



Facts about the Nuclear Waste Fund 2016

Kärnavfallsfonden, c/o Kammarkollegiet  
P.O.Box 2218, SE-103 15 Stockholm  
Phone: +46 8-700 08 00  
Fax: 08-20 38 81  
e-mail: [karnavfallsfonden@kammarkollegiet.se](mailto:karnavfallsfonden@kammarkollegiet.se)  
Internet: [www.karnavfallsfonden.se](http://www.karnavfallsfonden.se)  
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# Highlights of 2016

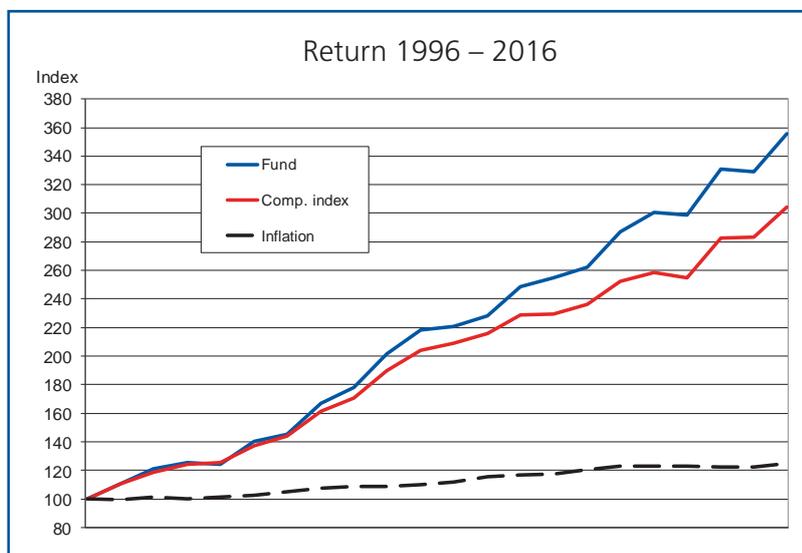
- The rate of return was 5.8 percent, which was 0.8 percentage point higher than the comparison index. Since the inflation rate was 1.7 percent, the real rate of return was 4.1 percent.
- The Fund capital increased by SEK 5,333 million, amounting to SEK 64,618 million at the end of the year.
- Fund management costs amounted to 0.018 percent of the Fund capital at the end of 2016, of which 0.012 percentage point was for asset management and 0.006 percentage point was for administration.

All figures in the following are based on measurement of the Fund's investments at fair value (market value).

# Return 1996 – 2016

The following graph shows the change in value of SEK 100 that was paid into the Nuclear Waste Fund on 1 January 1996. For the sake of comparison, the change in value of SEK 100 with the comparison index return is also shown, along with how much has been used to compensate for inflation during the period.

- SEK 100 in the Nuclear Waste Fund has grown to SEK 356.
- SEK 100 invested at the comparison index has grown to SEK 304.
- SEK 25 of the return has been used to compensate for inflation.



The following table shows the Fund's return, inflation per year and an average per year for the whole period.

Year	Nominal return (%)	Comparison index (%)	Active return (%)	Inflation (%)	Real return (%)
1996	10.6	10.8	-0.2	0.1	10.5
1997	9.9	7.4	2.5	1.9	8.0
1998	3.3	4.7	-1.4	-0.6	3.9
1999	-0.8	-0.6	-0.2	1.2	-2.0
2000	12.9	9.8	3.1	1.4	11.5
2001	3.5	4.7	-1.2	2.9	0.6
2002	14.9	11.8	3.1	2.3	12.6
2003	6.7	5.8	0.9	1.4	5.3
2004	13.2	11.2	2.0	0.4	12.8
2005	8.2	7.5	0.7	0.9	7.3
2006	1.2	2.5	-1.3	1.6	-0.4
2007	3.3	3.3	0.0	3.5	-0.2
2008	8.9	6.0	2.9	0.9	8.0
2009	2.5	0.0	2.5	0.9	1.6
2010	3.0	3.0	0.0	2.3	0.7
2011	9.4	9.7	-0.3	2.3	7.1
2012	4.6	2.5	2.1	-0.1	4.7
2013	-0.6	-1.4	0.8	0.1	-0.7
2014	10.7	10.7	0.0	-0.3	11.0
2015	-0.5	0.4	-0.9	0.1	-0.6
2016	5.8	5.0	0.8	1.7	4.1
<b>Average per year<sup>1)</sup></b>	<b>6.1</b>	<b>5.4</b>	<b>0.7</b>	<b>1.2</b>	<b>4.9</b>

<sup>1)</sup> Calculated as the geometric mean of the annual values.

The **nominal return** consists of the sum of realized and unrealized value changes in the Fund's investments as well as interest received (including inflation compensation on index-linked investments).

The **comparison** index has been

70% OMRX REAL, 15% Stockholm Stock Exchange's bond index all total and 15%

Money Market Index 30 days from 1 Jan. 1996 until 30 Sept. 2003.

100% OMRX REAL from 1 Oct. 2003

30% OMRX REAL and 70% OMRX BOND from 1 Jan. 2009

30% OMRX REAL, 50% OMRX TBOND and 20% OMRX MORT from 1 June 2009

30% OMRX REAL, 35% OMRX TBOND and 35% OMRX MORT from 1 Aug. 2009

30% OMRX REAL and 70% OMRX BOND from 1 Jan. 2011.

30% OMRX REAL and 70% OMRX BOND from 1 Jan. 2014

The index includes index-linked and fixed-income treasury bonds.

The consumer price index reported by SCB for December, the 12-month change in percent (rate of inflation), is used as a measure of **inflation**.

The **active return** relative to the index consists of the nominal return less the index return and shows how successfully the Fund has been managed in relation to the index.

The **real return** consists of the nominal return less inflation.

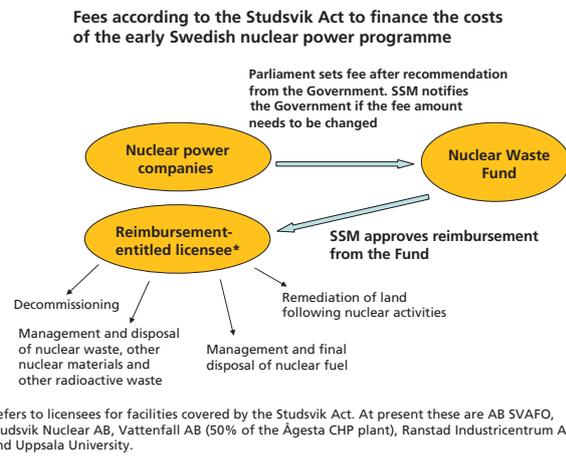
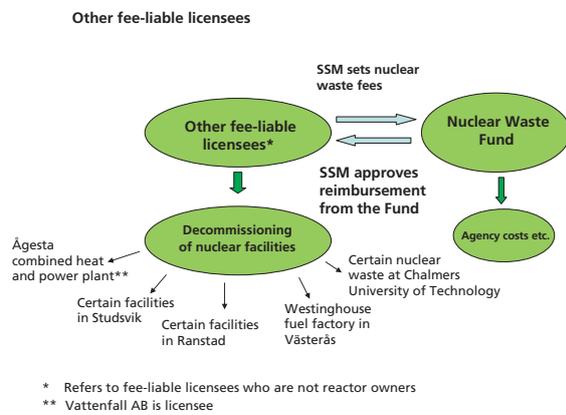
# The financing system

In the early 1980s the Riksdag (Swedish parliament) devised a special system for financing of the costs for safe future management and disposal of the spent nuclear fuel and decommissioning and dismantling of the nuclear power reactors.

Under this financing system, the holder of a licence to own or operate a nuclear facility that gives or has given rise to residual products pays a special fee to the Swedish state. The fee is levied at a given rate per kWh of electricity delivered by the nuclear power plants. Since 2008 the fee can also be determined as an amount in kronor, to be paid for example by a fee-liable licensee who no longer delivers nuclear energy.

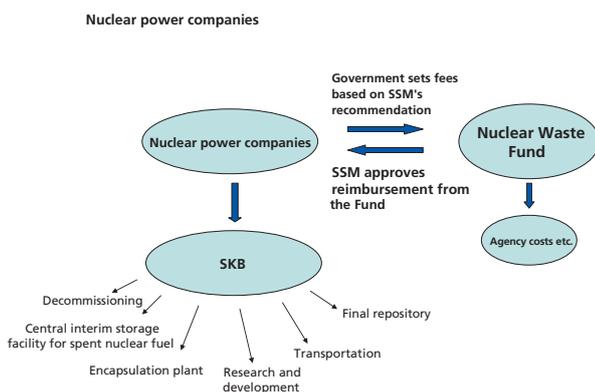
For the first 14 years the fees were deposited in interest-bearing accounts at Riksbanken (the Swedish central bank). Since 1996 the funded assets have been held by the Nuclear Waste Fund, which is a government authority. The Nuclear Waste Fund has its own Board of Governors but no employees. Kammarkollegiet performs administrative and capital management services for the Board. The Government decides on the size of the fee, based on a recommendation by the Swedish Radiation Safety Authority (SSM). In certain cases, SSM determines the fees. SSM and, in certain cases, the Government approve disbursements from the Fund. The Nuclear power companies have formed the jointly owned company Svensk kärnbränslehantering (Swedish Nuclear Fuel and Waste Management Co), SKB, to manage and dispose of the radioactive waste.

The main features of the financing system are illustrated in the following figures.



Each nuclear power company and other fee-liable licensee is fully responsible for all its costs, even if the fees accumulated in the Fund should not be sufficient. The party responsible for paying the nuclear waste fee must therefore provide a guarantee to the state for the costs the fee is intended to cover, but which are not covered by the paid-in and accumulated fees.

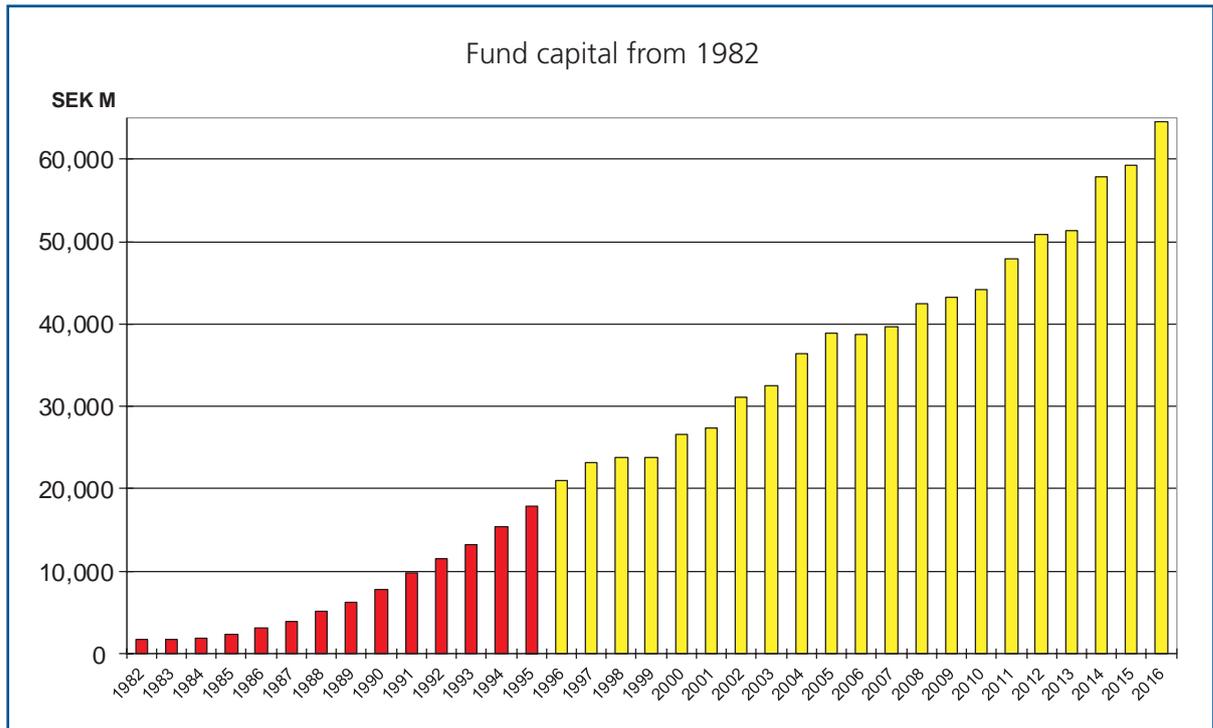
The principle for the financing of the disposal of nuclear waste is that the nuclear power industry should be liable for the costs. If it turns out that a reactor owner cannot pay, and Fund assets and guarantees are insufficient, the state – and thereby the taxpayers – will in the end have to contribute the necessary funds. As of 1 January 2008, the state is entitled to charge the nuclear power companies a risk fee for this risk. So far the Government has not decided on such a risk fee.



# Growth of the Fund

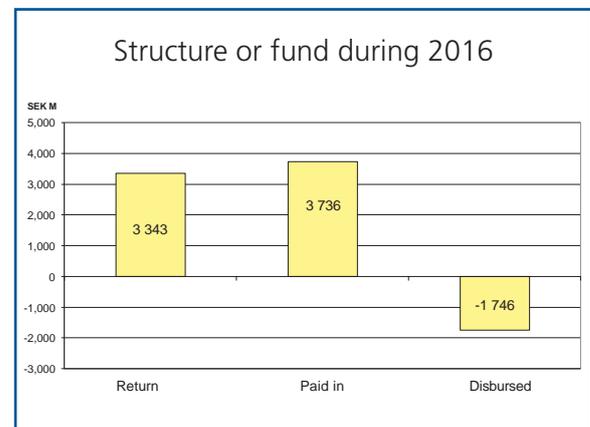
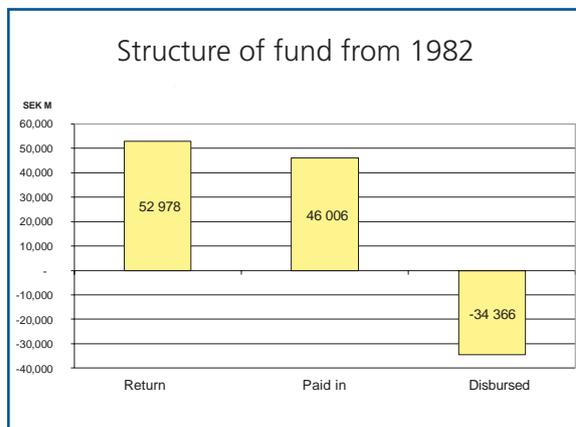
## Amount of capital

The Nuclear Waste Fund was started in 1982. The current management model was introduced in 1996. The size of the Fund at the end of each year since then is shown in the following bar graph. The red bars show the years when the fees were deposited in an interest-bearing account at Riksbanken (the Swedish central bank).



The following figure shows how the current Fund capital has been built up by accumulated payments, disbursements and return since the start.

During 2016, the value of the Fund increased by SEK 5,333 million. The following figure shows how the increase has been built up by payments, disbursements (including the Fund's operating expenses) and return during the year.



### Distribution of Fund capital per payer

According to law, the holder of a licence to own or operate a nuclear facility that gives or has given rise to residual products shall pay a nuclear waste fee. The paid-in fees are earmarked for each payer and may only be used to cover the costs attributable to that particular payer.

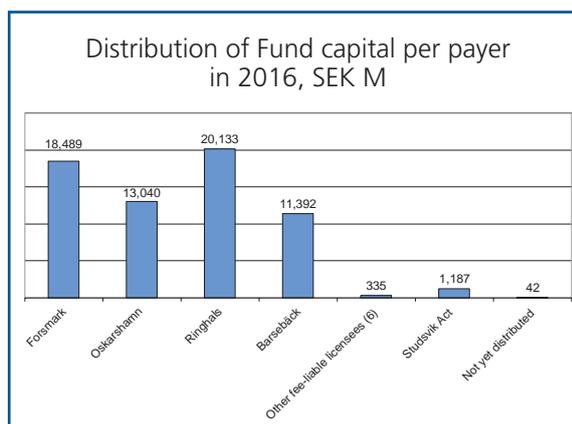
Prior to 1 January 2008, this fee liability applied to the holder of a licence to own or operate a nuclear power reactor and was limited to the time the reactor is in operation. The fee-liable reactor owners are Forsmarks Kraftgrupp AB, OKG AB (Oskarshamn) and Ringhals AB. In addition, Barsebäck Kraft AB is a fee-liable licensee.

Since 2010, five other fee-liable licensees also pay fees to the Fund. The five other fee-liable licensees are Chalmers Tekniska Högskola AB, Westinghouse Electric AB, Vattenfall AB Ågesta, Ranstad Mineral AB and Studsvik Nuclear AB. Starting on 1 July 2016, Cyclife Sweden AB is also one of the other fee-liable licensees. More than 69 percent of Studsvik Nuclear AB's Fund share has been transferred to Cyclife.

Fees paid in pursuant to the Studsvik Act are also managed in the Nuclear Waste Fund. Up until 2017, the nuclear power-producing companies must also pay a special fee to finance the decommissioning of the research reactors in Studsvik and certain other costs for the early Swedish nuclear power programme.

If the paid-in fees for a reactor owner or other fee-liable licensee should not suffice to cover the payer's costs, fees paid in by another reactor owner may not be used to make up the difference. If Fund assets are left over for a fee-liable licensee after all costs relating to that fee-liable licensee have been paid, these surplus fees must be paid back to the payer. This repayment obligation does not apply to Studsvik fees, however. Any surplus Studsvik fees in the Fund go to the state.

The distribution of the Fund capital at 31 December 2016 is shown in the following chart.

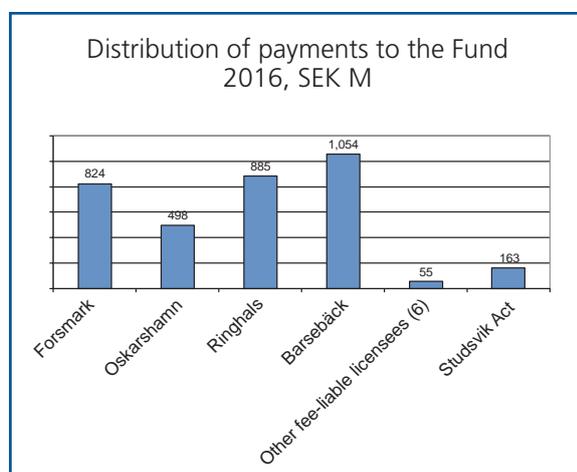


The method for keeping track of each payer's share of the Nuclear Waste Fund is the same as that employed for mutual funds. This method is described in greater detail in the Annual Report's Income Statement.

### Payments to the Fund in 2016

The fees for the reactor owners are calculated in relation to the energy that is delivered and set at a certain number of öre (1 öre = SEK 0.01) per kWh delivered. After 1 January 2008, the fee can also be set at a given amount in kronor, to be paid for example by a fee-liable licensee who no longer delivers nuclear energy or is a so-called other fee-liable licensee. The fee is differentiated for each fee payer and is calculated so that the total fees for each fee-liable licensee cover that particular payer's total costs. The sizes of the fees are shown in the presentation of results in the formal annual report.

The fee payments in 2016 amounted to SEK 3,736 million. They are distributed as shown by the following chart.



## Disbursements from the Fund 2016

The nuclear waste fee is used to cover

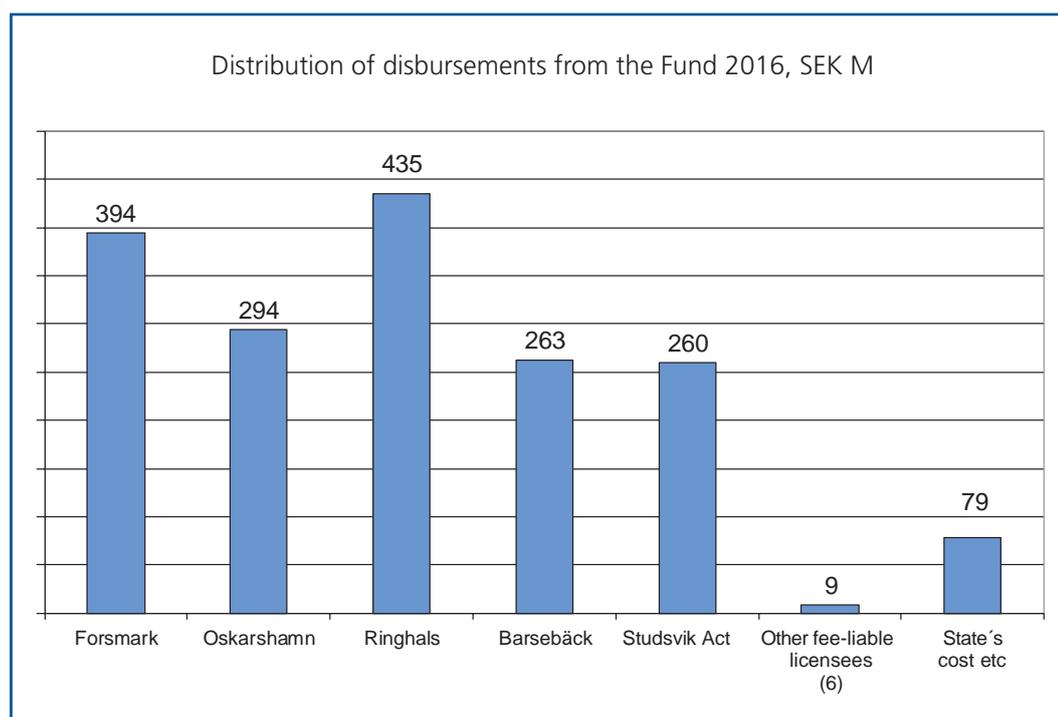
- the licensees' costs for safe management and disposal of waste products,
- the licensees' costs for safe decommissioning and dismantling of nuclear facilities,
- the licensees' and the state's costs for the research and development needed for safe management and final disposal of residual products as well as decommissioning and dismantling of facilities,
- the state's costs for management of the Fund assets and examination of questions concerning fees, disbursement of funds etc.,
- the state's costs for supervision of the decommissioning and dismantling of nuclear facilities,
- the state's costs for examination of questions concerning final disposal and monitoring and control of the final repository,
- the licensees', the state's and the municipalities' costs for information to the public in matters relating to management and disposal of spent nuclear fuel and nuclear waste, and
- costs for support to non-profit organizations for efforts in connection with questions concerning siting of facilities for management and disposal of spent nuclear fuel.

Joint costs, such as regulatory costs etc., are allocated among the fee-liable licensees.

The special Studsvik fee will be used to cover the costs of the early Swedish nuclear power programme.

Disbursements in 2016 amounted to SEK 1,734 million.

They are distributed as shown by the following chart.



# Capital management

## Goal

According to the Government's regulations, the Fund must be managed to ensure a good return and satisfactory liquidity.

In its investment policy, the Board of Governors has formulated its return goal in the following manner:

“The goal is – taking into account the restrictions imposed by the Government on the investment activities – to achieve the highest possible real return on the managed capital.”

## Investment rules

According to the Government's regulations, the Nuclear Waste Fund's investment options were restricted at the start in 1996 to deposits in an account at the National Debt Office. The deposits could, however, be made on conditions that reflected the terms for index-linked and fixed-income treasury bonds.

In 2002 the investment rules were changed so that the option of deposits with the National Debt Office on terms similar to those for treasury bonds was abolished and replaced with investments on the market for treasury bonds.

In 2009, the investment rules were changed to permit investments in covered bonds as well. Covered bonds are mortgage-backed bonds issued by housing finance institutions that are secured by a specially identified pool of assets consisting as a rule of mortgages which the institution has accepted as collateral for its own lending.

This means that the Fund has the following investment options.

- Sight deposits in accounts at the National Debt Office, with nominal return based on the repo rate.
- Short-term deposits at a fixed interest rate at the National Debt Office with an investment period that can vary between one month and one year.
- Investments on the market in treasury bills, fixed-income bonds or index-linked bonds issued by the National Debt Office.
- Investments on the market in debt instruments issued in accordance with the Covered Bonds Issuance Act (2003:1223).

Each year the Board adopts an investment policy for the Nuclear Waste Fund. The purpose of the policy is to provide rules for the investment of the Fund's assets. The policy sets the goal for rate of return while defining the division of responsibilities between the Fund's Board of Governors and Kammarkollegiet. The policy stipulates how different risks are controlled and limited and how the results of fund management are reported. The current investment strategy is posted at [www.karnavfallsfonden.se](http://www.karnavfallsfonden.se)

## Investments and return

As shown by the table on p. 4, the real rate of return since the introduction of the current management rules in 1996 has amounted to an average of 4.9 per cent per annum.

The nominal rate of return has exceeded the comparison index by an average of 0.7 percentage point per annum during the entire period since 1996.

Under the current investment rules, the Nuclear Waste Fund's options for optimizing the rate of return are limited to the following parameters:

- Choice between fixed-income and index-linked investments.
- Choice between treasury bonds and covered bonds (since 15 May 2009).
- Choice of duration in the investments.
- Choice of individual securities within each category and timing of purchases and sales.
- Increasing return by means of repurchase transactions repos.

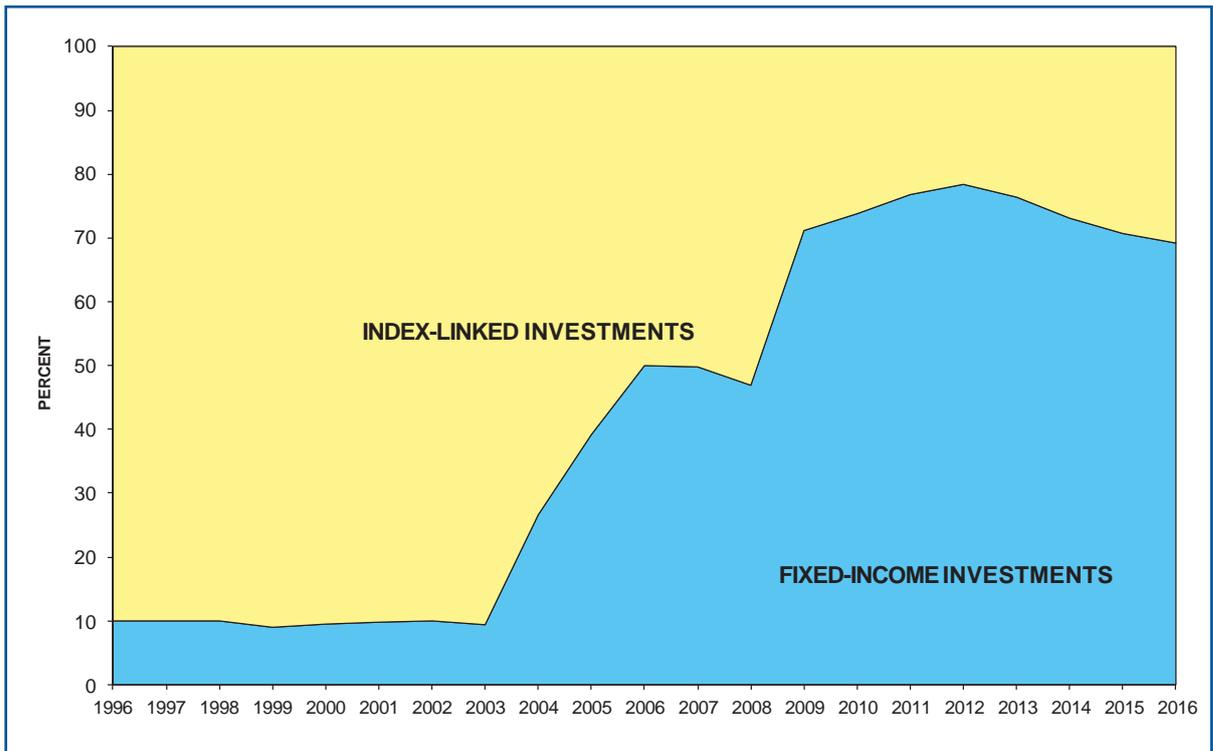
## Distribution between fixed-income and index-linked investments

When the current management model was introduced in 1996, Sweden had experienced long periods with high inflation. There was therefore concern that the value of the Fund would be undermined by inflation. Unlike most other capital investors with similar management assignments, the Fund's Board of Governors therefore decided to invest nearly all the Fund's capital in index-linked bonds with long maturity. The Fund was then able to take advantage of the high

real interest rates on the treasury bond market for long-term investments. Up until 2003, the proportion of index-linked investments was around 90 percent. Since then this percentage has declined. The reason for the decline in the proportion of index-linked investments is that conditions have changed. The Riksbank's inflation target, which was introduced in 1993, contributed to a sharp decline in the inflation rate,

which meant that index-linked bonds were no longer as attractive since there was then less of a need for insurance against the risk of inflation.

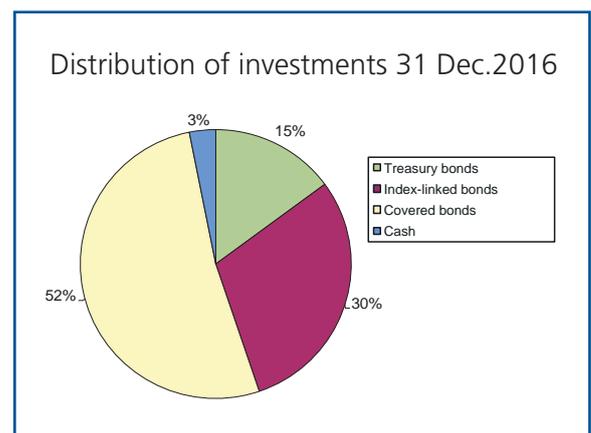
Real market rates fell after 2000, which meant that the market value of the Fund's investments increased sharply. All these factors led to a decision by the Fund Board to partially realize the value increase and reduce the proportion of index-linked investments.



**Distribution between government bonds and covered bonds**

When the restriction to treasury bonds was abolished and the option of investing in covered bonds was opened in 2009, there was a large shift from fixed-income treasury bonds to covered bonds. The reason was that covered bonds yield a higher return at only a slightly higher risk compared with fixed-income treasury bonds.

The pie chart shows the distribution of the investments at the end of 2016. The proportion of covered bonds is about 52 percent of the portfolio.

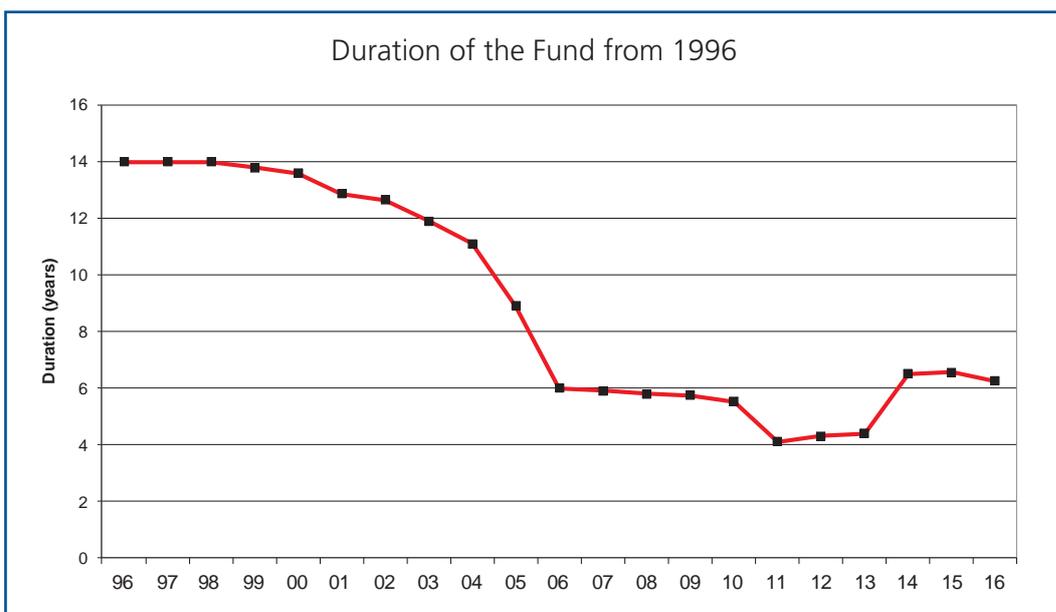


**Duration**

Duration is a measure of the interest rate risk in the portfolio. By interest rate risk is meant the change in value of an interest-bearing security that occurs when the market interest rate rises or falls. A longer duration leads to a greater change in value at a given change in market rates.

In connection with the Fund's decision to increase the proportion of fixed-income investments, the du-

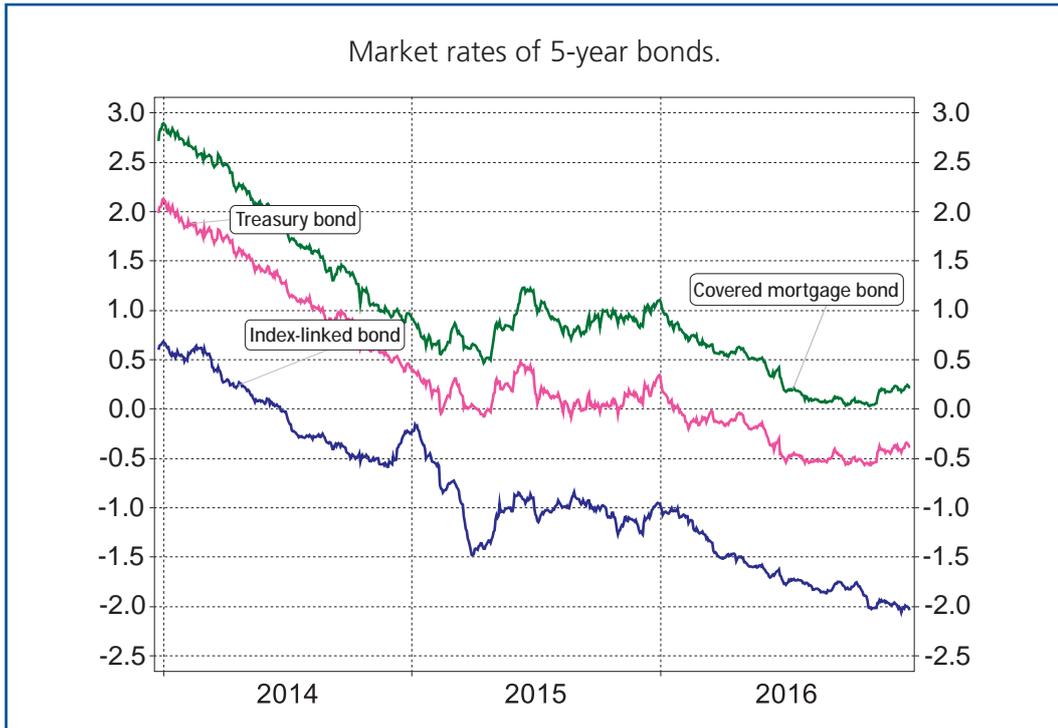
ration was reduced. The duration reduction was carried out during a period with falling interest rates, which contributed negatively to the development of the Fund. Duration increased during 2014 and 2015 due to the fact that the Board of Governors decided to introduce a new comparison index with a longer duration from 1 January 2014.



**Market trend**

The Nuclear Waste Fund’s investments and return should be viewed against the background of the market trend. The graph below shows the change in interest rates over the past three years for a long-term index-linked bond maturing in 2020 and for fixed-income bonds with an equivalent maturity. As is evident from the graph, the covered mortgage

bond yields a better return than the treasury bond. The return on the index-linked bond is dependent on how high the rate of inflation is. In the case of an index-linked bond, compensation is obtained for inflation (measured as the change in the consumer price index) in excess of the interest rate indicated by the lower curve.



The difference in interest rate level between the index-linked and the fixed-income bond is shown in the graph. An inflation rate of over 1.7 percent is necessary in order for it to be more profitable to buy an index-linked bond than a fixed-income treasury bond.

# The Nuclear Waste Fund's Board of Governors and administration

**Daniel Barr**  
Chairman,  
Product Director, Folksam

**Lena Johansson**  
Vice Chairman,  
Secretary-General,  
International  
Chamber of  
Commerce,  
ICC Sweden

**Sara Bergström**  
Senior Advisor  
Insurance  
Sweden

**Malin Björkmo**  
Licentiate in eco-  
nomics, Björkmo  
Advisors AB

**Malin Dahlrot**  
Finance Director,  
Sydkraft AB

**Johan Gyllenhoff**  
Group Treasurer,  
Vattenfall AB

**Björn Österberg**  
Chief Investment  
Officer IPM

The Board of Governors of the Nuclear Waste Fund is appointed by the Government.

	Appointed until
Daniel Barr, Chairman	2018
Lena Johansson, Vice Chairman	2017
Sara Bergström	2017
Malin Björkmo	2017
Malin Dahlroth	2017
Johan Gyllenhoff	2017
Björn Österberg, (from 1 jan 2017)	2018

In 2016 the Board of Governors also included Thomas Hahn.

The Nuclear Waste Fund has no employed staff. Kammarkollegiet performs administrative services for the Fund under a contract between the Fund and Kammarkollegiet, including capital management.

