

FOREWORD

Present-day Europe is undergoing irreversible changes. In so doing, ever wider possibilities are opening up for economic interaction between countries of Eastern and Western Europe. One of the natural forms of such interaction is the increased exchange of electric power between national power systems (NPS) and their international amalgamations, leading towards their eventual consolidation for parallel operation.

At present, several international, interconnected power systems are operating in Europe, such as UCPTE (twelve West European countries), NORDEL (four North European countries), that of East European countries (including the former USSR countries).

The extension of territorial boundaries of interconnected electric power systems provides for a more economically efficient utilization of fuel and energy resources while supplying electric power (and heat in the case of centralized heating) to users, as well as facilitates the solution of a number of ecological problems associated with the production, transmission and distribution of electric power. This accounts for the current interest in analyzing the desirability of parallel operation of interconnected power systems in Eastern and Western Europe. All the more so since the Unified Power System of the former USSR is connected via a d.c. back-to-back sub-station with the NPS of Finland which is part of the interconnected power system of the North European countries; links exist between Hungary and Austria.

The study of such problems calls for a fairly substantial knowledge of the current status and prospects for developing national and interconnected electric power systems in Europe, as well as of the methods and means used in on-line supervisory control and in planning the development of those systems.

In May 1987, the International Institute for Applied Systems Analysis (IIASA) held an international task force Meeting on Electric Power System Planning. The main topics under discussion included: the current status of power system planning in Western and Eastern countries; multiple-attribute optimization and interactive decision support systems;

and a number of new issues associated with power system planning.

The most active role in this task force meeting was played by Prof. F.S.Schwepe. In the discussions, special attention was given to the fact that the scientists and experts from both Western and Eastern countries lacked adequate information on the procedures, methods and techniques used in the development planning and on-line supervisory control of electric power system in various countries.

Prof. Schwepe proposed the idea of preparing under the auspices of IIASA a book aimed at Western readers, which could describe the interconnected power systems of Eastern Europe, as well as the technologies and methods employed for decision-making in controlling the operation and development of this mayor energy pool. At the last years (1988 — 1992) economy-politics situation in the countries of East Europe and in the states-republics of the former USSR changed significantly. But, new circumstances increase the necessity of the interrelations between interconnections of the East and West Europe.

The book offered to the readers was written by a group of experts from the Soviet Union and Czecho-Slovakia (in view of the fact that the Central Dispatching Department of the interconnected electric power systems of East European countries is located in Prague), including some members of IIASA's scientific staff. The book describes the current status of the electric power systems of Eastern Europe in parallel operation (Chapter 1). The information contained in this chapter and characterizing the energy resources, electric power generation and parameters of electric power systems is given for the period of stable economic development up to 1990 and only serves to provide a general impression of the scale of the described objects of control. In Chapters 2 and 3, considerable attention is given to the description of the means and procedures of on-line supervisory control of these interconnected systems, including a description of systems for load and exchange power control, methods for calculating and optimizing electric and energy regimes, as well as the reliability of electric power systems. The two concluding chapters describe the methodological principles, methods and mathematical models used in decision-making for developing the national and consolidated power systems of East European countries.

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We hope that this book will contribute to a better understanding of

the methodology and practical experience of electrical power system planning in European countries and may prove useful when the time comes for interconnecting the electric power systems of Eastern and Western Europe.

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Editor