



Summary and recommendations

Audit background

Up to now the costs in Sweden for dismantling, research and management of nuclear waste and spent nuclear fuel have amounted to about SEK 43 billion. In 2016 Svensk Kärnbränslehantering AB (SKB) estimated the remaining costs to be about SEK 106 billion. The Nuclear Waste Fund currently holds capital of about SEK 65 billion and the financial guarantees issued in the period 2015–2017 total about SEK 30 billion. The financing system thus covers large costs and according to the preparatory work that led to the legislation, the risks of the State having to pay for management of spent nuclear fuel and nuclear waste must as far as possible be minimised.

The central government financing system for management of nuclear waste must cover costs for decommissioning and waste management until the 2080s, according to SKB's timeframe. The system is based on the licence-holders paying in nuclear waste fees to the Nuclear Waste Fund. The licence-holders must also issue financial guarantees for approved fees decided that have not yet been paid in (funding amount) and for

unplanned events (supplementary amount). Decisions on the size of nuclear waste fees and guarantees are based on the cost estimates that the licence-holders must present.

Svensk Kärnbränslehantering AB is jointly owned by the licence-holders that are the reactor owners and every third year it draws up cost estimates on their behalf. The calculations are examined by the Swedish Radiation Safety Authority, which makes proposals to the Government on the size of fees and guarantees for one three-year period at a time. The Government then determines fees and guarantees for the reactor owners. The Swedish Radiation Safety Authority determines fees and guarantees for other licence-holders liable to pay fees based on their submitted cost estimates. The National Debt Office examines the guarantees to be issued and approves guarantees for other licence-holders. The reactor owners' guarantees are approved by the Government after a statement by the National Debt Office. The difference between estimated future costs and the funds committed to date in the Nuclear Waste Fund are to be covered partly by the continued fees from the licence-holders to the Fund and partly by return on the assets in the fund. The licence-holders are entitled to receive compensation from the Fund for some specific costs.

The three-year periods of the financing system are to ensure that the system is predictable and robust, in that changes in estimated costs and revenues are identified every third year and the system is then balanced by means of decisions on fee levels and financial guarantees for the subsequent period. The fee decisions are to be based on well-founded estimates of future costs and expected electricity production.

Purpose and audit issues

The purpose has been to audit whether the risk assessment of the State becoming liable to bear costs for management of the residual products of nuclear power is well-founded and reported in a co-ordinated and transparent manner. This is important for minimising the State's risk. Consequently, within the framework of the audit, attention is drawn to further opportunities to reduce this risk.

The audit covers the following six questions:

1. Are there organisational obstacles in terms of responsibility and working methods to reporting a co-ordinated picture and assessment of the risks of large central government expenditure?
2. Does central government use all significant opportunities to ensure that the basis for calculation is well-founded?
3. Are there further significant opportunities to reduce the State's risk?

4. Are the calculations by various actors coordinated to give a coordinated picture of the risks in the financing system?
5. Are costs and revenues in the financing system transparently reported?
6. Are uncertainties in the calculations transparently reported?

Audit findings

The Swedish NAO's overall conclusion is that there are major uncertainties and lack of agreement as to how extensive future costs and revenues in the financing system may be.

The financing system has probably been underfinanced and the State's financial guarantees insufficient.

The Government and responsible agencies have not made any coordinated assessments of the risks or reported them to the Riksdag. This makes transparency and decisions concerning the financing system more difficult.

The Swedish Radiation Safety Authority and the National Debt Office have not used their opportunities to decide on regulations and risk-limiting conditions to mitigate the State's risk.

The deficiencies should be seen in the light of the fact that incorrect estimates of individual items in the system may amount to tens of billions of kronor. The fact that conditions governing the financing system may change rapidly underlines the importance of correcting the deficiencies.

A complicated system with a large number of actors

The Government and Government Offices have the overall responsibility for the financing system. The Swedish Radiation Safety Authority proposes nuclear waste fees and the guarantee levels for reactor owners, but the Government sets the final level after the consultation on the Radiation Safety Authority's proposals. The ministries do not perform their own calculations for the financing system on which to base the Government's decisions concerning the level of nuclear waste fees and guarantees.

Several agencies have tasks within the financing system but no agency has overall responsibility for the system. In 2013 the Ministry of the Environment and Energy stressed the need for a coordinated risk analysis for the entire system. The Government decided in August 2017 that the responsibility and activities of the Swedish Radiation Safety Authority in the financing system should be transferred to the National Debt Office. The Government considers that the financial guarantee for the State will be

further improved by this. The Swedish NAO considers that the more coordinated agency responsibility can also provide better conditions for cohesive analysis and reporting of risks in the financing system. The improved conditions should then be utilised by the Government, for example by tasking the National Debt Office with making coordinated risk analyses and reporting them to the Government.

Major uncertainties and lack of agreement on the size of future costs and revenues

There is significant disagreement between the Swedish Radiation Safety Authority and the nuclear power companies concerning the size of future costs in the financing system, and how they should be calculated. This applies for example to the assumptions on future cost increases for various input goods and input factors (external economic factors) that affect the cost calculations. The Swedish Radiation Safety Authority's estimate shows that the basic cost may be SEK 15 billion higher than the figure reached by the nuclear power industry in its latest cost estimate (*Plan 2016*). The Swedish NAO considers that transparency would increase and conflicts decrease if the calculations were governed by regulations, especially considering that the nuclear power companies have anyway not followed the guidelines issued by the Swedish Radiation Safety Authority.

The costs estimated by SKB have increased for each three-year calculation, which shows the uncertainty of the calculations. On behalf of the Swedish Radiation Safety Authority researchers have estimated that the supplementary amount may have been underestimated by as much as SEK 10–20 billion.

Climate policy decisions and other social changes increase the future uncertainties in the financing system. This underlines the need for careful calculation of the financing and supplementary amounts and for setting them at a level that corresponds to the risks. At the same time, in October 2017, the Riksdag decided to increase the investment mandate for the Nuclear Waste Fund and the supplementary amount will act as a risk buffer when the Nuclear Waste Fund increases its investment risk. The Swedish NAO considers that this means that the level and guarantee for the supplementary amount will be extra significant for enabling the financing system to ensure that future costs can be covered.

The National Debt Office has proposed an alternative model of responsibility in the financing system that means that the nuclear power plants' parent companies take over financial responsibility from the reactor companies. The State would then only need to monitor the financial and economic strength of the parent company. The Swedish NAO

considers that the proposal should be further investigated since the question is very complicated.

Limited impact for legislative amendments in the period 2018–2020

In October 2017 the Riksdag decided on a number of amendments to the law governing the financing system, and most of the changes came into force on 1 December 2017. The changes include (as mentioned above) the extension of the Nuclear Waste Fund's investment rules to allow the Fund to also invest in shares or participations in companies. It is to be possible to make use of the financial guarantees for financing and supplementary amounts already before the fund assets linked to the relevant licence holders have been consumed.

The Swedish NAO notes that the proposed amendments have not achieved full impact in the Swedish Radiation Safety Authority's proposed nuclear waste fees and financial guarantees for the fee period 2018–2020 and will only be possible to apply fully for the decision on the period 2021–2023.

No coordinated analyses in the agencies' and Government's reporting

There is no coordinated description of the risks that the State may be forced to pay for decommissioning and treatment of nuclear waste. The Swedish NAO considers that there is a need for more general risk analyses of the financing system, summarising total revenues and expenses as well as illustrating various risks.

The Government's reporting to the Riksdag on the financing system in budget bills, other bills and the *Central Government Annual Report* does not address the various risks in the financing system.

The Government's decision on levels of nuclear waste fees and financial guarantees is based on political considerations that on repeated occasions have deviated by tens of billions compared with the Swedish Radiation Safety Authority's estimate.

In practice the financing system has run a deficit for much of the time the current system has been in force. For a long time, there has also been uncertainty as to when the guarantees for financing and supplementary amounts could be made use of by the State to pay for necessary measures for dealing with nuclear waste. It is probable that the State's guarantees have been too low, at least since the current financing system came into force in 2008, but these risks have not been analysed or reported to the Riksdag.

The future costs are very high and must be financed for a long time in the future. At the same time there is no consensus on costs among the actors concerned. The financial guarantees for financing and supplementary amounts will also be more central in the financing system in that the Nuclear Waste Fund's extended investment rules will allow higher risk investments.

The Swedish NAO considers that the Government should report regularly on the development of risks in the financing system to the Riksdag. The Government could do this through performance communications, more detailed reporting in the budget bills or through more extended reporting in the Central Government Annual Report.

Finally, the Swedish NAO notes that to date the agencies have not used all their tools, specifically the right to issue regulations and risk-limiting conditions, in order to guarantee transparency in SKB's basis for calculation and to minimise the risk in the guarantees.

Recommendations

In the light of the lack of coordinated analysis and reporting of the risks in the financing system and to further reduce the State's risk, the following recommendations are given.

To the Government

- Ensure that the total risks for the State can be assessed. To achieve this, the Government needs to give one agency the formal overall responsibility for analysis and assessment of risks in the financing system. The responsibility should include obtaining information from the other actors and compiling the results so that the total risks for the State can be assessed. When the Swedish Radiation Safety Authority's responsibilities for nuclear waste financing are moved to the National Debt Office in 2018 it may be appropriate to give the National Debt Office this overall responsibility.
- Develop reporting to the Riksdag of total risks in the financing system. Regular reports on the full picture of the system, in which questions concerning the balance in the system, the State's total risk on the basis of financial guarantees issued and the extended investment rules for the Nuclear Waste Fund are included, would increase transparency and insight into the system. The reports should also include information in case the Government's decision on nuclear waste fees and guarantees differs materially from the Swedish Radiation Safety Authority's assessment. This may be done through more detailed reporting in the budget bills, in performance

communications to the Riksdag, in the *Central Government Annual Report* or through a combination of such reporting.

- Investigate whether the parent companies instead of the reactor companies should bear the primary payment responsibility. The current arrangement, where the reactor companies and not the parent companies have the primary responsibility, means that the State must bear any further risk that may arise if the guarantees for which the reactor companies are responsible are valued too low. This part of the total risk could be reduced if the arrangement was that the parent companies are accountable, regardless of the amount.

In the opinion of the Swedish NAO it is reasonable that cost estimates in the financing system use the same reference bases and similar assessments as in other central government activities.

- Have an agency with expert knowledge of forecasting determine the external economic factors (EEF). This applies in particular to the macro-economic factors (EEF1–4) that have a major impact on cost estimates.

To the Swedish Radiation Safety Authority and the National Debt Office

Make active use of the right to issue regulations and the right to issue risk-limiting conditions as well as other tools that they have access to under financing legislation. This would increase transparency in the calculations and reduce the State's risk.