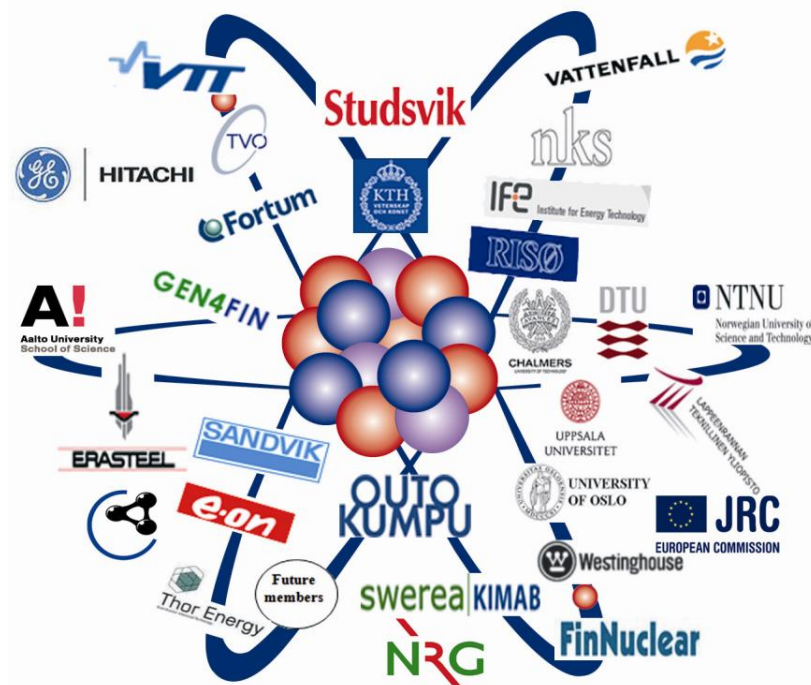


# Nordic Nuclear Materials Forum for Generation IV Reactors

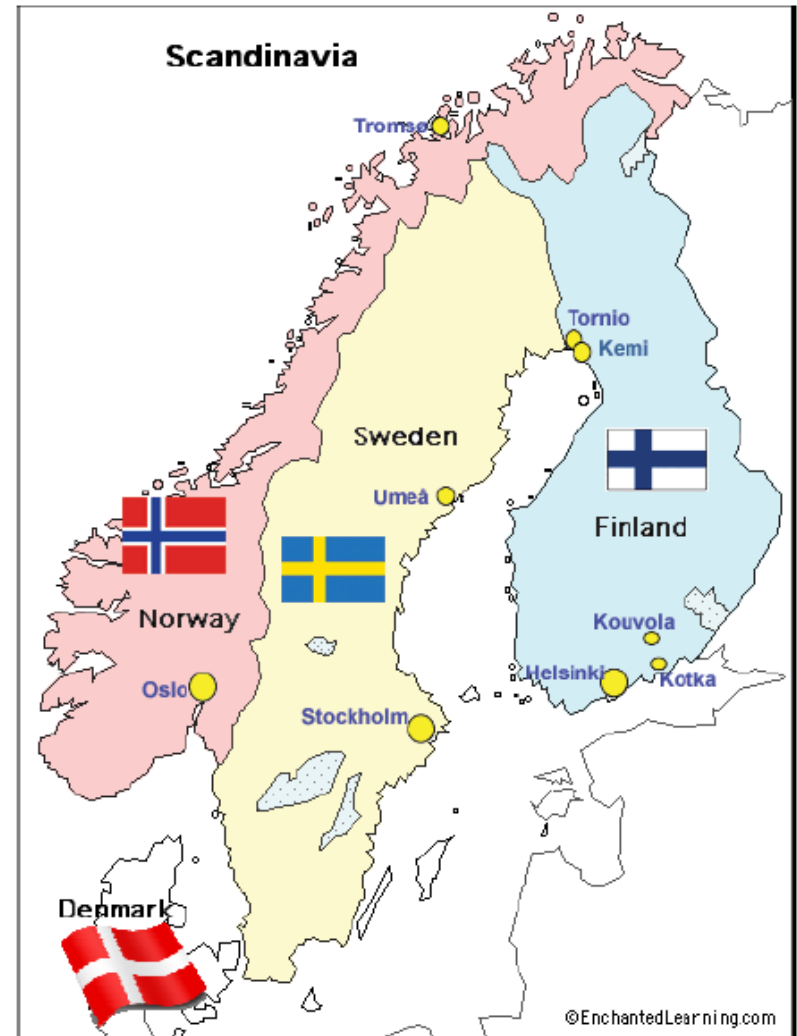
## NOMAGE4

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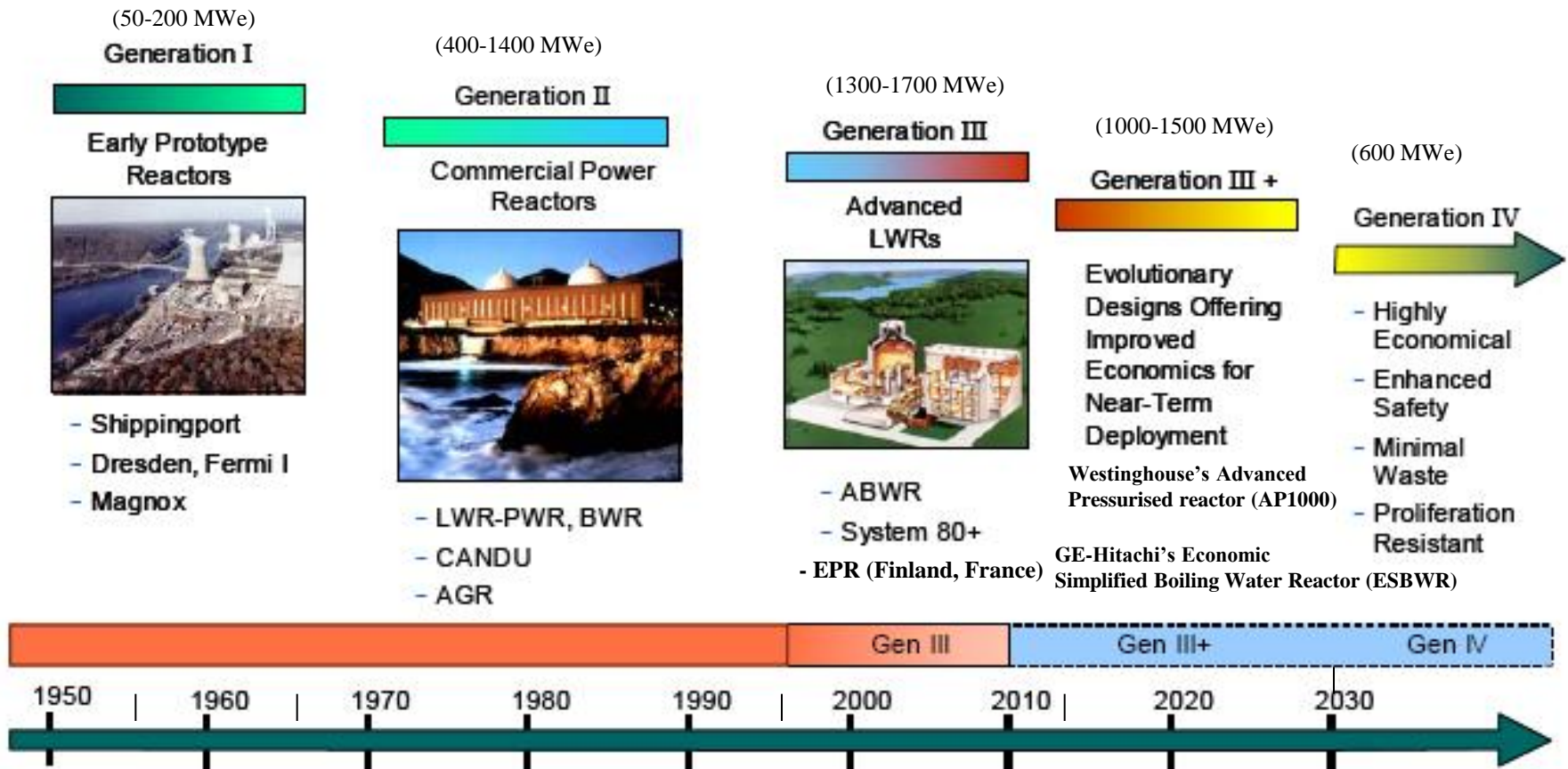
# Outline

- ✓ Gen IV
- ✓ Objectives NOMAGE4
- ✓ Organization
- ✓ Members
- ✓ Funding
- ✓ Gen IV seminars
- ✓ Gen IV website
- ✓ Gen IV long-term vision
- ✓ Acknowledgements



# Gen IV

## Generation IV reactors



- Gen IV: Most of these designs are generally not expected to be available for **commercial** construction before 2030
- **However:**
  - Research is going on NOW
  - Prototypes are being built/operating NOW
    - ✓ Chinese Experimental Fast Reactor , generating power
    - ✓ China started construction of a 210 MWe pebble bed reactor (HTR-M) in April 2011
    - ✓ China starts program to develop a thorium-fuelled molten salt reactor (February 2011)



# Forums

- GIF: Generation IV international forum
- GEN4FIN
- other

# Programs/ Projects

## Euratom

- GETMAT
- F-BRIDGE
- FAIRFUELS
- ASGARD
- SCWR-FQT
- MATTER
- GoFASTR
- ARCHER



# Objectives NOMAGE4

- Nordic dimension
  - To survey Gen IV activities in the Nordic countries
  - To establish co-operation and identify partners for R&D applications (EU, etc.)
- To build a sustainable forum for GenIV issues (materials, fuels, claddings, reactor physics, safety, ...)
- Combine resources in order to carry out more ambitious and extensive research than would be possible for the individual teams.
- Spreading knowledge on GenIV issues and on-going research to different parties involved in the nuclear field, such as universities and utilities
- Inspiring young people for GenIV related R&D



# Objectives NOMAGE4 - continued

- **All Gen IV concepts are included**
  - Sodium, lead, lead-bismuth, gas, supercritical water, ..
- **Importance of cross cutting issues**
  - Coatings of materials
  - Instrumentation
  - Creep properties
  - Modelling of materials
  - Irradiation properties
  - Reactor modelling
  - Thorium
- **Improving/coordinating applications for European Framework Programmes**



## Example of activity within the NOMAGE4 network

Halden investigates coatings for supercritical water conditions.

Coated samples are sent to VTT for exposure in supercritical water. Samples returned to Halden for SEM analysis. Results communicated back to VTT.

Similar coated samples also sent to KTH for exposure in liquid lead.

*This kind of work is done on an informal basis, without exchanging money*

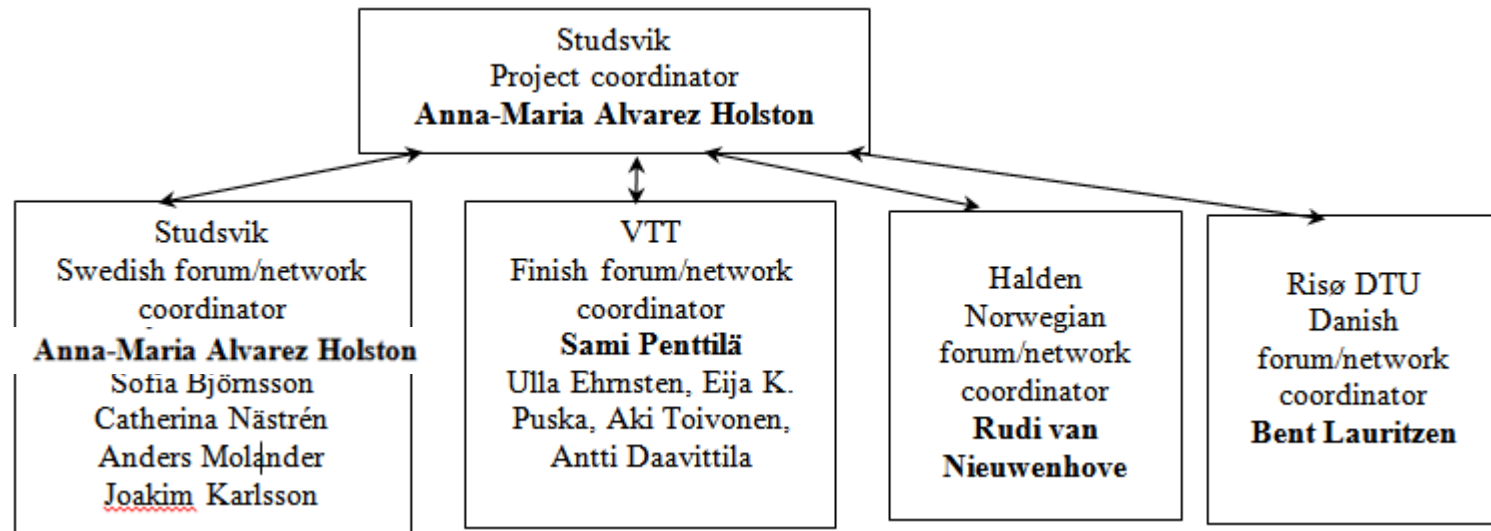
*Spirit of the network : Helping each other*





# Activity organization

## 2011



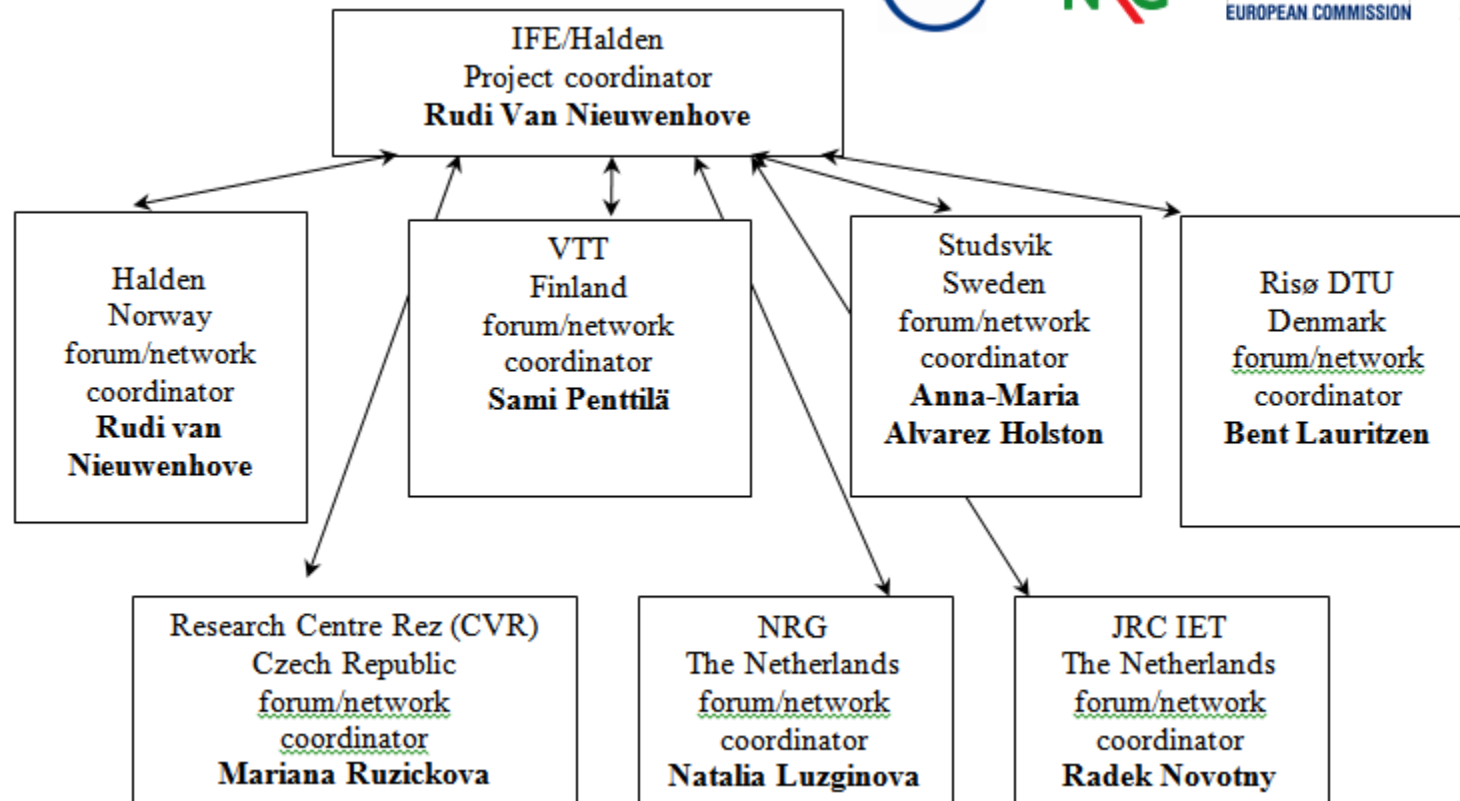
# Activity organization

## 2012



Studsvik

Technical University of Denmark



# Members

- Vattenfall
- Fortum
- Nordic Nuclear Safety Research, NKS
- TVO
- EON
- Westinghouse
- Sandvik
- Outokumpu
- Technical Research Centre of Finland, VTT
- Lappeenranta University of Technology
- Aalto University
- GEN4FIN
- Institute for Energy Technology in Norway, IFE
- Royal Institute of Technology, KTH
- Chalmers School of Technology
- Uppsala University
- Swedish Centre for Nuclear Technology, SKC
- Thor Energy, Norway
- Risø DTU National Laboratory for Sustainable Energy
- University of Oslo
- Swerea KIMAB AB
- FinNuclear Prizztech
- Norwegian University of Science and Technology
- **GE-Hitachi Nuclear Energy**

## New members (2012)

- NRG
- JRC IET
- Research Centre Rez (CVR)
- University of Tartu (Estonia)?



# Funding

- Presently funded by NKS (Nordisk kjernesikkerhetsforskning) as well as by sponsoring.

## This is NKS

### **Informal Cooperation Program**

NKS (Nordic Nuclear Safety Research) is a platform for Nordic cooperation and competence in nuclear safety, including radiation protection and emergency preparedness. It is an informal forum, serving as an umbrella for Nordic initiatives and interests. Its purpose is to carry out joint activities producing seminars, exercises, scientific articles, technical reports and other types of reference material. The work is financed and supported by Nordic authorities, companies and other organizations. The results are used by participating organizations in their decision making processes and information efforts.



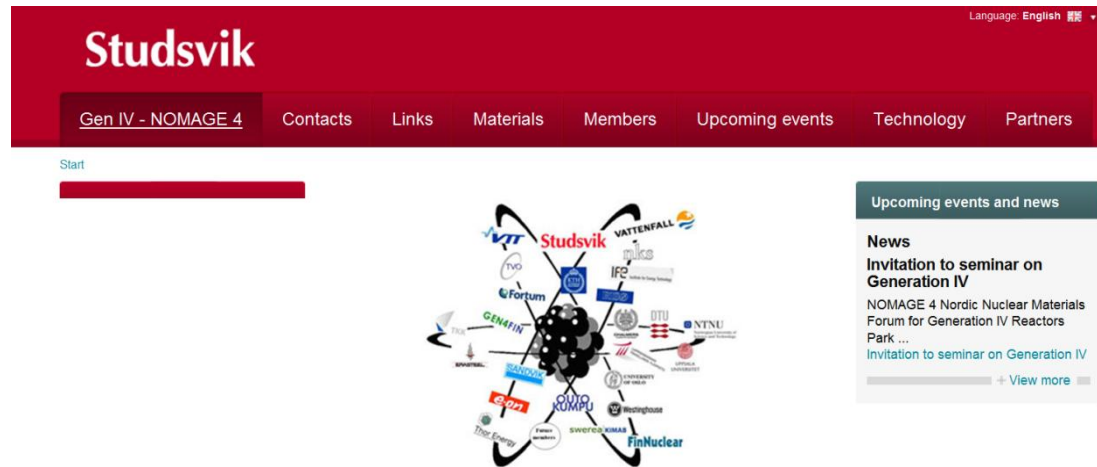
# Gen IV seminars

- Yearly seminar
  - Organized each year by a different (Scandinavian) country
  - Presentations made available on a website
  - Learning better the facilities/capabilities of each participant
  - Social part
- 2-day seminar up to now. We need to change this to 3 days!



# Website

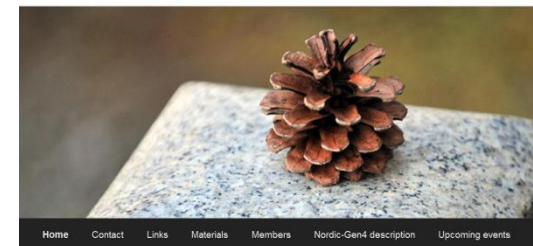
Present website: [www.Studsvik.com/Generation\\_IV](http://www.Studsvik.com/Generation_IV)



From 2012: New name : Nordic-Gen4 and new website  
[www.nordic-gen4.org](http://www.nordic-gen4.org)

## Nordic Gen 4

NOMAGE 4 Nordic Nuclear Materials Forum for Generation IV



*New website* [www.nordic-gen4.org](http://www.nordic-gen4.org)

- More information
  - ✓ Presentations
  - ✓ Links
  - ✓ Data base
  - ✓ Important news on Gen IV activities in the world
- More possibilities
  - ✓ On-line registration for seminars
  - ✓ Discussions, etc.



# Long term vision of the network (Nordic-Gen4)

**Presently:** Networking, information exchange, limited common programs

## **Future:**

- More focussed common experimental programs, making use of the existing infrastructures
- More involvement of the universities
- Extend the network (not only Scandinavian)
- Include small thematic workshops (coatings, corrosion, instrumentation, thorium, uranium nitride,..)

We need a different funding system (membership – fee ?)





# Acknowledgements

Financial support from NKS is gratefully acknowledged



# Thank you for your attention !

