SET-Nav
Strategic Energy Roadmap

Navigating the Roadmap for Clean, Secure and Efficient Energy Innovation

SET-Nav Case study:
Diffusion rate of renewable electricity generation
- the optimal RES-electricity share (focus on 2030)

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www.set-nav.eu

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Overview

- Aim: Renewable electricity generation is estimated to cover a high share of the future electricity demand in the EU. The possible diffusion of RES-E generation depends of the relative costs of RES-E to its alternatives, the policy ambition and the capability of the system to accommodate volatile generation.

→ Based on a "reference scenario" sensitivity runs are performed with regard to learning rates, sector coupling etc.

… **to see how the optimal share changes**

→ The slides next focus on another driver:
the overall RES policy ambition for 2030

Remark: Please note that results are in final draft stage at present (12 April 2018)

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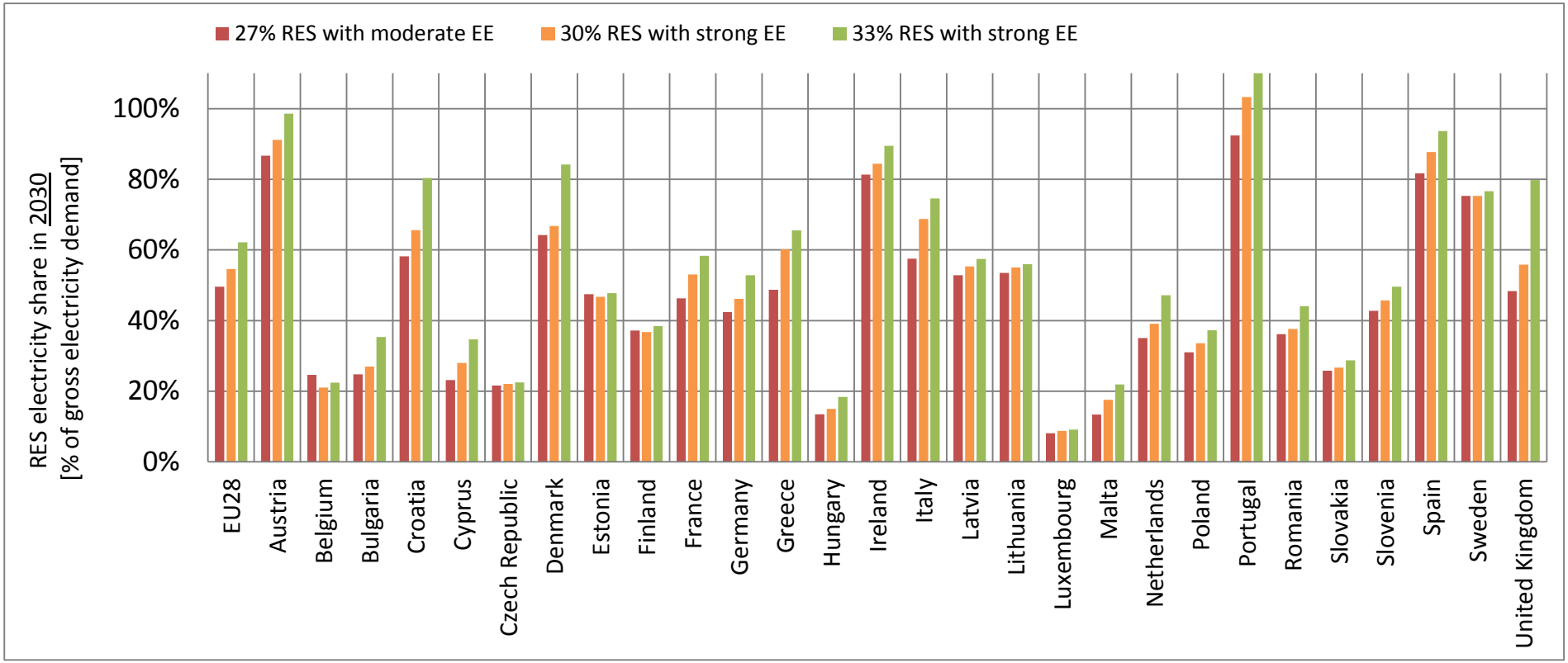
Results: RES-electricity share by 2030 at EU & MS level



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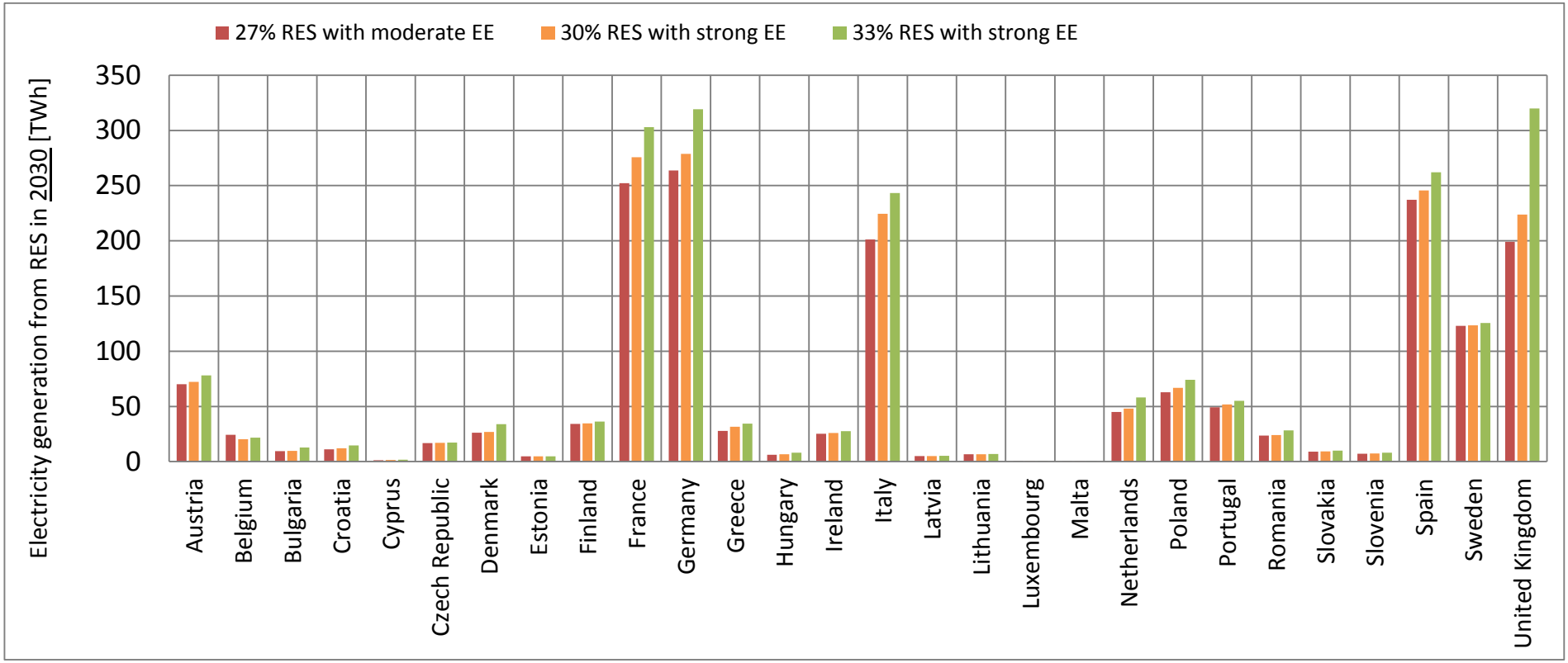
Results: RES-electricity generation by 2030 at MS level



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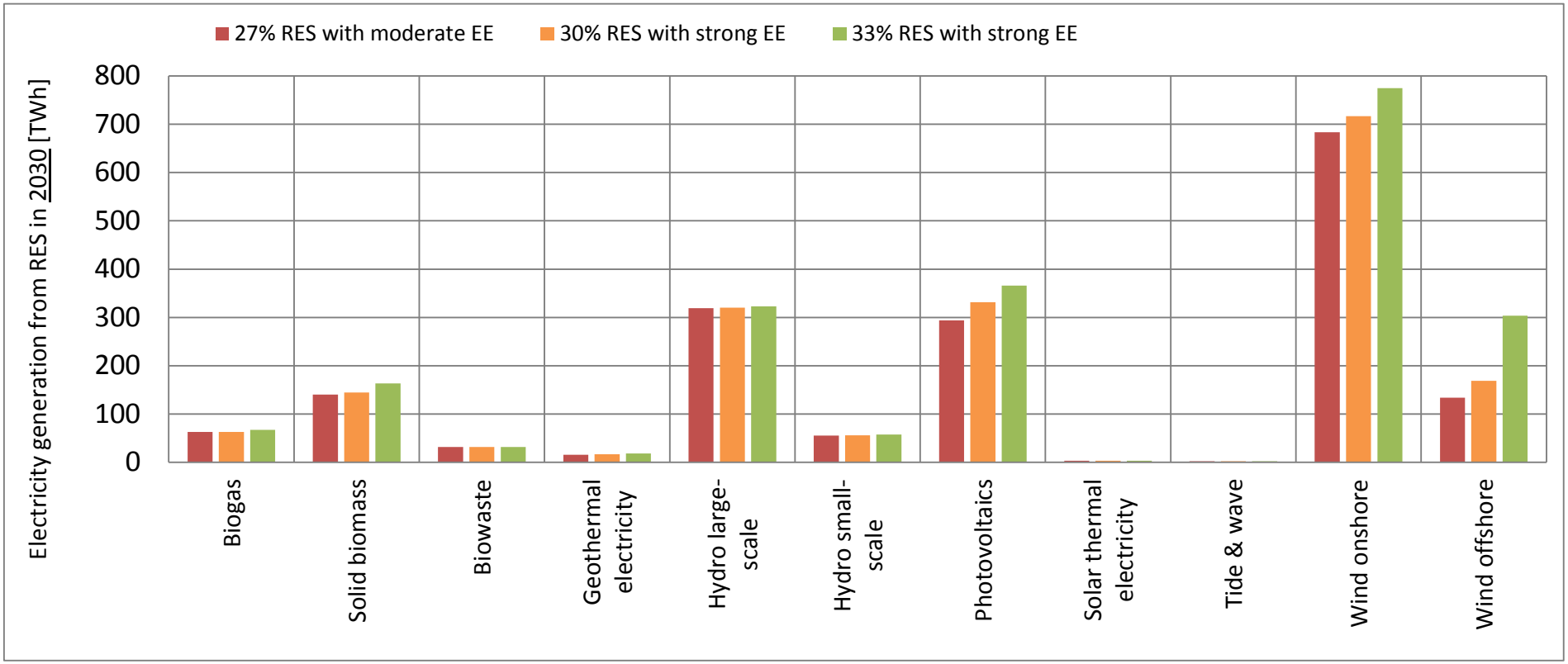
Results: RES-electricity generation by 2030 at technology level (EU28)



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BACKGROUND SLIDES
(Results in table format & approach)

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Scenario:	27% RES with moderate EE	30% RES with strong EE	33% RES with strong EE	27% RES with moderate EE	30% RES with strong EE	33% RES with strong EE	27% RES with moderate EE	30% RES with strong EE	33% RES with strong EE
	RES-27 (EE27)	RES-30 (EE30)	RES-33 (EE30)	RES-27 (EE27)	RES-30 (EE30)	RES-33 (EE30)	RES-27 (EE27)	RES-30 (EE30)	RES-33 (EE30)
	RES share 2030, with biofuel trade % (of gross final energy demand)			RES-electricity share 2030 (domestic) % (of gross electricity demand)			RES-electricity deployment 2030 (domestic) TWh		
EU28	**27.0%**	**30.0%**	**32.8%**	**49.6%**	**54.6%**	**62.1%**	**1,743.2**	**1,855.8**	**2,111.8**
Austria	43.3%	46.9%	49.8%	86.7%	91.2%	98.6%	70.1	72.3	78.2
Belgium	13.3%	13.8%	14.6%	24.6%	21.0%	22.4%	24.2	20.4	21.8
Bulgaria	25.0%	26.8%	30.0%	24.8%	27.0%	35.4%	9.5	9.8	12.9
Croatia	34.6%	37.8%	42.9%	58.2%	65.6%	80.3%	11.2	12.0	14.7
Cyprus	19.2%	21.4%	23.7%	23.1%	28.0%	34.7%	1.3	1.4	1.7
Czech Republic	19.3%	21.0%	21.2%	21.6%	22.0%	22.5%	16.7	17.0	17.3
Denmark	40.0%	44.3%	49.7%	64.2%	66.8%	84.2%	26.2	26.8	33.8
Estonia	47.3%	49.6%	51.7%	47.4%	46.7%	47.8%	4.8	4.7	4.9
Finland	48.8%	51.5%	53.1%	37.2%	36.7%	38.5%	34.2	34.7	36.3
France	29.3%	32.6%	35.1%	46.3%	53.1%	58.3%	252.2	275.7	303.0
Germany	24.2%	26.9%	29.4%	42.4%	46.2%	52.9%	263.8	278.9	319.1
Greece	26.7%	31.8%	35.0%	48.7%	60.1%	65.6%	27.7	31.7	34.5
Hungary	17.3%	20.2%	23.2%	13.5%	15.0%	18.4%	6.2	6.6	8.1
Ireland	26.4%	28.6%	30.0%	81.4%	84.4%	89.5%	25.2	25.9	27.5
Italy	23.1%	26.8%	29.0%	57.5%	68.8%	74.6%	201.2	224.6	243.4
Latvia	49.8%	52.4%	53.4%	52.8%	55.3%	57.4%	5.1	5.1	5.3
Lithuania	45.1%	49.3%	49.7%	53.5%	55.0%	56.0%	6.7	6.7	6.9
Luxembourg	9.2%	9.8%	9.9%	8.1%	8.8%	9.1%	0.7	0.7	0.8
Malta	12.6%	15.0%	17.3%	13.4%	17.6%	21.9%	0.4	0.5	0.6
Netherlands	14.4%	16.0%	18.4%	35.1%	39.1%	47.2%	44.9	48.1	58.0
Poland	20.4%	23.0%	24.4%	31.0%	33.6%	37.3%	62.9	66.8	74.0
Portugal	43.5%	49.6%	52.0%	92.4%	103.3%	110.1%	49.2	51.8	55.1
Romania	28.9%	30.8%	32.8%	36.2%	37.6%	44.1%	23.6	24.1	28.3
Slovakia	16.1%	17.3%	18.2%	25.8%	26.7%	28.8%	9.1	9.2	10.0
Slovenia	37.1%	39.3%	40.8%	42.8%	45.7%	49.6%	7.2	7.5	8.1
Spain	34.2%	37.6%	40.1%	81.7%	87.7%	93.6%	237.2	245.5	262.1
Sweden	66.7%	69.7%	70.8%	75.3%	75.3%	76.6%	122.9	123.4	125.6
United Kingdom	20.2%	23.5%	30.9%	48.3%	55.9%	79.8%	199.2	223.9	319.8

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Breakdown of 2030 RES-electricity generation by technology at EU level	27% RES with moderate EE	30% RES with strong EE	33% RES with strong EE
TWh	RES-27 (EE27)	RES-30 (EE30)	RES-33 (EE30)
Biogas	63.1	62.9	67.1
Solid biomass	140.5	145.0	163.4
Biowaste	31.7	31.6	31.8
Geothermal electricity	16.0	17.0	18.7
Hydro large-scale	319.5	320.2	323.2
Hydro small-scale	55.6	56.2	57.7
Photovoltaics	294.1	331.4	365.7
Solar thermal electricity	3.5	3.5	3.5
Tide & wave	2.4	2.4	2.4
Wind onshore	683.2	716.6	774.5
Wind offshore	133.8	168.9	303.9

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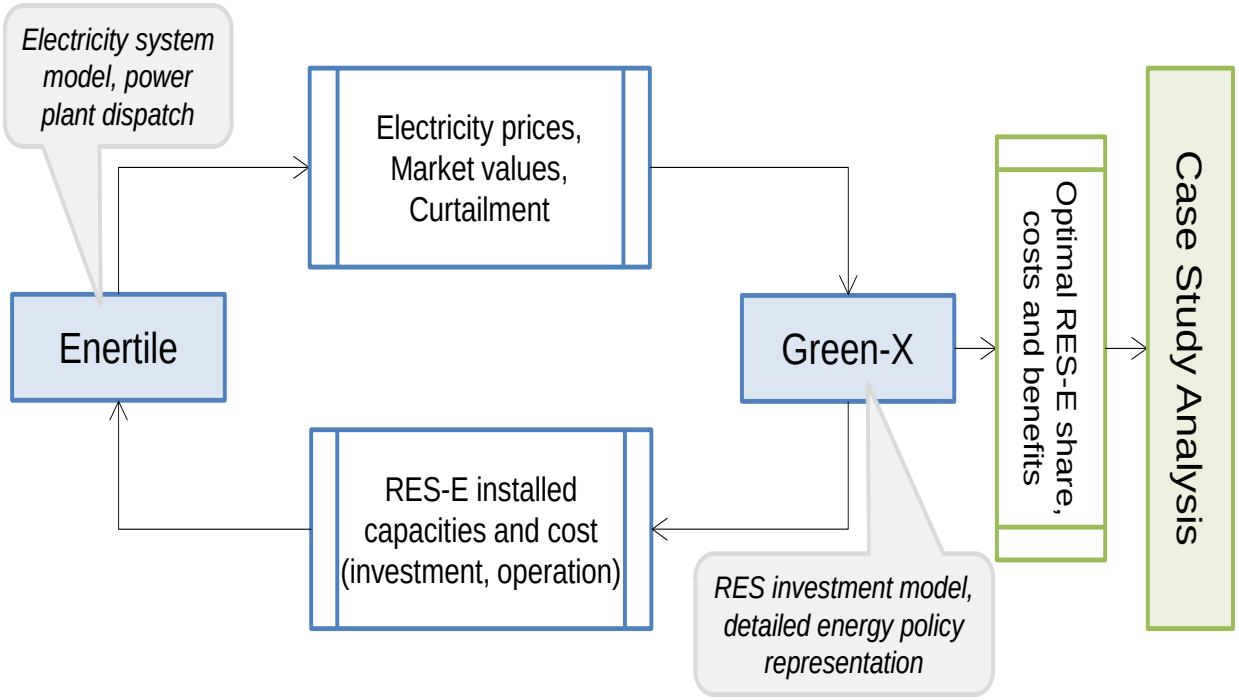
❖ The **modelling system** used within this case study

Method of approach (1/2)



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Method of approach (2/2)

❖ The **approach used in Green-X modelling**

- **A common policy framework until 2020:** All scenarios build on common ground for the near future, i.e. the years up to 2020. Here, a strengthening of national RES policies is presumed, serving to meet the given 2020 RES targets.
- **A "least-cost" approach for RES post 2020:** For renewables, the **default ambition level is generally set at 27% - i.e. achieving a RES share in gross final energy demand in size of at least 27% by 2030 and beyond. We contrast this with a higher level of RES policy ambition: 30% and 33%.**
- Conceptually, the scenarios follow a simplified policy concept for renewables: The underlying policy concept for incentivising RES can be characterised as a "least-cost" approach, enhancing an efficient use of RES for meeting the 2030 EU RES target in a cost-effective manner

Please note that this "virtual" policy concept matches perfectly with the objective of this case study. Thus, the undertaken least cost allocation of the RES efforts to the available RES technologies across all energy sectors (electricity, heat, transport fuels) and countries (EU28 Member States) delivers an optimal RES deployment under given constraints.