

ENTSO-E views on the Grid Connection and Pilot Code

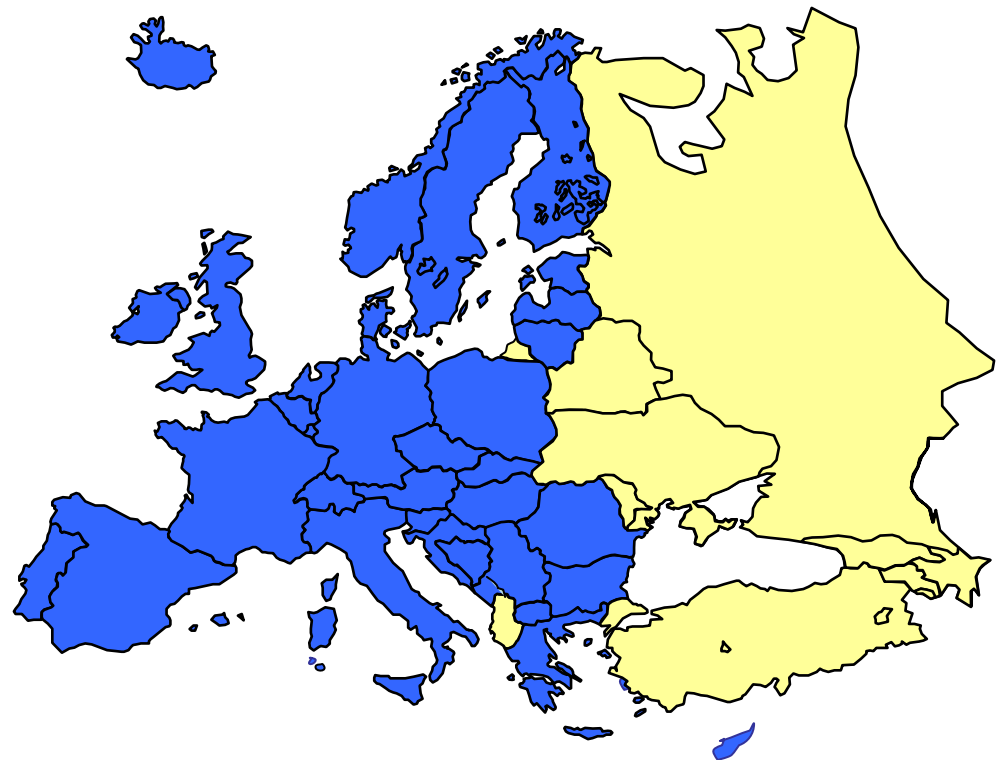
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A very challenging context for TSOs

- **High expectations** on TSOs in:
 - 3^d Energy Package
 - RES Package (>30% 2020)
 - Climate Package
- More **transmission capacity** needed with high emphasis on cross-border capacities (RES, CO₂, developing the market)
- Stressing major importance of **TSO cooperation** (reliability)
- Moving towards “single grid” perception at EU level (political)
- ***Need for new approach from a EU-TSO perspective***
 - *market frameworks*
 - *system development*
 - *technical rules and system operation*

ENTSO-E

- Founded in December 2008 and fully operational since 1 July 2009
- Represents 42 TSOs from 34 countries
 - **525** million citizens served
 - **828** GW generation
 - **305,000** km of transmission lines managed by the TSOs
 - **3,400** TWh/year demand:
 - **400** TWh/year exchanges:
- Replaces former TSO organisations: ATSOI, BALTSO, ETSO, NORDEL, UCTE, UKTSOA





The 3rd Package and Network Codes

- **Network Codes**
 - must be in line with non-binding Framework Guidelines (by ERGEG/ACER)
 - become **legally binding** through EC comitology process
 - must provide and manage effective and transparent access to the transmission networks
 - Ensure coordinated and sufficiently forward-looking planning and sound technical evolution
- **ENTSO-E** has the task of elaborating network codes
 - Transparency and extensive consultation required



The Role of TSOs

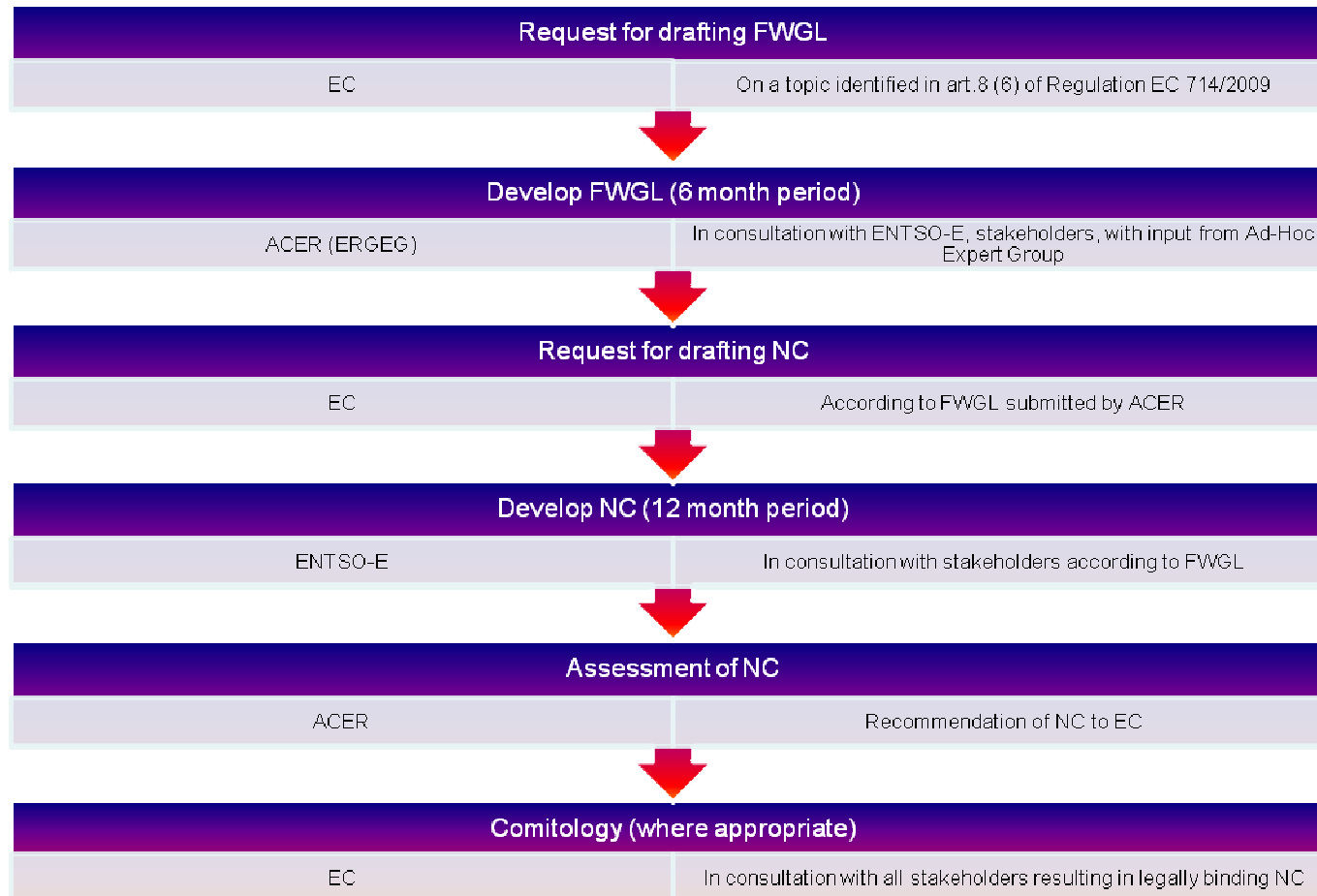
- The TSOs are responsible for all measures to **preserve system security** and to improve system adequacy
 - Contribute to the Security of Supply in Europe
- TSOs play a key role to facilitate
 - the **Integration of RES** – sustainable development
 - **Electricity Market Integration** – competitiveness
- TSOs are in the centre of these issues
 - with an in-depth knowledge of all relevant aspects
 - and a long history of collaboration with a now formalized European perspective



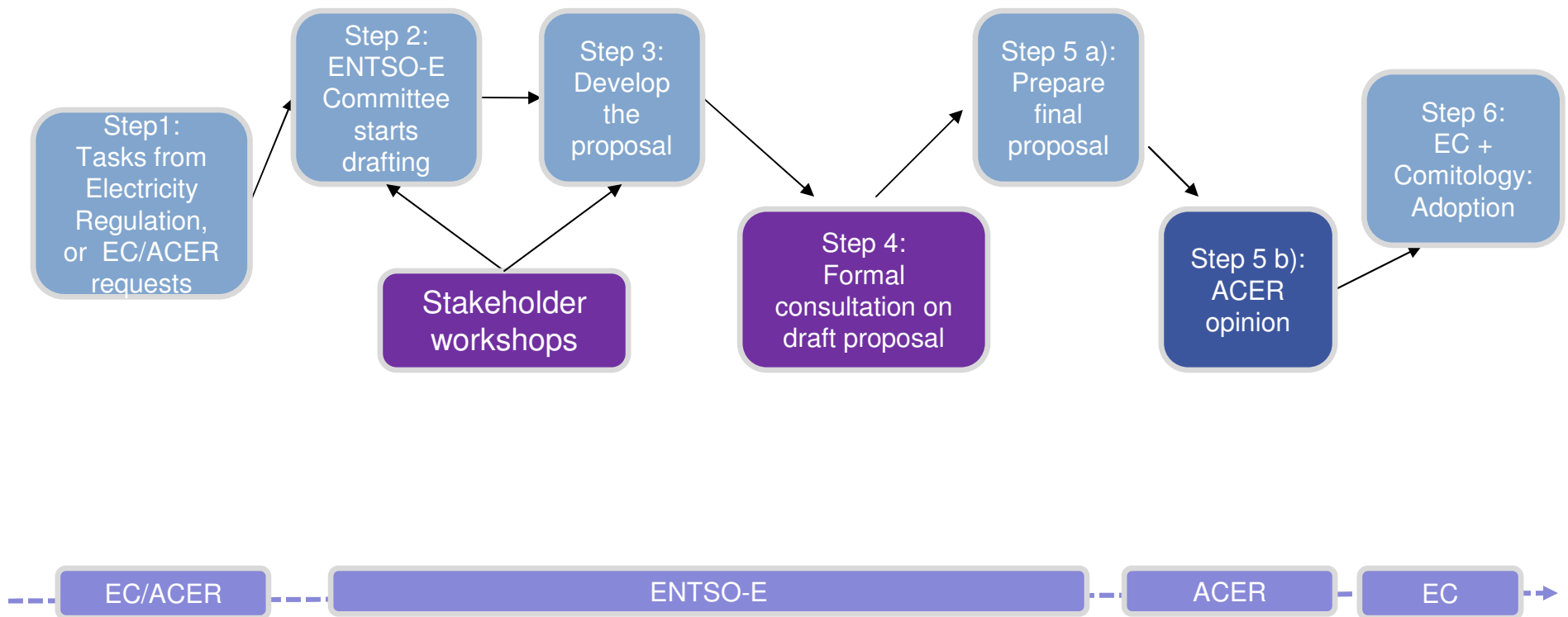
Why is a Network Code for Connection of Generators Important for TSOs?

- Generation facilities connected to the grid must contribute to **safe system operation**
- Generation facilities connected to the transmission and distribution systems shall provide contribution to **supply ancillary services** to
 - preserve system security and
 - improve system adequacy
- Objectives of requirements to generation facilities
 - provision of information for system management
 - system balancing / frequency stability
 - voltage stability
 - robustness of generating units against perturbations (stable operation)
 - system restoration after a disturbance

Network Code Development Process



One process together with EC and ACER





Pilot Code for Grid Connection with Special Focus on Wind Generation

- ENTSO-E has identified wind connection as the most prominent topic for a rapid introduction of network codes
 - Based on ERGEG's FWGL on grid connection
 - With the strong support of the EC and the Florence Forum
 - Based on the on-going significant investment efforts on wind generation for achieving EU **environmental and security of supply policy goals**

Objectives

- Facilitate adoption of best practices
- Reduce development and investment costs
- Harmonize structure and technical contents of national codes



Pilot Code for Grid Connection with Special Focus on Wind Generation

- Focus on technical requirements for connection
 - Grid access is out of the scope
 - Connection cost is out of the scope
- Based on requirements common to all generation types
 - Including a section with dedicated issues for wind generation and similar technologies
 - Dedicated issues for other generation technologies will be added subsequently
- Impact on Distribution System Operators must be evaluated as a significant part of wind generation is connected at the distribution level

Scope of the Pilot Code

Network Code Requirements for Generators

General requirements for all types of generation units

Coverage of Pilot Code Project

system-wide requirements
with specifics for coal, gas, hydro, nuclear, etc.

regional specific requirements



Subsection
Synchronous

system-wide requirements
with specifics for solar, wind, etc.

regional specific requirements



Subsection
Power Park Modules

system-wide requirements
with specifics for tidal & wave, wind, etc.

regional specific requirements



Subsection
Offshore



Framework Guidelines should inform on

- Clear policy options and a European direction for the development of the European electricity system
 - Based on a thorough impact assessment and reflecting the objectives of EU policies and the needs of system users
- The Network Codes that must be elaborated by ENTSO-E
 - A Framework Guideline may initiate multiple Network Codes
- The scope of the Network Code
 - Unambiguous definition and objectives
- The applicability of the Network Code
 - How the Network Code will be enforced to all system users



ENTSO-E Approach and Objectives

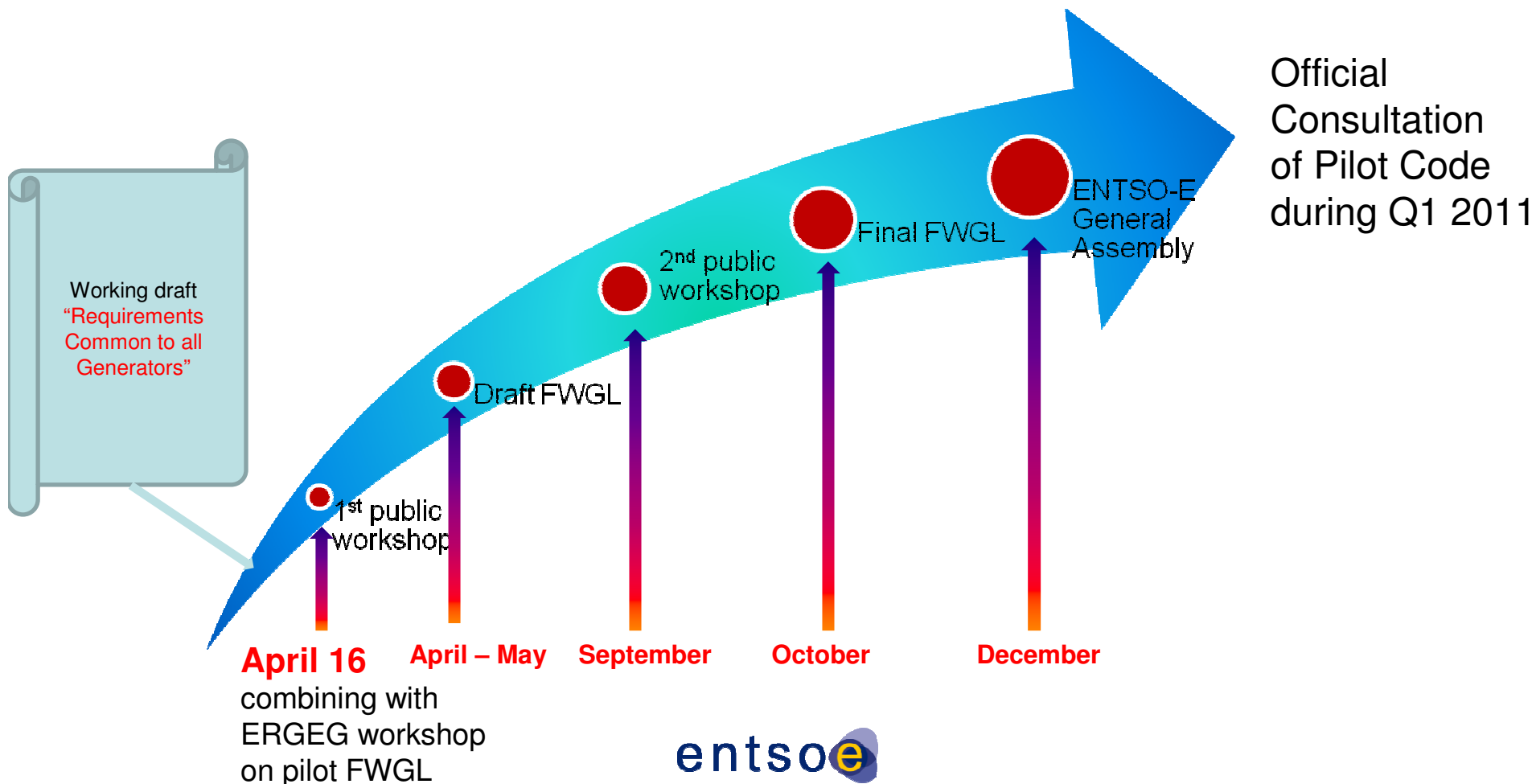
- A pragmatic and transparent approach
 - Considering the needs of stakeholders and the fundamental goal of a secure and efficient interconnected electricity system
- Close cooperation with ERGEG
 - Coordinating parallel works on Pilot Framework Guidelines and Pilot Code



ENTSO-E Approach and Objectives

- Early and open dialogue with **stakeholders** by workshops and informal meetings
 - To encompass all inputs and enhance the acceptance of the code
 - Gathering inputs, first on requirements common to all generation types, and second on requirement specific to wind generation
- Experiment the **Process**
 - Evaluate timelines and resources
 - Promote stakeholder involvement
 - Propose improvements

The Pilot Code Development Milestones for 2010





Conclusions

- Integration of RES and market integration poses a big challenge for European TSOs
- The new EU directives gives a framework to develop binding network codes
- ERGEG / ENTSO-E collaborate on Pilot Code for Grid Connection with Special Focus on Wind Generation
- ERGEG / ENTSO-E test the processes to develop the FWGL and the network code (in parallel)
- Stakeholder involvement is an important aspect of the work of ENTSO-E