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COMMISSION STAFF WORKING PAPER

Impact assessment

Accompanying document to the

Proposal for a Council Regulation

**on Union support for the nuclear decommissioning assistance programmes in Bulgaria,
Lithuania and Slovakia.**

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Disclaimer: This report commits only the Commission's services involved in its preparation and does not prejudge the final form of any decision to be taken by the Commission.

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Identification

Lead DG: DG ENER

Other involved services: SG, DG BUDG, DG REGIO, DG JRC, DG SJ, DG ECFIN, DG ENV, DG CLIMA, DG RTD, DG ENTR and DG EMPL

Agenda planning or WP reference: 2011/ENER/050

1.2. Organisation and timing

This proposal has been drafted by DG ENER and covers the assessment of the proposal for further financial EU support to Lithuania, Slovakia and Bulgaria, originating in the corresponding Accession Treaties.

An impact assessment steering group has been set up on 16/02/2011. DG ENER, SG, BUDG, REGIO and JRC participated in the work of this IASG. DG SJ, ECFIN, ENV, CLIMA, RTD, ENTR and EMPL were invited to participate in the work of the IASG, but did not nominate a representative.

The Impact Assessment Board has assessed the draft Impact Assessment submitted to their attention in September 2011 and issued its opinion on 21 October 2011. In line with the opinion, the draft Impact Assessment has been revised, in particular to:

- clarify the context for the proposed action and to provide a clearer problem definition (see section 2.1, 2.2, 3.1 and 3.2);
- explain more clearly the choice of policy options, link of options to specific objectives and link of options to feedback from stakeholders, European Court of Auditors and European Parliament (see section 2.2, 4, 5, in particular 5.1.1 and 6, in particular the paragraphs related to option 3);
- strengthen the impact analysis (see sections 5.1, in particular 5.1.1 and section 6 in particular the paragraphs related to option 3):
- provide a more operational evaluation and monitoring arrangement (see section 7.1 and 7.2)
- to take into account other comments related to the procedure, presentation and clarification of terminology (see section 1.3.1, 1.3.3, 2.2, 4 and 5.1.3).

A proposal for a Council Regulation is foreseen for November 2011. The Council Regulation is foreseen to come into force on 1 January 2014.

1.3. Consultation and expertise

1.3.1. Public consultation

A notice has been published on the DG ENER website¹ announcing the public consultation for this impact assessment on the future of the nuclear decommissioning programmes for Bulgaria, Lithuania and Slovakia.

The public consultation was launched on 16 March at the meetings of the Nuclear Decommissioning Assistance Programme Committee (NDAPC – management committee under comitology) and the Decommissioning Funding Group (DFG expert group) in March 2011. The NDAPC is composed of national Member State representatives that assist the Commission in implementing the current financial EU decommissioning support. The DFG is composed of nuclear experts from the Member State dealing with financial aspects of decommissioning. Discussions within the DFG gave the opportunity for the experts to express their views on the future orientation of the successor to the 3 nuclear decommissioning programmes. The consultation via the website lasted 4 weeks, considered sufficient for the main direct stakeholders and Member State experts to provide further comments if necessary, in addition to their input already provided at the DFG and NDAP meetings.

No further input was received from the consultation process via the DG ENER website. There were only two requests for additional information.

In general, all experts within the DFG recognise the need for continued financing of these nuclear units that were shut down early in line with the Accession treaties. All were of the opinion that there needs to be a solid and complete detailed decommissioning plan behind, including full costing estimates up to the completion date for decommissioning. A clear indication of the national co-financing and the way to secure this national funding in the long term has to be provided. Key milestones were explicitly supported, as well as the linking of payments to the accomplishment of concrete milestones, with the highest EU added value. Compliance procedures and close cost monitoring should be considered from the outset.

Some were strongly in favour of continuing with full support towards decommissioning and also for additional support for energy sector measures, however in a regressive way as off 2014.

Most experts were of the opinion to address only decommissioning needs and to refer energy sector needs to more specific financing channels such as the structural funds. A solid case with convincing arguments is required in order to ensure continuation of the nuclear decommissioning in a safe manner in these 3 countries.

The results of this consultation were fully integrated at appropriate levels of this Impact Assessment (ex. problem definition, assessment of the policy options, monitoring, and evaluation).

1.3.2. Direct consultation of the Member States concerned

In addition to the public consultation, the three Member States concerned were directly consulted on their further needs for financial EU support. All three Member States had

¹ http://ec.europa.eu/energy/nuclear/consultations/2011_04_15_nuclear_decommissioning_en.htm

approached the Commission in 2010 with a request to open negotiations on the extension of the EU support beyond 2013.

Upon request from the Commission, the three Member States provided a detailed justification for their request (ex. decommissioning planning, updated cost estimation for decommissioning).

The information provided by the Member States were the basis to define the specific objectives of the programme as well as the monitoring and evaluation provisions (Logical Framework Matrix).

1.3.3. Other inputs

The assistance programme has been subject to regular audits and evaluations. Amongst others a mid-term evaluation for Lithuania and Slovakia finalised in 2007, as well as a performance audit currently being finalised by the European Court of Auditors. These audits and evaluations have highlighted some weaknesses in the overall definition of the financial EU assistance and proposed a number of possible measures for improving the implementation of the programmes. Annex 3 provides an extract of the conclusions from the mid-term evaluation as well as some preliminary recommendations from the performance audit. The recommendations were taken into account.

Also the opinion of the European Parliament and the feedback from broad discussions in the different Committees of the Parliament (in the context of the adoption of the Council Regulation for the extension of EU support to Bulgaria for the period 2010-2013) and the findings of the European Parliament's own initiative report from 2011 have been taken into account. The feedback from these recommendations has allowed a clear definition of the general and specific objectives, performance indicators to meet them as well as to assess the policy options. It was also of major guidance for clearly defining the scope, amount and duration for further EU support in order to define a clear framework for the programme, with a clear statement to concentrate on decommissioning and to no longer support projects in the energy sector. The Commission's proposed implementation mechanism is also in accordance with the recommendations.

2. PROBLEM DEFINITION

2.1. Context

The three countries, Lithuania, Slovakia and Bulgaria, operated old soviet design nuclear reactors which the international community, in line with the G7 multilateral programme of action adopted at the Munich G7 summit in 1992, concluded could not be upgraded to meet the minimum required safety standards, at an economically acceptable cost. As such these plants required to be closed earlier than their foreseen end-of-lifetime dates.

In the context of the negotiations for accession to the European Union, the three candidate countries took the commitment to close and subsequently decommission these nuclear reactors by a commonly agreed date. This early closure represented an exceptional financial burden for the Member States which was not commensurate with the economic strength of the countries concerned. In recognition of this fact and as act of solidarity the European Union committed itself to continue to provide adequate additional financial assistance for decommissioning of these reactors. The closure commitment of the three Member States as

well as the commitment of the EU to provide financial EU support was foreseen in the corresponding Accession Treaties.

In 2006 and 2007 the European Council adopted new Regulations for Lithuania² and Slovakia³ which formed the legal basis for the continuation of the European Union assistance in these countries until the end of 2013. Since mid 2010 a new Council Regulation⁴ provides the legal basis for additional European Union assistance to Bulgaria for 2010 – 2013.

The total financial assistance from the European Union to the three Member States until the end of 2013 foresees € 847.8 million (€ 367 million for Lithuania, €13 million for Slovakia and €67.8 million for Bulgaria).

The European Union assistance is designed to support Member States efforts in the decommissioning of the nuclear power plants as well as to support measures in the energy sector to mitigate the economical consequences of the early closure, such as:

- the nuclear safety in the nuclear facilities,
- the establishment and upgrade of the waste management infrastructure required to start decommissioning activities,
- measures to support the nuclear safety authorities in safe assessment and licensing of decommissioning projects,
- the environmental upgrading of energy infrastructure and modernisation of conventional energy production capacity as a replacement for the lost nuclear energy production capacity in line with the legislation of the European Union,
- the enhancement of security of supply and energy efficiency,
- measures to support plant personnel in maintaining a high level of operational safety in the periods prior to the closure and during the decommissioning of the reactor units.

The European Union financial assistance has been made available in the form of contributions to three International Decommissioning Support Funds managed by the European Bank for Reconstruction and Development. In addition, since 2004, part of the financial assistance for Lithuania has also been made available as a direct support to the country in order to implement provisions of Art. 2.4⁵ of the Accession Protocol through a National Agency (Central Project Management Agency).

All three Member States have fulfilled their accession treaty commitments to close their reactors in a timely manner. Ignalina Nuclear Power Plant Unit 1 was shut-down on 31 December 2004 and Unit 2 on 31 December 2009. Bohunice V1 Nuclear Power Plant Unit 1 was shut-down on 31 December 2006 and Unit 2 on 31 December 2008. Kozloduy Nuclear

² OJ L 411, 30.12.2006, p.10

³ OJ L 131, 23.5.2007, p.1

⁴ OJ L 189, 22.7.2010, p.9

⁵ "The Ignalina Programme shall include measures to support plant personnel in maintaining a high level of operational safety at the Ignalina Nuclear Power Plant in the periods prior to the closure and during the decommissioning of the said reactor units."

Power Plant units 1 and 2 were shut-down on 31 December 2002 and units 3 and 4 on 31 December 2006.

All beneficiary countries were committed to proceed with the implementation of their decommissioning plan and where technically possible, defueling of the reactor took place as a first important step towards irreversible closure and decommissioning of the plants. Facilities necessary to support the decommissioning process are under installation. Preparation of licensing documentation is under elaboration and preparatory works for dismantling as an integral part of decommissioning are ongoing. The countries' legal framework and management structures are in the process to be adapted to take into account the change from an electricity producing company to an organisation for safe decommissioning. First dismantling works of non-active facilities have started. Major facilities for the treatment and storage of radioactive waste and spent nuclear fuel are under construction, where they are required.

The energy sector benefited from the financing of measures fully in line with the European Union energy policy. Energy efficiency projects were successfully completed, conventional production capacities were environmentally upgraded and new capacities are under construction and the adjustment of the electricity grid infrastructure is under implementation. In none of the three Member States did the closure of the nuclear reactor units result in a black-out electricity supply. Not even the severe gas crisis in early 2009 led to the reopening of the closed reactor units, although the intention was expressed at political levels.

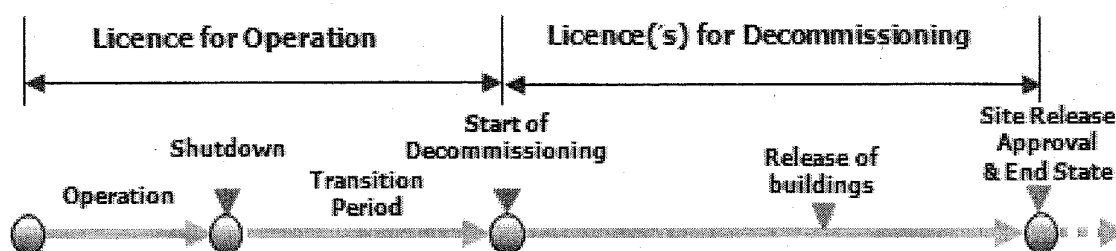
The table below gives an overview on some major achievements of the current financial EU support.

Where do we stand? Examples of main achievements

Lithuania	
Decommissioning	<ul style="list-style-type: none"> – Shut down of both units and defueling of unit 1 reactor core; – Finalisation of the free release measurement facility; – Start of dismantling works in the building with the Emergency Core Cooling System; – Start of decontamination of unit 1 primary circuit; – Start of dismantling works in the reactor turbine hall; – Construction works of spent fuel and radioactive waste storage facilities close to completion;
Mitigating measures	<ul style="list-style-type: none"> – Environmental upgrade of the Lithuanian Thermal Power Plant; – Construction of a new 440 MW CCGT plant ongoing; <p>1045MW production capacity was made available by those measures as replacement. Considering the date provided in annex 1 this corresponds to approximately 57% of the effective lost capacity.</p>
Slovakia	
Decommissioning	<ul style="list-style-type: none"> – Shut down of both units and complete defueling; – Update of the V1 conceptual decommissioning plan; – Elaboration of decommissioning license documentation and decommissioning waste management strategy; – Decommissioning license obtained in July 2011; – Reconstruction of an auxiliary boiler station;
Mitigating measures	<ul style="list-style-type: none"> – Reconstruction of Krizovany transformer substation; – Close to 400 energy efficiency projects supported mainly in the residential sector but 10% also in the industrial sector. <p>For Slovakia the mitigating measures were focused on the upgrade of their electricity network infrastructures that became necessary following the closure of Bohunice V1 nuclear power plant.</p>
Bulgaria	
Decommissioning	<ul style="list-style-type: none"> – Shut down of all 4 units and complete defueling of units 1&2. Complete defueling of units 3&4 is foreseen by end of 2011; – Construction of a dry spent fuel storage facility; – Revised decommissioning strategy put in place; – Design, supply and implementation of projects within the first stages of decommissioning; – Environmental impact assessment; – Start of dismantling works in the turbine hall;
Mitigating measures	<ul style="list-style-type: none"> – Extension and refurbishment of national electricity distribution system; – Rehabilitation of Pernic district heating; – Rehabilitation of Sofia district heating network and substations; – Contributions to energy efficiency and renewable energy projects through credit line facilities;

The energy efficiency measures will lead to an equivalent production capacity replacement of estimated 500MW. Considering the date provided in annex 1 this corresponds to approximately 62% of the closed down effective lost capacity (this does not take into account financial support provided separately to the EU decommissioning support for upgrading Kozloduy units 5&6 that also contributed to the compensation for the closure of units 1&2).

Apart from the listed achievements it is important to understand how far the three Member States progressed in decommissioning. Decommissioning is a long process composed in general of two major phases characterised by the type of license issued by the national nuclear regulator (see figure).



Slovakia has completed the transition period by having obtained its first decommissioning license for Bohunice V1 nuclear power plant. In Kozloduy units 1&2 have no more spent nuclear fuel in the units. Consequently both units have been transferred to the State Enterprise for Radioactive Waste and are close to obtaining their decommissioning license. By 2013 Kozloduy units 3&4 are expected to have received their decommissioning license. In the case of Lithuania the transition period will extend until 2016. This time is required to transfer all spent nuclear fuel from both reactor units to the dry spent fuel storage.

It must be understood that non-safety relevant decommissioning activities as well as the implementation of the required spent fuel storage facilities and waste treatment and storage facilities can already be executed in the transition period. Consequently, although only four out of eight concerned nuclear reactor units have completed the transition phase, first dismantling works have started (ex. in the turbine building) also for the other units. Progress in the spent fuel and waste management are in an advanced implementation stage. Equally important activities to be performed in the transition period are the preparation of all required licensing documents as well as environmental impact assessments, where required.

By the end of 2010 the European Commission committed a total of €1 807 million with the following breakdown:

- Lithuania: total commitment: €95.5 million; allocation to projects: €94 million (€94 million EBRD and €200 million CPMA); 72% on decommissioning and 28% on measures in the energy sector;

- Slovakia: total commitment: €423.7 million; allocation to projects: €391 million; 53% on decommissioning and 47% on measures in the energy sector;
- Bulgaria: total commitment: €42.8 million; allocation to projects: €75 million; 57% on decommissioning and 43% on measures in the energy sector;

The rate of absorption of the financial EU support has improved substantially over the last years with the realisation of major investment projects (ex. waste management infrastructure projects) and with the start of real decommissioning works. The absorption rate (full commitment to projects) is expected to be high by the end of the current financial perspective.

2.2. What is the problem?

Effects of radiological incidents can have potential consequences for the health of workers and citizens and for the environment as well as wide ranging economic implications for the energy sector. Consequently, nuclear safety requires the utmost attention and appropriate actions, also after the closure of the units during the transition phase where spent nuclear fuel is still present in the reactor units and during decommissioning. The problem is to eliminate as far as possible the source of radiological hazard. In concrete terms this means that the closed reactor units must remain closed, that they are defueled and that they are safely dismantled. In the context of ‘early closure’ and considering the related economical consequences for the three concerned Member States this closure must become irreversible⁶. Today this stage is not yet reached.

The current financial EU support has effectively mitigated the economical consequences of the early closure and the decommissioning process is well engaged (waste management infrastructure, preparation for dismantling). However, as can be deduced from the figure of the previous paragraph, the important safety relevant key projects in the decommissioning process are still to be implemented. The remaining key challenges (including tentative timeframe) to be addressed by the three Member States and the relevance of EU support are summarised in the next table:

Lithuania
<p>Remaining challenges:</p> <ul style="list-style-type: none"> – Defueling of spent nuclear fuel from Unit 2 and the reactor fuel ponds into the dry spent fuel storage (to be completed by end 2016); – Safe maintenance of the reactor units until defueling is completed (until end 2016); – Further dismantling works: Unit 2 turbine hall (until 2017); gas and ventilation building (2014 – 2015); dismantling works in reactor building unit 1 and 2 (start in 2017); – Engineering design for reactor core dismantling;
<p>Relevance of EU support: To provide financial support due to inadequate national resources (50m€only) for seamless continuation of decommissioning focussed on key projects towards irreversibility of the closure;</p>

⁶ Closure to become irreversible means that decommissioning has progressed so far on a technical level, that it would economically no longer be advantageous to consider the re-opening of the concerned reactor units.

Slovakia
<p>Remaining challenges:</p> <p>Preparation of decommissioning phase II from mid 2015 onwards (Preparation and execution of dismantling of the contaminated and activated equipment and systems) and completion of decommissioning phase I.</p> <ul style="list-style-type: none"> – Decontamination of spent fuel and other contaminated tanks (until end 2015) – Dismantling of reactor core and reactor building (start in 2015)
<p>Relevance of EU support: provide financial support to progress in decommissioning to be focussed on key projects towards irreversibility of the closure;</p>
Bulgaria
<p>Remaining challenges:</p> <p>Dismantling activities in the reactor buildings.</p> <ul style="list-style-type: none"> – Dismantling of large components in the reactor buildings 1 to 4 (start 2016) – Dismantling of equipment in reactor buildings 1 to 3 (start 2015)
<p>Relevance of EU support: provide financial support due to inadequate national resources (180m€ only) for seamless continuation of decommissioning with focus on key projects towards irreversibility of the closure;</p>

In order to allow for safe decommissioning, adequate financial resources should be available when required⁷. The updated decommissioning planning and decommissioning cost estimates provided by the Member States in early 2011 provide clear evidence that substantial additional financial resources will be required to complete decommissioning of the Kozloduy, Ignalina and Bohunice nuclear power plants in a safe manner.

For historical reasons, the three Member States do not have the required financial resources. The nuclear power plants were built under different political and economic regimes, not necessitating the accumulation of funding. Since 1995, 1999 and 2002 Slovakia, Bulgaria and Lithuania have respectively put in place their national funds in order to meet their national responsibilities for the financing of decommissioning. However, taking into account that the reactors were shut down before their initially foreseen end of design lifetime and that it takes about 25 years (ex. legal obligation for accumulation of funds in Germany) of operation to accumulate sufficient funds for decommissioning, it was not possible for the three countries to set aside sufficient funds. Today the available resources are still insufficient to ensure a seamless continuation and completion of safe decommissioning. In addition, early closure or decommissioning does not give rise to any economic advantage, such that the market will not finance the decommissioning process.

The immediate problem to be addressed is the funding shortfall to ensure continuation of safe decommissioning of the nuclear power plants in the three beneficiary countries, to ensure that the closure becomes irreversible and that the beneficiary takes gradually a stronger and

⁷ Commission recommendation on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste. OJ L 330, 28.11.2006, p.31

substantially higher own responsibility for the decommissioning of these reactors during the period up to 2020.

Findings from the mid term evaluation and the Court of Auditor's performance audit have contributed to the problem definition and to developing an appropriate policy option as discussed under section 6. Results from the discussions in the European Parliament in the context of the consultation presented under 1.3.3 provided additional input to the problem definition. The issues raised are summarised in the next table:

Issues raised
– To establish a needs assessment on progress so far, activities still to be performed and overall financing plan including resources from different stakeholders (ECA)
– To establish 'consistent strategy' with goals and criteria against which ongoing and future assistance can be judged and evaluated (Mid-Term) ;
– Definition of objectives and meaningful performance indicators for monitoring and reporting of programme implementation (ECA) ;
– Ex-ante evaluation for further EU support under the next MFF (ECA)
– Identify an optimal vehicle for providing assistance in the future (Mid-Term) ;
– Number of management levels and diffused responsibilities (ECA)
– Absence of funding ceilings and polluter pay principle should be applied (EP)
– Full funding not guaranteed (ECA)
– High share of funds used for mitigating measures and not for the main purpose (decommissioning) (EP)
– Economical consequences sufficiently mitigated (EP)
– Safety is of utmost importance (EP)
– Simplification of rules for implementation (EP)
– Assess funding through Structural Funds (ECA)

2.3. Who is affected, in what ways, and to what extent?

EU citizens and future generations as well as the environment are the main groups affected by the problem of funding shortfall and the associated risk of compromising nuclear safety.

This funding shortfall would be a major risk for the safe maintenance of the shut down reactors (no salaries for the staff to perform safe maintenance). It would also jeopardize the seamless continuation of safe decommissioning because of the risk that further decommissioning steps would be postponed to an undefined date, awaiting the availability of funds and transferring this liability and responsibility to future generations. It also increases

the risk of reopening of the unsafe nuclear power plants. At most of the reactor units no major irreversible dismantling steps have been implemented. Technically it is still possible to consider restarting certain reactor units, in particular if it is considered to be economical advantageous. The funding shortfall inevitable would also affect the environment such as water quality (ground-, river- and or sea-), air quality or would result in uncontrolled release of contaminated materials.

2.4. Evolution of the problem without further EU support

Discontinuing or no further EU support would leave the three Member States facing the full cost of completing the decommissioning process. As previously mentioned the Member States have currently insufficient alternative funding sources in place for timely implementation of safe maintenance and safe completion of decommissioning. Adequate funding not being available when required would:

- result in the interruption or delay of the decommissioning process;
- change the strategy (immediate to deferred dismantling);
- increase significantly the cost due to the delay;
- jeopardise nuclear safety;
- be a risk for the citizens and the environment due to the uncompleted decommissioning status;
- lead to the commensurate loss of plant specific expertise and knowledge because no funds would be available to cover the salaries of the experienced staff at the three NPP's performing the decommissioning works;
- shift the liability and responsibility for decommissioning to future generations.

2.5. EU right to act and EU added-value

The EU support is anchored in the Protocols No 4 for Lithuania, No 9 for Slovakia and No 30 for Bulgaria to the respective Accession Treaties^{8,9,10}. In addition, protocol No 4 on the Ignalina nuclear power plant in Lithuania provides further that:

- *"... the Union shall in solidarity with Lithuania, provide adequate additional Community assistance ... beyond 2006."*
- *"For the period of the next Financial Perspectives, the overall average appropriations under the extended Ignalina Programme shall be appropriate."*

It provides the framework for EU support also beyond the current financial perspective. It should however not to be considered as an obligation for the EU to cover the full costs for decommissioning until its completion.

⁸ OJ L 236, 23.9.2003, p.33 and p.944

⁹ OJ L 236, 23.9.2003, p.33 and p.954

¹⁰ OJ L 157, 21.6.2005, p.11 and p.38

Providing further financial EU assistance to Slovakia and Bulgaria is justified in the context of equal treatment with Lithuania, not in terms of absolute amount of funds but related to supporting the Member States in addressing the current funding shortfall for seamless continuation of safe decommissioning.

The necessity for intervention (subsidiarity) is due to the fact that adequate funds required for continuing safe decommissioning can currently be not be made available through the respective national funds as explained in the previous sections. Unlike other Member States in a similar situation but without being confronted to early closure of their plants, it was not possible for them to accumulate sufficient funds from operation of the plants.

It is therefore in the interests of the European Union to ensure that the concerned reactors remain closed and that they are defueled and dismantled in order to reduce the risk of negative consequences for the EU citizen and for the environment. The EU added value lies in the support of measures dedicated to achieving real physical progress in dismantling in order to reach a safe and irreversible state within the decommissioning process, which is of paramount importance for nuclear safety.

Article 203 of the EURATOM Treaty states that "If action by the Community should prove necessary to attain one of the objectives of the Community and this Treaty has not provided the necessary powers, the Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament, take the appropriate measures." The need for insuring nuclear safety throughout the decommissioning process calls thus for EU action under Article 203, thereby allowing the prolongation of the decommissioning assistance programmes. It is proposed to have one single common Euratom Council Regulation to cover the financial EU support to all three beneficiary Member States.

3. OBJECTIVES

The general policy objectives as well as the specific objectives have been defined in the broader methodology to establish the Logical Framework Matrix (full Matrix in section 7) according the Commission's Project Cycle Management procedure.

3.1. General policy objectives

The role of the European Union is to ensure that nuclear energy is developed (from cradle to grave) while meeting the highest level of safety. Consequently, two Council Directives on establishing a community framework for the safety of nuclear installations¹¹ as well as for the responsible and safe management of spent fuel and radioactive waste¹² were adopted on June 25, 2009 and on 19 July 2011 respectively.

The general policy objective for providing additional EU funding for the period 2014 – 2020 is to support the three Member States in their efforts to continue safe decommissioning according the revised decommissioning plans. It provides substantial and durable support for the health of workers and the general public, preventing environmental degradation and providing for real progress in nuclear safety and security and initiates at the same time the transition towards full own Member States financial coverage. The ultimate responsibility for

¹¹ OJ L 172, 2.7.2009, p.18

¹² OJ L 199, 2.8.2011; p.48

nuclear safety however remains with the Member State concerned, which also implies the ultimate responsibility for its financing.

In order to achieve this objective in the given context, additional assistance of €500 million has been estimated for the period 2014 - 2020, in support of safe decommissioning. This further assistance is clearly to be understood as an expression of solidarity towards the three concerned Member States.

3.2. Specific objectives

The three specific objectives of the additional EU support programme are to

- (1) To reach an irreversible state within the decommissioning process. The main expected results/outputs for achieving this objective are:
 - Nuclear power plants are safely maintained in post shut-down mode until complete defueling;
 - Decommissioning license is in place;
 - Design for the dismantling of the reactor core/primary circuit is completed;
 - Dismantling in the reactor building has started.
- (2) To safely manage the radioactive waste: The main expected results/outputs for achieving this objective are:
 - All nuclear reactor units are entirely defueled and nuclear spent fuel is safely stored;
 - Decommissioning waste is part of a comprehensive waste management programme and safely treated and stored according to a detailed waste management plan.
- (3) To maintain the key expertise and knowledge: This is of benefit for safe decommissioning but equally important for addressing the social consequences of the early closure. The expected result for achieving this objective is the redeployment of plant personal for decommissioning activities.

3.3. Consistency with other EU policies and objectives

The general and specific objectives for providing additional EU funding for the period 2014 – 2020 are consistent with the Community assistance programme provided under the current financial perspectives as well as the Lisbon Treaty (solidarity principle).

4. POLICY OPTIONS

The three identified policy options are:

Option 1: Baseline option: No further financial EU assistance;

Option 2: Business as usual: EU financial contribution to decommissioning and consequential measures in the energy sector;

Option 3: EU partial financing of decommissioning only

Under **Option 1** the implementation of the provisions of the accession treaty would end in 2013. No further financial EU assistance would be provided and consequently all three Member States would have to guarantee safe completion of their decommissioning programme with own national resources.

Option 2 would entail a prolongation of the current funding programmes, similar in level of funding (current support: €258 million per year) and in scope (decommissioning and energy measures to further mitigate the economical consequences of the early closure).

Option 3 is a clear political message that the three Member States should show a higher degree of financial responsibility and ownership and therefore additional funding is proposed to be reduced in amount (about €71 million per year in average) and limited in time (no EU support any more beyond 2020). Under this option, no further EU assistance would be made available for measures in the energy sector for mitigating the economical consequences of the early closure. The EU support would only be focussed on key issues in order to progress on safe decommissioning. The EU support would need to be complemented by substantial additional national financial resources to meet the remaining funding gap for the completion of decommissioning.

The policy option of no EU intervention but completing decommissioning only with private funding was not considered. Early closure or decommissioning are not giving rise to any economical gain, which means that also the market will not finance the decommissioning process.

Complementary to the policy options it is important to assess the possible delivery mechanisms in order to identify the most appropriate mechanism for achieving the general and specific objectives in the most effective and efficient way. This has been recommended in the context of the mid-term evaluation. Option 1 (no further financial EU assistance) does not require any delivery mechanism.

There are four possible delivery mechanisms that can be considered for options 2 and 3. They are:

Mechanism A: Funding under joint management with the EBRD through the existing international multi-donor funds (current mechanism for all three Member States): This is the current system. It worked well in the period before Accession, but has since then started to show its limits. It is to be noted that the other donors have not provided any further support since years, making the EU the largest and since 2004 the only remaining donor (more than 95 % of current funds totals).

Mechanism B: Funding under joint management with the EBRD however through dedicated EC funds: This system would benefit from the EBRD's competence as financial institution under joint management, without the drawbacks of the multi-donor fund system.

Mechanism C: Funding under centralised indirect management through the existing national agency CPMA (current additional mechanism only for Lithuania) nominated by the Commission: With the completion of the main infrastructure investment projects, and the

advancement in the decommissioning process with skilled own staff at the nuclear power plant, a tendency to move towards complete execution of the EU budget by CPMA is the ongoing trend.

Mechanism D: Funding integrated into the EU structural funds mechanism: This delivery mechanism would be entirely new and would put the decommissioning support programme under the General Regulation governing the Structural Funds.

The implementation of any further EU support directly by the European Commission without any intermediate implementing body (EBRD or CPMA) is not considered as delivery mechanism. The Commission does not have the required human resources to act as contracting authority, to ensure the implementation of investments and the management of decommissioning project preparation, selection, appraisal, procurement, contracting and control.

5. ANALYSIS OF IMPACTS

5.1. Economic, social and environmental impacts

Effects appear mainly linked to the fields below, and are positively respectively negatively linked to either funding of a safe decommissioning, or the lack of sufficiently and timely available funding. They are mainly cross-border.

5.1.1. *Economic impacts*

- Electricity prices for consumers. Although it can be argued that up to now, the cost of electricity charged did not include all back-end costs (except Slovakia), there are high increases in electricity prices for end consumers due to the early closures. Options 2 and 3 would ease the effect, by offsetting partly the decommissioning costs and spreading the price rise due to increased levies on electricity over time.
- Electricity trade: the early closure has led to diminished generation capacity in the three Member States, and hence diminished electricity trade (Bulgaria), or switches from being electricity exporter to importer (Lithuania and Slovakia). It is to be noted that Lithuania and the Baltic States in general are not connected to the European electricity grid, making them vulnerable to major electricity imports from one single source, Russia. Lithuania had to close down its two nuclear reactor units, representing around 70% of the energy generation. It is still heavily dependent on one supplier (Russia 80%) for all energy sources (oil – gas – electricity). Only option 2 would make a difference, as energy sector measures would then be financed.
- Competitiveness:

The Accession Treaties already recognise the extraordinary burden that is placed on the economies of the three concerned Member States following the early closure. The amounts needed for the decommissioning process, especially given the imposed early closure, might handicap the competitiveness of the three Member States during an extended period of time. Therefore, EU funding is already foreseen since the Pre-Accession status in order to restore the competitive balance with Member States who

have had more time to accumulate decommissioning funds during the operational lifetime of their nuclear power plants.

Option 1 would therefore worsen the competitive status of the three concerned Member States. Options 2 and 3 restoring the competitive fair grounds as far as the amounts needed for decommissioning are concerned. However, given the time lapse since the closure and the mitigation measures already put in place until now, care must be taken in order not to go too far, especially relating to replacement capacity or equivalent savings. Such an action could possibly create distortion with other Member States who have to replace outdated power generation themselves.

Additionally, under option 1 and 2 in the case of Lithuania, experience in the "first of a kind" decommissioning of a graphite reactor would be build up – with all international expertise involved in the research and steering of the programme. This would strengthen Lithuanians competitiveness in the field of decommissioning of graphite reactors.

- Impact on the GDP:

The seamless implementation of the current decommissioning plans (option 2 and 3) will stimulate growth by accelerating the pace of decommissioning activities to be performed. Delaying decommissioning because of inadequate funding (option 1) would have a negative impact on the GDP, as investments would be shifted towards the future.

- Public authorities:

Option 1 will have a major budgetary impact for the beneficiary Member States. They would need to cover the full remaining funding for decommissioning from their national budget. This cannot be considered credible. At present effectively €50 million is available in the national fund in Lithuania; €30 million is available in the national fund in Slovakia for reactors 1 and 2; and €180 million is available in the national fund in Bulgaria for reactors 1 to 4. Option 2 and 3 will limit the impact on the national budgets. Nevertheless, option 3 clearly emphasises the need for the three Member States to ensure a higher degree of financial responsibility and ownership. While providing a reduced support beyond 2013 this allows for a smooth transition to full Member State funding of decommissioning until the end of the process. It provides an additional time reserve for Member States to set aside national resources to take over the financial liability for completion of decommissioning.

- Administrative burden:

For the implementation of the policy options (2 and 3 only) the burden depends on the selected delivery mechanism identified in section 4.

For mechanism A the decision systems are complicated, giving the EU only one vote amongst the donors, and are leading to a dilution of responsibilities. In case of difficulties in the implementation of projects this mechanism has shown its limitations regarding the Commission's possibilities to intervene. This weakness has also been identified in the context of the performance audit conducted by the European Court of

Auditors. Due to the fact that since 2004 there were no further 3rd party contributors to the multi-donor fund this mechanism seems no longer appropriate.

Under mechanism B the decision making process would be streamlined, as well as the monitoring flows improved, and administrative burden decreased. The General Conditions applicable to the European Community contribution agreements with international organisations as well as the Commission's procedural decisions would then be binding and would fully apply (which is not the case for the multi-donor funding mechanism under A). Mechanism B would strengthen the Commissions management possibilities to intervene more efficiently in case of difficulties (delays and cost overruns) in the implementation of decommissioning project by the beneficiaries. At the same time it allows to reduce the number of management levels as recommended by the Court.

Implementation of the EU support via a dedicated national agency under delivery mechanism C has benefits for the future kind of projects of proximity for instance during tender processes and day to day follow up of the decommissioning works by local companies. Although this mechanism is operating in Lithuania, a similar alternative is not investigated for Slovakia and Bulgaria, as no suitable structures exist at present to fulfil this role. Given the time needed to set up, verify and accreditate such new structures, a significant risk for delays would occur.

The inclusion of the decommissioning funds into the structural funds (mechanism D) would appear to be contrary to the overall philosophy of the structural funds, which are geared to growth objectives, notably in line with the priorities of the EUROPE 2020 strategy. Structural Funds operate on the basis of shared management. In accordance with this principle, it is up to Member States to design, select, implement and manage projects, in line with the priority axes laid down in operational programmes that are the subject of a Commission decision. The primary responsibility for monitoring and control of the project lies with Member States. The Commission participates in programme monitoring committees on an advisory basis and performs selective audits on the basis of a risk analysis. The system of regular technical inspections performed by the Commission as part of the monitoring mechanism for nuclear decommissioning is not readily compatible with the shared management model. International cooperation would also be less straightforward under shared management. Specificities in the field of nuclear decommissioning such as active involvement of specialised nuclear services and inspections to assure nuclear safety throughout the decommissioning process are not readily compatible with the shared management mode of the Structural Funds. The Structural Funds operate on a co-financing basis, i.e. national public or private co-financing is required, with the EU contribution being determined by the various limits set out in the General Regulation governing the Structural Funds. The actual level of the EU contribution to a given priority axis is additionally modulated on the basis of a number of criteria, including the full application of the "polluter pays" principle.

- Impacts on third countries:

Option 1 would lead to an immediate funding shortfall. This could have a potential major impact in and outside the EU as highlighted in the problem definition under section 2. Options 2 and 3 address the funding shortfall and will have a positive impact on citizens and environment in and outside the EU.

5.1.2. *Social impacts*

- **Employment:** Currently a significant number of skilled people are employed at the concerned power plants (4200 in BG (715 in decommissioning of units 1-4), 2000 in LT and 1000 in SK(240 in V1)). These skilled labour forces are needed for the safe maintenance of the closed down reactors, for the radiological characterisation and for some pre-decommissioning activities requiring their existing historical knowledge of the plant's operational life time. If no funding would be available (options 1), this would pose a serious threat to the payment of their salaries¹³. It would also affect whole towns, where the NPP is generally the main employer. Therefore many more people than only the direct staff would be affected in their future. In case of continued EU financing for decommissioning (options 2 and 3), the key staff with their expertise would be maintained as well as the historical memory, with the highest value for the decommissioning project. Their historical knowledge would be used optimally, and the risk of additional cost overruns due to "unforeseen discoveries" would be significantly lower. Additional skilled labour would be needed in the operation of the waste facilities.
- **Security (accidents / terrorism / security of energy supply):** without funding (options 1), less strict control and less maintenance are likely, leading to a higher risk of misuse. With the acceleration of the decommissioning process (options 2 and especially 3), this risk diminishes.
- **Health:** radiological risks for workers as well as for the general public are possible in case of accidents or lower safe maintenance. Safe treatment, storage and disposal of spent fuel and radioactive waste should be according to the highest safety standards but they require appropriate funding (options 2 and 3). The relevance of safety has been underlined by the European Parliament.

5.1.3. *Environmental impacts*

- **Environment:** in case of delaying the decommissioning, the waste management, in case of insufficient safe maintenance or accidents, or even simply as a result of ageing monitoring equipment, impacts would include areas as drinking water, rivers and lakes, the food chain, flora and fauna, radiological effects on land, water and air. It is important to ensure transparent monitoring, especially for possible EU wide effects. The risk for accidents, contamination, leaks etc increases with the lack of funding for safe maintenance and decommissioning (option 1 entail a significant risk, which is much lower under options 2 and 3).

5.2. **Sensitivity analysis**

The decommissioning process is a complex process which extends over a significant time. There are several uncertainties. Some are of a technical nature (e.g. the first-in-a-kind decommissioning of a graphite reactor, differences between building plans and actual built dating back to the soviet era). Others are the availability of sufficient national funding, price evolutions, changing safety regulations or additional safety requirements imposed at the licensing stage.

¹³ To be noted that not for all staff, salaries should be paid under decommissioning.

RISK MATRIX

	High impact	Medium impact	Low impact
High probability	Non-availability of national funding	Price evolutions	
Medium probability	Technical changes due to "the first-of-a-kind" decommissioning of a graphite reactor; changing safety regulations; additional safety requirements imposed at lincensing	Differences between building plans and actual built dating back to the soviet era	
Low probability			

The above risk matrix concerns the overall decommissioning process independent from where the financing is provided. However, the risk for the EU budget should be limited by setting clear priorities in the tasks to be performed (highest EU added value), give the overall ceiling for the EU funding solidarity (cost overruns are born by the beneficiary Member States), as well as creating the optimal funding contributions on for instance an "earned value" management control concept.

To complete the above considerations the Logical Framework Matrix in section 7 identifies additional external factors that have the potential to influence (or even determine) the success of the EU support programme, but lie outside the direct control of the European Commission.

6. COMPARING THE OPTIONS

The overriding principle and main weighing factor is the contribution to improving nuclear safety and security while progressing with nuclear decommissioning. All impacts have been treated in a qualitative way, within the need to contribute to the general and specific objectives. Option 1 does not address any of the objectives. It excludes the EU from any influence on safe decommissioning reaching an irreversible stage in the process. Consequently this option must therefore to be excluded. Business as usual option 2 and option 3 contribute to the overriding principle of nuclear safety. Option 2 is however far more costly without justified EU added value (high time lapse since closure and significant measures put in place to deal with the early closure consequences).

Option 1: Baseline option: No further financial EU assistance

In the case funding has to come entirely from the already stretched national budget, the "immediate decommissioning" strategy will not be pursued, especially given the current economical context, the energy needs and the original reluctance to close down early the "profitable" nuclear reactors. Talks about re-opening have already been held. The potentially re-opening of these nuclear reactors poses a serious threat to the citizens and the environment.

Strengths: <ul style="list-style-type: none"> – national responsibilities taken – polluter pays principle would be fully endorsed 	Opportunities: <ul style="list-style-type: none"> – less costs on the EU budget – no programme administration (delivery mechanisms) required
Weaknesses: <ul style="list-style-type: none"> – insufficient funding available in the national fund – economical context of weak national budgets – no "direct" international view on the decommissioning process 	Threats: <ul style="list-style-type: none"> – compromise nuclear safety – postponement of decommissioning and related higher inflated costs – restart of the reactors – prolonged duration of and additional costs for safe maintenance – unemployment of staff and loss of necessary skills for nuclear decommissioning – radiological exposure – environmental degradation

Option 2: Business as usual: EU financial contribution to decommissioning and consequential measures in the energy sector

Further financial support beyond 2013 at the current support level will allow to swiftly progress with the actual dismantling operations and waste treatment. Further energy efficiency measures and installation of new electricity generation capacity can continue, as well as the restructuring of the electricity networks.

However so far most of the energy sector objectives, consequential to the closure, have been met. It has allowed for the concerned Member States to have sufficient additional EU financed capacity at peak load conditions, allowing for coping with the normal network operations. Moreover it seems that, given the period since the early closures as well as the risk of distortion of competition in the field of energy efficiency measures, network upgrading and building of new electricity generation capacity, this funding window should not be further considered. The business as usual option has to be excluded also for the following reasons;

- further EU support to projects in the energy sector would lead to distortion of competition and
- a continuing high level of financial support to decommissioning would not be a sufficient incentive for the concerned Member States to gradually take over full financial responsibility and ownership of the decommissioning project.

The position to terminate funding for energy projects was clearly supported by the European Parliament.

Strengths: <ul style="list-style-type: none"> – supports continuation of immediate decommissioning – make it impossible to restart the reactors – use of available expertise and historical memory – more economic approach – reduce unemployment by using own skilled 	Opportunities: <ul style="list-style-type: none"> – contribution to increased nuclear safety – actual progress with de-fuelling and dismantling works – better check on the optimal advancement of the decommissioning – further support of measures in the energy sector
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staff when immediate dismantling – international expertise coming in through the EU funding approval process	
Weaknesses: – EU rather than national funding – further EU support at a high funding level – polluter pays principle less applied	Threats: – continuous request for full funding – sub-optimal allocation of resources (energy sector) – double funding in the energy sector – distortion of competition and preferential treatment (EU financing of 20-20-20 targets)

Option 3: EU partial financing of decommissioning only

Option 3 reflects a clear political will of the Commission to gradually phase out the financial EU assistance for decommissioning in the three Member States. Limited support only to decommissioning also excludes the threats identified for option 2. Meeting the programme objectives with option 3 requires however a full commitment of the Member States to provide the required additional financial resources to met the costs to completion of safe decommissioning.

Under option 3 €500¹⁴ million would become fully available for decommissioning. This would support the continuation of safe decommissioning beyond 2013, bring the decommissioning process to an irreversible stage and at the same time stimulate a stronger own financial effort by the beneficiary Member State itself.

The main funding data related to the decommissioning of the nuclear power plants in the three Member States is summarised in the table below. The data is based on the updated estimations of total costs for decommissioning and of remaining funding needs beyond 2013 to complete the decommissioning as provided by the Member States.

[€million]	Lithuania	Slovakia	Bulgaria	Total
Decommissioning cost estimation (including waste management, MS data)	2 800	1 146	1 858	5 804
EU support for decommissioning (by end 2013)	1 107	429	510	2 046
Other financial support (national resources and other donors)	343	291	495	1 129
Additional needs (beyond 2013, MS data)	1 350	426	853	2 629
Proposed additional EU support At 2011 prices	210	105	185	500

¹⁴ Financial amounts are given in 2011 prices.

Remaining funding gap	1 140	321	668	2 129
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The total amount required for decommissioning of the eight nuclear power plant units is estimated at € 804 million. By the end of 2013 € 175 million will have been put in place. Out of this amount, € 046 million (64%) will be covered by the financial EU support. Member States and other donors will have contributed by 2013 with additional € 129 million.

The additional funds required beyond 2013 is estimated at € 629 million. The proposed extension of the EU financial support by €500 million represents approximately 20% of the remaining funds to be provided. The reduction in the amount of the financial EU support for the next financial perspective takes due account of the evolution since the three Member States have joined the EU.

At the time of accession (2004 and 2007) the Member States were in a difficult economic situation. To allow for the early closure of the concerned nuclear power plants and to address the urgent needs of the Member States to address the economic consequences of closure as well as for starting preparation of decommissioning it was justified that the EU covers the major part of the funding needs.

In the meantime, Member States have established legal provisions that should address the funding needs for decommissioning (ex. special levy on electricity prices). Member States are also committed to bear their responsibility for the completion of decommissioning. Nevertheless, it cannot reasonably be expected (due to the reduced time of accumulation as explained above) that by 2013 the three Member States would be in a position to complete the decommissioning only by their own financial means. Therefore, the reduced amount of €500 million of further EU support is considered to be reasonable to support the seamless continuation of the decommissioning process and the transition to the full remaining financing by the Member States.

The €500 million additional EU support shall be dedicated to support safety relevant activities. It is expected from the Member States that they are ready to provide the required additional financing to cover the remaining funding gap (see table above) and to safely complete decommissioning in order to ensure efficient and effective use of the additional EU support of €500 million. Slovakia and Bulgaria already expressed their readiness to meet this expectation.

Lithuania will have to make significant larger efforts to accumulate the needed funds. Not only that Lithuania started much later with making financial provisions for decommissioning but also the electricity prices in the past were extremely low and even after having increased the prices since two years, they are currently still low (0.0955€/kWh) as compared to Slovakia for example (0.1277€/kWh). In addition priorities in the energy sector are more focused on security of supply and interconnections. Under the Commission proposals for the next financial framework Lithuania will, at the same time, remain a major beneficiary of the Structural and Cohesion Funds, which will allow for continued support for catering for the economic and social consequences of decommissioning. In addition, the Connecting Europe Facility proposed by the Commission will create major opportunities for Lithuania to upgrade and modernise its energy, transport and telecommunications infrastructure. This could free some national resources that could be re-directed for providing the balancing funding of decommissioning.

With the additional €500 million the EU support dedicated to decommissioning as percentage of total estimated costs for decommissioning reaches around 44% (€ 546 million out of € 804 million).

Taking into account the overall total EU funds committed to the three Member States until 2013 (€ 848 million) plus the additional €500 million up to 2020, the total EU support as a percentage of total estimated costs for decommissioning approaches 58%.

It has to be noted that the EU will have allocated by the end of 2013 around €802 million for mitigating measures in the energy sector, consequential to the early closure out of the total EU support of € 848 million.

Beyond 2020 the Commission does not foresee any further extension of financial EU support.

<p>Strengths:</p> <ul style="list-style-type: none"> – reduced EU support (in amount and time) – provides time to establish more national financial means – supports continuation of immediate decommissioning – make it impossible to restart the reactors – use of available expertise and historical memory – more economic approach – reduce unemployment by using own skilled staff when immediate dismantling – international expertise coming in through the EU funding approval process 	<p>Opportunities:</p> <ul style="list-style-type: none"> – contribution to increased nuclear safety – transition to full financial responsibility and ownership of the Member State – actual progress with de-fuelling and dismantling works – better check on the optimal advancement of the decommissioning
<p>Weaknesses:</p> <ul style="list-style-type: none"> – still some EU support – polluter pays principle not fully applied 	<p>Threats:</p> <ul style="list-style-type: none"> – Member States unable to provide the balancing funding to met the cost to completion of decommissioning – continuous request for full funding if no concrete milestones and boundary conditions for the EU funding would be set

In summary, the impacts would be a contribution to the improvement of nuclear safety (options 2 and 3) with an accelerated defueling and decommissioning under international co-operation; versus a highly increased safety risk (under option 1), with EU wide effects in case of a possible accident, and possibly re-opening of potentially unsafe reactors.

Option 3 would indeed have a high added value as it would allow to advance significantly the decommissioning process in a safe way, to improve significantly nuclear safety and to provide at the same time a transition period for the Member States to gradually take over full ownership and financial responsibility.

Delivery mechanisms

The administrative burden should be less than at present for all the three considered policy options. **Options 1** would not require any delivery mechanism, however the EU would then lack information on the continuation of safe maintenance and decommissioning.

In **option 2 and 3**, there will be only a single legal base, and only one set of rules that apply to all three decommissioning funds. It is proposed to have a national channel for Lithuania (mechanism C), as the CPMA is in place and have successfully managed several EU funding programmes over the past years. CPMA is located in Lithuania and has therefore less overhead and administrative costs in the monitoring process. For Bulgaria and Slovakia, where such a national implementing body does not exist, it is proposed to continue to use exclusively the EBRD. However given the absence of continued funding from other international donors, and in order to streamline and to simplify, it is proposed to go through a dedicated decommissioning fund (mechanism B). This would increase the decision making power and the influence of the Commission over the EU funding to attain objectives, and increase responsibility by suppressing a layer of decision making and approval procedures (the Assembly of Contributors – fund rules – specific rules for tendering etc.). Both mechanisms B and C will strengthen the Commissions management role, in particular also when dealing with difficulties in project implementation. The combination of options B and C represent a natural evolution of the current Commission Decision on Procedures and will improve the overall management of the programme regarding efficiency and effectiveness as recommended by the European Court of Auditors.

The preferred option

Option 2 (business as usual) has high costs and only reduced added EU value. Option 1 (no further EU support) jeopardizes nuclear safety with potential high negative impact on EU citizens and the environment.

The main concern is that the financing for the continuous safe-maintenance and decommissioning needs to be available in a timely manner. This is the crucial element for improving nuclear safety and the protection of all EU citizens. Whether the financing comes from EU or other funding sources, it is important to realise that all further impacts of safe maintenance and decommissioning itself are equal (impact on nuclear safety, radiological risks, other environmental risks, employment etc). In case no funding would be available, safe maintenance would be compromised. Loss of unique expertise would render the whole decommissioning process, more difficult and costly. It is equally important to have sufficient resources available to allow the continuation of the decommissioning process.

EU partial financing for decommissioning only (option 3) is considered the most appropriate solution following a clear expressed political will. This option maximises the EU added value and supports the transition towards full Member State funding of the safe completion of decommissioning beyond the next multiannual financial framework. Option 3 provides for real improvement in nuclear safety and will help to achieve timely real physical progress in defueling and decommissioning and ensure that the closure is irreversible.

Option 3 combined with the implementation mechanisms B (for Bulgaria and Slovakia) and C (for Lithuania) will provide for a continued strengthening of the Commission's management for the effective, efficient and economical use of EU funds. The identified weaknesses under the current implementation mechanism (A) would be overcome and it would reinforce the Commissions management possibilities to intervene more efficiently in case of difficulties (delays and cost overruns) in the implementation of decommissioning project by the

beneficiaries. The specific objectives being aligned with the proposed budget and based on revised/updated decommissioning plans (needs expressed by the Member States) together with the meaningful performance indicators are the basis for achieving the expected benefits from the further financial EU support after 2013. This approach is in full accordance with the recommendations from the European Court of Auditors.

7. MONITORING AND EVALUATION

7.1. Core indicators of progress towards meeting the objectives

In order to be able to verify the success of the programme (meeting the general and specific objectives) **SMART Objectively Verifiable Indicators** have been identified. Those indicators can also serve to target the funding towards tasks with the highest EU added value. At the same time, they allow to give a clear signal and incentive to the beneficiary Member States for them to advance efficiently and effectively on the vital parts of the decommissioning process.

The Logical Framework Matrix (presented below) provides an overview of the main programme parameters in terms of objectives, outputs (results), activities, pertinent indicators, source of verifications and basic assumptions.

At the current stage those indicators are generic to all three individual Programmes (Ignalina, Bohunice and Kozloduy Programme). For the implementation it is foreseen to adopt one annual work programme for all three individual Programmes specifying the objectives, expected results, related indicators and timeline for the use of funds under each annual financial commitment.

On a procedural level it is foreseen to adopt not later than 31 December 2014 detailed implementation procedures for the duration of the Programme. This decision shall also contain expected results, activities with the corresponding performance indicators, as well as the decommissioning plans for all three individual Programmes that will serve as baseline for the monitoring of the progress and the timely achievement of the expected results.

A major precondition to ensure efficient use of the further EU support in meeting the objectives is the need for the three Member States to put in place by January 2014, a national legal framework to provide adequate provisions for the timely accumulation of national financial resources for the safe completion of decommissioning.

7.2. Broad outline for possible monitoring and evaluation arrangements

The monitoring is based on the review of the identified indicators, measuring progress towards meeting the objectives.

A revised Commission Decision on Procedures (similar to the current programme) will define all related procedural issues related to the implementation of the extended EU financial support, amongst others also the monitoring and reporting requirements. The EU monitoring, reporting and evaluation arrangements will contain at least:

- Twice per year a monitoring committee meeting with EU on the spot to verify the advancement of the decommissioning works.

- Regular status and progress reporting from the beneficiary NPP as well as the implementing bodies (EBRD and CPMA).
- Yearly combined programming documents, annexed to the Commission Decision on financing reporting progress towards decommissioning.
- Status reports to the European Parliament and Council on the implementation of the financial EU assistance

Additionally, a monitoring system should be put in place by the beneficiaries, allowing for active day-to-day monitoring of the projects and tasks, and allowing for immediate operational feedback into the planning with corrective measures.

Regarding arrangements for evaluations it is foreseen that no later than end 2016, an evaluation report shall be established by the Commission on the achievement of the objectives of all the measures (at the level of results and impacts), the efficiency of the use of resources and its European added value, in view of a decision on modification or suspension of the measures. The evaluation shall additionally address the scope for simplification, its internal and external coherence, the continued relevance of all objectives, as well as the contribution of the measures to the Union priorities of smart, sustainable and inclusive growth. It shall take into account evaluation results on the long-term impact of the predecessor measures.

It is planned to perform ex-post evaluation in close cooperation with the Member States and beneficiaries. The ex-post evaluation shall examine the effectiveness and efficiency of the Programme and its impact on decommissioning.

Evaluations will take account of progress against identified performance indicators in the Regulation and the Work Programmes.

LOGICAL FRAMEWORK MATRIX				
	Intervention logic	Indicators	Source of Verification	Assumptions
Overall Objective	Support the Member States efforts in safe decommissioning.	Progress according decommissioning plan (tasks, costs, resources, timing);	Decommissioning plan; Regular monitoring meetings; Reporting by NPP and national authorities;	Stable political and regulatory framework; National funding forthcoming to meet the funding gap;
Purpose	To reach an irreversible state within the decommissioning process; To safely manage the spent fuel and radioactive waste;	Dismantling according decommissioning plan; Waste management according detailed waste management plan	Decommissioning and waste management plan; Regular reporting and monitoring meetings;	Stable political and regulatory framework; No changes in decommissioning strategy;

	To maintain the key expertise and knowledge;	Use of staff from the nuclear power plants;		
Outputs (expected results)	NPPs safely maintained; No environmental impact; Spent fuel safely stored; Nuclear waste safely stored; Decommissioning license in place; Design of core/primary circuit dismantling; Staff engaged on decommissioning;	Nb of incidents/accidents; Environmental monitoring data; Nb of fuel elements stored and Nb of waste packages stored according to the planning; License issued according to the time schedule; Design completed in time; Nb of staff employed; Earned value analysis;	Status and progress reports; Regular monitoring meetings; License issued by the regulator; Staff accountancy;	Efficient NPP management structure for decommissioning established and fully operational; Efficient decommissioning planning in place; Operational feedback effectively used; No changes in decommissioning strategy; Proactive project monitoring function in place;
Activities	Safe maintenance; Defueling; Dismantling works; Radwaste treatment and conditioning; Licensing docs; Engineering design core/prim circuit dismantling; Staff training and reallocation;	Planning of safe maintenance; Nb of fuel elements unloaded; Quantity of material/system dismantled; Quantity of rad waste treated and conditioned; Submission of licensing doc; Design feasibility and engineering studies; Nb of staff trained and reallocated;	Status and progress reports; Regular monitoring meetings; Detailed decommissioning work plan; Operational feedback to NPP planning department; HR plan;	Efficient NPP management structure for decommissioning established and fully operational; National funding forthcoming to meet the funding gap; Economic viability for using own NPP staff;

8. ANNEXE 1: OVERVIEW OF 3 COUNTRIES BASIC DATA

	LITHUANIA	SLOVAKIA	BULGARIA
Type of reactor (and number)	RBMK (2)	VVER 440/230 (2)	VVER440/230 (4)
Capacity shut down early	2600 MWe nominal average load factor before closure 70% Effective lost capacity = 1820 MWe	880 MWe nominal average load factor before closure 86,8% Effective lost capacity = 764 MWe	TOTAL 1760 MWe nominal Units 1to4 880MWe average load factor before closure 75% Effective lost capacity = 660 MWe (taken into account also upgrade of units 5-6 with 300 MWe)
Lost years due to early closure compared to 30 years of operation	17	4	15
Specific conditions / circumstances to be taken into account	<ul style="list-style-type: none"> • 70 % of energy production shut down early • Isolation from EU grid 	<ul style="list-style-type: none"> • Electricity price already high at top of EU range • 10% of energy production shut down early • V1 NPP covered approx. 20% of electricity consumption • Slovakia became net importer of electricity after closure (exporter before) 	<ul style="list-style-type: none"> • Contribution nuclear to overall electricity production 45% before shutdown in 2002 of units 1&2 and 17% in 2007 after shutdown of units 3&4
Total cost of decommissioning (waste)	2800 MEUR	1 146 MEUR	1858 MEUR

man. incl.); Updates estimation by Member States			
Completion date for Decommissioning	2029	2025	2030
International funding until 2014 ¹⁵	1451 MEUR	636 MEUR	890 MEUR
Of which already received EU funding up to 2014	1367MEUR	613 MEUR	850 MEUR
Of which already received funding from other donors up to 2014 ¹⁶	84 MEUR	23 MEUR	40 MEUR
Existing National Funding	50 Mio €	230 MEUR	180 MEUR
National budget provisions earmarked	No	Yes	Yes
Funding GAP Updated estimation by Member States	1350 MEUR	426 MEUR	853 MEUR
Requested EU funding	770+580= 1350 MEUR ¹⁷	426 MEUR	450 MEUR
Proposed EU funding	210 MEUR	105 MEUR	185 MEUR
Required national funding	1110 MEUR	318.5 MEUR	700.5 MEUR

¹⁵ Including also other international donors and interest

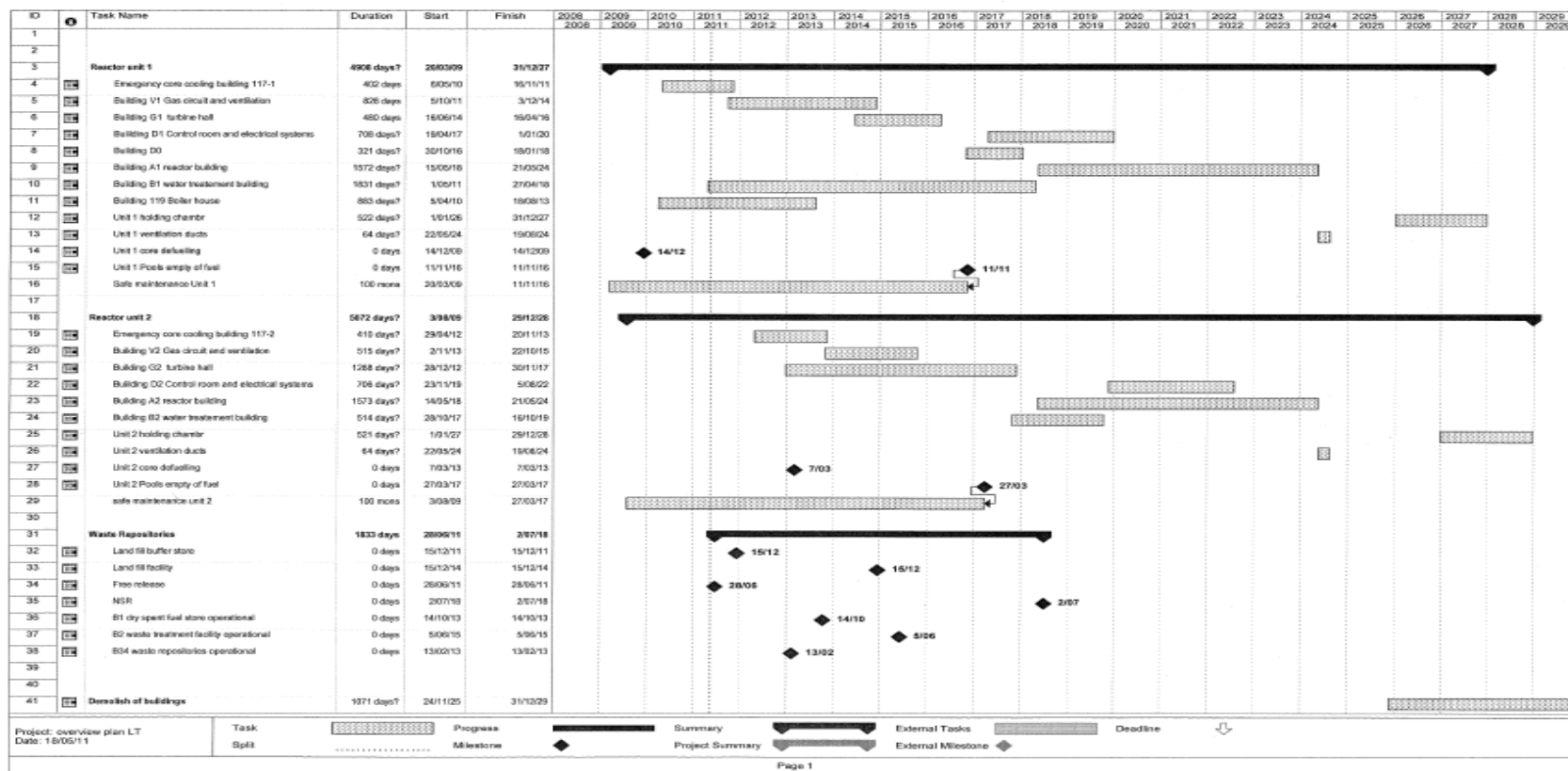
¹⁶ Including international donors and accumulated interest

¹⁷ €70 million for the period 2014-2020 and additional €30 million for the period 2021-2028

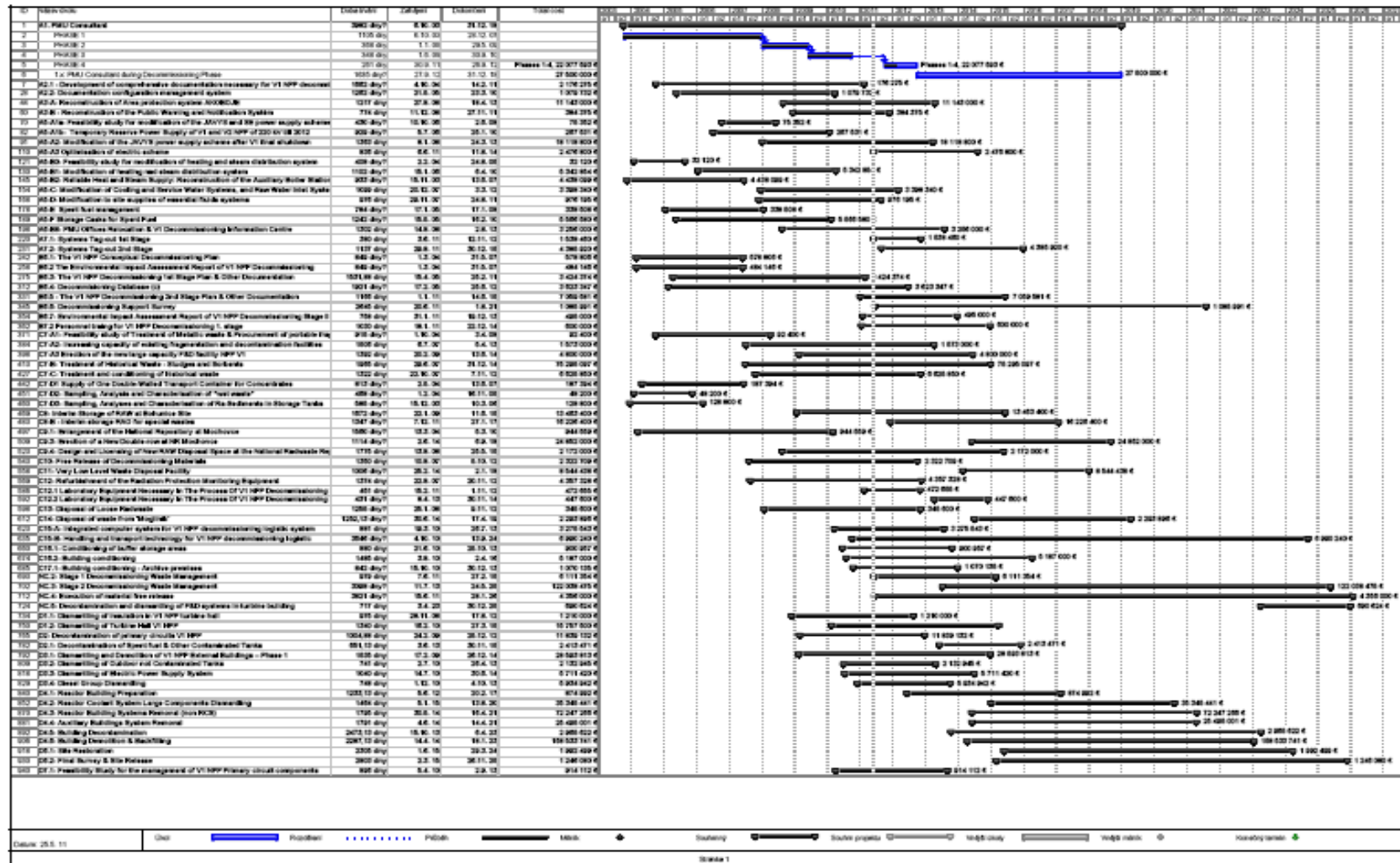
Key milestones with specific EU added value or interest			
• Closure	Reached	Reached	Reached
• Core defueling	2009/2013	Reached	Reached
• Reactor building defueling	2016/2017	Reached	U1&2 reached U3&4 to be reached end 2011
• Decommissioning licence	Ongoing – building wise licensing approach	Reached for phase 1	U1&2 end 2011 U3&4 end 2012
• Primary circuit decontamination	Started for unit 1	December 2012	2027
• Dismantling turbine hall	2016/2017	2015	2020
• Commission of a national repository for low and intermediate radioactive waste	2018	2015	End 2015
• Primary circuit (incl. RPV) dismantling	2022/2023	August 2020	Units 1&2 end 2024 Units 3&4 end 2028

9. ANNEXE 2: FULL DECOMMISSIONING PLANS FOR LT, SK, BG

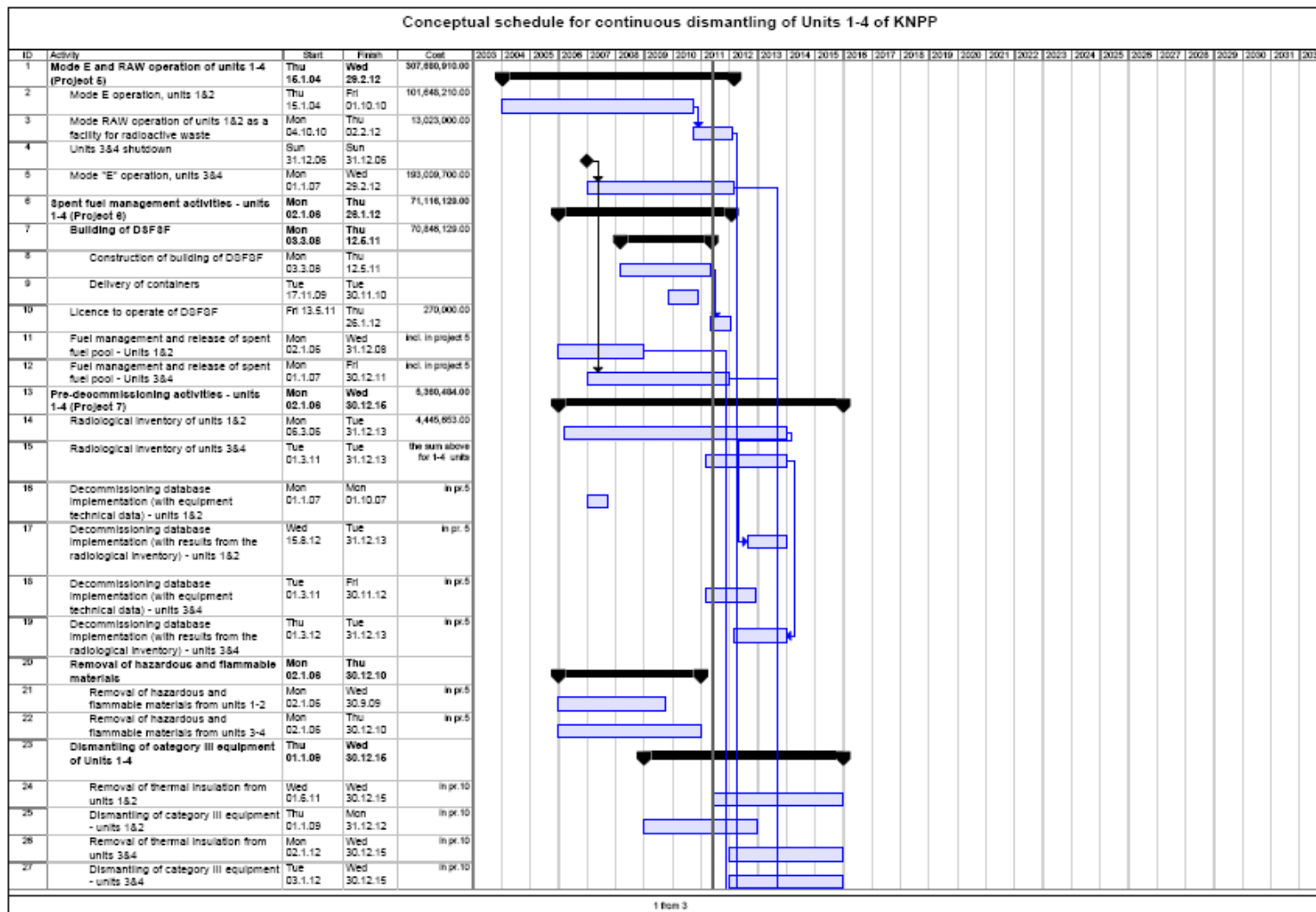
9.1. Annexe 2.1: Detailed decommissioning plan – Lithuania



9.2. Annexe 2.2: Detailed decommissioning plan – Slovakia



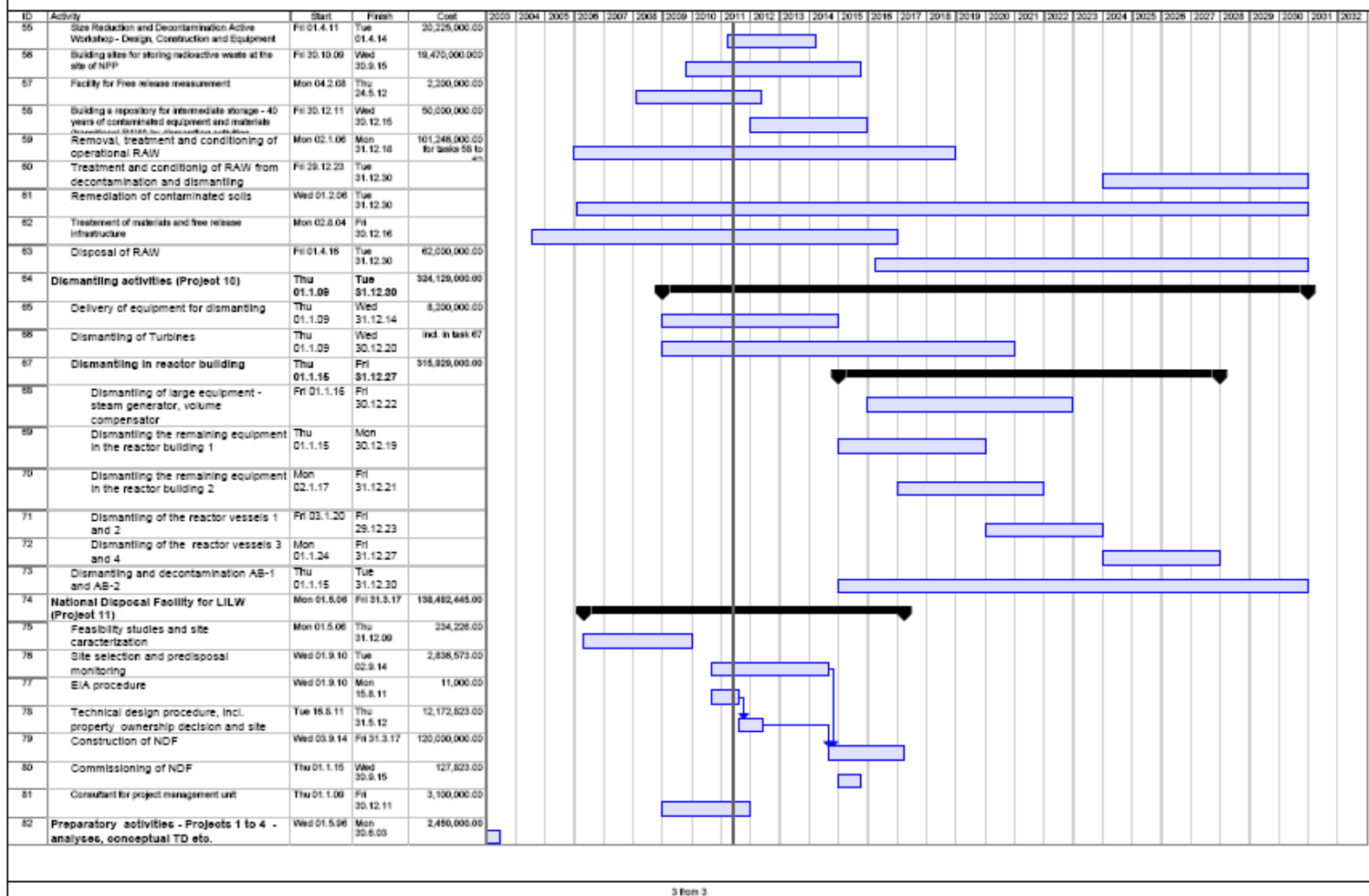
9.3. Annexe 2.3 Detailed decommissioning plan – Bulgaria



Conceptual schedule for continuous dismantling of Units 1-4 of KNPP

ID	Activity	Start	Finish	Cost	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
28	Decommissioning Licence for Units 1&2	Tue 24.10.08	Thu 02.2.12																													
29	Preparation of decommissioning plan	Tue 24.10.08	Wed 01.5.11	in pr.8																												
30	Safety assessment report	Mon 02.5.09	Mon 01.5.11	in pr.8																												
31	Technological Specification	Wed 01.5.11	Mon 01.5.11	in pr.8																												
32	EIA report & public consulting	Tue 01.1.08	Mon 01.5.11	294,631.00																												
33	Decommissioning licence for Units 1&2	Thu 02.2.12	Thu 02.2.12	310,000.00																												
34	Decommissioning Licence for Units 3&4	Tue 01.1.08	Mon 02.12.13																													
35	Preparation of decommissioning plan	Mon 03.5.09	Wed 01.2.12	in pr.8																												
36	Safety assessment report	Mon 02.5.08	Wed 01.2.12	in pr.8																												
37	Technological Specification	Mon 02.1.12	Tue 28.2.12	in pr.8																												
38	EIA report & public consulting	Tue 01.1.08	Mon 01.5.11	The sum is common off																												
39	Decommissioning Permit for Units 3&4	Mon 02.12.13	Mon 02.12.13	310,000.00																												
40	Infrastructure preparation, activity for supporting of site and project management (Project 8)	Wed 01.8.01	Tue 31.12.30	543,980,005.00																												
41	Supply of equipment: security, laboratory, hardware od decommissioning management, measuring devices etc.	Mon 03.5.04	Fri 30.9.11	5,728,145.00																												
42	Establishment of an Independent Heat source	Mon 02.5.11	Wed 30.12.15	28,400,000.00																												
43	Supporting of the site	Mon 02.1.12	Tue 31.12.30	163,844,800.00																												
44	Project management and engineering	Wed 01.8.01	Tue 31.12.30	48,619,260.00																												
45	Consultant of Project management group	Wed 01.1.03	Thu 31.12.20	97,400,000.00																												
46	Separation of infrastructure units 1-4	Mon 21.1.08	Wed 30.12.16																													
47	Supply and installation of systems for measurement of heat, fuel and electricity	Mon 21.1.08	Fri 18.11.11	incl. in task 41																												
48	Design and reconstruction of heating systems and steam for own needs	Fri 02.5.08	Wed 30.12.15	incl. in task 42																												
49	RAW Management and Free release activities (Project 8)	Mon 02.8.04	Tue 31.12.30	548,036,211.00																												
50	Facility for treatment of low level radioactive water	Mon 18.3.04	Wed 01.5.11	2,159,450.00																												
51	Equipment for decontamination of pools and large tanks	Thu 09.9.04	Fri 29.12.06	829,333.00																												
52	Facility for retrieval and processing of ion exchange resins	Tue 01.11.05	Wed 30.9.15	2,776,507.00																												
53	Facility for retrieval and processing of the solidified phase of evaporator concentrate tanks	Wed 01.7.09	Wed 30.9.15	22,534,462.00																												
54	Facility for treatment and conditioning of radioactive waste with High Volume Reduction Factor	Wed 01.4.09	Fri 30.5.14	29,896,738.00																												

Conceptual schedule for continuous dismantling of Units 1-4 of KNPP



10. ANNEXE 3: CONCLUSIONS OF PREVIOUS/ONGOING AUDITS

Conclusion of mid term evaluation Slovakia and Lithuania

The mid term evaluation for Slovakia and Lithuania showed that a majority of the projects has been well implemented in so far as the results match the objectives. The costs of the projects, to the extent that it could be assessed within the evaluation, are fair when compared to the results.

The following provides an extract of the recommendations:

- That the EC develops a consistent strategy with goals and criteria for the decommissioning assistance programme(s), against which any ongoing and future assistance could be judged and evaluated.
- Ensure that any assistance provided is consistent and complementary with the national activities (implemented via national decommissioning funds and/or other national means).
- With the consideration that the conceptual decommissioning plans for both Bohunice and Ignalina were developed and decommissioning strategies selected in both countries, a more accurate estimate of actual decommissioning and related energy sector costs (against which the needs for financial assistance commitments could then be assessed) should be developed.
- In light of the changing framework conditions, it is suggested to carry out an assessment to identify an optimal vehicle for providing assistance in the future.

Preliminary recommendations of European Court of Auditors performance audit (2011)

- (a) The Commission should put in place the conditions for an effective, efficient and economical use of EU funds. To this effect:
 - It should establish a detailed needs assessment showing the progress of the programmes so far, the activities still to be performed and an overall financing plan identifying the funding resources from the different stakeholders.
 - Before further spending takes place, the Commission should analyse the resources available and the expected benefits. This should lead in turn to objectives being aligned with the budget made available and to the establishment of meaningful indicators, which can subsequently be monitored and reported on as necessary for the programme implementation as a whole.
- (b) Should the EU decide, as proposed by the Commission, to provide further financial assistance in the next multi-annual financial framework, this support should be based on an ex-ante evaluation of the EU added value of such intervention, identifying the specific activities to be financed through the EU

budget, taking account of other funding facilities such as Structural Funds and the conditions for EU disbursements.