



**MODELLING THE IMPACTS OF
HIGHER DEPLOYMENT OF WIND
CAPACITIES IN BULGARIA**

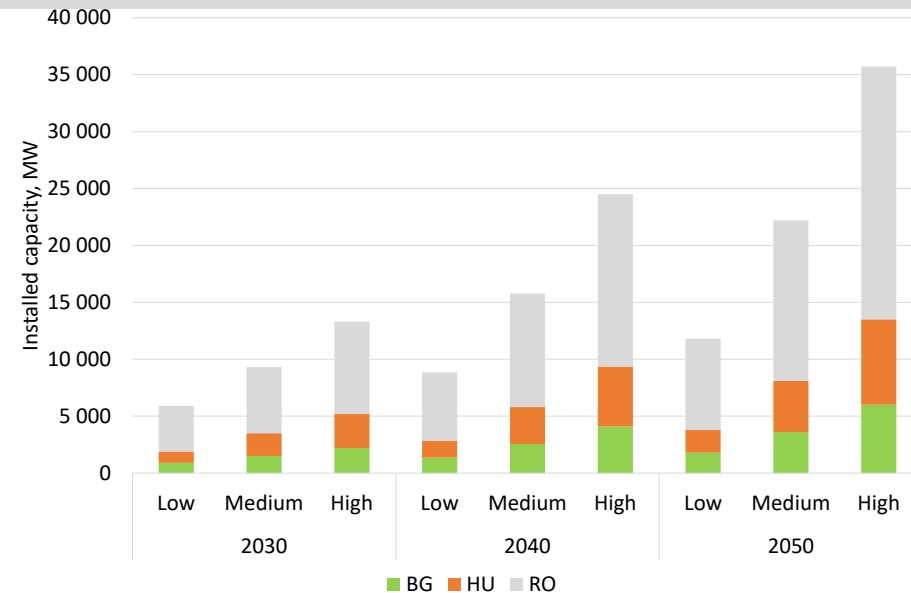
**Unlocking the Potential of
Onshore Wind Energy
in Bulgaria**

26 September 2023

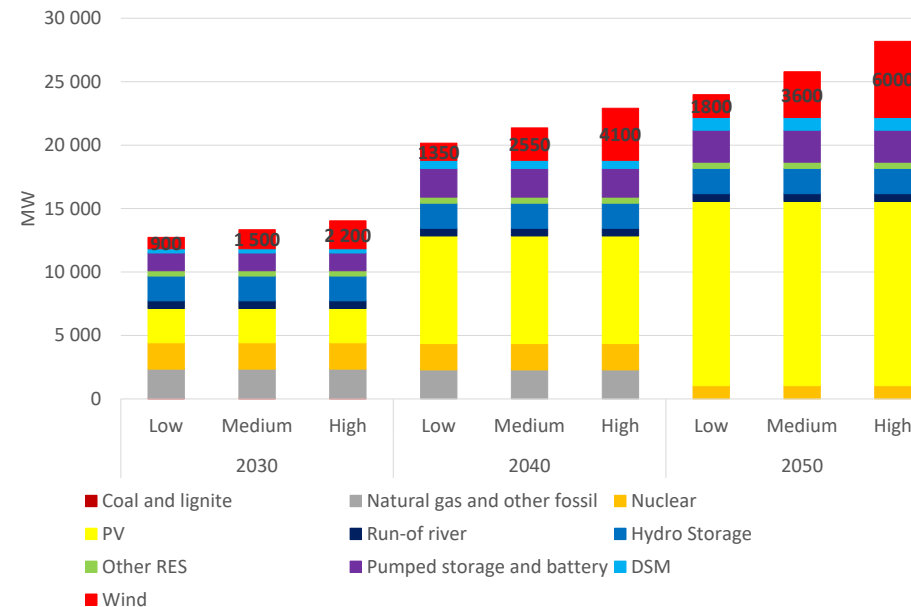
Scenario set-up

- Three countries are assessed:
 - Bulgaria, Hungary and Romania
- Three scenarios are modelled
 - low wind penetration parallel in all three countries
 - moderate wind penetration parallel in all three countries
 - high wind penetration parallel in all three countries
- All the other factors are the same in all scenarios
- Year 2030, 2040 and 2050 are modelled

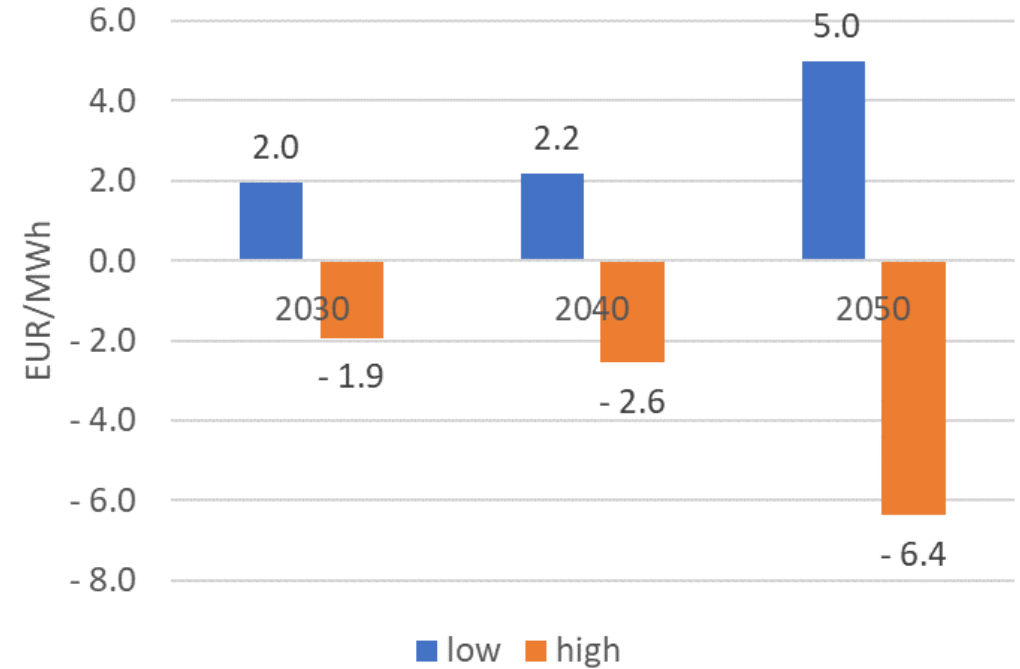
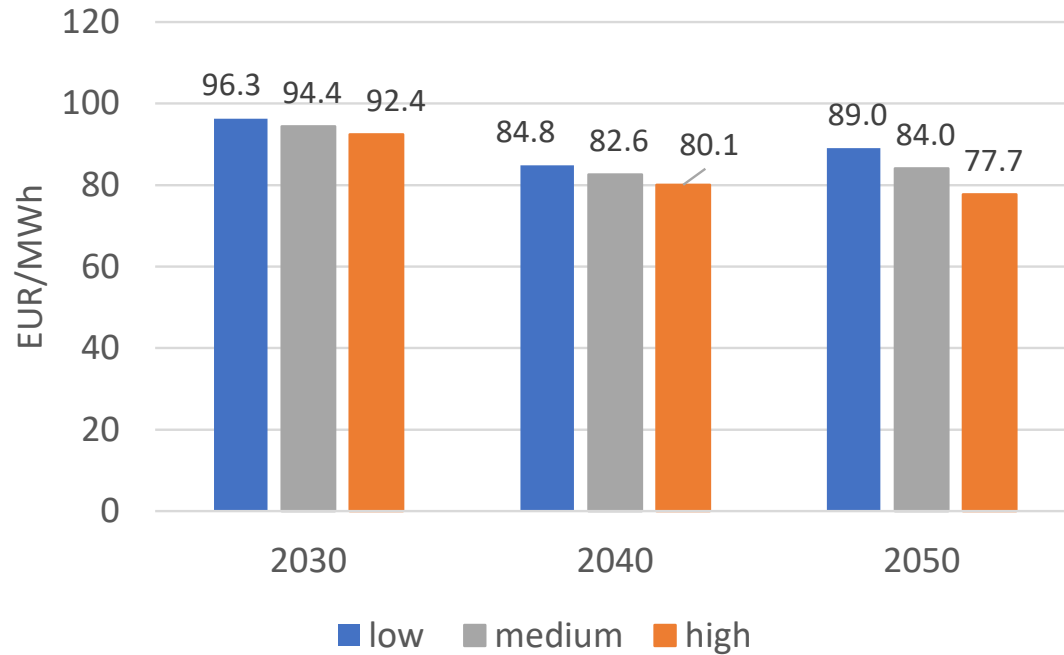
Wind installed capacity in the three scenarios



Capacity mix in BG



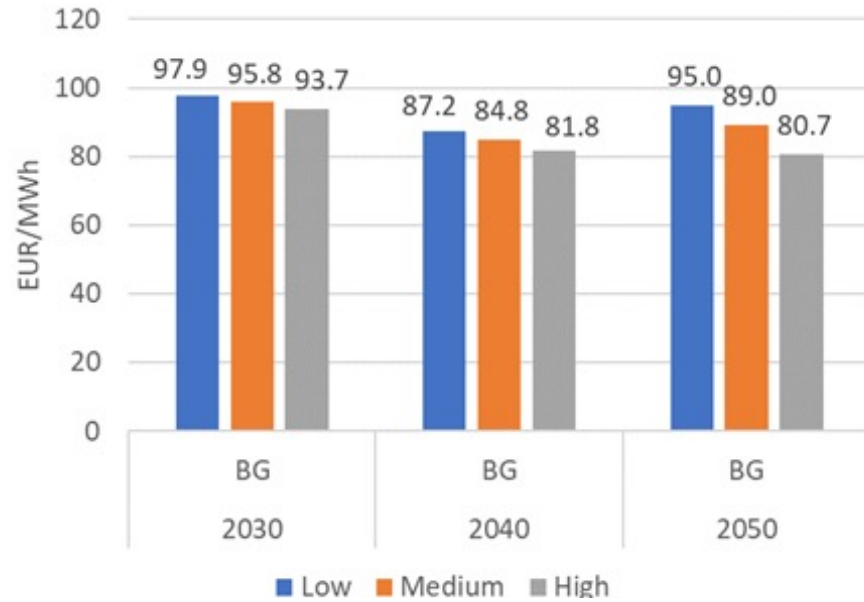
Baseload electricity price



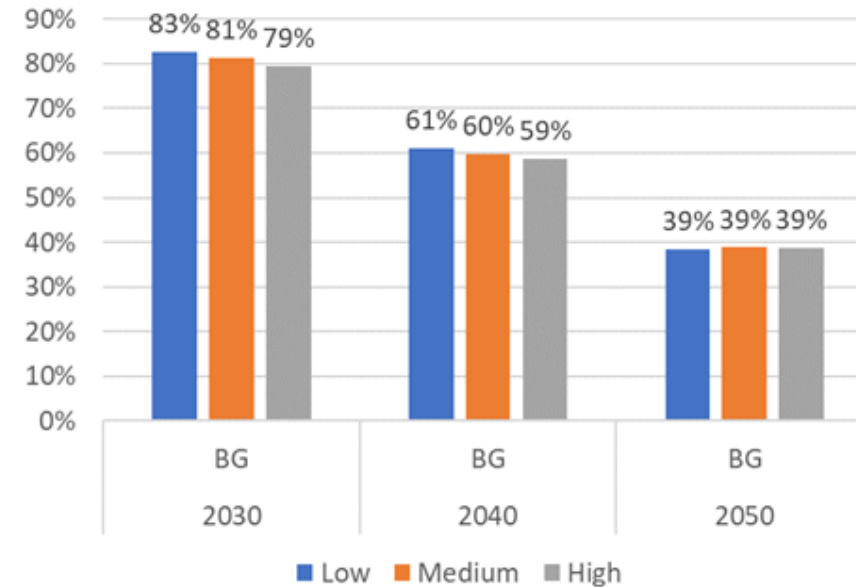
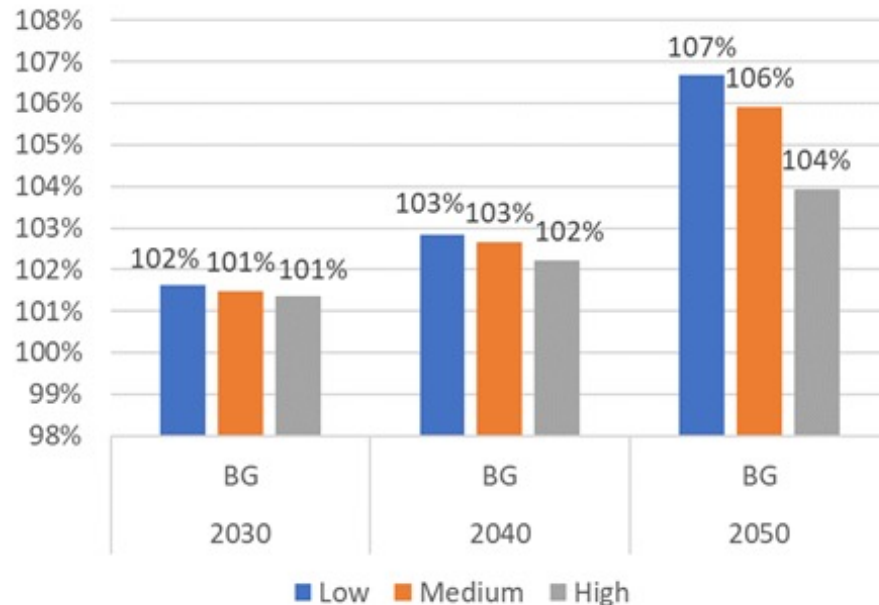
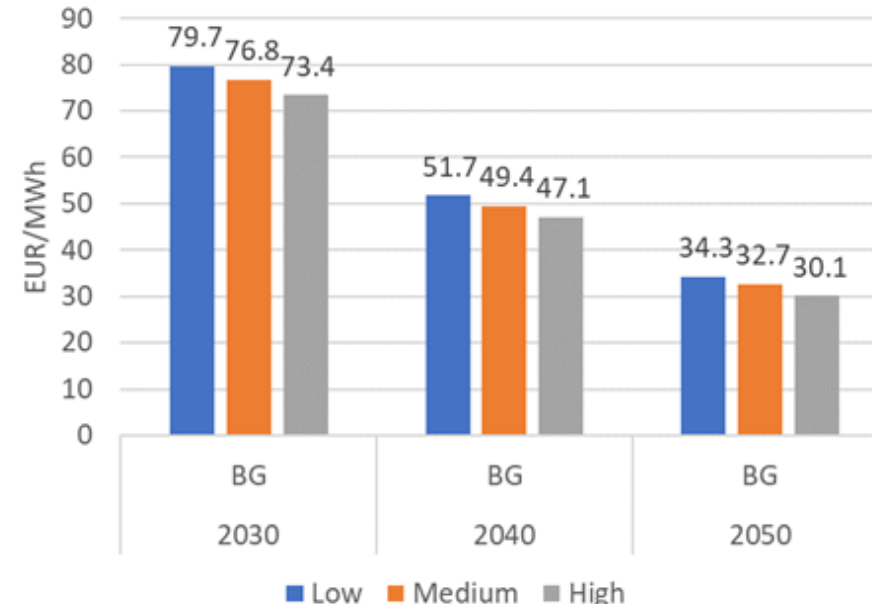
- The larger deployment of wind capacities leads to lower baseload prices on average in Bulgaria in all modelled years
- The price effect is moderate in 2030, 3.9 EUR/MWh between the low and high scenario but increases significantly over the years, reaching 11.4 EUR/MWh in 2050
- Prices follow a generally decreasing trend over time in high scenario but in the medium and low cases price increase is observable in 2050 relative to 2040.

Wind deployment effect on wind and PV market value

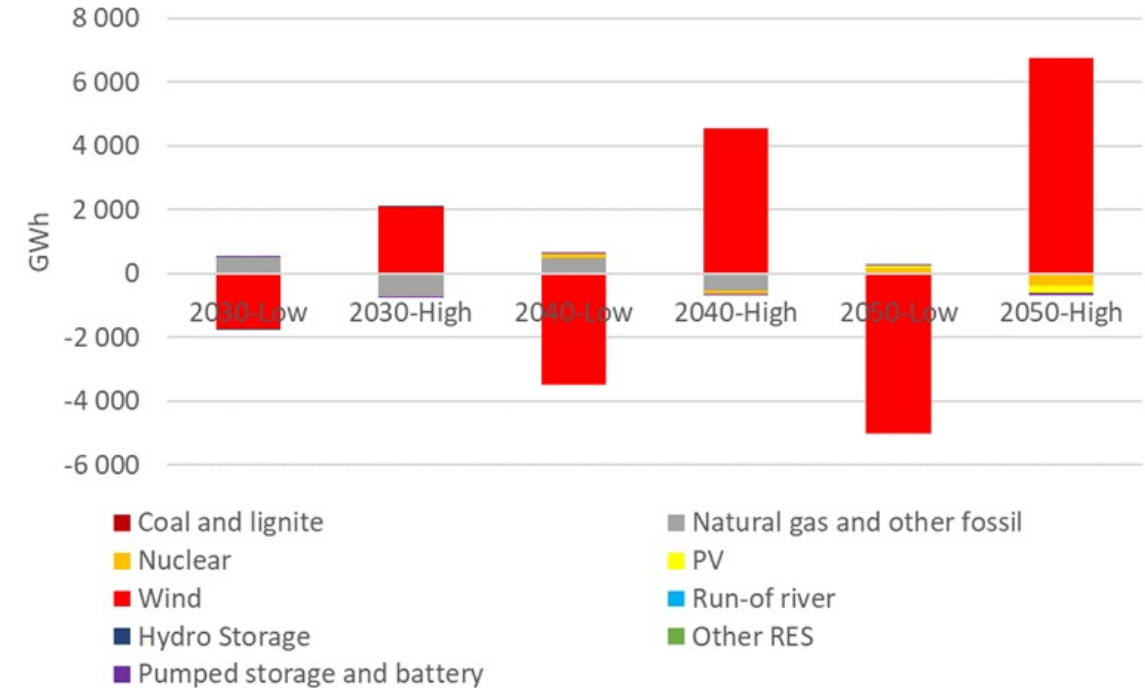
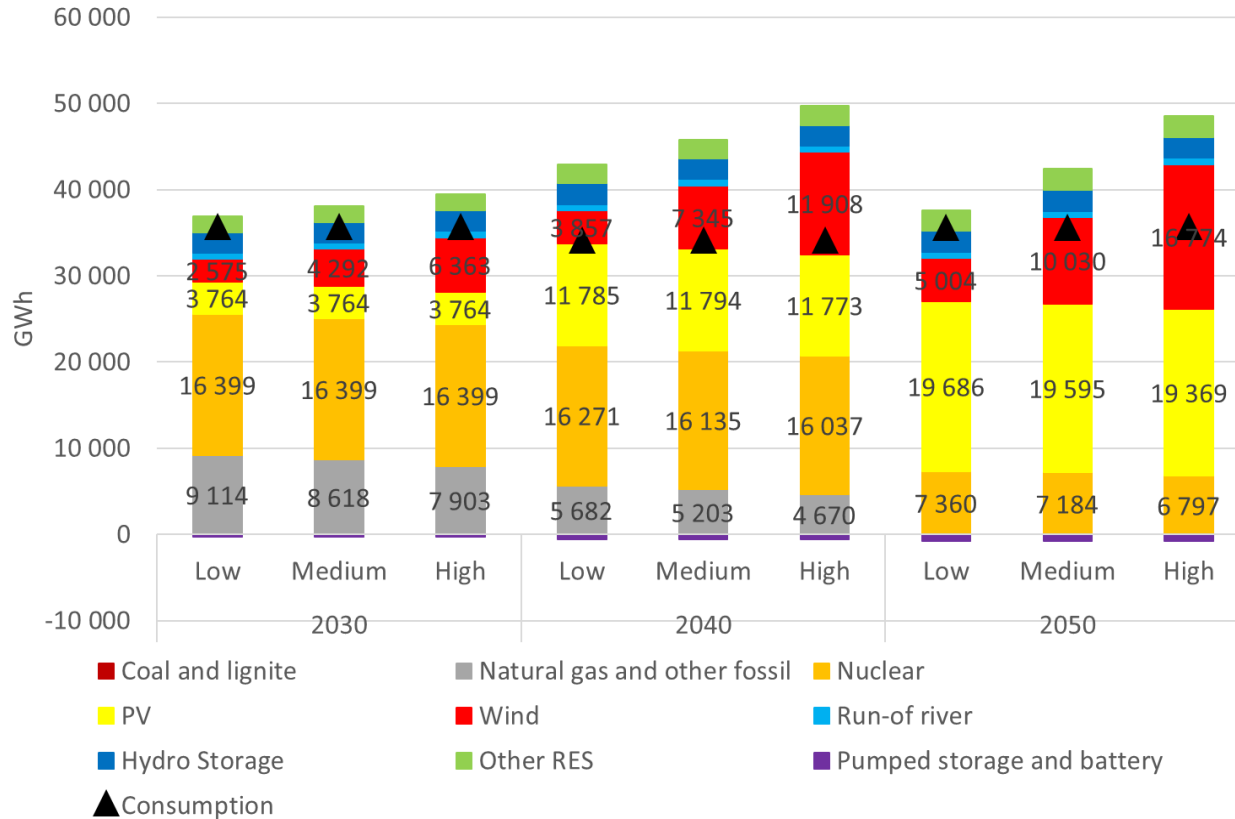
Wind market value



PV market value

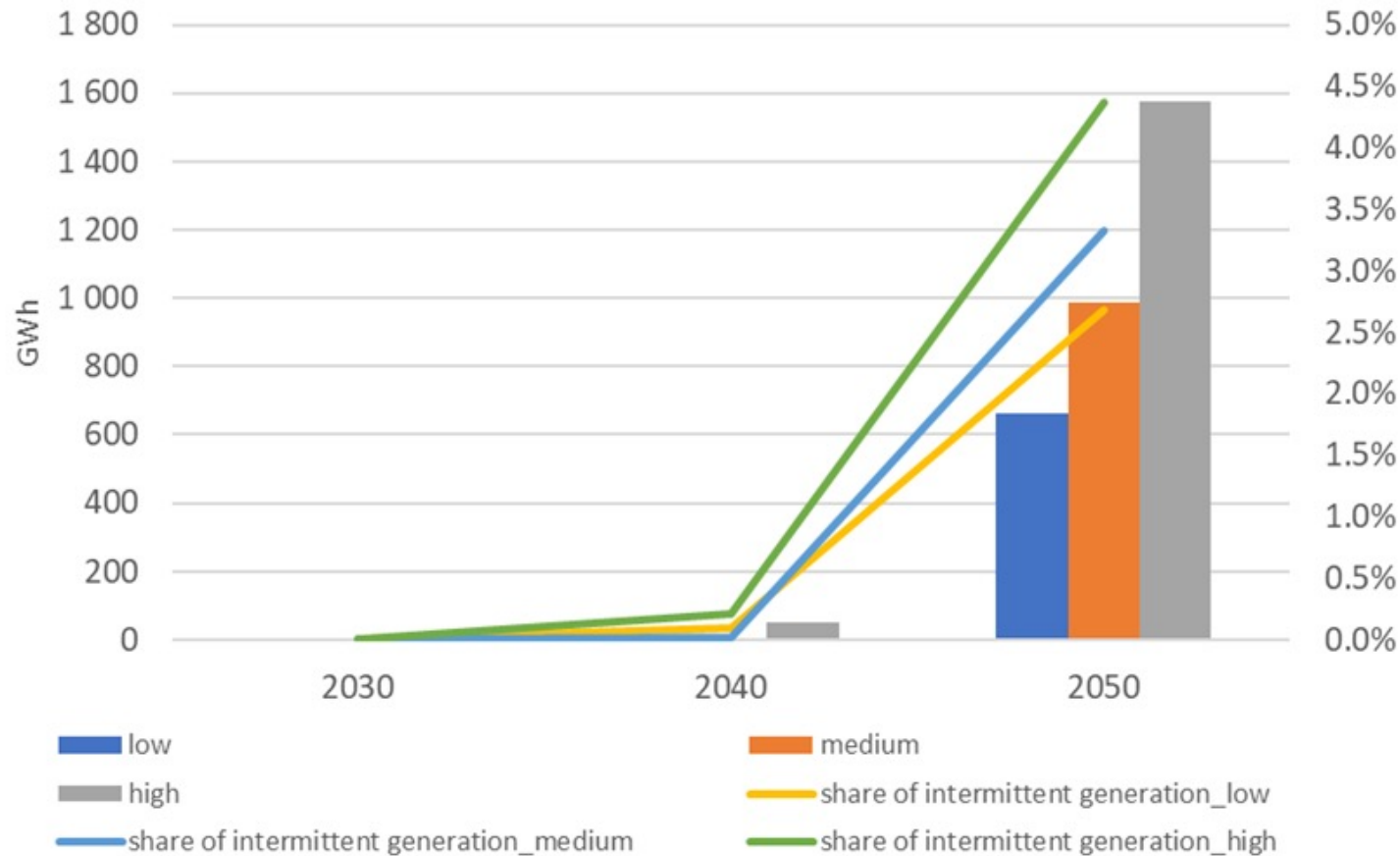


Electricity mix



- Larger wind deployment in the region mainly influences the net export ratio of Bulgaria, in high the country exports a significantly larger amount of electricity than in low.
- Wind deployment has a smaller impact on Bulgarian generation in 2030 and 2040 mostly natural gas-based production decreases if more wind is present, while in 2050 nuclear and PV-based production is slightly lower.

RES curtailment



- RES curtailment is not relevant in 2030 and 2040 with very low curtailment values
- Depending on wind deployment RES curtailment in Bulgaria can vary a lot in 2050
- In the low scenario it only accounts for 2.5% of the total PV and wind generation however in high it reaches almost 4.5%