CAN THE PAKS-2 NPP OPERATE WITHOUT STATE AID? THE POWER PLANT COMPANY: A BUSINESS ECONOMICS APPROACH

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Our analysis will first review some earlier papers on the topic of Return on Investment (ROI), and present their respective methodologies and main findings. Then we will present our own methodology based on the shareholder value approach that is common in the field of corporate finance. To calculate ROI, we drew up the financial statement forecasts of the power plant company for the total investment period (2015-2025) and for the period of operation (2026-2085). To forecast the financial statements, we defined several parameters that can be subjected to sensitivity analysis. The paper presents scenarios primarily for the **wholesale (sales) prices attainable by the power plant and effect of the expected capacity utilization rates on ROI,** but the calculation model makes it possible to analyze the impacts of many other factors as well. The model comprises a total of 20 parameters that can be altered to make simulations of expected returns and financial viability.

We have extensively relied on the most recent market forecasts and data to specify the expected market power price and capacity utilization scenarios. According to the forecast of the European Commission,[1] the price level of European power generation will increase by 2.4% on average per year at constant prices until 2020, but by 2021-2030 and 2031-2040, prices will already decrease by an annual 0.17% and 0-19%, respectively. This implies a price increase by 23% by 2026 at constant prices, that will moderate to 21% by 2030. According to a fresh paper by the British system operator,[2] the wholesale UK power price expected for 2026 will be 96.1, 76 and 54.2 £/MWh under the high, base case and low market prices scenarios, respectively, that is, calculated at the long-term inflation rate of the UK (2.38%) and at 2015 prices, prices will change by +13%, +3% and -16% in real value, respectively.

Our modelling results warrant the following main conclusions:

- unless the wholesale power prices show **permanent real price growth, the project will not pay off; its net present value is expected at EUR -5.0 to -6.3 billion** depending on the utilization rate. At the same time, it will present outstanding additional equity financing needs for the company **(additional capital injection exceeding the amount**

[1] EU (2014), p. 213.

[2] National Grid (2014).

of the Russian loan to be drawn, of EUR 12.4-18.6 billion, will be needed to keep the company operational). Until the early 2050s, the power plant company can only remain operational through repeated capital injections. In the **first ten years** of operation, the owner (the Hungarian taxpayers) will have to help out the nuclear power station by **HUF 210-250 billion per annum on average, and in the subsequent decade by HUF 140-160 billion per annum on average,** but even in the third decade of operation, the annual average capital injection amount will be HUF 41-75 billion;

- **provided that** the wholesale power prices will develop by and large according to the forecast of the European Commission (in our model, they **increase in real value by 25% until 2026), the ROI will still be negative at any of the capacity utilization rates** (EUR -2.7 and -4.5 billion), and the owner will have to keep providing significant **(EUR 6-10.5 billion) additional funding** to keep the facility operational. Repeated proprietary capital injections will be needed year on year until the mid-2040s to keep the project going. In the **first ten years** of operation, the owner (the Hungarian taxpayers) will have to help out the nuclear power station by **HUF 140-190 billion per annum on average,** and in the following decade by **HUF 50-117 billion per annum on average;**
- **provided that the** market power prices **will be permanently higher by 50%** than the current ones, the project costs may be recovered at **high utilization rates** (net present value between EUR -2.6 and -0.1 billion), but the project would nevertheless need additional proprietary capital injections (of EUR 2.2 to 5.6 billion) until the mid-2030s. In the **first ten years** of operation, **the owner** will have to help out the nuclear power station by **HUF 68-133 billion per annum on average.** In the second decade, the support will amount to HUF 0-43 billion on annual average;
- **ROI will be ensured,** in line with the declarations of the government, **if the wholesale power prices will be higher by 75% in real terms than the current ones throughout the lifetime of the power plant that would operate at a utilization rate of min. 85% throughout the period.**

The key findings of our analysis can be summarized as follows:

1) Considering the international power price forecasts, it is highly likely that the Paks-2 New Power Plant would not be able to attain the sales prices required for independent market operation and **would be permanently in need of State aid.** We do not consider long-term real price growth by 75%, the rate needed for the independent market operation of the facility, a realistic option in the electricity market. Price increase on such scale would provide extraordinary stimulus to technological innovations in the field of the other energy generation technologies and of energy efficiency, making the preservation of such a permanently high price unlikely.

2) The market prices notwithstanding, the high-capacity operation of nuclear power plants is becoming increasingly problematic due to the spread of renewable energies that limits the market options open to baseload

operators due to the low variable costs of solar and wind energy. This problem will be particularly evident during the combined operation of the current and envisaged Paks units, when the share of nuclear energy may exceed 70% of domestic power generation.[3] It would, therefore, be advisable to **reduce the period of overlap to the minimum, and to schedule the activation of any new power plant capacities for the mid-2030s.**

3) According to the forecast of the International Energy Agency, **new innovations cutting the investment and operating costs significantly (by 24-30% by 2035) are imminent also in nuclear technology.**[4] This circumstance underlines that premature investment implies the risk of foregoing new innovations realized in other technologies, and also that **countries taking a later decision on upgrading their nuclear capacities will be in a more favourable situation.**

4) Under the realistic power market scenarios, **the power plant is likely to be continually in need of additional capital injections by the owner,** and that **will make State aid a fact.** To prevent such support from becoming prohibited State aid, it would be commendable for the Hungarian government to acknowledge that the project does contain State subvention, and to **initiate an authorization procedure** at the European authorities.[5]

5) The Hungarian government should alter its project communication strategy and **present its calculations and arguments in favour of the investment.** Instead of stressing how cheap electricity generated by the nuclear power plant will be, it should tell the domestic and international public opinion why, although power generated in the nuclear power plant will probably not be cheap, it still considers it important to realize this project according to its current timetable.

[3] According to the ENTSO-E database, the utilization rate of the French nuclear power plants characterized by a similarly high nuclear production ratio was only 73-76% in the past years.

[4] World Energy Investment Outlook, 2014

[5] Some government declarations argue that the project does not comprise State aid, if only because the Russian loan will be repaid by the central administration, not the power plant, so the power plant will not assume any debt service obligation. In our opinion, this is obviously false. For, if the state owner does not charge to the power plant its financing costs set out by international contract, the market investor principle would clearly be impaired. Pursuant to Article 107 of the Treaty on the Functioning of the European Union, if a State agency provides investment, credit etc. to an undertaking, that measure will not be regarded as State aid only if any private investor in the market would have acted similarly. It is hard to imagine a market investor that would not charge its own financing costs to the undertaking in which it invests its money. Therefore, in our view, the project will contain no State aid only if the special project vehicle (SPV) can produce the costs of its own funding. This assumption is also the starting point of our model.