Funding Mechanisms for Radioactive Waste Management

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Managing spent nuclear fuel

• Two major options are currently applied to manage spent fuel:
  – **Direct disposal**: nuclear fuel is used once and is then stored in anticipation of disposal.
  – **Partial recycling**: the spent fuel is reprocessed to recover uranium and plutonium that may be fabricated into new fuel for light water reactors.

• Both options, as well as any prospective advanced recycling, eventually entail the use of an **operational repository for final disposal**.
Example of fuel cycle cost breakdown for different spent fuel management strategies

(Capacity: 75 TWh/year, discount rate 3%)

Back-end fuel cycle cost uncertainties

Back-end component of total fuel cycle cost (USD/MWh): should be compared with the total generation cost (e.g. ~USD 60/MWh for France)

Requirements and features of RWM financing (1/3)

- To establish the size of liabilities and guarantee adequate financing, periodic assessments of the costs of managing radioactive waste are essential.
  - Cost assessments are performed regularly in most countries.

- Expenses for disposal will appear over extended periods, and much of the expenditure could incur long after income from electricity generation has stopped.
  - It is fundamentally important that appropriate financial arrangements are established and that the accrual of adequate and available funds for the implementation of the selected back-end strategy is carefully pursued and monitored.
Requirements and features of RWM financing (2/3)

• The most common mechanism adopted for the accrual of funds are levies on nuclear electricity.

• In some cases, waste producers can pay lump sums (e.g. in the Republic of Korea) or proportionally to the volumes of waste produced (e.g. in Belgium).

• The payments of fees and levies are accumulated in internal or external funds.
Requirements and features of RWM financing (3/3)

• In some countries a dedicated fund is established that is often administered by a third party; this approach promotes transparency, insolvency protection and confidence.

• Periodic reassessments of liability estimates and of funds are important to ensure sufficiency and adequacy.

• To guarantee availability, ring-fencing of funds is a key feature. Other protective measures are sometimes implemented.

Initial values covered substantial levels of uncertainties, which could be gradually reduced as more accurate knowledge of costs had been gained through further advancements of the programme.

Conclusions

• Expenses for disposal of commercial high-level waste appear over extended periods.

• Funding for the SNF management is often accumulated in funds through fees/levies on nuclear-generated electricity.

• To ensure availability and sufficiency, ring-fencing and frequent periodic reassessments of funds, combined with other protective measures, are essential.

• The deployment of a deep geological repository for high-level waste will reduce uncertainties and raise public confidence.