D2.1 - Database of TradeRES scenarios

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Document information

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1.0	2.11.2020	PU	Common data on policy scenarios, emission and commodity prices, forecasted technological progress, RES potentials, and other related parameters.		
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Disclaimer

Executive Summary

The present deliverable, as part of task 2.1, includes common data on policy scenarios; emission prices; commodity prices; projected cost and technical parameters of energy conversion technologies and transmission connections; biomass, wind and solar potential; as well as initial generation and transmission capacities in the scenarios.

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1. Scenarios

The four coloured cells in Table 1 produce four central scenarios based on 100 % RES (or near). Time is irrelevant in the context of these scenarios (if this RES level happens in 2030, 2040, 2050, or 2060 etc.).

Additional variations on weather years, cost developments, etc. can be built as sensitivity cases. Similarly, when in the following sheets data is given for low, medium, and high assumptions, or several years, then these can be studied as sensitivity cases. In addition, the modelling may start from low CO_2 price and 2030 technology cost and biomass potential assumptions, but if that does not lead to a near 100 % electricity system, it is possible to easily switch to different assumptions.

It is left open at this stage whether the TradeRES scenarios use transmission capacities and generation capacities from an external future scenario, or whether 2020 capacities are used as a basis. In both cases, fossil fuel plants will be removed in the TradeRES scenarios.

Some of the case studies can also build an additional "~60 % RES" scenario to prove robustness, workability, and the pathway towards 100 % RES. This scenario can be created, for example, by selecting values that are between the current system and S1 scenario.

Table 1 Scenarios for electricity (and energy) system optimization models and pricing

High sector coupling: Much flexible demand from direct and indirect electrification of industry/mobility/heating	S2 ("flexible"): - Some thermal power capacity - Thermal power can set the electricity price - High sector coupling - Many new electricity loads due to electrification - Much flexible demand	S4 ("radical"): - No thermal capacity (except nuclear) - Electricity price based only on demand - High sector coupling - Many new electricity loads due to electrification - Much flexible demand
Low sector coupling: Little flexible demand from direct and indirect electrification of industry/mobility/heating	S1 ("conservative"): - Some thermal power capacity - Thermal power can set the electricity price - Low sector coupling - Few new electricity loads - Little flexible demand	S3 ("variable"): - No thermal capacity (except nuclear) - Electricity price based only on demand - Low sector coupling - Few new electricity loads - Little flexible demand
	Some thermal capacity: 80-90% VRE + hydro (+ nuclear) - "Peak load fossil" - "Peak load bio" - "Power to methane"	No thermal capacity: 100% VRE + hydro (+ nuclear) - "Loss-of-load probability"

Note: Thermal capacity refers to thermal electricity-generation capacity.

2. Common data on scenarios

The common data on the scenarios are given in the supplementary data file. Table 2 describes the data items that are included in the data file.

Table 2 Description of data items in the scenario data file

	Description
Emission prices	Price alternatives (low, medium, high) for emissions
Commodity prices	Price alternatives (low, medium, high) for commodities
New technology data	Projected cost and technical parameters of new energy conversion (production, consumption, storage) technologies
New transmission data	Projected cost and technical parameters of new connections (transmission lines etc.)
Biomass potential	Biomass potential in European countries
Wind potential	Wind (offshore and onshore) potential in European countries
Solar potential	Solar (different PV categories and CSP) potential in European countries
Transmission capacities	"Initial" transmission capacities in the scenarios
Generation capacities	"Initial" generation capacities in the scenarios

3. Supplementary data

TradeRES_D2_1_Scenario_data.xlsx