

Chapter 19

Power System Operator Certification: A Case Study for India

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ABSTRACT

The unbundling of the electricity industry has changed the way the energy supply business is handled from a mainly technical to a more commercially dominated one. This new paradigm shift has facilitated creation of new system and/or market operation entities in electrical utilities throughout the world. The increasing number of different companies with diverse interest participating in the electricity supply business leads to a shift from traditional tasks of power system operation among these companies to new additional job duties or even a complete new job as system or market operator. This case study examines the critical change that have taken place in the commercial environment in which power system operators now work both at the system operation level as well as in the generation operation and how that affects their day-to-day operations. This case study analyses the international scenario along with their performance targets that have already been implemented worldwide and would describe their impacts on the job to be performed by the system operator in India. Finally the training needs of system and market operators' personnel both at the system operation and generation operation where these entities are separated are pointed out, focusing on the new points that have arisen because of the new commercial environment.

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1. INTRODUCTION

The unbundling of Electricity Industry has paved a new operational environment changing from the classical technically driven operation towards a commercially customer oriented business. This process is initiated by various Governments across the world including India with the passage of the Electricity Act 2003 in the Parliament with a directive to establish a competitive electricity supply business. With the act,

- A number of electrical utilities in the States of India has already moved from their single monopolistic type of structure into an unbundled industry with separate generation companies, transmission companies, distribution companies along with merchant power plants, trading companies and power exchange,
- While majority of these states, the system operation lies with the state transmission utility, a process of ring fencing the power system operation is initiated.
- In some of the States, only transmission companies are carved out and keeping the generation and distribution function in one company.

As part of the reforms, the electricity supply business is separated into

- The physical transfer of energy (based on real-time power dispatch, i.e. MW) and
- The energy trading environment (based on financial energy trading, i.e. Rs./MWh).

The physical transfer of energy is under responsibility of the system operator (SO) who has the responsibility to fulfil the two basic tasks:

- Providing security of the interconnected power system
- Balancing power/frequency of the system.

Again, the role of system operator depends on the transmission asset ownership as

- Transmission System Operator (TSO), if overall system operation responsibility and asset ownership belong to one and the same company (common in Europe). In this case the transmission system is operated by the system operator.
- Independent System Operator (ISO), if overall system operation responsibilities belong to an independent company (like in the US, South America, Australia). The transmission system is operated by one or more transmission agents under supervision of the system operator.

The Energy trading environment is through the market operator (MO) who is responsible for the overall economic trading environment. This entity can either be

- Integrated into a system operator like in Argentina, PJM (Pennsylvania-New Jersey-Maryland) or NYPP (New York Power Pool) or
- Separated as an Independent Market Operator (IMO) like in Scandinavia (Allembly et al., 2000).

Grid code, co-operation rules and market rules also define the mutual interfaces between system operator and market operator as well as the interfaces between each of them and the diverse agents like suppliers, distributors and consumers that are physically connected to the transmission grid and/or trading in the market environment. Referring to this framework, system operator and market operator have to act in a non-discriminating way and transparently with regard to tariff structures and decision making. Furthermore, the metering and settlement code defines the interface between system operation and energy trading and contains the basis for the settlement of imbalances.

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