

# Pilot Network Code on Grid Connection with special focus on Wind Generation

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Reliable Sustainable Connected

# Pilot Code for Grid Connection with Special Focus on Wind Generation



## ENTSO-E identified in 2009 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
- **Capitalize** on Europe's advance in RES exploitation

# Why is the Pilot Code needed?



## Changes in generation:

- Retirement of generation plant at end of life
- Retirement of plant for which it is uneconomical to comply with environmental directives such as LPCD
- Integration of large scale renewables in particular wind (including offshore)
- Large numbers of small scale generation, e.g. CHP and domestic solar PV
- Installation of very large generation units, e.g. 1800MW nuclear
- Low carbon fossil fuel based generation, e.g. application of Carbon Capture & Storage (CCS)

# Why is the Pilot Code needed?



## The integration of RES leads to new challenges:

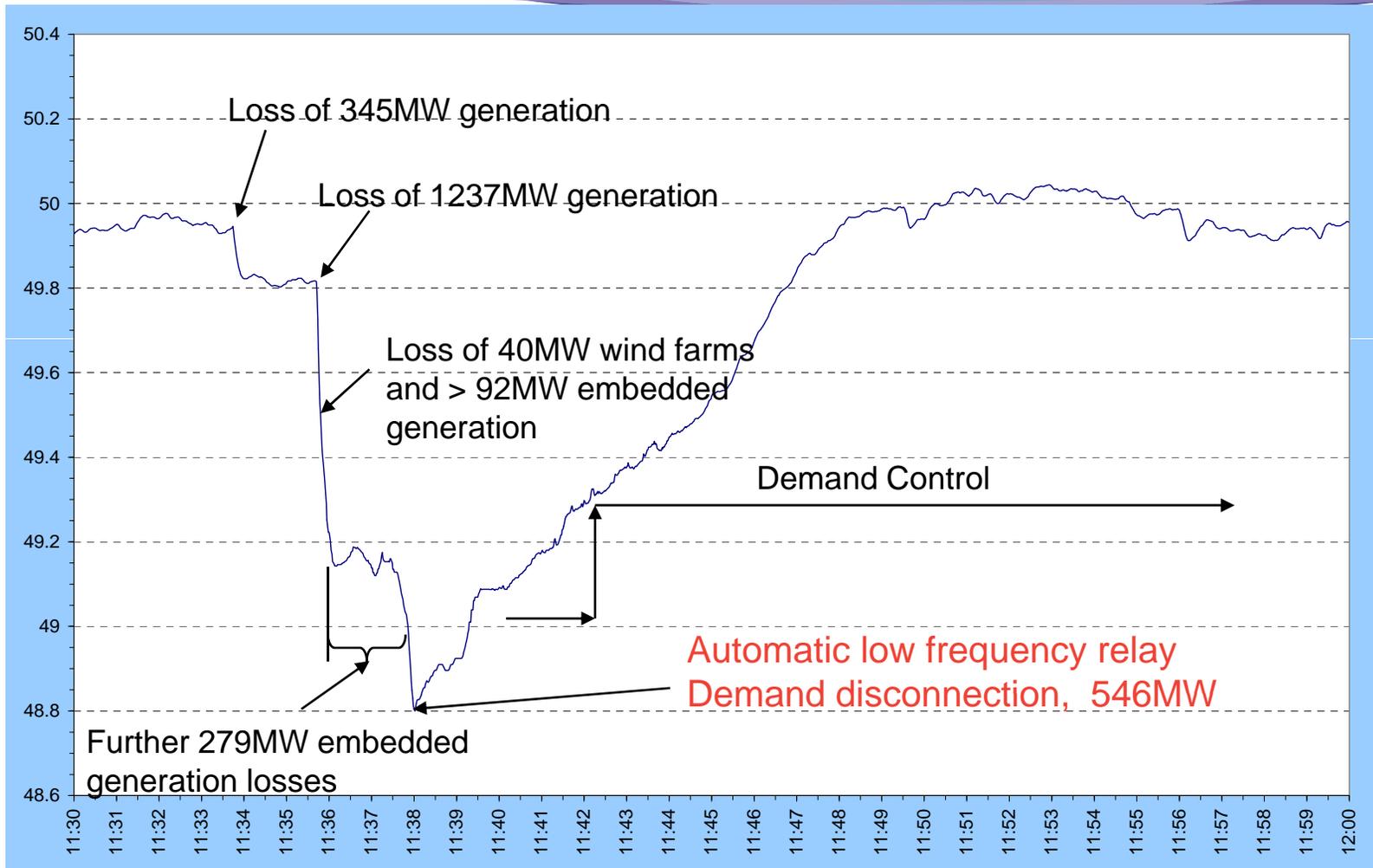
- Much greater dependency upon weather
- Very fast changes in generation mix with high volatility
- A lot of new generation with new technical characteristics, e.g. inherent inertia (PPMs). Greater variation in system inertia.

## EC / Market Players ask for a level playing field

### ➤ The Pilot Code supports all political goals

- The requirements lead to a level playing field
- The requirements are a prerequisite for safe system operation
- The requirements help to integrate RES as they set standards

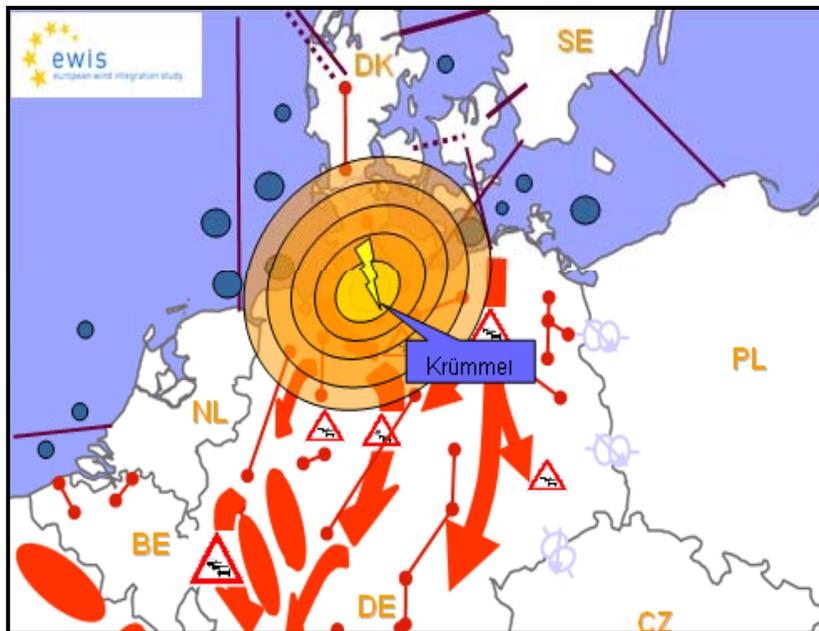
# Large Frequency Incident on 27 May 2008 in GB Stage 1 Demand Disconnections at 48.8Hz.



# Experiences from System Operation and Studies

## Identified Operational Risks (EWIS study)

- Imbalance
- Frequency instability (FRT capability of the generating units)
- Voltage instability (Voltage control options and short circuit Power ratio)
- Overall Stability due to high transit flows



source: [www.wind-integration.eu](http://www.wind-integration.eu) (EWIS)

- *Risks leading to a lack of adequacy*
- *Risks leading to a lack of system security*
- *Financial risks*

## Pilot Code helps to implement Mitigation Measures

Harmonized and sustainable requirements for generators

- **FRT capability** to mitigate the risks for frequency instability in case of system faults
- **Voltage control capability** to mitigate the risks for voltage instability

# Lessons learnt from disturbances



**New technical rules and requirements are needed to address today's challenges**

**The Pilot Code set the requirements needed**

# Pilot Code Project

## General requirements for all types of generation units

Coverage of Pilot Code Project

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

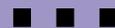
regional specific requirements



**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

# Coverage of the Pilot Code

- **Power generating facilities have to provide technical capabilities** as a precondition for grid connection
- The Code shall be applicable to **new and existing** power generating facilities
- Degree of applicability distinguished by categories of power generating facilities:
  - voltage level of connection and capacity size of generating units and power park modules
- Power generating facilities connected to transmission and distribution systems
- Compliance tests and simulations

## Not covered

- Operational procedures (*To be covered by NC on Operational Security*),
- Grid access issues (*Not in the scope of the FWGL*),
- Grid connection requirements for distribution system operators and for end customers issues (*Separate NC within the same FWGL*), amid others

# Pilot Code Status and main recent milestones

- **On March 29<sup>th</sup> 2010 the EC invited ERGEG** to draft a pilot framework guideline on electricity grid connection
- **ERGEG released the in July 12<sup>th</sup> the draft FWGL** (consultation made until September 24<sup>th</sup>) – Final FWGL in December 2010
- **Working closely with ERGEG and stakeholders:** EWEA, Eurelectric (WG Thermal), DSO Associations (Eurelectric (WG Networks), GEODE, CEDEC), Solar PV (EPIA), Manufacturers (Siemens (CCGT, Hydro), ABB (Excitation control systems), GE (CCGT), Alstom (CCGT), Toshiba (Nuclear), AREVAnp (Nuclear), VATech
- **Two open public workshops were held in 2010**
  - Working drafts of Requirements for Generators were made available (last draft is available at : [https://www.entsoe.eu/index.php?id=42&no\\_cache=1&tx\\_ttnews%5bttn\\_news%5d=75](https://www.entsoe.eu/index.php?id=42&no_cache=1&tx_ttnews%5bttn_news%5d=75))
- **Draft requirements are considered being well in line with the draft FWGL**
  - **Main focus is to achieve broad debate on technical issues**

## Next steps

- **Continuous revision** of collected comments (e. g. from external stakeholders workshop)
- Discussion with **stakeholders will continue**
- **Draft Pilot Code to be released end of Q1 2011**
- Formal Process following ACER's FWGL in Q3-Q4 2011
  - Public Consultation according to ENTSO-E's consultation process
  - Comitology Process

# Lessons Learned

- 12 months to elaborate a Network Code is a challenge: ENTSO-E to start the technical scoping phase as soon as ERGEG/ACER start writing the respective framework guideline and decide what needs harmonization
- Transparency and extensive consultation is essential
- Not all institutions / associations / companies are aware of the process and its consequences
- Different Market Players have very different and contradicting views on the draft Pilot Code
- Use of simple language is important as Regulations are translated in all EU languages