



WIN GLOBAL 2008
Sweden Report
Monica Bowen-Schrire

1 Nuclear Overview

a. Energy Policy

Nuclear power accounts for about half of Sweden's electricity production. In 1997, the Social Democrats, the Center Party and the Liberal Party agreed that 2010 would no longer be the deadline for the phase-out of nuclear power and that Barsebäck's two reactors should be shut down. The last of the two Barsebäck reactors was shut down in 2005. Currently, there is no political decision on a deadline for the decommissioning of the remaining Swedish reactors.

b. Nuclear Equipment (Number and Type)

Sweden has 10 power-generating reactor units at three sites in Sweden: Forsmark (3), Oskarshamn (3) and Ringhals (4). Seven of the ten reactors are BWRs and three are PWRs.

The three reactors at Oskarshamn have a total net output of 2215 MW and generate ten percent of Sweden's electricity. In 2007, Oskarshamn produced 15.4 TWh.

In a normal year, Ringhals generates some 28 billion TWh of electricity. This is approximately one fifth of Sweden's total electrical energy consumption. Ringhals will be able to produce an additional approximately 4 TWh per year by 2012. Ringhals increased its capacity by 140 MWe in 2007.

Forsmark generates 24 TWh of electricity per year, which is approximately one sixth of Sweden's total electrical energy consumption. SEK 6 billion is being invested in increased production capacity in Forsmark, with the aim of meeting increased environmental and safety requirements and in order to increase the service life of the reactors. In total Forsmark will be able to increase the output of its three reactors by 410 MW.

c. Safety

Two incidents occurred at Forsmark NPP in July 2006 as a result of deficient defence in depth systems. An action plan, focusing on technical measures as well as measures to improve decision-making, maintenance and modifications and to reinforce safety culture has been implemented to correct these deficiencies.

d. Public Acceptance

The latest opinion poll, commissioned by KSU's Analysis Group in Sweden and conducted in December 2007, showed that the majority of Swedes (52 %) are in favour of replacing the nuclear reactors currently in operation or of building new ones if necessary. 42 % of Swedes are against replacement and new construction.

An opinion poll conducted by the SOM Institute in autumn 2007 shows that confidence in the nuclear industry with respect to information provided on energy and nuclear power is lower than it has been since the Chernobyl accident. One interpretation is that the low confidence is due to the incidents at Forsmark NPP and at the nuclear power plants in Germany and the subsequent media debate.

Polls commissioned by Ringhals NPP and Forsmark NPP show that in 2007, confidence for Ringhals and Forsmark continue to be high. Almost 80 per cent of the people living in vicinity of the plants say that they have a high or very high level of confidence in the plants. However, there has been a decline in the share of those with a very high level of confidence in the plants.

e. Nuclear Waste Management

The Swedish Nuclear Fuel and Waste Management Co (SKB) has been given the task of the safe management and disposal of nuclear waste in Sweden. Sweden has a well-functioning organization for managing various types of radioactive waste. There is a central interim storage facility for spent nuclear fuel, a final repository for LILW, and a specially-built vessel with transport casks and containers for shipping the radioactive waste between the nuclear installations.

Two important components still have to be put in place to complete the nuclear waste management system: a plant for encapsulating the spent nuclear fuel in copper, and a deep repository for depositing the canisters. SKB has also been given the task of building these facilities.

SKB has investigated the deep disposal method, materials and technology for almost 30 years. The proposed method involves encapsulating the fuel in copper and embedding it in bentonite clay at a depth of about 500 meters in the rock.

SKB is currently conducting site investigations, which include thorough investigations of the bedrock from the ground surface, in the municipalities of Östhammar and Oskarshamn. SKB will then build the deep repository on the most suitable of these sites. When the investigations are concluded, applications for permits to site and build the deep repository will be submitted to the authorities. This is a step-by-step democratic process.

2 Nuclear Competences and Nuclear Research

The Swedish Centre for Nuclear Technology (SKC) was established 15 years ago. The purpose of SKC is to provide long-term support to securing knowledge and competence development at an academic level for the Swedish nuclear technology program. This means that SKC will contribute to safe, effective and reliable nuclear energy production, which is an important part of the Swedish energy supply.

SKC is financed by Forsmarks Kraftgrupp AB, Ringhals AB, OKG AB, Westinghouse Electric Sweden AB and the Swedish Nuclear Power Inspectorate (SKI).

SKC has five main aims:

1. To increase the interest among students in nuclear technology education.
2. To ensure that the needs of the organisations financing SKC are met with respect to the recruitment of qualified nuclear personnel. To achieve this, universities will provide basic education, carry out research projects and support the continuing education of engineers.
3. To provide attractive education in nuclear technology.
4. To create strong and internationally recognized research groups within areas that are vital for and unique to the nuclear area.
5. To ensure that universities have the organizations and skills to conduct research.

SKC's activities focus on the following areas:

- Thermal hydraulics
- Core physics
- Core and plant dynamics
- Chemistry
- Material physics and engineering
- Safety and severe accidents
- Reactor diagnostics
- Detectors and measurement
- Safeguards
- Fuel technology

Nuclear research is conducted at a number of universities in Sweden, including Chalmers University of Technology, the Royal Institute of Technology, Stockholm (KTH) and Uppsala University. The nuclear power plant operators also sponsor university research as does the Swedish Nuclear Power Inspectorate.

3 WIN 2007 Main Achievements

The main activities conducted by WIN Sweden are described below.

Work on developing and improving the national website, www.winsverige.se continued in 2007.

Gunilla Johnsson, chairperson of WIN Sweden, was the chairperson of the WIN Global Charter Revision Group. The new charter was presented at WIN Global's Annual Meeting in April 2007.

Together with WIN Finland, WIN Sweden arranged a session at the PIME Conference in Milano, Italy in February 2007.

Local seminars for WIN Sweden members were held in Ringhals and Oskarshamn. In May 2007, Professor Janne Wallenius spoke about transmutation and new nuclear

technology (*Generation V*) at a seminar in Ringhals. In May 2007, a well-attended seminar was also held at OKG NPP in Oskarshamn. The main topic was radiation.

WIN members in Oskarshamn also became involved in the work of the Pink Ribbon for Breast Cancer Association. WIN in Oskarshamn developed information materials on how radiation is used to diagnose and treat breast cancer.

Contacts were made during the year with politicians.

WIN Sweden held its Annual General Meeting in Forsmark in October 2007. The meeting was sponsored by Forsmark NPP and the Swedish Nuclear Fuel and Waste Management Co (SKB). Monica Bowen-Schrire replaced Gunilla Johnsson as chairperson of WIN Sweden and Malin Löwe replaced Bodil Berntsson as secretary of WIN.

WIN Sweden has 179 members (May 2008).