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## Technical challenges in the modification of grids

Heike Kerber  
Berlin, 17 October 2011



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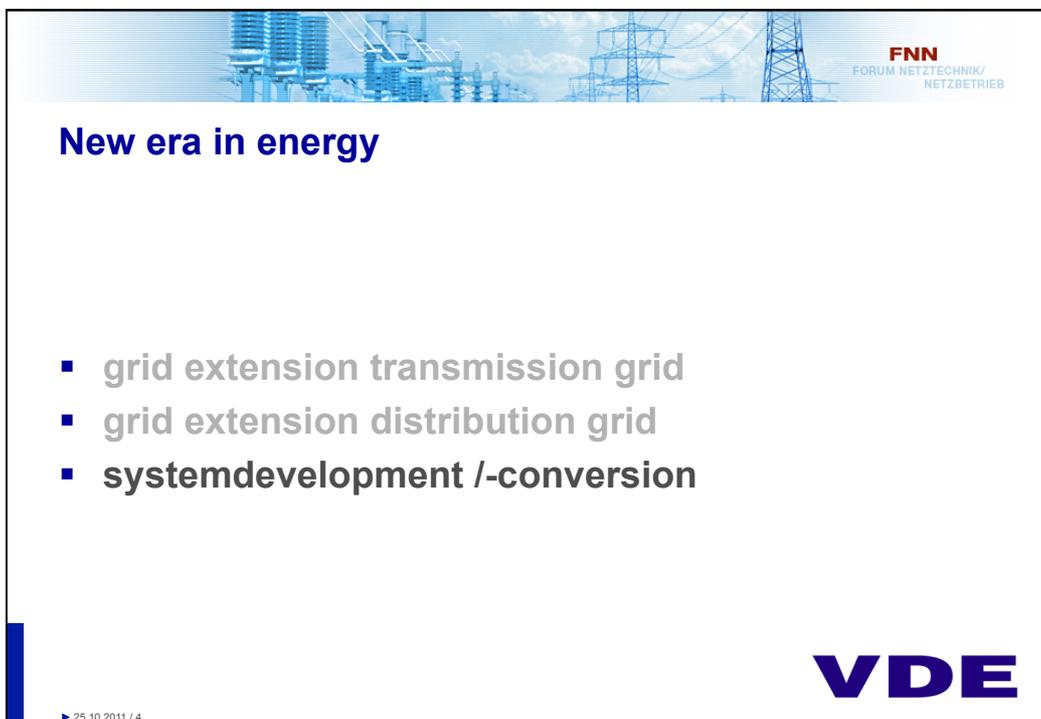
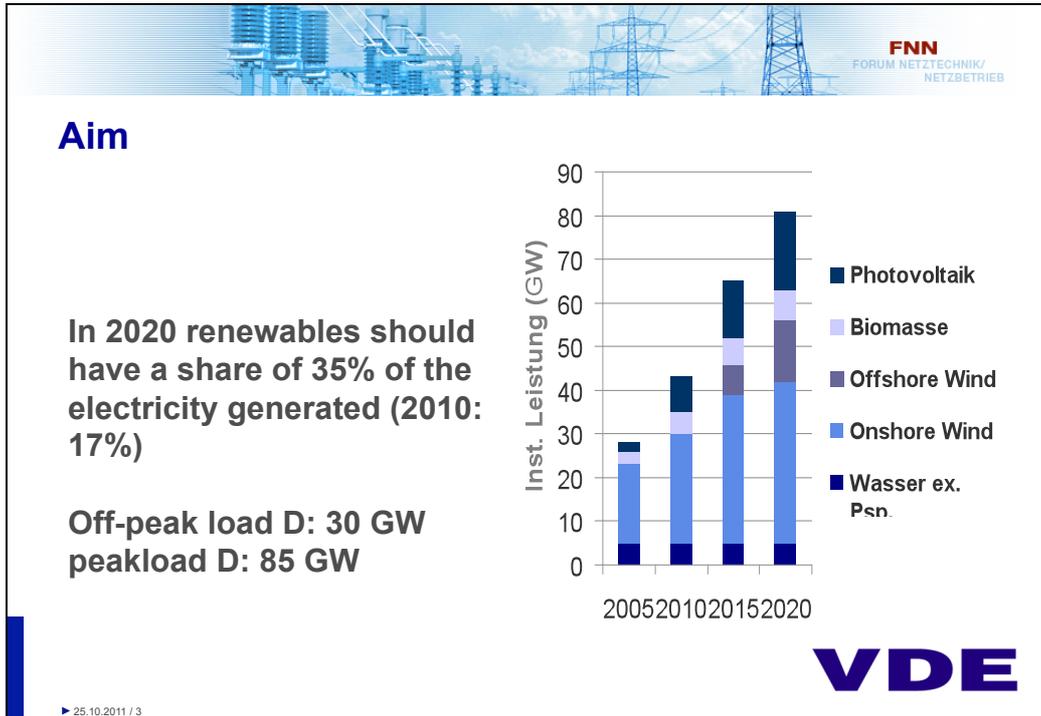
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## Forum Netztechnik/Netzbetrieb im VDE (FNN)

- Rule-setting for technical requirements and operational aspects of electricity networks from 230 V to 380 kV
- representatives of all stakeholder groups concerned included
- over 300 members financing and supporting the activities



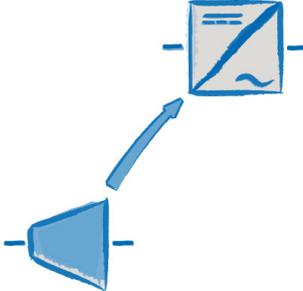
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## fundamental system change

- from centralised infeed to centralised plus decentralised infeed (in low voltage network).
- replacement high-inertia system with power inverter system
- large distances of decentralized generation

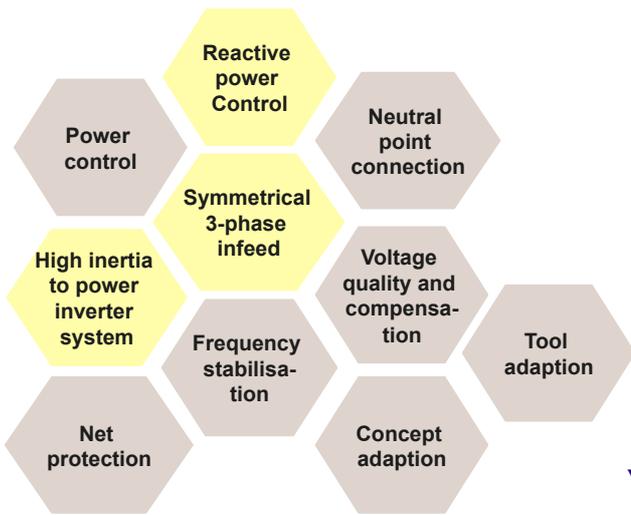


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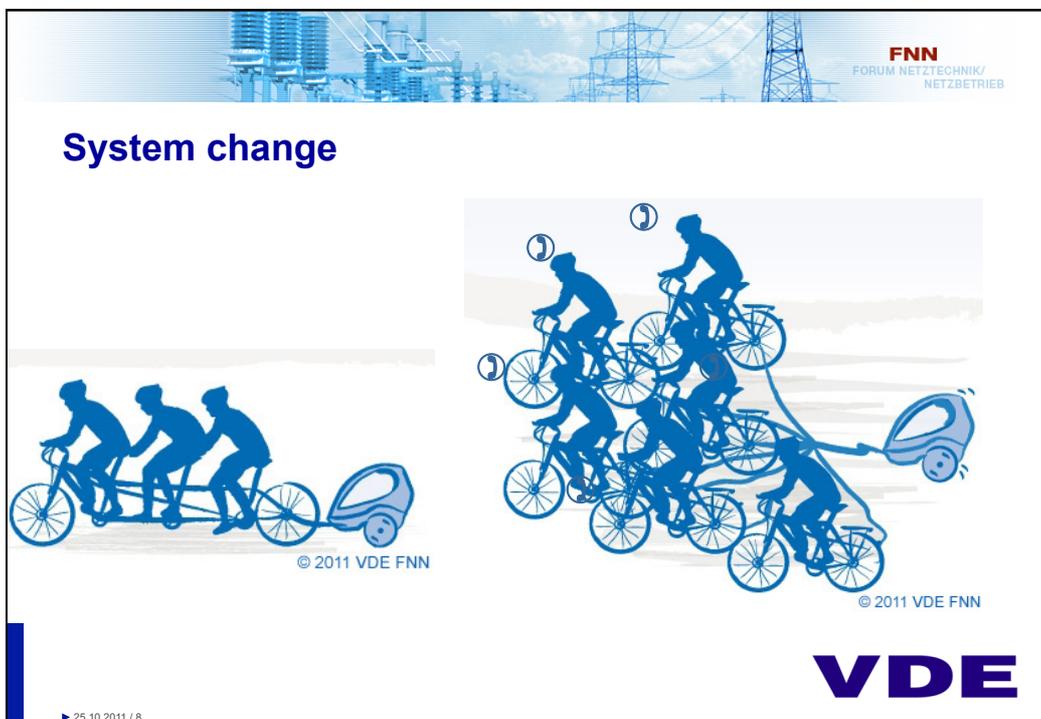
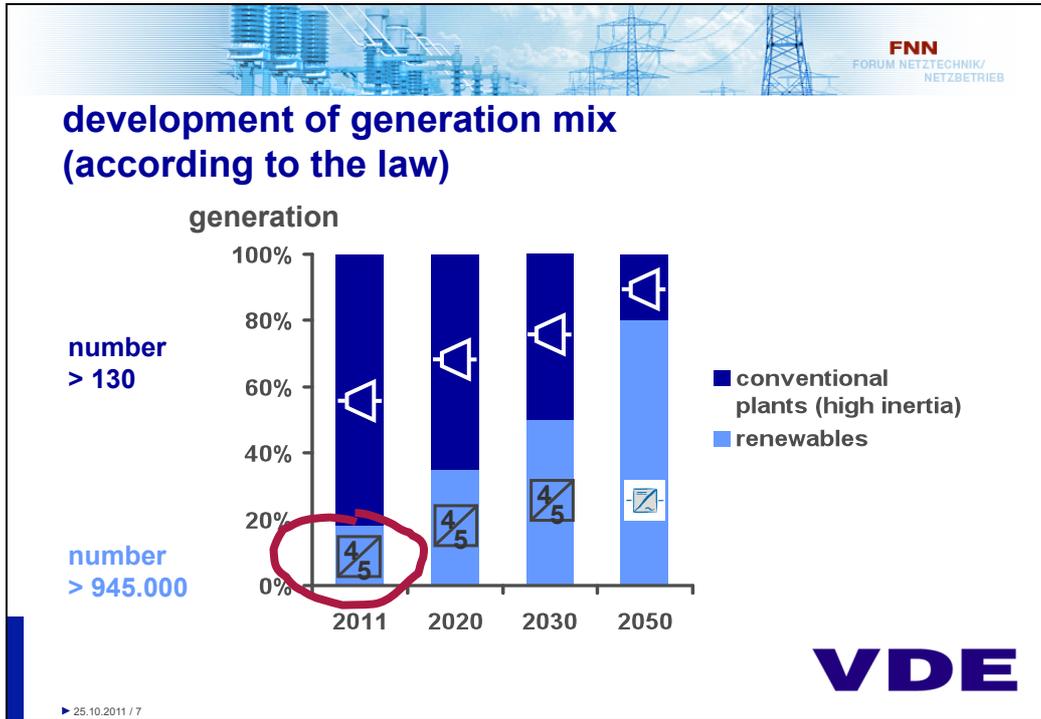
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## technical challenges



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## generators connected to the low voltage grid

until 2011:

- compability with the grid
- quasi negative load
- quick disconnection in critical situations

Since 1.08.2011 2011: VDE-AR-N 4105

- grid support during normal operation
  - active power reduction with overfrequency
  - static voltage maintenance
  - 3-phase rotary current feed



VDE-AR-N 4105:2011 1.08.2011  
Power generation systems connected to the low-voltage distribution network  
Technical conditions for the connection to and grid operation with low-voltage distribution networks




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## towards a win-win-system ?

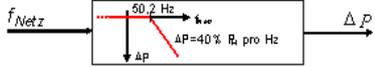
- growing interdependency of the different roles  
→ need for common understanding of the system (50,2 Hz as an example)
- development not possible to be done after lunch  
→ like urban development are processes, roadmaps and time needed
- in transmission and distribution network we need technical measures to ensure the system stability  
→ roadmap on the way
- ancillary services via renewable generation necessary  
→ first steps done: VDE-AR-N 4105
- Talking about mass market when it comes to technical changes  
→ common understanding about principles and processes

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## 50,2 Hz



- Generators installed after September 2005 and > 10 kW<sub>p</sub> (small roof modules excluded)
- Result: 9 GW resulting 315.000 PV installations to be retrofitted



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## 50,2 Hz

- Since 1.09.2011: VDE-AR-N 4105
- Since April 2011: recommendation for transition period




**VDE-AR-N 4105:2011-08**  
 Power generation systems connected to the low-voltage distribution network  
 Technical minimum requirements for the connection to and parallel operation with low-voltage distribution networks  
 Deutscher Verband der Elektrotechnik (DVE) e.V.  
 VDE-AR-N 4105:2011-08  
 Deutscher Verband der Elektrotechnik (DVE) e.V.





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**information**

- **Challenges:**  
[www.vde.com/en/fnn/pages/networks.aspx](http://www.vde.com/en/fnn/pages/networks.aspx)
- **VDE-AR-N 4105:**  
[www.vde.com/en/fnn/pages/n4105.aspx](http://www.vde.com/en/fnn/pages/n4105.aspx)
- **50,2 Hz:**  
[www.vde.com/en/fnn/Pages/50-2-hz.aspx](http://www.vde.com/en/fnn/Pages/50-2-hz.aspx)

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**Thank you !**

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