



Federal Ministry
for Economic Affairs
and Energy

The end of the operating time of wind turbines: legal framework and current developments in Germany

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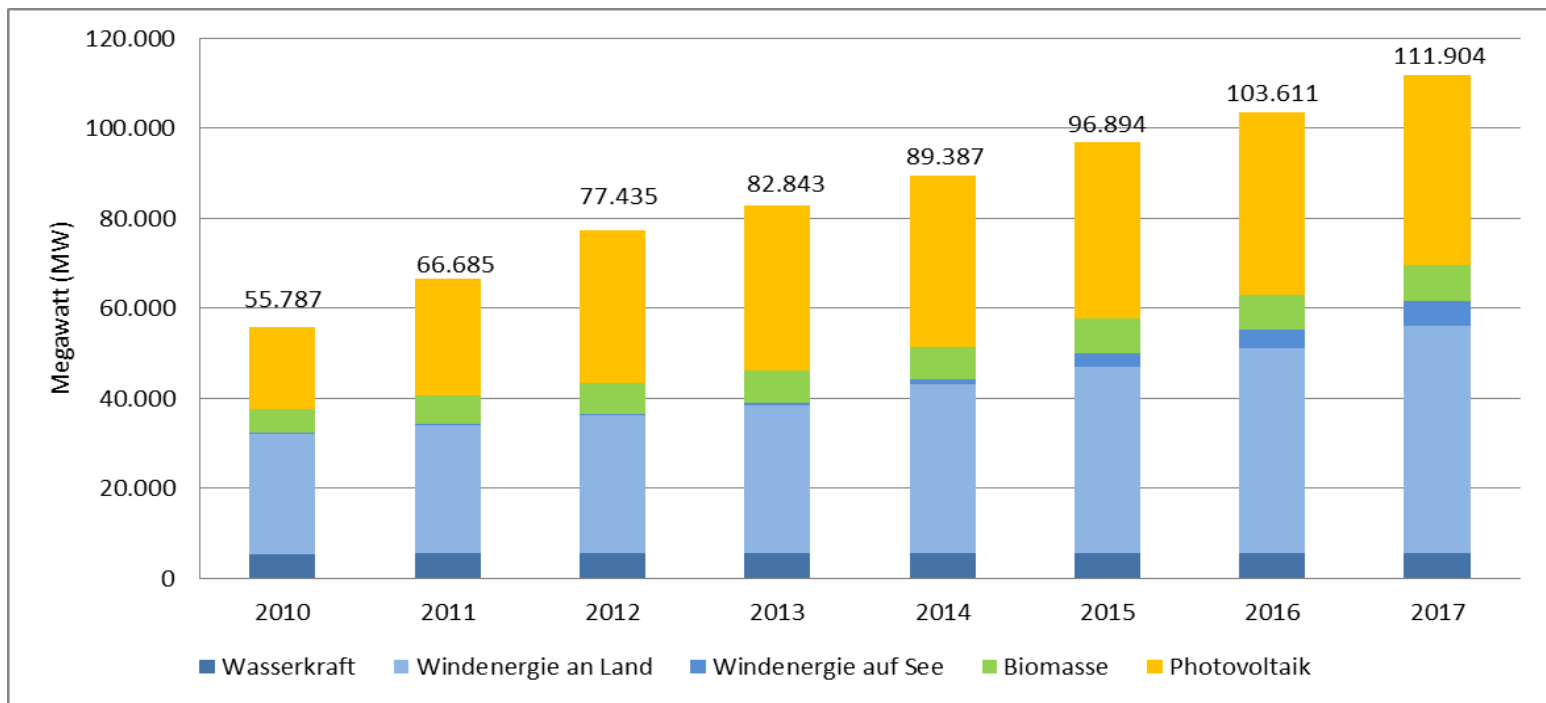
Paris, 2017 March 22

Overview

1. Status of Land-Based Wind Energy
Development in Germany
2. Dismanteling and Repowering
3. Legal Framework

Annual Installed Capacity RE

- 112.000 MW in total (in 2017: 8.300 MW) = 36% RE share
- Wind onshore: 51.000 MW = 14% share on total energy consumption

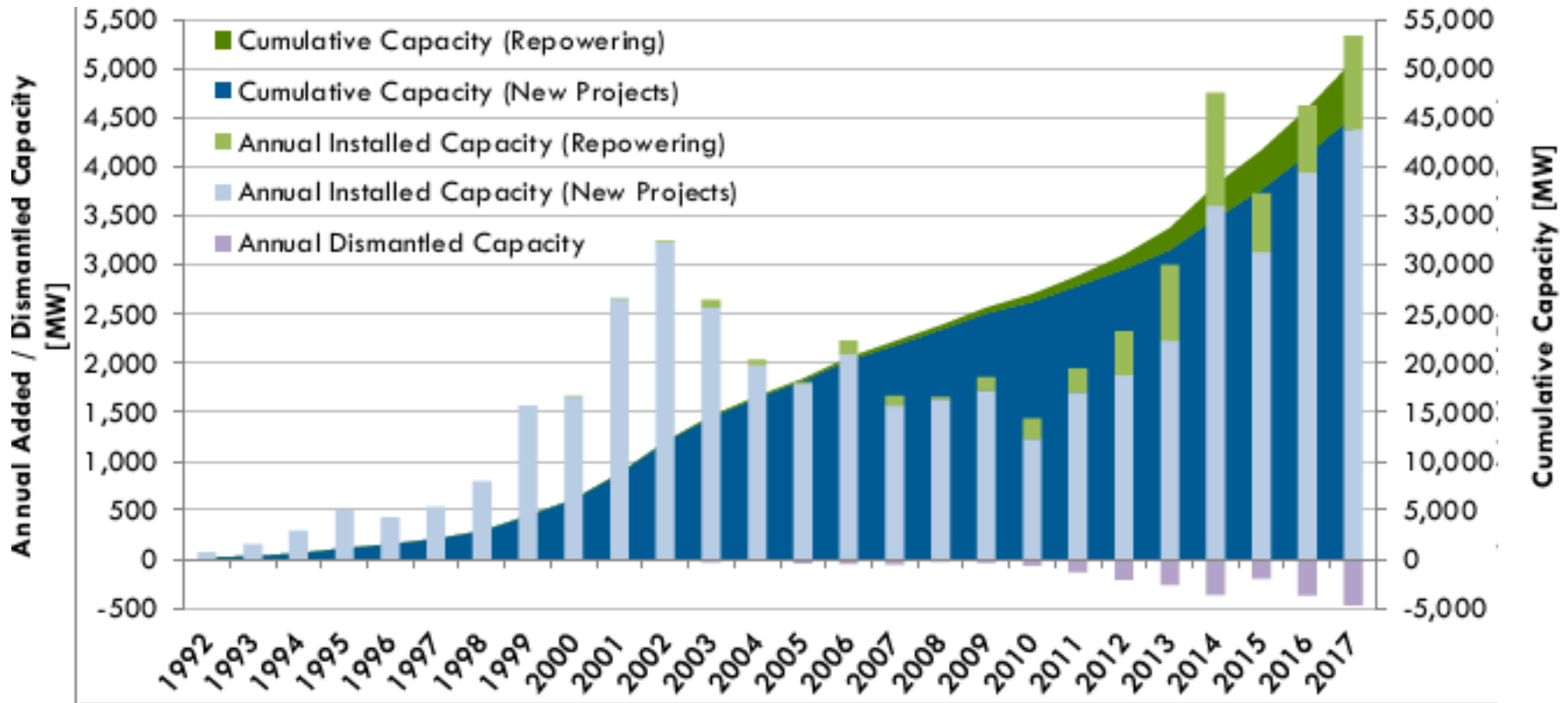


Land-Based Wind Development 1992-2017

Cumulative Capacity: 51.000 MW , 28.700 Wind turbine generators

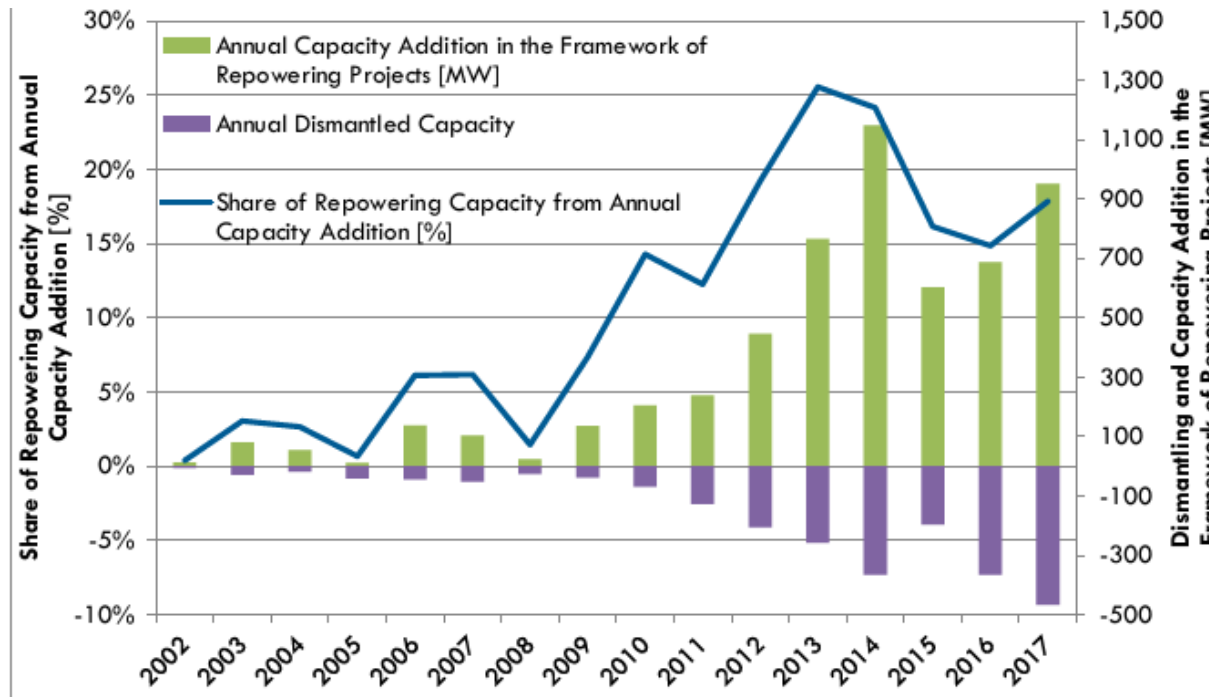
Repowering in 2017: 950 MW, 315 Turbines (not binding)

Dismantling in 2017: 470 MW, 390 Turbines (not binding)



Dismanteling and Repowering

- Dismanteling of Wind turbine generators in general after expiry of the 20-year funding EEG period (in Germany from 2021 with an annual rate of about 2.000 MW expected)
- At present: about 1.600 MW in total decommissioned
- Repowering: no clear definition, in general new installation on the same site or in the near area



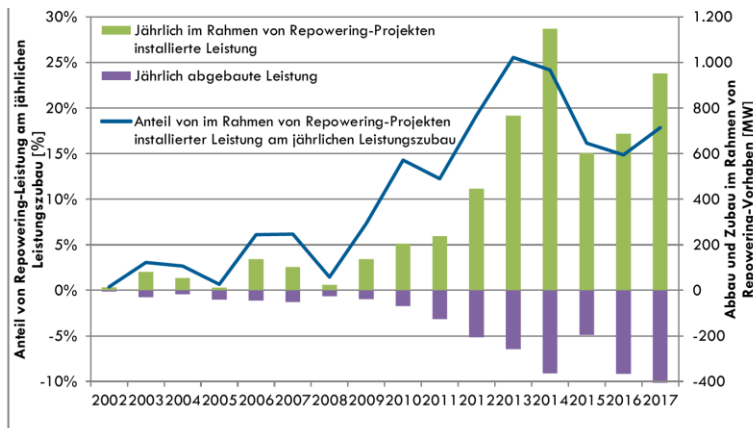
Dismanteling and Repowering

Reasons for decommissioning:

- Operation is no longer economically feasible due to their technological condition
- High pressure to free up the space occupied by the turbines for new projects

Reasons for Repowering:

- Repowering bonus until EEG 2014 (0,5 ct/kWh); higher yealds due to higher average capacity of repowering turbines 3 MW (instaed 1,2 MW)
- Share of repowering in 2017 were 18% of the gross new installation



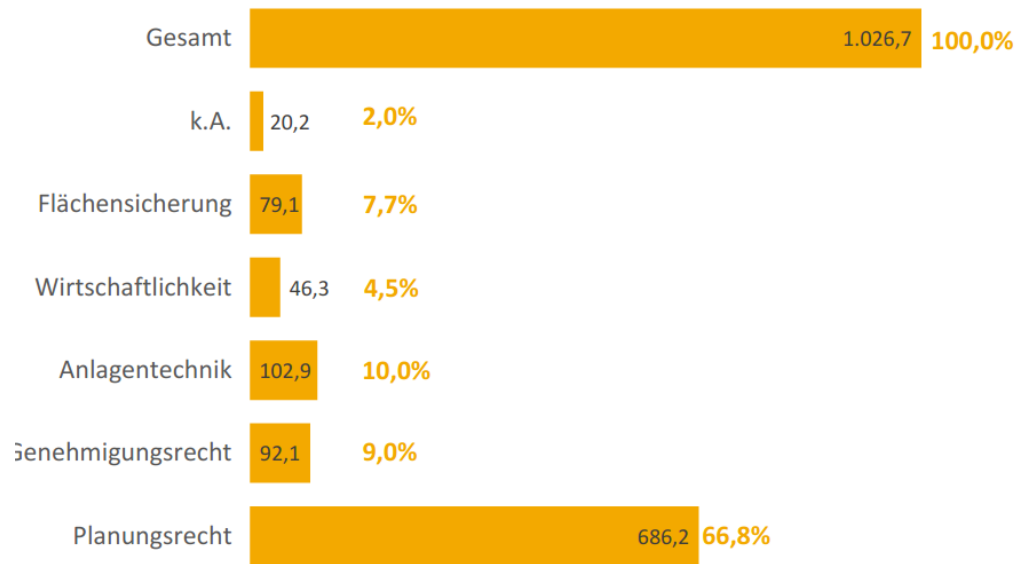
Continued operation of wind turbines

- Continued operation without any EEG tariffs depends on:
 - Operation costs of wind plants; approximately 3 ct/kWh
 - Market value of wind power (in 2017: 2,8 ct/ kWh) and rates on EEX power exchange
 - Further framework for other business models beyond the EEG funding (Power-to-Gas, direct delivery, self-consumption)
- At present: about 900 MW (2.000 wind plants) under continued operation
- Recent results from operator survey by the German Fachagentur Wind:
 - Repowering not possible: in about 47% of wind projects (f. e. in the year 2021 after termination of the EEG funding)

Repowering not possible?

- Failure reasons:

- Planning law (no wind priority area, height restrictions, distance control to residential area)
at 66% share
- Further reasons: Economics, system engineering, securing areas as well as licensing law



Legal Aspects for Repowering

- Approval procedure according to Federal Immission Control Act (duration approx. 3-5 years from planning to realisation)
- Approval usually not limited in time
- Framework conditions in regional planning (Regional Planning Act) are decisive:
 - Positive designation of fitness areas = Wind-priority areas, with exclusionary effect or without
 - Distance regulations for nature and species protection reasons,
 - new distance regulations for residential development,
 - Distances to radio navigation systems
- Planning free spaces of the local community in the context of urban land use planning (Building Act)

Conclusions

- Repowering is of great importance for the long-term achievement of the RE expansion goals
- Area availability and acceptance are limited to go to new "white" areas
- Clear advantages of repowering:
 - Higher performance of the systems (triple power yield at half the number of systems)
 - positive for space requirements
 - Consolidation of power generation and therefore better use of network infrastructure
 - Enabling new business models (power-to-gas)

Thank you for your attention.

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