

The Closure of the Bohunice V-1 Reactor in Slovakia and the Wider Implications

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The Slovak Republic, has as other countries in the region, an electricity sector which is based on Coal, Hydro and nuclear power, with an increasing dependency on natural gas and on an only slowly developing new renewable sector. In 2006 the installed capacity was 7781 MW of which 2460 MW was nuclear; 2800 MW was fossil fuelled and 2452 MW was hydro. However, nuclear provided the largest share of electricity, producing 16.6 TWh, compared to 8.8 TWh from coal and gas and 4.4 TWh from hydro.

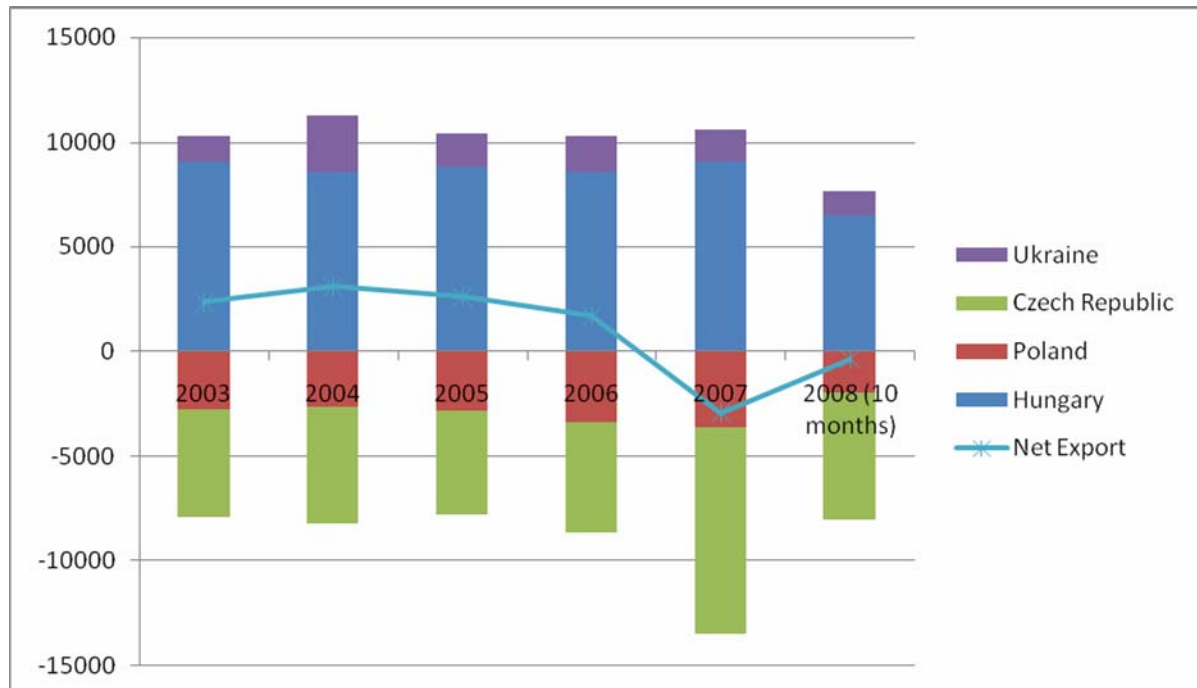
The table below shows the contributions made in the first ten months of 2008 from the different energy sources.

GWh	Hydo	nuclear	lignite	hard coal	natural gas	not attributable	other renewables
Jan	362	1468	169	157	203	248	29
Feb	341	1387	207	117	190	214	27
March	493	1470	128	49	184	213	28
April	481	966	197	94	167	196	25
May	414	1437	162	91	147	184	24
June	358	1128	127	178	52	166	24
July	412	1163	127	135	54	171	26
Aug	342	1224	177	111	55	169	20
Sept	267	1135	190	97	100	159	23
Oct	260	1203	218	100	168		28

Natural gas generates around 5% of the total electricity

Historically, Slovakia has been a net electricity exporter. The graphic below shows the net electricity flows between Slovakia and its neighbouring countries over the last five years. As can be seen in the last two years Slovakia has become a net electricity importer. Although in 2008 it seems that the electricity import and exports are likely to approximately level out.

UCTE Net Energy Flows into Slovakia (GWh)



Source: UCTE

The graphic also demonstrates the extent to which Slovakia is connected to the UCTE network. Given that the lines can be used equally for electricity import or export, the existing infrastructure would be able to import approximately 27 TWh of electricity per year, close to the total electricity consumption in Slovakia.

The EU accession partnership agreements required the closure of the first generation of Soviet designed reactors that were in operation in Central Europe. This affected three countries and eight reactors: Kozloduy units 1-4 in Bulgaria and Bohunice V-1 in Slovakia, with VVER 440-230 reactors; and Ignalina units 1-2 in Lithuania, with the two RBMK reactors. Given the dependency of the countries on nuclear power the reactors were required to be phased out over a decade rather than being closed immediately, has had occurred in Eastern Germany, following unification. In Germany four VVER 440-230 reactors were closed and construction halted on other reactors of Soviet design.

The accession agreement required the four Bulgarian reactors to be closed by the end of 2006; in Slovakia two reactors by the end of 2008; and in Ignalina, unit 1 in 2005 and unit two in 2009. In the case of Slovakia this was eight years later than the earliest close date originally envisaged.

Despite the extension of the operating lives of all these reactors significant funds were made available the EU to assist with the closure of the reactors. The European Bank for

Reconstruction and Development managed funds given on a multilateral basis from the EU and from other country donors. The funds accrued were for Kozloduy, €170 million; for Ignalina, €34 million; for Bohunice €134 million. In the case of Bohunice this was allocated towards decommissioning activities and for assistance in the energy sector. The energy sector work was defined as:

- Define priority projects in the area - a systematic least-cost analysis of the state of the energy sector after the closure of units 1 and 2 will facilitate the strategic decision-making process in the sector; it will help the Slovak government to assess the viability of potential projects on the basis of environmental and energy efficiency considerations.
- Ensure safe and reliable electricity supply after the closure of the Bohunice nuclear power plant. In order to resolve the problem of post-closure grid instability, the existing transformation sub-station at Krizovany is being reconstructed and adjusted to the new conditions of electricity supply.

Continual Operation of Reactors

The ongoing conflict between the energy authorities in Ukraine and Russia over the transit of natural gas spread into the EU in early 2008. As a result of a conflict over the price to which Ukraine was paying for its gas and the alleged siphoning of gas through the EU bound gas pipelines, the Russian authorities halted the gas flow. This led to calls for greater energy security, especially in Central Europe, that have a greater reliance of Russian natural gas than in the EU 15 Member States – that have domestic production, access to the LNG market and to the Norwegian resources.

Specifically in a couple of countries there were calls for the re-opening of the high risk reactors previously closed in line with Accession Agreements.

Bulgaria:

- The President Georgi Parvanov said on the 6th January that the two units were needed to cope with the crisis that resulted from the cutting off of Russian natural gas supplies.
- However, it appeared that by the 7th January the Commission had not received an official request to re-open the closure question.
- Prime minister, Sergei Stanishev, said reopening the units would be an extreme measure, but could be envisaged should the crisis take too much longer to resolve¹.
- On 8th January, a group of Members of the European Parliament (MEP) has issued a statement, urging the European Commission to support any request by the Bulgarian authorities for the reactivation of Units 3 and 4 of the Kozloduy Nuclear Power Plant. The statement is an initiative of Geoffrey Van Orden, former rapporteur for Bulgaria and is endorsed by Ari Vatanen (FR/FINN), Jan Zahradil (CS), and Vladimir

¹ <http://www.euractiv.com/en/energy/gas-crisis-gives-slovakia-excuse-restart-nuclear-unit/article-178429>

Urutchev (MEP from the Citizens for European Development of Bulgaria - GERB party).

Bulgaria made previously made a formal plea for the reopening of the two Kozloduy reactors in March 2007, with the support of regional neighbours, which said they feared economic and political instability otherwise. The EU rejected the request.²

Slovakia:

Slovakia's Prime Minister Robert Fico announced on Saturday 10 January that the decommissioned 440 MW unit at Bohunice will resume production within the next week, in order to maintain stability of the country's electricity grid. "We are aware that this is a violation of the accession agreement, but this is happening at a time of crisis³,"

The Press reported the Commission stated that they had not received an official. However, other information suggests that a formal request to the EU council and the Commission has been made

Long and Short Term Solutions:

The closure of the nuclear reactors in the region as a consequence of Accession is not a sudden requirement, but has been known for around a decade. As such, any energy management problems that their closures bring should be seen as a failure of the utilities and regulators to prepare properly rather than a consequence of taking the reactors offline.

The EU has made available financial and technical assistance over the last decade to facilitate the closure of these facilities. Furthermore, had other EU and domestic energy objectives, such as energy efficiency improvements and renewable energy targets, been actively pursued and met, the security of supply and economic implications of reduced available of natural gas would not be so significant.

On the short term the increase price and unavailability of natural gas can be addressed through domestic and international grid management.

1) In Slovakia, there are adequate interconnections to meet any shortfalls resulting from the closure of the latest Bohunice reactor and the unavailability of the gas fired power stations. The Bohunice reactor was 440 MW and could have provided around 3 Twh of electricity, about 10% of the country's supply. Natural gas provides between 5-8% of the electricity.

2) With this reduction in supply demand can still be met through a greater reliance on imported energy. This was noted by the UCTE (Union for the Co-ordination of Electricity Transmission) when last year it received a request in writing from the Slovakian authorities for a potential emergency procedure if they would undergo problems with their power system

² <http://news.bbc.co.uk/1/hi/world/europe/7814477.stm>

³ <http://www.euractiv.com/en/energy/gas-crisis-gives-slovakia-excuse-restart-nuclear-unit/article-178429>

as a result of the closure of Bohunice. However, UCTE replied that there should be no problem with the stability of the Slovak electricity system following when BOHUNICE closure because the Slovak electricity system has adequate possibilities of electricity imports.

3) Data from the web site of the grid operator show that during the week of the closure of the Bohunice reactor no additional grid problems occurred⁴.

⁴[http://sepsas.sk/seps/en_UdajeTyzdenne.asp?kod=392&tyzden=1%202009&obdobie=1st%20week%20\(27.December%20-%202020.Januar2009\)&spat=en_UdajeOPrev2009.asp?Kod=391](http://sepsas.sk/seps/en_UdajeTyzdenne.asp?kod=392&tyzden=1%202009&obdobie=1st%20week%20(27.December%20-%202020.Januar2009)&spat=en_UdajeOPrev2009.asp?Kod=391)