BULGARIAN ELECTRIC POWER SYSTEM– DEVELOPMENT AND SOCIAL COSTS[1]

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BOOK SYNOPSIS

The book is an updated follow-up of two national reports on Bulgaria as part of a European research into the costs of sustainable energy systems within the CASES project co-funded by the European Commission. The project pooled the efforts of 26 research centers all over Europe, as well as of their counterparts from India, Brazil, Turkey, and China. The reports on Bulgaria were approved for dissemination in 2008 by DG Research (http://www.feem-project.net/cases/downloads_deliverables.php).

The first part of the book discusses the electricity demand and supply drivers, and identifies a reference scenario by 2030. Unlike all other strategies for the past decade, this book makes a quantitative analysis of the county's installed capacity and electric energy balance until 2030. The findings (Table. 2.15) indicate the huge excess of electricity production capacities. Given a forecast gross consumption of 37,754 GWh in 2020, the surplus is estimated to amount to 38,268 GWh, or 101.36 %. Bulgaria has never exported more than 7-8,000 GWh/yr. When analyzing this surplus caused by extensive development with government guarantees, it has to be taken into account that after 2006, electric power has not been exported by NEK EAD, but by other external traders to the detriment of clients in the country. The deficit, typical in the Balkans, is already becoming a mid-term surplus. On the other hand, Bulgaria imports over 70% of the power resources, and therefore installing new capacity for the export of electric power is not cost-efficient.

The lack of growth in electric power demand (Section 2.2 of Part 1) points to the obvious need in the reference electricity scenario to develop only sites which will compete with the options for refurbishment of the existing power plants. The analysis in Section 2.2.5 (Selecting Electric Power Facilities) shows that the Belene NPP has to be ruled out of the reference electricity scenario by 2030 (a more detailed discussion of this project is presented in Appendix 1). This section also provides some considerations on developing conventional and small HPPs, on wind farms, on cogeneration projects in Combined Heat and Power District Heating Plants, on the projects for condensate steam-gas power plants by the Varna CHPDH and Haskovo CHPDH, and on the new condensate facility in the Maritsa Iztok 4 Thermal Power Plant. Table 2.17 (p. 76) presents a capacity and electric power balance for the reference electricity scenario, whereby the reserve capacities have been reduced to a reasonable level of about 20%, thus providing for a return on the investments. The power capacity savings in the reference electricity scenario (Tables 2.16 and 2.17, Figures 2.2 – 2.5), in comparison with those of the extensive scenario of all existing projects (Table 2.15) as of 2020, are 6,850 MW, and as of 2030 – 7,850 MW. This means savings in investments worth 14.4 billion euro by 2020 and 16.6 billons euro by 2030. (For the Belene NPP alone, according to a statement by the Minister of Energy, the investment is estimated to be 10 billion euro).

[1] Electronic version of the book is available at: http://abea-bg.org/images/stories/Electroenergy/Book%20%20Elektroenergy_1,3%20-%2018%2012%202012.pdf

Chapter 3 in the first part of the book analyses topical issues in the Bulgarian energy policy: the EU energy policy, the national targets for sustainable development, including Bulgaria's lagging behind by decades in terms of some essential energy and economic indicators for sustainable development, climate changes and clean energy, energy security (energy dependence and diversification of import, development of the production facilities structure of the national energy system, technological and legal issues of connecting WPPs to the electricity system); prices, competitiveness of the economy and social status of the average consumer; energy policy and liberalization of the energy markets; baseline assumptions for a strategy covering the following 20-30 years, and institutional and research issues of the energy policy.

The second part of the book focuses on building a new understanding of and policy for the development of the power industry, not only in terms of a system of technologies in its own right, but also through a monetary assessment of the negative impacts all along the whole lifecycle of the energy resources and technologies. According to the CASES project and the reference electricity scenario, the authors have elaborated the intrinsic (explicit), external and social (intrinsic plus external) costs for the production of electricity from organic fuels and RES for Bulgaria. This part is made up of five chapters: introduction to the ExternE methodology of the CASES project, production of and technology behind organic fuels, valuation of the social costs of the electricity produced from organic fuels, valuation of the intrinsic and social costs of the electricity produced by renewable energy sources (RES), and comparison of the social costs in the electricity production from organic fuels and from RES. The tabular and graphical findings we present and analyze indicate the significant consistent patterns of a new process of replacing the conventional power plants in Bulgaria with hydro, wind, biomass and solar– based power plants.

Summary

1. The book shows that the energy system cannot and should not be developed without well-founded national targets and independent prognosis.
2. The book contributed to observing of the strategic energy policy of EU [L23] for dropping out "whatever subsidies," including the country guaranty for the market risk of the nuclear power plant"Belene"- amounts for 15 years between 13 billion euros in the case of specific production cost 6 Euro cents/KWh and 21.9 billion euros in the case of specific production cost 10 Euro cents/KWh of the plant. *(By way of illustration – these amounts are comparable to the actual state support of the Bulgarian academy of Sciences for 340 and 570, respectively years ahead)*
3. The scenario recommended in the book for the development of the national electricity system suggests saved investments 14.4 billion euros by 2020 and 16.6 billion euros by 2030, in comparison to the actual extensive scenario for development. This huge amount of common sense investment saving could help the country to solve a number of economic and social problems as energy efficiency, infrastructure, education, health care…
4. Chapter 3 of the book contains analysis and suggestions directly connected to the relevant issues of the energy policy, the new legislation and the initial prerequisites for the energy strategy for the next 20-30 years
5. The second part of the book suggests a new standpoint and policy for the future development of the energy in accordance with the entire (social) cost of the resources, the technologies and the negative impact they have on the environment and public health.

Appendix 1

ECONOMIC, BALANCE AND REGIME CONSIDERATIONS FOR RULING OUT THE BELENE NPP FROM THE REFERENCE ELECTRICITY S

- Analyses show that the Belene NPP is not necessary for the electric power balance of the country.
- Due to the unconvincing expediency and competitiveness of the Belene NPP, no investors have yet been found willing to take the risks involved in building it. Looking for investors, the Bulgarian National Electric Company (NEK EAD) declared that it guarantees the marketing, in part or in whole, of the electric power produced by the plant during the next 15 years. This means that at a cost of 6 cent/KWh, the state guarantees (takes a market risk of) some 13 billion euro. If we add to this amount the declared 50% share in the costs for the construction works worth 10 billion euro, building the Belene NPP leads to an incredible economic burden on the rather negative foreign trade balance of the country. Currently, in the conditions of a financial crisis and a number of economic and social problems, proceeding with the construction of the Belene NPP is counterproductive for the economic reconstruction of the country.
- It is worth noting that in the key working document concerning the energy policy of the European communities ("Energy policy for Europe"), the cost of electricity produced by NPPs remains 4–4.5 eurocent/kWh until 2030. Belene NPP will be not competitive in the European electricity market.
- The government guarantees and the request for a government loan in their own right contradict the EU's Nuclear Illustrative Programme, in which the section on "financial issues" explicitly states: "It is important to make sure that no nuclear energy projects in the EU shall be supported by any government subsidies whatsoever". How then can we explain why, due to financial difficulties, the former government of Bulgaria addressed Russia with a request for a government loan worth approximately 4 billion euro to build the plant – a plant which is not necessary to meet the country's electricity demand by 2030?
- Currently, Bulgaria's energy dependence amounts to some 72% on the average and to 100% for crude oil, natural gas and nuclear fuel imported from Russia. Building the Belene NPP and its operation will increase the country's energy dependence on Russia, which is in contradiction to the national security policy and the EU's policy to decrease its energy dependence;
- The big-unit capacities also require commensurate reserve capacities. This means that 1,000 MW in other plants are kept as a reserve and are engaged only in case of failure in the master capacity. Such reserve capacity has just some 300–400 hours of utilization throughout the year and fails to pay back the investments. However, such an extra reserve is paid by the end- consumers, and thus the price of electricity grows without asking for their consent.
- Unit energy capacities of over 400 MW are unacceptable for our country, although certain concessions can be made to accommodate 600–700 MW, because they would endanger the dynamic stability of the electric power system and reduce the reliability of electricity supplies.
- To address energy markets entry by 2035, a group of 10 countries is involved in developing six types of fourth-generation- high-temperature nuclear reactors capable of producing hydrogen, reactors offering significantly better energy efficiency or using a closed fuel cycle, in which nuclear wastes are partially or completely recycled. The second objective of these developments is reducing the capital intensity and operation costs, assuming that such an NPP will be operated for 60 years.