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FlexPlan

Advisory Board Meeting| 29th October 2020

Pan-European and regional scenarios

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Agenda

- Introduction
- Pan-European Scenarios
- MILES Regionalization Module
- Exemplary preliminary results (1 scenario)

Introduction

Pan-EU Scenarios

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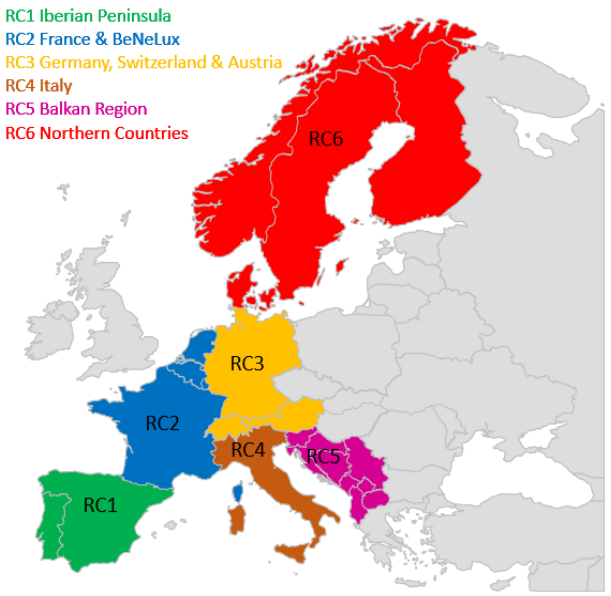
FlexPlan aims to develop an innovative grid planning tool and validate it using six ambitious regional cases covering different geographies in Europe

This results in a complete data collection and analysis process, including:

- **Pan-European Scenarios for the considered target years**
  - **European based**
  - **Regionalization needed (up to grid node detail)**
- Grid models
  - Transmission and distribution
  - Including geographic information
- Additional data sources for complementary studies
  - Environmental impact
  - Fuel and Technology costs (OPF)



Pan-European Scenarios

Pan-EU Scenarios

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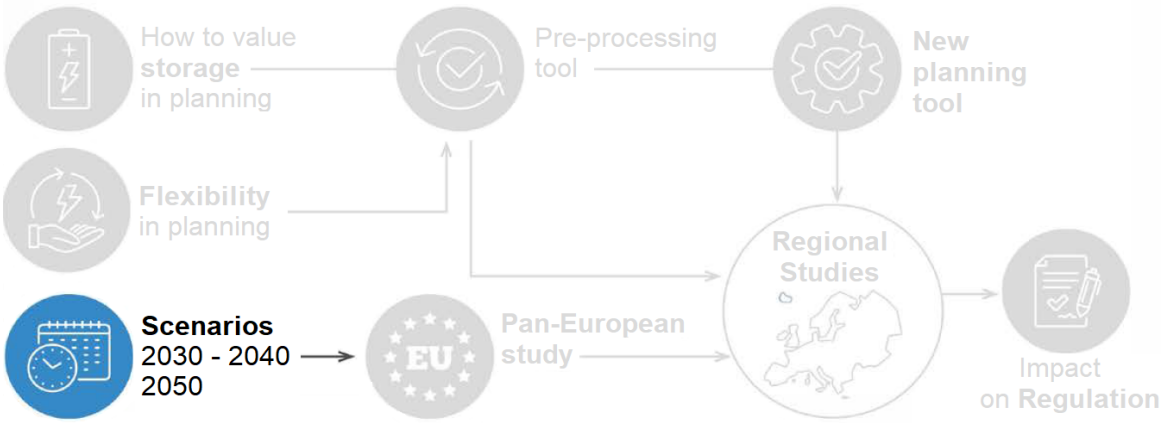
- Three Scenarios
  - Pan-EU framework, data at national level
    - Installed generation capacities by technology
    - Annual mean capacity factors for renewable energy sources
    - Annual electricity consumption and peak load
    - Hourly time series data for consumption
    - Net transfer capacities
    - Commodity prices for different types of fuel for nuclear and fossil power station
    - Total operational reserve power

- Using already validated data sources, to foster work development and achieve a higher acceptance of developed tool and obtained results



Pan-EU Scenarios

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- TYNDP 2020 Scenarios used as main data source
  - Complemented by TYNDP2018 and MAF2018, when needed
- Three target years
  - 2030
  - 2040
  - 2050
- But…
  - TYNDP 2020 does not detail data for 2050 (only presents trends at EU level)

National Trends (NT)
is the central scenario based on draft NECPs in accordance with the governance of the energy union and climate action rules, as well as on further national policies and climate targets already stated by the EU member states. Following its fundamental principles, NT is compliant with the EU's 2030 Climate and Energy Framework (32 % renewables, 32.5 % energy efficiency) and EC 2050 Long-Term Strategy with an agreed climate target of 80–95 % CO_2 reduction compared to 1990 levels.

Global Ambition (GA)
is a scenario compliant with the 1.5° C target of the Paris Agreement also considering the EU's climate targets for 2030. It looks at a future that is led by development in centralised generation. Economies of scale lead to significant cost reductions in emerging technologies such as offshore wind, but also imports of energy from competitive sources are considered as a viable option.

Distributed Energy (DE)
is a scenario compliant with the 1.5° C target of the Paris Agreement also considering the EU's climate targets for 2030. It takes a de-centralised approach to the energy transition. A key feature of the scenario is the role of the energy consumer (prosumer), who actively participates in the energy market and helps to drive the system's decarbonisation by investing in small-scale solutions and circular approaches.

Source: ENTSO-E

Pan-EU Scenarios

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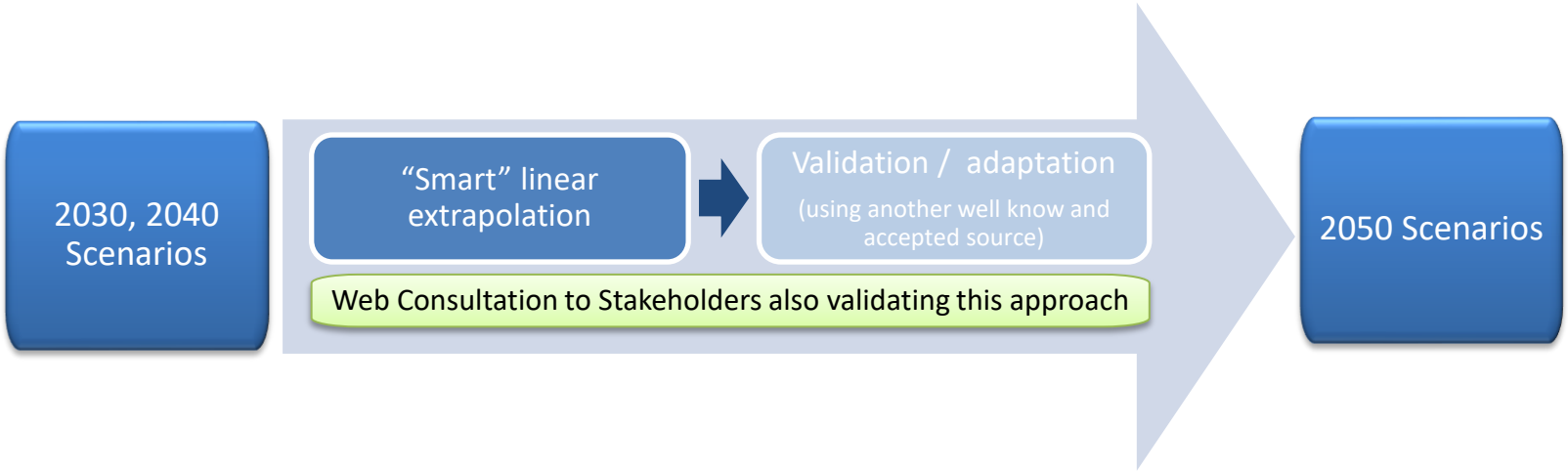

"Smart" linear extrapolation

- Respecting physical limits
  - No negative installed capacities (which might arise from reducing trend in some technologies)
  - Capacity factors for renewables are maintained
- Does not apply to reserve calculation

Pan-EU Scenarios

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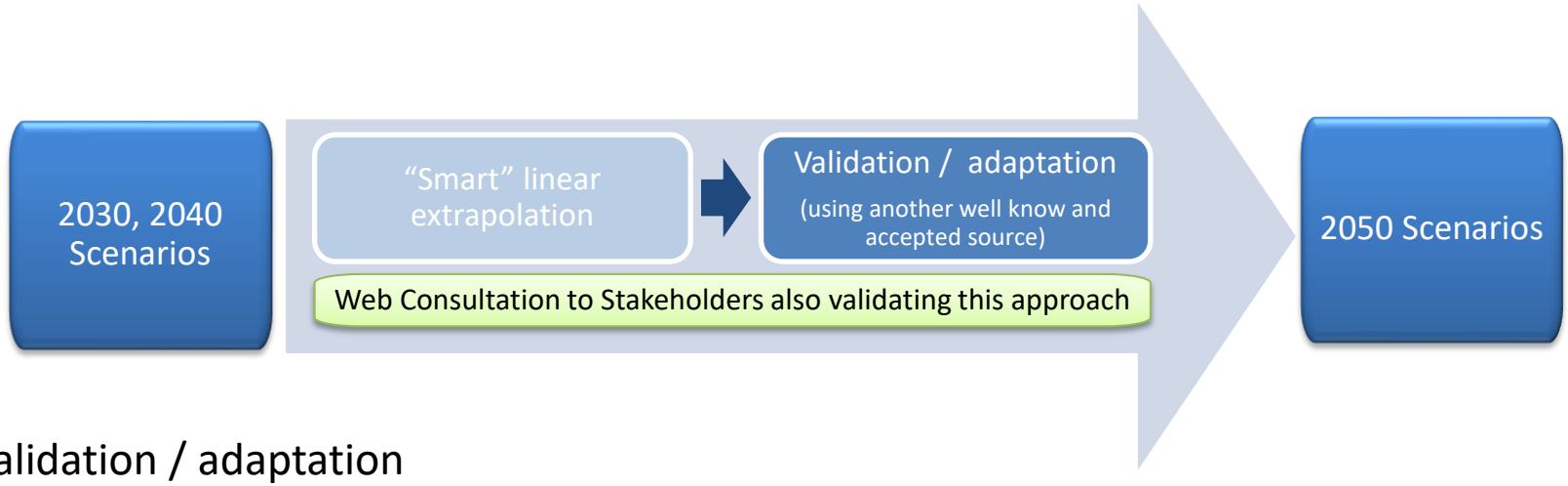
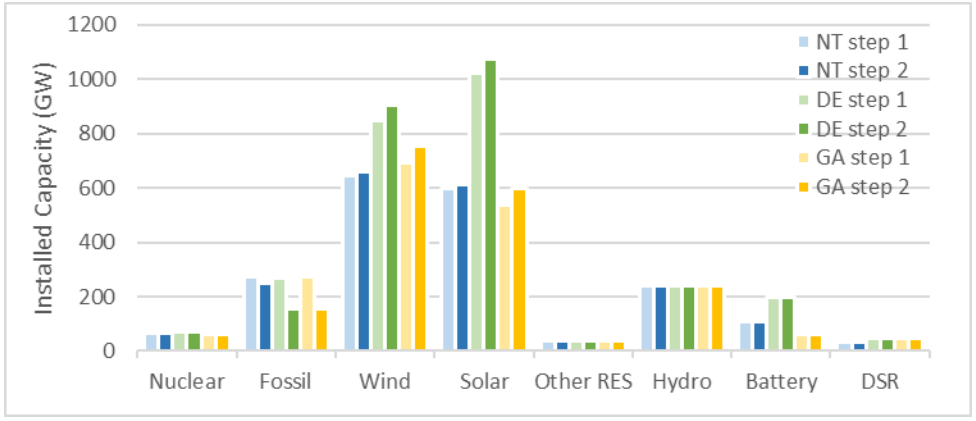


Validation / adaptation

- Using «A Clean Planet for All» long term strategy from EU Commission
  - ELEC scenario for National Trends
  - 1.5 Tech and 1.5 Life scenarios for Global Ambition and Distributed Energy – approach already followed by ENTSO-E in TYNDP 2020 scenarios creation



Pan-EU Scenarios

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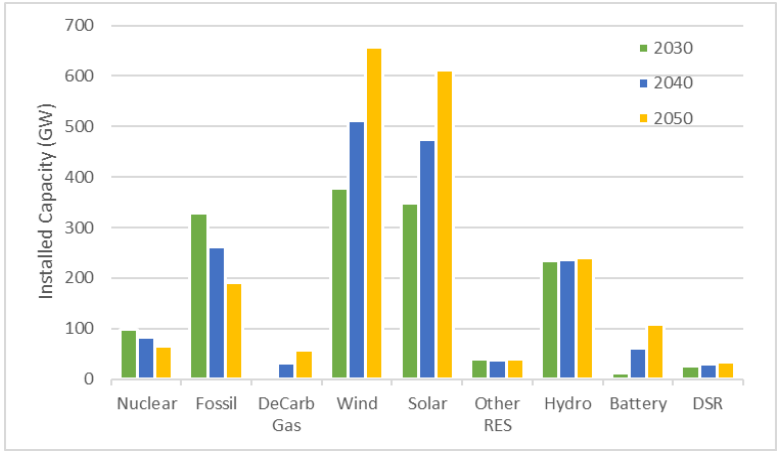
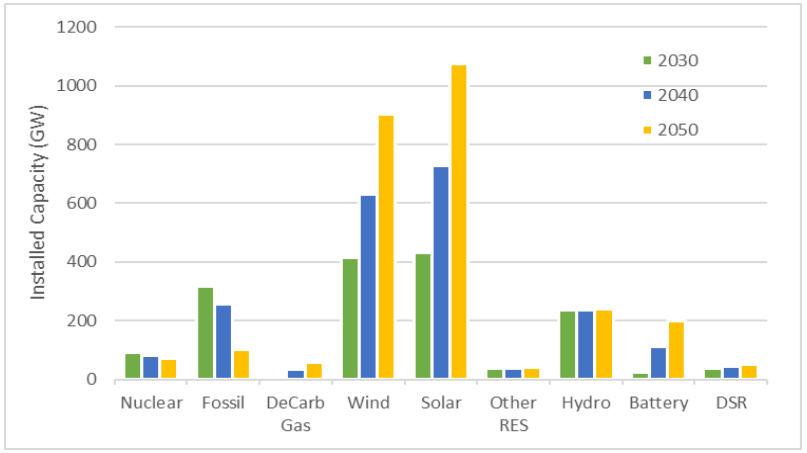
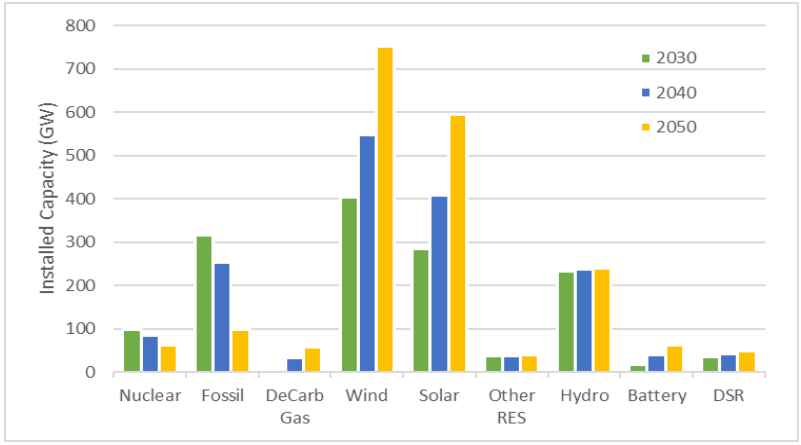
Some exemplary results – Evolution of installed capacity at EU level



National Trends



Distributed Energy



Global Ambition

Pan-EU Scenarios

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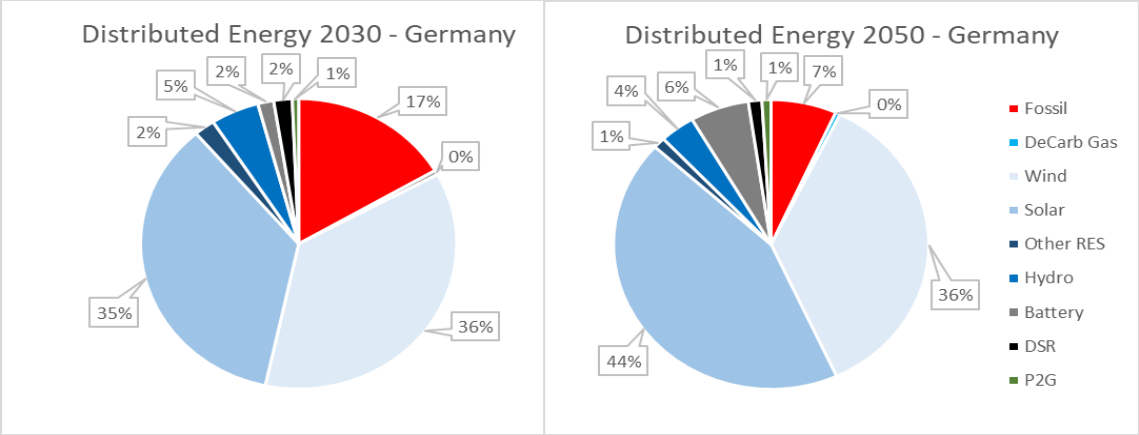
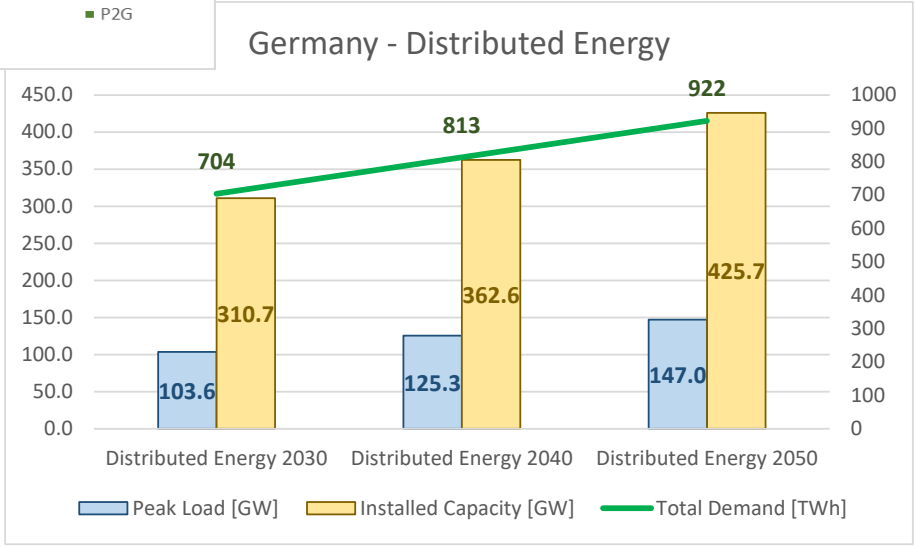
Some exemplary results – country evolutions





Full methodological approach and additional results are available in Deliverable D4.1 –accessible at https://flexplan-project.eu/publications/

MILES Regionalization Module

MILES Regionalization Module

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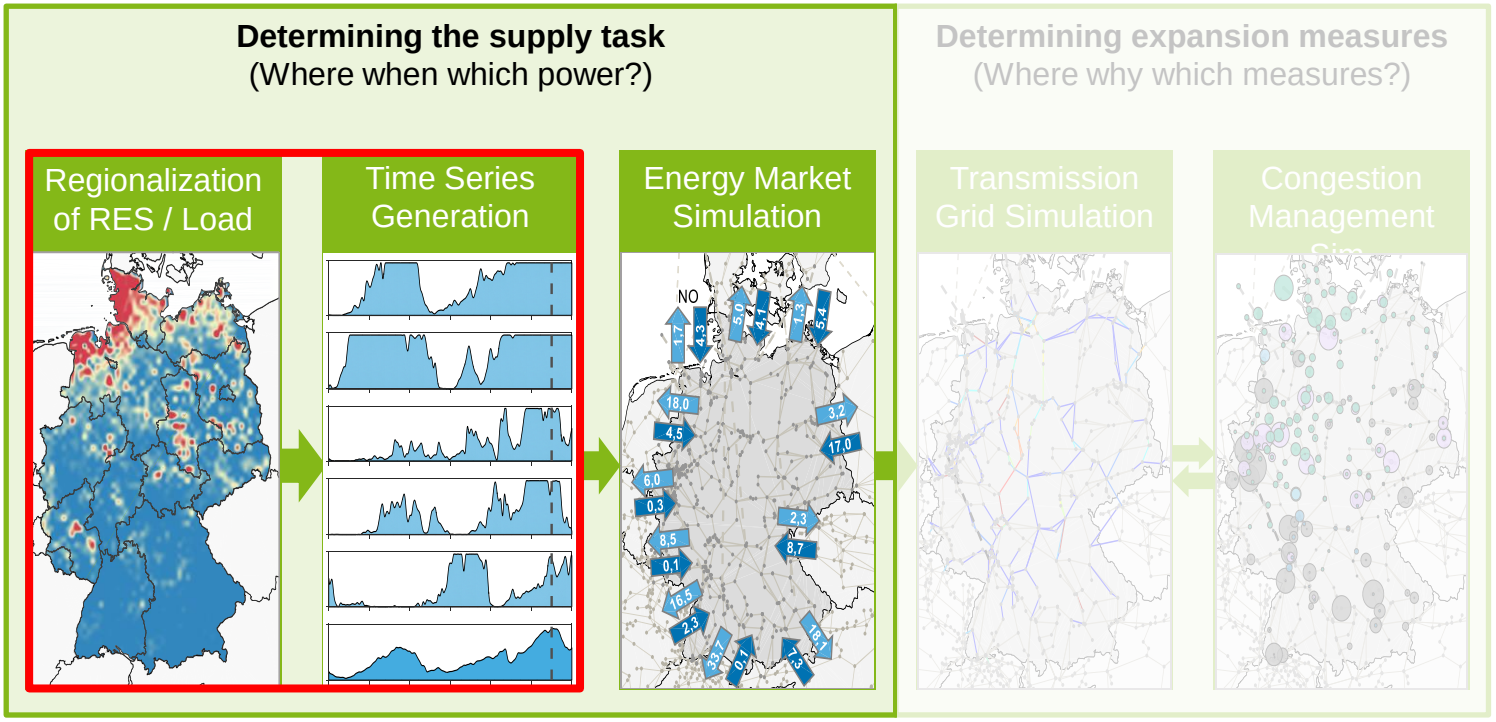

Regionalization Module

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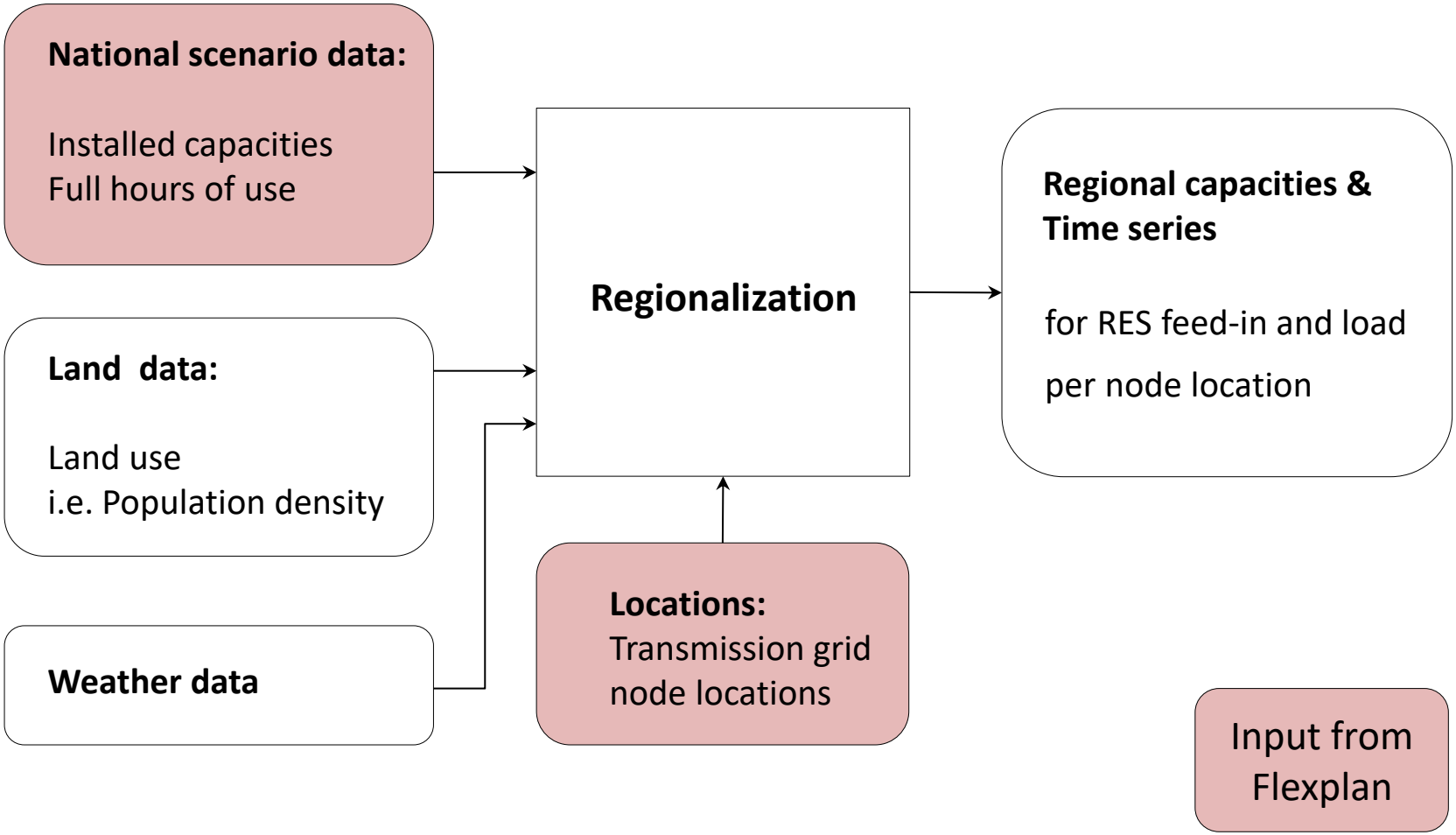

Regionalization Module
Spatial distribution

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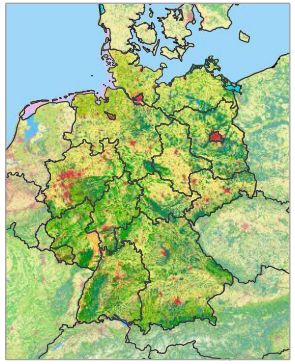
Corine Land Cover Dataset



Land use

National scenario data
Installed capacities

Regionalization factors

Spatial distribution

Regional capacities per node location

Regionalization Module
Time series generation

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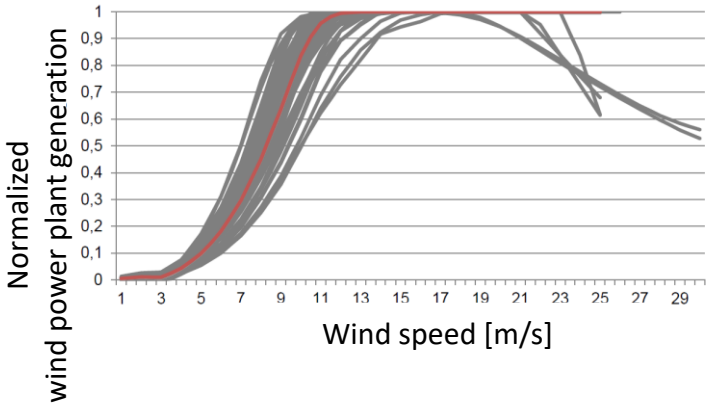
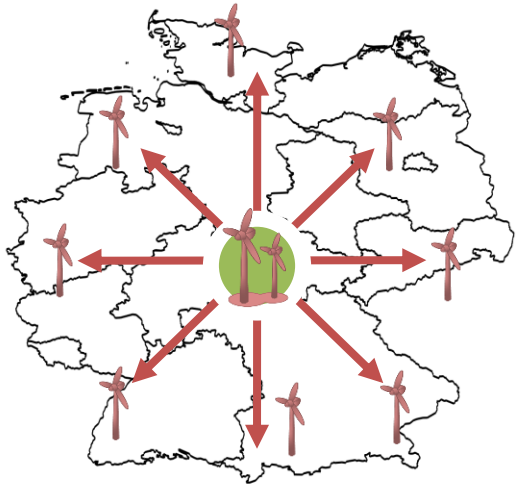




Regional capacities

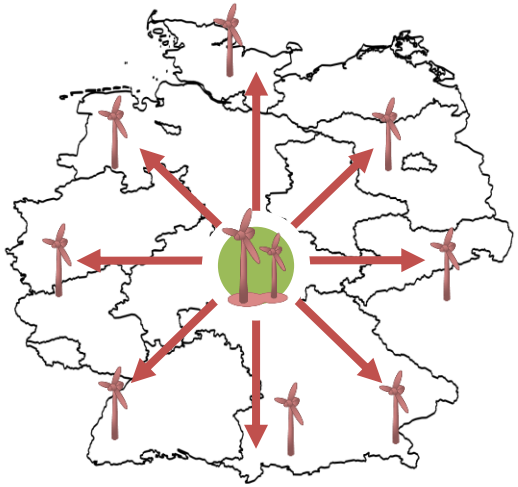
Characteristic curve

Regional weather data for each hour of the year

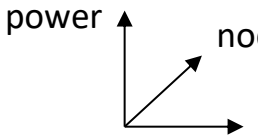
Cosmo EU Model

Numerical weather models provide meteorological data based on physical relatonships

7 km²



Regional time series



Exemplary preliminary Results (1st Scenario)

MILES first regionalization scenario results

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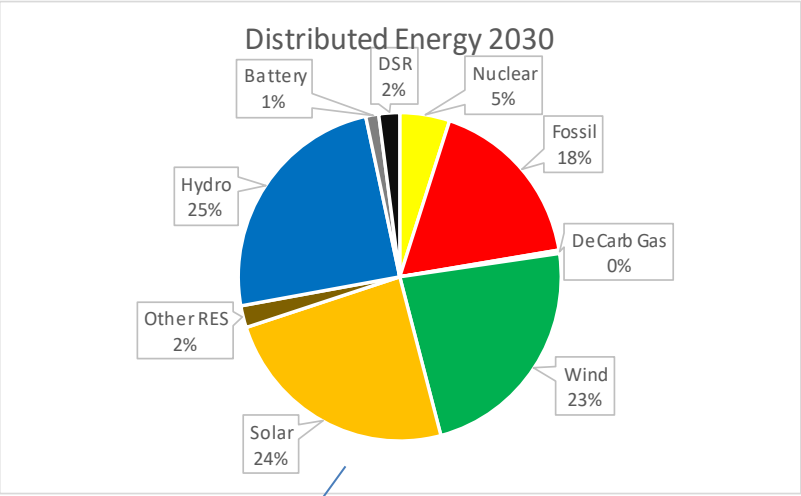

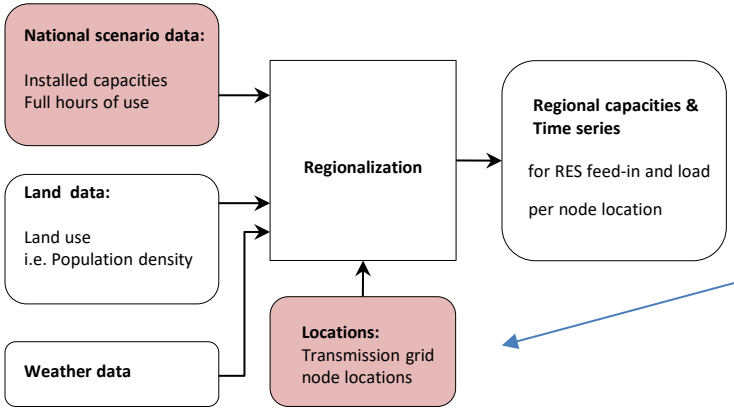

Regional Case	Countries	Number of transmission nodes
1	Spain	599
	Portugal	404
2	France	766
	Netherlands	37
	Luxembourg	11
	Belgium	46
3	Denmark	162
	Norway	168
	Sweden	175
	Finland	70
4	Italy	728
5	Serbia	79
	Macedonia	103
	Albania	165
	Montenegro	67
	Bosnien Herzogovina	240
	Croatia	233
	Slovenia	174
6	Germany	732
	Austria	70
	Switzerland	126

Regionalization scenario results

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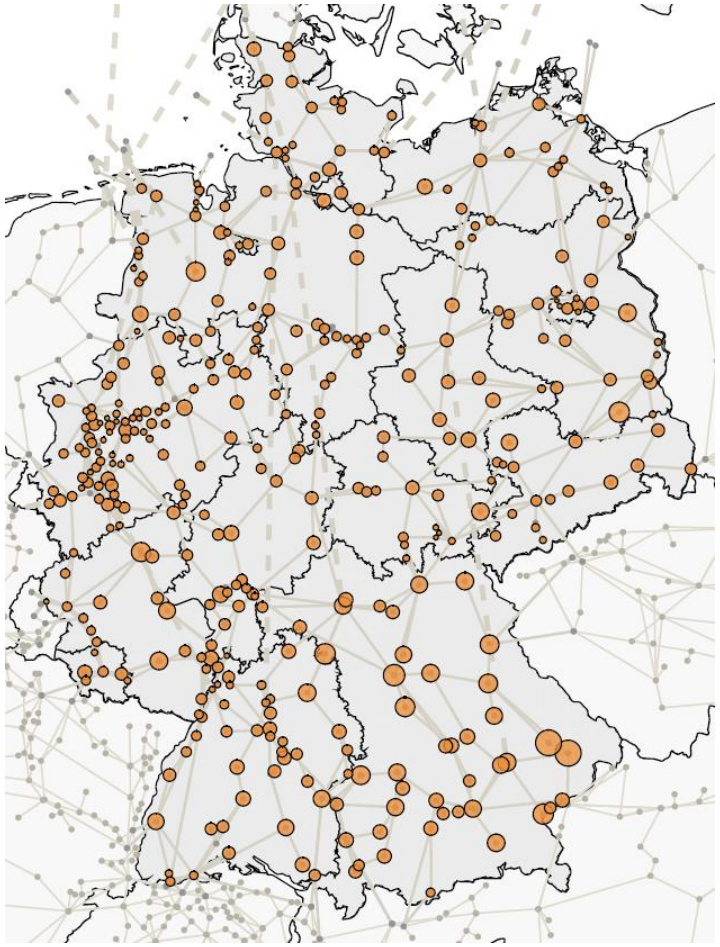
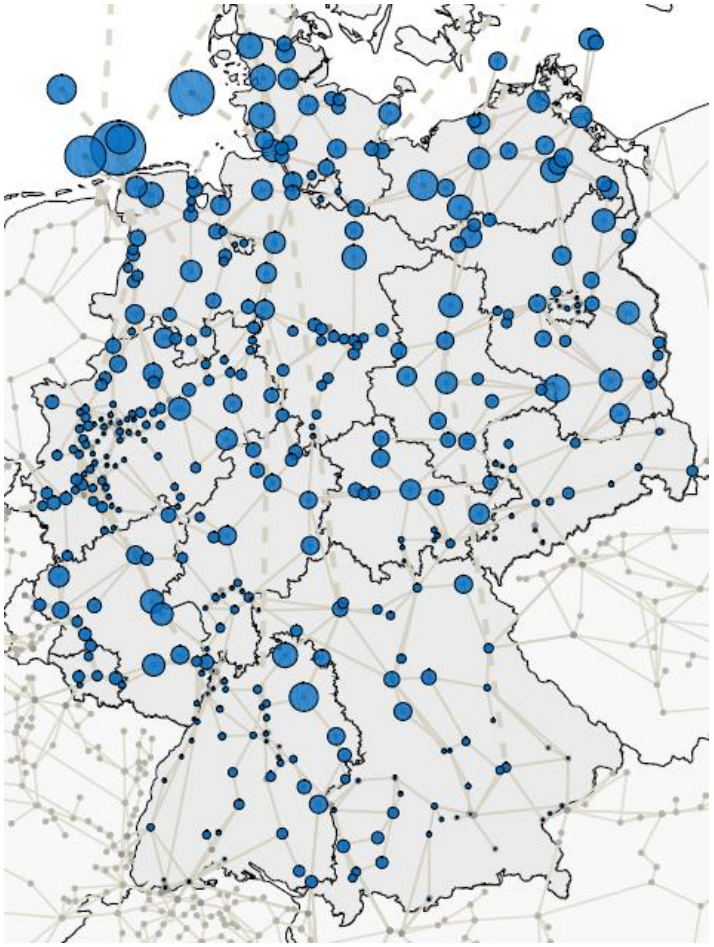


Spatially distributed PV capacities in Germany



Spatially distributed wind capacities in Germany

MILES first regionalization scenario results

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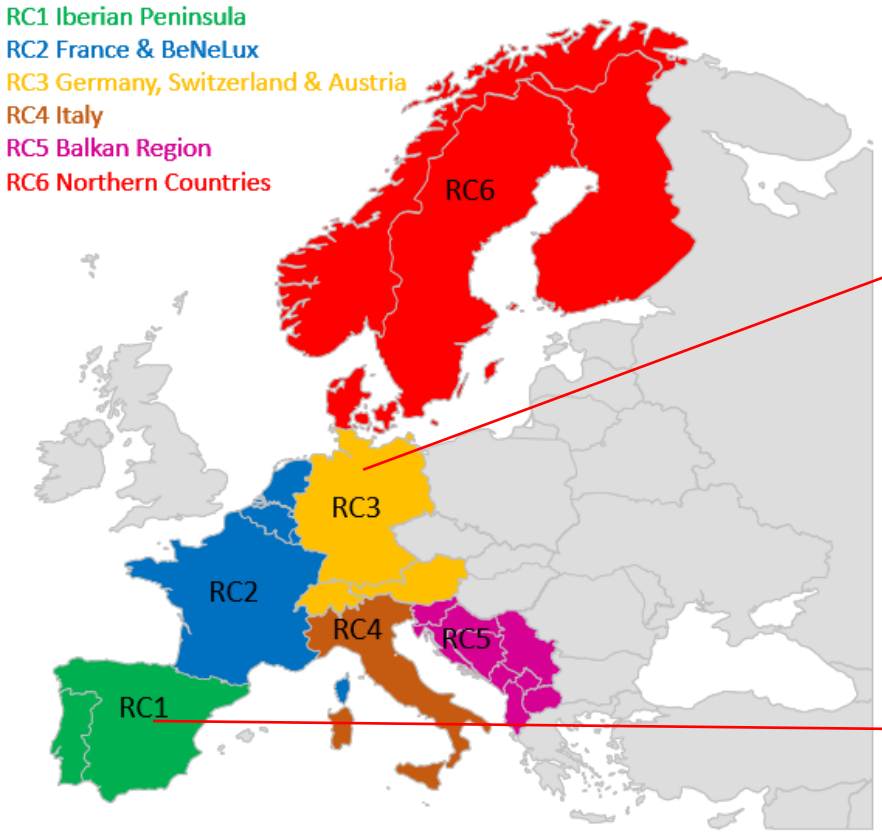
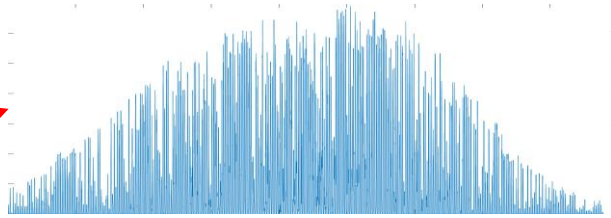
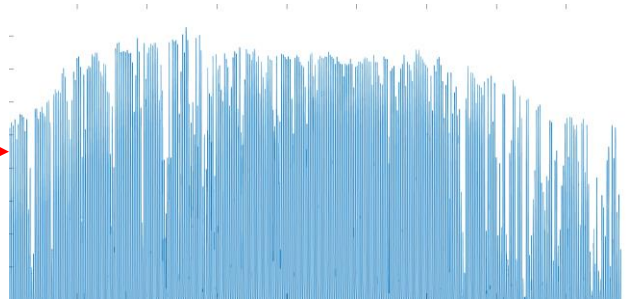




PV feed-in Germany



PV feed-in Spain

Any questions?

Thank you…

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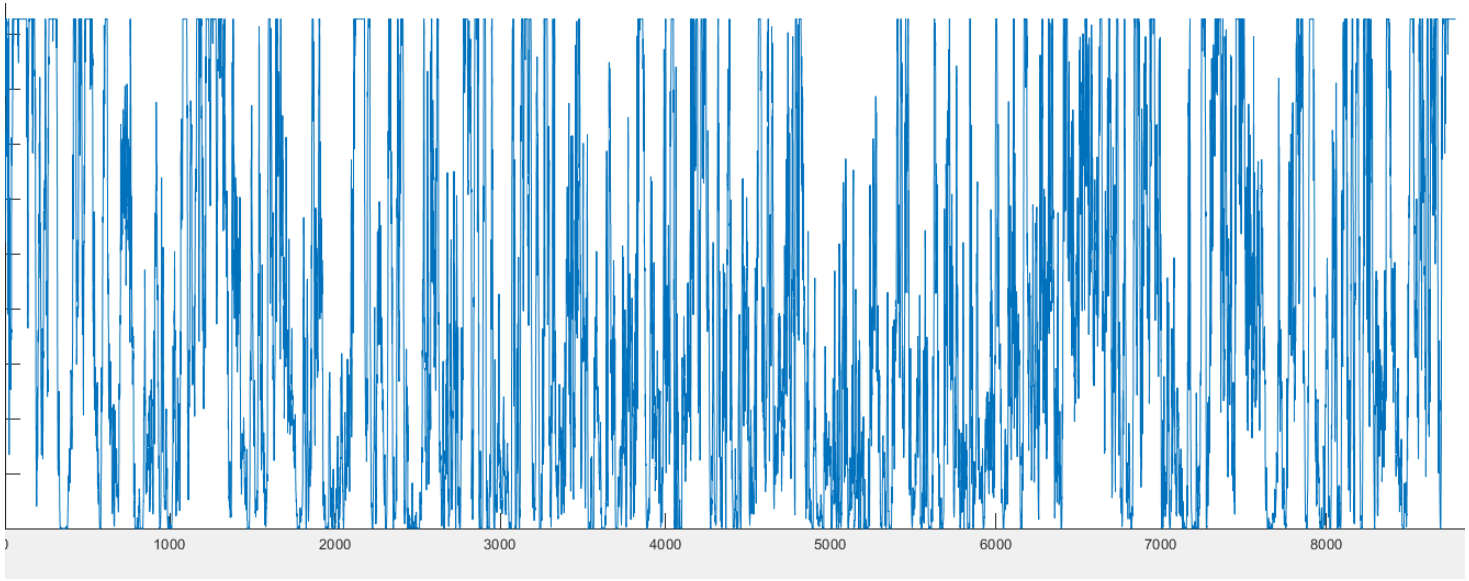
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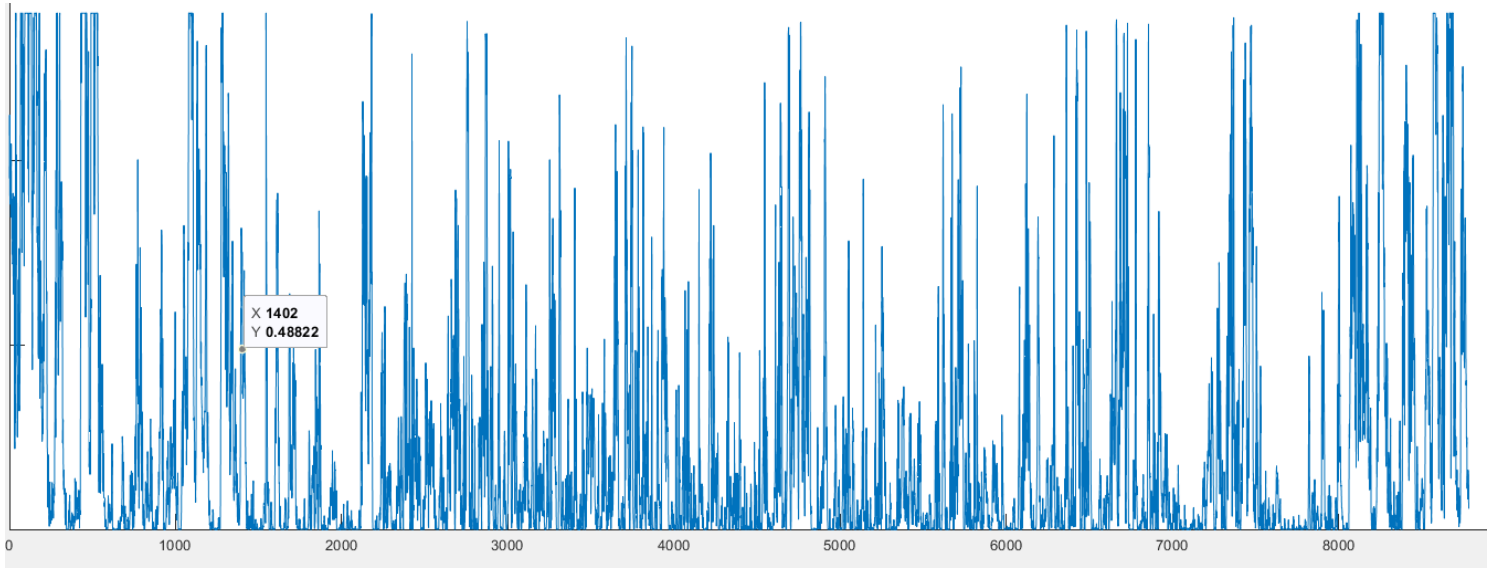
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