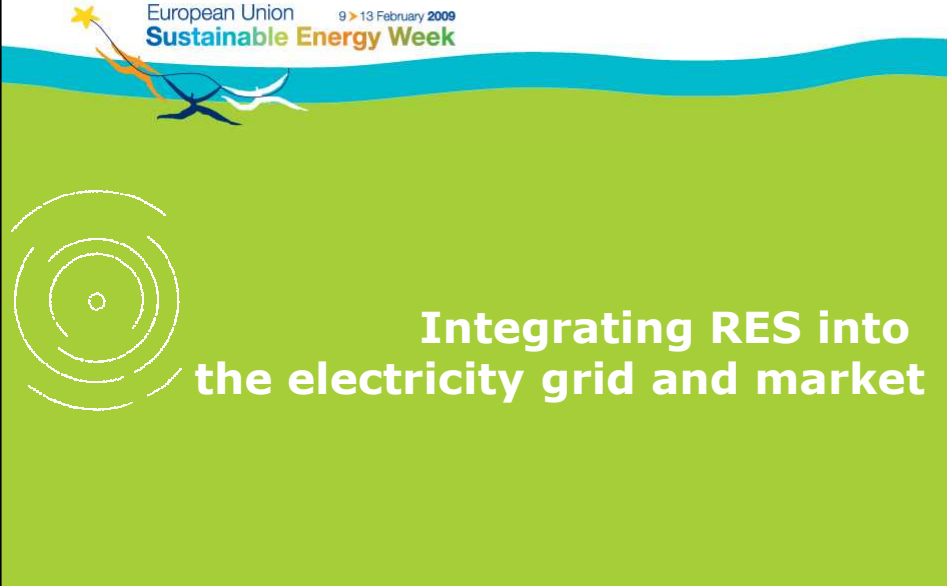





European Union 9 > 13 February 2009
Sustainable Energy Week



 **Integrating RES into
the electricity grid and market**


  **EUROPEAN
COMMISSION**

Juan J Alba
Director, Regulatory Affairs, Endesa
Brussels, February 11th 2009

Grid access and investments

1. RES foster network reinforcements
2. Planning of network expansion shall take into account **expected installations both** in RES and in conventional generation
3. Appropriate **remuneration and incentives** for TSO and DSO
4. **Same grid access rules for RES and conventional generation**: all generators, should pay the cost of local grid connections
5. Appropriate **allocation of the cost of grid reinforcements**

European Union 9 > 13 February 2009
Sustainable Energy Week



Grid access in Spain

1. RES **pay the cost of grid connections** and reinforcements, as the rest of generators
2. RES have the **right to access** the grids, as the rest of generators
3. The grid operator can deny the access to a connection point, only due to lack of evacuation capacity. In this case the operator must redirect the generator to other connection point
4. In the case of limited access at a certain connection point, the RES generators **would have priority access** to the grid. **WHY?**
5. **No capacity reserve** for existing generators: this will change soon



Market integration and dispatching

1. RES are an **integral part of the generation portfolio**
2. The merit order is provided by the **market: priority dispatch is not necessary** and becomes unsustainable when renewable penetration is large
3. RES can and should be subject to the **same scheduling and balancing regime** applied to other generators and loads
4. Introduce **proper market signals** to make RES manageable
5. Integrate balancing and intraday markets
6. Take advantage of **technology**: storage, electric cars



RES Integration in Spanish Market

Ambitious development of RES is compatible with ensuring that RES generation is subject to **the same market rules as non-RES**.

1. RES generators **have no priority in the electricity market dispatch**: They compete with the rest of generators in the same conditions.
2. Only when there are grid congestions and it is necessary to reduce the generation in a certain area, the **last plants affected by the reduction are RES generators**.
3. All RES generators **pay their imbalances**.

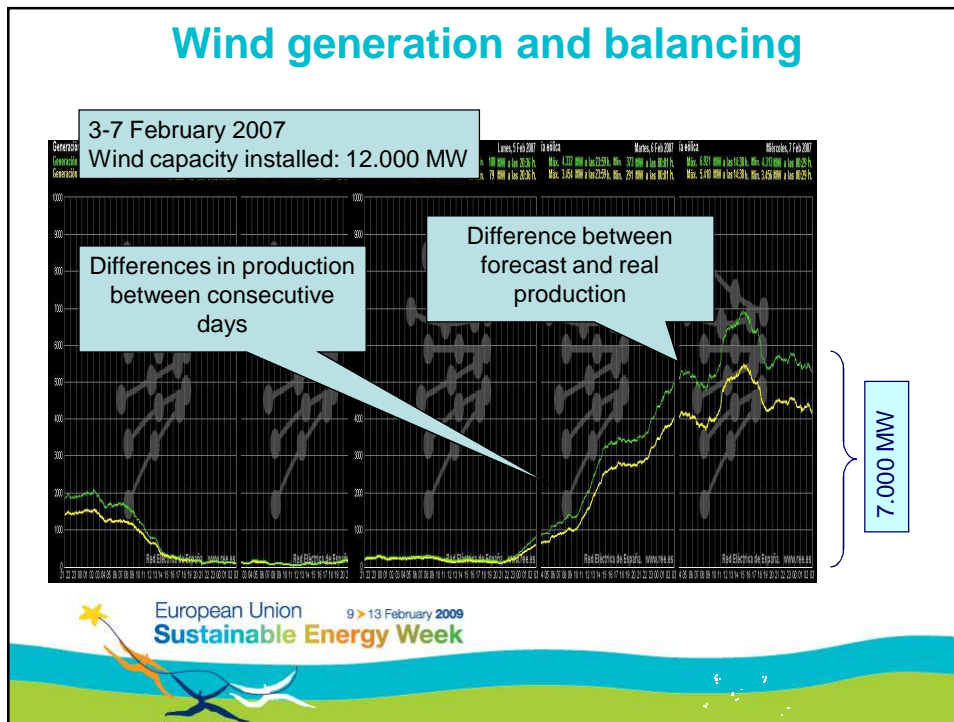


Priority dispatch

1. The merit order is provided by the **market**
2. **Priority dispatch is not necessary**
3. It becomes unsustainable when renewable penetration is large
4. Even when it does not affect the merit order (wind and photovoltaic), it may still lead to additional costs, when congestion occurs or when conventional plants are disconnected to accommodate RES

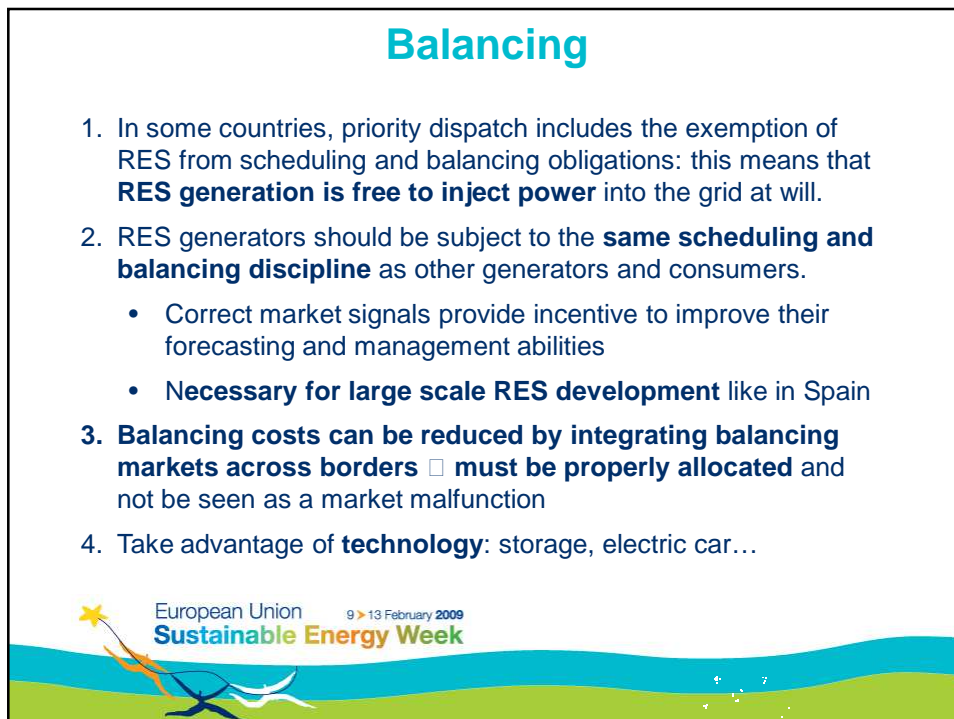


Wind generation and balancing

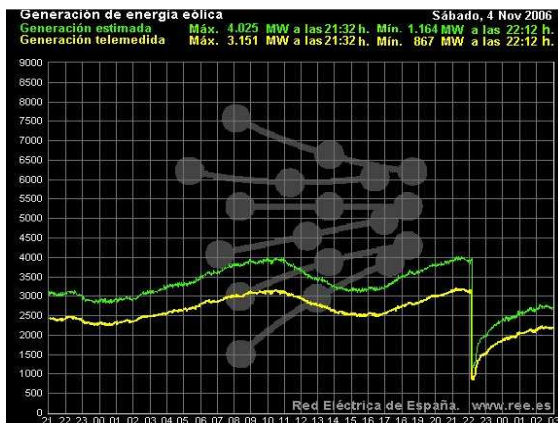


Balancing

1. In some countries, priority dispatch includes the exemption of RES from scheduling and balancing obligations: this means that **RES generation is free to inject power** into the grid at will.
2. RES generators should be subject to the **same scheduling and balancing discipline** as other generators and consumers.
 - Correct market signals provide incentive to improve their forecasting and management abilities
 - **Necessary for large scale RES development** like in Spain
3. **Balancing costs can be reduced by integrating balancing markets across borders** □ **must be properly allocated** and not be seen as a market malfunction
4. Take advantage of **technology**: storage, electric car...



Need for adequate technical regulation



- Nov/4/2006: incident occurred in the German HV grid caused a temporary frequency fall in the majority of the European Electricity System
- In Spain, this led to the automatic disconnection of 2.800 MW of wind generation, due to inadequate regulatory requirements at the time
- This bad regulation resulted in a major power supply failure
- Wind generators are required to support voltage and frequency dips.



Technical requirements in Spain

RES (as conventional generators) are required to resist **voltage dips or frequency perturbations.**

1. All new wind generation must support voltage dips.
 - Older plants have to upgrade their systems before 2010. If they do not they will receive no premium or feed-in tariff
2. Reactive energy compensation for plants > 10 MW: Rewards and Penalties
3. All generators > 10 MW must be associated to a control centre to be controlled by the System Operator.
 - If they do not, they will receive no premium or feed-in tariff
4. Promote repowering and technical upgrades



Final message

RES can be an excuse to be conservative:

- Underestimate interconnection capacity
- Distort generation dispatching

Or the justification to build the power system of the future

- Develop grids (interconnections)
- Integrate markets
- Make best use of technology

Providing benefits for all power system users

