Fading Radiance: Bulgaria's Power Loss and the Regional Implications

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Abstract: Despite the dearth of a significant domestic supply of energy resources, Bulgaria is well positioned as an energy hub for Southeast Europe, a position it has worked to achieve and continues to work to maintain. Successfully fulfilling this role requires tackling many demands: the growing regional demand for a reliable supply of electricity, maintaining transit facilities for the movement of primary energy to Western Europe, reducing harmful emission involved with secondary energy production, and satisfying the needs of a domestic population struggling to meet the increasing costs that accompanies privatization. This paper addresses these complex variables and Bulgaria's efforts to satisfy these multiple energy needs.

As Bulgaria is welcomed into the fold of the European Union on January 2007, it loses a vital component that has allowed it to stand out in the Balkan's energy field. In an agreement for accession into the European Union, reactors three and four (with a combined capacity of 880 megawatts) of Bulgaria's only currently operating nuclear power plant, Kozlodui, will be decommissioned by the end of the year.[57] Amidst a storm of controversy over safety and political maneuvering, the first two of its six reactors were decommissioned in 2002. The debate over reactors three and four has been no less contentious.[58] But the dye has been cast, and now Bulgaria and its neighboring countries must deal with the consequences. While concern over public health has been a key issue in many of the debates, money and competitive positioning gets the most press. Responsible for more than forty percent of electricity production in Bulgaria, nuclear power has allowed Bulgaria to become an energy exporter, accounting for between 50 and 90% of the exported electricity in Southeast European in the last five years.[59] Kozlodui has two additional reactors of a more modern design and larger in size (each 1000MW) which will remain in operation, and nuclear energy will continue to be a part of Bulgaria's energy mix. However, with the impending decommissioning, the country's rank as fourth largest exporter of electricity in Europe, its position as an energy hub in Southeast Europe, and its ability to bring in foreign currency is seriously weakened.[60] There are plans to make up for this shortfall, but it will take time. And until this lost production is replaced, what will be the immediate and long-term consequences?

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[57] Xinhua (11 March 2006) "Bulgaria may suspend electricity export after 2007: officials say", http://www.chinaview.cn/index.htm.

[58] Novinite.com (2 December 2002). "Rally against Closure of Nuke Units 3,4 in Downtown Sofia Today."

BBC (3 June 2003). "Bulgarian opposition considers new motions of no-confidence in government."

[59] Platts (2006) Bulgaria faces an expected supply crunch, http://www.platts.com/Electric%20Power/Resources/News%20Features/easteurope/bulgaria_profile_3.xml.

[60] EBR (25 July 2006). "Plant closure will result in significant shortage of Bulgarian generation capacity", *Energy Business Review*, http://www.energy-business-review.com/article_feature.asp?guid=4A2E9A4B-3E3F-4D34-B72E-DA9157718351.

Sudden Impact

The most direct effects of the closure will be a loss of foreign capital for Bulgaria and another hike in the price of electricity, although the reasons behind this remain questionable. Bulgaria's 2001 income for electricity sales reached $150 million US dollars, and it is estimated that the state will lose out on two billion in US dollars after the closure of the reactors.[61] It's unclear how the state plans to make up for the lost revenue, and perhaps the loss will need to be chalked up as the cost of doing business with the EU. But it's not a situation in which the state feels comfortable, and the wheels are already in motion to modify the condition. The plans are to complete construction of another nuclear power plant further downstream along the Danube in Belene, and to build a new coal-fired thermal power plant and rehabilitate existing plants in the Maritsa Iztok cluster in Southeast Bulgaria. The thermal power plants provide for use of domestic fuel, the lignite coal that is so abundant in Bulgaria. As of June 2006, sod has been turned on the new Maritsa Iztok I Thermal Power Plant. Its production capacity will surpass three quarters of what will be lost with the decommissioning of reactors 3 and 4, but full operations are not estimated to begin until 2009. And there are thoughts of adding a new high capacity unit to one of the existing plants, the Maritsa Iztok III.[62] But there is still a gap in time before the new plants are on line and the existing ones receive a much needed refurbishment.

Belene seems to be a sure deal, and, following a suspicious tendering process accused of favoritism attached to parallel negotiations about gas imports,[63] a Russian firm was finally offered the contract, with Bulgaria able to retain majority interest in the plant.[64] The completion of the Belene Nuclear Power Plant has the support of the government and the majority of the population, primarily because it is seen as a way of keeping generation capacity high, of helping to meet Kyoto Protocol allotments of carbon dioxide emissions without sacrificing production, and of allowing Bulgaria to retain its Balkan energy hub status. But the commissioning of the Belene Nuclear Power Plant is not expected until 2012.[65] Once all these stations are in operation, electricity production is predicted to exceed current levels. Initially, there will be a greater dependency on hydropower and renewable energy sources until new thermal and nuclear generation can come on line.[66] In the meantime, the National Electricity Company (NEC), the state majority owned private company responsible for the purchase and distribution of electricity as well as trade negotiations, will be placing its hopes in the Tsankov Kamuk hydropower plant, a facility that has faced numerous problems and is in need of rehabilitation.[67]

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[61] EIA (2006). "Country Analysis Briefs, Southeast Europe", Energy Information Administration, http://www.eia.doe.gov/emeu/cabs/SE_Europe/Electricity.html.

[62] Vatahov, I. (26 June 2006) "Bulgaria's Reactor Closure Aftershocks", *Sofia Echo*, Bulgaria.

[63] Ibid.

[64] Sofia Echo (7 August 2006). "Bulgaria Requests Better Offers for Power Plant Construction," Business Report. http://www.sofiaecho.com/article/bulgaria-requests-better-offers-for-power-plant-construction/id_16877/catid_23.

[65] Vatahov, I. (26 June 2006) "Bulgaria's Reactor Closure Aftershocks", *Sofia Echo*, Bulgaria.

[66] NEK (2005). Generation Development Forecasts, http://www.nek.bg/cgi-bin/index.cgi?l=2&d=1227.

[67] Vatahov, I. (26 June 2006) "Bulgaria's Reactor Closure Aftershocks", *Sofia Echo*, Bulgaria.

But it's not just the state and the NEC that will feel a pinch. Like death and taxes, higher electricity prices in Bulgaria seem to be a sure thing. Utility price adjustments in Bulgaria have occurred almost annually since macroeconomic stability was achieved following the economic crisis of 1997.[68] Electric generation and distribution companies alike are in the process of being sold and rehabilitated. The capital outlay for such projects needs to be recouped, and these expenditures are invariably passed on to consumers. In fact, much of the privatization of the energy industry in Bulgaria has been possible only through foreign investment, and these international companies must deal with the expense of dilapidated equipment and infrastructure as well as theft, a result of nation-wide economic stress.[69] Despite hopes of delaying an electricity price hike,[70] an increase arrived a few months prior to the scheduled closure.[71]

Many experts claim that the closure of Kozlodui will lead to increase in the price of electricity. For example, the Executive Director of NEC said the company expects sharp increases of the price of electricity due to the liberalization of the energy market.[72] Import revenues are used by NEC to cover the losses that the firm has at the internal market because it sells the electricity to the recently privatized electricity distribution companies at a lower prices. According to him, this would mean that the price at which NEC sells its electricity should be increased by 30%. However, with the competitive character of a liberalized energy market, this would be difficult to achieve. Other sources predicted that after decommissioning of reactors 3 and 4 the price of electricity from Kozlodui will rise more than 50%[73] and NEC will then transfer this expense on to the end consumer, an increase estimated to be from 10%[74] to 17%,[75] although there is great suspicion that the closure will be used as a justification for price increase even if its effect is minimal.

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[68] Assenza, G. (2002). Promoting Energy Efficiency in Economies in Transition: the Case of Bulgaria, The Fridtjof Nansen Institite, Postboks 326, N-1326 Lysaker, Nerway.

[69] Sofia Echo (17 August 2006). "CEZ invests 80 million leva in energy developments in Bulgaria", Business Report, http://www.sofiaecho.com/article/cez-invests-80-million-leva-in-energy-developments-in-bugaria/id_17094/catid_67.

[70] Sofia Echo (7 July 2006). "Bulgaria Searches for Ways to Delay Electricity Price Hike", http://www.sofiaecho.com/article/bulgaria-searches-for-ways-to-delay-electricity-price-hike/id_16421/catid_67.

[71] Sofia Echo (14 August 2006). "Power Operator Restructuring Approved", http://www.sofiaecho.com/article/power-operator-restructuring-approved/id_17000/catid_23/search_1.

[72] Mediapool, March 29, 2006, http://mediapool.bg/show/?storyid=115840.

[73] SEEurope.net (10 March 2004). "Electricity Prices Up by 17% after the Closure of Units 3 and 4 of NPP Kozlodui", http://www.bulgaria-gateway.org/en/browser.php?state=content&id=1667&type=article&lang=en&topic_id=1&cur_pos=.

[74] Vatahov, I. (26 June 2006) "Bulgaria's Reactor Closure Aftershocks", *Sofia Echo*, Bulgaria.

[75] See 16.

While prices that reflect the cost of production carries many benefits (more equitable distribution of funds and greater incentives for efficiency), the unfortunate part is that wage increases in Bulgaria, as well as the neighboring countries, have not kept pace with inflation.[76] The net result is that a greater share of household budgets is going toward energy expenditures,[77] further burdening an already stressed population. The International Monetary Fund (IMF) recently announced that Bulgaria is likely to remain one of Europe's poorest nations even after accession into the Union.[78]

The Neighbors

And let us not forget that many of the adjacent countries will suddenly lose a valuable energy supply. Although Greece has had an increase of nearly 50% in generating capacity since 1993, there has also been a matching increase in demand, and Greece remains a net electricity importer.[79] Most of their generation is accomplished via thermal power plants burning lignite coal, but hydroelectric production has doubled and the use of renewables (geothermal, wind, biomass) has increased tenfold, although still accounting for less than 2% of total generation. In 2003, electricity imports, at 4200 gigawatt-hours, accounted for more than 7% of total consumption,[80] arriving not only from its Balkan neighbors to the north (Albania, Macedonia, and Bulgaria with a combined capacity of 600 megawatts) but also from Italy (with a capacity of 500 megawatts via an underwater cable).[81] At 2,230 gigawatt-hours in 2004, Bulgaria has been responsible for a bit more than 50% of Greece's imported electricity, or 38% of Bulgaria's electricity exports.[82] In the absence of this share and with a predicted increase in demand, not only will Greece have to rely more on the imports from elsewhere, it must also become better adept at energy conservation as well as use of domestic renewable sources.

Serbia, still in recovery from a decade of sanctions and war, has many fences to mend. Like much of this newly re-emerged country, recent conflicts have brought hardship to the energy sector as well.[83] With the dramatically reduced standards of living caused by war and prolonged economic sanctions, assistance was provided for

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[76] NSI (2006). "Bulgaria 2004 – Socioeconomic Development", National Statistical Institute of Bulgaria, http://www.nsi.bg/ZActual_e/NewE-Budget.htm.

[77] NSI (2006). "Total Households' Expenditure by Group for May 2005 and 2006", National Statistical Institute of Bulgaria, http://www.nsi.bg/BudgetHome_e/BudgetHome_e.htm.

[78] Sofia Echo (11 August 2006). "Bulgaria to Remain Relatively Poor after EU Entry – IMF Report", http://www.sofiaecho.com/article/bulgaria-to-remain-relatively-poor-after-eu-entry--imf-report/id_17033/catid_64.

[79] CSLF (2006). An Energy Summary of Greece, Carbon Sequestration Leadership Forum, http://www.cslforum.org/greece.htm.

[80] Ibid.

[81] IEA (2004). Greece-Standard Review, Energy Information Centre,

http://www.iea.org/textbase/nppdf/free/2004/Greece_comp04.pdf.

[82] See 3.

[83] SEENERGY (2006). Serbia, Energy Demand Forecast, Southeast Europe Multi-country Energy Website for the Athens Process, http://www.seenergy.org/?/organizations&type=3&stat=5&col=2124.

electricity imports.[84] Its continued problems include extraordinarily high energy intensities, frequent disruptions of service, financially unstable state-owned generation company (JP Elektoprivreda Srbije), unreliable cogeneration district heating plants, limited integration in international energy markets (after thirteen years reconnected in 2004 to the Union for the Co-ordination of Transmission of Electricity (UCTE)[85]), continued dependency on importation of primary fuels, especially natural gas, which is in greater demand so as to meet energy and environmental needs. A heavy reliance on electricity for space heating has been the case for the last decade because of the absence of a viable fuel market in urban centers, further taxing the electricity system. Nearly 10% of its electricity is imported,[86] still with greatest need during the winter.[87] Serbia declares that it is able to balance domestic production and consumption,[88] although it admits that it will have to engage in "rational consumption", something that is not only wise but which is obligatory for the Southeast Europe Energy Union.[89]

The Former Yugoslav Republic of Macedonia has also been taxed with troubles and has been dependent on imports. In 2005, the country consumed 7.93 gigawatt-hours of electricity while only having generated 6.27 of them, requiring an importation of 1.66 gigawatt-hours,[90] accounting for more than 20% of total consumption, an increase from its 2002 need of 15%. The state has two lignite-fired plants, one oil-powered plant (used for peak demand periods), and six hydropower plants that account for about 17% of production. Only a couple low-voltage transmission lines cross over from Bulgaria, and much better lines are shared with Greece, Montenegro, and Serbia.[91] Having been the least developed of the Yugoslav republics as well as feeling the ethnic Albanian insurgency of 2001, Macedonia's economic transition has been incremental and fraught with an excessively high informal economy, at approximated 20% of GDP.[92] As in Bulgaria, wages in Macedonia have lagged behind increased costs of living,[93] so continued price hikes associated with transition continues to squeeze consumers.

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[84] EAR (2006). Serbia, European Agency for Reconstruction, http://ear.europa.eu/serbia/serbia.htm.

[85] EPS (2006). About Us: History, Elekroprivreda Srbije, http://www.eps.co.yu/onama/history.htm.

[86] SEENERGY (2006). Serbia, Description of Energy Sector, Southeast Europe Multi-country Energy Website for the Athens Process, http://www.seenergy.org/index.php?/countries&stat=5&type=3&col=2117.

[87] EPS (2006). Electric Power Industry of Serbia, Elekroprivreda Srbije, http://www.eps.co.yu/publikacije/godisnji_izvestaji/TechAR06e.pdf.

[88] Serbian Government (23 February 2006). "No electricity shortages in Serbia this year", http://www.srbija.sr.gov.yu/vesti/vest.php?id=20916&q=electricity+prices.

[89] Serbian Government (22 July 2006). "Rational consumption of energy a necessity", http://www.srbija.sr.gov.yu/vesti/vest.php?id=25577&q=electricity+import.

[90] CIA (2006). Macedonia, Central Intelligence Agency World Fact Book, https://www.cia.gov/cia/publications/factbook/geos/mk.html.

[91] SEENERGY (2006). Macedonia, Description of Energy Sector, Southeast Europe Multi-country Energy Website for the Athens Process, http://www.seenergy.org/?/organizations&type=3&stat=7&col=2117.

[92] See 34.

[93] SSORM (2006). "Poverty in the Republic of Macedonia", State Statistical Office of the Republic of Macedonia, http://www.stat.gov.mk/pdf/2006/4.1.6.50.pdf.

In comparison, Romania has faired well. Its location makes it easier to receive imports of natural gas and electricity from Russia and Ukraine, although the prices keep rising.[94] While it has bought electricity from Bulgaria, its generation capacity has surpassed it domestic need[95] and there are multiple foreign suppliers close at hand from which Romania can chose.[96] In fact, its export of electricity has been almost nine times the amount imported.[97] It has one nuclear power plant, Cernavoda, which currently has one functioning reactor that generates 10% of the states electricity. But a second reactor under construction scheduled to go on line by March of 2007, and then a third and a fourth which should be ready for action in 2012. By 2015 Romania expects to increase its total electricity production by more than 20%, primarily through the tripling of nuclear generation.[98] So great will the generation capacity be that there has been talk of exporting directly to Turkey via a cable under the Black Sea, bypassing Bulgarian territory altogether.[99] Romania has shown remarkable success in preparing for the emerging Southeast Europe energy scene. Under an EU directive, it began the process of liberalizing its electricity sector. By the year 2000, it had established a wholesale electricity market, and by 2003 had started setting standards of efficiency and a strategy for competitiveness.[100] And it's paying off with record sales.[101]

Since 1997 Turkey has been a net importer of electricity, buying primarily from Bulgaria and through Iran. But in recent years the generating capacity of Turkey has increased to the point of meeting domestic demand (which fell during the 2001 economic crisis), and in 2003 it ceased purchase of Bulgarian electricity despite the indemnity protection that the Bulgarian NEC had established during the original trade agreement. This caused significant problems for the Bulgarian energy system. Some of the thermal power plants, especially Maritsa Iztok III, had to reduce their production and keep it at base load for almost a year until the right export balance was made. In addition, a high voltage transmission line to Turkey, which was constructed before by NEC for about BGN 300 million (or EUR 150 million) to boost its export possibilities to Turkey, stayed unused and added to the losses which NEC had to bear because of this decision.

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[94] Moldova.org (2 August 2006). "Ukraine to increase for electricity imports", http://economie.moldova.org/stiri/eng/15362/.

[95] CIA (2006). Romania, Central Intelligence Agency World Fact Book, https://www.cia.gov/cia/publications/factbook/print/ro.html.

[96] OPCOM (2004)."Recent developments in the Romanian electricity market", presentation

http://ec.europa.eu/energy/electricity/south_east/doc/6/opcom_presentation.pdf.

[97] IAEA (2005) Data Reference Bank, Romania, International Atomic Energy Agency, http://www.iaea.org/inis/aws/eedrb/data/RO.html.

[98] MEC (2003). Road Map for Energy of Romania, Romanian Government Ministry of Energy and Commerce, available through Southeast Europe Multi-country Energy Website for the Athens Process, Romania, Energy Demand Forecast, http://www.seenergy.org/index.php?/countries&stat=11&type=3&col=2124.

[99] See 5.

[100] See 41.

[101] OPCOM (2006). Romanian Electricity Spot Market: more than one million US dollars – new record for daily transactions, Romanian Power Market Operator, Press Release No. 4/2006, http://www.opcom.ro/portal/content.aspx?item=2179&lang=EN.

The reason cited for this decision by Turkey is that it would be able to produce its own at a rate lower than what it costs to import.[102] In addition to the increased generation capacity, made possible with an extensive hydropower network, the construction of several combined gas-fired generation plants, and a newly built coal-fired plant, imports from Turkmenistan have undercut Bulgaria's rates.[103] But its declarations of energy independence may be premature as it is expected that in the next couple years there will be a shortfall of electricity[104] unless its wind and geothermal resources can be developed and nuclear facilities brought on line by 2012.[105]

Turkey's potential to Europe as the conduit of future fuel supplies, primarily that coming from the Caspian Sea region, continues to be noticed, and the eyes of the West are drawn again toward Anatolia.[106] In fact, Turkey's position as the regional energy hub will be strengthened if it can secure natural gas from places other than Russia, including Turkmenistan, Iraq, and Iran. While reliance on these places may be unpalatable to some, being able to provide energy to Europe would strengthen Turkey's bid to join the Union on more than just "civilization discourse".[107] Given that recent natural gas crises in Ukraine and the Republic of Georgia show the unreliability of supplies from Russia,[108] having secured alternatives becomes increasingly important. However, with increasing prosperity, an expected rise in electricity demand, uncertainties – despite continued efforts – about self-sufficient generation, and not being joined to the UCTE,[109] it seems improbable that Turkey will become a regional electricity supplier.

Integration and Liberalization

The long-term effects are more complex and much harder to predict. But one thing is quite clear, that the regional energy sectors are destined to be absorbed into the European Union. In 2005 the Balkan states signed the Energy Community Treaty and put themselves clearly on a path toward regional and European integration of the energy market. Negotiations are ongoing with Turkey about joining later. In accordance with the 2003 Athens Memorandum of Understanding, members must ready themselves for a

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[102] Sofia Echo (3 August 2003). "Turkey won't buy Bulgarian electricity", Business, http://www.sofiaecho.com/art.php?id=6945&catid=23.

[103] EIA (2005).). "Country Analysis Briefs, Turkey", Energy Information Administration, http://www.eia.doe.gov/emeu/cabs/turkey.html.

[104] U.S. Department of State (April 2006). "Background notes: Turkey", Bureau of European and Eurasian Affairs, http://www.state.gov/r/pa/ei/bgn/3432.htm.

[105] See 48.

[106] GMF (22 March 2006). "Turkey seen as energy security lynchpin", The German Marshal Fund of the United States, http://www.gmfus.org/event/detail.cfm?id=242&parent_type=E.

[107] Turkish Daily News (4 April 2006). "Turkey's toolbox should include energy security", http://www.gmfus.org/publications/article.cfm?parent_type=P&id=182.

[108] See 51.

[109] UCTE (2006). Members, Union for the Coordination of Transmission of Electricity,

http://www.ucte.org/aboutus/members/e_default.asp.

free-market exchange of electricity and natural gas.[110] The general idea is to secure affordable supplies of energy across the region to foster economic growth, but an additional hoped for benefit is regional integration and cooperation and the strengthening the Southeast Europe Stability Pact. Signatories of the Energy Community have agreed to meet European Union standards on pollution control and management and pricing regulations. However, to accomplish this, as well as to meet the growing energy demand, at least $40 billion USD of investment in the next decade is needed.[111]

But the job is harder for some than it is for others. Romania has made good progress and Turkey is well positioned, but many of the other Balkan states face more difficult circumstances. In addition to repairing, replacing, and rehabilitating decrepit facilities and infrastructure, state regulatory agencies must be established and business deals must be transparent and free of corruption. And the means of electricity generation is not homogenous, meaning that some states and some companies are better equipped for a competitive environment. Given that the liberalization and integration ball has already started rolling, this is perhaps one of the more important questions. Who will be the winners and losers in this regional remix of the electricity market? The gravitational effect of Western Europe's market continues to pull hopes, ambitions, and material supplies to its core. Electricity, which used to be a national affair, has now become regional.

Not surprisingly, the big push has been toward increasing capacity. The popular formula for economic development has been more, more, more. While the World Bank[112] has highlighted the need for rehabilitation of facilities in the Balkans, its accompanying mantra has been enlargement of power generation. Western Europe is seeking new markets, and the apple in the Southeast looks ripe for picking. Energy intensity, losses, and import dependency are still high, and foreign companies are investing billions to get their eventual cut rather than allowing their competitors to jump in without them. But the effects of open markets and privatization are unsure. The rate hikes of utilities in all the transition countries have outpaced wage increases, and many consumers have either been unable to pay their bills or have simple deprived themselves of the luxuries of light and heat. So desperate have things gotten that energy theft has been a serious problem. Even profit-motivated energy companies have worried about opening markets because of fears that they couldn't be competitive with better equipped and managed businesses from abroad.[113]

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[110] ERDSEE (2006). Energy in Southeast Europe – Regional Policy for a Regional Market, Economic Reconstruction and Development in South East Europe, http://www.seerecon.org/infrastructure/sectors/energy/#1.

111 World Bank (10 July 2006). "Energy Security: World Bank Works to Address Pressing Needs in Eastern Europe, Turkey and the Former Soviet Union; In a rapidly growing region, strained and aging energy facilities call for new investments", http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/0,,contentMDK:20988413~menuPK:258604~pagePK:146736~piPK:146830~theSitePK:258599,00.html.

[112] Ibid.

[113] Vaknin, S. (18 November 2002) "Electricity Markets in Eastern Europe", http://www.buzzle.com/editorials/11-18-2002-30512.asp.

Circumstances and inducements are pushing the transition economies of Southeast Europe to expand their large-scale production capacity in a competitive fashion and endangering localized populations. For example, in the newly liberalized market and the creation of a regionalized grid, generation companies must provide low-cost electricity in order to survive. Otherwise consumers will select the cheaper product of a competitor, assuming it has the capacity to meet the demands for its goods. In the case of Bulgaria, it has been claimed that failure to rehabilitate, modernize, or repair equipment has kept prices artificially low, the consequences being that unnecessarily high pollution levels continue to threaten the public health of local residents and that the economies of competing, neighboring states are subsidized.[114]

Claims that the Balkans will continue to serve the West European core in a peripheral fashion have become more pronounced. The Stability Pact Watch Group[115] asserts that investments from the West are overly focused on increasing large-scale generation capacity of electricity while largely ignoring the enduring high energy intensity (GDP/unit of energy) and its negative social consequences rather than seriously implementing energy efficiency measures and better utilizing renewable energy sources. Turkey's importation of cheaper electricity from a more peripheral region is another example of this globalized, capitalistic structure.

But not all viewpoints are so cynical. Although the liberalization of regional energy trade combined with the sudden deflation of production is expected to put a short-term squeeze on all of Southeast Europe,[116] analysis of the electricity market in Southeast Europe indicates that a regional energy market would bring lower electricity production costs as well as a more reliable supply to utility systems that have experienced chronic shortages.[117] A necessary component of this, however, is a well developed network of transmission lines. Otherwise you get transmission congestion and accompanying price adjustments. But better lines are still in the process of being developed. Bulgaria, Macedonia, Albania, and Italy have agreed to develop an energy corridor (Corridor 8), improving transmission lines and gas pipelines that will also branch out to Serbia, Montenegro, and Greece.[118]

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[114] Miladinova, G. (2006). "The Prospects of Nuclear Energy in Bulgaria: the Rush towards the Construction of Belene Nuclear Power Plant", in *Energy & Environment Special Issue on Energy Policy and Nuclear Power - 20 Years after the Chernobyl Disaster*, Vol. 17, No. 3, 401:416.

[115] Stability Pact Watch Group (2005). Arrested Development, Energy Efficiency and Renewable Energy in the Balkans, http://www.bankwatch.org/documents/arrested_development_05_05_1.pdf.

[116] See 4.

[117] Koritarov, V. & Veselka, T. (2003). "Modeling the Regional Electricity Network in Southeast Europe", presented at the IEEE Power Engineering Society Energy Development and Power Generating Committee. Panel Session: Southeast Europe and Regional Electricity Market – Configuring the Power System, IEEE General Power Meeting, Toronto, Canada, 17 July, 2003. http://search.yahoo.com/search?p=modeling+the+regional+electricity+network+in+southeast+europe&fr=FP-tab-web-t500&toggle=1&cop=&ei=UTF-8.

[118] Macedonian Ministry of Economy (2005). Macedonia, Bulgaria, Albania, and Italy Signed Declaration for Cooperation in the Area of Energy Infrastructure, http://www.economy.gov.mk/default-en.asp?ItemID=864EA9222446A142A197F16D21067AA8.

Further analysis of the power market in the Balkans reveals that national competitiveness depends not only on the effectiveness of the generation facilities, but also on topography and weather.[119] Those countries with greater reliance on hydropower are much more energy sensitive to drought and would be in greater need of electricity imports to satisfy domestic demand under such conditions. Additionally, dependence on imported fuels makes generation costs more vulnerable to spikes in world prices that would subsequently make the generated electricity less competitive. With a reliance on hydropower at 30% for Macedonia,[120] 37% for Serbia,[121] and an astonishing 75% for Montenegro,[122] the electricity sector in these countries are most vulnerable to dry conditions. At more than 30%, Romania also has a high reliance on hydropower, but its other sources of generation are being quickly developed.[123] Turkey has 30 hydropower plants, but they operate at only a fraction of their theoretical potential,[124] so it's possible to extract even more juice from them. Most of its electricity generation is currently accomplished with coal and, now, imported natural gas. Of the Balkan countries, Greece and Bulgaria have the smallest shares of electricity from hydropower (9% and 8%, respectively), and each has considerable generation from domestic fossil fuel sources, nearly 90% for Greece[125] and 36% for Bulgaria, which also imports natural gas for production of an additional 16% of the total amount.[126] While Albania and Macedonia fair better when it rains, electronically speaking, those countries with large thermal capacities, like Bulgaria, do better under dry conditions when they will be able to make up for other's shortfalls.

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[119] CEEESA (2005). Power Market Analysis and Potential Revenues of 2 New Transmission Lines in the Balkans, Center for Energy, Environmental, and Economic Systems Analysis, http://www.dis.anl.gov/ceeesa/programs/balkans.html.

[120] See 36.

[121] World Bank (2006). Water Resources in Europe and Central Asia, volume II – country water notes, http://lnweb18.worldbank.org/ECA/ECSSD.nsf/ecadocbylink2/Country%20Water%20Notes?OpenDocument.

[122] SEENERGY (2006). Macedonia, Electricity Market, http://www.seenergy.org/index.php?/countries&stat=7&type=3&col=2117.

[123] OPCOM (2006). Romanian Electricity Spot Market: more than one million US dollars – new record for daily transactions, Romanian Power Market Operator, Press Release No. 4/2006, http://www.opcom.ro/portal/content.aspx?item=2179&lang=EN.

[124] U.S. Department of State (April 2006). "Background notes: Turkey", Bureau of European and Eurasian Affairs, http://www.state.gov/r/pa/ei/bgn/3432.htm.

[125] CSLF (2006). An Energy Summary of Greece, Carbon Sequestration Leadership Forum, http://www.cslforum.org/greece.htm.

[126] NEK (2005). Electricity Trade; Republic of Bulgaria National Electricity Company, http://www.nek.bg/cgi-bin/index.cgi?l=2&d=1014.

Back to Bulgaria

So what does all this mean for Bulgaria and the impending closure of Kozlodui's reactors? Bulgaria is well on the road to Europe-wide integration of trade in electricity. It has changed the structure of the electricity company,[127] and it's slowly but surely modernizing its facilities and infrastructure, and it has gained membership in and is cooperating with the necessary international agencies.[128] But nonetheless, it's about to take a big hit with the closure, experiencing up to more than 700 million Euros of lost revenue.[129] And while there may be enough electricity to meet domestic needs, the lost capacity means higher prices for consumers.

For these reasons there is tremendous support for recapturing the glory days of being the Balkan Energy Hub, but it seems unlikely that Bulgaria will be able to regain its status as net regional energy supplier. While Bulgaria's National Electricity Company will remain responsible for domestic transition and the negotiation of regional trade, its concerns must stay focused on state-wide demands, performance of facilities, and service to network consumers. The energy intensity (unit of production per unity of energy used) of Bulgaria remains well below that of European standards,[130] and needless losses within the system remain high.[131] Continued competitiveness in the energy market depends on the ability to become more efficient in regards to production, transmission, and use.

Despite the state's objectives and the support of international agencies such as the World Bank, as well as that of the general population, for the completion of the Belene nuclear power plant, there are growing voices in opposition to this strategy. The rationale against construction of the Belene nuclear power plant includes seismic instability of the site, uncertainty of the need for such a large generating capacity, the shadiness of the negotiation and decision-making process, and whether the electricity produced at the plant will be competitive on the regional market. Also rejected is the argument that nuclear power would help meet Kyoto Protocol allotments of carbon dioxide without sacrificing production. Bulgarian emission of CO_2 is already 50% below 1988 levels while the target reduction share was only 8%. Also rejected is the notion that the capacity loss will create a gap in the reserve capacity, making the country subject to brown-outs or black outs. In fact, even after decommissioning Kozlodui's reactors, the reserve capacity will remain double that aimed for by other member states of the European Union, and since joining the Union for the Co-ordination of Transmission of Electricity (UCTE) in May 2003, and having unfettered transmission with much of Europe, there is no great need to carry high amounts of reserve capacity.[132]

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[127] NEK (2005). Restructuring of NEK EAD, http://www.nek.bg/cgi-bin/index.cgi?l=2&d=1216.

[128] NEK (2005). International Cooperation and Public Relations, http://www.nek.bg/cgi-bin/index.cgi?l=2&d=1017.

[129] See 3.

[130] See 59.

[131] NEK (2005). Generation Development Forecasts, http://www.nek.bg/cgi-bin/index.cgi?l=2&d=1227.

[132] See 59.

There are also conceivable benefits to the closure of Kozlodui's reactors. First, the risks to public safety will be markedly reduced. Not only will the likelihood of a devastating plant accident be much less, but the difficulty and danger of waste disposal will shrink and the dependence on Russian imports of nuclear fuel and on the export of the waste back to Russia will dwindle, at least until Belene gets fired up. Second, the higher prices will be an additional incentive to become more efficient consumers and to drive people's attentions toward alternative sources, such as wind, solar, biomass, and geothermal. Actually, these are part of the mandate for energy development in cooperation with the EU, that increasing shares of the energy mixed be from renewable sources. Yet there is still considerable complaint that Bulgaria, as well as almost all nations, are ignoring the benefits of increasing energy efficiency and making use of renewable resources.[133] In fact, as Bulgaria melds into the European Union, decreased energy intensity is necessary for economic competitiveness.

[133] See 59 & 60.