



Federal Ministry  
for Economic Affairs  
and Energy

# Flexibility demands of a variable-RE-based electricity supply

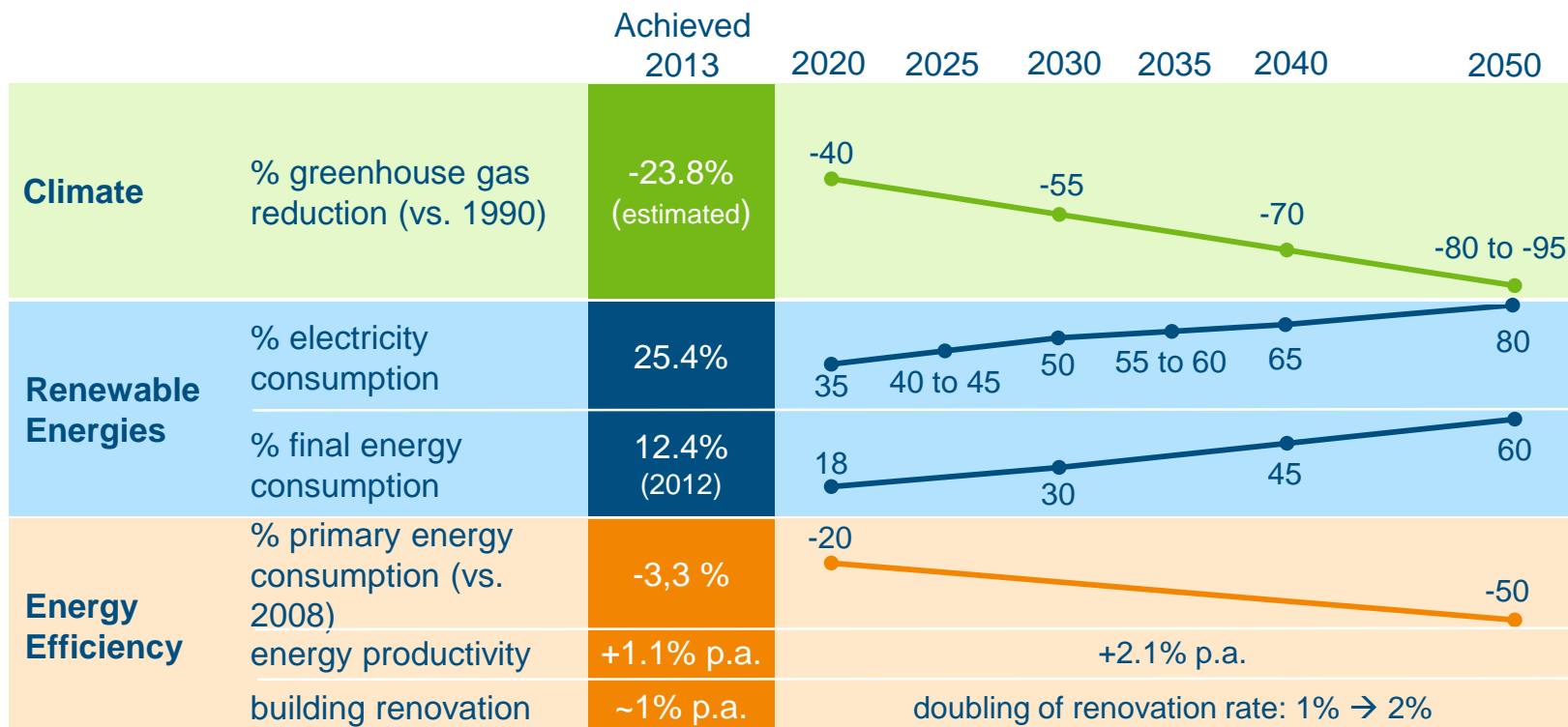
Germany's program for decentralized battery storage systems

IRENA "International Energy Storage Policy and Regulation Workshop"

November 7, 2014

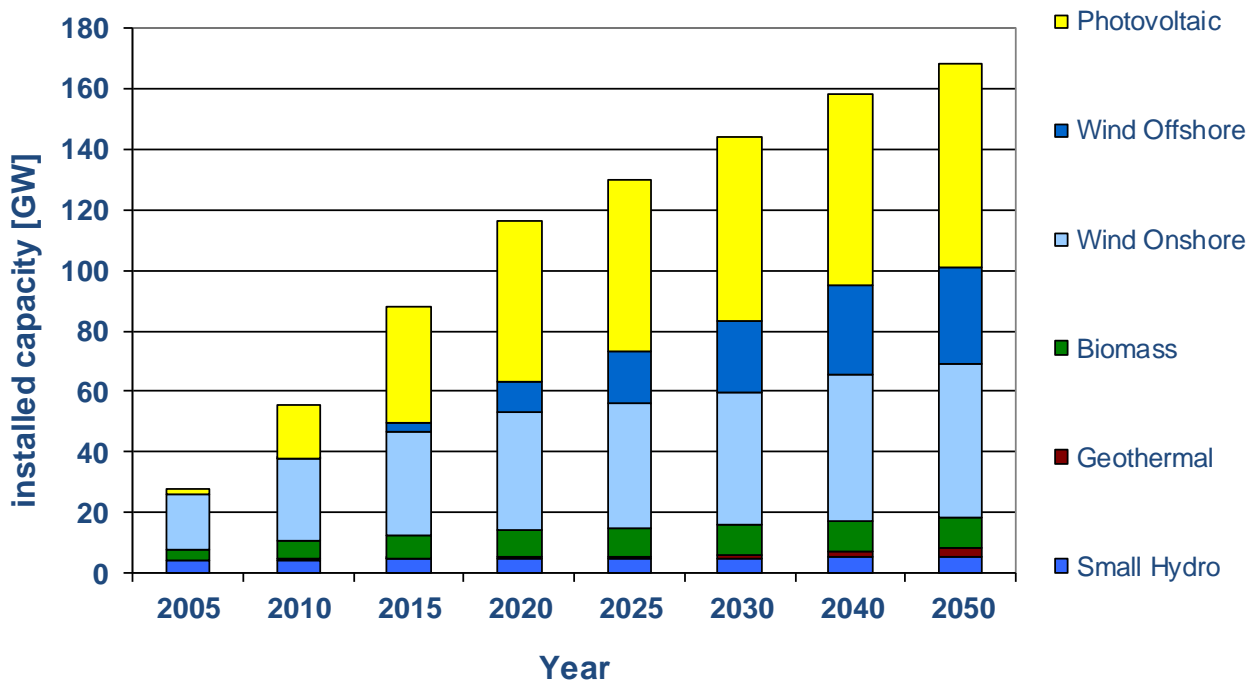
Tokyo

## Energiewende targets until 2050



*Germany has set ambitious targets in all sectors and is on track.*

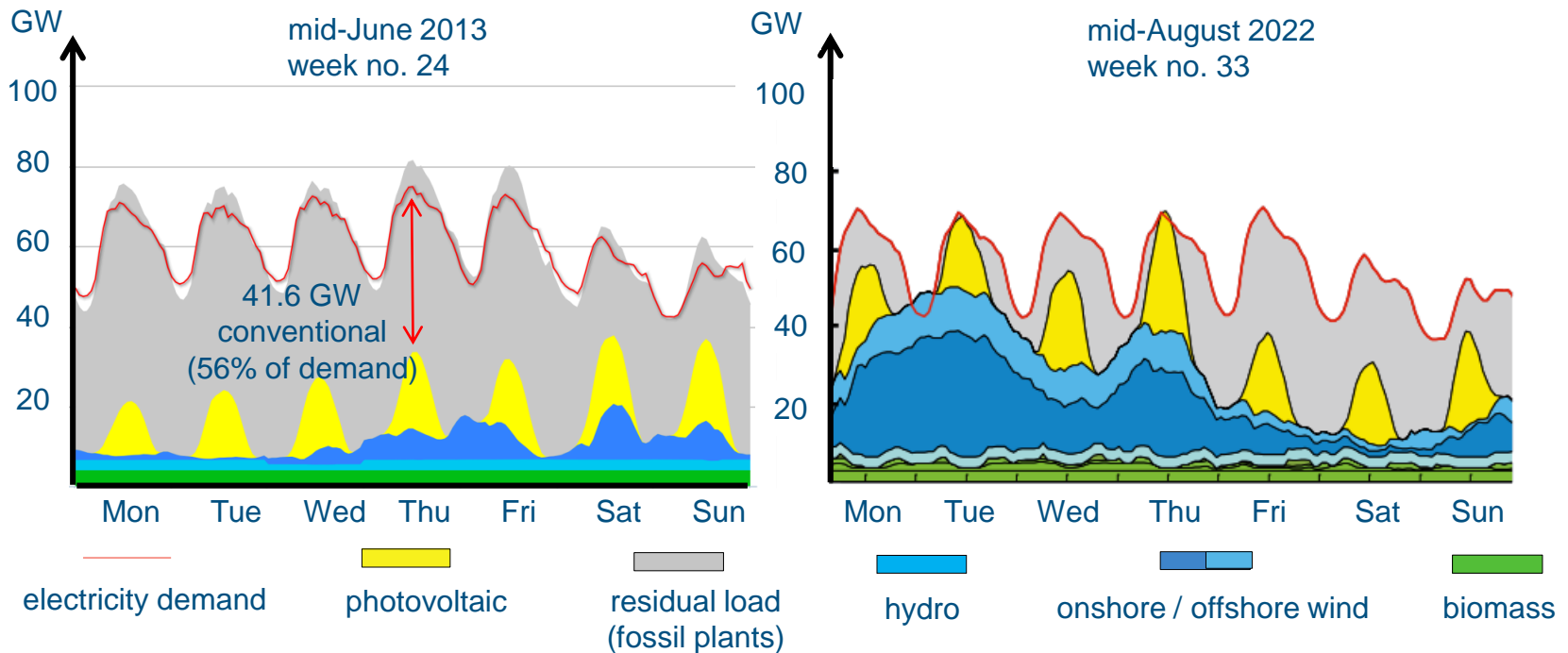
## Development of installed RE capacity in Germany



*The share of variable renewable energy will continue to increase.*



## German electricity-system volatility today and in 2022

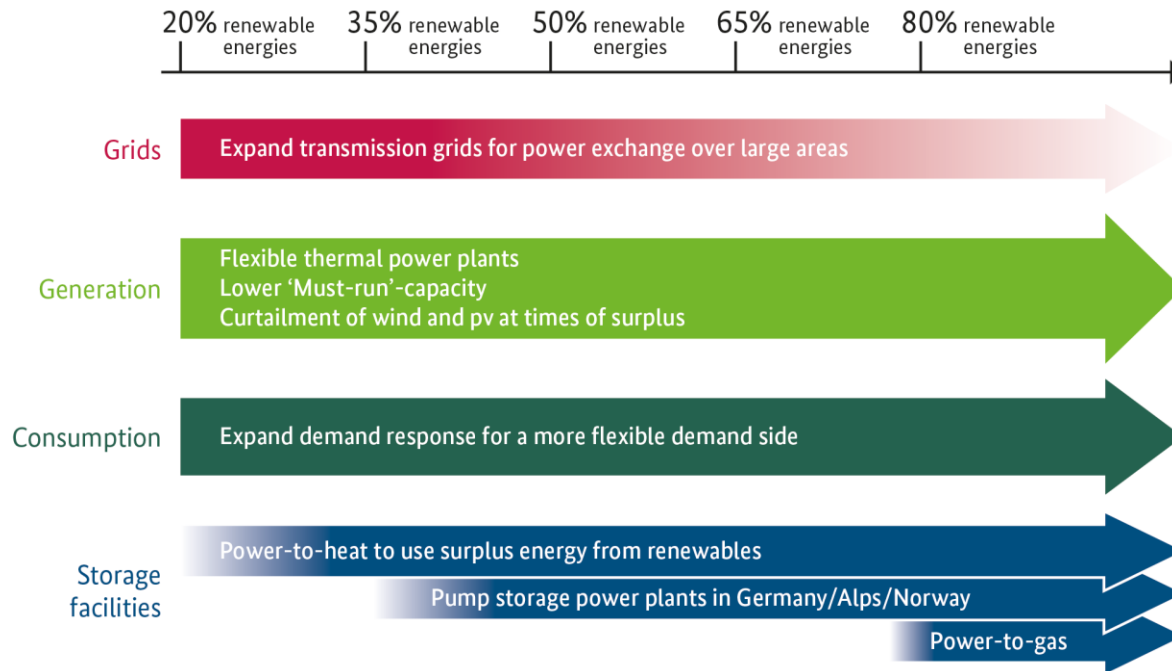


Source: Agora Energiewende 2013

*Conventional power plants need to adapt to higher flexibility needs.*



## Flexibility measures depending on renewables share



*Flexibility needs can mainly be covered by market mechanisms. New storage capacities are only needed for high renewable shares.*



## Storage demand in the short-medium and long term

### *short-medium term*

- Mostly short-term demand for flexibility
- From system point of view no significant storage demand
- More competitive flexibility options available
- Decreasing electricity prices and –spreads at spot market
- Potential drivers: self-consumption and e-mobility

### *long term*

- Storage demand for security of supply reasons as well as flexibility reasons
- Increasing demand for flexibility
- Higher fluctuations of spot market prices
- Demand for long-term storage
- Times of significant electricity overproduction

*Currently difficult market environment for storage solutions, focus on R&D. Storage competes with other flexibility options.*



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## Market Incentive Programme / KfW-Programme for decentralized PV storage

- **Parliamentary assignment**
  - Bundestag assigned Fed. Government to introduce programme
- **Objectives**
  - Support of decentralized storage solutions
  - Contribution to grid stabilization
  - Technology-neutral
  - Market Incentive Programme: Incentivizing technology development, driving cost reductions



## Scope / cornerstones of the programme

- Start 05/2013
  - KfW programme (#275): low-interest loan plus repayment bonus
  - Support for investment in battery storage systems that are combined with PV systems (PV systems from 01/2013 on with max. 30 kW)
  - Repayment bonus max. 30% of the battery storage system cost, but max. 600 €/kW<sub>PV</sub> (!) (reference value is PV system)
- Technology neutral
- Max. feed-in power 60%  $P_{inst,PV}$  → grid relief / stabilization
  - Interface technology for remote parameterization and remote control
  - Open Interface of battery system (→ replacement batteries possible)
  - Fair value replacement guarantee for battery for 7 years





## Current status of the programme (as of 07/2014)

- Since the programme started in 05/2013, KfW has granted 5200 loans with a total volume of 85 Mio. €
- Average repayment bonus of approx. 3000 € granted



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## Technology Development: „Support Initiative Electricity Storage“ („Förderinitiative Energiespeicher“)

- Shared programme of Ministry for Economic Affairs and Energy and Ministry for Education and Research
- Volume of 200 Mio. EUR
- > 400 project proposals of volume of > 1 Mrd. EUR received
- More than 250 projects accepted
- Focus areas:
  - Wind-Hydrogen-Coupling
  - Batteries in the distribution grid
  - Thermal storage
- Further projects on alternative pumped storage plants, compressed air storage



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## Conclusions

- Storage solutions are important for energy systems primarily based on renewable sources
- Storage solutions will be needed in perspective, however:
- Today still mostly expensive and – partly - in development stage
- More cost competitive options to be used first
- R&D necessary to realize the needed technology development and cost reductions
- Focus on creating a level playing field for competition of different flexibility options (flexible supply and demand, grids, storage, ...)
- Ensure storage solutions are employed in grid stabilizing manner