

Significance of Onshore Wind Energy

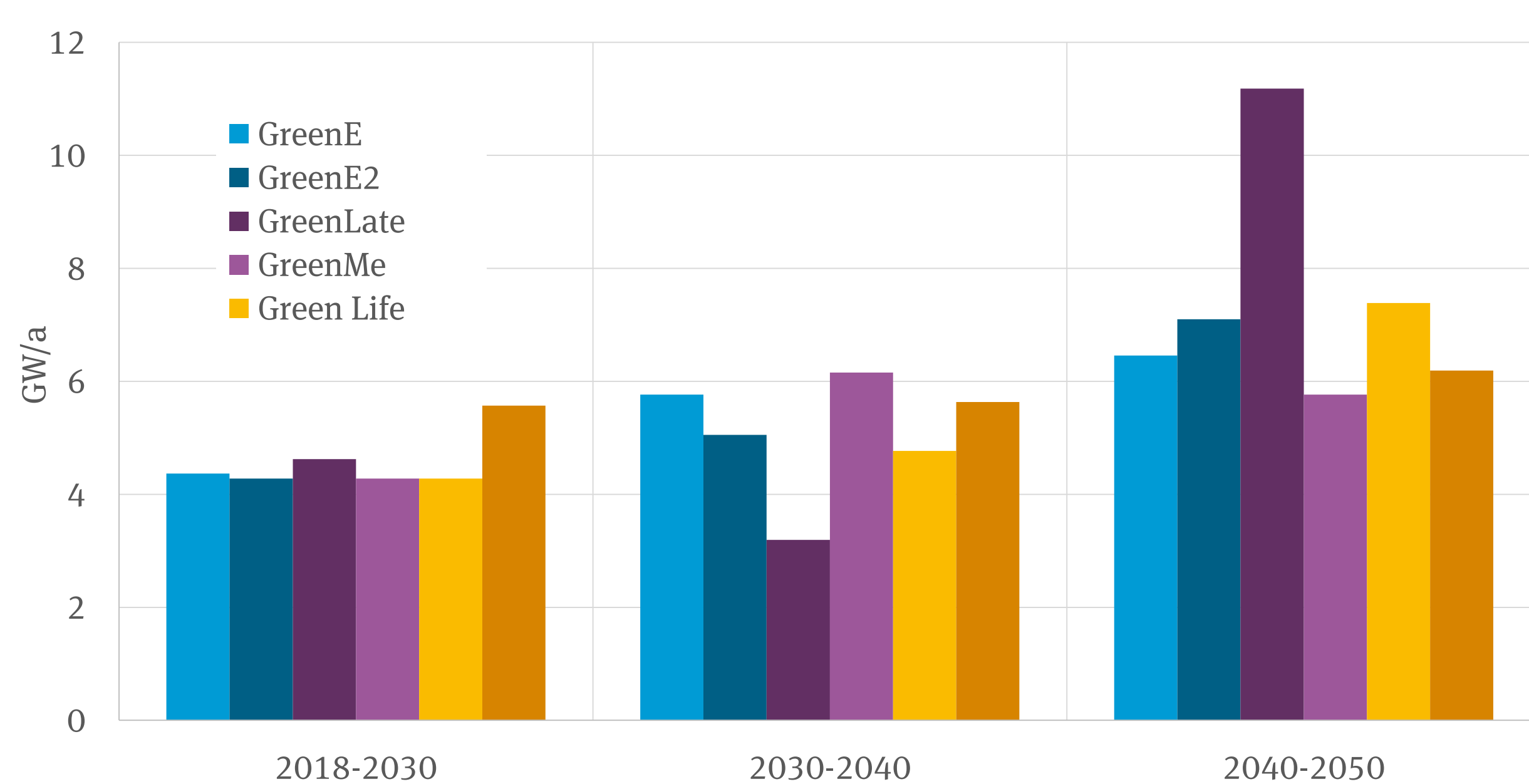
Growing significance of wind energy for energy transition versus actual challenges.

Significance of wind energy for the energy transition and climate protection

Wind energy is the key technology for the energy transition in Europe. A set of future scenarios published by the German Environment Agency, with varying assumptions e.g. concerning successful efficiency measures, growth, resource usage, life style change show how the „Energiewende“ targets to 2050 can be achieved in Germany (see poster RESCUE). The Green Supreme Scenario is the only one ambitious enough to be considered promising concerning the Paris Agreement Goals.

- All RESCUE-scenarios determine an installed capacity of Wind energy of about **80 GW by 2030** (about 100 GW are reached in the Green supreme scenario).
- This implies a gross expansion rate for onshore Wind of at **least 4 GW/a on average between 2018-2030 in Germany**. In order to have a chance to meet the 1.5°C temperature goal **5,5 GW/a in average** would be necessary (Green supreme scenario) (**fig. 1**).
- However, the actual installation rate dropped from 4,8 GW in 2017 to 0,9 GW in 2019. **Hence the actual development is lagging way behind the necessary expansion.**

Figure 1: Average gross expansion rate for onshore wind energy according to different RESCUE-scenarios



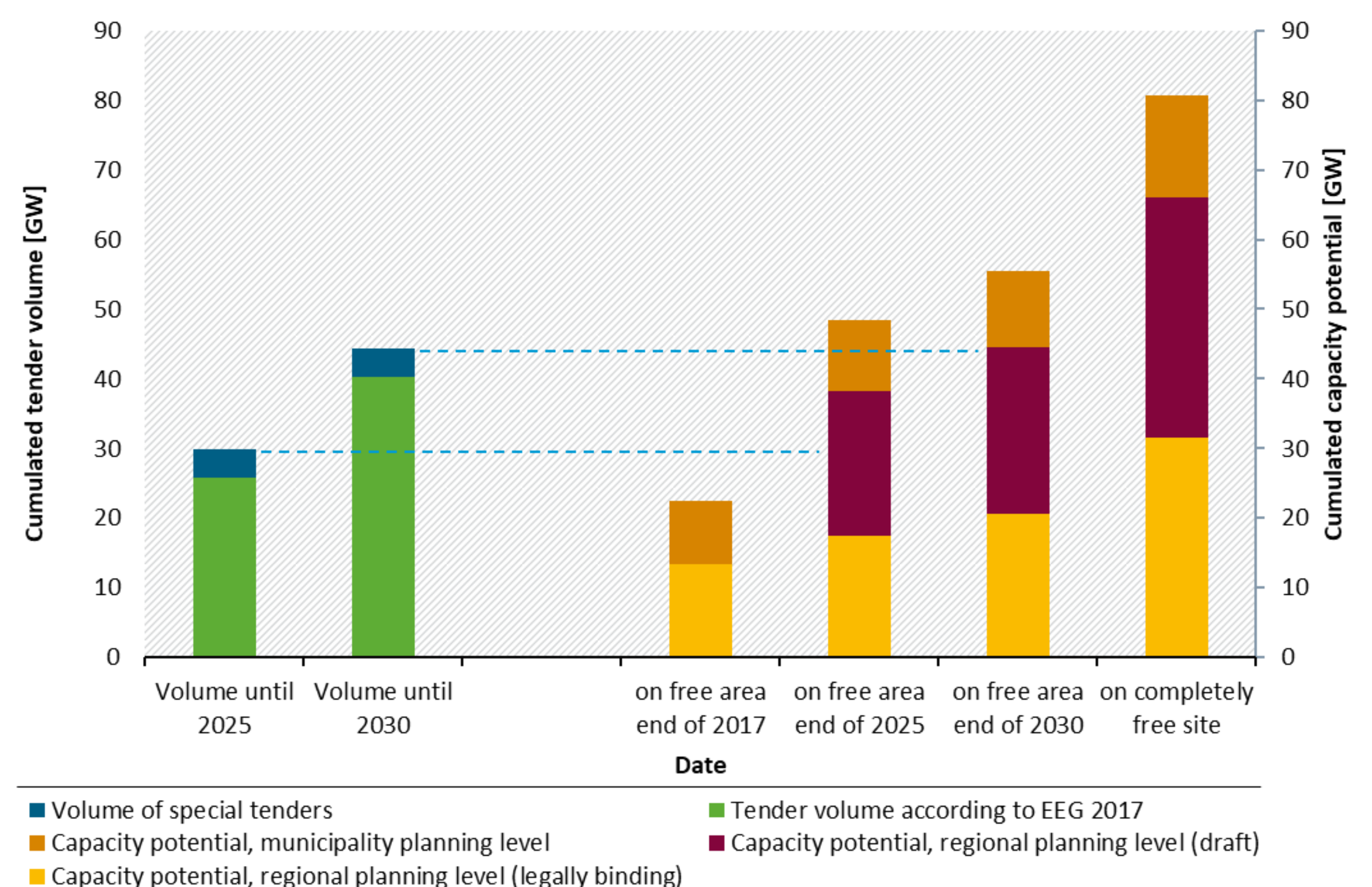
Lack of designated areas for wind turbines

One key challenge is the availability of areas usable for wind energy. In Germany, areas for wind energy are drafted and designated by the regional and urban land-use planning authorities.

- Today **0,9 % of Germany's surface area** is designated for wind energy use. Theoretically this would **only be enough for 55,4 GW of installed capacity in 2030 (fig. 2)**. Additionally there are considerable **uncertainties**: e.g. areas are **often not usable** (23 % of the areas until 2014 have not even been developed), 23,9 GW of the potential areas are yet only at draft state.
- Now the Government is planning on a minimum distance of 1000 m to residential areas. This would further reduce the actual designated areas by about **21-46 %**.
- Often massive opposition against projects, due to feared negative impacts on landscape, wildlife or human health can delay or prevent project implementation.

- And to complicate matters, about 50 % of the today installed wind power capacity cannot be repowered after the lifetime ends, since they nowadays are situated outside the actual designated areas.

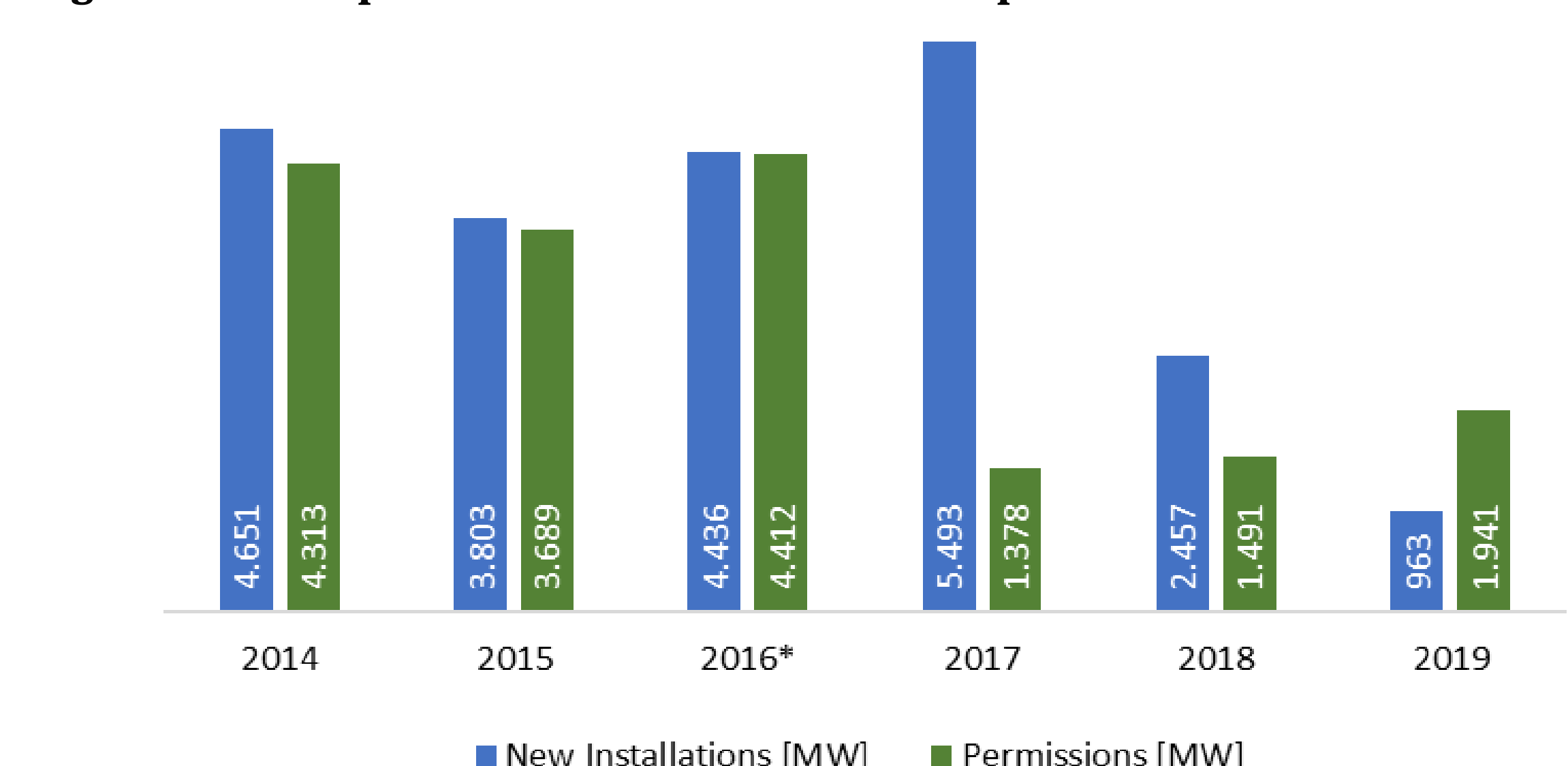
Figure 2: Comparison of the potential of designated areas with the actual tendering volume



Decline in permissions since 2014

Besides the dramatic drop of new installations the lean period of low number of permissions granted (**fig. 3**) also continues. And an economical operation beyond the remuneration period of 20 years is unsure. This could lead to a shut down of 22,9 GW capacity by 2030.

Figure 3: Development of new installations and permissions



Source: Fachagentur Windenergie an Land (2020)

These factors may well lead to an actual **decrease of installed capacity by 2021. It is crucial to find solutions between the government and federal states on how sufficient space can be assigned for wind energy projects and successful citizen participation can enhance local acceptance.**

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