

Sweden: Nuclear Waste Fund deficits prompt government action

Author: Charly Hultén – WISE Sweden

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Nuclear Monitor last reported on the chronic deficit in the Swedish Nuclear Waste Fund in 2014 (NM #796; see also #751 and #736).

In the interval since 2014 interwoven streams of events – among regulatory agencies, in government policy, in the energy market – and the declining vigor of nuclear power companies have combined to arouse a great deal of uncertainty about the ability of the Waste Fund to cover costs. Notable among these events are:

- the newly-appointed chair of the Fund sounded an 'SOS' in June 2015.
- in 2015, two power companies announced plans to shut down a total of four reactors.
- in June 2016, the Minister of Energy managed to secure a multiparty Energy Agreement, which included lifting a tax on nuclear power capacity.
- in 2017, frustration with a lack of transparency regarding the cost estimates and prognoses offered by the industry-owned nuclear waste management company, SKB AB, reached new heights – not only among environmentalists (as usual), but in central institutions like the National Debt Office and the National Audit Office.

In June 2017 the government proposed changes in the law and statute governing financing of the management of Swedish nuclear waste; in December the proposals were approved in the Riksdag. Although the dust is still settling, we now have something to report.

The fund

The Nuclear Waste Fund was founded in 1982. The accumulated funds are intended to cover all aspects of Swedish nuclear waste management, from storage of fuel waste to dismantling of reactors and storage of their components. All R&D for proposed waste management processes, and public vetting of the proposals (still under way) are financed out of the Fund, as well.

The fundament in the scheme for financing waste disposal in Sweden is the so-called 'polluter pays' principle. That is, the cost of waste disposal as outlined above is to be covered by the industry that generates the waste. (That the fees are immediately passed on to end consumers is not considered a problem; instead, it is seen as an incitement to economize on the use of electricity, while stimulating the market for more efficient electrical devices.)

Today, some call the presumption that power companies should act in the public interest "naïve", but one should recall that the situation was quite different back in the 1980s, when the scheme was set up. Then, all nuclear power companies were Swedish-owned and had a substantial element of public sector ownership, i.e., national or local government held controlling interest. Today, two of the three companies, Fortum and Uniper (formerly E.On), are foreign-owned; all, even state-owned Vattenfall, operate for profit. 'Corporate interest' is a relatively new factor in the equation.

The fee

The chief sources of financing are two: a per-kWh fee on nuclear energy generation, and securities (collateral) that are required of reactor operators to cover shortfalls in fee revenue should "unplanned events" impact on the amount of power generated. Most criticism concerns the fees. Estimates of the status of the Fund (the influx of assets in relation to estimated costs) are revised at three-year intervals. They are based on recommendations presented to the Government by the Swedish Radiation Safety Authority (SSM), after consultation with the National Audit Office and the National Institute of Economic Research, a body within the Ministry of Finance.

For many years the fee remained stationary at SEK 0.01/kWh. Estimates presented in 2011 showed a sizeable deficit, however, and in 2012 the fee was raised to SEK 0.02, then raised again to SEK 0.04 in late 2014. The current proposal for 2018-2020 is an average fee of SEK 0.05/kWh. (Average, because some operators will also be paying for the reactors they have shut down ahead of schedule. The actual lifetimes for OKGs two ex-reactors are short of their expected lifetimes by 2.1 and 21.5 years, respectively, so the remaining OKG reactor will now be charged a fee of SEK 0.064/kWh in 2018-2020.)

Payments into the fund will continue as long as nuclear power is generated. Costs will continue to be generated long after nuclear power has ceased to be, which means that

total cost estimates, too, need to extend maybe another 40-50 years beyond the theoretical 40- to 50-year lifetime that applies to the reactors. Calculating the status of the Fund that far into the future is difficult.

Chronic and growing deficits

The reasons for the deficit are a mixture of politics, macroeconomics, finance and 'corporate interest'. Some examples:

- *Politics*: Politics plays in when the Government sets the sums to be paid. These have most often been lower than SSM had proposed. As the National Audit Office recently pointed out, government decisions have meant "tens of billions less than what the regulator, SSM, considered necessary". (A kind of fiscal corporate interest may also play a part in this; Vattenfall's profits go straight into the Treasury.)
- *Macroeconomics*: Electricity prices have been low in recent years, which affects the companies' ability to pay.
- *Finance*: Low interest rates have impacted the market value of bonds in the Fund.
- *Corporate interest*: To date, SKB AB's production predictions and prospective cost estimates supplied by the industry – the basis for the regulator's proposals – have missed the mark. Historical analysis reveals that power generation has consistently been overestimated, future costs underestimated.

But another key factor now on the table is a less than penetrating analysis that patently inaccurate estimates and predictions from the industry have been subjected to over the years. More on this below.

There are two prime consequences of underfinancing. One is obvious – there will not be enough money in the fund on the Day of Reckoning, leaving taxpayers to foot the bill. But, secondly, setting the fee too low means a *de facto* state subsidy to nuclear power as long as the reactors are online. University economists second Greenpeace and other non-governmental groups in pointing this out.

Awareness, diagnosis ...

Fears of shortfalls and accusations of "hidden subsidies" in the system have been voiced for well over a decade now, but the latest round started in mid-2013, when SSM and the National Debt Office were unable to agree on a joint recommendation about a revision of the law and statute governing the Nuclear Waste Fund. These included a recommendation to raise the fee. The separate recommendations that they submitted to the Government lay, seemingly unattended to, until December 2014, when the Government announced an 85% hike in the fee, from SEK 0.022/kWh to SEK 0.04. Even this rise was not enough, according to SSM's analyst: "If an estimate for the coming period were to be made today, the figure would land at just under SEK 0.06," he commented to the press.

Crisis awareness regarding the deficit spread to broader circles in mid-2015 when Dan Barr, newly appointed chairman of the Waste Fund, sounded the alarm in Sweden's leading business daily: The Fund is an estimated 11 billion Swedish crowns short (US\$1.34 billion; €1.12 billion); something has to be done about it! Mr Barr's call came amidst the decisions of two reactor owners to shut down two reactors each.

Estimates of the shortfall vary widely, from the SEK 11 billion Dan Barr points to and upwards. One main 'X factor' is the cost of dismantling reactors. SKB estimates the cost of dismantling and removal of Sweden's 12 reactors at SEK 23.7 billion. The estimate is significantly lower than estimates in other countries, and lowest in all of Europe. Furthermore, the costs will be incurred late in the overall process, decades into the future, which amplifies the uncertainty.

The only party that seems not to have recognized the seriousness of the situation is industry-owned SKB AB, who as late as 2016 declared the system to be "robust". Although a full-fledged 'blame game' was under way at the time, everyone else agreed that the nub of the problem lay in the quality of the data the company has provided over the years. Even SSM, known to be sympathetic to the

waste management project in most respects, complained of a lack of clarity surrounding SKB's estimates.

SKB has refused to reveal the models they use to arrive at their calculations, despite the regulator's requests. Access to the models is important. An example: SKB's cost estimates in 2013 were 57% higher than the figure they presented in 2007. Without knowing how the figures are arrived at, it is impossible to evaluate them or to make any well-founded assumptions about future cost trends.

SSM itself has come under fire for not vetting the industry's estimates more rigorously. Some point to the fact that by statute SSM has the power to force SKB to reveal their methods, but has chosen not to use it. Government agencies like the National Debt Office and the National Audit Office and academics point out that SSM lacks the auditing competence required to deal with the long-term and complex projections involved.

Another area where the regulator is seen to have favored the industry concerns the presumed reactor lifetimes, which form the basis for calculating payback rates. The law has stipulated a maximum reactor lifetime of 40 years; SKB AB uses 60 years as their base. SSM itself now uses 50 years. SSM has never accepted SKB's use of 60 years, but even though the authority has had the law and statutory muscle on its side, it has not persuaded the company to change its ways.

This practice is questioned by environmentalists and economists alike. Partly as a hidden subsidy, partly because of doubts that Swedish reactors will remain online that long. As Sweden's largest environmental organization summed up its concerns in 2014: "Stricter safety requirements may render new investments unprofitable, measures to remedy operational problems may prove unaffordable, or a new reactor accident somewhere may cause continued operation of Swedish reactors to be called into question."

Then, we have the documented record of Swedish governments, regardless of political hue, further whittling down the fee proposed by the Authority. Most recently, for the period 2018-2020, by 19% in relation to the Authority's draft proposal. This prompted Auditor General Ingvar Mattson to comment in a December 2017 media release: "The Government has on repeated occasions set nuclear waste fees and economic guarantees at levels that are tens of millions [SEK] less than the amounts the Radiation Safety Authority deemed necessary, and [our] analysis shows that the financing system in all probability is underfinanced."

Government 'beneficence' toward power companies arises out of a combination of the returns state-owned Vattenfall produces and external factors. Lessons from the Fukushima disaster have entailed costly improvements in reactor cooling facilities. Meanwhile, electricity prices fell sharply early in the period and are still low. Some alternative, renewable sources of electrical power are now producing at prices nuclear power companies cannot beat. Because of these (and other) factors, Sweden's nuclear park has shrunk by 40%. At the same time, maintaining a sufficient volume of nuclear production is key to maintaining the balance in the Nuclear Waste Fund. In short, politicians' fear of squeezing the industry too hard is perhaps understandable. Yet, the fact remains that unless the Fund is in balance, taxpayers will end up having to fill the gap.

One external factor not related to either energy production or energy policy, but which has eaten into Fund's solidity, is a decline in the market value of the Fund's assets. To date, the Fund has been authorized to invest in bonds and certain other guaranteed interest-bearing securities. Several institutions have pointed to the Fund's vulnerability to trends in the finance market as a weakness in the system that needs to be corrected.

... and therapy?

The Government has responded to the crisis by taking several drastic (by Swedish standards) measures.

In August 2017 the Government transferred primary responsibility for the financing of the Nuclear Waste Fund from the Swedish Radiation Safety Authority to the National Debt Office.

In October 2017, the Riksdag approved a government bill that amends the pertinent law and ordinances in the following respects:

- The reactor lifetime to be used as the basis for waste fee calculations is extended to 50 years, in line with SSM's recommendation.
- Rules for estimating costs and prospective fee payments to the Fund have been specified more closely with a view to increasing transparency, in line with advice from the National Debt Office, the National Audit Office and the National Institute of Economic Research.
- The Nuclear Waste Fund may invest up to 40% of its holdings in common stocks, a request of the Fund. The increased risk that this change implies will be compensated by raising the amount of securities required of reactor owners. (Professor Göran Finnveden, a former board member of the Fund, offers two suggestions in this regard: that the Fund's investments should be long-term, which, he says, would both yield higher returns and reduce the risk to the Treasury; and long-term investments made in "green bonds and similar securities" would have the added advantage of enhancing the sustainability of the Swedish economy, one of the stated aims of government policy.)

No one can say with any certainty that these changes will be enough.

Two issues remain outstanding.

First, a proposal to transfer the responsibility to pledge securities from the reactor owners to their parent companies is under consideration. (Nuclear operators in Sweden may be likened to 'shell companies' in the sense that they are provided with only enough capital to keep their reactors in working order; profits are passed on to the parent company.) The Government has said it will present its conclusions in Spring 2018.

A second outstanding issue is the need for a comparative study of the costs of decommissioning reactors performed by a third party, i.e., a body that stands free of the waste management company and reactor owners; this issue is at least on the table.

For decades, the nuclear establishment was a Swedish 'holy cow' and, as such, was not subjected to incisive scrutiny. Not so today. The debate on the deficit in the Nuclear Waste Fund these past two years cuts sharper and deeper than ever before.

Principal sources (all in Swedish):

- MKG Web news 25 Oct 2017 and 17 Dec 2017.
- National Audit Office, Press material, 7 Dec 2017
- National Debt Office, Remissvar _ Strålsäkerhetsmyndigheten förslag på kärnavfallsavgifter, finansierings- och kompletteringsbelopp för 2018-2020 (SSM2016-5513-13) 28 augusti 2017 (Solicited comment on preliminary report)
- Radiation Safety Authority Press material, 30 Jun 2017
- Förslag på kärnavfallsavgifter, finansierings- och kompletteringsbelopp för 2018-2020. Report SSM2016-5513-66, 19 oktober 2017, pp 80ff.
- Regeringen Prop. 2016/17:199 om finansiering av kärnavfallsntering (Government Bill)