

## 5a. Grid Connection Codes

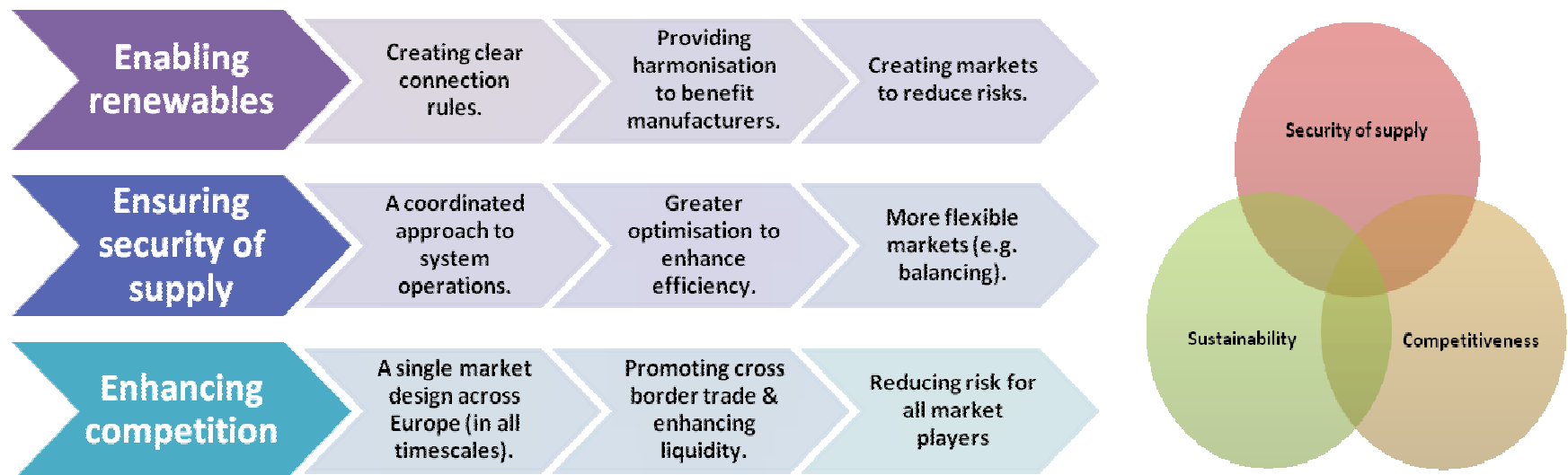
Requirements for Generators  
Demand Connection Code  
HVDC Network Code



# The Third Energy Package

- 3 regulations and 2 directives.
- Adopted July 2009, law since March 2011
  - Key step forward in developing a (more) harmonised European energy market
  - Separation of ownership of monopoly energy transmission activities
  - Formation of European Transmission System bodies, ENTSOG and ENTSO-E
  - Formation of ACER – Agency for Cooperation of Energy Regulators

## Goals:



# European Networks Codes – Commission target to enter into force by end of 2014

## Connection Codes

Requirements for Generators

Demand Connection Code

HVDC

## Market Codes

CACM

Forward Capacity Allocation

Balancing

## Operational Codes

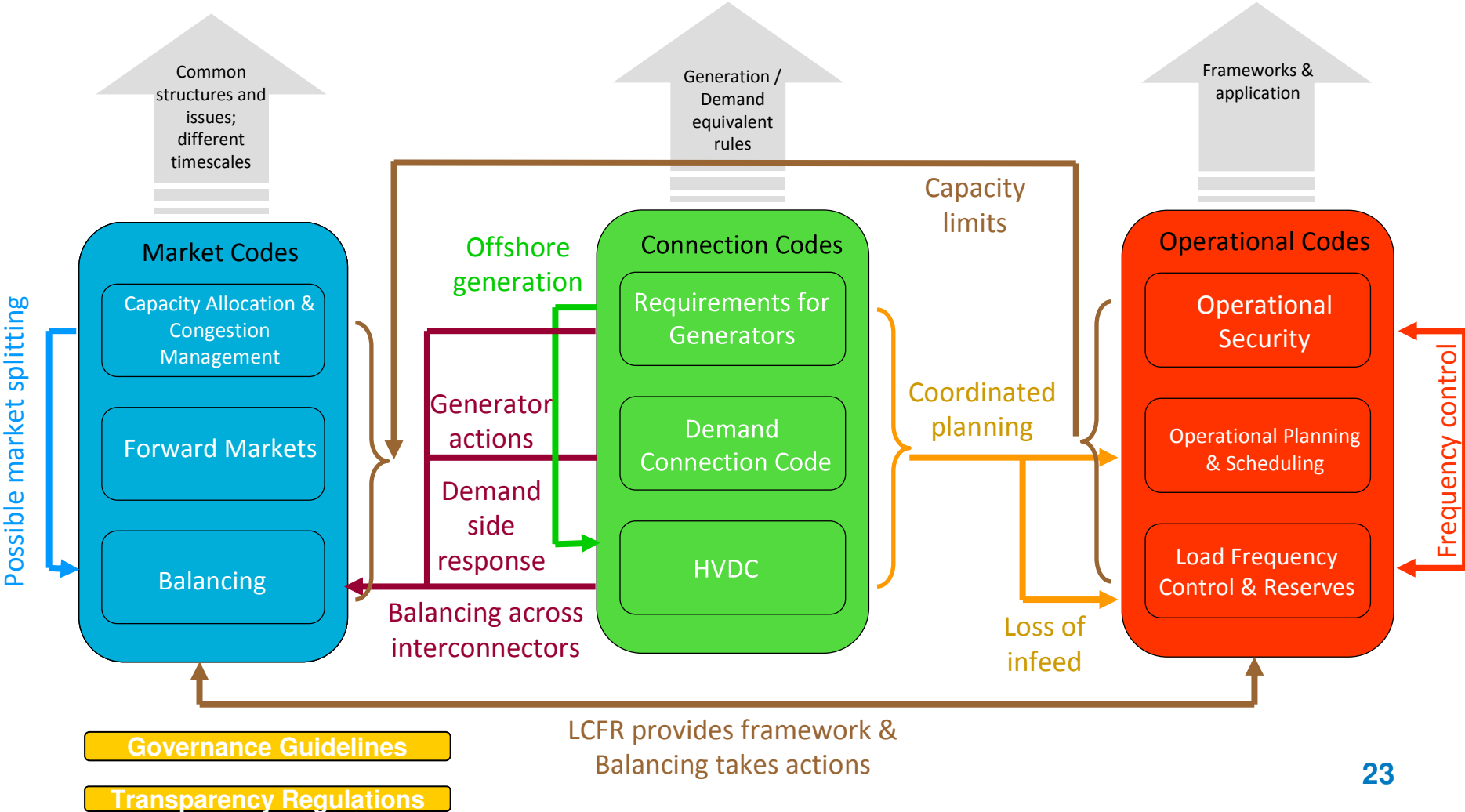
Operational Security

Operational Planning and Scheduling

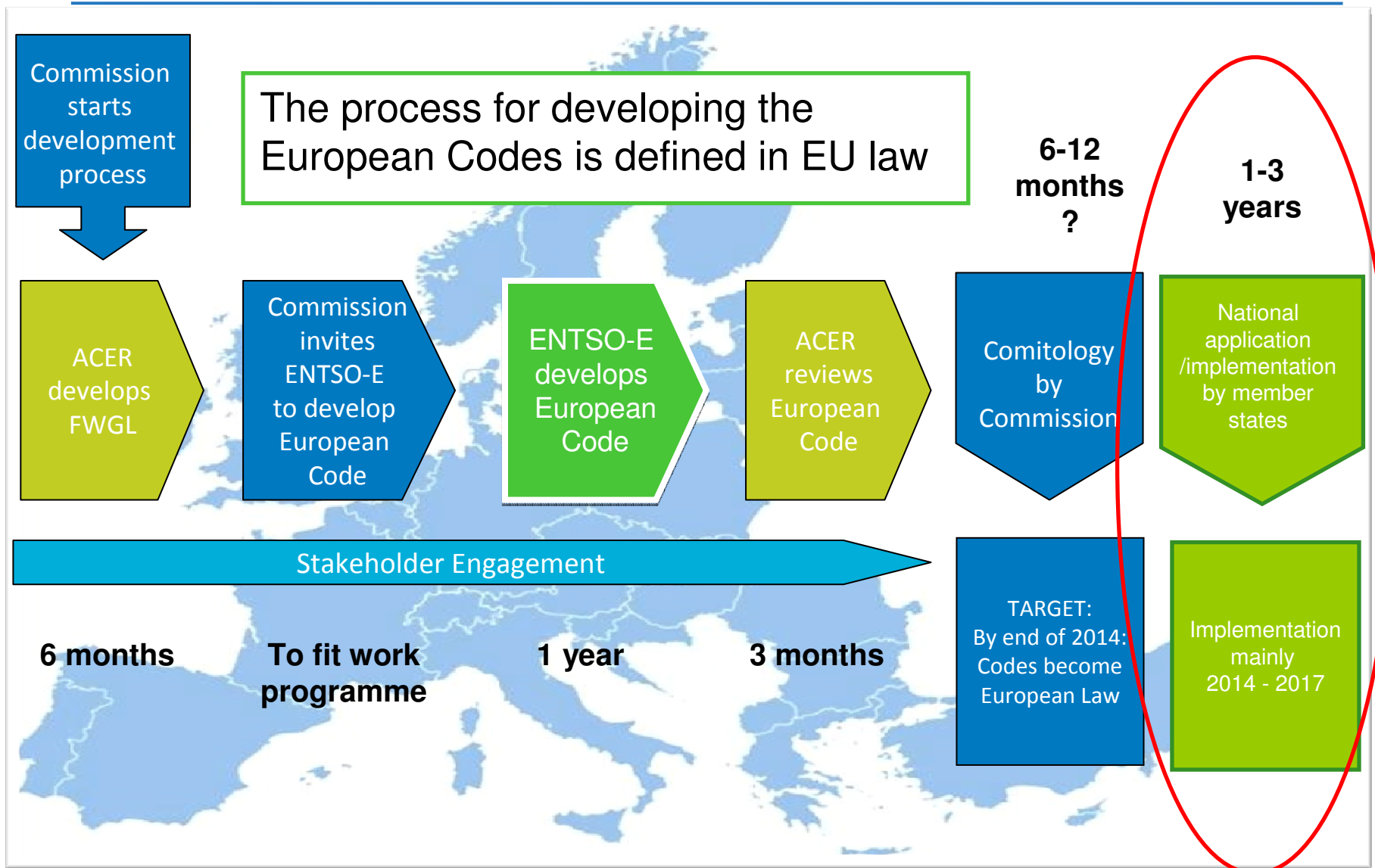
Load-Frequency Control and Reserves

# ENC High Level Interactions

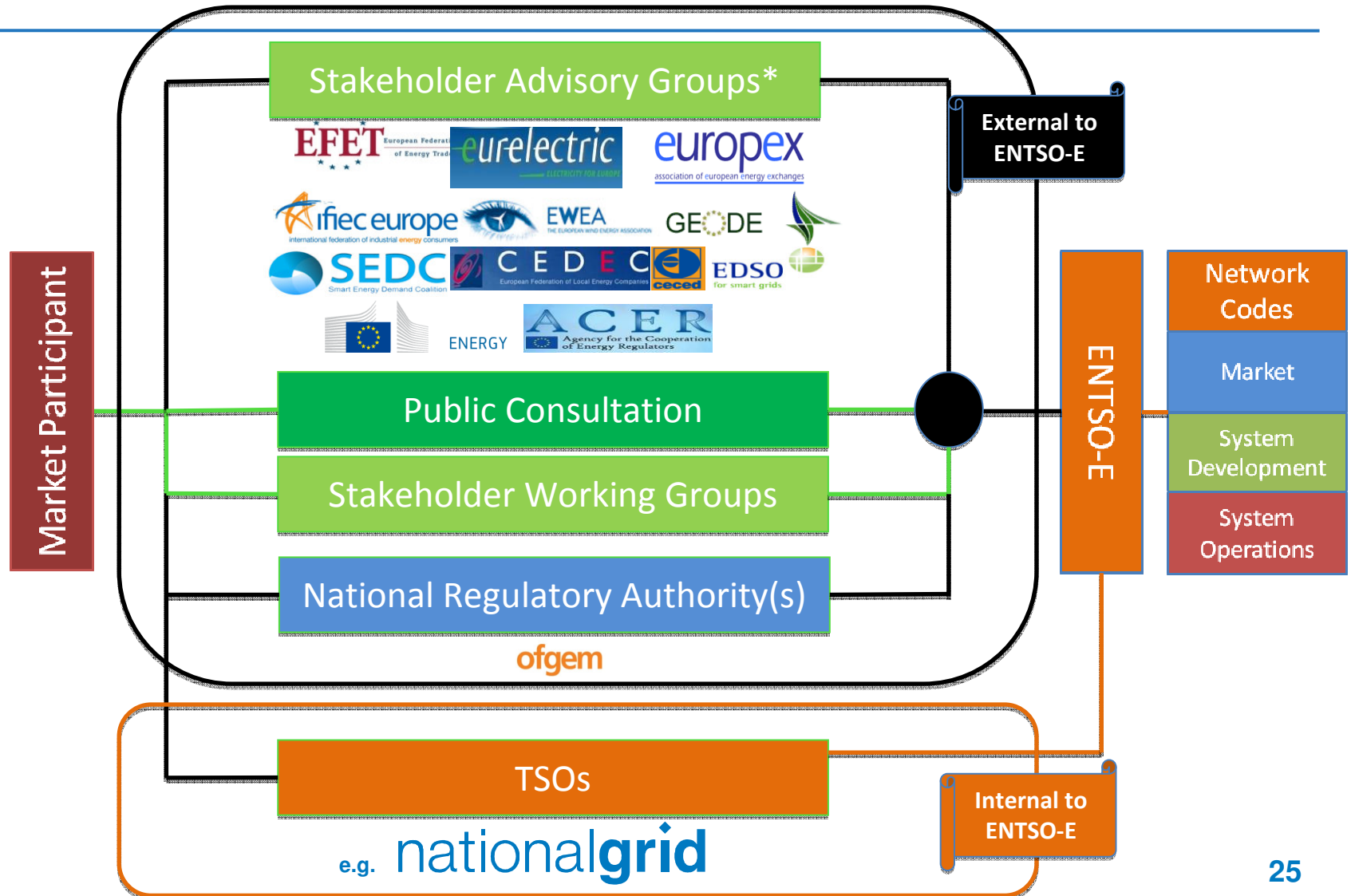
9 codes, 1 package



# European Network Code (ENC) Development Process



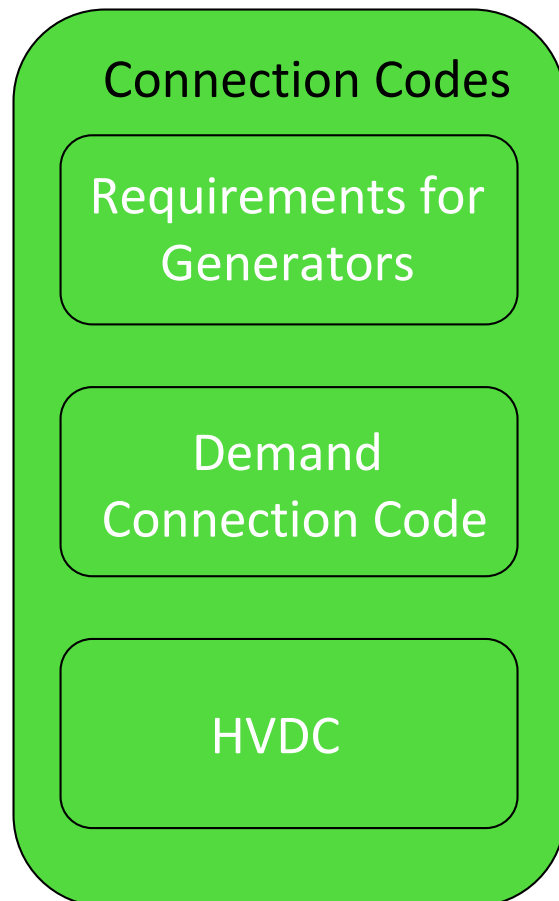
Stakeholder engagement on the Network Codes



\* non-exhaustive list, SAG depends on individual Network Code

# Connection Codes

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Sets functional requirements which new generators connecting to the network (both distribution and transmission) will need to meet, as well as responsibilities on TSOs and DSOs .

Sets functional requirements for new demand users and distribution network connections to the transmission system, basic Demand Side Response capabilities, as well as responsibilities on TSOs and DSOs.

Sets functional requirements for HVDC connections and offshore DC connected generation.

# Grid Connection Codes

**Requirements for Generators**

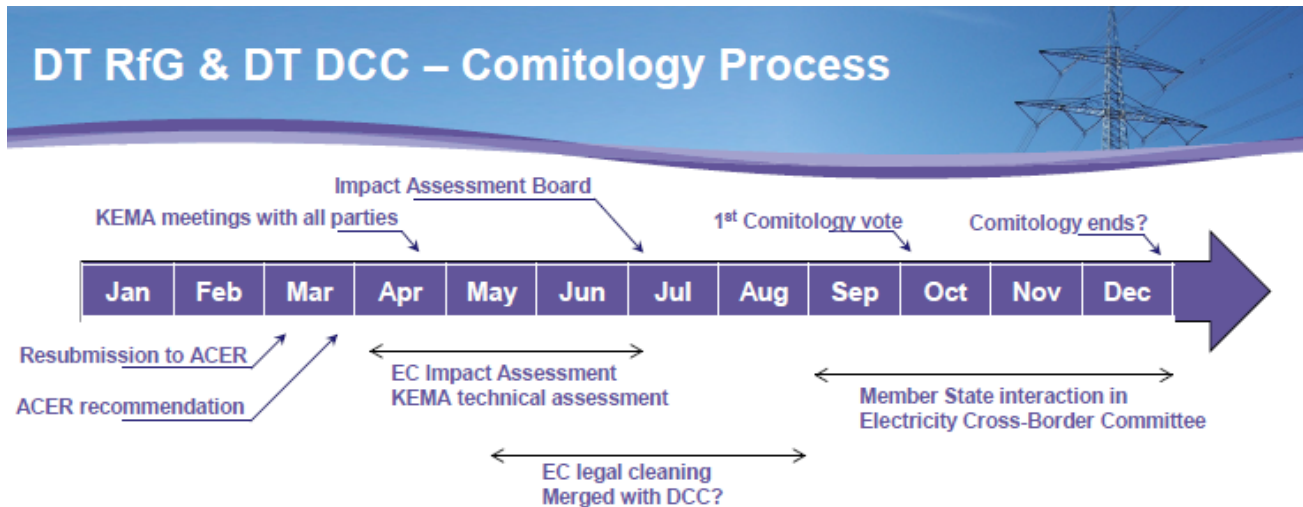
**Demand Connection Code**

**HVDC**

Where is it now?	What happens next?	Key Issues for GB
Submitted to Commission	<p>DNV Kema impact assessment report for Commission - Sept</p> <p>Implementation guidance document (by Drafting Team) – Sept</p> <p>Comitology predicted to finish – Q1/2 2014</p>	<p>Changes in thresholds - 4 generators bands</p> <p>Requirements on much smaller units (from 800W)</p> <p>Retrospective application</p>
Submitted to Commission	Likely to follow RfG into Comitology	<p>Practicality of application to domestic consumers</p> <p>Is this the right vehicle for DSR?</p>
<p>Drafting in progress</p> <p>Initial scope and call for stakeholder input documents written</p>	<p>12 month timeframe for drafting by ENTSO-E finishes in May 2014</p> <p>Next user group mtg - Sept</p>	<p>TSO definitions, roles &amp; responsibilities</p>



# RfG & DCC in Comitology jointly



## Comitology

- Informal meeting on EC version of RfG/DCC in September 2013
- 1<sup>st</sup> formal vote in Electricity Cross-Border Committee expected for October 2013
- No strict deadline for the Committee
  - If no issues are raised, it concludes quickly
  - If issues are raised, revisions can also be decided on quickly (on the spot)
- Procedure of “Regulatory Procedure with Scrutiny”
  - After positive opinion of the Committee, both the Council and the European Parliament have 3 months to oppose to the proposal

## Requirements for Generators (RfG)

- RfG was the first of the European codes to be developed and has provided a pilot for the process
- Applies requirements to smaller, embedded generation (now from 800W rather than 50MW in England & Wales)
- Operational notification process for all Embedded Plant allocated to Relevant Network Operators
- Overriding principles for GB application:
  - Fit for purpose to cover future developments (move to increased non-synchronous generation)
  - Assumes GB remains as a synchronous area
  - Extensively replicates GB Grid Code requirements
  - Application within GB is affected by new categorisation of generators  
(replacing Large, Medium & Small Power Station classifications with type A-D bandings)

Generator Size	Direct Connection to:		
	SHET	SPT	NGET
Small	<10MW	<30MW	<50MW
Medium			50-100MW
Large	10MW+	30MW+	100MW+

RfG Type	Generator Capacity	Connection Voltage
A	800W-1MW	<110kV
B	1-10MW	<110kV
C	10-30MW	<110kV
D	≥30MW	>110kV

## Demand Connection

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- Focuses on the connection of industrial loads and DSOs
- Sets out requirements which will apply to the demand side of the power system, contributing to system security and efficient load management
- Generally seeks to mirror RfG requirements
- Introduces demand side response (DSR)

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## Big brother to switch off your fridge: Power giants to make millions - but you must pay for 'sinister' technology

- Computer chips will take control of home appliances when energy is low
- Sensors will detect spikes in demand for power and when grid struggles to meet it, will temporarily shut off appliances
- Can shut down supply without warning - or your consent

By [RUSSELL MYERS](#) and [MARTIN BECKFORD](#)  
 PUBLISHED: 22:02, 27 April 2013 | UPDATED: 22:10, 27 April 2013

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Fridges and freezers in millions of British homes will automatically be switched off without the owner's consent under a 'Big Brother' regime to reduce the strain on power stations.

The National Grid is demanding that all new appliances be fitted with sensors that could shut them down when the UK's generators struggle to meet demand for electricity.

Electric ovens, air-conditioning units and washing machines will also be affected by the proposals, which are already backed by one of the European Union's most influential energy bodies. They are pushing for the move as green energy sources such as wind farms are less predictable than traditional power stations, increasing the risk of blackouts.

Last night critics:



‘Sensors in domestic appliances would check [the] frequency every 0.2 seconds, **and if it fell to 47Hz** – a level that would risk blackouts – the devices would kick in and shut fridges, freezers and ovens down.’

# High Voltage Direct Current (HVDC)

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- Specifies requirements for long distance DC connections, links between different synchronous areas and DC-connected Power Park Modules, such as offshore wind farms, which are becoming increasingly prominent in the European electricity system.
- A relatively new area in which fewer standards or grid codes exist, making a pan-European approach particularly beneficial.
- Follows on from the RfG and DCC codes building on the same foundations to create a consistent and complete set of connection codes.
- Covers various configurations of HVDC including:
  - AC connection point requirements for independent, single or multiple links
  - AC connection point requirements for offshore PPMs
- DC meshed systems not currently included in the Network Code.

## Questions

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