Federal Ministry
for Economic Affairs
and Energy

Legal guidelines of EEG (Renewable Energy Sources Act) and the System Stability Ordinance as well as future measures for PV grid integration

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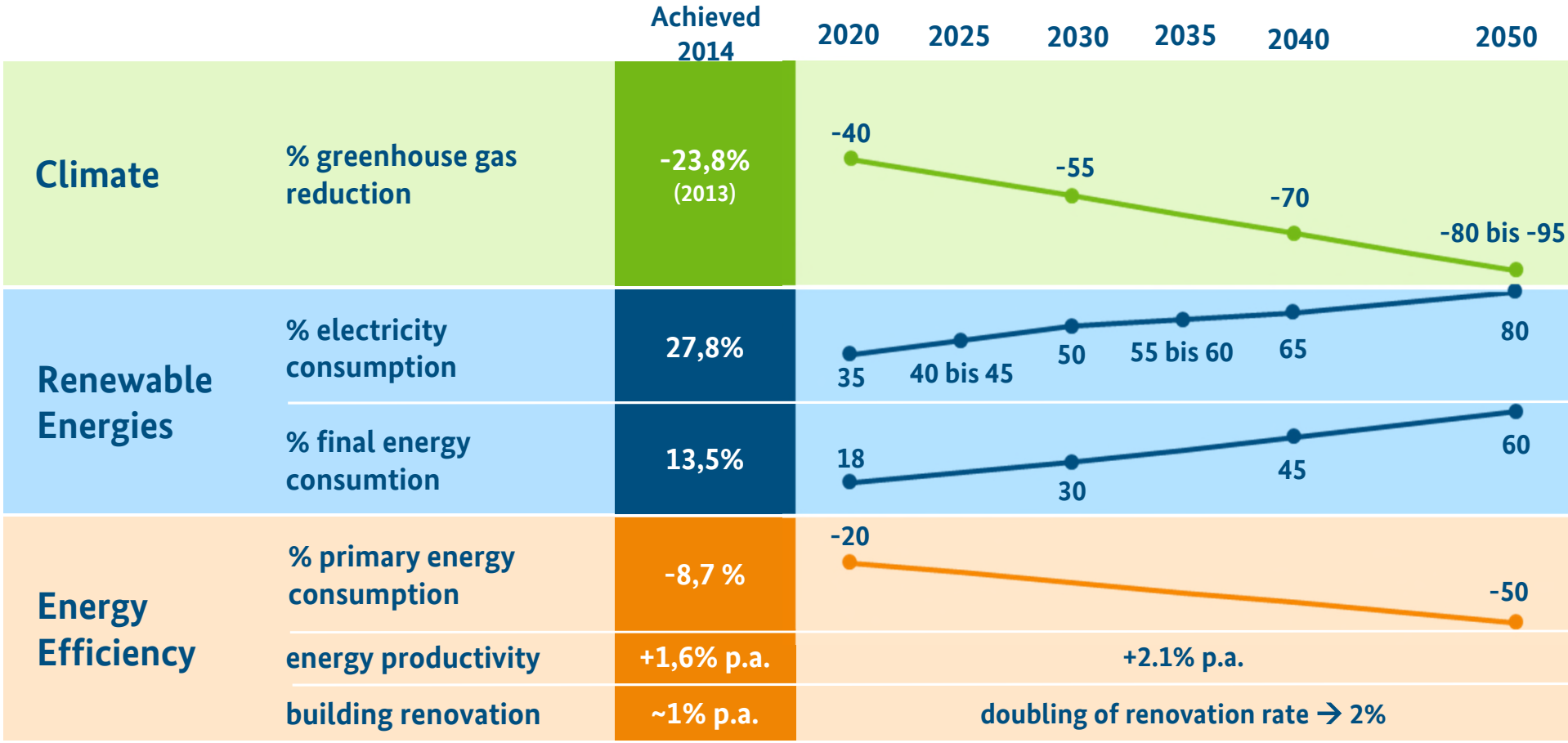
Overview

- Development of the expansion of renewable energies
- Grid connection
- Grid usage
- Funding programme for storage
- Outlook

Introduction – *Energiewende*

The **future** of energy supply

- *"Energiewende"* (energy transition) targets until 2050:



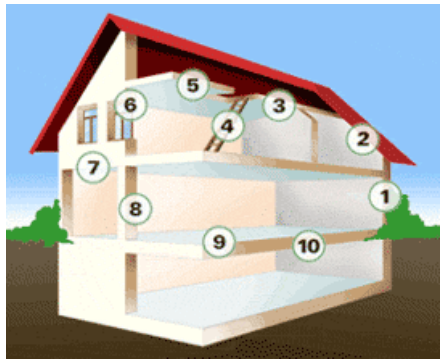
Introduction

Cornerstones for a "*Energiewende*" *(energy transition)*

1. Renewable energies:
- rapid and continuous development
- economical and environmentally compatible

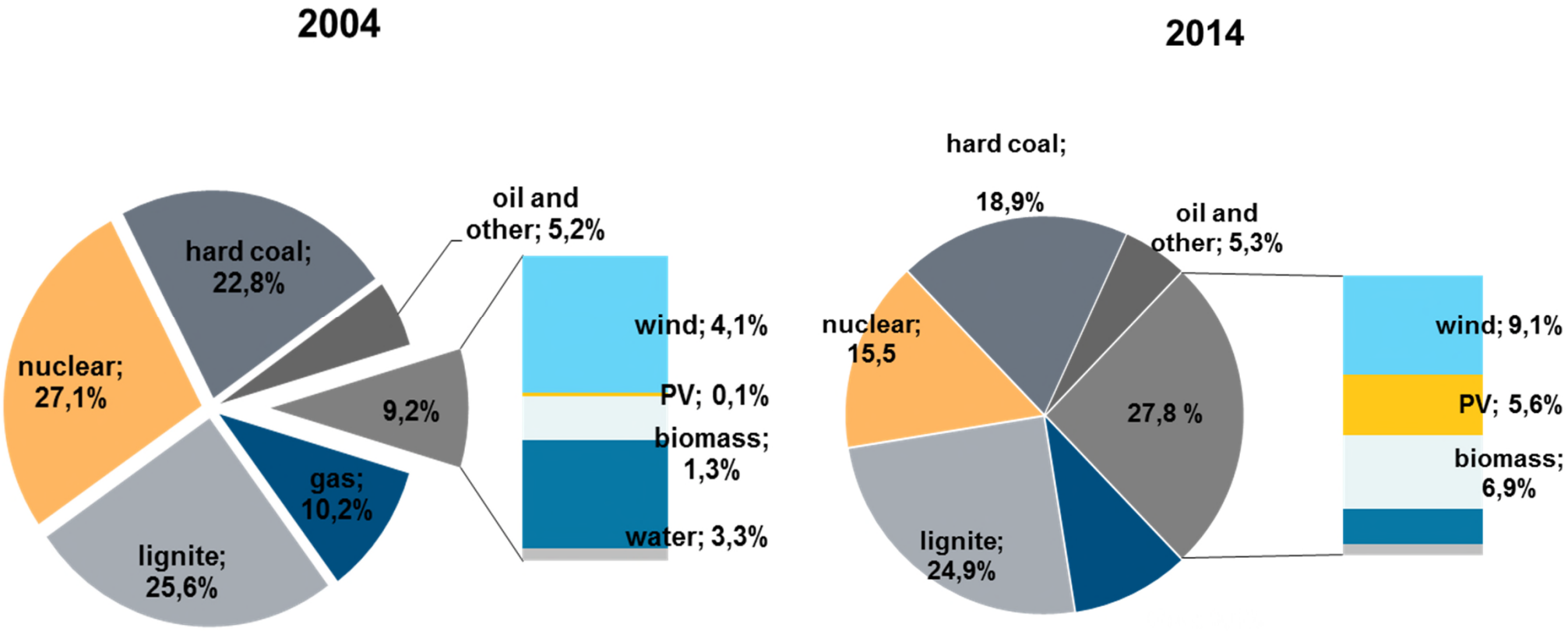
2. Future-viable infrastructure/grids
- flexible and high-performing
- integrates renewable electricity

3. Energy efficiency and energy savings
- reduces the energy consumption
- ensures economic efficiency



Development of Renewable Energies (Electricity)

- **Increasingly greener and fluctuating: The electricity mix**



System integrity – PV plants

- **Installed capacity of PV in total in Germany: 39 GW**
- **System requirements for PV:**
  - Grid connection/ metering
  - Feed-in management
  - 50,2 Hertz conversion
  - Funding programme for storage

Grid connection

Overview of the grid control of EEG:

1. **Priority grid connection** as a key element to achieve the expansion targets, § 8 EEG
2. **Priority purchase** of electricity from RES, § 11 EEG
3. **Obligation in terms of grid expansion, § 12 EEG –** Duty to optimize or to expand the grid
4. **Improved grid and system integration due to technical requirements for renewable energy facilities,** § 9 EEG (controllability)
5. **Feed-in management,** §§ 14, 15 EEG
6. **Legal regulations** on costs to be borne for grid connection, §§ 16,17 EEG

Grid connenction

1. **Priority grid connection – Central norm of EEG**:
   - **Obligation to connect for network operators,** § 8 (1) EEG
   - **Duty of the network operator to expand the grid,** § 8 (4) in conjunction with § 12 EEG (increasing the grid capacity)

Grid connection

2. Priority purchase of electricity from RES

- Priority physical transmission of electricity from RES, § 11 (1) sentence 1 EEG
- Commercial energy consumption within a fixed feed-in management, § 11 (1) sentence 2 EEG

- Equal privileged treatment of electricity from cogeneration, § 11 (1) sentence 3 EEG
- Right to expand or optimize the grid, § 12 EEG – but a capping of the peaks in the grid planning process

3. Obligation in terms of grid expansion, § 12 EEG

- Duty to optimize or to expand the grid

Grid usage

4. Improved grid and system integration due to technical requirements for renewable energy facilities (controllability)

- § 9 (1), (2), (3) and (6) EEG:

➢ Plants over 100 kW: Any time, the network operator can remotely reduce the power and retrieve the actual feed-in power (goal: to secure grid stability)

➢ This applies also to PV plants between 30 and 100 kW

➢ Choice for PV plants less than 30 kW:

a) 70% capping the peaks at the grid connection point or

b) controllability (just a simple technical setup to reduce power)

5. Feed-in management, § 14 EEG

- Exception of the purchase obligation (§ 11 EEG) during grid congestions (special regulation § 13 Energy Industry Act [EnWG]) – as an interim measure
- Background: grid security and grid stability
- Using the technical setup according to § 9 EEG, the network operator has the opportunity to remotely reduce the plant. This applies to the following conditions:
  - Grid congestion
  - The conventional power plants are reduced in priority as far as possible (only fossil „must-run plants“ are allowed to be in operation)

5. Feed-in management, § 14 EEG

- Switching off in a predefined sequence:
  1. Elimination of grid disturbances by grid related measures, § 13 (1) number 1 Energy Industry Act [EnWG]
  2. Elimination of grid disturbances by market related measures, § 13 (1) number 2 EnWG – limiting conventional power plants on a contractual basis
  3. Emergency procedures for conventional power plants, § 13 (2) EnWG (redispatch)
  4. Limiting RES and CHP-systems, § 14 EnWG
     - Limiting small PV plants under 100 kW subordinately
     - Switching off in a predefined sequence on the assumption that the smallest possible quantity of electricity from RES and CHP-systems is limited

6. Legal regulations on costs – hardship clause, § 15 EEG

- The limited RES and CHP-systems are compensated (§ 15 EEG)
- They receive 95 % of the missed revenue (the maximum loss of revenue is limited to 1 % of the total power production)
- The calculation is based on a guideline of the Federal Network Agency
- Comparable legal situation as well as in the context of conventional power plants („Redispatch“).
- Costs are shown in the grid charge

7. Program for PV battery storage systems 2013 - 2015

New acquisition of PV plants / storage system:

- The maximum eligible costs are 2.000 €/kWp for a combined PV plant and battery storage*, the repayment bonus is 30 % (retrofitting: 2.200 €/kWp)*

  This means a maximum of 600 - 660 Euro/kWp.

Technical requirements for an appropriate grid stability & interfaces

- Limit of 60 % of the rated output at the grid connection point (capping)
- Interface for remote parameterization

  (the lines of active power and reactive power are adjustable)
- An interface for a remote control is available
- Integration in an energy management system is possible

7. Retrofitting system stability regulation for PV („SysStabV“)

- 90% of the system performance of PV are retrofitted until yet

Low voltage PV plants (problem of 50,2 Hz):

- In the German power system remain 4-5 GW with a critical frequency setting (50,2 Hz)

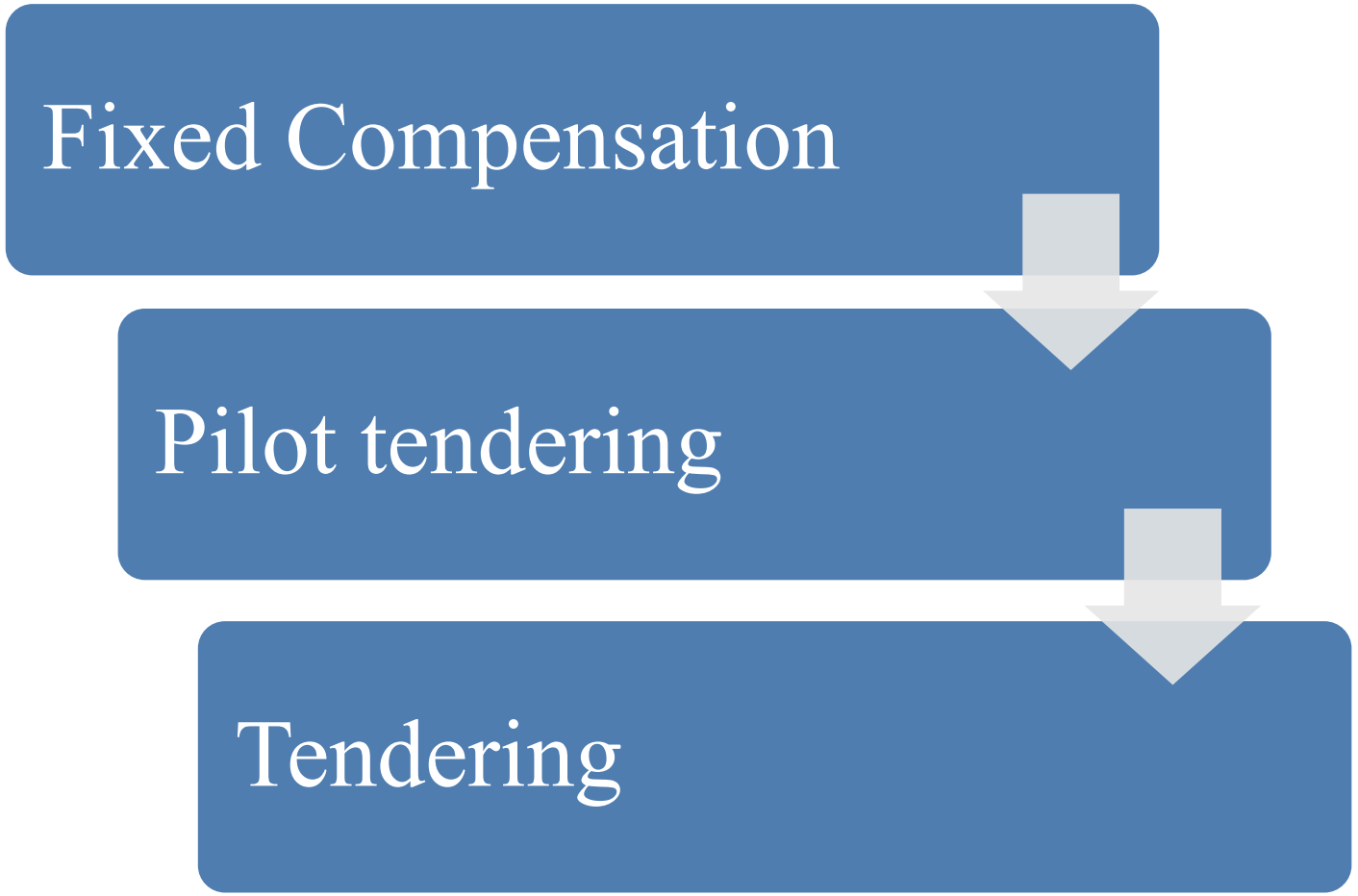
Grid usage

Increasing measures for feed-in management (1,5 TWh) and „redispatch“

Reasons:

- Delay in the grid expansion
- Increasing build-up of onshore wind energy facilities in Northern Germany
- Grid congestion in Central Germany
- The need for „redispatch“ currently increases to 21 GW

Outlook – system change towards tendering



Flexibility of the power system

Overview of the set of measures:

1. **Grid expansion**
2. **Network adjustment and modernization**
3. **Flexible production (RES and conventional power plants)**
4. **Flexible consumption (load management)**
5. **System services by renewable energies, grid control that is adjusted to renewable energies**
6. **Storage of electricity generated from renewable energies**
7. **Usage of the electricity in different fields (heat, traffic)**
8. **Flexible and adjusted energy market**

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for your attention!

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