Assuring Nuclear Education into the 21st Century in Sweden

By

G. Löwenhielm, SKI, and T. Lefvert, SKC

Presented at Saclay, 7-10 Sep. 2004

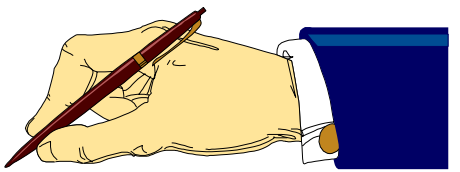
Content

- Introduction
- Threats towards nuclear education
- Swedish Centre for Nuclear Technology
- Education situation in Sweden
- Strategic competence needs in Sweden
- Effects of measures

Nuclear Safety Convention

Nuclear Safety Convention §11.2:

"Each Contracting Party shall take appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety related activities in or for each nuclear installation, throughout its life"



Threats towards nuclear education

Discussed during year 2000 in Sweden.

Threats due to:

- **Deregulation of electricity market.**
- **Decision to close Barsebäck 1.**
- **At universities**
  - **Less funding from the state to universities**
  - **Nuclear subjects not a “hot” subject to study**
  - **Retiring professors in nuclear subjects may not be replaced**

Swedish Centre for Nuclear Technology - SKC

Started early in the 1990's to support PhD studies.

Swedish Nuclear Power Inspectorate (SKI)
Westinghouse Electric Sweden
Ringhals AB (3PWRs, 1 BWR)
Forsmark Kraftgrupp AB (3 BWRs)
OKG AB (3 BWRs)
Barsebäck Kraft AB (1 BWR)

SKC support to PhD students

The PhD program has gradually expanded.

Today SKC supports 10 - 12 PhD students at 7 universities (about 0.9 Million Euro/year)

Altogether

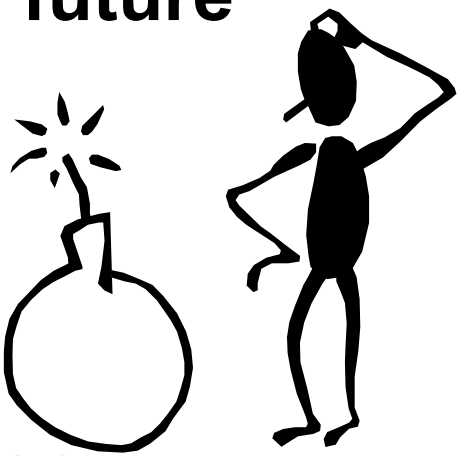
7 doctoral dissertations

11 licentiate dissertations

SKC expansion - support to professorships

In 2001 education in risk zone; four professors were to retire in near future

Clear indications some of these would not be replaced.



SKC Decision:

Expand SKC to support professor- and lectureships. (Six years contract)

Budget expanded from 1.1 to 1.7 million Euro/year.

Organisation - The tasks of SKC

Fill needs of competence for authority and industry

Provide basic training of nuclear engineers and future specialists

Support research groups in areas unique for nuclear power

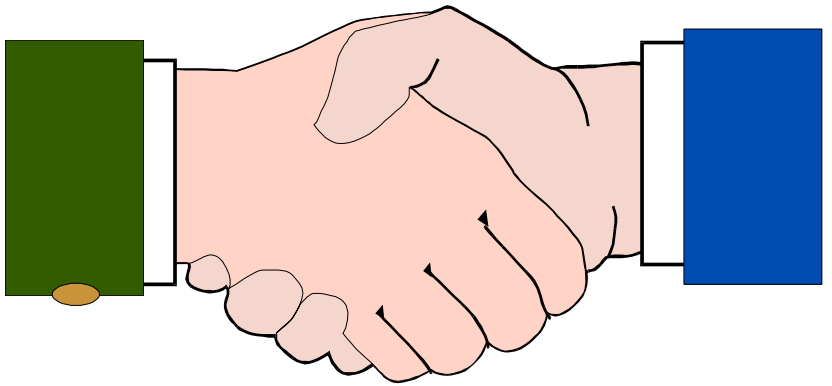
- **Senior teachers/researchers**
- **Research projects**

Organisation-University actions

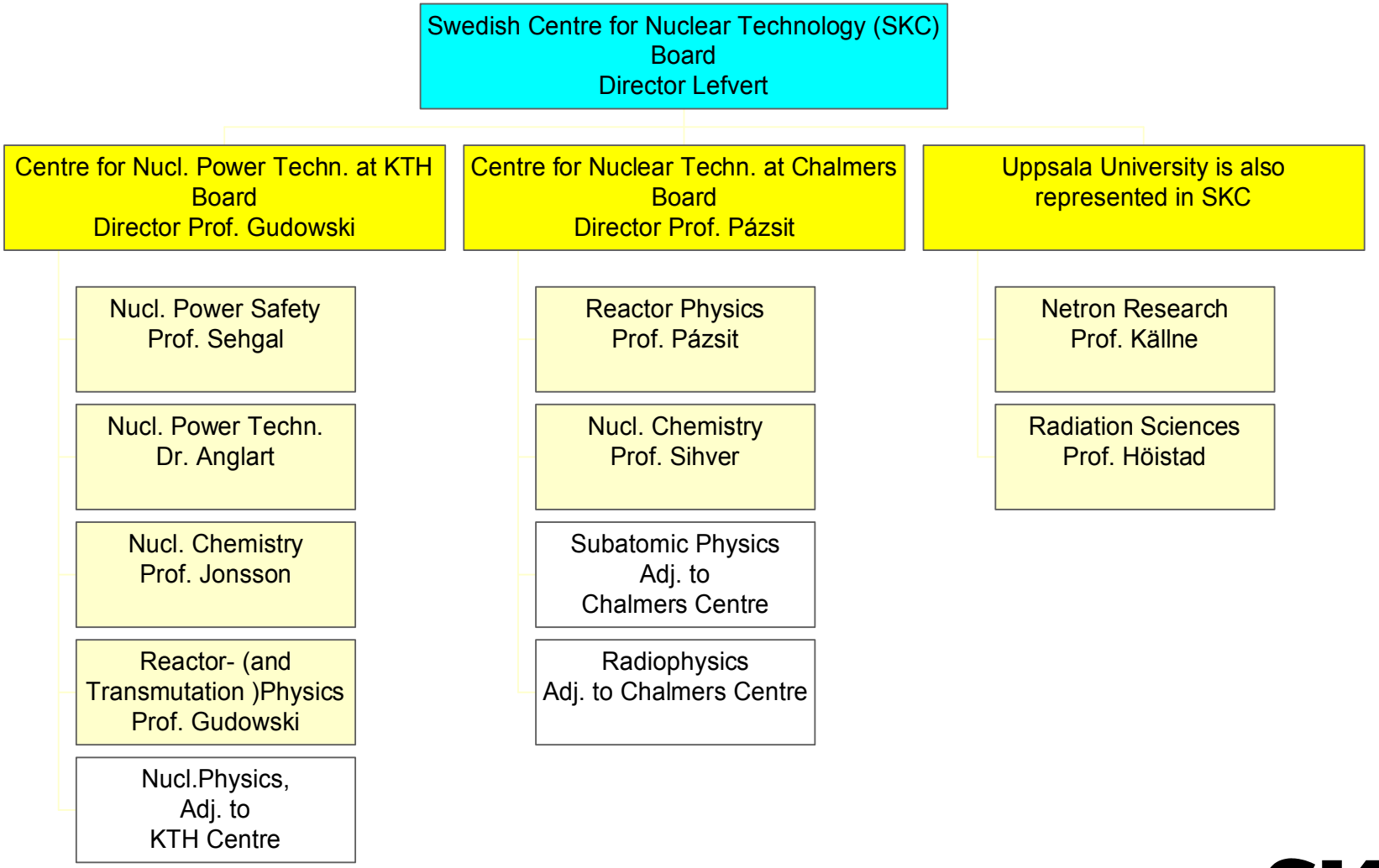
Academic Centre for Nuclear Technology at Royal Inst. of Technology (CEKERT)

Dito at Chalmers (CKTC)

Co-operation between nuclear departments at Uppsala University



Organisation-SKC-Universities



Education situation in Sweden

Royal Inst. of Technology (KTH)

Education in

- Nuclear Engineering
- Reactor Physics
- Nuclear Chemistry

With substantial research associated.

Education situation in Sweden (cont)

Chalmers University of Technology (CTH)

Education (and research) in

- **Reactor Physics**
- **Nuclear Chemistry**
- **Attempts to start Nuclear Engineering.**

University of Uppsala (UU)

- **Radiation measurement techniques (Waste and safeguard issues)**

Strategic competence needs

In 2001 the strategic competence need was evaluated up to year 2010.

Data from 709 employees from 11 organisations were sampled. Prognosis up to year 2010 in 11 areas.

Result: About 50 educated persons/year needed.

Present day capacity at universities sufficient

Survey competence need

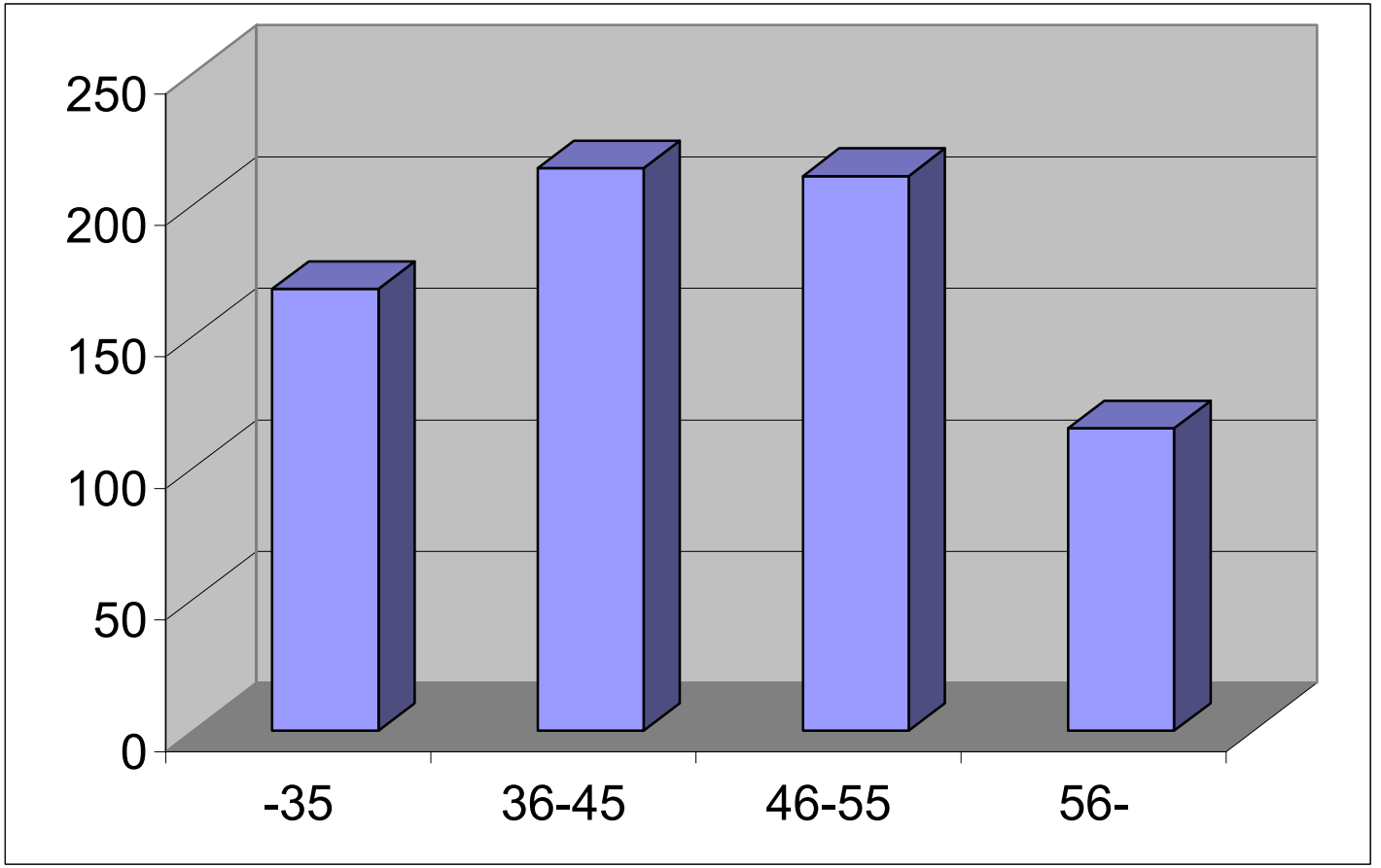


Figure – Age distribution for all highly educated people, strategic personnel

Survey competence need

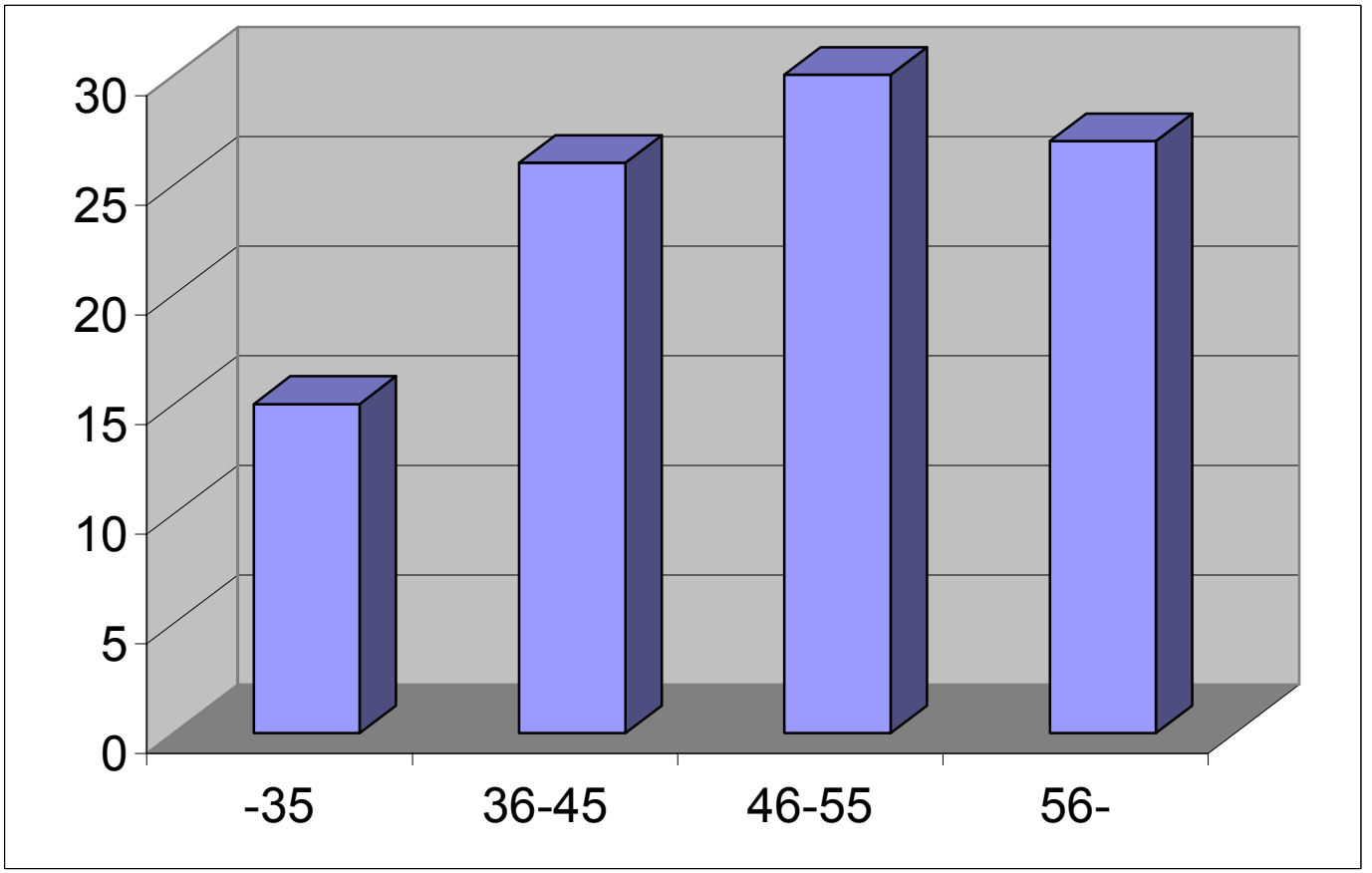


Figure – Age distribution for strategic personnel with PhD (or equivalent)

Effect of measures

If SKC had not expanded its activity, what then?

- **Less professors and other posts.**
- **Less education and research.**
- **Student number seems to have increased, would have been less. (Could be other reasons)**
- **Half-time evaluation will be performed this year**

Highly gratifying that SKI and industry have secured future undergraduate and postgraduate programmes at KTH, CTH and UU.