

HOW TO BALANCE THE FUTURE IN A SMALL COUNTRY WITH A HUGE NUCLEAR PAST AND PRESENT: THE SWEDISH EXAMPLE

Imre Pázsit
Department of Reactor Physics
Chalmers University of Technology
SE - 412 96 Göteborg
Sweden
imre@nephy.chalmers.se

ABSTRACT

1) The general situation in Sweden

Sweden has by far the most intensive nuclear industry in the world in relative terms; that is, the nuclear generated electricity per capita is the highest in the world. Sweden has 1.5 reactor units per 1 million inhabitants (12 reactor units for 8 million people); this is 50% higher than the same figure in France.

However, according to a national vote (referendum) in 1980, all nuclear power must be phased out by 2010 (the date itself is not fixed by the referendum, only by Parliament). It has to be added that this phasing out is bound to certain conditions on finding alternative sources, which will by all certainty not be fulfilled until 2010.

Another unique feature is that there has never been a nuclear engineering curriculum in Sweden in the strict sense. Core physics, reactor thermal hydraulics, fuel technology etc belong to departments under separate schools: physics, mechanical engineering, chemical engineering, respectively. None of the courses is obligatory (all are elective).

Due to the referendum and other political manoeuvres, research on new forms of nuclear energy is not supported by research councils.

The above facts influence the competitiveness of nuclear engineering programs negatively, despite the fact that at present, the job opportunities are very good.

2) Challenges

We need to raise the level of academic appreciation of nuclear technologies in general, both by decision makers, the general public and prospective students.

We need to provide prospects for an academic or industrial career in nuclear technologies.

We need to organize a nuclear engineering curriculum at the postgraduate level. This is already underway.

3) Mismatch between demand and supply of graduates

For the time being there is a reasonable balance. However, a large shortage of graduates in the not too distant future is possible, especially, if the phasing out of the present reactors starts without the continuation of the nuclear energy program with advanced reactors, accelerator driven systems etc. In that case it will be extremely difficult to maintain expertise in the industry.