

Nuclear safety and decommissioning

Update on the implementation of the EBRD's Ukraine Safety Upgrade programme

For more information

Iryna Holovko
National campaigner for Ukraine
iryna@bankwatch.org

Introduction

In 2013 the EBRD approved a loan of EUR 300 million for the Ukraine Nuclear Safety Upgrade Program, which is co-financed with another EUR 300 million loan from the Euratom Loan Facility. These loans come with the condition that the state should:

- establish a national body on nuclear decommissioning;
- provide for and support a functioning decommissioning fund; and
- ensure that nuclear agency Energoatom charges a tariff that is sufficient for the timely implementation of its obligations under this agreement;

In 2017 Ukraine met these conditions: a national body on decommissions was established and a decommissioning fund is up and running, with regular contributions from the nuclear operator Energoatom.

However these two entities alone are not enough to ensure that sufficient funds are made available and that these are not misused for contradictory purposes. More work is still needed to:

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- a) Ensure the appropriate size of the decommissioning fund. According to the latest design, between EUR 76 and 100¹ million euros will be allocated for decommissioning of each nuclear unit, depending on its size (440 or 1000 MW);
- b) Safeguard against the devaluation and misuse of the funds;
- c) Revise the concept of decommissioning so that enough funds are allocated, according to current knowledge and data.

Outdated from the start

The **concept for the decommissioning** of the nuclear units was revised in 2012 and 2013 at the request of international donors including the EBRD and was approved by the ministry of power and energy in December 2015². This concept is the key strategic document for preparing nuclear units for decommissioning. It defines the decommissioning strategy, including the number of stages, the total expected costs and the annual financial allocations to the decommissioning fund and a radioactive waste fund. The concept suggests that the size of financial allocations are calculated based on existing decommissioning practices around the world, as well as on the situation in Ukraine's nuclear sector, including plans for its further development.

There are a number of issues with this approach.

The economic data is outdated. Calculations in the concept are based on an exchange rate of 7.9 hryvnas to the euro, which is now 29 hryvnas to the euro. A significant part of decommissioning costs are salaries, and while most of the works will be done decades from now, the concept assumes a minimum salary of UAH 1134. In 2016 minimal salary was already UAH 1600, and further inflation is not properly accounted for in calculations.

The total expected cost of decommissioning per unit is unrealistic. According to the concept, the total cost

of decommissioning of one 1000 MW nuclear unit (VVER-type) in Ukraine is expected to be UAH 2.9 billion (or EUR 100 million at an exchange rate of 29 hryvna to the euro) and EUR 2,3 billion (EUR 76 million) for a 440 MW unit. But the **cost of nuclear decommissioning projects in Europe is seven to ten times higher**, with costs of decommissioning projects in Bulgaria, Slovakia and Lithuania continuing to rise³.

Current estimates of the cost of decommissioning for one large industrial nuclear unit in Europe are between EUR 700 and 1300 million. While some costs in Ukraine like wages and project management are lower than in countries like Germany or the US, immediate dismantling is much cheaper on average. In the case of Ukraine, when deferred dismantling of nuclear power plants is chosen, there is a 40 year-period during which plants require financial resources to maintain safety and security, and the whole process is expected to take more than 60 years. In the case of immediate dismantling, decommissioning can be finished in 13 to 25 years (as in the case of the Trojan plant in the US and the Greifswald plant in Germany), and existing plant infrastructure can be used for dismantling to lower the total cost.

The concept relies on the extended operations of units for another 15 to 20 years. The concept compares different decommissioning strategies, namely immediate or deferred dismantling, with 15 or 20 years of extended lifetime beyond initially projected periods. None of the scenarios explore the option when nuclear units are closed at the end of their projected lifetime. Meanwhile, the decommissioning fund established in 2006 has accumulated only UAH 2,7 billion (roughly EUR 90 million). This means there won't be enough money for decommissioning if some of the units will need to be closed early, potentially causing pressure on the nuclear regulator to grant licenses for risky operations at the nuclear units in question.

The concept for decommissioning needs to be revised as soon as possible to reflect actual decommissioning costs and recent economic data.

¹ Currency exchange rate as of May 2017 - approx.. 29 UAH per EUR;

² Ministerial order №798 from 10.12.2015

³ http://www.eca.europa.eu/Lists/ECADocuments/SR16_22/SR_NU_CLEAR_DECOMMISSIONING_EN.pdf

Protecting decommissioning funds against devaluation and potential misuse

A decommissioning fund was established in 2005 as a condition of the post start-up safety upgrade loan for the K2R4 project. Since 2006, a fixed amount of UAH 283.4 million set by government decree⁴ has been paid annually into the fund by Energoatom. Yet this sum has not once been revised since 2006, despite a devaluation of the hryvna and a near fivefold increase in Energoatom's revenues between 2006 and 2015⁵. While a revision of the amount allocated to the decommissioning fund based on the company's revenues is stipulated in the law 'On regulation of the issues, related to ensuring nuclear safety,'⁶ this has never happened.

The new concept for decommissioning finally provided for an increase to the annual allocations for both the decommissioning and radioactive waste funds – UAH 785.4 million and UAH 962.19 million respectively. These amounts were paid only from January 2017 after they had been reflected in the state budget for 2017. However, this is still not enough for the safe decommissioning of all fifteen nuclear reactors operating in Ukraine.

The decommissioning fund is a state fund within the state budget, for which the treasury maintains a special account as a "financial reserve for the nuclear units decommissioning". However, the money in this fund is not safeguarded from being used for other purposes within the approved state budget, and experts say that the money from the decommissioning fund has actually been used for other purposes in the past and it is not clear how much is currently in the fund. The money is also not safeguarded against the devaluation of hryvna: a value of UAH 283 million in 2006 with at an exchange rate of UAH 6 to EUR is not the same as in 2017 when the rate is nearly 30 to one.

There are different ways to safeguard the funds for

4 Cabinet of Ministers of Ukraine № 594 from 27.04.2006;

5 In 2006 Energoatom's revenues were UAH 6, 8 billion, and in 2015 – UAH 32,9 billion;

6 Law of Ukraine № 1868-IV from 24.06.2004, article 7;

the future use, including investing them into low-risk businesses or converting into securities. According to Ukrainian law⁷, the state may allocate part of the decommissioning fund into state securities. However, this has never been done so far due to the fact that the managing authority did not have the respective mandate. The ministry of fuel and energy is a non-profit state organisation, and according to national legislation, it cannot purchase and sell securities, nor can it receive income from such operations.

As a result, the decommissioning fund has lost value in the last decade. According to the protocol of its meeting, the national body on decommissioning raised this issue in 2015, and in October 2015, the Cabinet of Ministers of Ukraine granted the ministry of fuel and energy a respective mandate to purchase securities. Currently the process is stuck at the ministry of finance, which has to give an order to the treasury to transfer money to the respective account at the ministry of fuel and energy for purchasing securities. As of 1 February 2017, this has not been done.

The decommissioning fund needs to be urgently checked for how much money is there and without further delays be properly safeguarded from devaluation and potential misuse. As the guarantor of the EBRD and Euratom loans, the ministry of finance needs to be called to action and implement the steps necessary for safeguarding the decommissioning fund.

National body on decommissioning

The national body on decommissioning nuclear units was established by the Cabinet of Ministers in January 2014⁸ to control the decommissioning fund and to prepare recommendations for improvements to the fund's management. It consists of seven representatives from Energoatom, the ministry of fuel and energy, the state nuclear inspectorate, the ministry of finance, the ministry of economic development and trade, and two state committees that deal with state securities. The board should meet

7 The law of Ukraine "On regulation of the issues, related to ensuring nuclear safety", art. 8

8 Cabinet of Minister's decree № 21 from 22.01.2014;

at least twice per year and report annually in March to the Cabinet of Ministers. The Board has powers to:

- approve annual action plans for decommissioning preparations submitted by Energoatom;
- control the use and investment of the funds;
- approve annual plans submitted by Energoatom for investing money from the fund; and
- approve Energoatom's proposal regarding the conversion of the fund's resources into state securities.

It is unclear how the body can combine both its executive and oversight functions.

In 2016 the board focused primarily on enabling the conversion of the fund's money into securities as described above. There was no oversight of how Energoatom is using the fund. According to Energoatom⁹, the company did not use any money from the fund to implement preparatory works for future decommissioning, although such works are already ongoing. The use of decommissioning funds is only possible when decommissioning plans for each nuclear power plant are developed and approved, including for the development of those plans.

There are currently no decommissioning plans for any nuclear power plants in Ukraine, in spite of the fact that the designed lifetimes have been reached for seven nuclear reactors at three nuclear power plants. According to the 'review and approval procedure of nuclear installation decommissioning plans'¹⁰ these plans must be prepared by Energoatom no later than 18 month prior to the termination of a nuclear installation's operations. Energoatom and state nuclear regulator argue¹¹ that these plans were not developed because there is an approved governmental plan to extend the lifespan of all nuclear power units beyond their projected term. Currently Energoatom uses its own operational costs to perform preparatory works for decommissioning¹².

⁹ Energotom letter to NECU № 16395/32 from 11.11.2016;

¹⁰ Approved by the decree of Cabinet of Ministers of Ukraine № 594 from 27.04.2006

¹¹ SNRIU letter to NECU № 15-25/7164-37b from 27.10.2016;

¹² Energoatom letter to NECU № 16395/32 from 11.11.2016;

The decisions of the supervisory board are mandatory for Energoatom but exert a soft power over other ministries that also need to take steps towards decommissioning, like enabling the fund to be safeguarded from devaluation through the purchase of state securities. Although necessary changes in legislation were made back in 2015, the ministry of finance has delayed a green light for converting part of the decommissioning fund into securities.

Another complication is that membership in the board is by name and not position, so with every change in government, the new board needs to be approved by the cabinet. This was the reason why the Board did not function for most of 2015 and until November 2016.

The functions of the supervisory body – executive and oversight – need to be clarified. It is also necessary to reconsider membership in the supervisory body not by name so as to ensure its continued functioning.

Insufficient tariffs to implement the safety upgrade programme

The successful implementation of the EBRD and Euratom loans depends on sufficient co-financing provided by Energoatom's tariff on electricity. While the loan is used for purchasing equipment, all related works (design, construction and installment, commissioning in operation) need to be covered by the company's own resources.

In December 2016 the National Energy and Utilities Regulatory Committee (NKREKP) approved a new electricity tariff for Energoatom from 1 April 2017 at a level of 48 kopeks¹³. This tariff, according to the company, does not fully cover the implementation of the Complex (Consolidated) Safety Upgrade Program. The total required amount for the programme's implementation in 2017 is UAH 2332 million, while the tariff would raise three and half times less, or just UAH 651,5 million.

The deadline for the full implementation of the safety upgrade programme has already been postponed by

¹³ NKREKP decree № 2156 from 9.12.2016;

the government in 2015 from December 2017 to December 2020, and now with a lack of a sufficient tariff, there is a serious risk that the new implementation timeline will not be met. New delays mean that the old nuclear units will continue to operate with a known shortfall on safety investments. Moreover, the state nuclear regulator has granted lifetime extensions for four nuclear units, without first seeing safety measures fully implemented. Instead, it relies on the assumption that these will be implemented within the approved timelines after a lifetime extension decision.

Energatom's tariff needs to be increased to fully cover the costs of the timely implementation of the safety upgrade measures in accordance with an approved annual plan.

Conclusions

In 2013 the EBRD approved a EUR 300 million loan for the Ukraine Safety Upgrade Program in order to leverage Ukraine's nuclear industry and government to ensure that safety upgrades at Ukraine's nuclear fleet are fully and timely implemented, and that decommissioning and nuclear waste issues are properly handled and fully financed.

While certain positive steps have been taken so far by the Ukrainian government – including increased allocations to the decommissioning and nuclear waste funds, the establishment of a supervisory body and the implementation of some safety measures – these are not sufficient for reaching the ultimate objectives – improved nuclear safety via the timely implementation of upgrades at the operating units and the safe decommissioning of old nuclear units.

Therefore we strongly recommend that the EBRD's management and board:

- demand that the Ukrainian government and NKREKP **fully incorporate the cost of a timely implementation of the safety upgrade program into Energatom's electricity tariff**. Such a tariff should be ensured throughout the duration of the safety upgrade programme's implementation;
- initiate a **review of the 2015 concept of nuclear units decommissioning** with the participation of

international experts. This should help Ukraine determine a more realistic cost scenario for decommissioning based on best available practice;

- demand from the Ukrainian government that **the decommissioning fund is properly safeguarded from devaluation and misuse**. As the guarantor of the EBRD and Euratom loans, the ministry of finance needs to be called to action to enable the conversion of the decommissioning fund into securities without further delays;
- work with the Ukrainian government to clarify the functions of the **supervisory body**. It is necessary to also reconsider membership in the body not by name to ensure its regular functioning.



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