Summarising Feasibility Study of Constructing a New Nuclear Plant in Lithuania

25 October, Vilnius

BACKGROUND

On 26th January 2006, during an energy conference in Vilnius, government officials from three Baltic countries agreed to commission a feasibility study for a new nuclear power plant in the region.

On 27th February 2006, the Prime Ministers of Lithuania, Latvia and Estonia issued a communiqué expressing their approval of construction of a new nuclear plant in the region and inviting the national energy companies to invest in the Project.

The memorandum of understanding about conducting the feasibility study on the building of a new nuclear plant was signed by the heads of Lietuvos Energija, Latvenergo and Eesti Energia on 8th March 2006.

INTRODUCTION

The Baltic electrical system and – as a result – the economies of the Baltic States are facing a major challenge going forward. According to the EU accession arrangements for Lithuania, the nuclear power plant facilities operating today at Ignalina will have to be closed down, causing a major shift in the electrical demand-supply balance for electricity not only in Lithuania but in the integrated Baltic electrical system, including Estonia and Latvia.

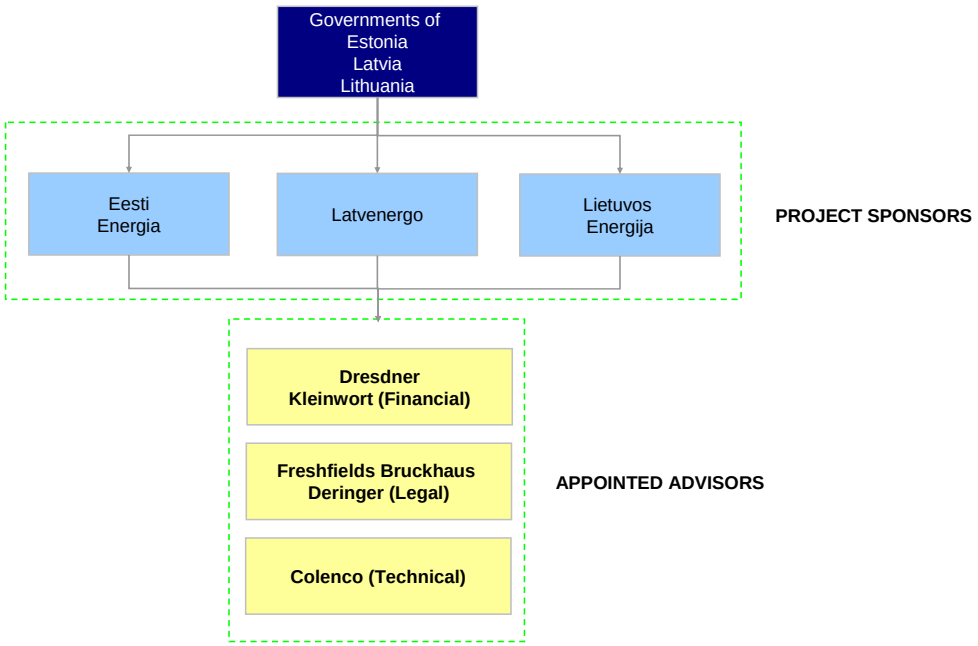
It is for this reason that the three governments of Estonia, Latvia and Lithuania have decided to jointly explore possible options to address this issue with the utmost urgency. One of the options considered entails building a new nuclear power plant in Lithuania, effectively replacing the existing obsolete Ignalina blocks with up-to-date safe nuclear power production technology. In order to assess the feasibility of this particular option the three governments requested their respective three state owned utilities - Eesti Energia, Latvenergo and Lietuvos Energija AB (the “Sponsors”) to undertake a study of this subject.

The work within the framework of the feasibility study has been split amongst the following four working groups:

- The Technical and Environmental Working Group, responsible for conducting technical assessment of best available technologies for the new nuclear plant, possible reactor size, and the potential investment and operational costs of the facilities
- The Financing Working Group, responsible for economic and financial appraisal of the Project,
- The Legal Working Group, responsible for structuring the Project in the light of applicable legal, contractual, regulatory and EU law requirements
- The Transmission Working Group, responsible for investigating the adequacy of the Baltic transmission system for ensuring power flows from the new plant in Ignalina to power systems in all countries involved and estimating the reserve capacity required after construction of the new plant.

The Sponsors appointed advisors to assist with the financial, technical and legal analysis of the feasibility of the project (Dresdner Kleinwort, Freshfields and Colenco Power Engineering).

Figure 1. Main parties involved in preparation of the Feasibility Study



GOAL OF THE FEASIBILITY STUDY

Given the task set out by the respective governments jointly to the Sponsors, the goal of this feasibility study has been to assess whether it is realistic to envisage that a NPP could be successfully developed in the current and prospective economic, technical, financial and legal environment in the Baltic States and the EU. This analysis was based on information available today on:

- available reactor technologies
- current market environment for commodities (in particular oil and gas),
- legal and regulatory framework for nuclear generation specifically in the Baltic region
- applicable legal framework in Lithuania and the EU
- technical status of the interconnected Baltic system
- current and forecast financial standing and financial market environment.

CONCLUSIONS

The main conclusion of the Study - it would be feasible to develop a new nuclear power plant to replace Ignalina.

The key factors supporting this conclusion are as follows:

- There is a clear need to replace the capacity that will be lost when Ignalina is finally closed.
- Replacing Ignalina with nuclear capacity offers a number of important advantages compared with alternatives. In particular, it will maintain diversity of fuel source and generation mix; it will reinforce security of supply by using fuel that is readily available from a global market; and it will assist in meeting Kyoto protocol emissions targets.
- Replacing Ignalina with one of the range of modern nuclear plants that meet current day international safety and environmental standards will also deliver substantial public benefits.
- The work done also shows that there is good reason to expect that the project could be successfully implemented in practice.
- From a technical standpoint, the study of available reactor technologies shows that there is a satisfactory range of proven reactors that would be suitable for use and that would meet prevailing international safety standards. The conducted assessment reveals that the current Ignalina site is suitable for developing a new reactor(s). The study also shows that the current transmission grid would be able to cope with the new power plant with only very manageable reinforcement and adaptation. It indicates that short term storage of spent fuel would continue as for Ignalina, that long term storage options for existing and future spent fuel are to be developed in the context of EU-led initiatives, and that the new plant's storage costs would be financed on the basis of regular contributions to an independent fund, in line with best European practice.
- From an economic perspective, the study also indicates that nuclear is also a more viable choice for new capacity than alternative forms of power generation, based on current fuel prices and projections, and the expected range of reactor prices. Financial analysis and initial consultations with potential lenders also indicate that it would also be feasible for the sponsors to provide the necessary equity and to raise the necessary debt. This will of course require that the financing is suitably structured and that appropriate commercial contracts for a project of this kind are put in place to support the financing. It will also require that processes currently under development to ensure that each sponsor is sufficiently capitalised to support its share of the financing are in due course implemented. There is good reason to think that these steps are achievable.

The analysis undertaken in the context of this study indicates that today the undertaking of the three Sponsors jointly to build a new nuclear power plant appears feasible from a technical, electrical system, financial and legal perspective on the basis described above.
More specifically, conclusions have been arrived at with regard to the items listed in more detail below:

- Need for additional generating capacity

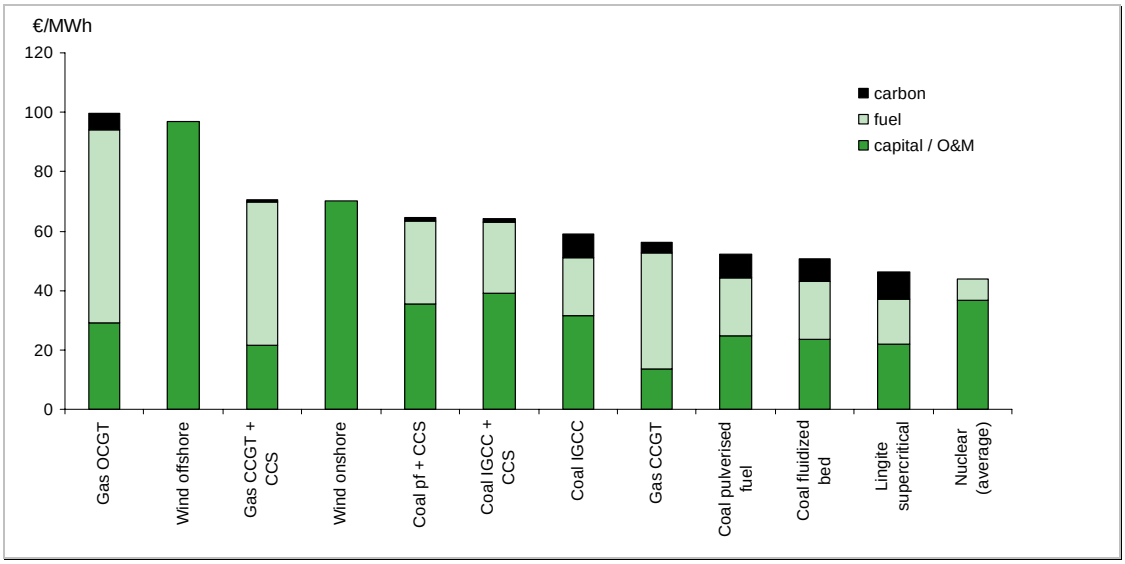
The analysis indicates that given the current and forecast economic development for all three Baltic States a significant demand and supply gap will be apparent. This is exacerbated by the closure of Ignalina. As a result significant new capacity needs to be built to fill such gap. Nuclear generation capacity is one major source of such replacement to be considered.

Likely cost advantage of nuclear reactor over alternative sources of new generation

The analysis indicates a cost advantage of all the analysed reactor designs over other forms of likely generation capacity additions in the Baltic system.

Using different estimates for oil and coal prices it has been possible to assess indicative ranges for generic new entrant costs. The Project's economic feasibility will thus be based on the assessment whether the all inclusive costs for the Project, including full financing cost, could be reasonably assumed to be below such new entrant cost pricing level.

Figure 2. Indicative electricity generation new entry costs for different fuels



Source: Dresdner Kleinwort Equity Research

- Availability of suitable reactor designs

The study entailed an extensive, albeit preliminary, assessment of reactor technologies available today. The exhaustive market survey confirmed that all these reactor types present highest safety standards, which exceed the safety levels of current operations at Ignalina and would be at least as high as other European reactors in operation today. Furthermore it appears that there is a sufficient variety of suppliers available for such reactors to provide a competitive environment at the procurement stage.

- Security of supply of nuclear fuel

The nuclear fuel market is effectively a global market supplying over 400 nuclear installations over recent decades with nuclear fuel in a reliable, efficient and cost effective manner. It is important to bear in mind that the actual cost of the nuclear fuel represents only a small part of the overall cost base for any nuclear reactor. In addition, sources of uranium are fairly well distributed geographically, so that no particular region has a dominating role. Furthermore, relevant international studies indicate that a sufficient level of uranium reserves available. While a few reactor types have technical specifications which limit the number of suppliers of particular services for fuel delivery the overall market for such services however is diversified such that no foreseeable issue with regards to security of supply has been identified.

- Site

Using International Atomic Energy Agency's (IAEA) standards for evaluating the possible site options it has been concluded that sufficient space at the existing Ignalina site is available to accommodate at the nuclear reactor unit. In this context drillings and geological research has been undertaken which supports these conclusions.

- Human Resources

According to the information provided by potential suppliers and the experience of the technical advisor, the average number of staff required to operate a new nuclear plant is between 400 and 500 persons. An assessment of the age and qualification structure of the personnel at the existing nuclear facility in Ignalina indicates that following an education management process, eligible current employees could constitute the majority of the staff at the new plant.

- Decommissioning and spent fuel costs

The envisaged approach to decommissioning and storage cost is - in line with European and national regulations and best practice - to make the Project responsible for making regular payments to a separately held fund, which provides for the future costs of decommissioning the power station and of long-term storage of spent fuel. The level of contribution would be set periodically by an independent authority on an objective basis as to ensure that the fund is adequate. The Project would pass on these costs to its customers under its power purchase agreements. Lithuania already has to identify the most appropriate approach for storing its existing spent fuel materials from Ignalina's past operations Thus, building a replacement nuclear power plant does not create a new task, - indeed the additional spent fuel volumes from the project will, in economic terms, be likely to reduce unit cost of overall storage through economies of scale; and the establishment of a fund to finance the cost of the Projects storage and decommissioning needs will create financial stability which will assist in the development of storage and decommissioning facilities for the site as a whole.

- Transmission system capabilities

Having regard to the latest UCTE requirements and the current status of the integrated transmission systems of the Baltic States, the analysis indicates that the current infrastructure and electrical system is capable of accommodating up to 3,000MW of nuclear capacity without major modification. In this context a detailed analysis has been undertaken of the likely cross-border flows under various scenarios, as well as an analysis of the necessary arrangements with regards to primary, secondary and tertiary reserve to support different configurations of reactor types and unit numbers. All this analysis supports the overall conclusion that the Project is technically feasible.

- Likely funding structure

It was concluded that the strong level Sponsor support likely required - either directly and/or indirectly via off-take undertakings - would mean that the Sponsors' rating assessments are likely to include a pro rata participation in the Project itself, irrespective of the corporate structures employed. Further, it was concluded that a fully integrated financing package is more economic, more flexible and less complex than a project finance approach for integrated construction and operation phases on a non-recourse basis.
The overall investment cost is expected to be indicatively between €2.5 - 4.0 billion, depending on the reactor type chosen and the number of units to be installed, amongst other parameters. In addition, it is assumed that a not insignificant amount of equity from the Sponsors would be required.

- Overall likely size of the investment

The study has confirmed that under the contemplated project structure as described above, the Sponsors could select any of the reactor types available today for the Project, i.e. there are no restrictions from a financial, technical, system or legal perspective to any single design. In addition, the analysis indicated that for some of the designs analysed it may well be possible to contemplate constructing two units, which could provide certain additional benefits and reserve such as economies of scale, future procurement benefits, and reserve capacity benefits. These benefits however, have to be weighed against the ability of the Sponsors and ultimately the Baltic market to absorb such amounts of electricity.

- Legal issues

As indicated above, no substantial legal obstacles to the successful implementation of the project have been identified, assuming that appropriate commercial arrangements are successfully negotiated, that the necessary legislative changes are introduced and that the technical environmental and economic requirements for applicable regulatory and other authorisations are met.

Main Parameters

Capacity needed	800-1600 MW
Investments	2.5-4 billion Euros
Overnight capital cost	1300-2000 Eur/kW
Possible project completion	2015

NEXT STEPS

Clearly, this assessment is based on current expectations about likely ranges of price evolution in fuel, carbon, reactor and financial markets and about the outcome of a variety of negotiations with third parties and the results of detailed environmental impact assessments, design work and regulatory approval processes.
Recommendation is that work should start on implementing the project, subject to regular periodic governmental review to verify that no circumstances have arisen which would adversely affect the feasibility of the project; and subject to final approval once full details of the reactor price, financing package, commercial arrangements and other key elements of the project have been negotiated.
Implementing the project is a substantial task requiring many interrelated technical, commercial, financial and legal work streams. It will involve negotiations with a variety of commercial counterparties and consultations with and approvals from a variety of regulatory authorities at national and EU level. Implementing legislation will be necessary in the host country; and appropriate inter-governmental and government support agreements will need to be entered into before financing and other final commitments are made.

Summary Report for Feasibility Study of Constructing a New Nuclear Plant in Lithuania will be presented to Governments and Parliaments of Lithuania, Latvia, Estonia by November, 2006.

WHY NUCLEAR TECHNOLOGY?

While there are various options to replace the generation capacity lost through the shut down of Ignalina, it is important to highlight in this context the main reasons why nuclear reactor technology should be considered:

- It allows sponsors to maintain the current mix of fuels used in the Baltic electricity system and thus maintain a diversified generation structure
- It contributes to security of supply as it uses nuclear fuel from a global market without material security of supply concerns
- Given the high construction cost and low operating cost of nuclear operations significant value would likely be captured in the domestic economies as opposed to wealth transfer on an ongoing basis to the fuel supply markets
- It will help meet Kyoto targets for CO2 emissions, while at the same time supporting growth of the domestic economies
- Nuclear technology offers a relatively stable and predictable initial cost base
- Potential economies of scale may arise in the establishment of final storage facilities for nuclear fuel from the current Ignalina plant and the proposed replacement
- The combined effect of the current high commodity price environment for oil, gas and coal coupled with a low interest rate environment could make the economics particularly attractive

While there are significant political and environmental concerns regarding nuclear generation, it appears that today's technologies are able to provide a safe and sound framework for assessing and mitigating these concerns to a very large extent. The governments and Sponsors involved in the project, if it were to go ahead, would clearly need to ensure that concerns on these issues are met through appropriate standards, transparency and public debate. **The environmental and safety standards of the proposed station and site would of course be verified in due course under applicable Lithuanian licensing procedures.**