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Financial Arrangements for NPP Decommissioning in Switzerland

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Agenda

1. NPP’s in Switzerland
2. Swiss approach
3. Facts and figures
4. Current challenges
5. Conclusions
NPP’s in Switzerland – overview
NPP’s in Switzerland – facts and figures

<table>
<thead>
<tr>
<th>NPP</th>
<th>Operational</th>
<th>Reactor</th>
<th>Power (gross)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beznau 1</td>
<td>since 1969</td>
<td>pressurized water</td>
<td>380 MW</td>
</tr>
<tr>
<td>Beznau 2</td>
<td>since 1971</td>
<td>pressurized water</td>
<td>380 MW</td>
</tr>
<tr>
<td>Gösgen</td>
<td>since 1979</td>
<td>pressurized water</td>
<td>1060 MW</td>
</tr>
<tr>
<td>Leibstadt</td>
<td>since 1984</td>
<td>boiling water</td>
<td>1275 MW</td>
</tr>
<tr>
<td>Mühleberg</td>
<td>1984 - 2019</td>
<td>boiling water</td>
<td>390 MW</td>
</tr>
</tbody>
</table>

10-year average annual proportion of nuclear energy used for producing electricity is 39%.
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Swiss approach (1/3)

Principle of “user pays” (Swiss Nuclear Energy Act)

- Operators of NPP’s are responsible for the disposal of radioactive waste and the decommissioning of their plants.
- Implementation of a Decommissioning Fund and a Waste Disposal Fund into which operators of nuclear facilities pay annual contributions.
- The 2 funds are a part of the federal administration – NPP operators have no direct access to the money in the two funds.
- Liability sequence for contributions from NPP operators.
Swiss approach (2/3)

Purpose of the two funds (established in 1984 and 2000 respectively)

- Decommissioning Fund: securing the costs for the decommissioning and for the disposal of the resulting waste.
- Waste Disposal Fund: securing the costs for the disposal of nuclear waste resulting from the operation and of spent fuel elements following the decommissioning of an NPP.

The decommissioning and waste disposal costs have to be fully covered by the two funds.
Until the end of the decommissioning of an NPP the operators have to pay the necessary contribution into the two funds.
Swiss approach (3/3)

The decommissioning and waste disposal costs are calculated every five years by the NPP operators under the supervision of the two funds.
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Key figures

<table>
<thead>
<tr>
<th>CHF</th>
<th>Decommissioning</th>
<th>Waste disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost study 2011</td>
<td>2,974,000,000</td>
<td>15,970,000,000</td>
</tr>
<tr>
<td>To be covered by the funds</td>
<td>2,974,000,000</td>
<td>8,448,000,000 *</td>
</tr>
<tr>
<td>Fund holding as per 31.12.15</td>
<td>1,999,813,210</td>
<td>4,222,622,357</td>
</tr>
<tr>
<td>Debit amount as per 31.12.15</td>
<td>1,972,100,000</td>
<td>4,100,800,000</td>
</tr>
<tr>
<td>Surplus/underfunding in CHF</td>
<td>27,713,210</td>
<td>121,822,357</td>
</tr>
<tr>
<td>Surplus/underfunding in %</td>
<td>1.41%</td>
<td>2.97%</td>
</tr>
</tbody>
</table>

* The disposal of waste from operations has to be paid by the operators on an ongoing basis. Up to date, approx. 5.5 billions Swiss francs have already been paid.
Calculation basis

- Operating period (calculatory): 50 years
- Investment return (calculatory): 3.5%
- Inflation (calculatory): 1.5%
- Safety margin on costs according to cost study 2011: 30%

Realized investments returns:

<table>
<thead>
<tr>
<th>Year</th>
<th>Decommissioning Fund</th>
<th>Waste Disposal Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>7.19%</td>
<td>7.38%</td>
</tr>
<tr>
<td>2014</td>
<td>11.52%</td>
<td>11.50%</td>
</tr>
<tr>
<td>2015</td>
<td>- 0.53%</td>
<td>- 0.48%</td>
</tr>
<tr>
<td>2016 (30.06.16)</td>
<td>2.67%</td>
<td>2.65%</td>
</tr>
</tbody>
</table>
Governance

Federal Government

Administrative Board

Investment Committee

Cost Committee

Office

Statutory Auditor

Management and coordination of all asset management activities

Management and coordination of the cost calculation (cost studies)
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Current challenges

1. Situation on capital markets – challenging investment environment → insufficient investment returns

2. Correct calculation of decommissioning and waste disposal costs → inadequate cost studies → inadequate basis for the calculation of the contributions of the NPP operators

3. Economic stability of NPP operators – capacity of NPP operators to pay for the contributions → default of contributions → joint and several liability takes effect
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Conclusions

- Switzerland has a well established system to secure the funding of the decommissioning and waste disposal of the five NPP’s.
- The two funds are on track.
- Good governance and best practice are a prerequisite for tackling the existing challenges.