The interaction of Conventional Power Production and Renewable Power under the aspect of balancing Forecast Errors

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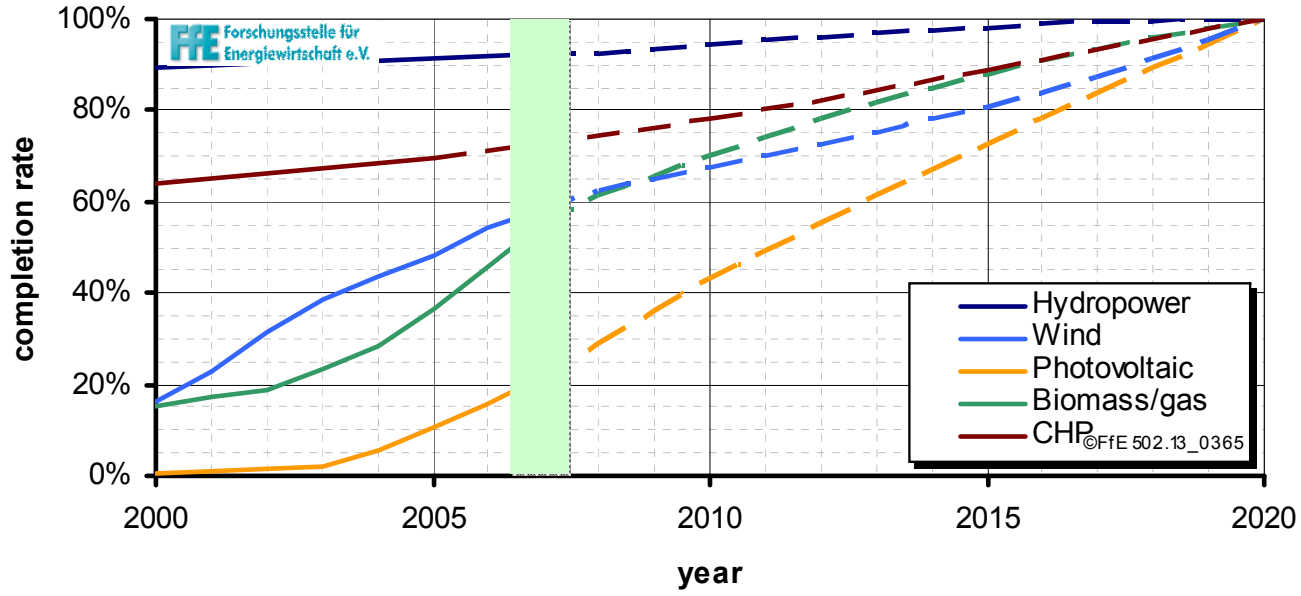
Agenda

- The IEKP and the expected Growth of Renewable Power Production
- Load Profiles and the resulting Residual Load
- The Accuracy of the Wind Power Forecast
- Balancing Wind Forecast Errors in 2020
- Conclusions

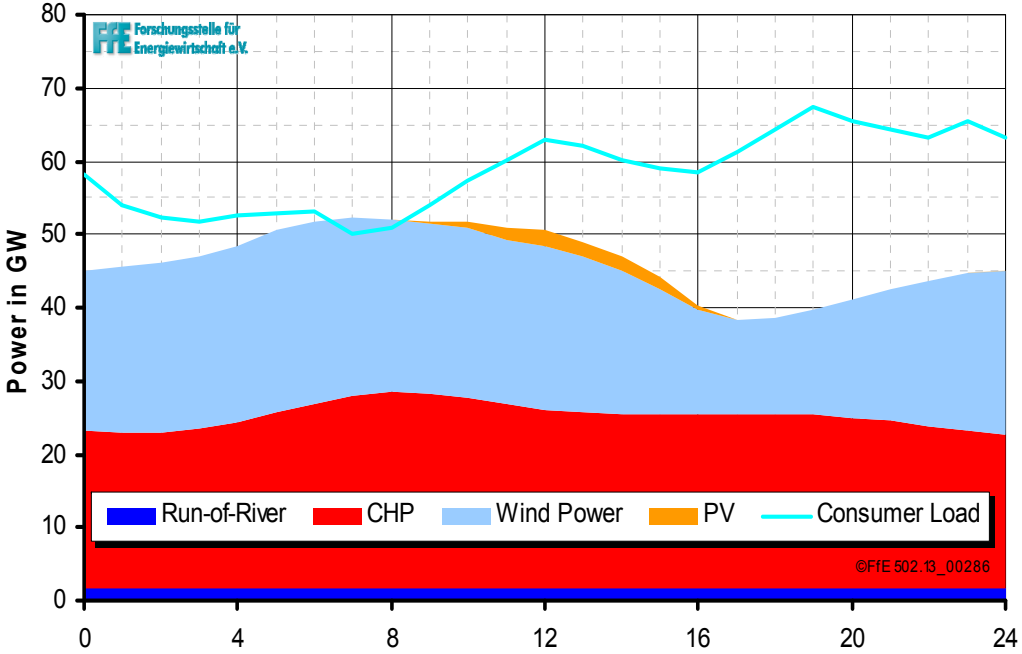
The IEKP and the expected growth of renewable power production

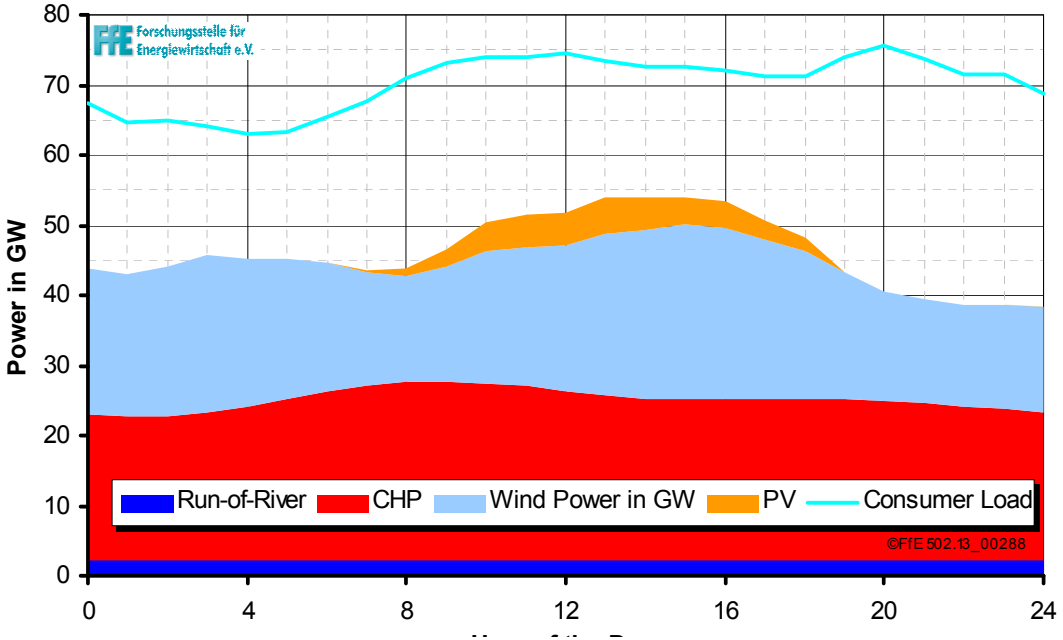
	Installed Power in GW		Generation in TWh	
	2007	2020	2007	2020
Net Power Consumption	-	-	514	498
Gross Power Consumption			614	584
CHP	20.9[1)]	30.1	71.6[1)]	118.5
Wind	22.2	38.1	39.7	87.2
Photovoltaics	3.8	17.9	3.1	15.5
Hydropower	4.7	5.1	20.7	24.3
Biomass/gas	3.2	7.1	21.8	46.2
Geothermal Energy	0.0	0.3	0.0	1.8
Sum Must-Run	51.6[2)]	91.5[2)]	135.1[2)]	247.3[2)]

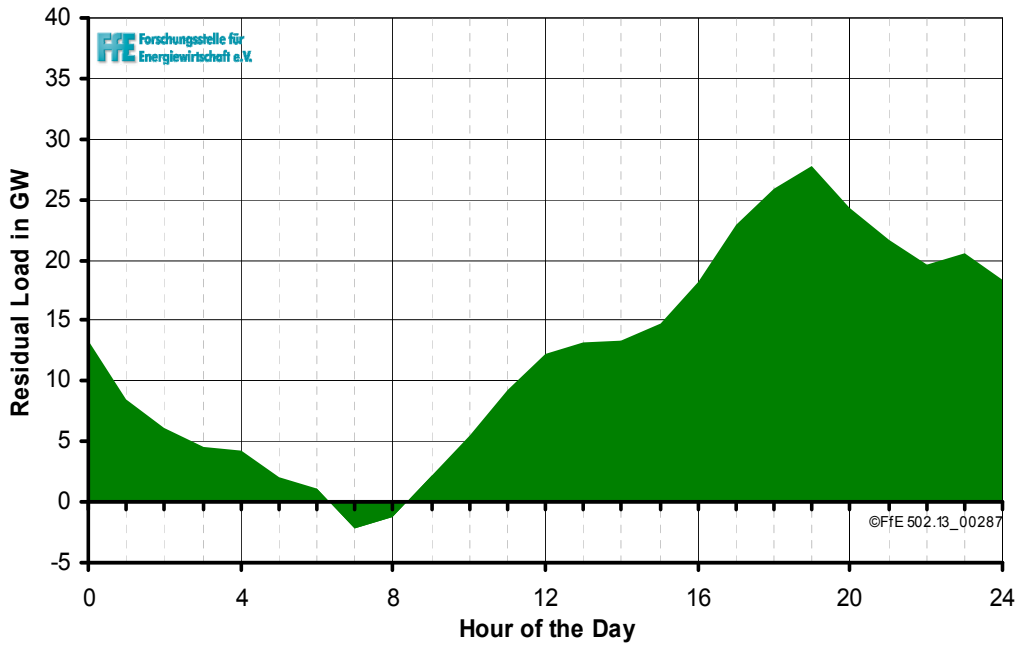
1) 2005 2) without biomass/gas, which is already balanced in CHP ©FfE 502.13_392

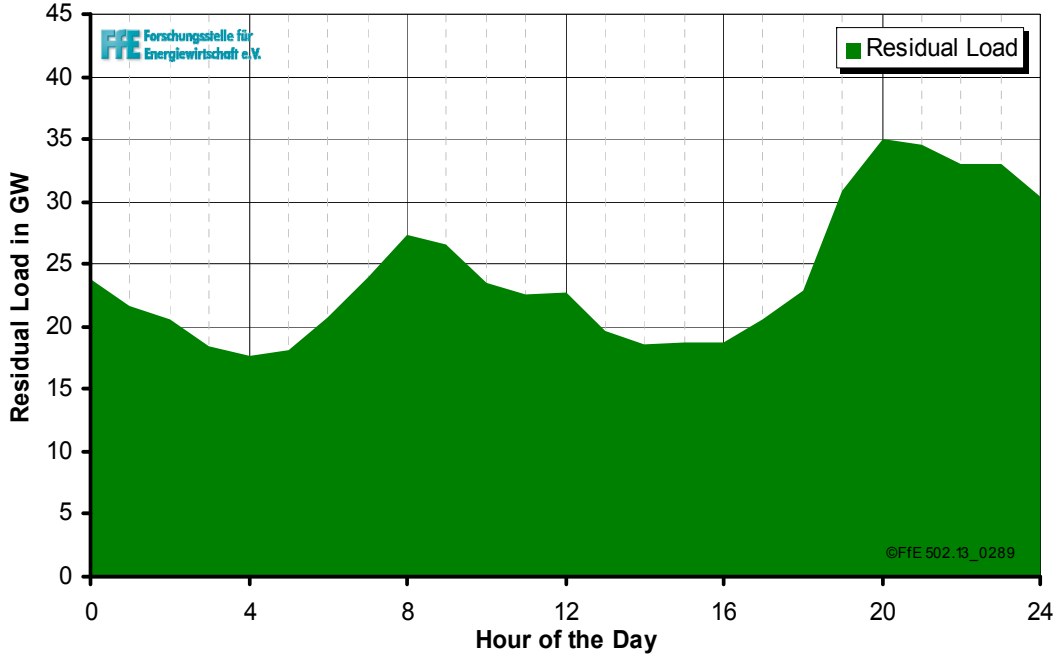


Load profiles and the resulting residual load



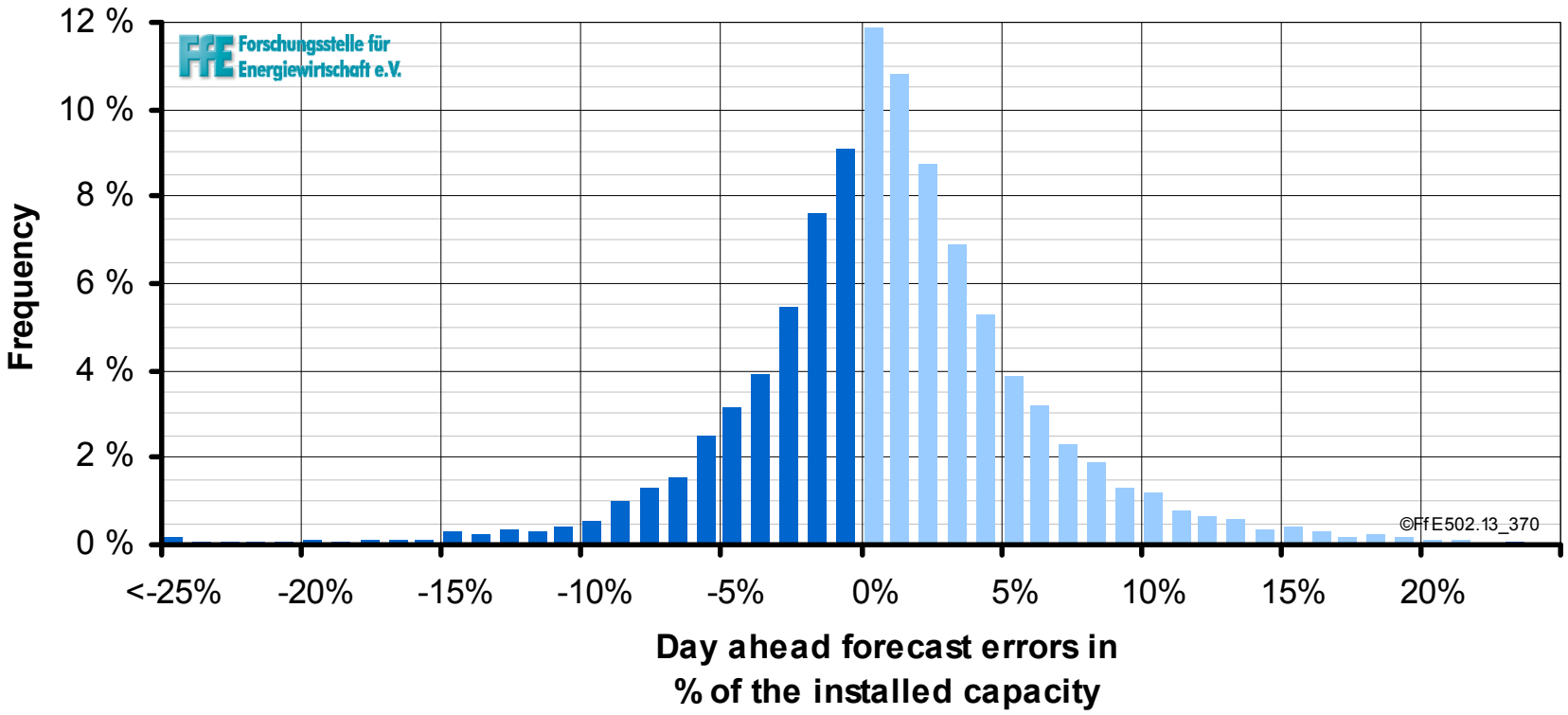




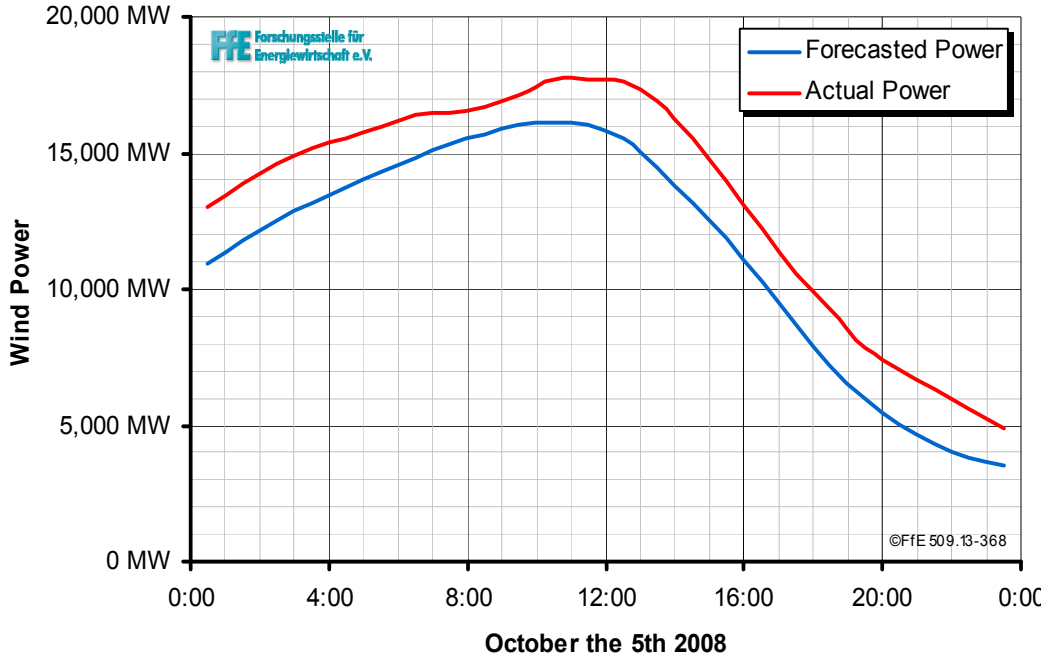


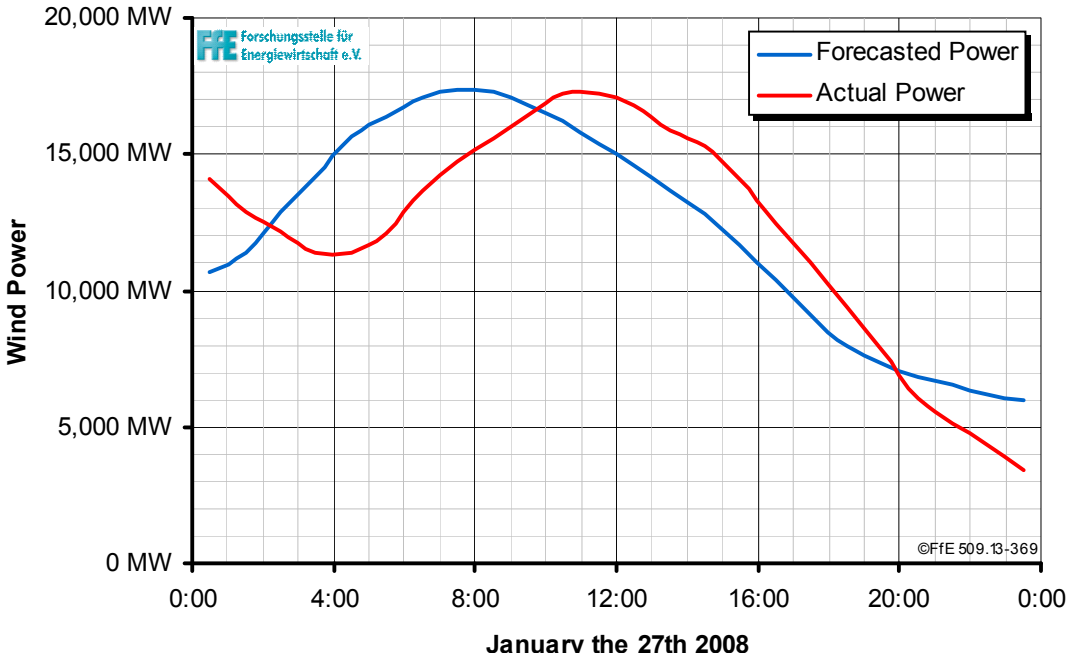
The accuracy of the wind power forecast: distribution of the forecast errors

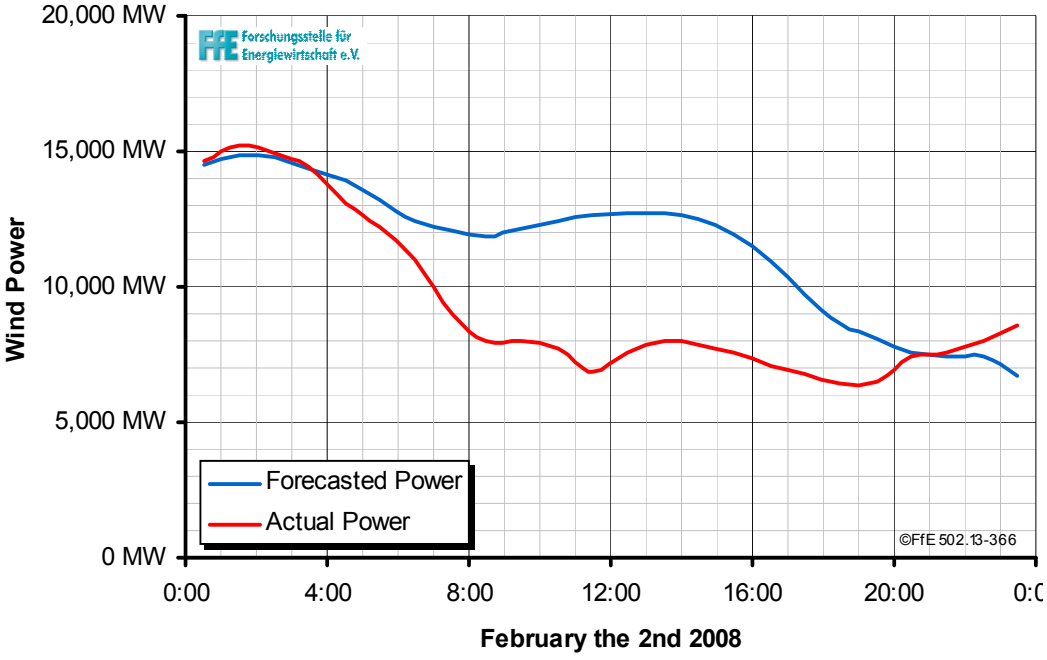
$$\text{Power}_{\text{Forecast Error}} = \text{Power}_{\text{Forecast}} - \text{Power}_{\text{Actual Value}}$$

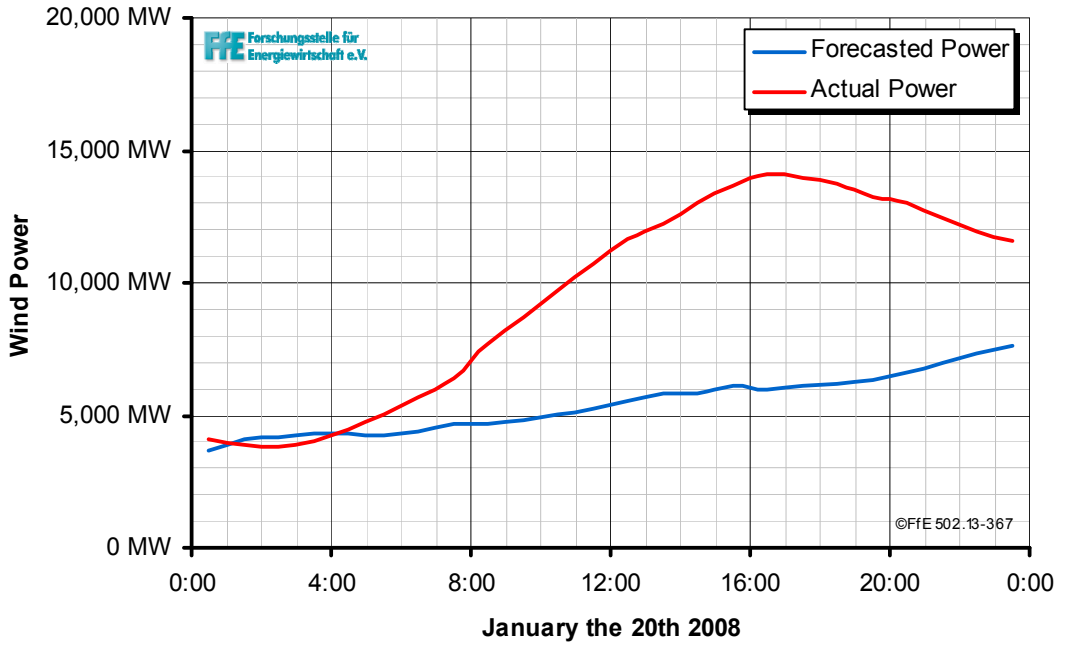


The accuracy of the wind power forecast: selection of interesting days in 2008

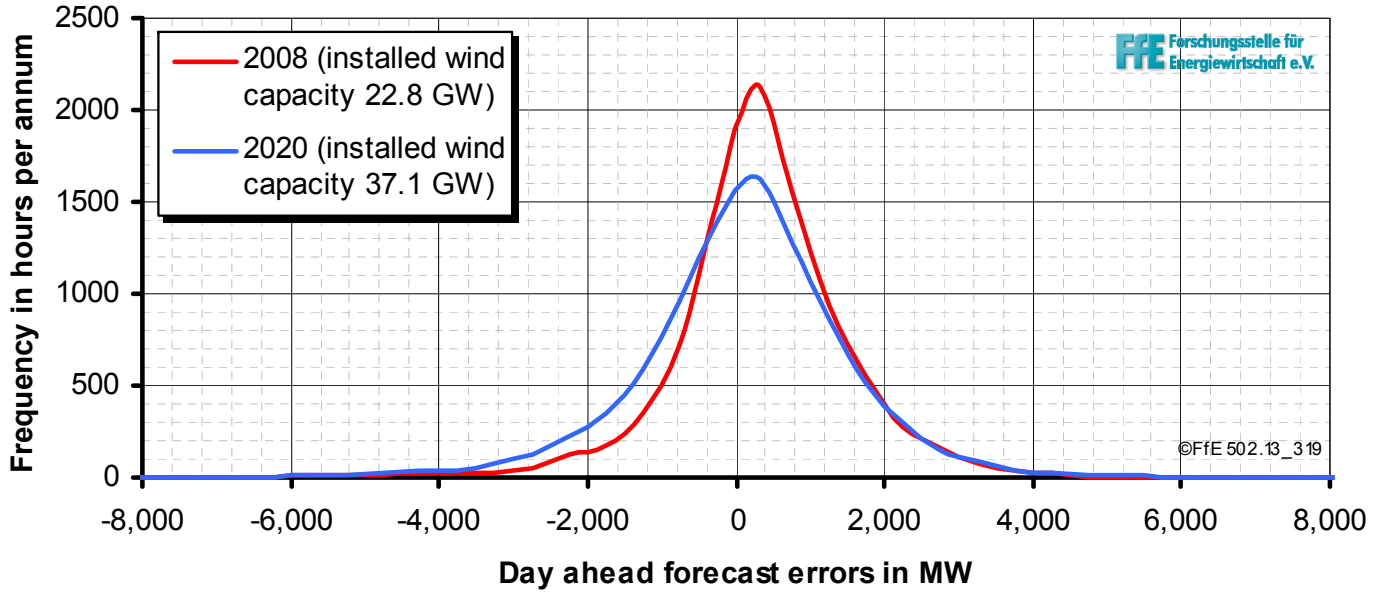


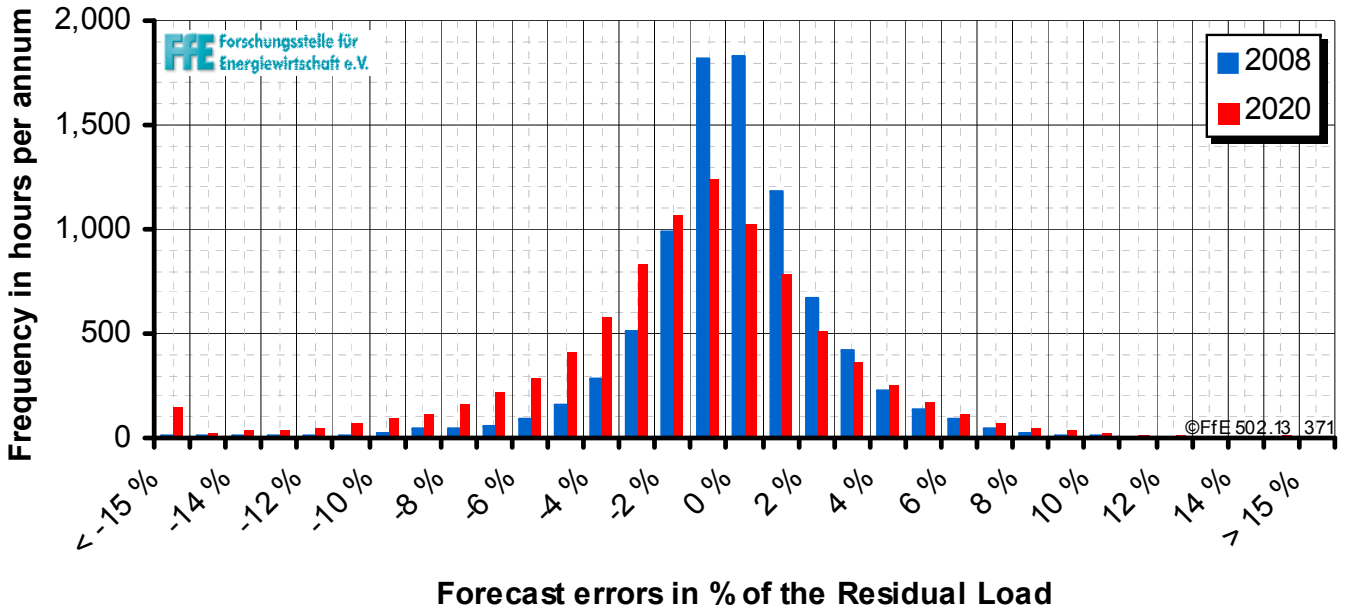




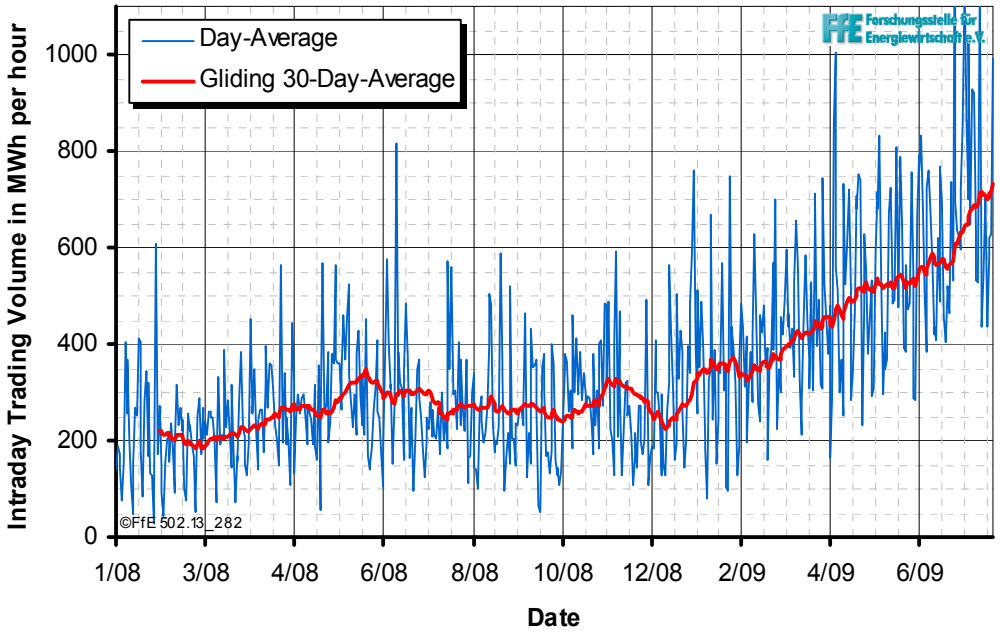


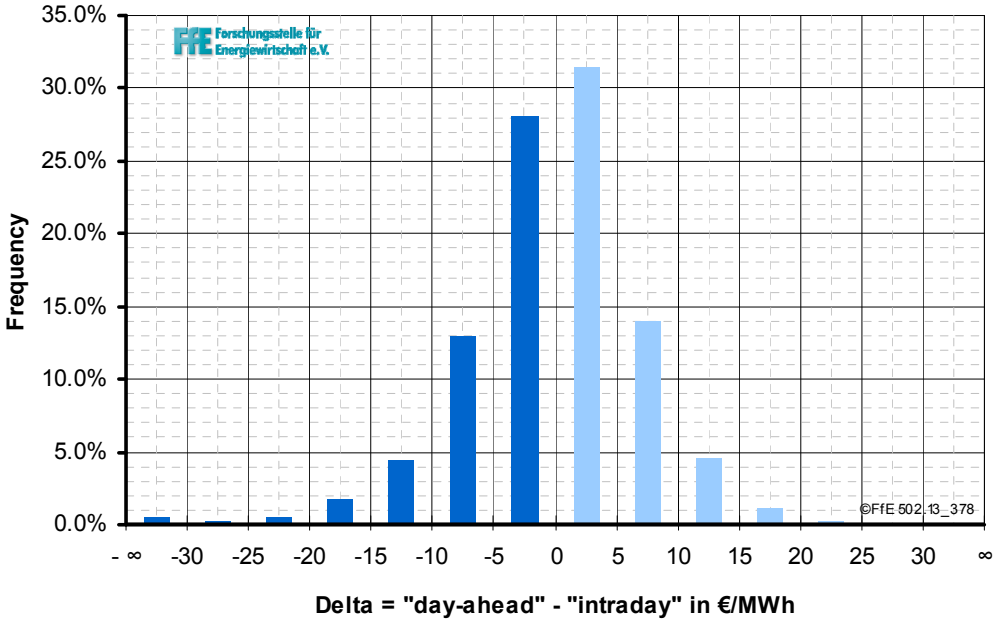
Balancing wind forecast errors in 2020: Demand of conventional power to fulfil the forecast errors

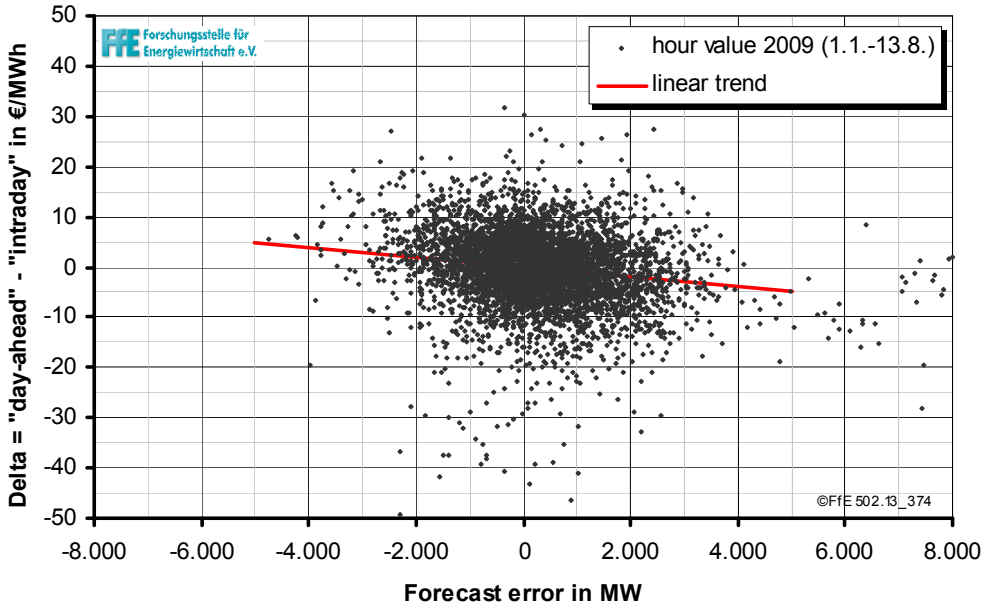


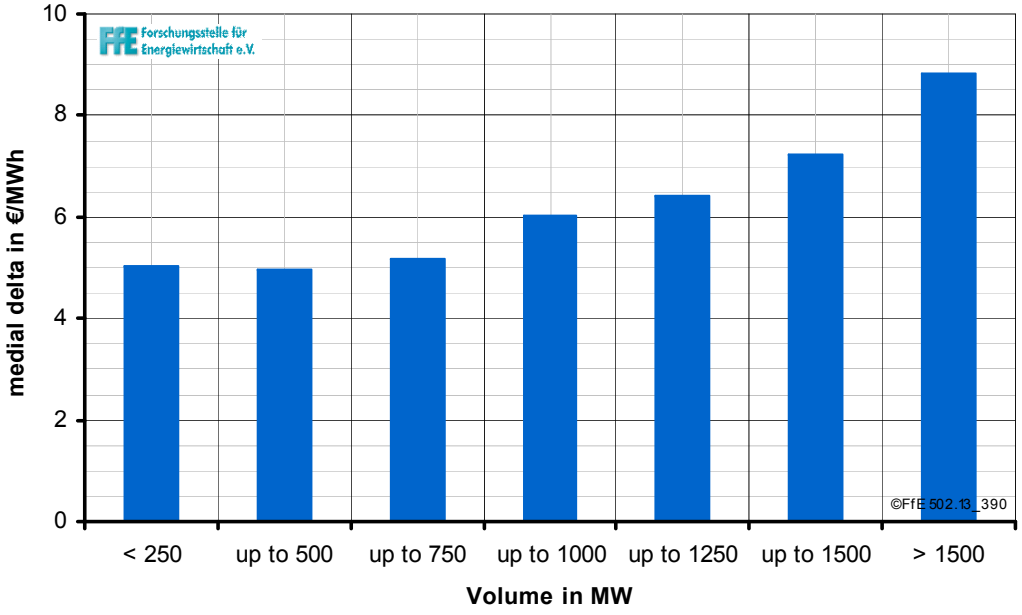


Balancing wind forecast errors in 2020:
New market rule: clearing the forecast errors in the intraday-market









Summary and Conclusion

- To assess the interaction of renewable energy sources and the conventional power plants it is essential to consider the load curves.
- The analysis of the scenario "doubling the renewable power production until 2020" shows high requirements for the operation of the conventional power plants due to sporadic negative residual load and high gradients of the residual load.
- While the installed wind capacity increases significantly up to 2020, the average power for balancing forecast errors will raise moderately.
- The effects on the conventional power plants are extensive because the extreme forecast errors will be more frequent and less conventional capacity will be available for balancing the forecast errors.
- A future approach of balancing forecast errors in the intraday-market has to face the challenge that the traded volume is negligible in comparison to the day-ahead market and the needed balancing power.

Discussion…

Thank you for your attention!

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