Self-evaluation on Capacity Building in Finland: Report of the Committee for Nuclear Energy Competence in Finland

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1. Finland in a nutshell

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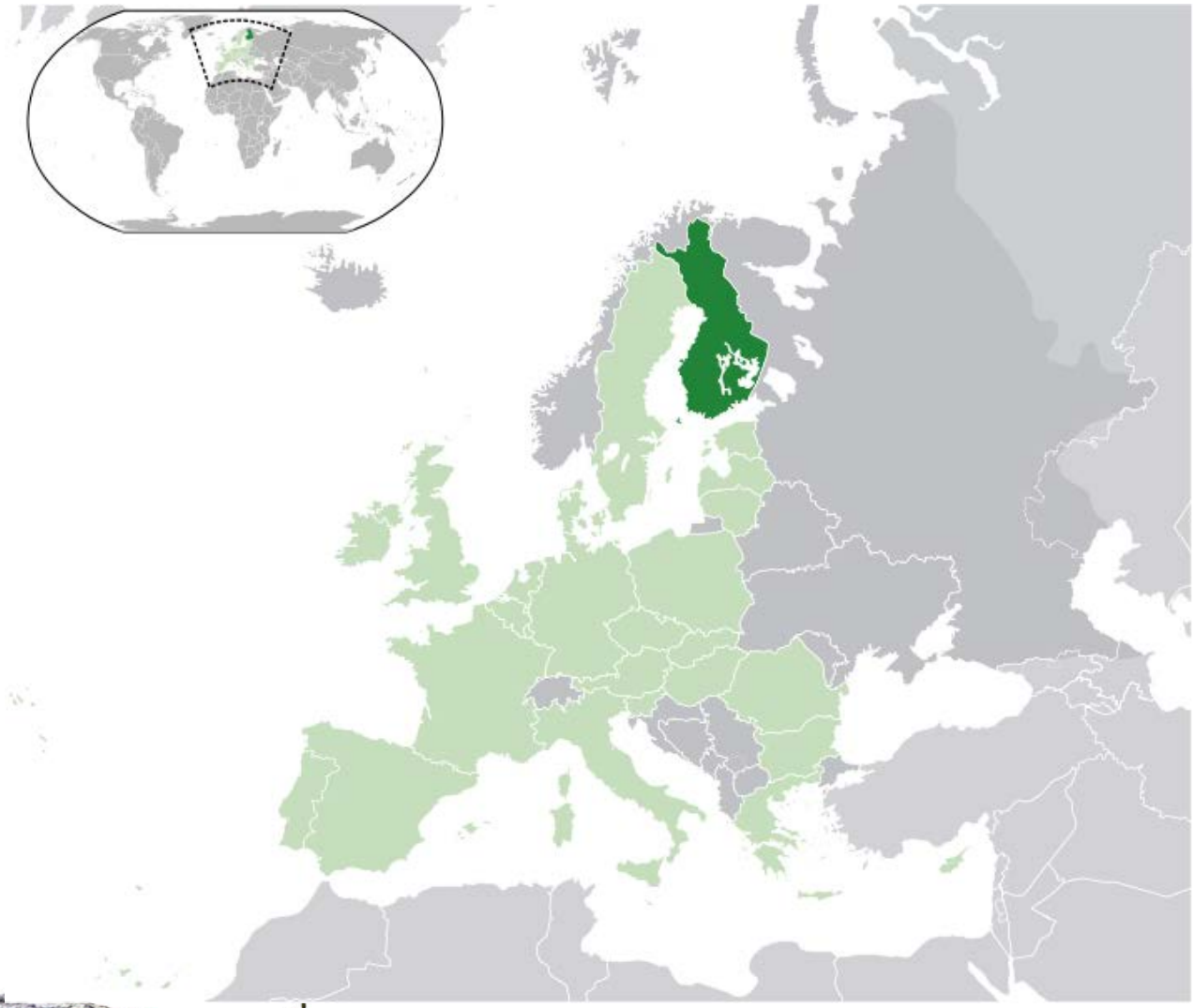
Finland – northern Scandinavian country



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2. Nuclear in Finland

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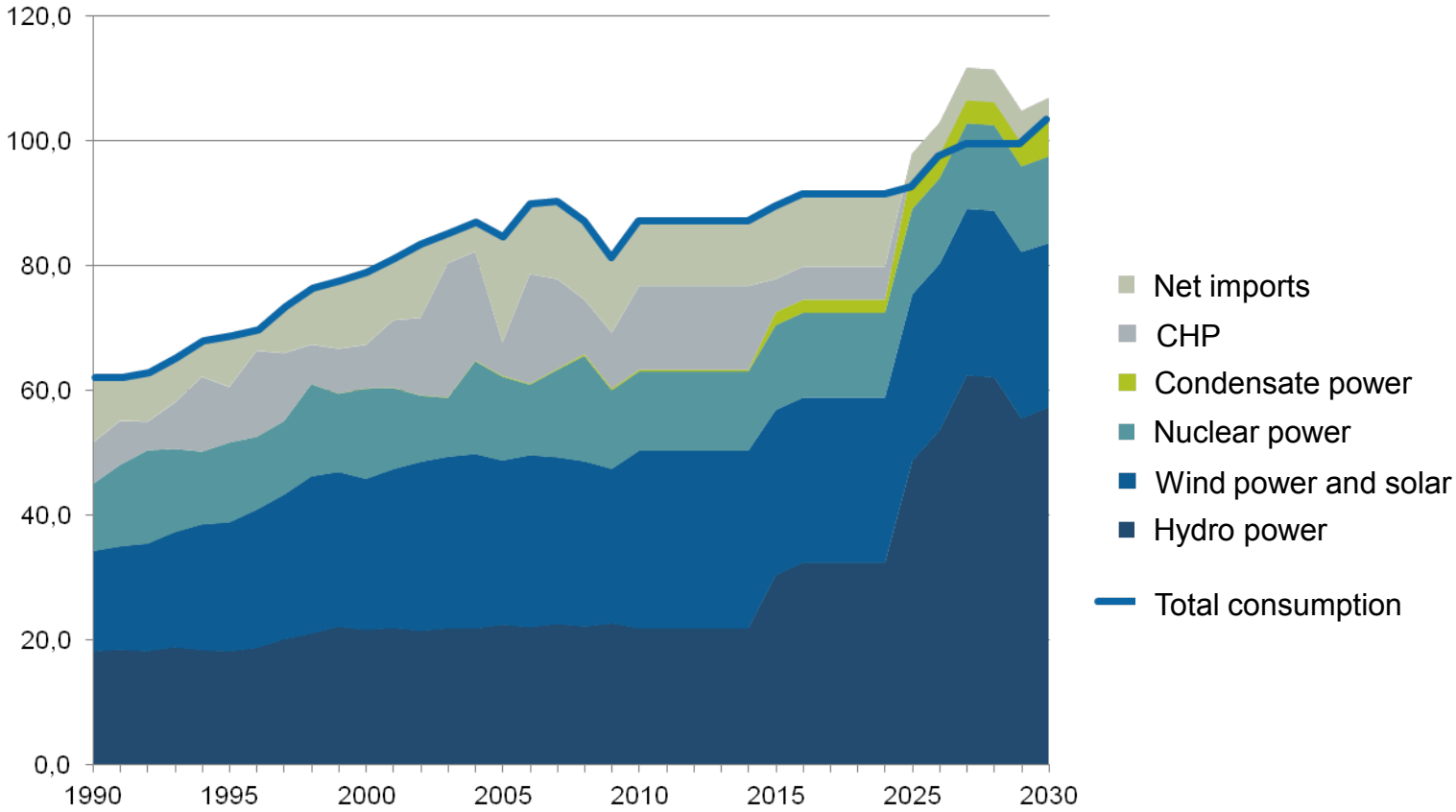
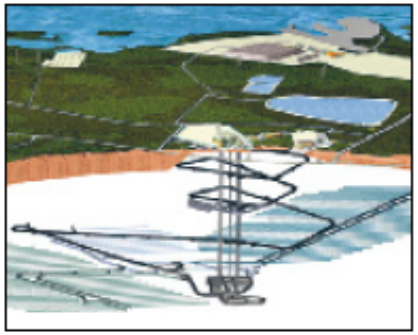
Electricity supply and consumption, twh



Source: Energy and climate strategy background report 31.1.2013

Finnish Nuclear in Nutshell



WASTE MANAGEMENT:

- Repositories for LLW & MLW in operation at Olkiluoto and Loviisa
- Initial Decision in principle for spent fuel repository at Olkiluoto ratified by Parliament in 2001
- Confirming underground rock characterisation studies underway in ONKALO facility at Olkiluoto

HANHIKIVI, PYHÄJOKI

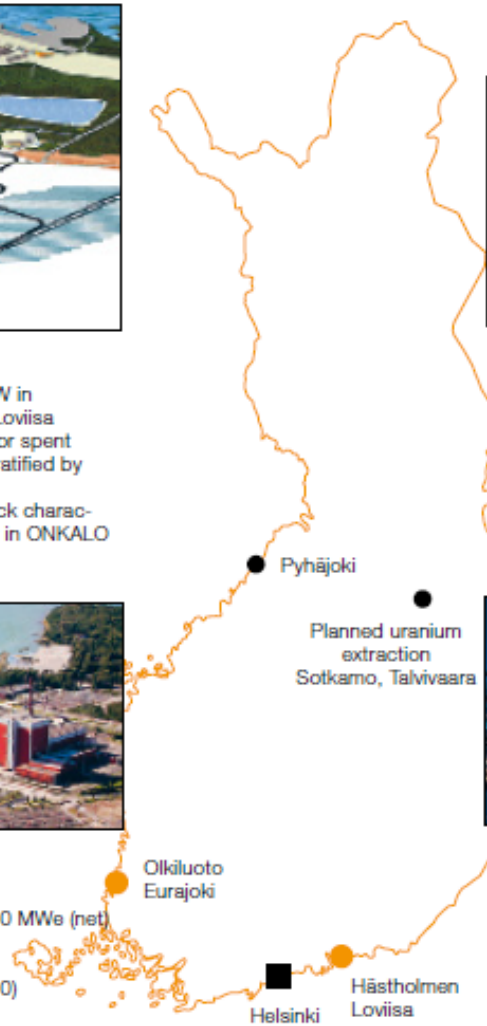
Owner: Fennovoima Oy
Planned: Hanhikivi 1

OLKILUOTO, EURAJOKI

Owner: Teollisuuden Voima Oyj
Reactor units 1&2: BWR 2 x 880 MWe (net)
Operation started: 1979, 1982
Production: 14.2 TWh (2010)
Load factor: 93.5 per cent (2010)
Under construction
Olkiluoto 3: EPR (PWR) 1600 MWe
Planned: Olkiluoto 4

HÄSTHOLMEN, LOVIISA

Owner: Fortum
Reactor units 1&2: PWR 2 x 488 MWe
Operation started: 1977, 1981
Production: 7.7 TWh (2010)
Load factor: 91.1 per cent (2010)



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3. Finnish Nationwide Committee for Nuclear Competence :

The capacity building Self-evaluation

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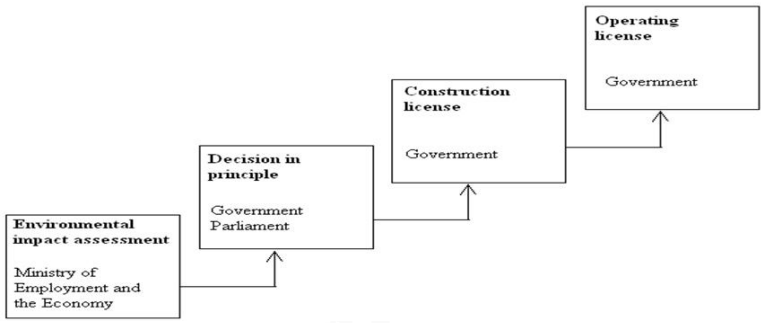
The Finnish Parliament 1.7.2010

- The Government of Finland gave decisions in principle (a political license) to start the preparation phase for two new NPP units in May 2010.
- Parliament ratified these DIPs in July 2010 (Olkiluoto 4, Fennovoima 1 and for Posiva). One of four statements demanded that knowledge and infrastructure must be secured for the Finnish organizations.
- After this, the Ministry of Employment and Economy decided that a self-evaluation on capacity building should be made.

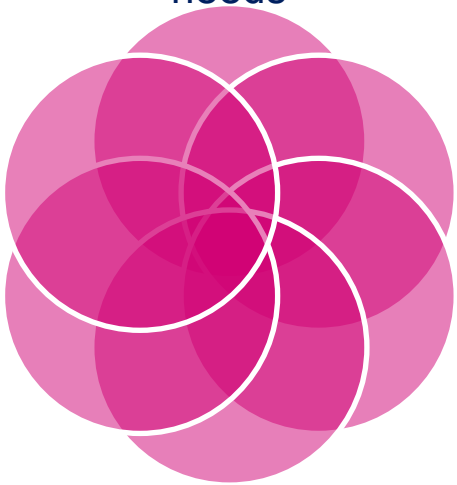


Task of the Committee

Current human resources in nuclear energy sector and future needs

VTT research reactor utilisation

Status of education and training in nuclear sector



Guidelines for participating in international research on nuclear safety

Possibilities for Finnish companies to contribute to large nuclear power plant projects

Research infrastructure

Output: recommendations of activities until 2025

Organising the National Committee for Nuclear Energy Competence in Finland

- Chairman: Industrial Counsellor from the Ministry of Employment and the Economy
- Members from several organizations:
  - Ministries (4)
  - Radiation and Nuclear Safety Authority STUK
  - Universities (5)
  - Research institutes
  - Utilities (3)
  - Posiva (a company for final disposal of spent nuclear fuel)
  - FinNuclear Association (Industry group)
- More than 150 people participated in the work of the committee

4.Self-evaluation Process and its results

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Concept

- All key players round the same table.
- Work done voluntarily and supported both financially and with human resources by all the organizations.
- Systematic Approach.
- All results have been made public.
- Recommendations for future activities were made.
- New work on national nuclear research strategies has started after this self-evaluation.
- All the “key players” of the Finnish Nuclear Industry are taking part in the implementation of the recommendations via new working groups.

The Finnish Survey on HR, R&D and E&T

- A questionnaire was sent to almost 300 organizations
- The organizations were prioritized to four target groups:

	Group	No. of members	Response Rate
1	Key Finnish nuclear organizations	20 in total	100%
2	Other universities and higher education institutions	Just over 20	Total 21%
3	Industries closely associated with power companies	several dozen	*)
4	Other related industries	approx. 200	*)

*)The target groups 3 and 4 did not consider themselves nuclear specific and the questionnaire was long. Thus the response rate remained low in these groups.

4.1 Human Resources in Nuclear Sector in Finland

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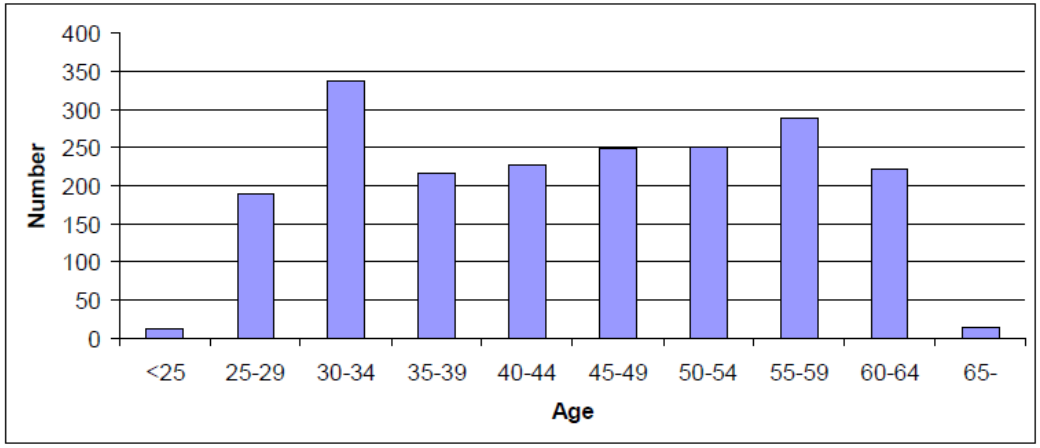
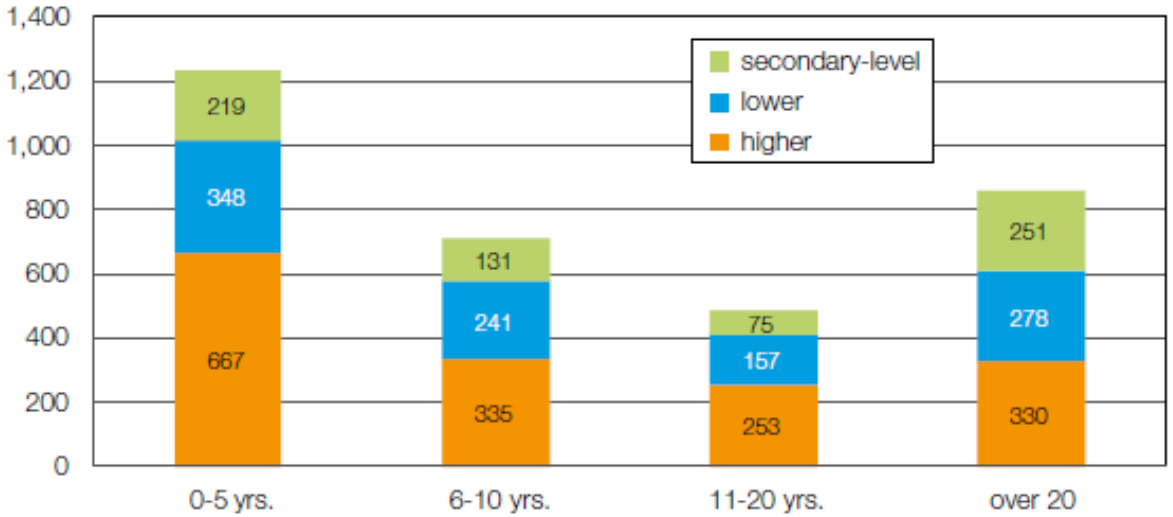
Human resources in nuclear energy sector (2010)

All human resources in the industry

▪ Master's degree	1585	
Out of them Licentiates		55
PhD / Doctors		232
▪ Bachelor's degree	1024	
▪ Vocational/professional school	676	
	3285	

Age distribution of the major nuclear sector organizations in 2010 and Human resources in nuclear industry by years of experience in nuclear (2010)





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Overall Need for Nuclear Energy Sector Personnel

- By the year 2025, the need for personnel will grow most in the following competence areas:
  - Construction engineering
  - Automation and control room
  - Mechanical engineering
  - Electrical engineering
  - Quality management
  - Process engineering

Degree	2010	2015	2020	2025
Higher university degree (Master)	1,585	1,849	2,047	2,117
Lower university degree (Bachelor)	1,024	1,126	1,465	1,573
Secondary-level vocational training	676	742	841	832
Total	**3,285**	**3,717**	**4,353**	**4,522**

5. The Finnish Nuclear Research Strategy 2014

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The New Nuclear Research Strategy 2014

- MEE set up a working group in January 2013 to prepare a research strategy for nuclear energy field through 2030 based on a recommendation in the Competence report. The strategy was finalised in April 2014.
- *Vision: Internationally high-quality Finnish expertise and research will secure the safe, sustainable, and competitive use of nuclear energy and promote business opportunities in the field*.

Photo: LUT

Photo: VTT

Recommendations

1) Focus areas in nuclear energy research must be compiled into wide-ranging national programmes.
2) The scientific level of Finnish nuclear research needs to be raised.
3) Active participation is needed in international research that is important for Finland through broad-based national multidisciplinary collaboration.
4) To secure the quality and quantity of researcher education, a broad and comprehensive doctoral programme network needs to be established.
5) Building, maintaining, and utilising infrastructure requires coordination at the national level.
6) In research activities input is needed into the development of innovations. The growth of business operations and internationalisation are supported by bringing the players together under Team Finland.
7) It is proposed that an advisory committee be set up in connection with MEE linked with nuclear research and utilisation as a permanent expert body to support decision-making in national questions related to the nuclear energy field.

6. Comparison with IAEA Capacity Building

Comparison with IAEA Capacity Building

- This WG and study was started without taking into account IAEA program, but later Capacity Building ideas were analyzed:
  - Education and training
    - Committee allowed this part to be very efficient (once 12 professors in a meeting)
  - Human resource development
    - National and organizational levels were cleared
  - Knowledge Management
    - 21 different areas were identified
  - Knowledge networks
    - With Committee this proceeded well

7. Lessons learned

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Lessons learned

- In Finland the most important result of the CB self-evaluation was the process itself. Commitment to this work and results by the experts and organizations are very important.
- There should be a broad cooperation in the national capacity building work.
- Complicated queries end in thin catch - also endless patience is needed.
- All definitions should be agreed and the rules should be clear (plans of the organizations). Quality takes time.
- Reserve enough time and resources. In the Finnish case the national effort forced MEE to leave important international projects aside.
- It pays to be active with media also during the Self-Assessment.

Press Conference 26 March 2012 where the report of the Competence Committee was handed to the Minister of Economic Affairs, Jyri Häkämies (left). On the right, the Chairman of the Committee, Riku Huttunen

The report is available in
www.tem.fi/files/33099/TEMjul_14_2012_web.pdf

Kiitos

Thank you

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