



Bureau of
Energy Resources,
United States
Department of State



National
Association of
Regulatory
Utility
Commissioners

Workshop on Regional Electricity Trade and Market Development

Exploring Grid Codes

April 24, 2014





What is Grid Code

The rules and procedures which govern the technical issues related to connection to transmission system, utilization and operation of the transmission system including provisions describing the current circumstances under which the emergency measure of correction in case of delivery may be commissioned, and when and who may commission this measure.



Objective of a Regional Grid Code

- ⦿ To define standards for operational reliability and quality of supply of electricity in the region;
- ⦿ To coordinate operation and planning between utilities in the region including ranking of planned investment projects to increase transmission capacity; and
- ⦿ To facilitate the development of an integrated electricity market.



The Regional Grid Code

The regional Grid Code is a starting point for the harmonization of national rules, setting the minimum requirements for technical properties that will influence the operation of the interconnected electric power system. The regional Grid Code must, however, be subordinate to the national rules in the countries concerned.



Grid Code is Designed to

- ⦿ Develop, maintain and operate an efficient, coordinated and economical system for the transmission of electricity;
- ⦿ Facilitate competition in the generation and supply of electricity; and
- ⦿ Promote the security and efficiency of electricity generation, transmission and distribution systems.



How is Grid Code Developed

Grid Code is developed through a cooperative process both nationally and regionally. The process involves:

- ⦿ **Developing framework guidelines (about 6 months);**
- ⦿ **Developing network code (about 12 months);**
and
- ⦿ **Consultations, agreement and implementation (about 9 months).**



Elements of Grid Code

- ⊙ **Planning code;**
- ⊙ **Connection conditions;**
- ⊙ **Compliance process;**
- ⊙ **Operating code;**
- ⊙ **Balancing code**
- ⊙ **Data registration code; and**
- ⊙ **General conditions.**

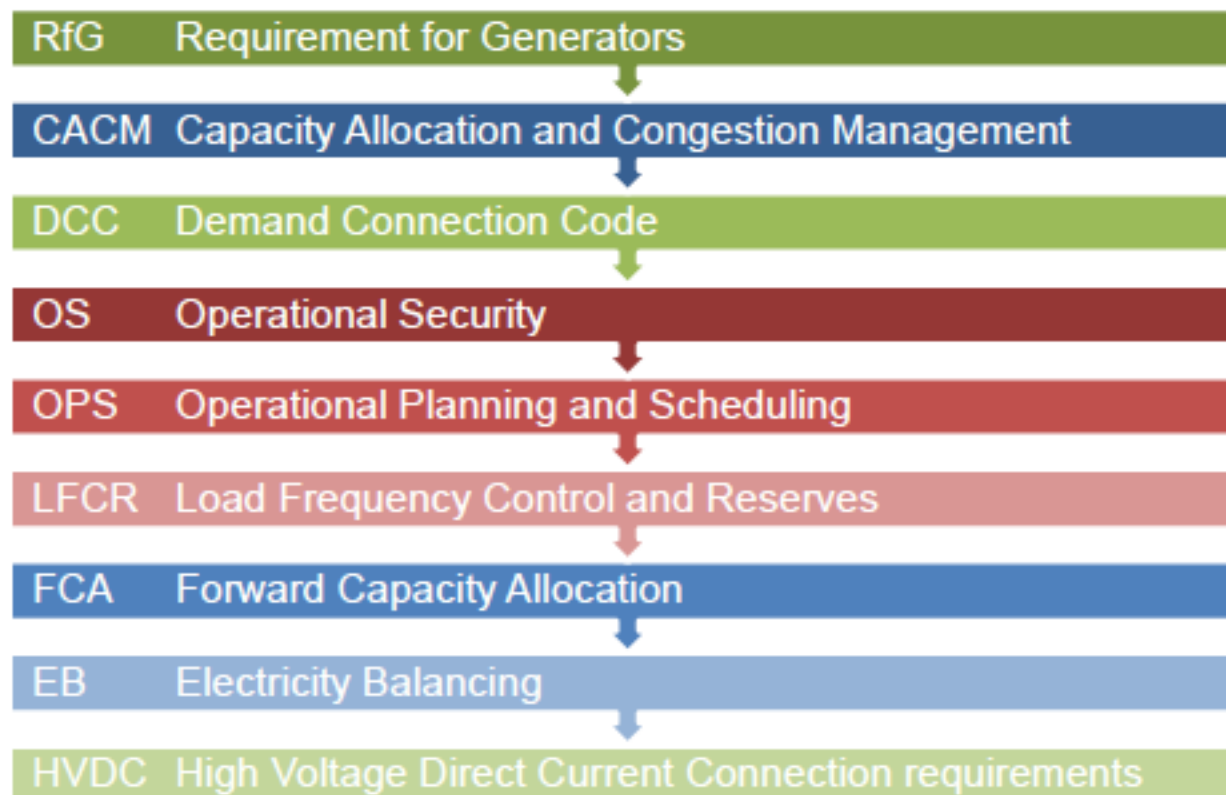


The Process

- ⊙ **Initiation;**
- ⊙ **Drafting including informal consultations;**
- ⊙ **Formal consultations;**
- ⊙ **Approval; and**
- ⊙ **Final roll out.**



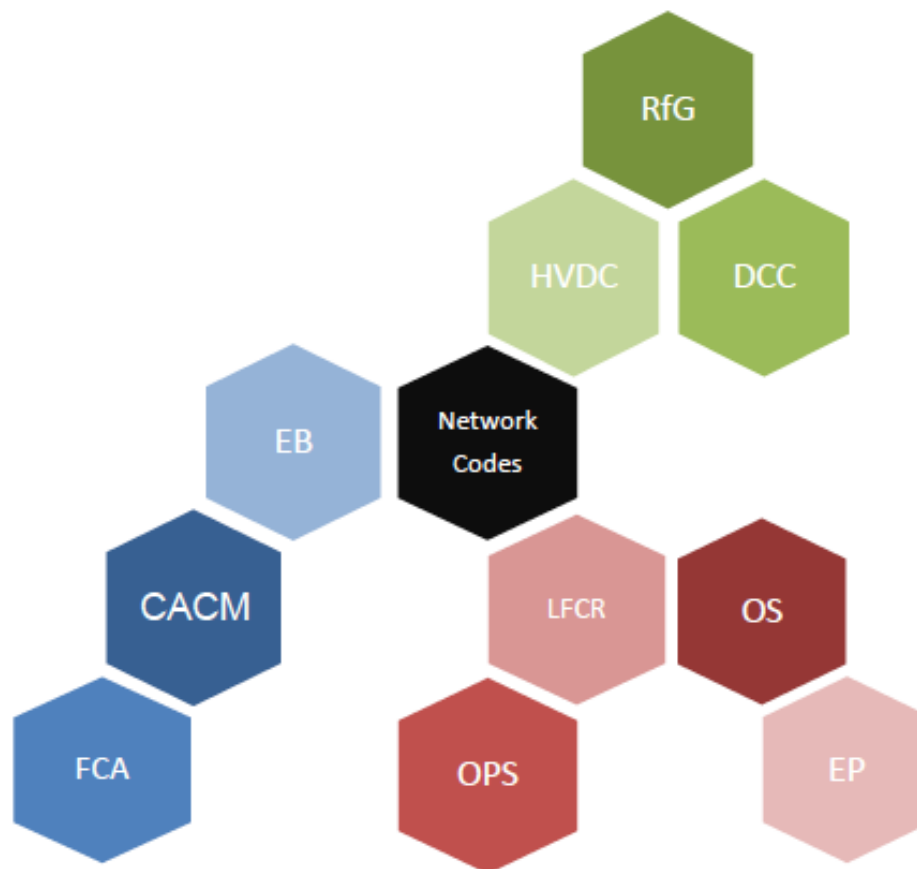
Flow



Source: Reliable Sustainable Council (ENTSO-E)

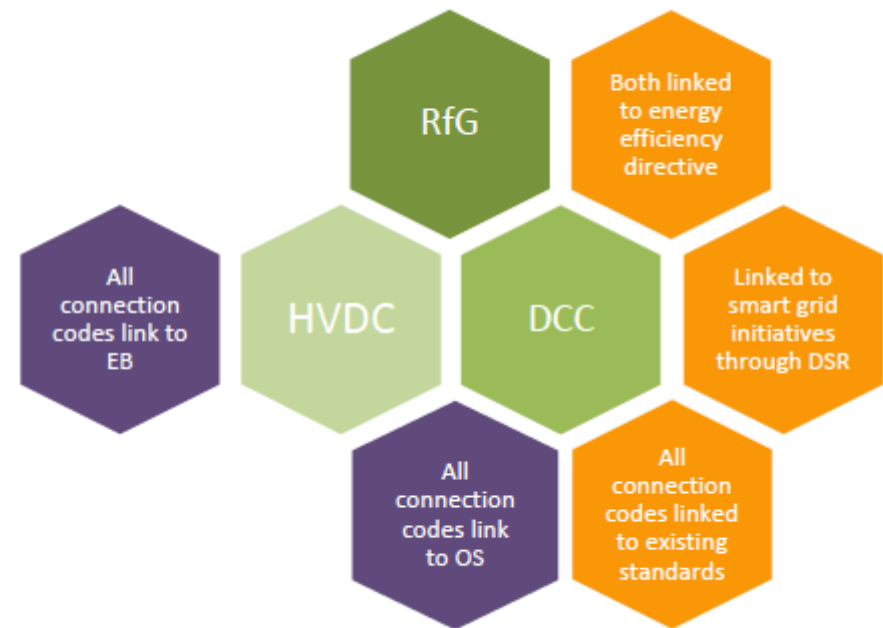


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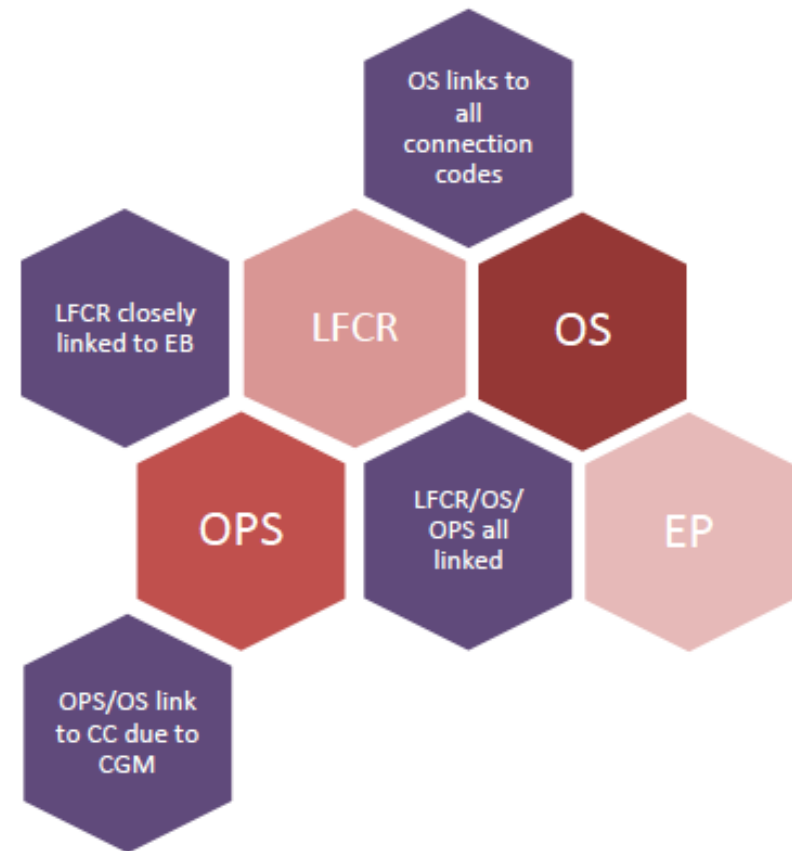
Grid Related Network Codes

- ⦿ Requirements for generators (RfG);
- ⦿ Demand connection codes (DCC); and
- ⦿ High voltage DC codes.



System Operation Related Network Codes

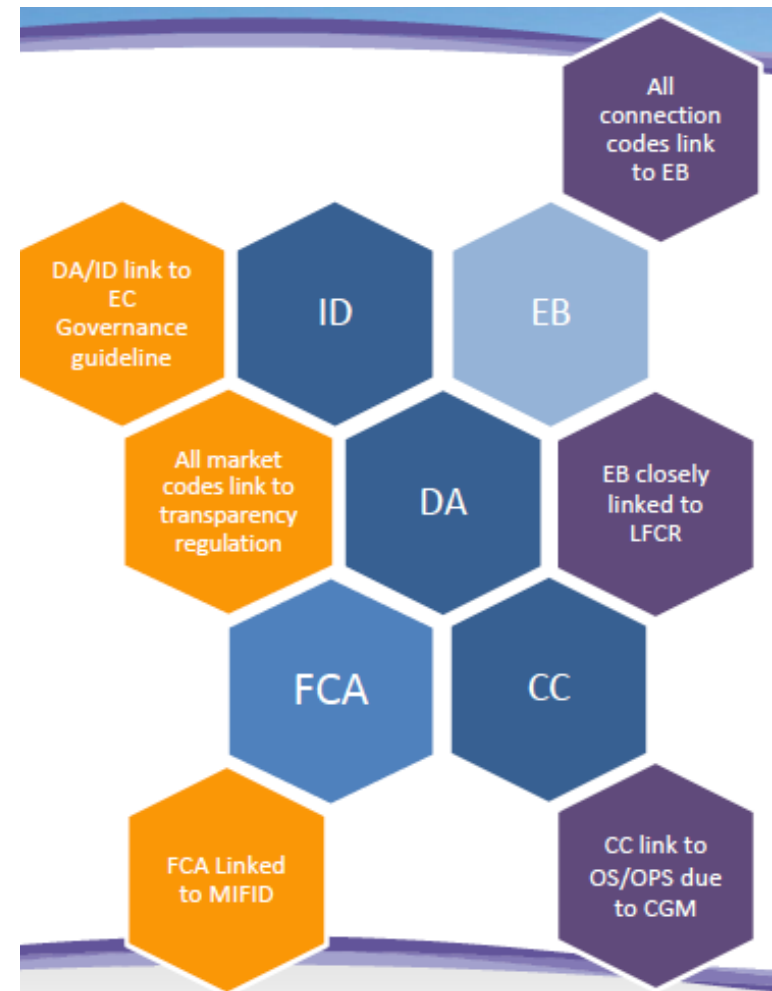
- ⦿ Operational security (OS);
- ⦿ Operational planning and scheduling (OPS);
- ⦿ Load frequency control & reserve (LFCR); and
- ⦿ Emergency procedures (EP).





Market Related Network Codes

- ◎ Capacity allocation and congestion management (CACM);
- ◎ Forward capacity allocation (FCA);
- ◎ Electricity balancing (EB).





Thank you!

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