Chapter 2
Factors Affecting the Future of Power Supply Industry

ABSTRACT

In the past two or three decades, several developments took place in the power supply industry. These developments formed influencing factors that have a bearing on the power supply industry structure and future evolution. It is very helpful before embarking on the planning of the power system to attempt to identify such factors and understand how they might affect the future plans, design, composition, and operational aspects of the power system.

In many countries the power supply industry has been transformed by means of reforms, deregulation of markets, and public-private partnerships into new setups and hierarchies. The understanding of these trends is essential to follow up the future structure and organization of the power systems.

Environmental considerations and consequences of power system operation have a great deal of influence on future plans. Other internal and external factors include market entry of new power system technologies, efficiency improvements of system components, and introduction of new or renewable energy sources.

The understanding of all factors that might influence the planning process directly and indirectly is a prerequisite to guaranteeing a realistic outcome. This understanding provides the guiding principles and outer boundaries of the concepts and thinking process involved in power system planning.

INTRODUCTION

This section introduces the new emerging trends and critical factors which have shaped and continue to influence decisions of power system planners and operators. These new trends, or critical factors, are characterized by being greatly influenced by market and political forces. The evolution of new ownership models that separate government from private sector is one such trend. Later on the Public-Private Partnership (PPP) has taken its due place.

The discussion about the new regulatory and market constraints will hopefully shed some light on all these issues and how they affect the processes of decision making and conducting...
business in the electricity sector. It will introduce new terminologies, discuss new procedures and tools, and present the philosophy underlying the changes and trends that lie ahead.

The new trends have evolved from the deregulation strategies adopted by almost all power utilities. The model of a comprehensive monopolistic utility is almost a fact of the past; although in few countries it is still in place. Presently there is the vertical model which distributes the country into geographical regions and gives a concession to one utility to serve one particular region or area. Then there is the functional model which separates generation from transmission from distribution and gives each one to one or more companies. In between the two models there are several variants. These variants depend on the ownership of the power utilities. For example generation and distribution are privatized while transmission is kept as a government entity. In others generation is kept with government while transmission and distribution are privatized (Metaxiotis, 2010, p. 1).

In almost all cases, government is moving away from controlling the power system and more into regulatory roles and duties. This is driven primarily by the fact that governments want to divorce themselves from the heavy burden of financing the power system. Luckily, the private sector is interested in assuming this financial responsibility provided it gets fair return on its investment. The governments are somehow satisfied with the regulatory roles, which include tariff setting, licensing, power quality issues, and more. The relationship between the regulatory body, which does not by default represent government per se, and the power companies could be a complex one as the criteria used involve customer satisfaction, companies’ profitability in addition to quality of the power delivered.

In certain aspects these ownership models have created competition and a drive for better quality. Therefore, new technologies and procedures have been tried and put into use. Moreover, customer satisfaction has become an important factor in the electricity business to the extent that in certain cases customers dictate their preferences as to green power over other environmentally polluting sources. In other cases performance of power companies in relation to power quality standards constitutes a bargaining power against such companies.

The electricity supply industry has faced and is still facing challenges and threats from emerging new trends. As a matter of fact the structure and shape of the electricity supply industry have been greatly affected and changed as a result of these trends. These trends cover a wide spectrum of areas and they are inter-disciplinary and inter-related. Therefore, functions and responsibilities of the various entities must be such as to be able to cope with this fact. Moreover, engineers currently working in the electricity supply industry are quite different from the older ones who used to work in the recent past. Although the basic education is almost the same, newer curricula have introduced newer sciences and tools, which were not present in the past.

All these new trends have created new functions and duties for the power system planners and operators. On one hand better tools have been developed to improve the planning aspect of the power system including peak load and energy forecasting, risk assessment and reliability enhancement, integrated resource planning, and future expansion and investment planning. On the other hand other tools have been developed for the proper and cost-effective operation of the power system. These include: contingency analysis, economic dispatch with provision for tie-line control and power exchange, energy efficiency, demand side management, reliability and availability monitoring, optimum power flows and loss reduction, interruption management and power restoration, and billing and payments follow up (Metaxiotis, 2010, p. 2).