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**Hydropower Investment
Promotion Project (HIPP)**

Grid Code Requirements and Responsibilities of the Regulators

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Introduction

- Definition of Grid Code: **“A document that contains the minimum technical rules governing maintenance of network stability, security, and reliability and that is mandatory for all market participants”**;
- Grid Code covers the operating procedures between TSO and the users of the transmission system;
- It covers the process of:
 - Planning
 - Connection
 - Operating
 - System balancing;
- **Regulator plays crucial role in the network processes in creation of the grid code and in its implementation.**



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Contents of the Grid Code

- Glossary
- Balancing
- Network planning
- Operational planning
- Metering
- Operation
- Electrical equipment requirements
- Connection to the grid
- Voltage, Frequency and Load control
- Restoration and parallel operation
- Defense plan
- Ancillary services



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Balancing Code

- Ensure that at all times generation is matched to demand;
- Maintain the appropriate margin of reserve capacity to ensure, the integrity of the electricity system and the security and quality of supply of the power system;
- Ensure the procedures for balancing the system generation and demand in real time;
- There are three sub-codes:
 - Dispatch code
 - Ancillary services code
 - System frequency and voltage control code



Network Planning

- Sets out the requirements for supply the certain information by network users so that the Transmission System Operator can carry out the planning and development of the transmission system;
- Provide framework for future network development, taking into account the existing situation;
- Creation by the TSO the transmission network development plan and generation adequacy plan for planning and development of the transmission system to operate economically, secure and safely;
- Specifies the conditions for the system users to plan and develop their systems to be compatible with the transmission system;
- Specifies the standards that will be used by TSO in the planning and development of the transmission system;
- It is applies to TSO, Generators, DSO and Customers directly connected to the transmission system.



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Operational Planning

- Covers the period from one year ahead up to the real time balancing stage.
- It consists of three sub-codes:
 - Outage planning code covering the scheduling and co-ordination of system outages
 - System assessment code covering system security assessment and demand forecasting and
 - Scheduling code covering the day ahead scheduling process



Metering code

- Setting out the requirements for commercial metering in order to facilitate the operation of the electricity market;
- Establishes clear rules for the installation and use of metering to ensure that production, transfer and consumption data is available to support the efficient settlement of electricity transactions.



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Operations

- Coordination of the operations in the grid;
- Consist of separate grid codes as follows:
 - System testing and monitoring;
 - Operational coordination and event information supply;
 - Safety coordination;
 - Accidental planning;
 - Demand control;
 - Plant and apparatus identification;
 - System tests.



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Electrical Equipment Requirements

- Sets out the requirements for equipment forming part of the network of the TSO and the equipment of system users at the point of connection to the transmission network;
- It defines the range and general requirements for plant, equipment and apparatus at the connection points between the network users and TSO.



Connections to the Network

- The terms and conditions on which connection to the transmission system is granted will be set out in a commercial agreement, on reasonable terms, entered into by the user and the TSO;
- Describes the specific contractual agreement between the TSO and the user for each individual connection point of the transmission system;
- In most of cases where a single user has multiple connections on a single site then only a single contractual agreement is required.



Regulator's Responsibilities

- Approval of the Grid Code;
- Approval of the network tariffs;
- Approval of the connection conditions and tariffs for connection to the grid;
- Approval of the costs for reserve capacity;
- Approval of the costs for ancillary services;
- Approval of the general contractual agreements;
- Monitoring of the implementation of the Grid Code;
- Monitoring of the market;
- Regulatory reporting;
- Coordination with the neighboring regulators where the TSO has a connection with neighboring TSOs;
- Dispute resolution;
- Initiate the amendments of the Grid Code by the request of market participants;
- Issuing recommendations and resolutions for improving the grid code.



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