

// Using CM-SAF's SIS and SID data in the SolStEis solar power generation model

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Systems Analysis (SYS)



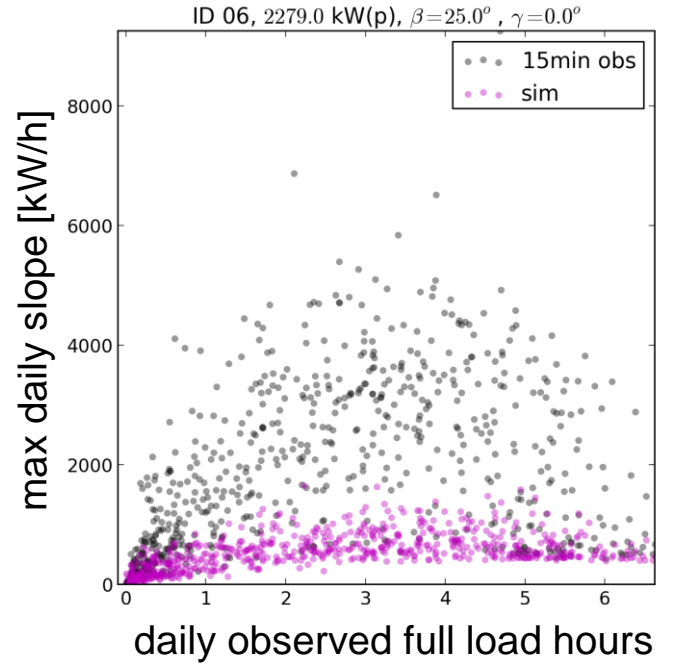
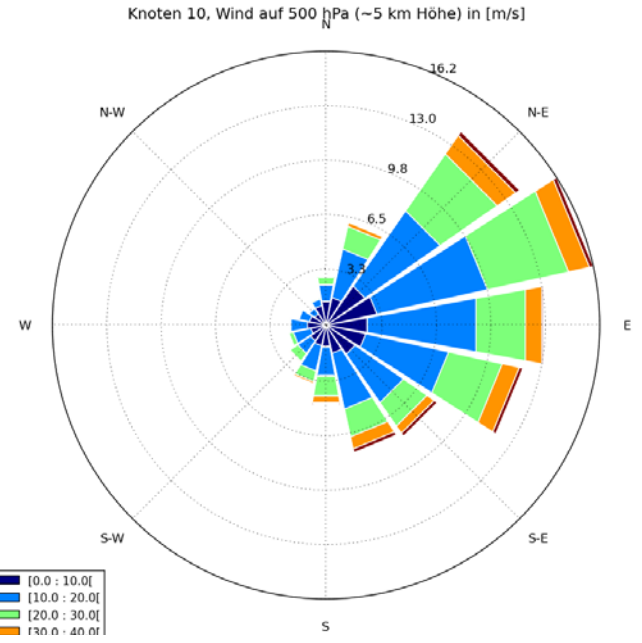
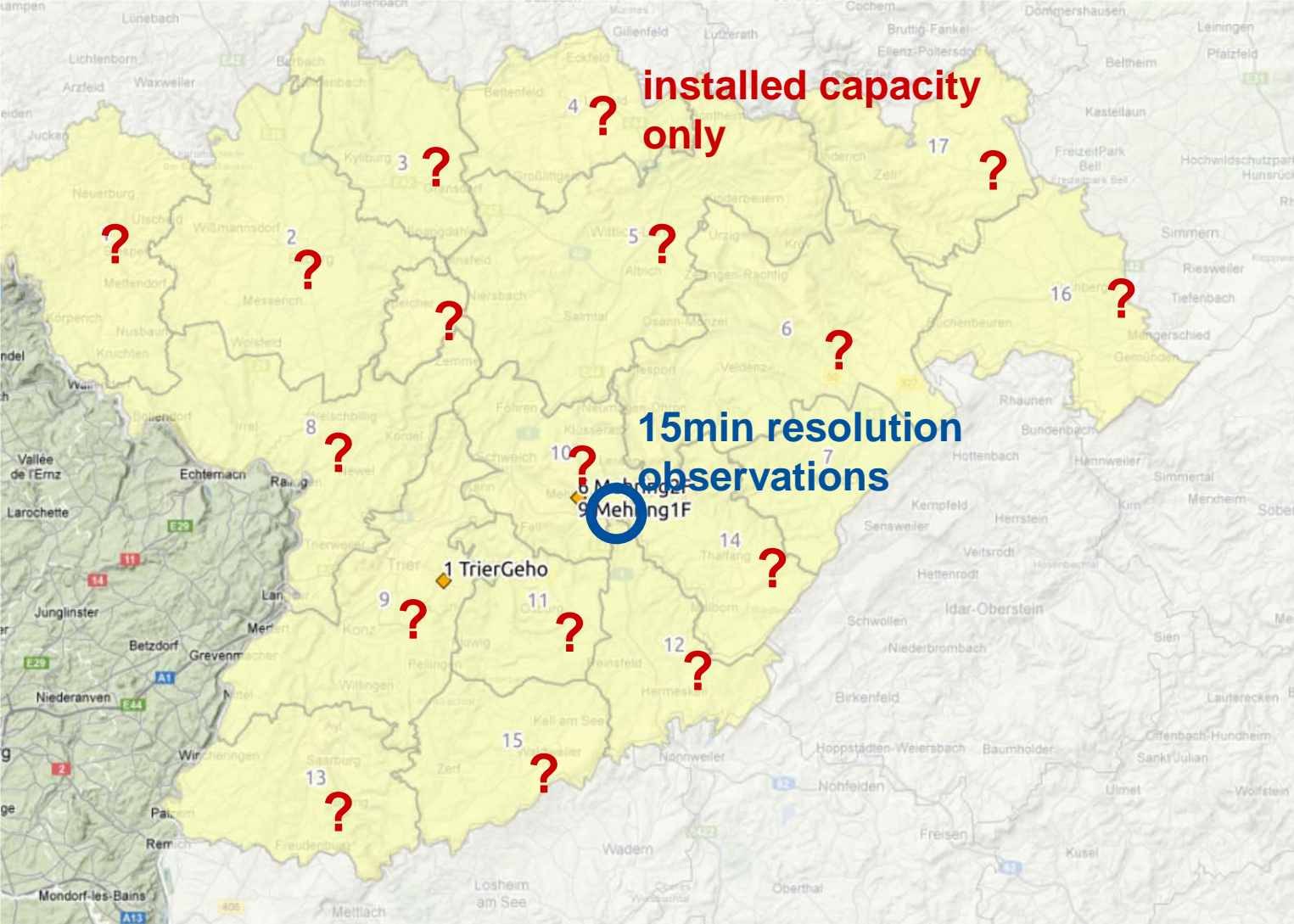
// The SolStEis Model



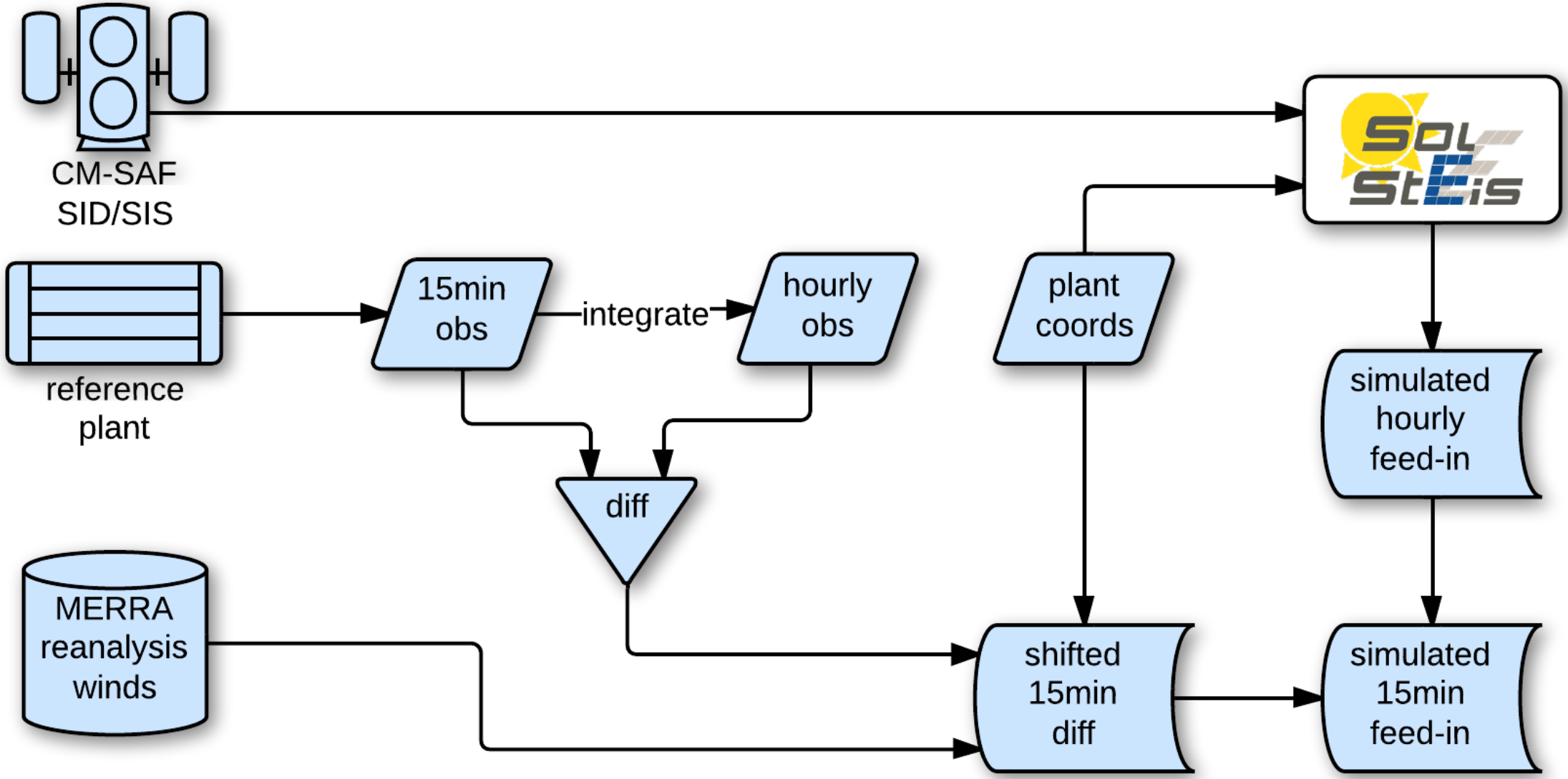
- „SOLarSTrom EinspeisungsSimulator“
- Straightforward PV simulation model following Huld et al. [2010]
- Additional assumptions from Drews et al. [2007], Macedo and Zilles [2007], Schubert [2012]
- Optional statistical pre- and postprocessing

// PV Simulation for an Autonomous Region

Goal: Provide 15min PV data for all sub-regions

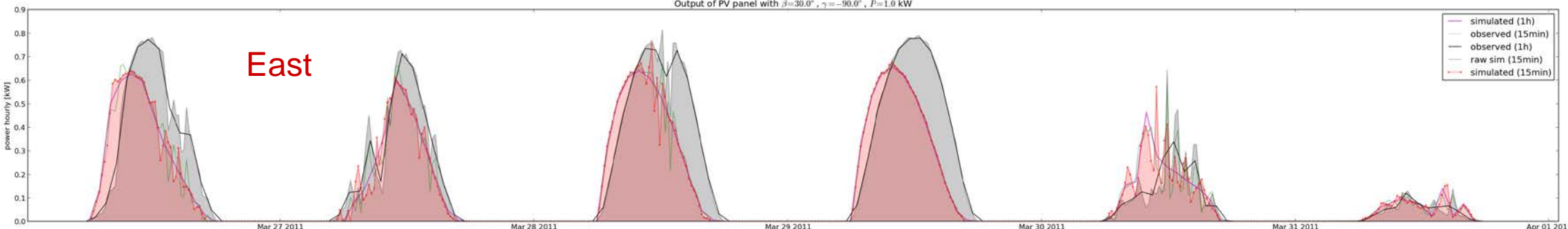
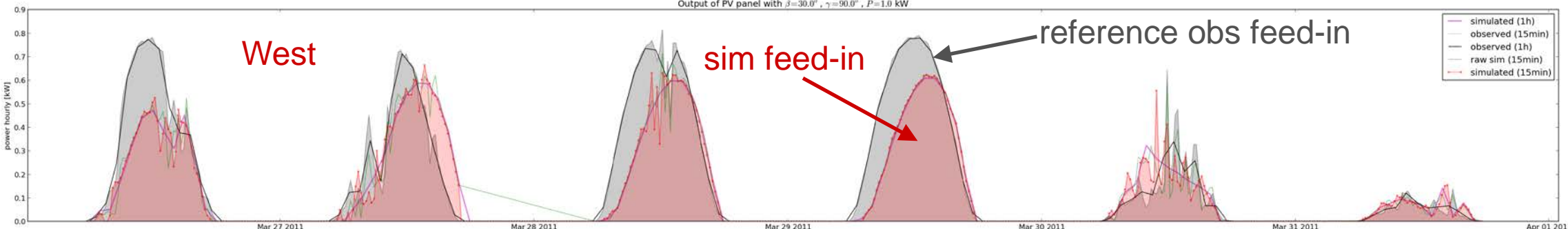
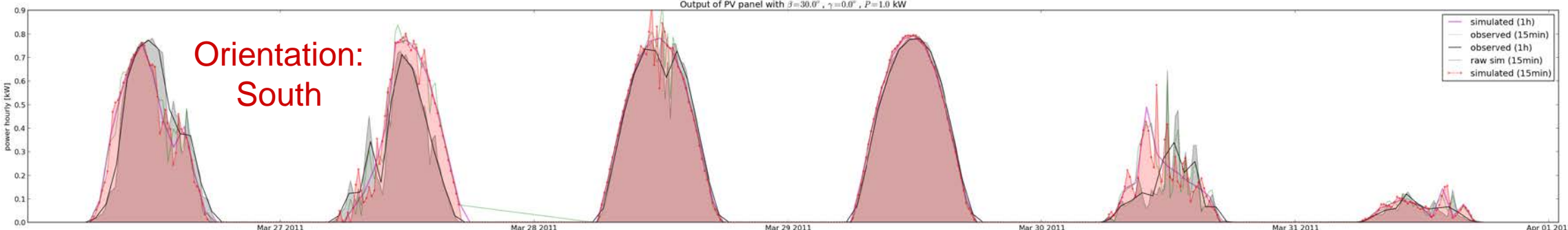


// Processing Scheme

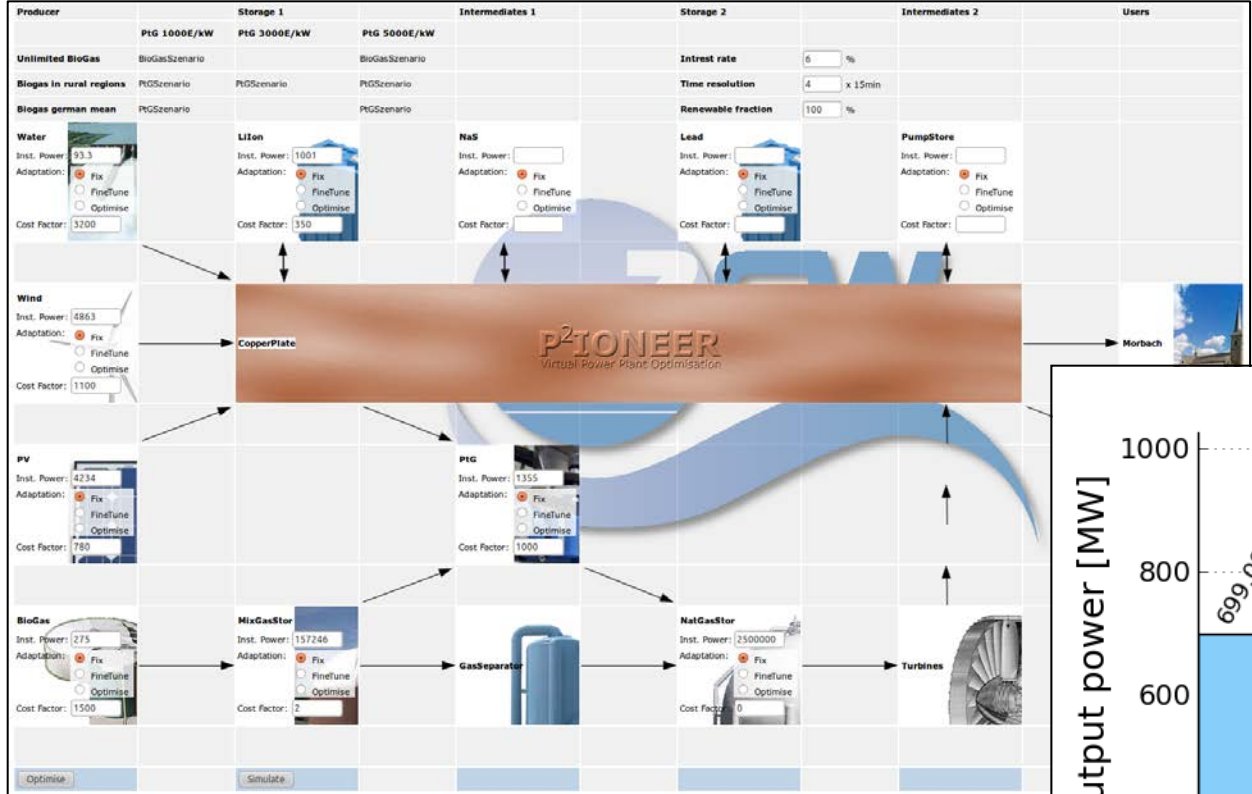


// Result: Simulated Observations

East, West and South facing panels simulated separately

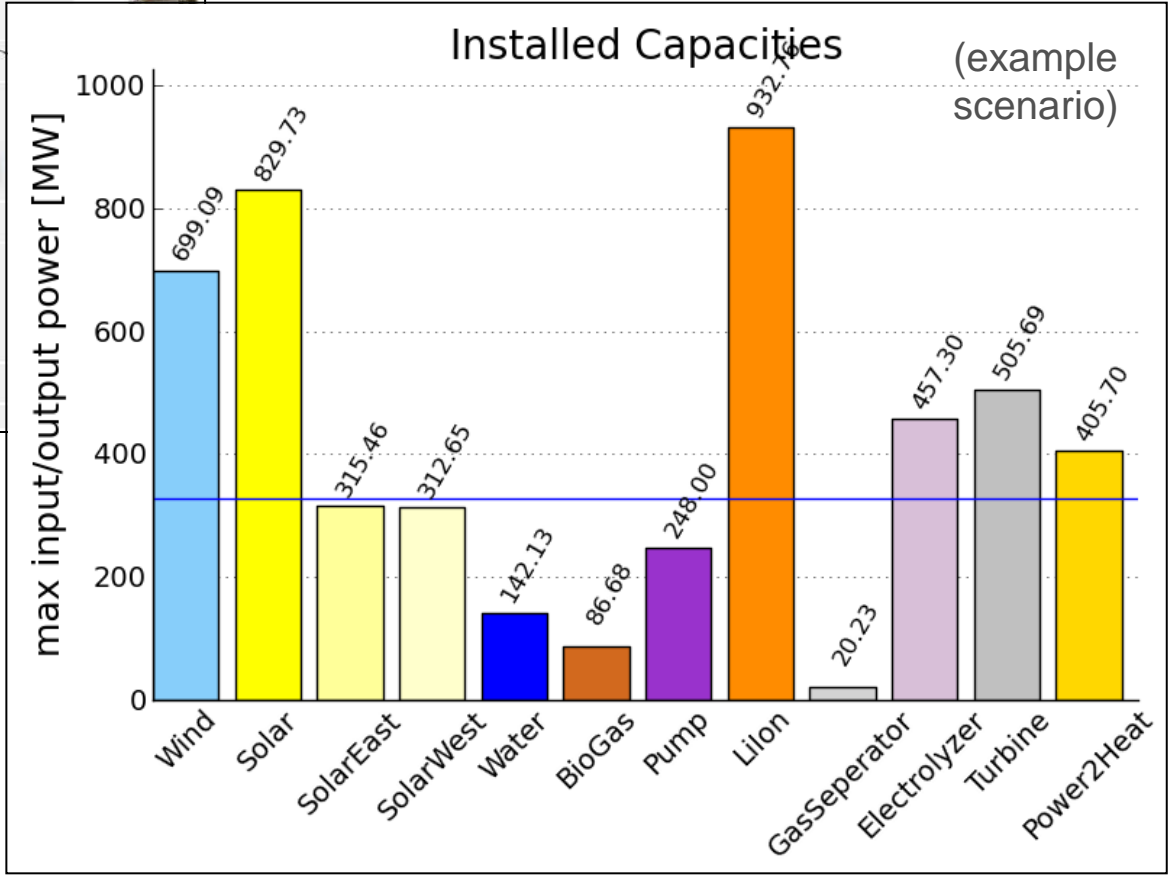


// The P²IONEER Model

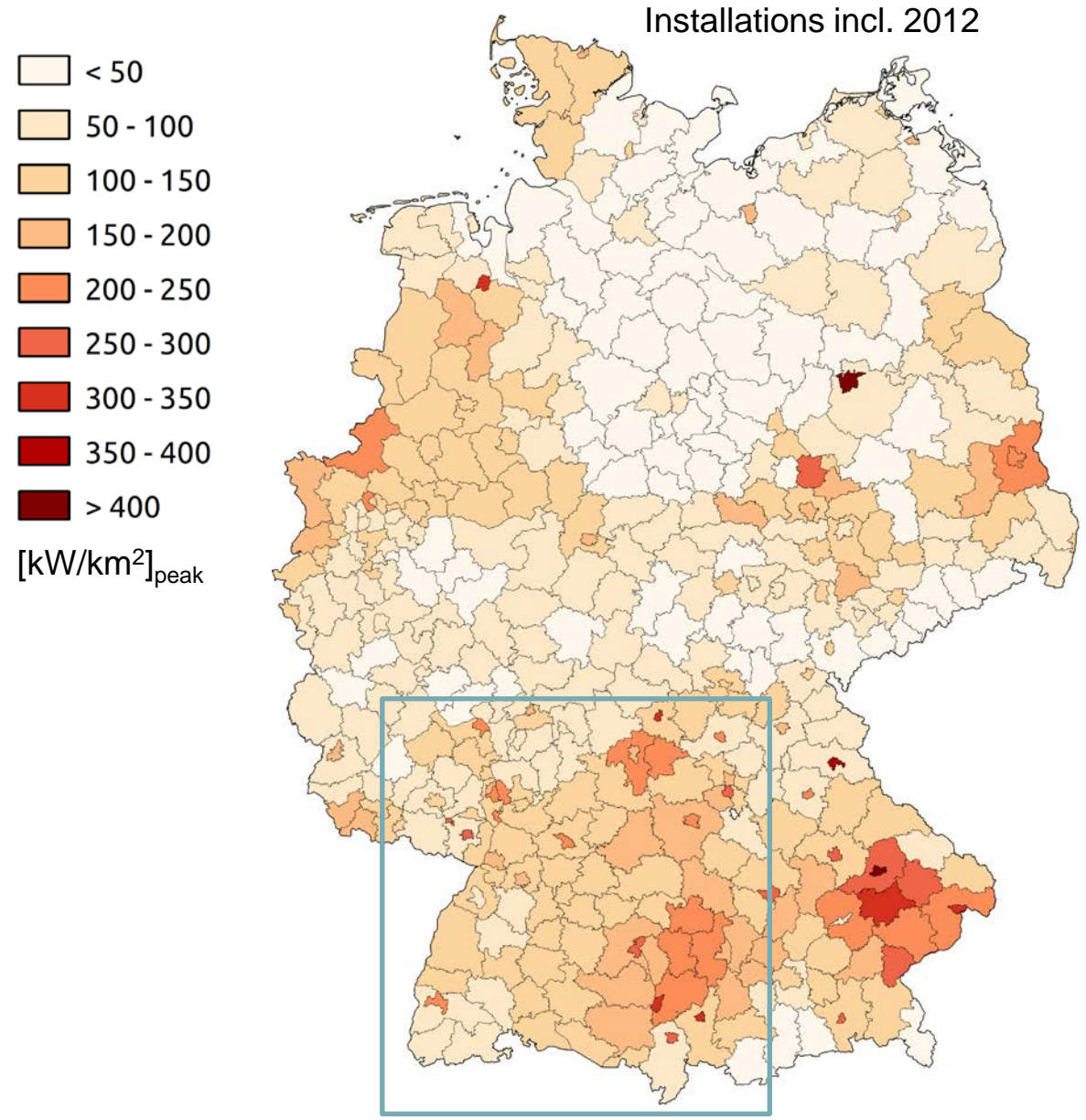


P²IONEER
Virtual Power Plant Optimisation

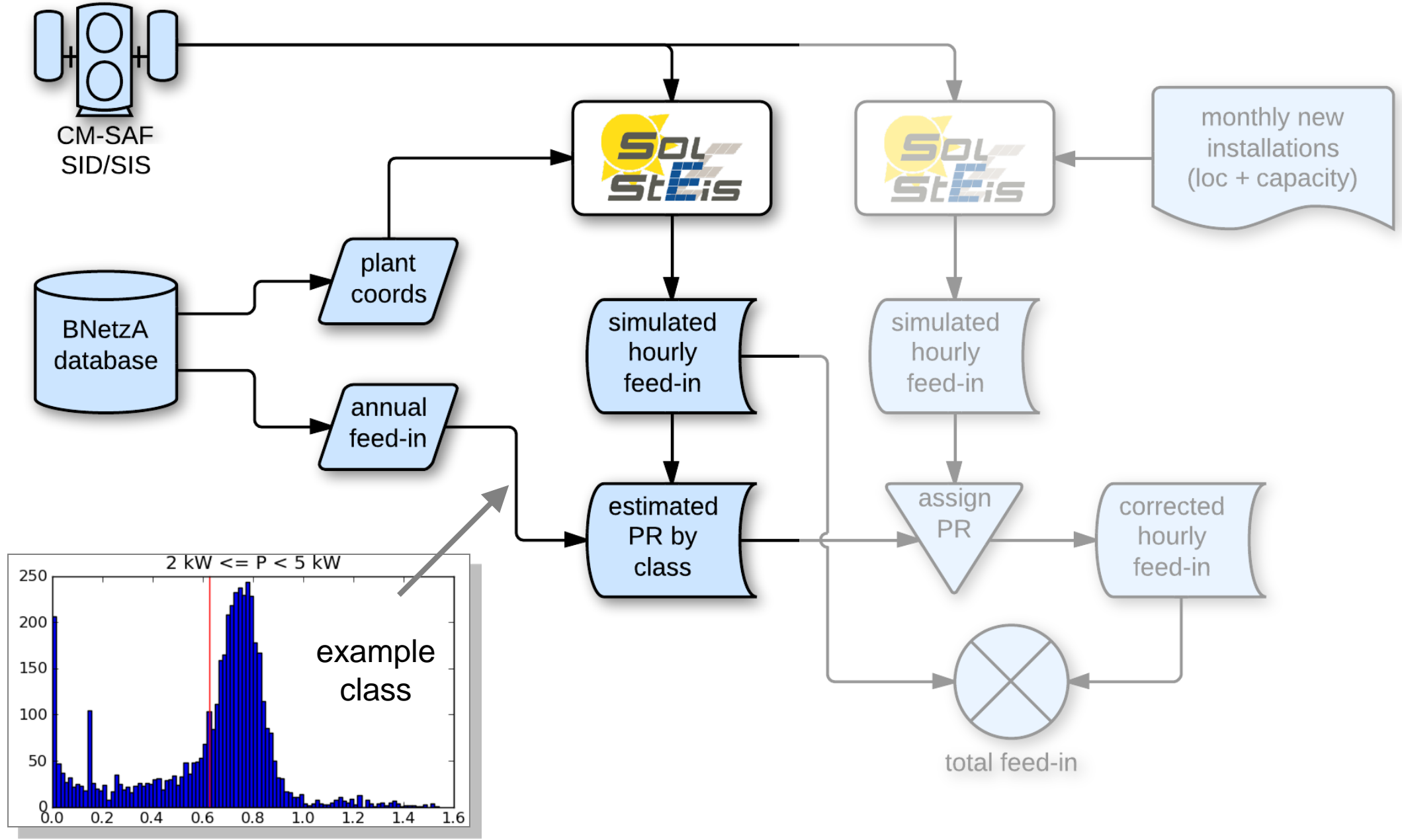
Optimise using
Machine Learning



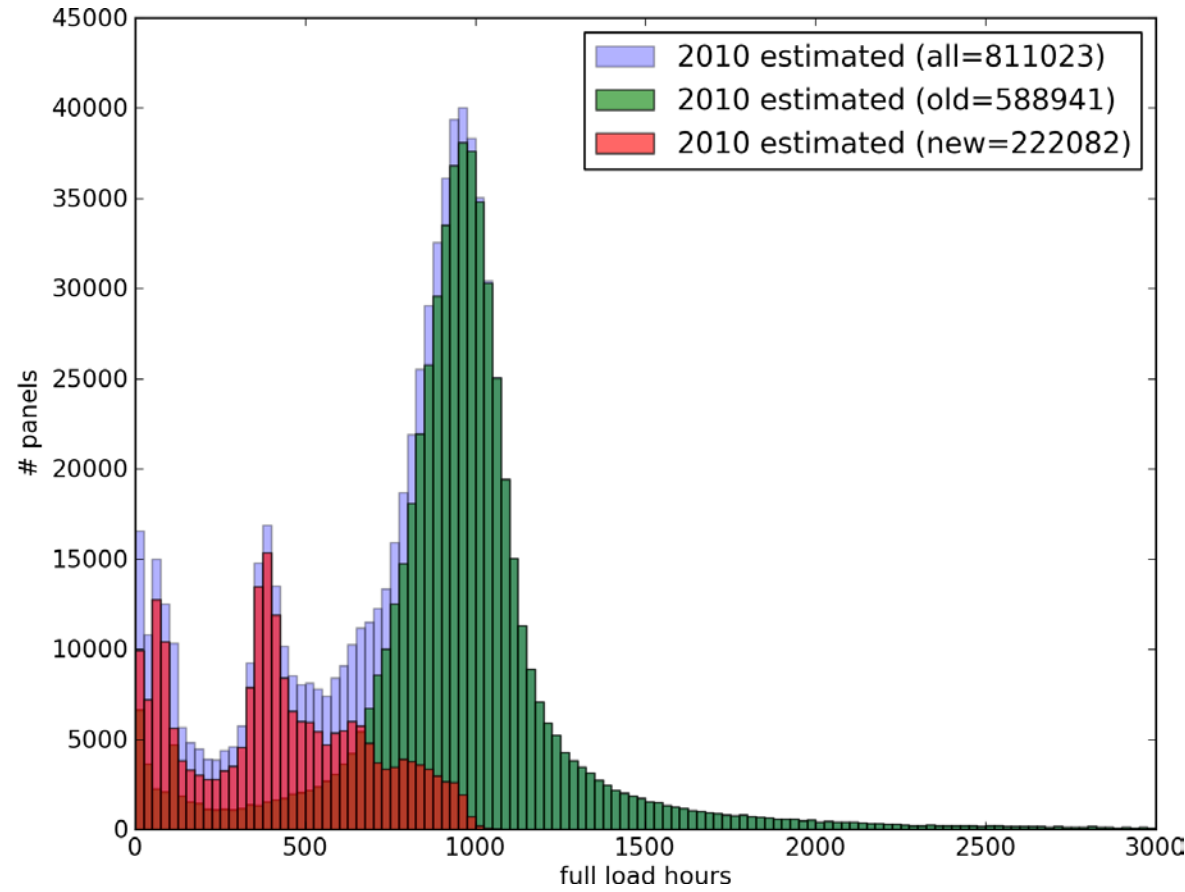
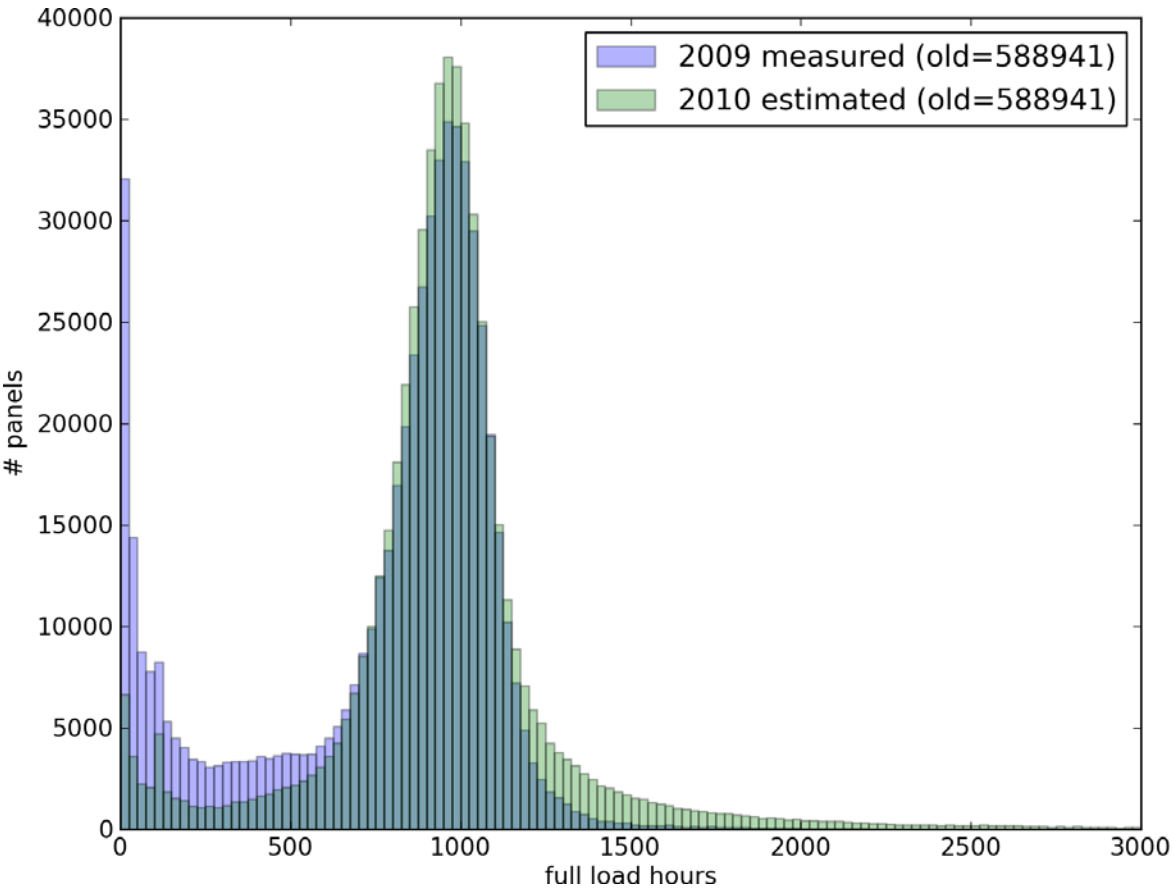
// PV Power Density and Growth in Germany



// PV feed-in estimation for Germany



// Histograms of Full Load Hours for all PV Plants

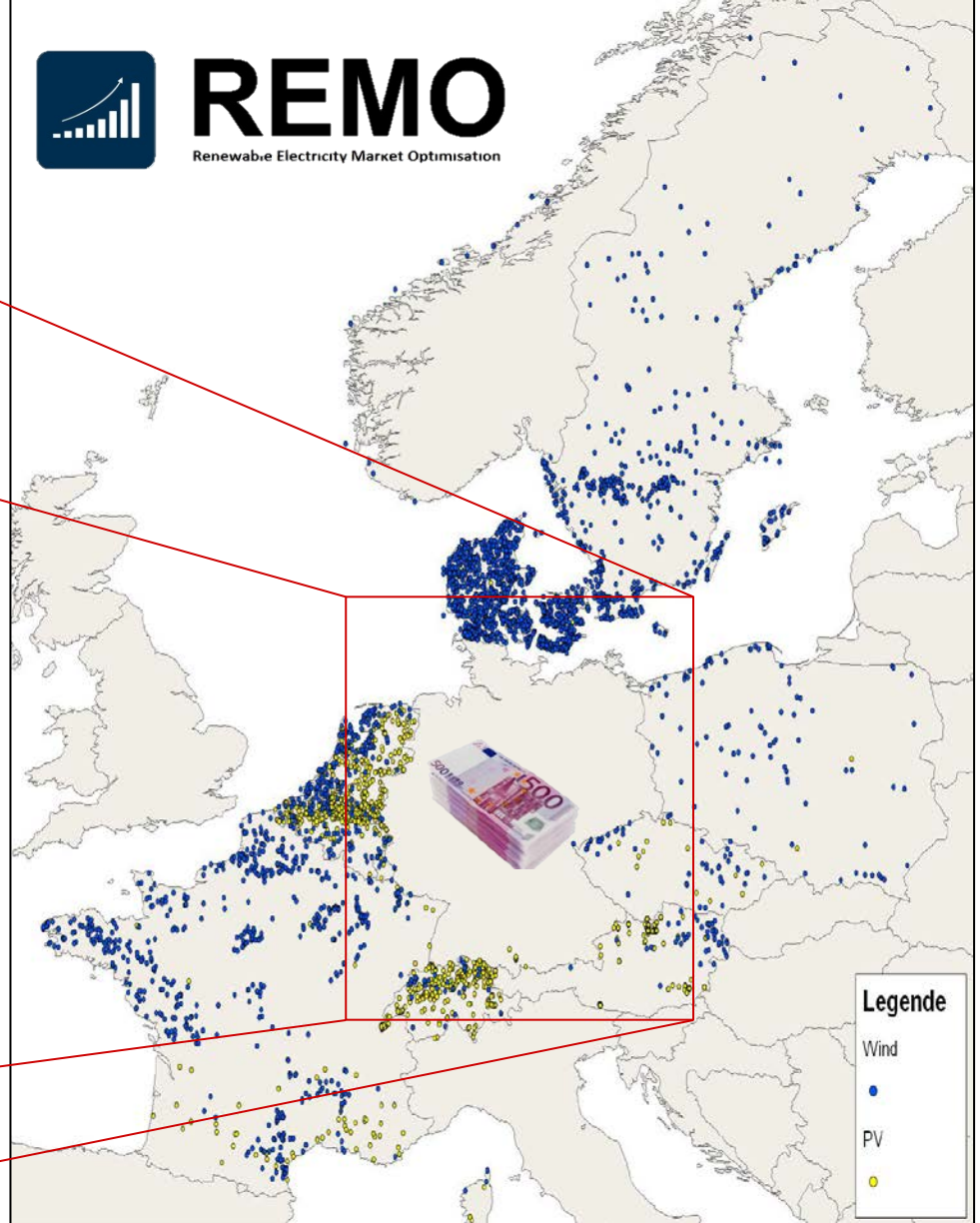
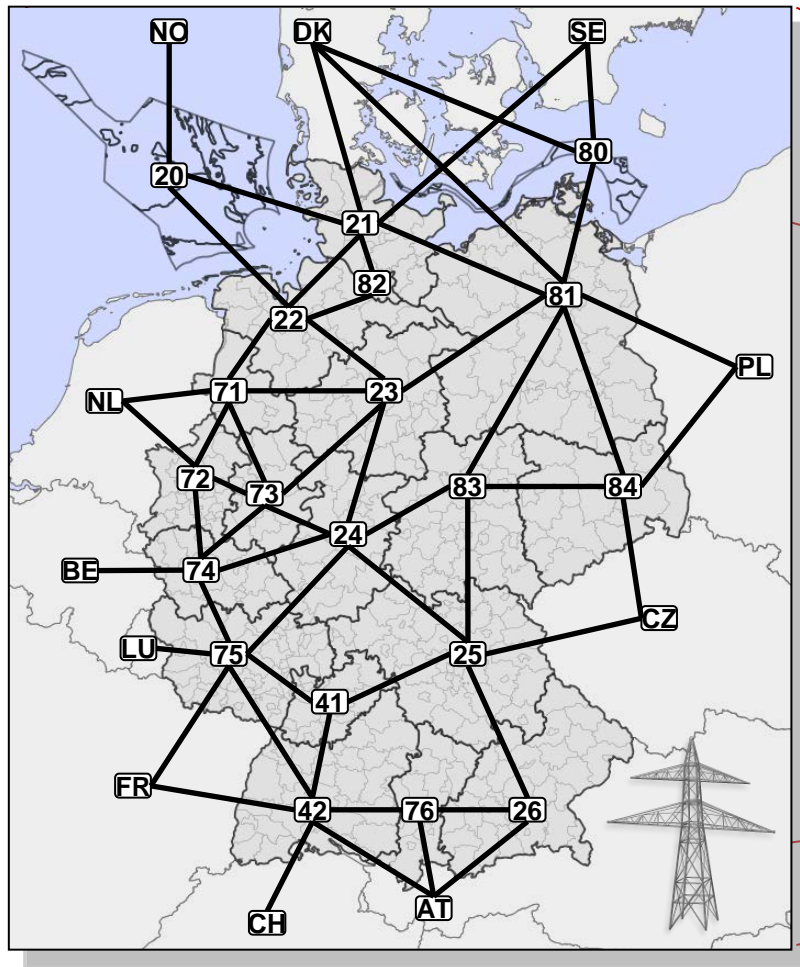


- Annual upscaling error for Germany's annual PV feed-in: ca. **3%**
- Largest improvement likely through filtering/classifying feed-in data

// PV Input for Market Simulations

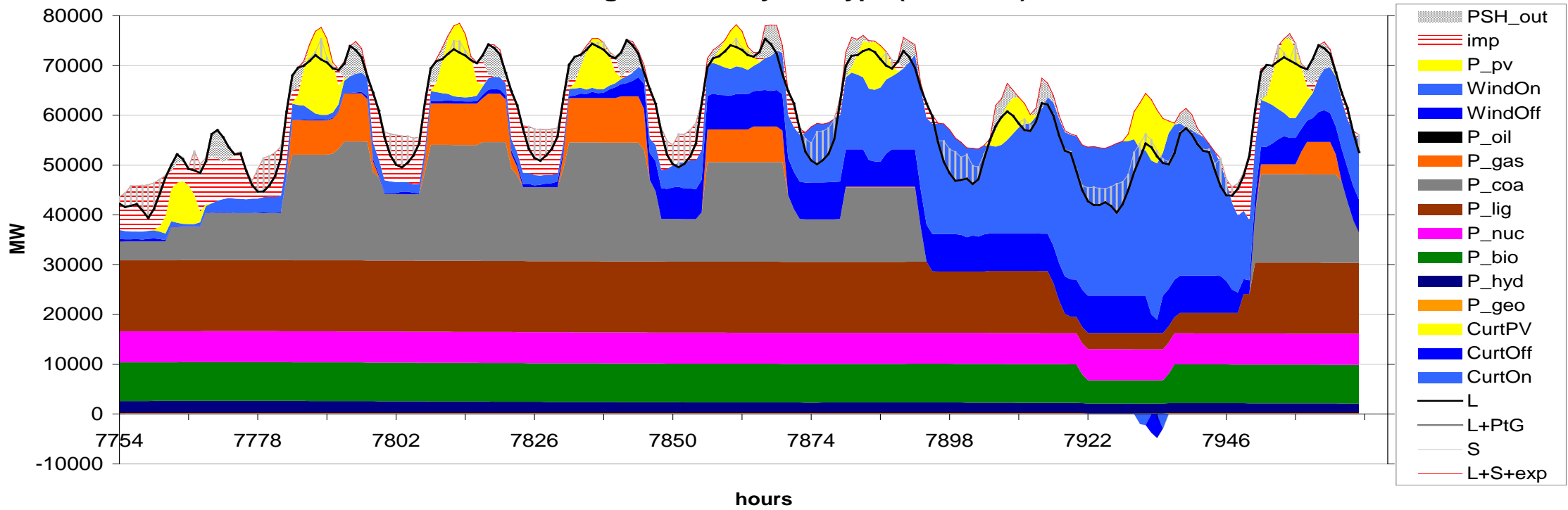
Simulate statistical mix of PV installations

- in Germany
- at multiple European locations



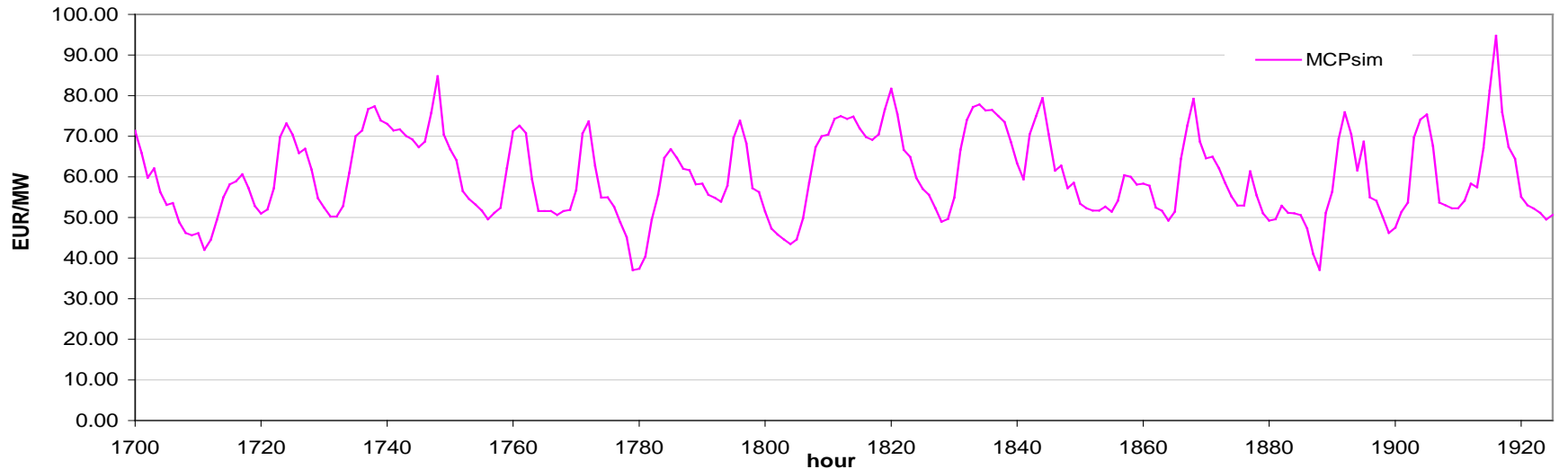
// Example power plant Dispatch and Electricity Prices

Power generation by fuel type (Nov 2020)



Mid-day dip through PV

Market Clearing Price March 2020



// Conclusions and Outlook

- ❖ CM-SAF surface radiation data are essential inputs for
 - power system simulation and
 - PV feed-in upscaling studies
- ❖ Our requirements are
 - High horizontal and temporal resolution
 - Consistency over one or a few years
- ❖ We consider using additional CM-SAF products for our simulations (instead of reanalysis data)
- ❖ We wish we could download timeseries of several parameters at a list of locations

Thank you for your attention!

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