** - Competent elected officials responsible towards the voters
- **The public – a resource** - Concrete plans and clear study results a prerequisite for public engagement and influence
- **The environmental groups – a resource** - Their members and their experts give us valuable contributions
- **Stretching of SKB to clear answers** - We build competence so we can ask the difficult questions. We ask until we get clear answers
- **The competent authorities our experts** - The authorities visible throughout the process. Our decision after statement by the competent authorities

Party roles and decision making process – Lessons learned

- If you trust the actors and the process you may accept the outcome
- Define clearly the party roles in dialogue with the other parties
- Stay within your role
- Define each step in the decision making process - address what, when, by whom

Important components in building trust

- Serious project – serious people
- Show the positive aspects
- Openness on challenges and potential impacts
- Open ears to local concerns and views
- Scientifically well founded – openness to critical views

Desired result

- Turn a national project into a local interest
- Keep the positive attitude



The siting process – Some lessons learned

- Respect to local democracy paramount
- Overall needs for public acceptance
- Needs of the implementer to demonstrate scientific and technical understanding
- Confidence that the repository will be beneficial to the local community
- Strong implementer presence in the local community
- The implementer needs to drive the siting process



Building trust and acceptance - some key factors

- Understanding the importance of public acceptance and support from management
- Honest and open information and dialogue
- Outreach communication activities are most important
- Be present and reachable – always
- Respect that seemingly unimportant issues (from the implementer's point of view) may be crucial to others
- Be creative and adapt the communication to local conditions – there is no “standard method” for building local acceptance
- Strive to be integrated in the local society

Waste Management Organisation



WMO – roles and responsibilities

- Clearly defined role, responsibility and mandate for WMO
- Strong, competent WMO with their own experts
- WMO with overall responsibility and mandate to lead the process
- WMO must define and lead the RD&D (RD&D plan, reviewed and accepted)
- WMO must assume responsibility for long and short term safety
- Organisation to fit the needs in different phases – needs change over time

The WMO needs:

- Support from its peers – government and the power industry
- Clearly defined, agreed and communicated process
- Clear and secure funding
- Strong and competent authority



Change of SKB management

The profile of SKB top management have changed depending on main needs in different phases of the nuclear waste programme

- 1973-1983 - Foundation of waste management system
Erik Svenke, Engineer
- 1983-1997 - Implementable repository system Sten Bjurström, Engineer
- 1997-2003 Feasibility studies
Peter Nygårds, Political civil servant
- 2003-Site Investigations
Claes Thegerström, Engineer



Kärnavfallsrådet



Key factors for success

- Get the science right
- Get the technology right
- Get public acceptance

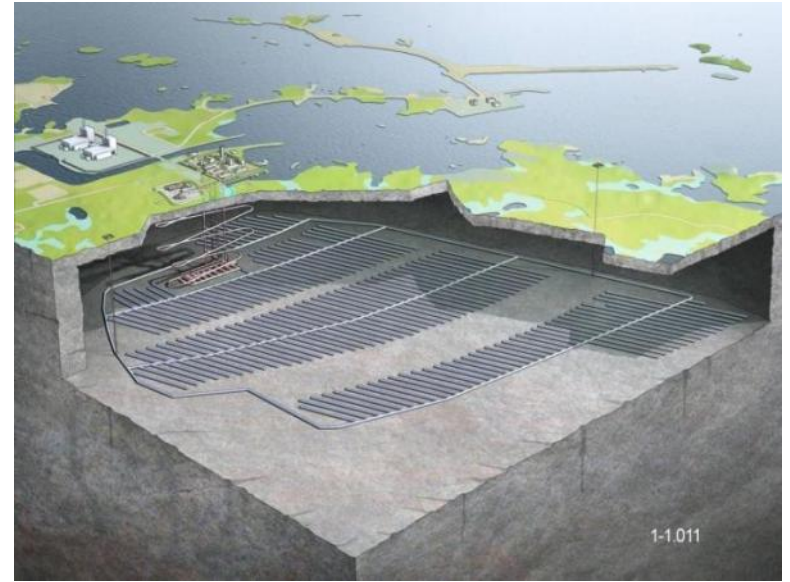


Summing up – Some key factors for progress in the Swedish programme

- Legal framework - clear roles/responsibilities for industry and state - robust funding mechanism
- Strong regulatory authority
- Dedicated and strong waste management organisation
- Building trust in affected municipalities creates the necessary public acceptance
- Long-term planning of the waste management organisation (RD&D programmes) reviewed every third year by the Government and its authorities, with input from the scientific community, municipalities, NGO's and the general public
- Experiences gained by SKB in management, technology approach, scientific bases and communication



Building public acceptance is never completed



Thank You