

How to *handle* the dynamic effects

Day-to-day challenges of integrating renewables in the transmission grid

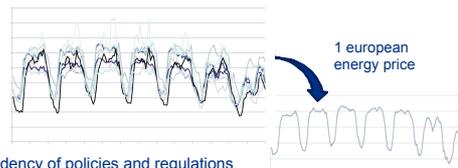
Alan Croes

Berlin, 17 October 2011



Challenging context in “4 dimensions”

- Market; integrated processes



- Ecology/environment; including dependency of policies and regulations



- Time; long term planning vs operation
and everything in between

- Scale; local, national and international
NIMBY, permits, policies, goals, vision

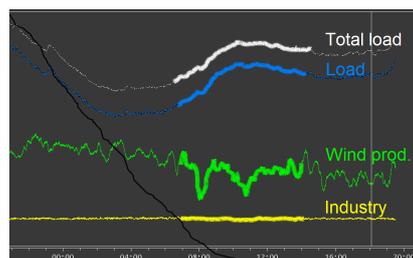


From long term planning to operation

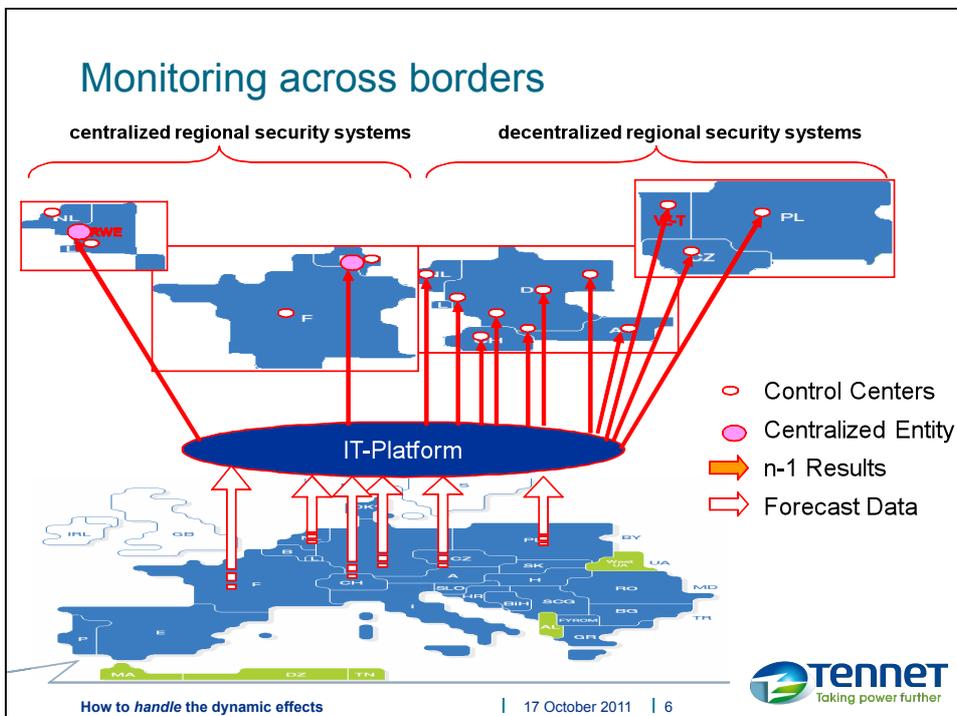
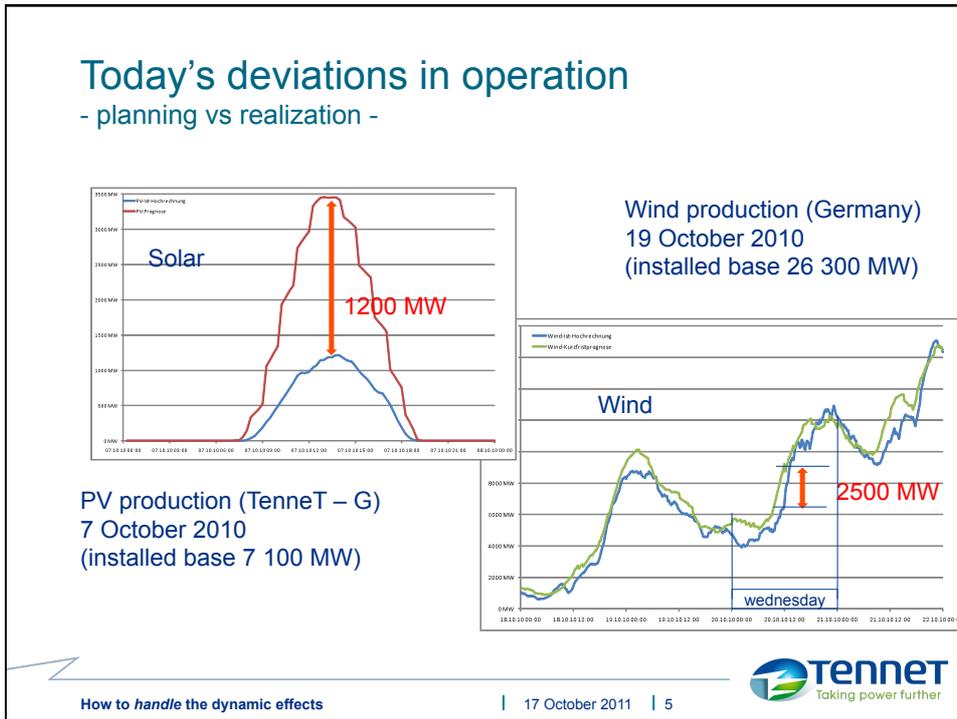
- Planning corridors is not equal to realization of grid infrastructure !
 - => Congestion management has been introduced to cope with deviation between new generation and delivery of new corridors
- Forecast, scenario and snapshots of the future have one certainty, they will not happen exactly as predicted
 - => Mid term planning including maintenance and effects of the projects is necessary to check the security of supply.
 - => Daily forecast and 24hours contingency analysis based upon European market results are made in cooperation with neighbouring TSOs

From long term planning to operation (2)

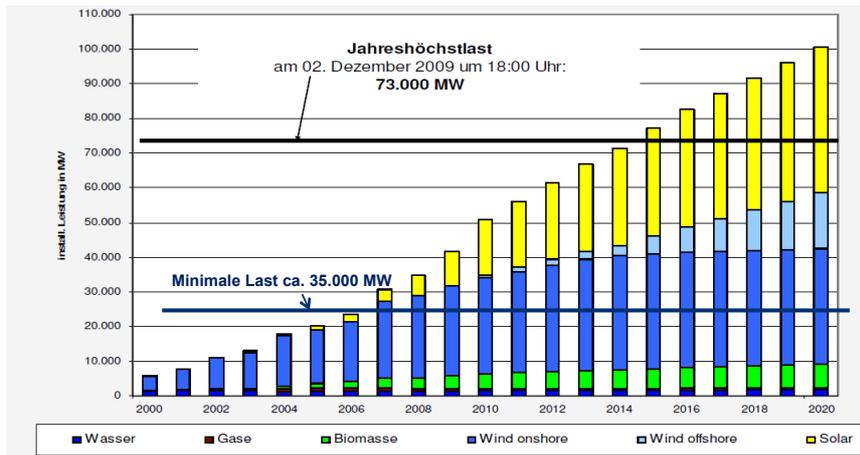
- Day ahead planning is not equal to final realization, due to:
 - wind generation deviations
 - disturbances in the network
 - load / balances deviations
 - intra day market



- => Online monitoring and online contingency analysis of the network based upon real-time data collection beyond national borders.



Development of RES integration in Germany



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This is how to handle the dynamic effects:

- Forecast techniques improvements
- International cooperation & grid development
- Flexibility to handle deviations

There is little time to develop smart markets, smart consumers, smart grid and smart regulators if we want RES together with security of supply.

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