Integration of Renewable Electricity In Europe

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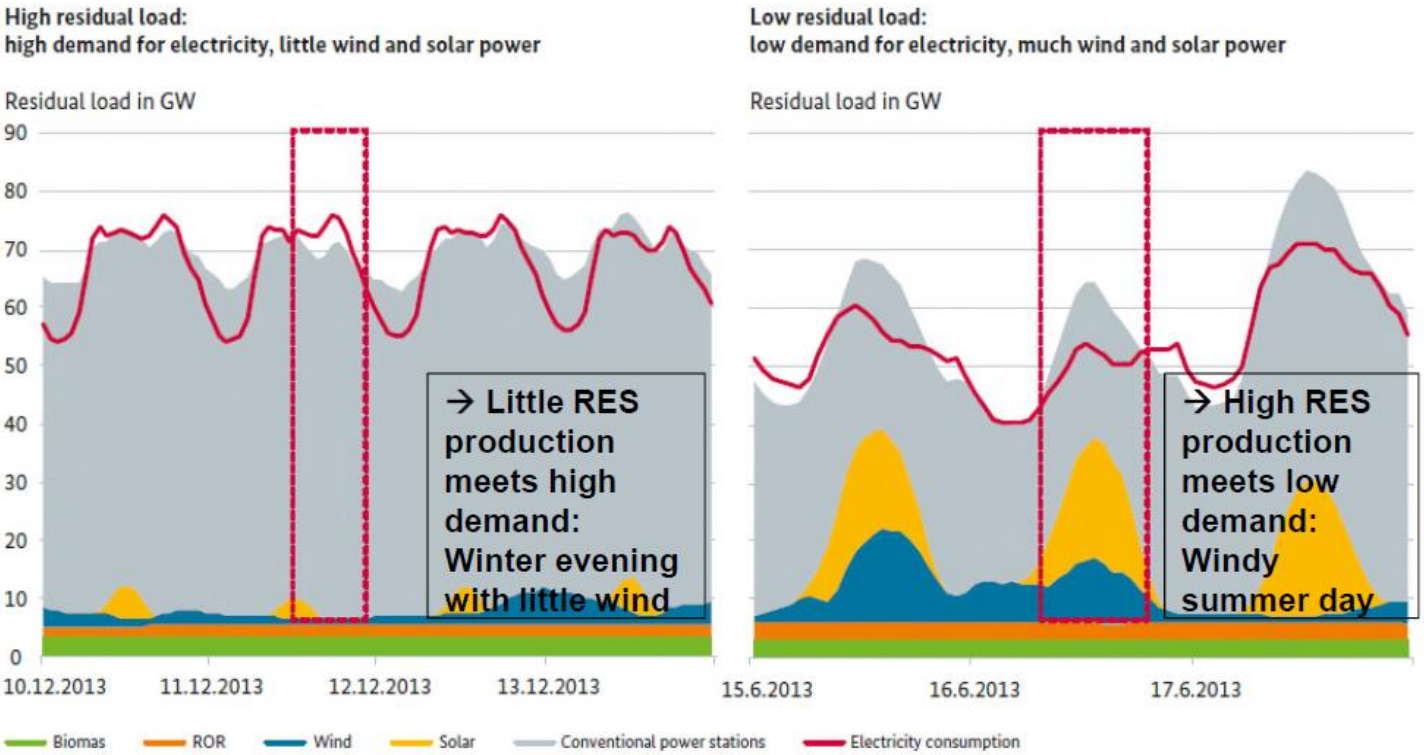
Renewables and CCS policy

2 sides: Making the market and renewables fit together

Integrating variable renewables requires new thinking

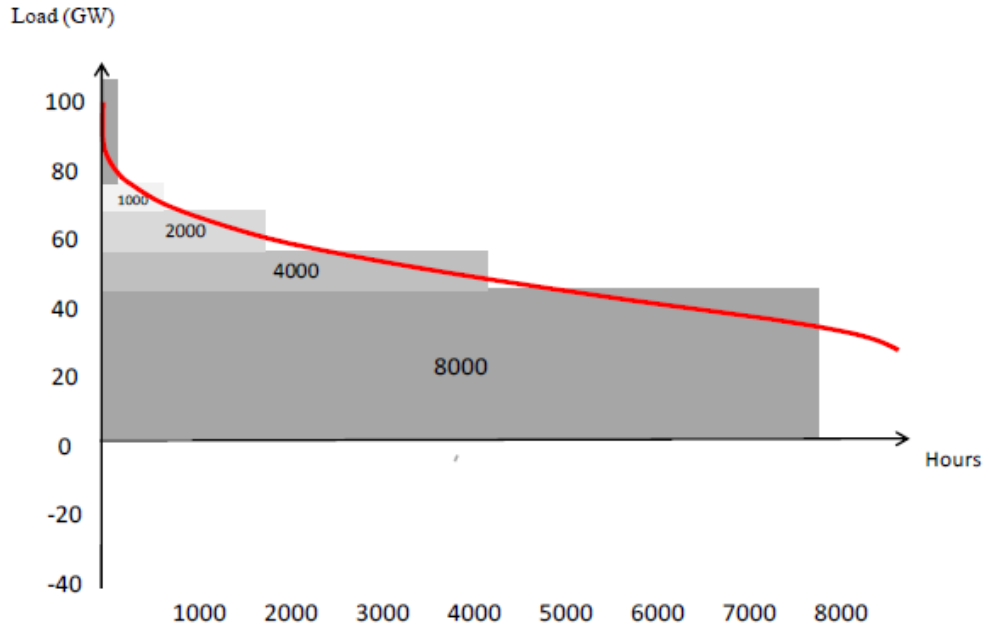
Figure 2: Examples of situations with high and low residual load



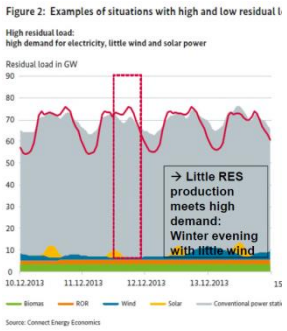
Source: Connect Energy Economics

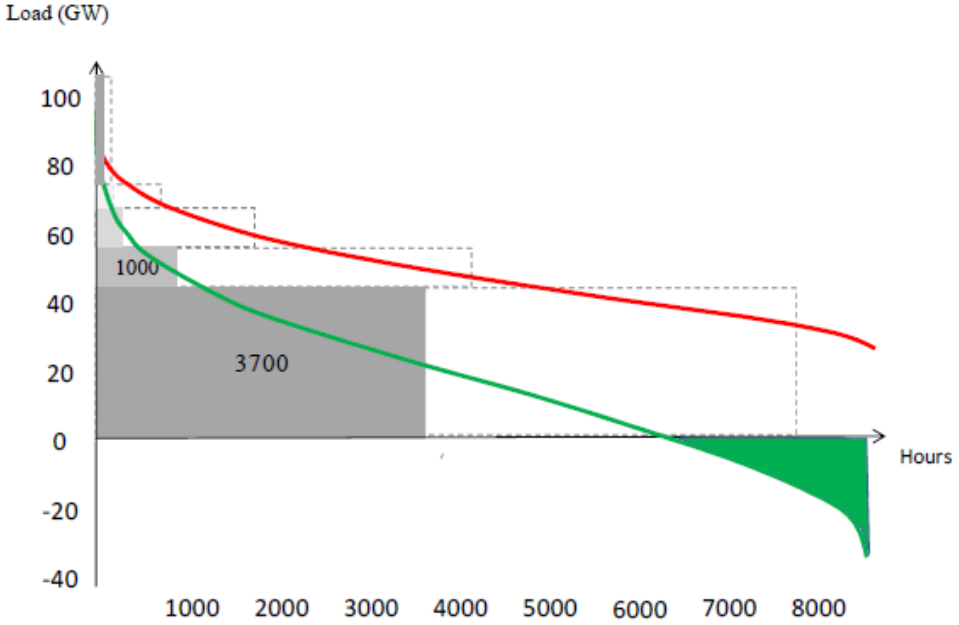
Initial least cost generation mix and full load hours of capacity

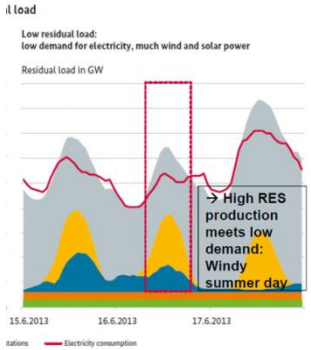
Source: IEA report
Securing Power during the Transition
Generation Investment and Operation Issues in Electricity Markets with Low-Carbon Policies



Effect 1: Short run Impact of high shares of renewables on the load factor of existing plants

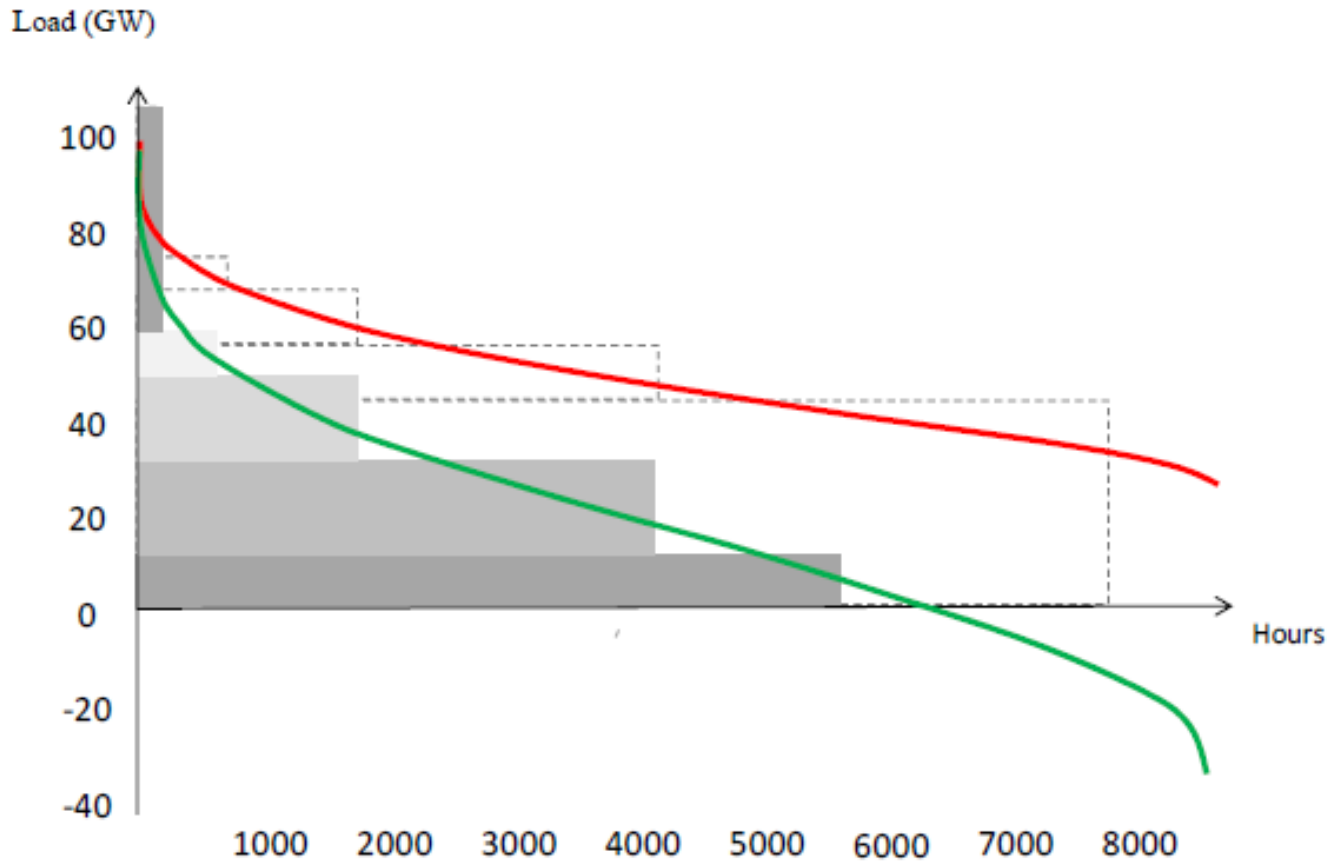


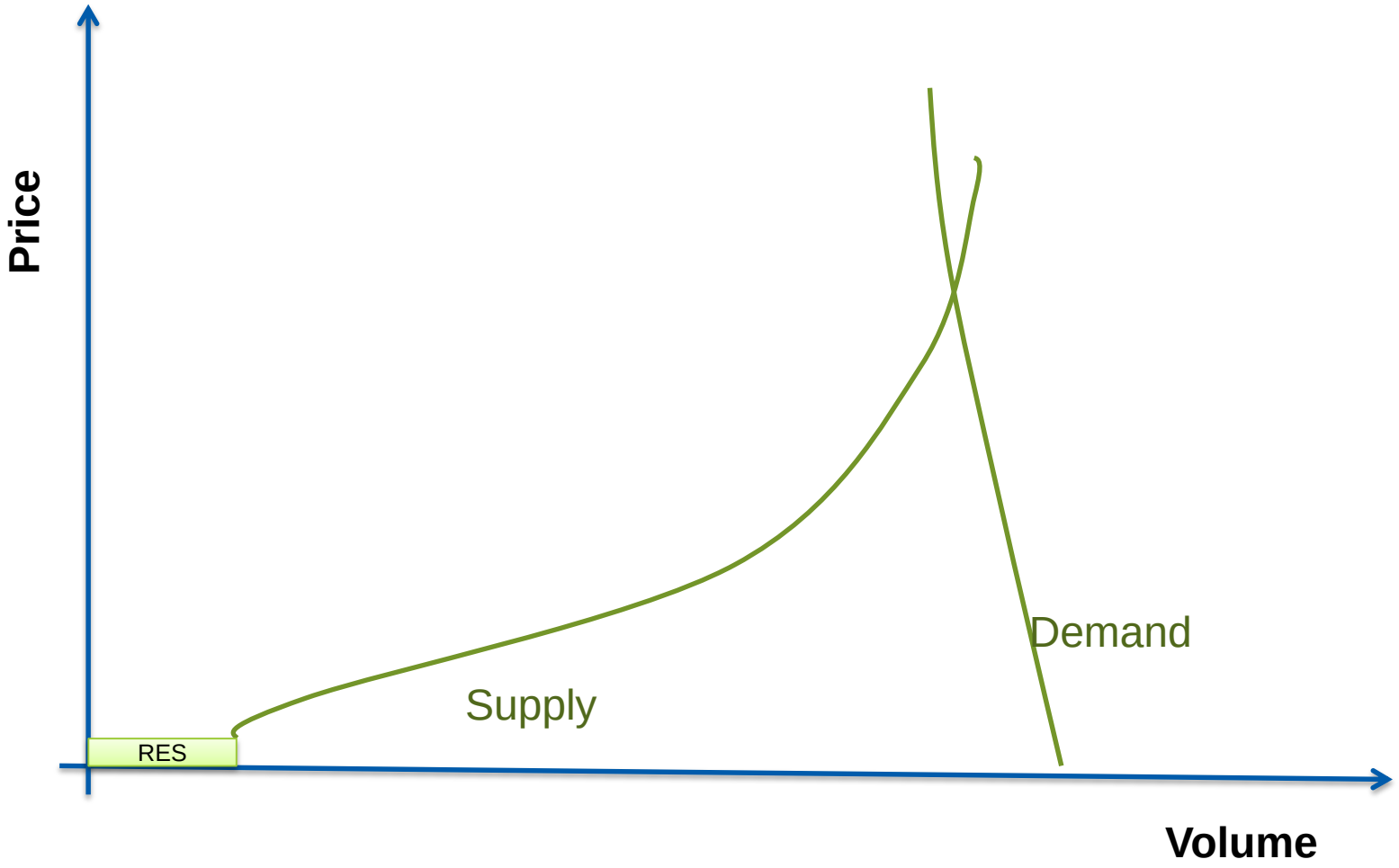




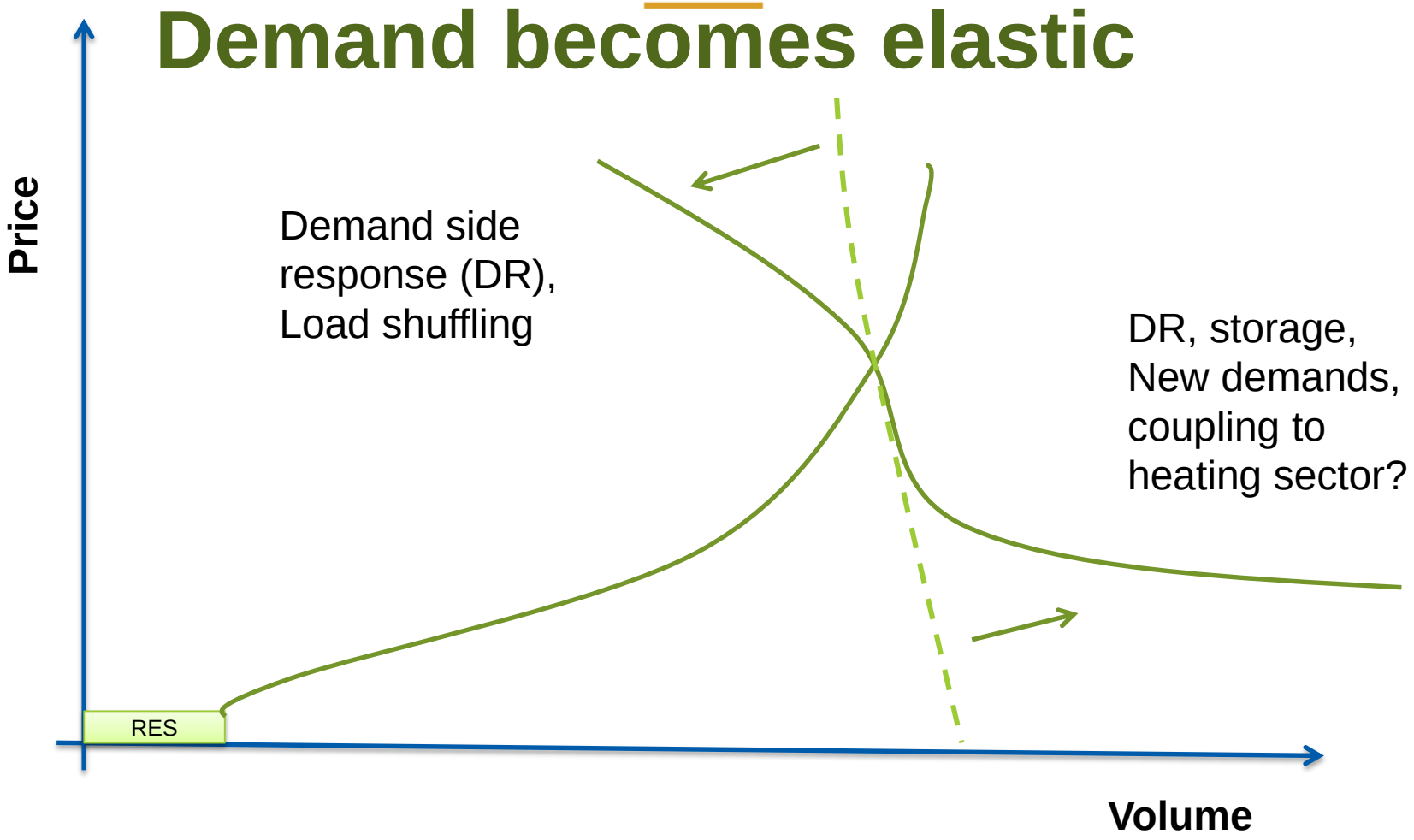
European Commission

Effect 2: Long run optimisation of the mix based on the residual load duration curve



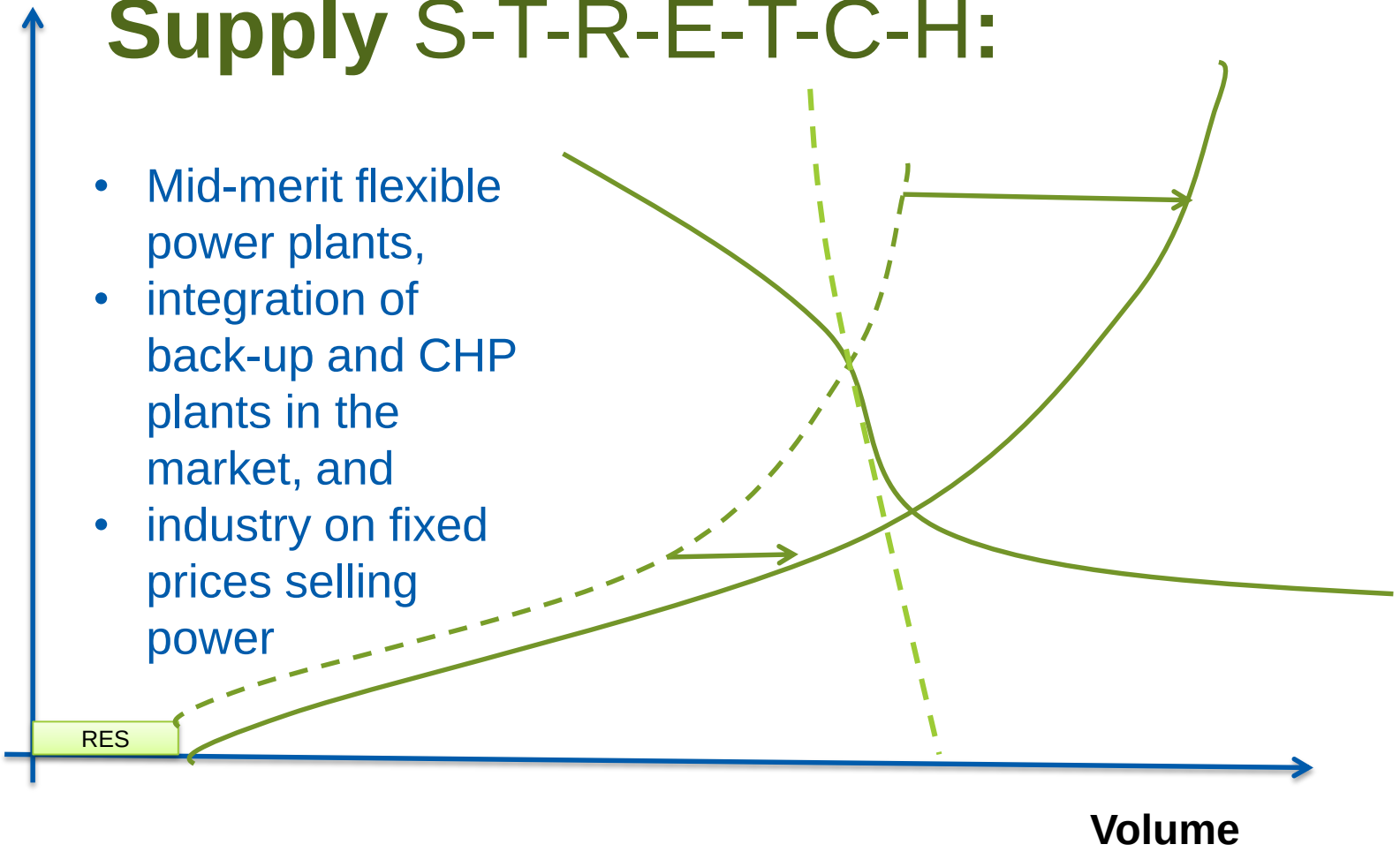

Price
Demand
Supply
RES
Volume

Demand becomes elastic



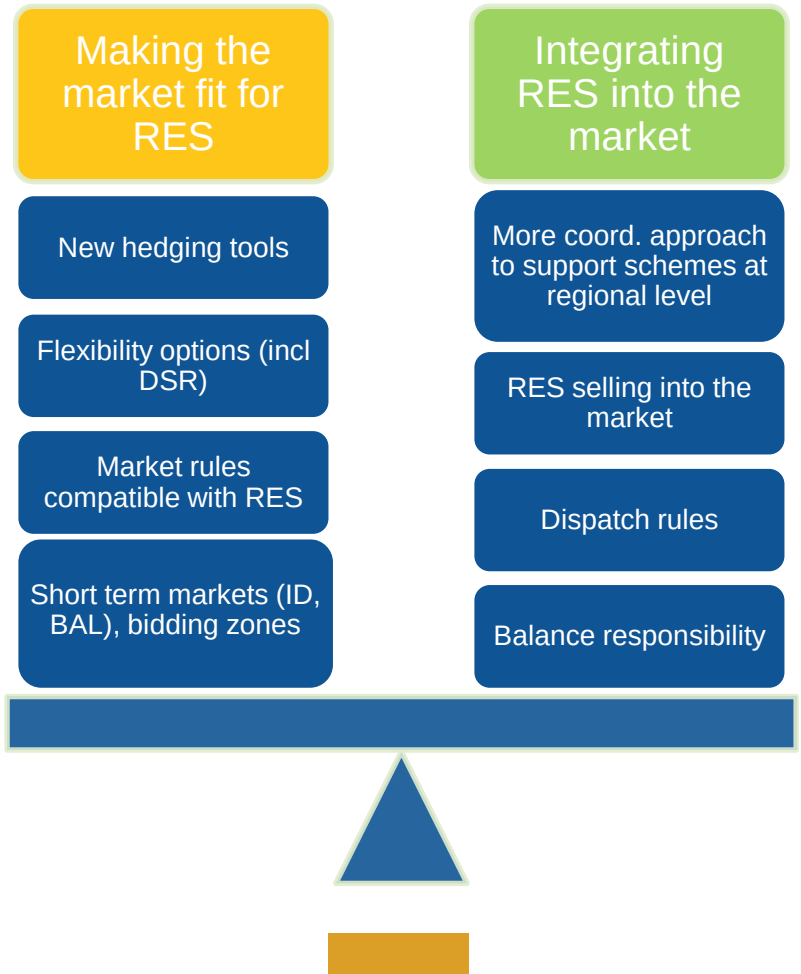
Supply S-T-R-E-T-C-H:

- Mid-merit flexible power plants,
- integration of back-up and CHP plants in the market, and
- industry on fixed prices selling power

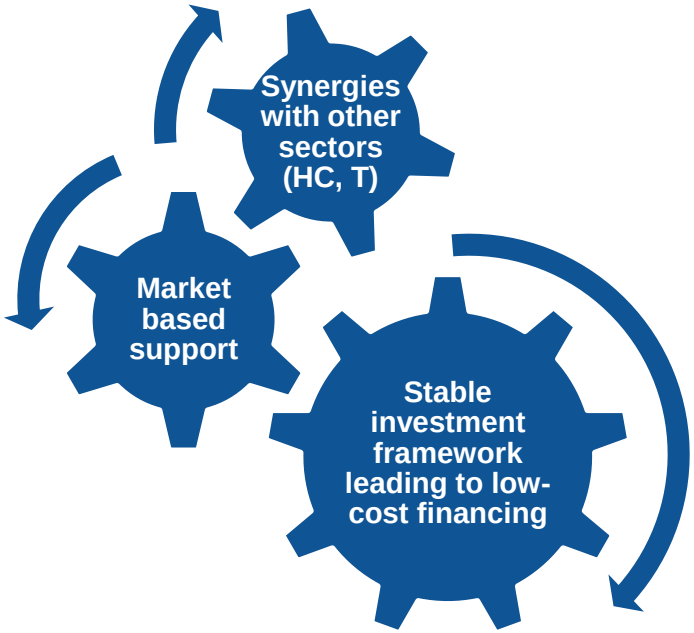


Result: Sustainable price and system adequacy in all situations

Making the market and renewables fit together



Creating an enabling and cost-efficient environment for renewables



Delivering on the Energy Union's ambition of making the EU the world leader in renewable energy requires creating a conducive environment for renewables to attract the required investments

Thank you for your attention

More information on our website:
http://ec.europa.eu/energy/en/topics/renewable-energy

ENER studies available here:
http://ec.europa.eu/energy/en/studies

2014 RES integration study available here:
https://ec.europa.eu/energy/sites/ener/files/documents/201406_report_renewables_integration_europe.pdf

IEA study:
http://www.iea.org/publications/insights/insightpublications/SecuringPowerTransition_Secondeedition_WEB.pdf

Back-up slides

(DNV-GL study)

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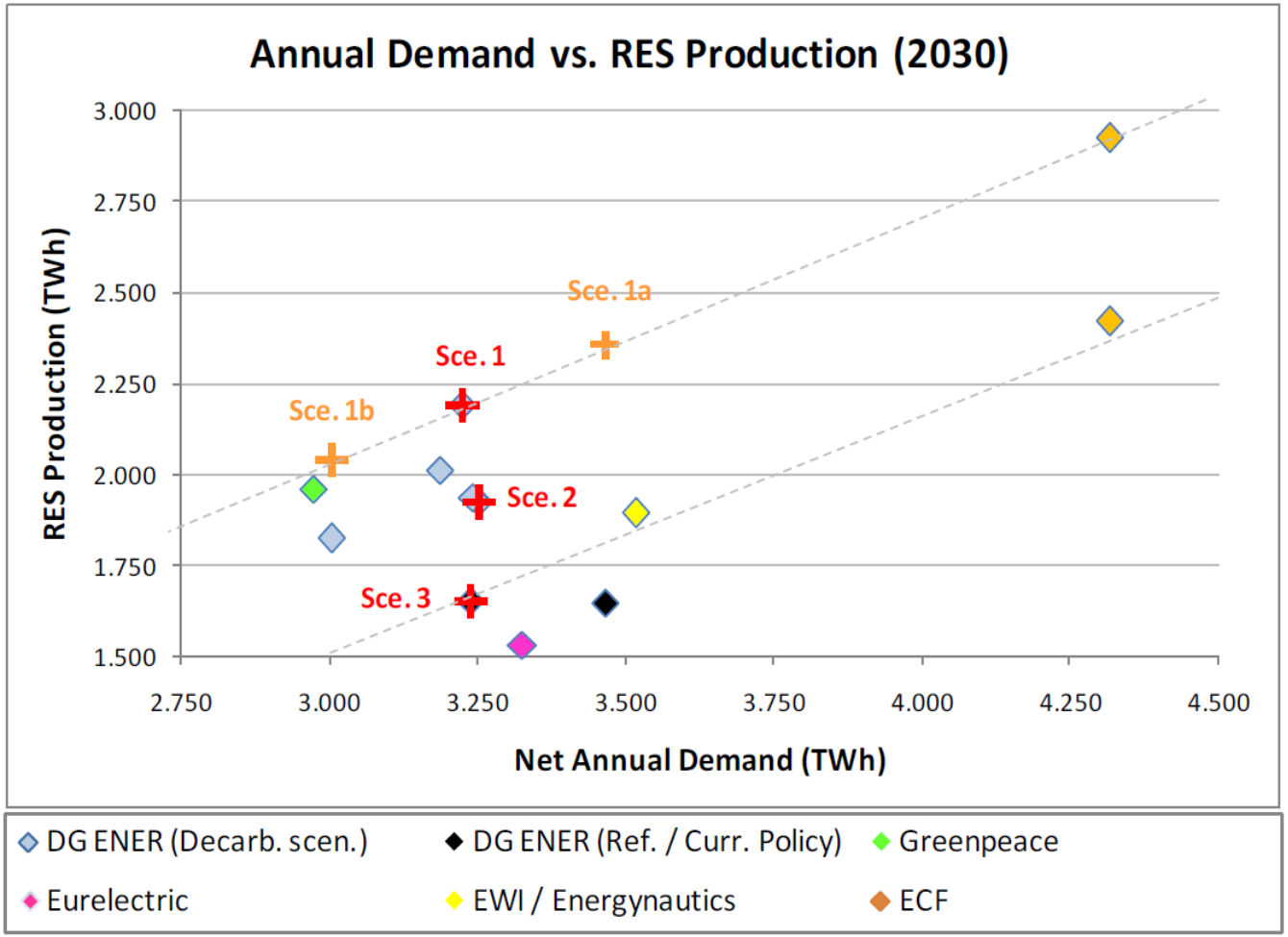
Assumptions and scenarios

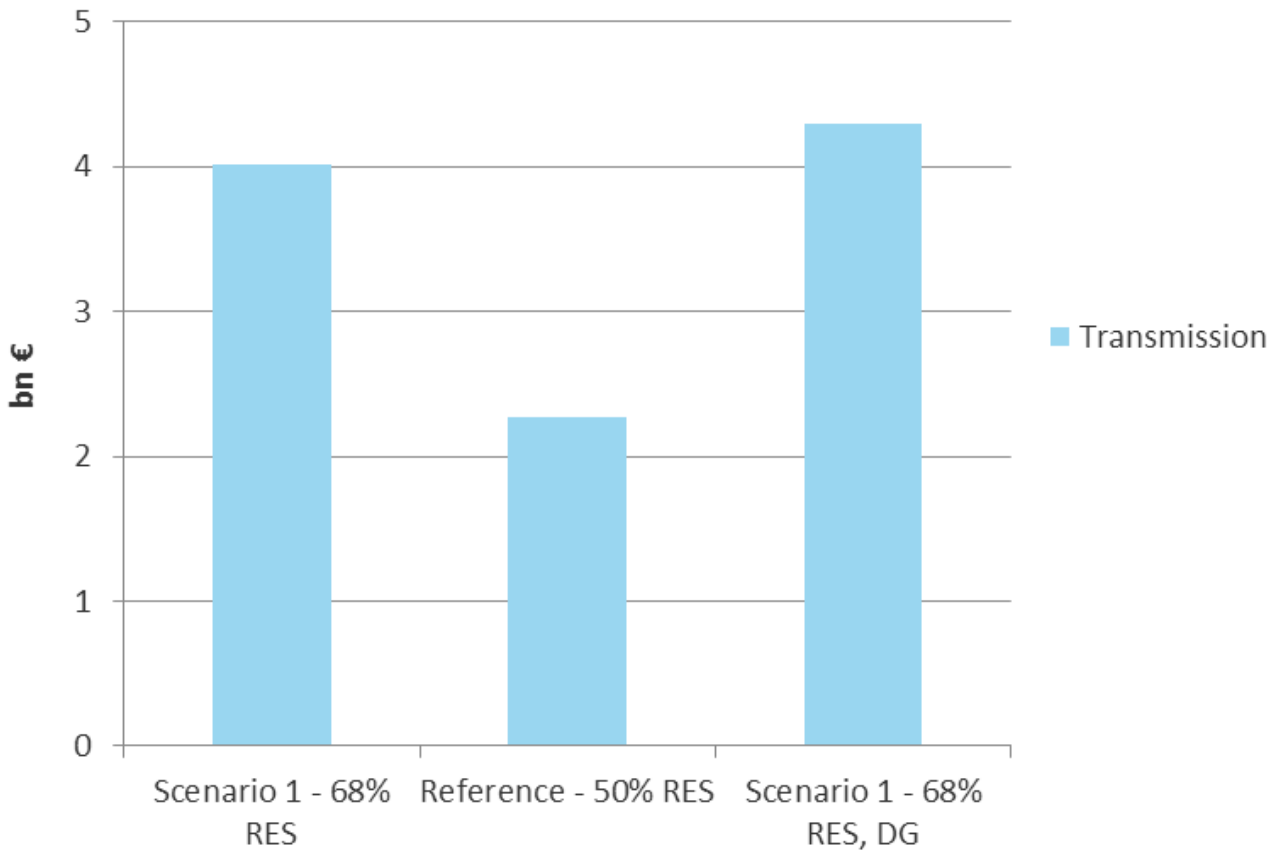
	Scenario	RES
1	Optimistic Scenario	68%
1a	Optimistic scenario with high demand	
1b	Optimistic scenario with high energy efficiency	
2	Middle Scenario	59%
3	Pessimistic Scenario	51%



Future costs for RES-integration

We will need more grid investment with additional RES-E :

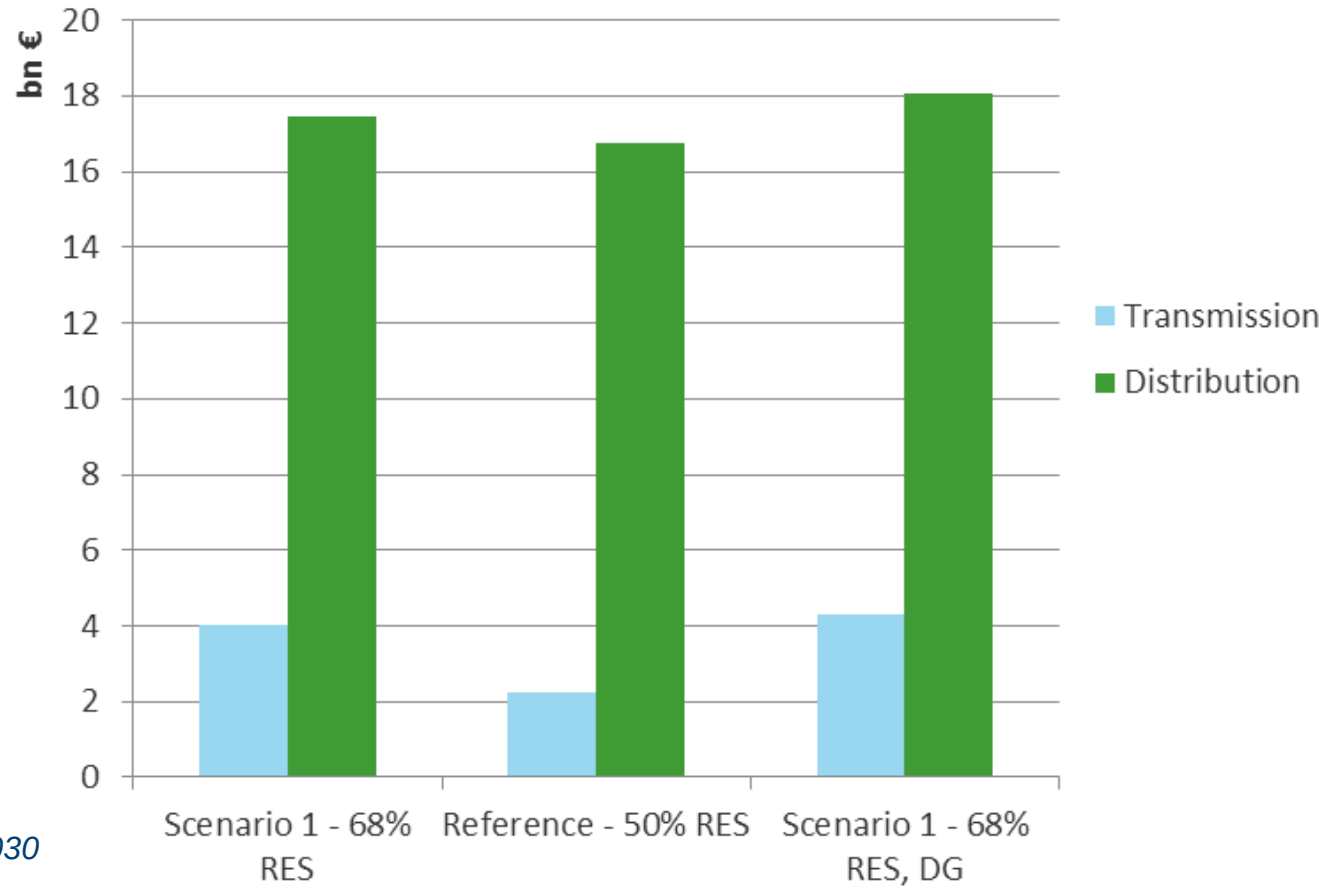
both transmission…



Annualized cost components in 2030

Future costs for RES-integration

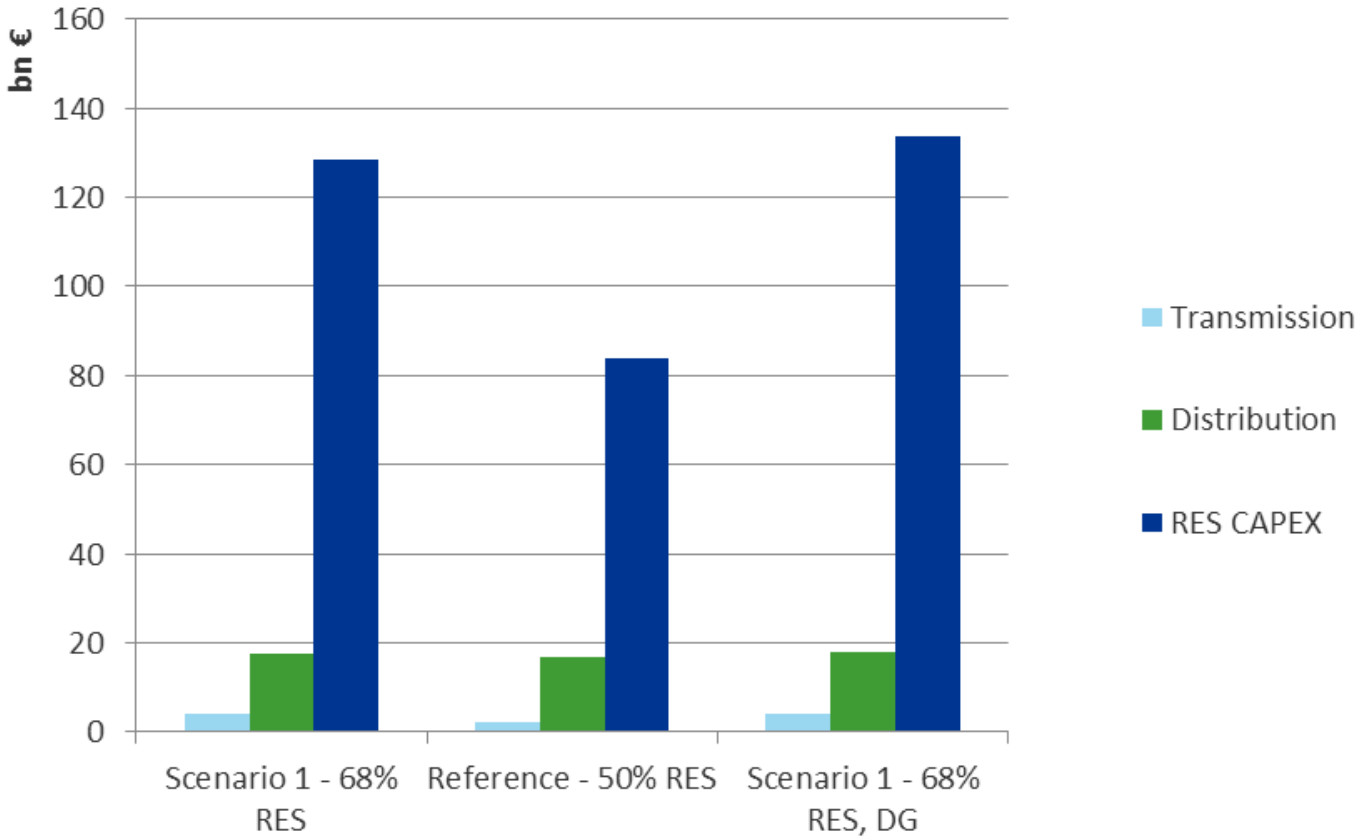
…and distribution…



Annualized cost components in 2030

Future costs for RES-integration

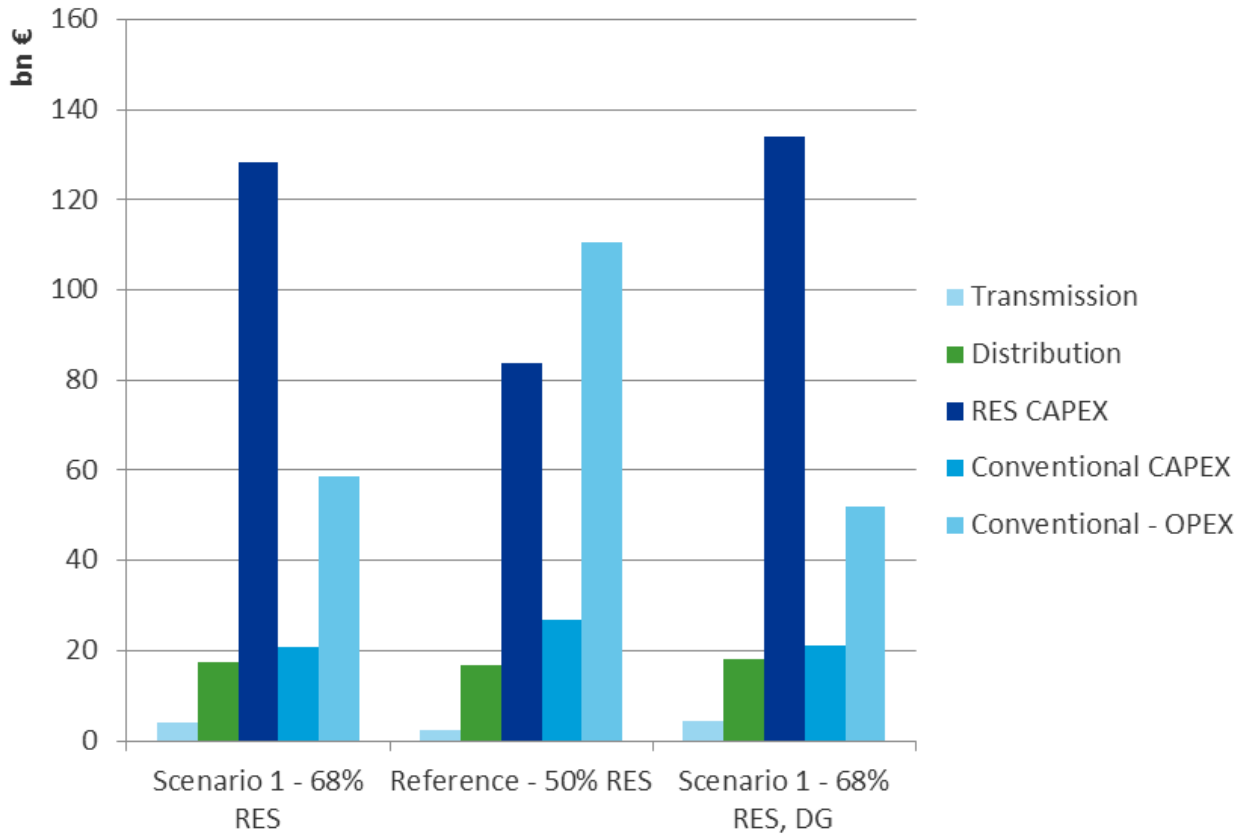
…additional RES investments…



Annualized cost components in 2030

Future costs for RES-integration

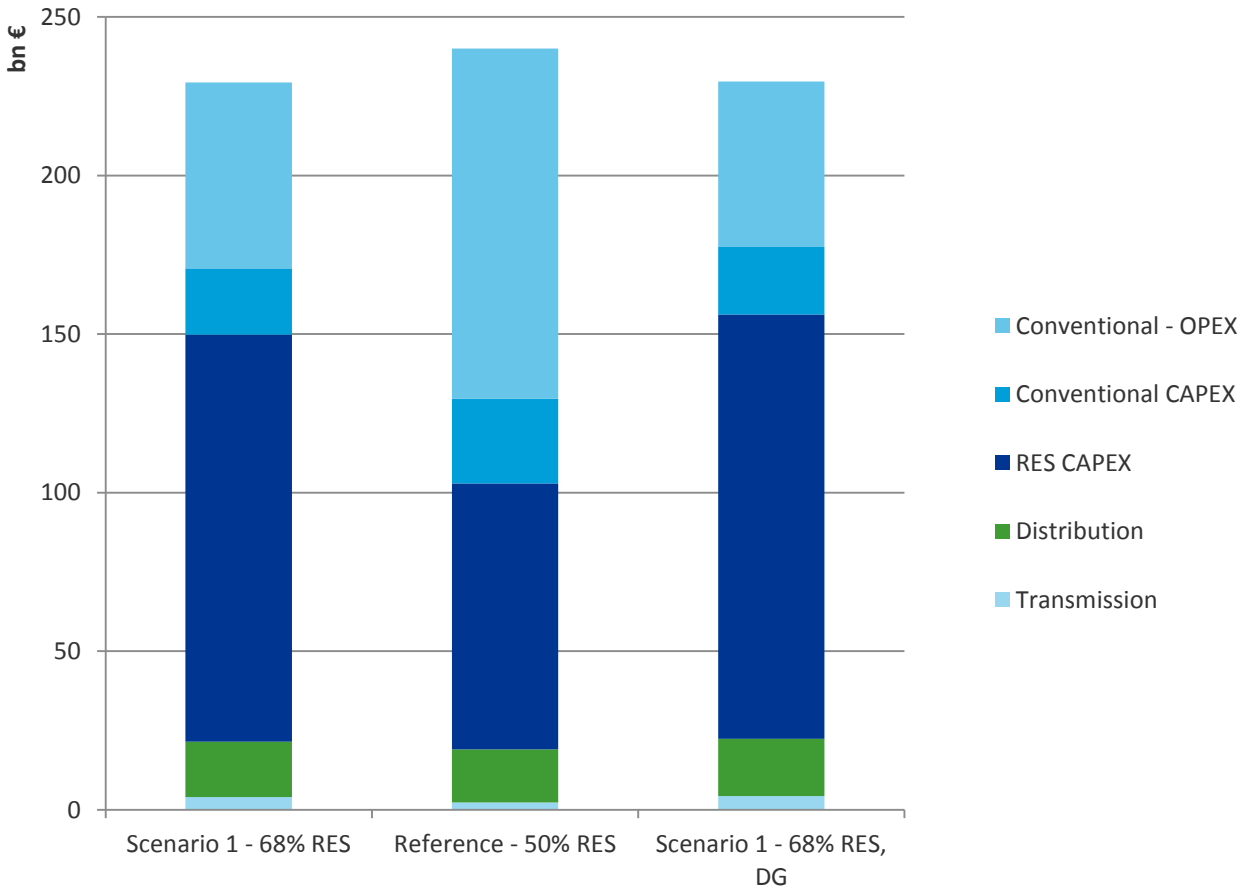
…but also less conventional generation…



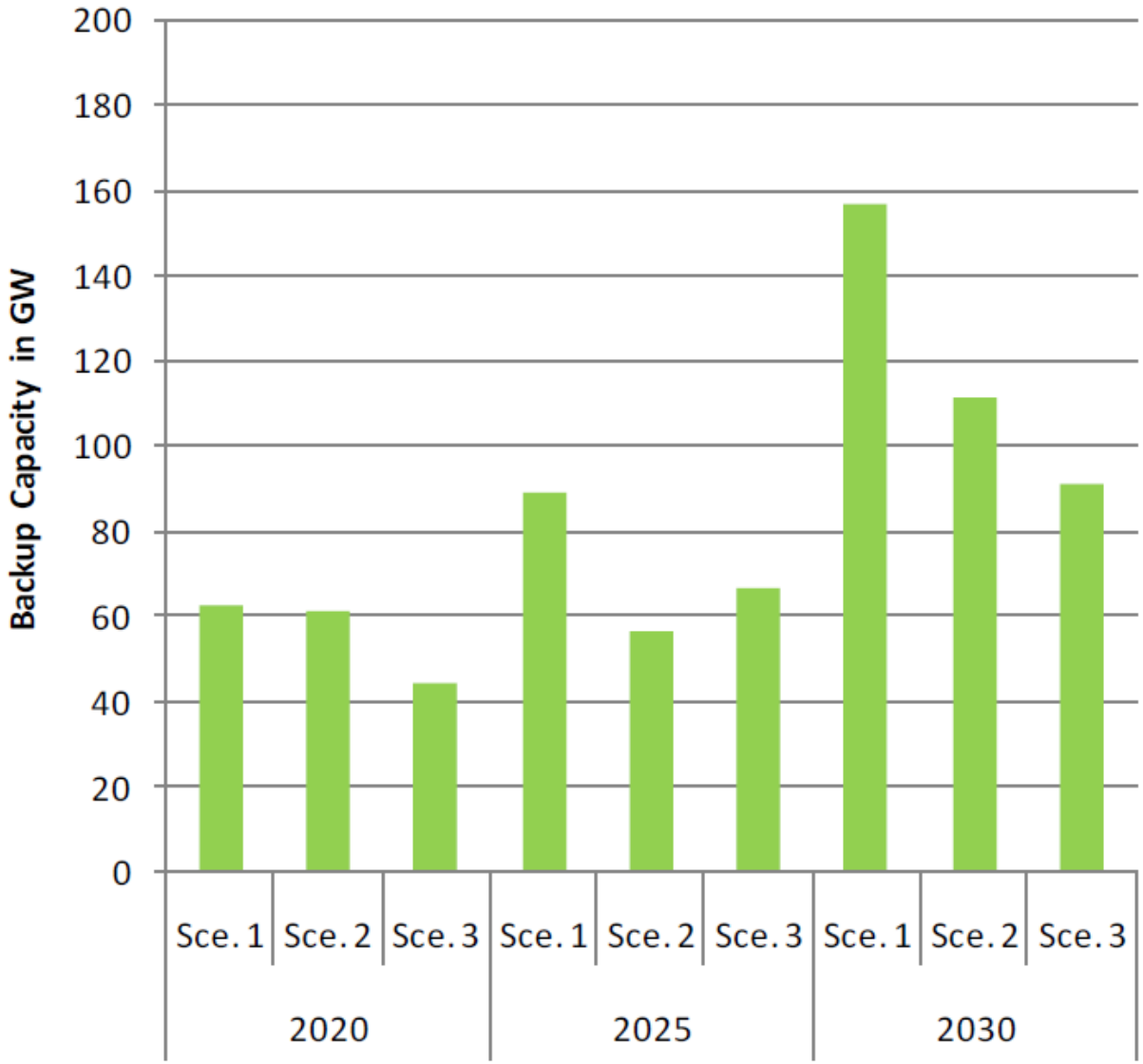
Annualised cost components in 2030

Future costs for RES-integration

…which more than compensates for RES-costs



Annualized cost components in 2030


Backup Capacity in GW
200
180
160
140
120
100
80
60
40
20
0
Sce. 1
Sce. 2
Sce. 3
Sce. 1
Sce. 2
Sce. 3
Sce. 1
Sce. 2
Sce. 3
2020
2025
2030