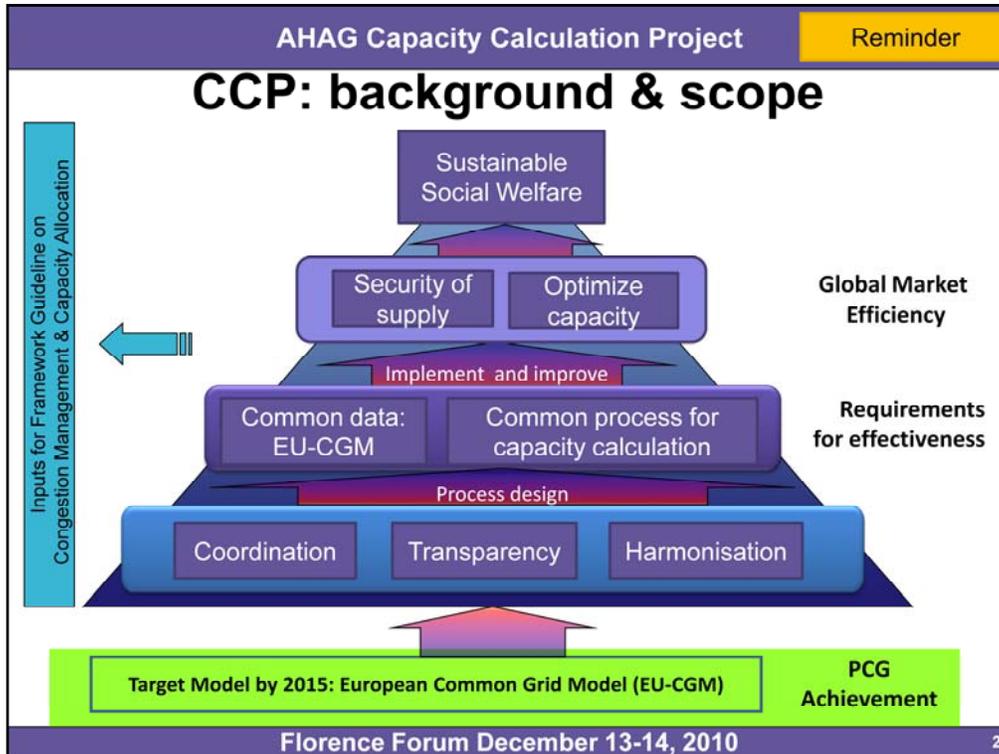


# **Ad Hoc Advisory Group**

## **Capacity Calculation Project**

Main achievements & Work status



### Objectives of Capacity Calculation project:

Develop appropriate coordinated processes and common information exchange for:

- coordinated methods for capacity calculation
- establishment of European-wide grid modelling processes (EU-CGM)

Capacity evaluation and optimisation for the different timeframes compatible with risk assessment and operational security.

Work priority = day ahead timeframe done before Summer 2010.

Same process design for Long term and intraday capacity calculation after Summer 2010; some specificities

Establish appropriate mechanisms for data sharing :

- from market participants to TSOs
- Among TSOs

- from TSOs to market participants => transparency } => The more data and reliable hypothesis the better capacity evaluation

## Main achievements: Design of principles

- **Coordinated capacity calculation process**

- **Five steps process relevant for all timeframes**, enhancing harmonization :  
=> Day ahead, **Long Term**, **Intraday**
- Ensuring efficient capacity calculation coherent with a secure power system operation, based on coordinated ATC or Flow-Based

- **Define a European Common Grid Model as a main milestone**

- Common model (=common base case) of the European-wide grid for a coordinated capacity calculation
- **Base case(s) built on data exchanged**
  - **between TSOs**
  - **and from stakeholders to TSOs**

- **Risk assessment in capacity calculation**

- **Capacity Calculation is based on a security analysis and calculation**
- **Principles to define the Reliability Margin**

(\* in bold font: new achievements since Florence Forum of June 2010)

In bold font: new achievements, after June 2010

In normal font: work done and already presented at the Florence Forum last June 2010

## Main achievements: Design of principles

- **Firmness of capacity:**
  - **Basic issues to be the foundation of firmness of capacity**
  - **Maximize capacities with harmonized levels of firmness and cost recovery**
- **Transparency:** on the process and data
  - **Tutorials**
    - ⇒ **to explain the main concepts**
    - ⇒ **to be prepared for being available on ENTSO-E website**

→ **Pave the way for Capacity Calculation NC  
to be scoped and drafted in 2011.**

In bold font: new achievements, after Summer 2010

In normal font: work done and already presented at the Florence Forum last June 2010

## Present & Future topics

- **Definition of zones for congestion management**
  - CCP focuses firstly on the purpose related to the management of “internal” congestion and then evaluation of the costs/benefits for splitting the present bidding areas
  - CCP establishes a methodology to assess the costs/benefits of splitting in smaller bidding areas
  - ERGEG request to study CWE case → CWE TSOs for evaluation
  - Impact assessment and evaluation methods for merging present bidding areas and/or price zones: to be studied in 2011 while drafting NC
- **Firmness**
  - Draft definitions
  - Definition of tools for physical firmness
  - Different firmness levels induce impacts on necessary tools and consequential costs
  - To be further investigated in 2011 in terms of Market design & NC drafting

Florence Forum December 13-14, 2010

5

When the zone issues was firstly requested from stakeholders it was related to possible constraints « internally » a bidding area which may limit XB-capacity.

Therefore a first approach was to investigate the possible benefits but also the costs of such a splitting approach.

Additionally it was pointed out that this splitting approach:

- was not bringing closer to the EU target Model of a Single Price Coupling
- was a short term signal (price spread between bidding areas when congestion appeared between them)
- Was not relevant for medium to long term needs: grid development and signal for the localization of generation (to avoid to aggravate further already congested paths/regions)

Additionally it was pointed out that the different policies may bring to competing and not always coherent approach if there was some delay or impossibilities to reinforce the grid. For example:

- priority to REN infeed may lead to high transit flow leading to reducing XB capacity
- Redispatching can help, when available, to manage both. However there are some counterpart: CO2 emission if redispatching is not CO2 free, cost for REN payment and for redispatching
- How to manage this competing approach

ERGEG asks for a study case in CWE for splitting present bidding areas and also merging some of them. It was agreed that AHAG-CCP established a method for this evaluation; CWE TSOs and other CWE stakeholders will carry out the study.

It was also pointed out that the present number of scenarios requested was not possible to investigate for the timeframe asked by ERGEG : June 2011. Therefore CWE TSOs will propose simplified scenarios.

## Present & Future topics

- **Comparison of capacity calculation methods (coord. ATC and FB)**
  - Establishment of the comparison criteria
  - Qualitative assessment of pros & cons according to the above criteria
  - By next January: further recommendations as complements to the draft FG
- **Following work: By end of January 2011**
  - Draft a final document to sum up the main achievements of AHAG CCP work
  - Prepare a package containing tutorials and presentations of each deliverable
  - List of remaining open issues :
    - To be considered in drafting the Network Code for capacity calculation
    - To be dealt in a larger framework than capacity calculation
- **Afterwards:**
  - Scoping and starting the drafting process for the capacity calculation network code according to EC-ERGEG-ENTSO-E planning

Presentations regarding deliverables have been produced the whole year long.  
Tutorials have been also presented and sent around.

As far as open issues are identified (lists to be shared and completed next January):

- Package with all presentations: tutorials and presentations updated after meetings
- Allocation process

-Firmness

-Prices zones versus bidding areas: merging/extending zones/areas, to be clarified and further investigated during 2011

-Need for pricing information/estimation from GenCo to be used for capacity calculation

-...

# **ANNEX**

## **AHAG Capacity Calculation Project**

Detailed review of  
the main results & deliverables

## Main deliverables of AHAG CCP

1. Design the coordinated capacity calculation principles
  - ✓ How to build the EU- Common Grid Model?
  - =>Process and data exchange
2. Provide an overview of the capacity calculation methods:
  - ✓ Comparison between different methodologies for capacity calculation
3. Risk assessment: basis for capacity calculation
4. Principles for coordinated operational measures among TSOs to support firmness of capacities
5. Methodology to assess the feasibility of new definition of zones
6. Transparency of the capacity calculation process towards market stakeholders

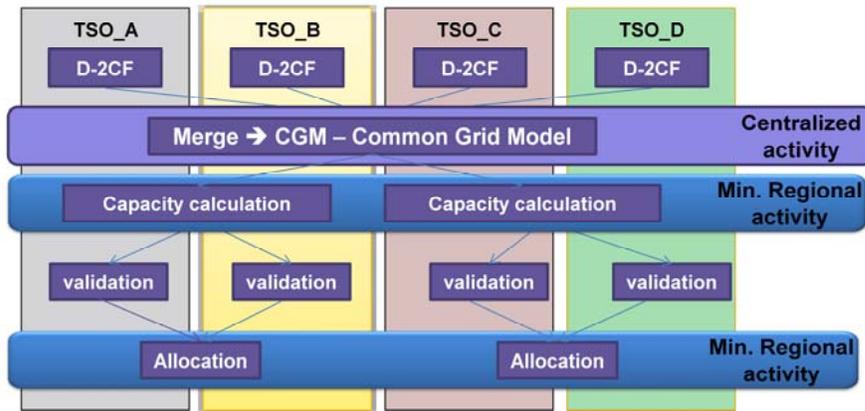
During the year:

-first priority was given to Day Ahead timeframe (up to Summer 2010)

-After Summer 2010 the other timeframe have been partly studied

## Coordinated capacity calculation process

5 steps for capacity calculation up to allocation : example for Day ahead



Ex-post analysis and continuous improvement after implementation

Florence Forum December 13-14, 2010

9

The main 5 steps for the coordinated capacity calculation process :

1. Starting from common and shared hypothesis : D-2CF for day ahead capacity calculation
2. Merging of these « elementary » files describing each zone to be used as a coherent description of the power system description for a common and coordinated capacity calculation  
=>Common grid model as a major milestone of the process
3. Capacity calculation process in itself based on risk assessment and ensuring a secure power system operation. Two methods have been considered by PCG (coordinated ATC and coordinated Flow based). These two methods are the only relevant for the mid-term target in coherence with the European target model of Single Price Coupling Validation step to make sure hypothesis and results are OK for a secure power system operational, taking into account the most recent information from the power system

At a first step capacity calculation will be done at the regional level (ex: CSE, CEE, SWE ...). In case of highly interdependent flows or at a second step with more maturity, a supra-regional capacity calculation can be carried out (ex: CWE+CSE, ...) => Therefore « Min. » is added as a comment for this step.

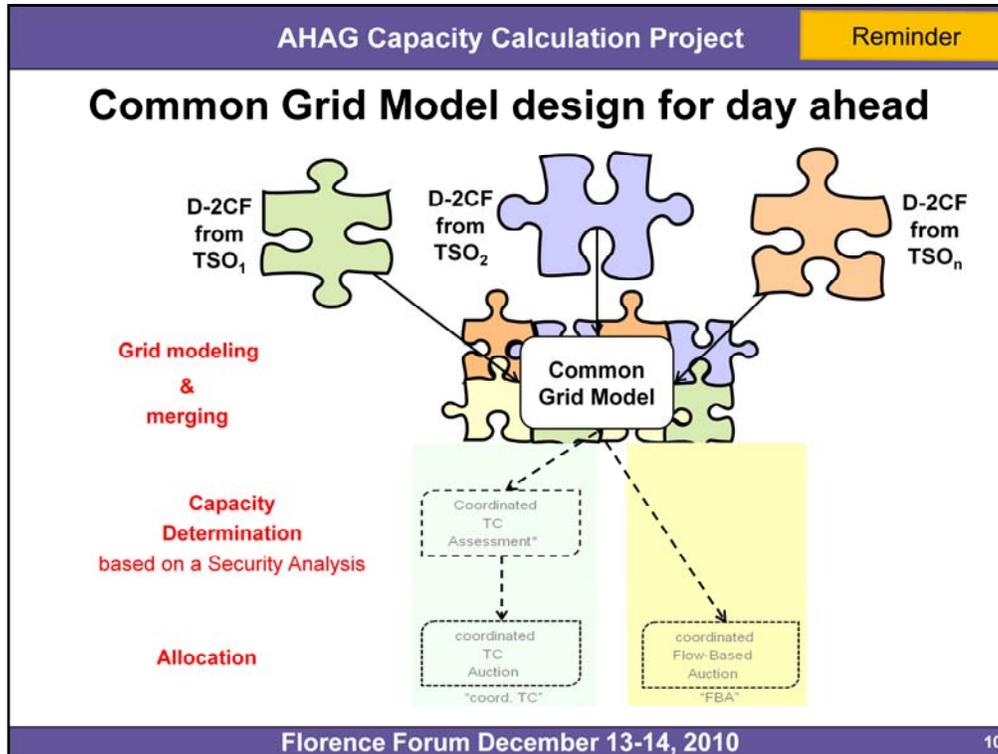
4. Validation step to ensure secure and feasible simultaneous capacity taking into account the last information from the power grid + taking into account economical data (or price estimation) from generation units
5. Allocation process : implicit or explicit

Steps 3 & 5 are considered firstly at a Regional Group level. However it should be considered at a higher level (2 regions or more) in a step by step approach in order to take into account interdependent regions.

Harmonised and coordinated process , transparent

- ⇒ Improve the security of the power system operation
- ⇒ Optimise and maximise the capacity provided to the market regarding risk assessment
- ⇒ Towards a global market efficiency

**Centralised activities help for harmonisation and anticipated security management of Regional and European power system**



### PCG design :

- European Common Grid Model : EU-CGM
- 2 methods for capacity calculation : coordinated TC or coordinated Flow based approach
  - Using a pragmatic and stepwise approach
  - Coherence and compatibility between different timeframes and different regions
  - Capacity level must be in coherence with the power electric system

From this starting point, design of the EU-CGM and capacity calculation process for day ahead :

- CGM for DA: D-2CF merging
- CGM for long term: YACF merging + scenarios consistent between regions

### EU – CGM : for day ahead

- ⇒EU-CGM : D-2 Capacity Forecasts (CF) from each TSO, to be merged into an European base case.
- ⇒D-2CF = base case = power system description prepared in D-2 for the day ahead capacity calculation and allocation

### Capacity calculation methodologies :

- ⇒Coordinated Transfer Capacity (based on NTC/ATC method : improved ETSO method)
  - Relevant for non-highly meshed grids : peninsulas or longitudinal areas
- ⇒Coordinated Flow Based (presently dry-run on CWE, CEE and SEE)
  - Relevant for highly meshed grid : most of continental Europe, where physical flows need to be anticipated for a secure operation of the power system

**AHAG Capacity Calculation Project** NEW

## What is needed to build the CGM? Overview on technical data

*TSOs*

Planned outages grid elements

*TSOs, with the input of GenCos*

Planned outages generation units

Estimation of generation pattern

Forecast renewable generation

*TSOs, with inputs of suppliers, DSO and industrial customers*

Forecast load pattern

*TSOs, with the input of market participants*

Cross-border schedules

→

D-2CF  
from  
TSO<sub>1</sub>



Florence Forum December 13-14, 2010 11

The objective is to collect the most relevant data for building the base case (ex D-2CF for CGM and capacity calculation for the Day Ahead timeframe).

Therefore the most relevant data can be provided by the market participant in charge of the related activities. For example:

- data on Transmission Grid by TSO
- data from Generation Unit by GenCo
- Data on consumption by industrial consumers, DSO, TSO
- ...

Therefore the TSOs collect the data from the relevant stakeholders and use them for building the base case regarding the considered timeframe.

For data on generation, Eurelectric is OK to provide technical data, but need further discussion and common work with ENTSOE before providing estimation/hypothesis on economical and pricing information.

## Long Term and Intraday timeframes

### Same principles from Long Term to Intraday

- Long term
  - Common Grid Model based on scenarios
  - Regional coherence
  - Long term capacity must take into account the level of uncertainties
  - TSO are responsible to define the level of long term capacity
- Intraday
  - Target and main challenges: build an intraday common grid model, and re-assess a capacity calculation
  - Step by step approach, towards a regional activity, inducing more automatization

### Basically: same 5 steps approach for Long term, Day Ahead and Intraday

#### For Long term:

The main challenge is to collect and build relevant scenarios for one region. These scenarios must be available for the TSOs of the other regions.

In case of several region are highly interdependant, a specific work has to be carried out to find consistent approach in order to identified properly the risk associated to the influence of the other region on the considered one and the related probability (approx.).

One key issue related to firmness for the long term capacity calculation: it must take into account the level of uncertainties which is higher for long term time frame (yearly, monthly and possibly weekly for region with a high amount of renewable infeed or highly variable consumption).

#### For Intraday:

The main challenge is to have more automatized process to received updated information close to real time, update the forecast file (IDCF and/or snapshot), merge them and make the capacity calculation.

With implicit continuous auction, the number of re-assessment of the XB capacity will increase step by step.

AHAG Capacity Calculation Project NEW

## Firmness of Capacity: principles

*Need for*

**Firmness of capacity**



Maximize capacity      Cost sharing

*Compatible with a secure power system operation*

*of the regulatory*      *framework*

Florence Forum December 13-14, 2010 13

The capacity level should be coherent to the physics of the grid (physical risks)

Cost issues for TSOs:

- TSOs must have the guarantee that all firmness costs are covered and shared,
- Harmonized regulatory framework is needed for cost sharing (i.e. for redispatch)

TSOs firmness cost are covered by the grid access tariff found by end users (customers mostly and rarely generators).

Full guarantee of XB capacity and schedules will benefit to market participants acting on the XB market.

## Definition of zones (1)

- **Scope of the issue in AHAG CCP: congestion management**
  - 2010: evaluation of zone splitting in case of « internal congestion »
    - Splitting in smaller bidding areas vs no splitting+ countertrading (if possible)
    - Methodology to assess the costs/benefits of defining smaller bidding areas (see following slide)



- **2011: evaluation of merging present bidding areas**
  - Market and economical design evaluated while NC drafting
  - Increase competition and liquidity

- Bidding area is for bids and offers, and is a important basis for capacity calculation
- Price area is equal to bidding area if there is congestion between bidding areas
- Price area consists several bidding areas in case there is no congestion between these bidding areas
- than bidding areas is a market design issue and there is several possibility:
  - using redispatching (but the question of the availability is important and not certain)
  - using average approach apart from congestion management issue

Scope of the issue dealt by AHAG-CCP:

Congestion management

- Evaluation of the interest of splitting into smaller bidding areas

Price zones : stable for the different timeframes

- Market design: forward to Day Ahead/Real time, balancing ...

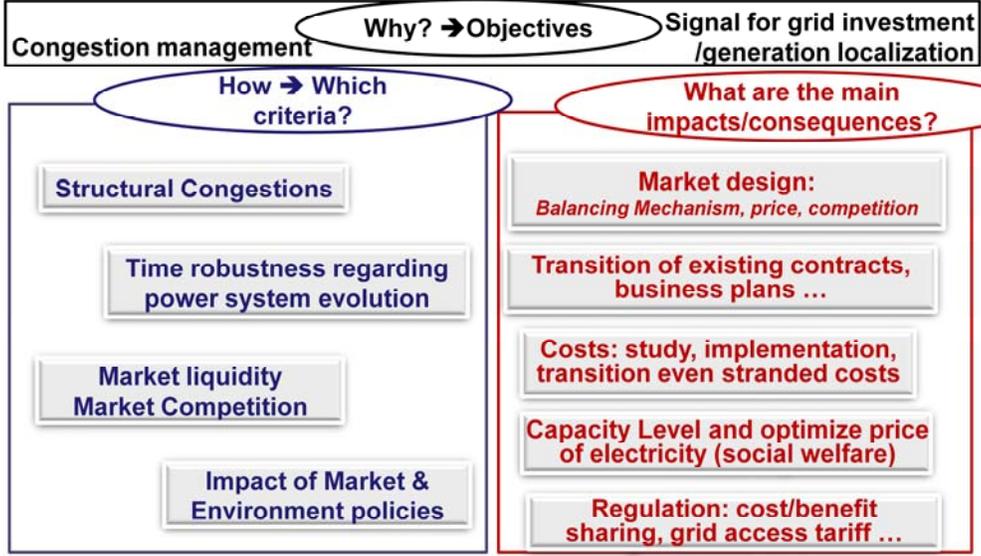
Price zones depend on congested paths or not between bidding areas

## Definition of zones (2)

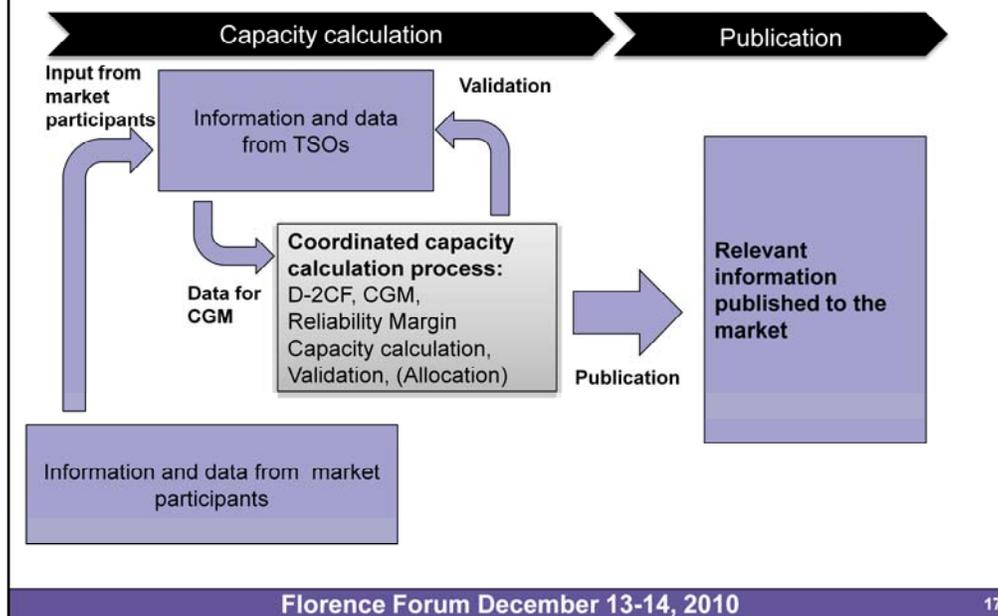
- **2010 outcome: evaluation process**
  - Taking into account criteria and impact assessment
  - Regarding costs/benefits analysis, to include
    - study phase, taking into account evolution of the Power System
    - implementation phase for stakeholders
    - transition phase for stakeholders
- **2010 outcome: key issues for deciding of new bidding areas**
  - Price signal for the short term ...
  - ... versus signals for the medium/long term
    - for grid development or reinforcement
    - for relevant signal for generation localization

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- Price area is equal to bidding area if there is congestion between bidding areas
- Price area consists of several bidding areas in case there is no congestion between these bidding areas
- than bidding areas is a market design issue

### Zones splitting for Congestion Management Focus on a qualitative methodology



## Transparency framework



Florence Forum December 13-14, 2010

17

### Transparency Principles

- Relevant information for market participants shall be published
- Ex-ante and ex-post information publishing timeframes to meet needs of the market
- Data/information exchange between TSOs and market participants and among TSOs should ensure a good quality evaluation of transfer capacity
- Some detailed information may be available only for authorities or market players under some restriction
- Standards for harmonisation of data sharing is needed
- Introductory information (tutorials) is prepared for common understanding: base case, capacity calculation methodologies, risk assessment ...

## Security calculation & Risk Assessment

- Main principle of risk assessment
- Translation into capacity calculation → definition of the reliability margin
- Main principle to define the Reliability Margin

