

beyond 2020

Cost-benefit analysis of RES policy pathways beyond 2020

*... draft final results of
the quantitative assessment*

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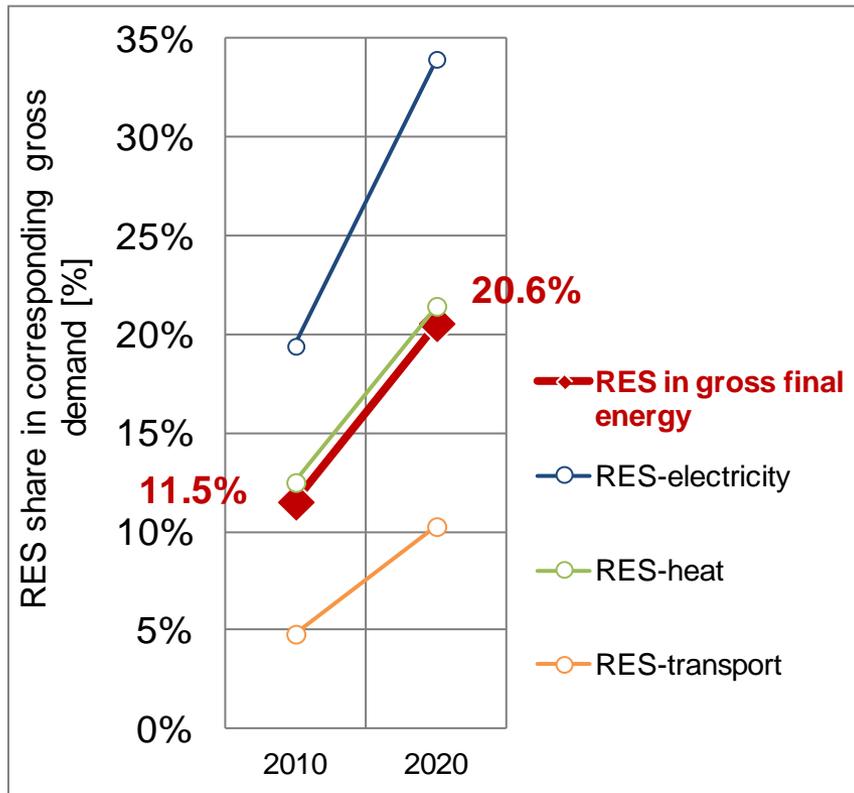
This presentation presents outcomes of model-based assessments conducted within the European IEE project

◀ Design and impact of a harmonised policy for renewable electricity in Europe ... www.res-policy-beyond2020.eu

Content

- (1) **Introduction** - *the starting point ... 20% RES by 2020*
- (2) **A closer look beyond 2020** ... *the challenges & the policy options*
- (3) **Results** *of the quantitative RES policy assessment*
- (4) **Conclusions**

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► 20% RES by 2020... **What do the NREAPs tell us?****NREAP** – outlook to 2020 (EU level)

According to the NREAPs, Member States plan to overachieve the overall 20% RES target by 0.6%.

... whether or not the proposed actions will be sufficient to achieve these targets remains to be seen ...

► **The starting point**
... 20% RES by 2020

... from “business as usual” (BAU) to
“strengthened national RES policies”

BAU case: RES policies
are applied as currently
implemented (without any
adaptation) until 2020,
i.e. a **business as usual**
(BAU) forecast.



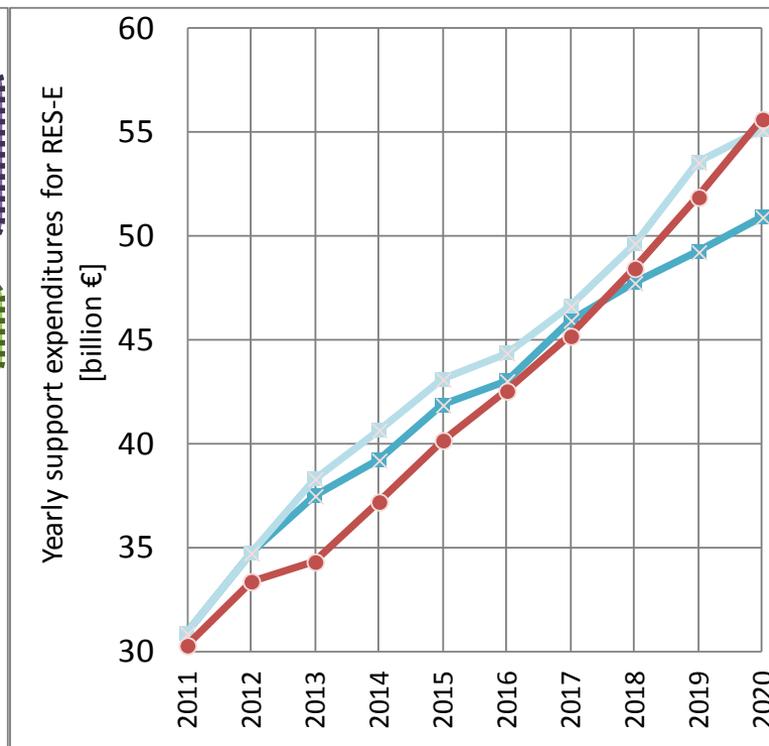
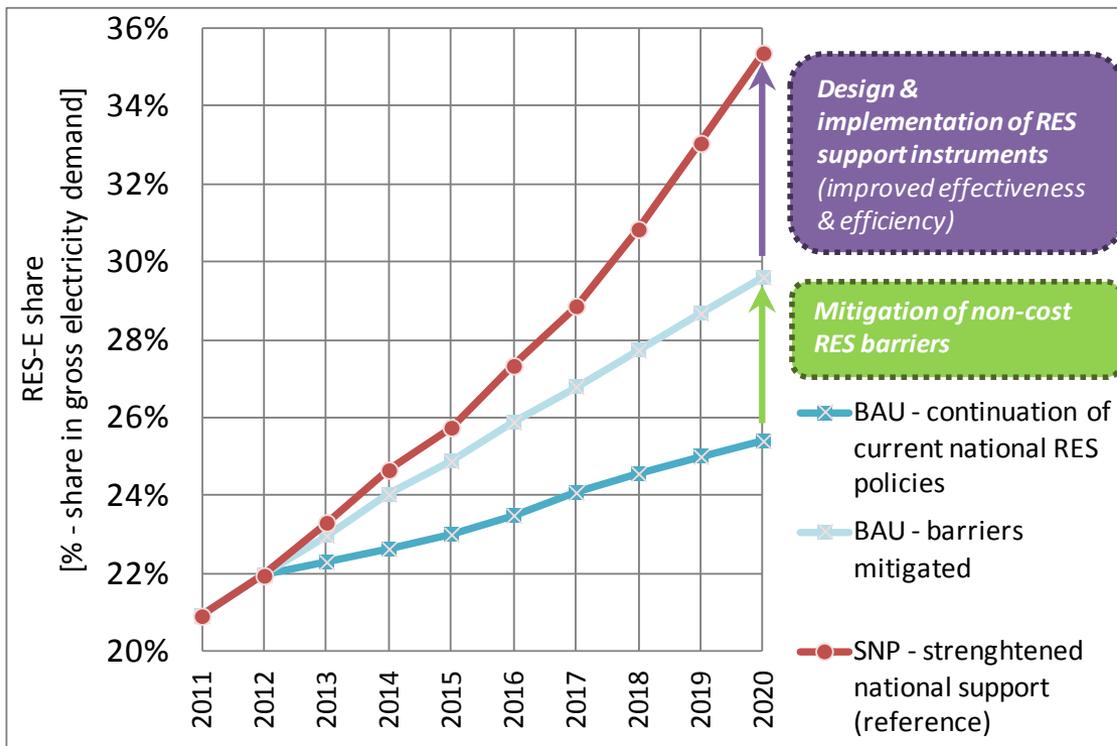
Strengthened national RES support:

- ◀ Meeting 20% RES by 2022 as precondition
- ◀ Continuation BUT fine-tuning (increasing cost-efficiency & effectiveness) of national RES policies
- ◀ No change of the in prior chosen policy track
- ◀ Mitigation of non-cost barriers

- ◀ Green-X BAU scenarios draw a more pessimistic view where only a RES share of 15% to 17% appears feasible under current RES support (*BAU case*)
- ◀ A strengthening of national RES policies (SNP) appears essential as well as a removal of non-economic barriers that hinder an accelerated market diffusion

Results: Towards an effective and efficient RES target fulfillment

- from BAU to strengthened national support



Comparison of RES-E deployment & corresponding support expenditures for new RES-E (installed 2011 to 2020) in the EU-27 for selected cases

- i.e. BAU and strengthened national support

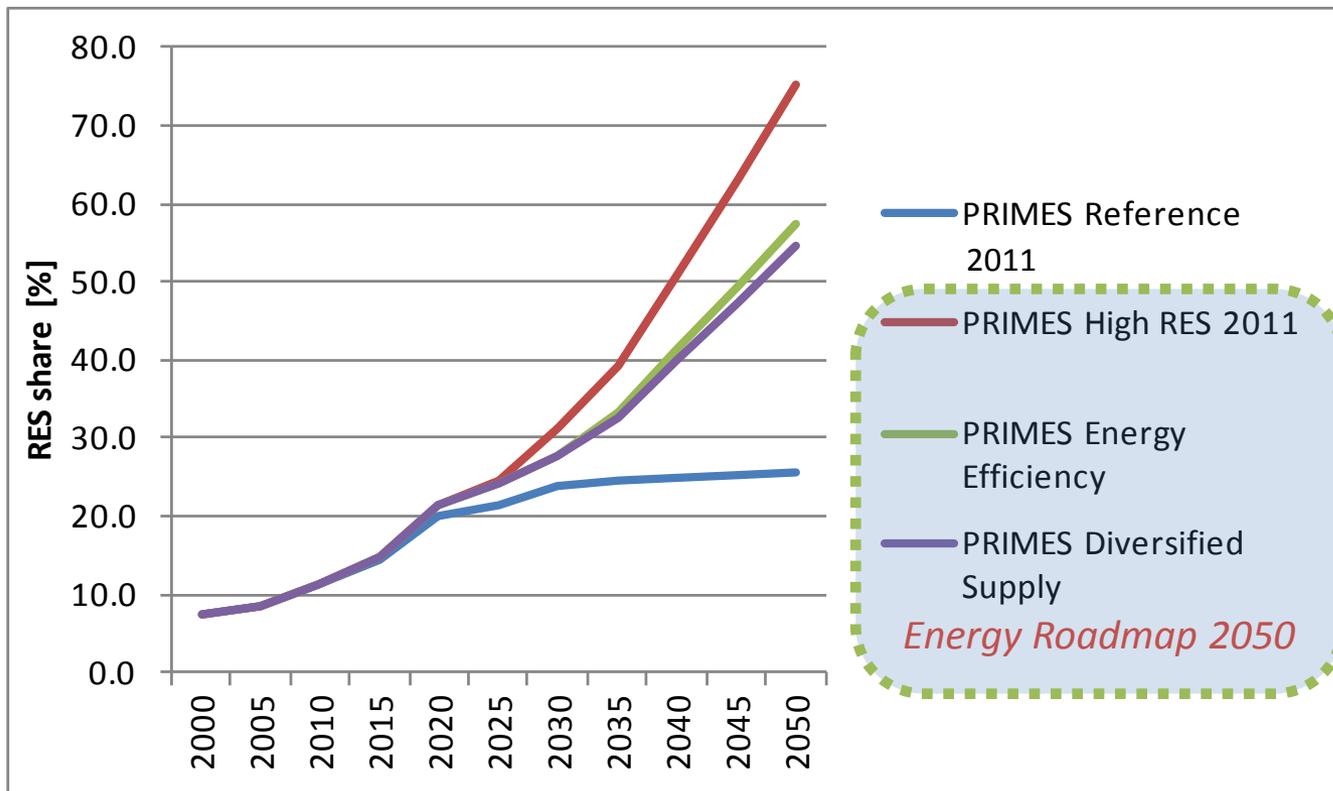
Source: Re-Shaping project (2012)

Our agenda for “tomorrow”

→ *Tackle the energy & climate problem ...*

*... for which renewable energies are
the key mitigation option*

Source: Energy Roadmap 2050 (EC, DG ENER, 2011)



A RES strategy beyond 2020

Several policy dimensions relate to the debate on a future RE strategy for Europe beyond 2020. These include:

- ◀ **RE support instruments** and financing aspects related to that,
- ◀ **Electricity market design** and impacts on market functioning arising from an enhanced use of (variable) renewable energy sources,
- ◀ **Sustainability concerns**, in particular related to the use of biomass,
- ◀ **Cooperation with third countries**, in particular imports (to the EU) of biofuels and solid biomass as well as renewable electricity (RES-E).

Generally, future policy choices related to above dimensions might show a *more national orientation* or could reflect *further consolidation and cooperation among Member States*, whereby the ultimate extent would be a harmonised approach across the EU.

beyond2020 - Definition of RES policy pathways

Degree of harmonisation		Instrument	FIT (feed-in tariff)	FIP (feed-in premium)	QUO (quota system with uniform TGC)	QUO banding (quota system with banded TGC)	ETS (no dedicated RES support)	TEN (Tendering for large scale RES)
	Characterisation							
Full	<ul style="list-style-type: none"> •EU target •One instrument 	1a	2a	3a*	4a	5*	6	
Medium	<ul style="list-style-type: none"> •EU target •One instrument •Additional (limited) support allowed 	1b	2b	3b	4b			
Soft	<ul style="list-style-type: none"> •National targets •One instrument •MS can decide on various design elements incl. support levels 	1c	2c	3c	4c			
Mini-mum	<ul style="list-style-type: none"> •With minimum design standards for support instruments 	<ul style="list-style-type: none"> •National targets •Cooperation mechanism (w/o increased cooperation) 	7* Reference (national RES support with cooperation) (w/o minimum design standards)					
No	<ul style="list-style-type: none"> •No minimum design standards for support instruments 							

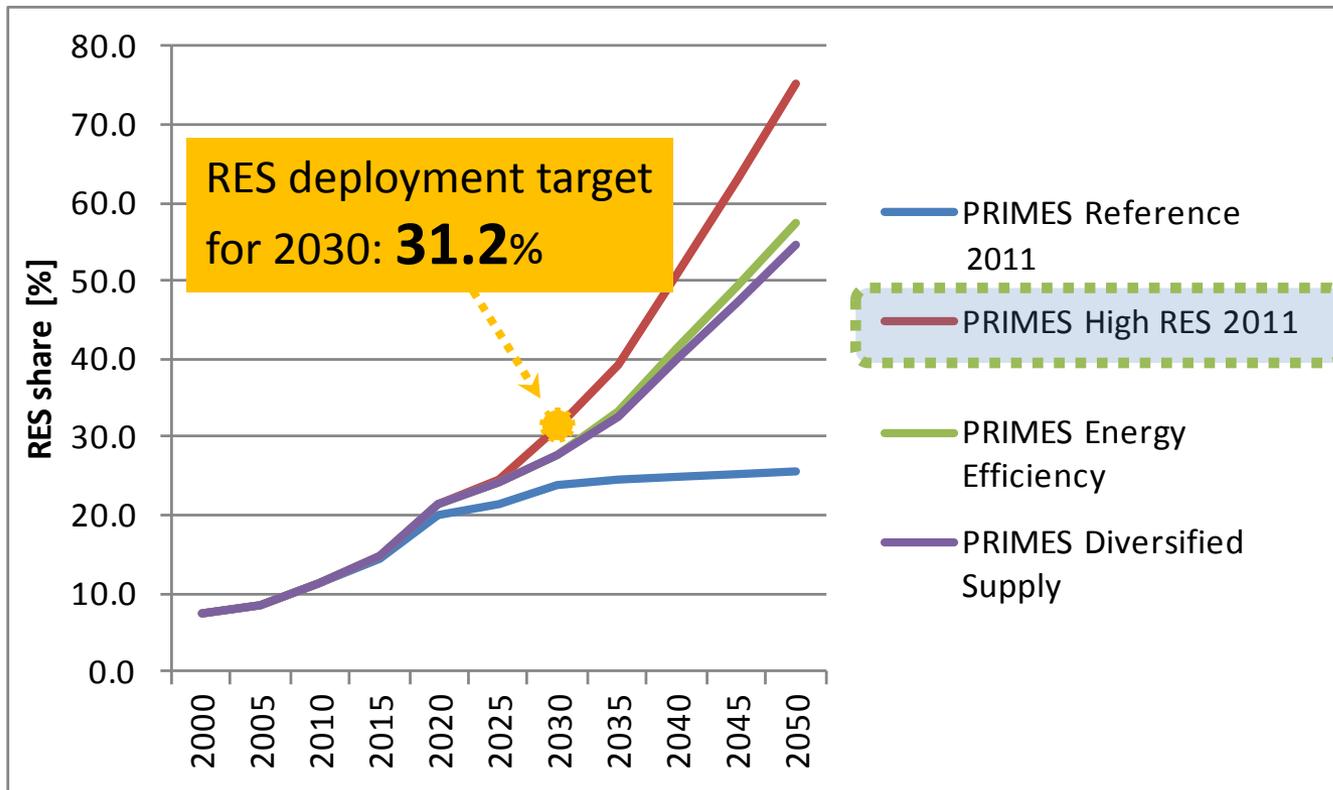


Note: *Pathways assessed at the interim stage of the project



Key assumptions / approach

- RES policy assessment conducted with Green-X model
- Assumptions on conventional reference system, energy and carbon prices as well as energy demand based on *PRIMES „high renewables“ case* (EC, Energy Roadmap, 2011)
- Final modeling incorporates outcomes of the assessment of long-term RES potentials as well as of grid-related & electricity market aspects, in particular incl. market values for variable RES-e



www.green-x.at

Source: Energy Roadmap 2050
(EC, DG ENER, 2011)

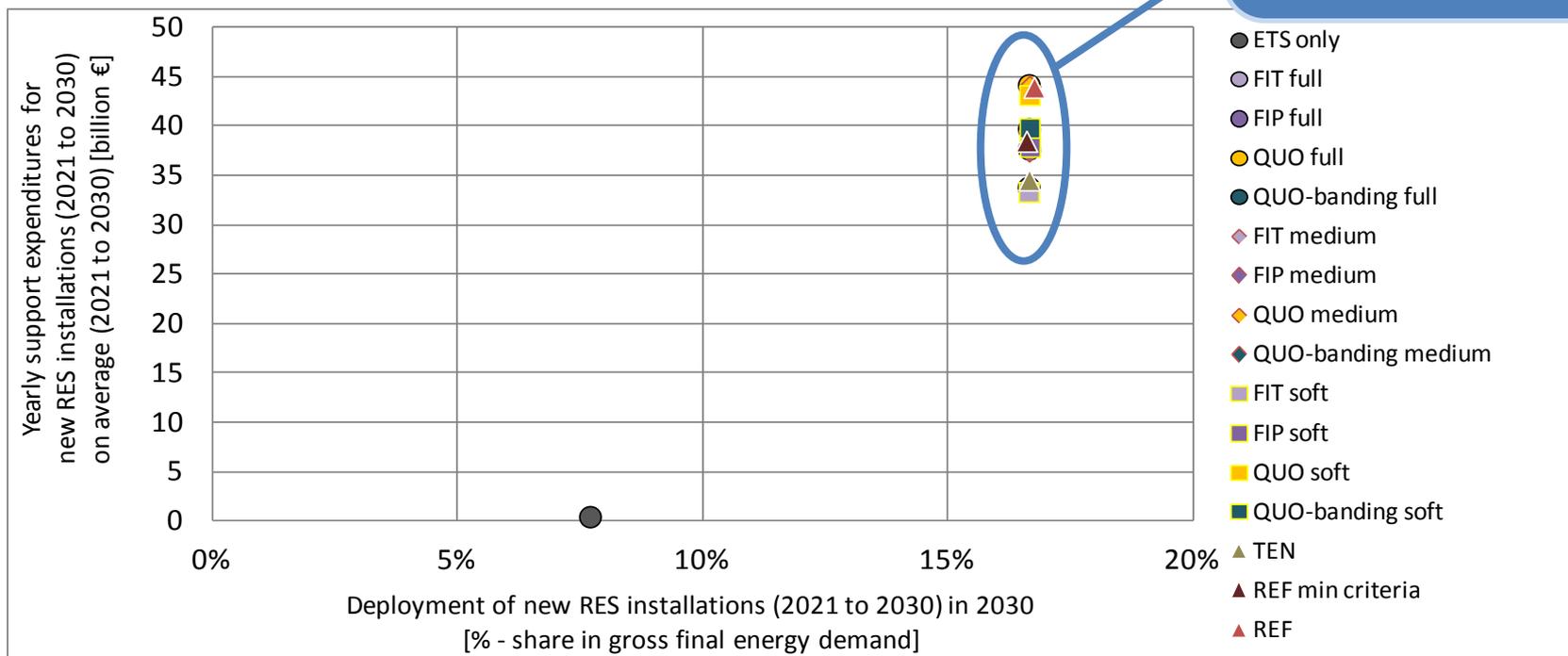


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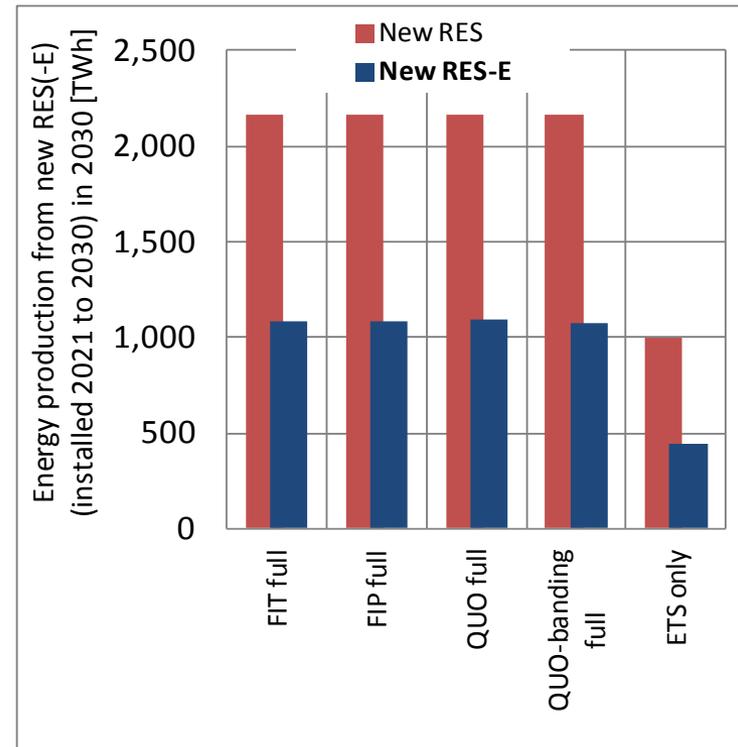
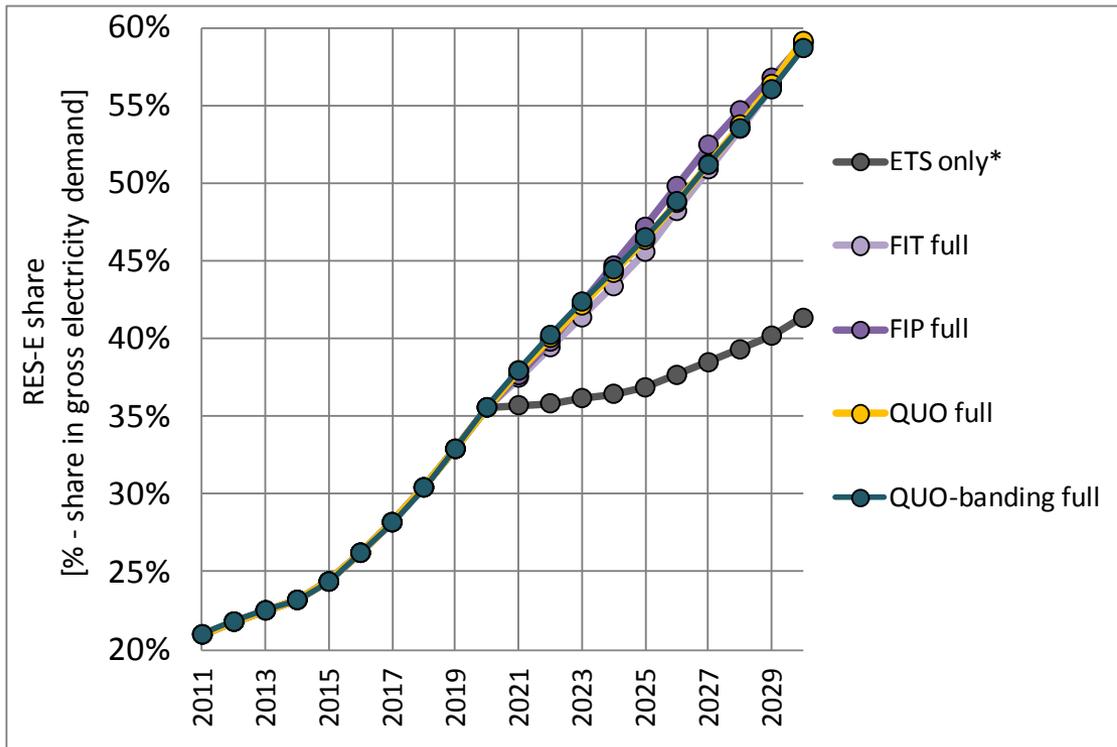
Results: RES pathways beyond 2020 ... final results (on deployment, cost & expenditures)

Comparison of **deployment & support expenditures** for new RES installations only (from 2021 to 2030) in the EU-27 for all assessed cases

Differences between assessed policy pathways are not of significantly high magnitude (with the exemption of "ETS-only")



Results: RES pathways beyond 2020 ... final results (on deployment)

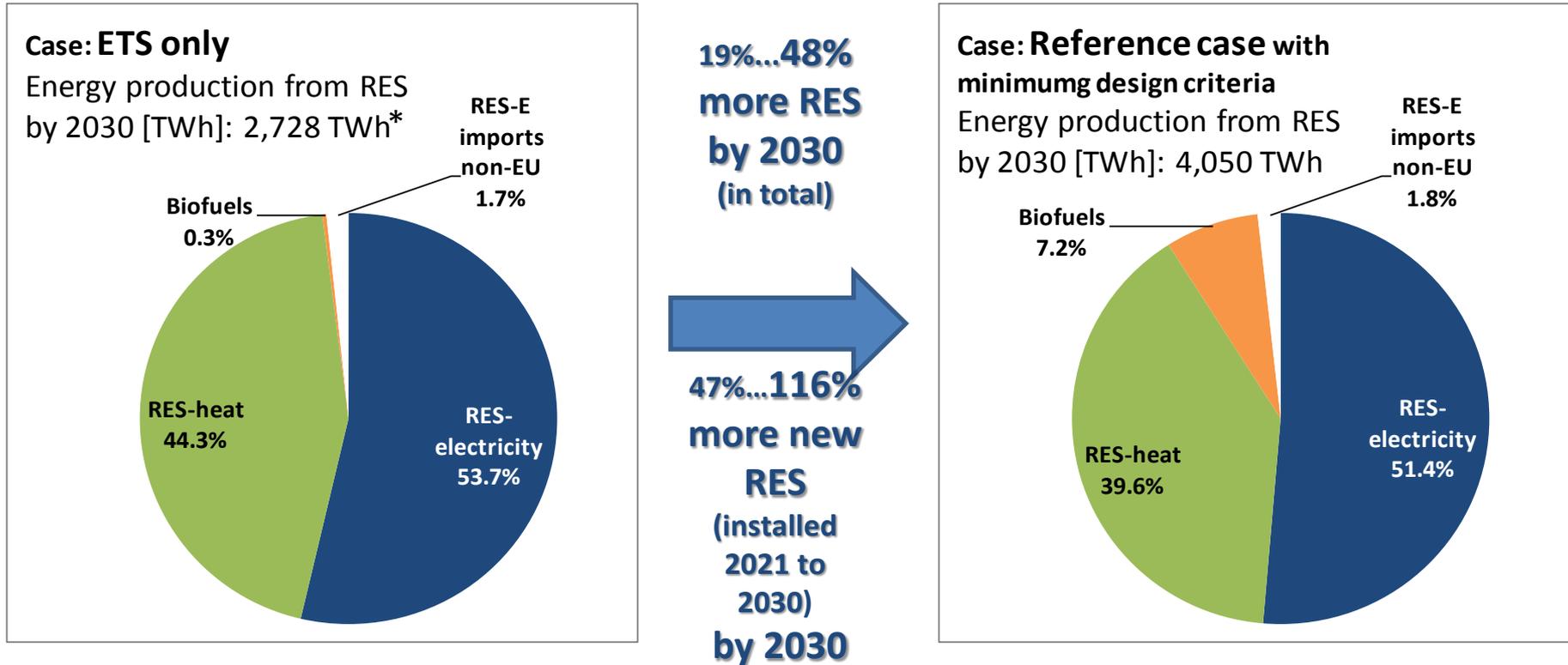


Comparison of the resulting **RES(-E) deployment**

- over time for all RES-E (left)
 - by 2030 for new RES(-E) installations only (from 2021 to 2030) (right)
- in the EU-27 for all assessed cases

Results: RES pathways beyond 2020 ... final results (on deployment)

**if carbon action is taken seriously: 3,390 TWh*

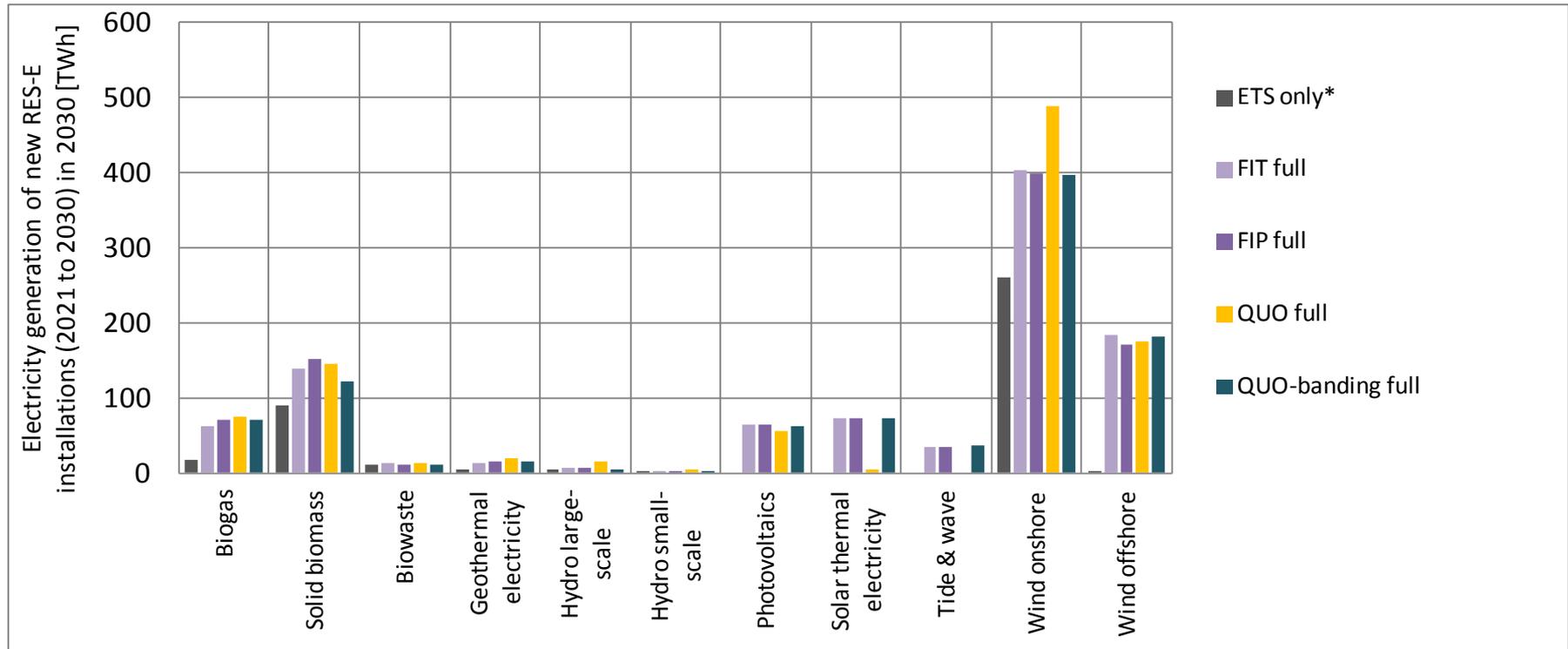


Breakdown of energy production from **RES by 2030** in the EU27

- for the "ETS only" case (left)
- for the case of "Reference case with minimum design criteria / intensified RES cooperation" (right)

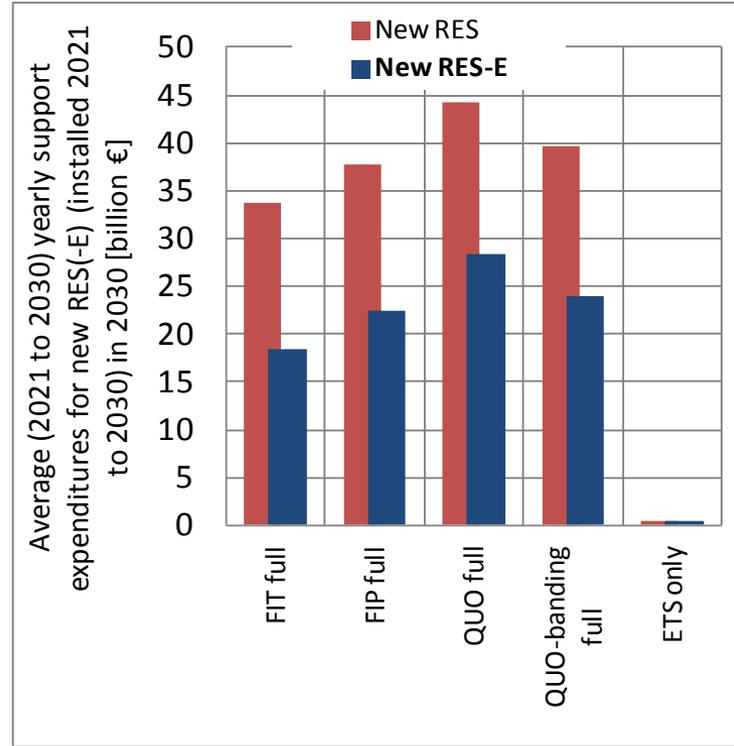
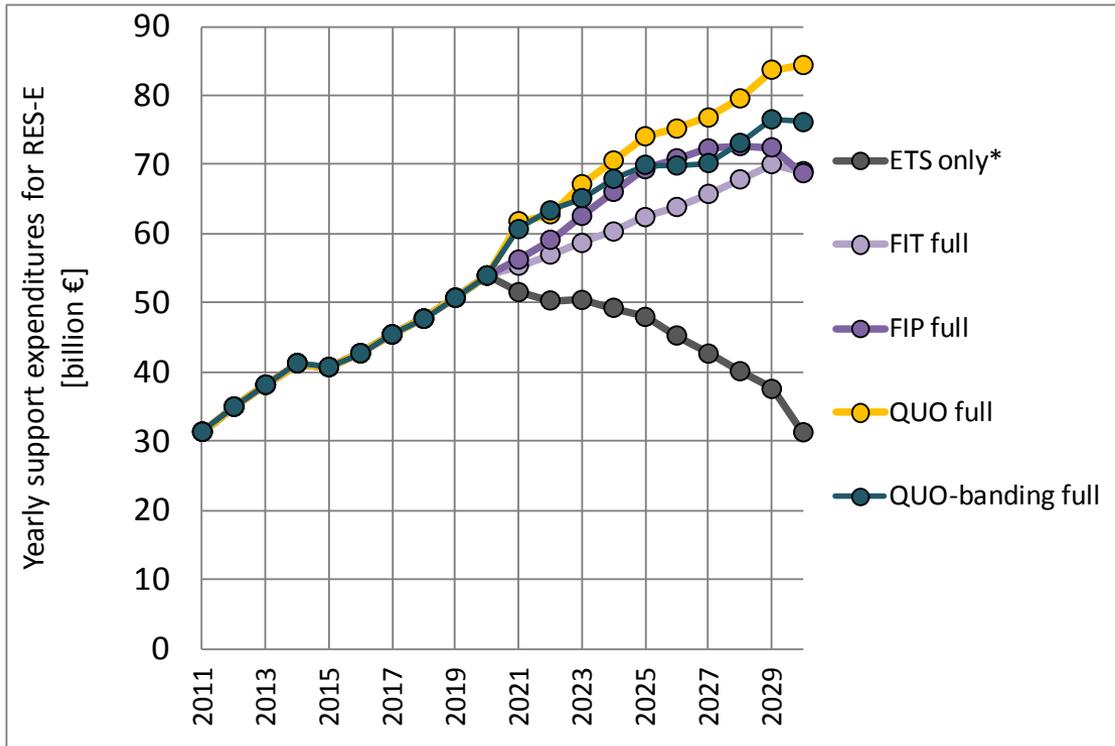
Full harmonisation
•EU target for RES 2030
•One instrument

Results: RES pathways beyond 2020 ... final results (on deployment)



Comparison of the resulting **RES-E deployment** by technology (of new installations (2021 to 2030) in the EU-27 for all assessed cases

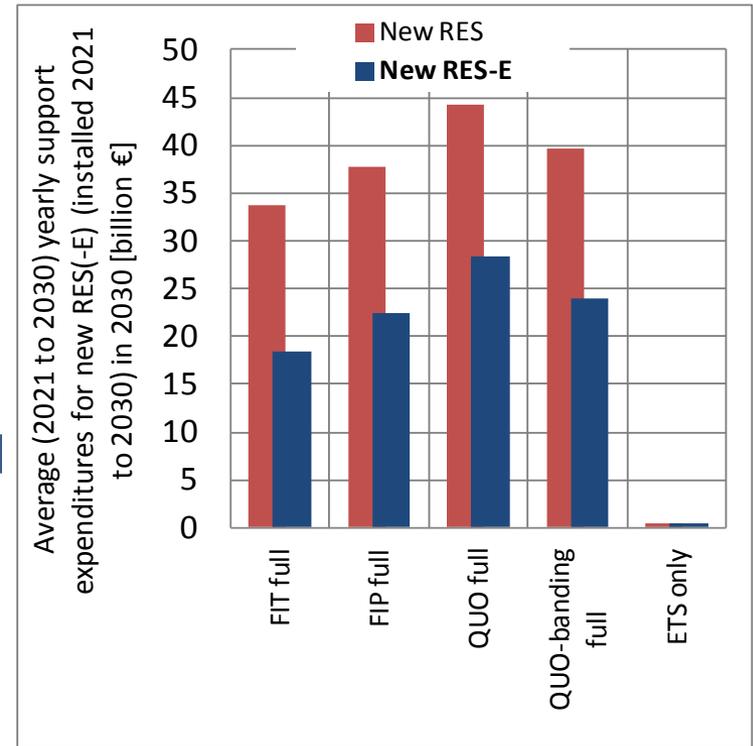
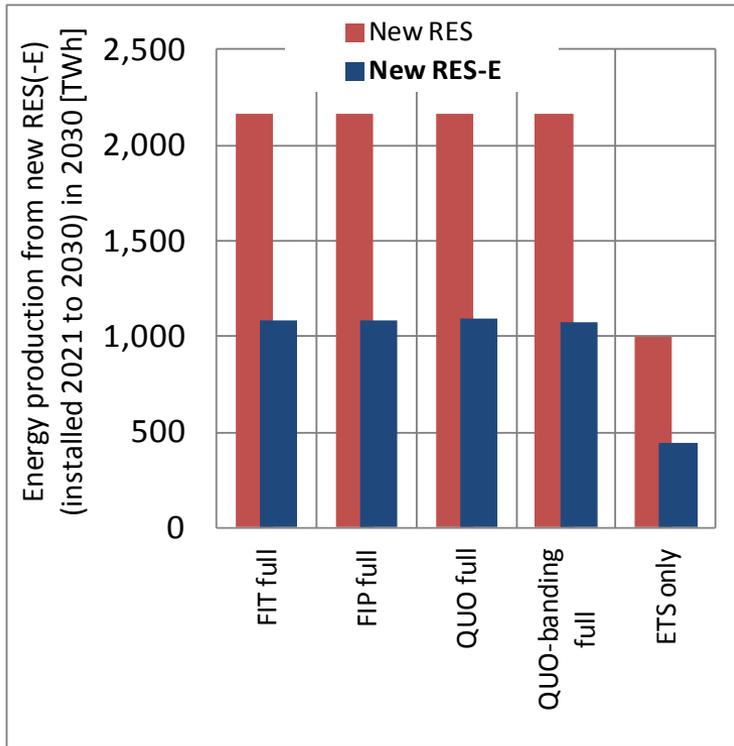
Results: RES pathways beyond 2020 ... final results (on cost & expenditures)



Comparison of yearly **support expenditures**

- over time for all RES-E (left)
- on average (2021-2030) for new RES(-E) installations only (from 2021 to 2030) (right) in the EU-27 for all assessed cases

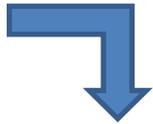
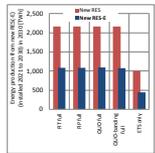
Results: RES pathways beyond 2020 ... final results (on deployment, cost & expenditures)



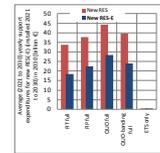
Comparison of **deployment & support expenditures**
for new **RES-Electricity installations only** (from 2021 to 2030)
in the EU-27 for all assessed cases

Full harmonisation
 • EU target for RES 2030
 • One instrument

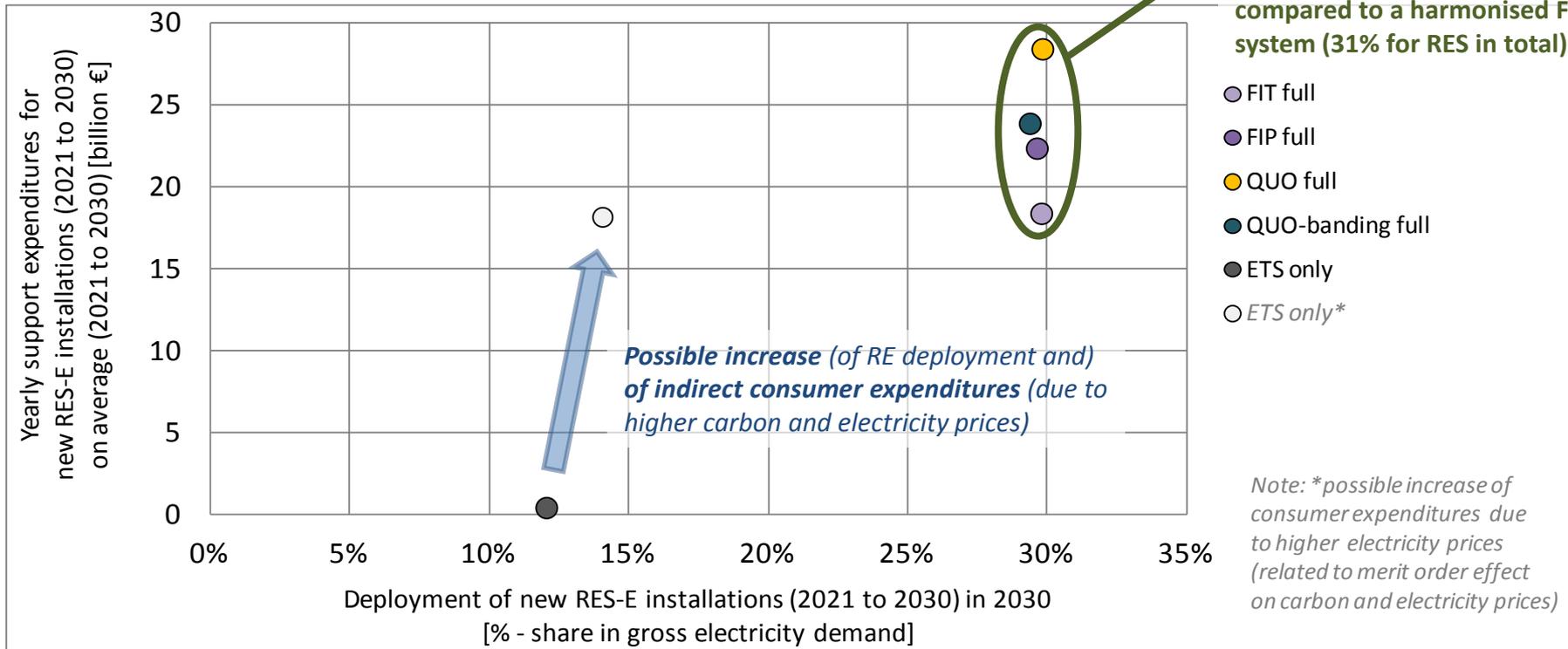
Results: RES pathways beyond 2020 ... final results (on deployment, cost & expenditures)



Comparison of **deployment & support expenditures** for new **RES-Electricity** installations only (from 2021 to 2030) in the EU-27 for all assessed cases



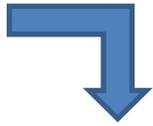
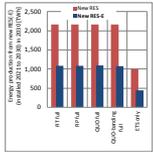
55% cost increase for RES-E in the case of a harmonised uniform quota system compared to a harmonised FIT system (31% for RES in total)



Medium harmonisation

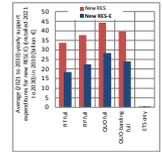
- EU target for RES 2030
- One instrument
- Additional limited support allowed

Results: RES pathways beyond 2020 ... final results (on deployment, cost & expenditures)

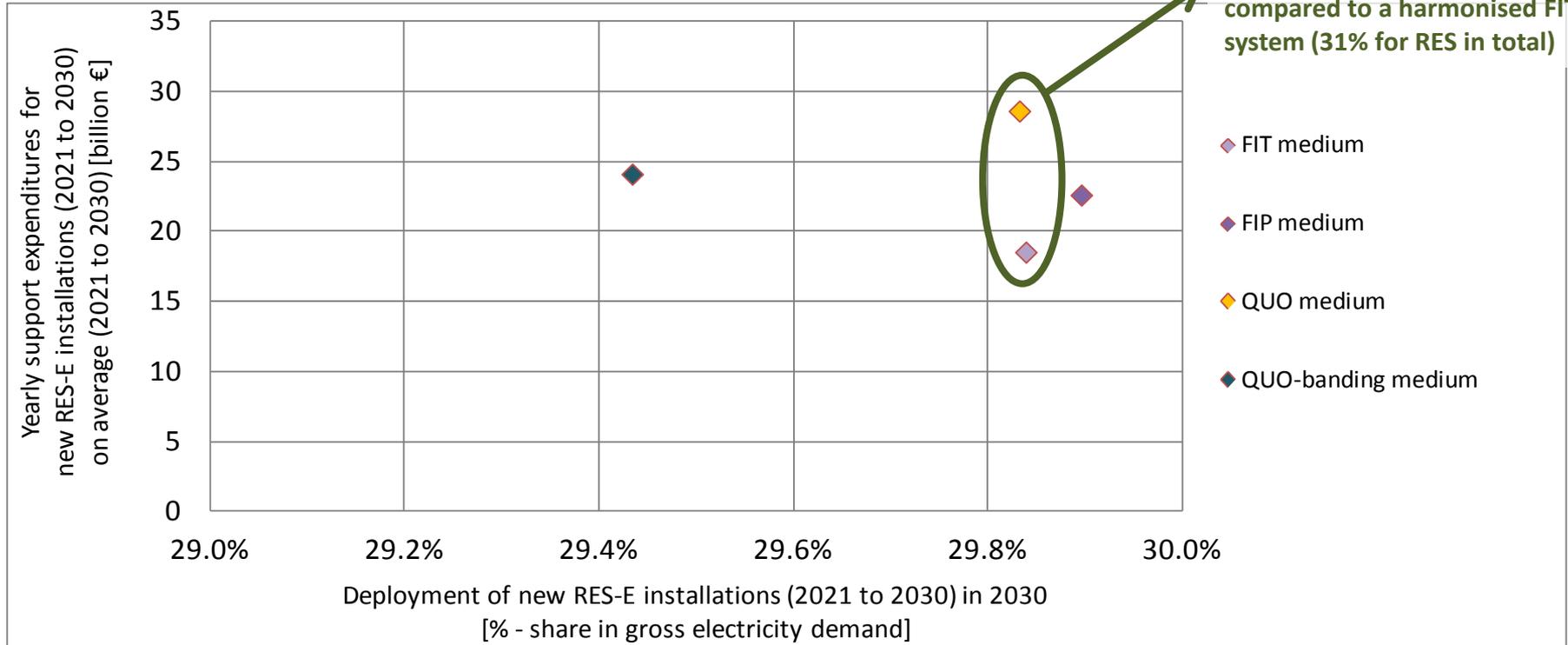


Comparison of **deployment**
& **support expenditures**

for new **RES-Electricity** installations only
(from 2021 to 2030)
in the EU-27 for all assessed cases



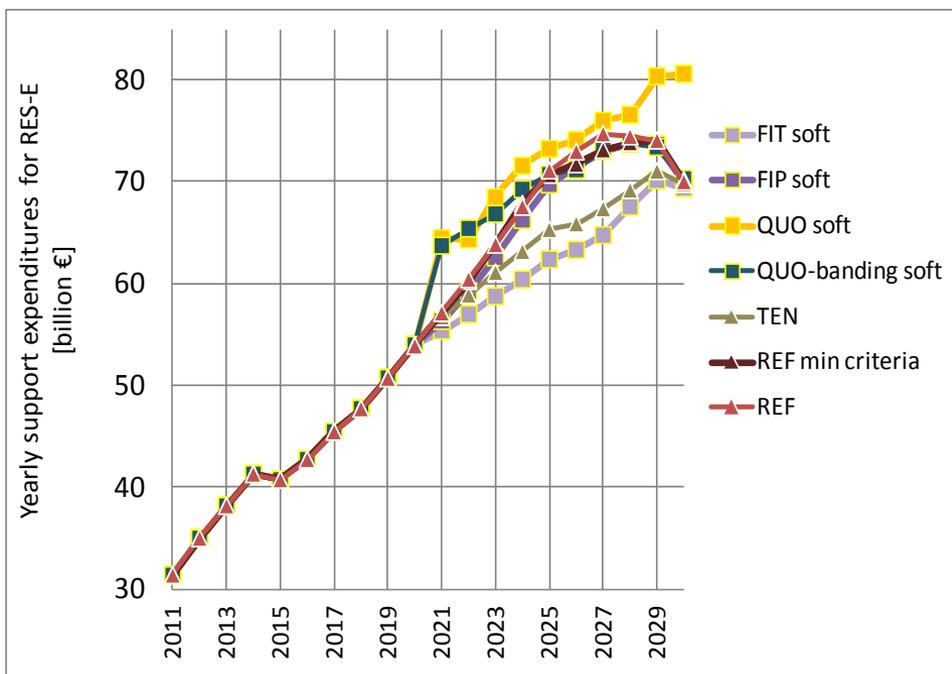
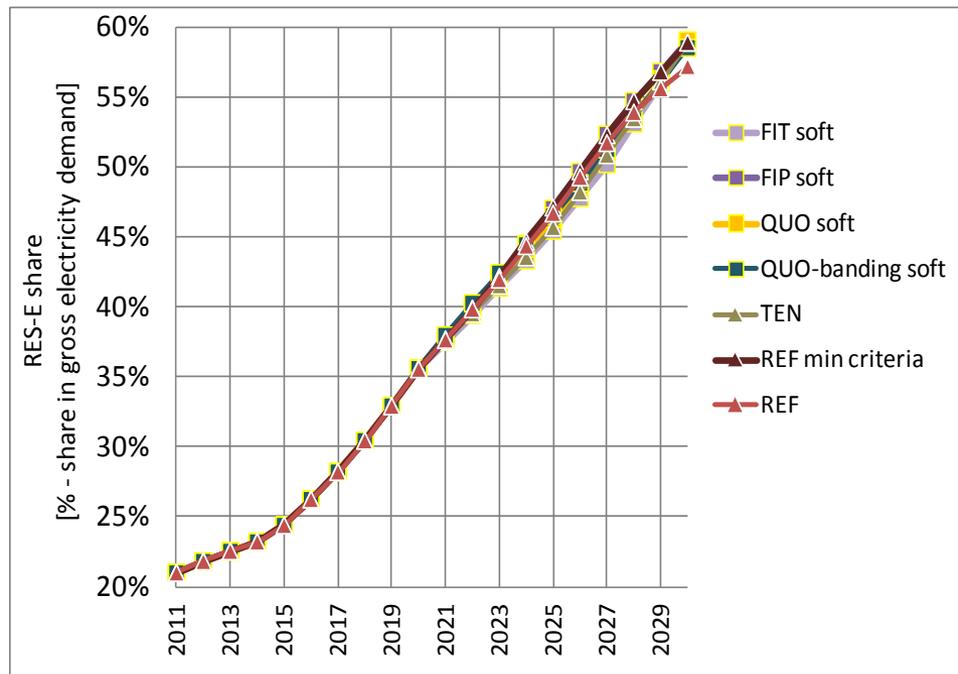
54% cost increase for RES-E in the case of a harmonised uniform quota system compared to a harmonised FIT system (31% for RES in total)



Minimum / No harmonisation
 •Reference case(s) of national support with /without minimum design standards

Soft harmonisation
 •National targets for RES 2030
 •One instrument
 •MS can decide on detailed design

Results: National 2030 RES targets & resulting deployment / (virtual) exchange



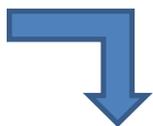
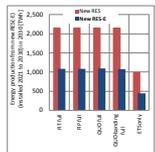
Comparison of the resulting
 •RES-E deployment over time (left) and related
 •support expenditures over time (right)
 in the EU-27 for all assessed cases



Minimum / No harmonisation
 •Reference case(s) of national support with /without minimum design standards

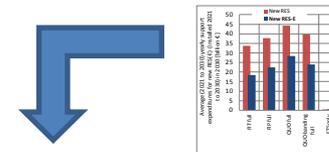
Soft harmonisation
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Results: RES pathways beyond 2020 ... final results (on deployment, cost & expenditures)

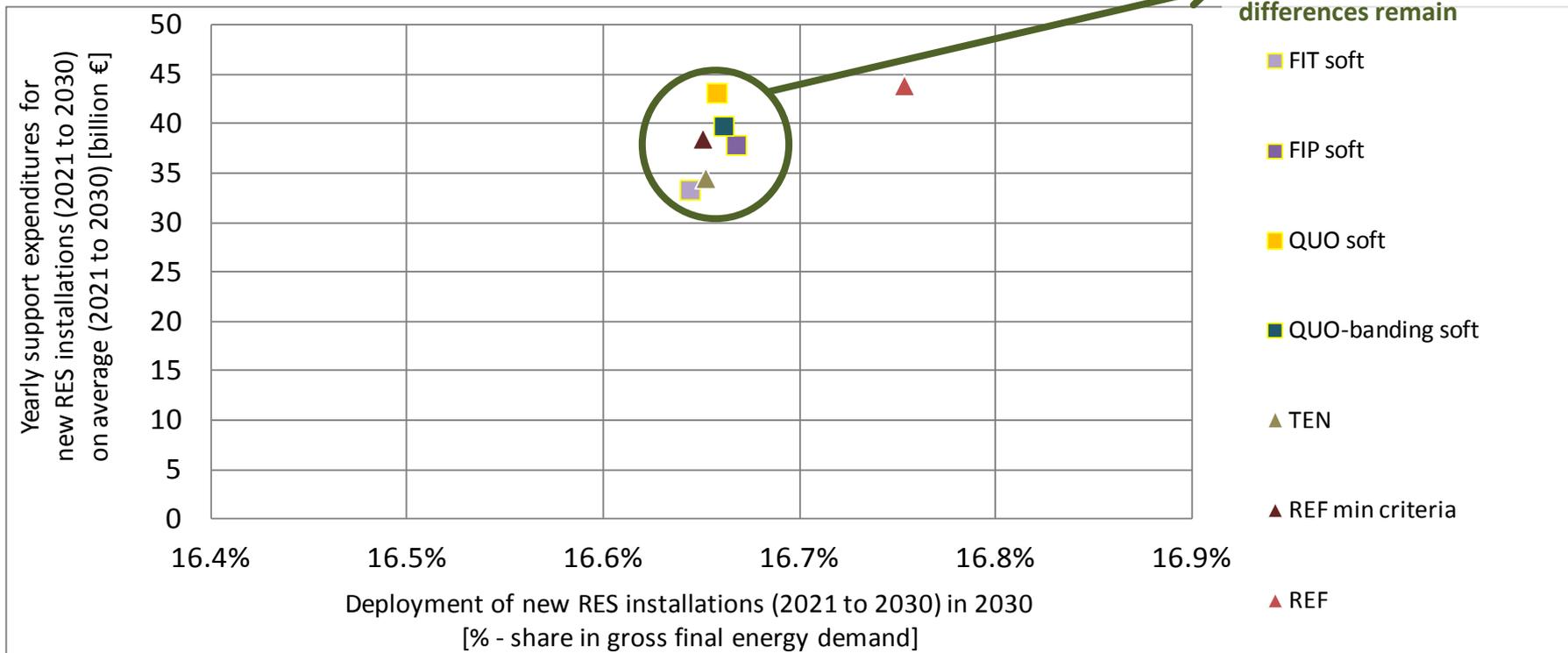


Comparison of **deployment & support expenditures** for new **RES installations** (from 2021 to 2030)

in the EU-27 for all assessed cases



A variety of policy options show a comparatively similar performance, but some differences remain

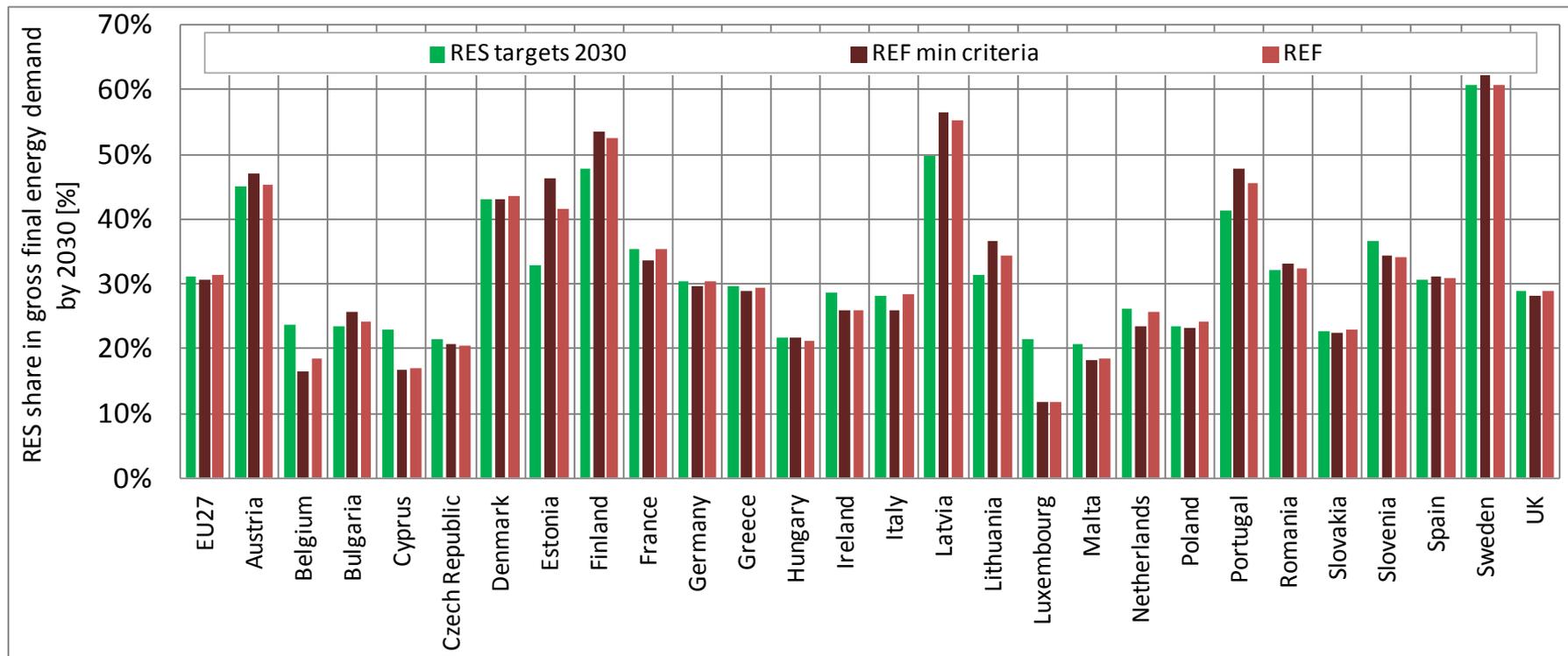


- FIT soft
- FIP soft
- QUO soft
- QUO-banding soft
- ▲ TEN
- ▲ REF min criteria
- ▲ REF

Minimum / No harmonisation
 •Reference case(s) of national support with /without minimum design standards

Soft harmonisation
 •National targets for RES 2030
 •One instrument
 •MS can decide on detailed design

Results: National 2030 RES targets & resulting deployment / (virtual) exchange



Comparison of national RES targets for 2030 and resulting deployment in the case of national support

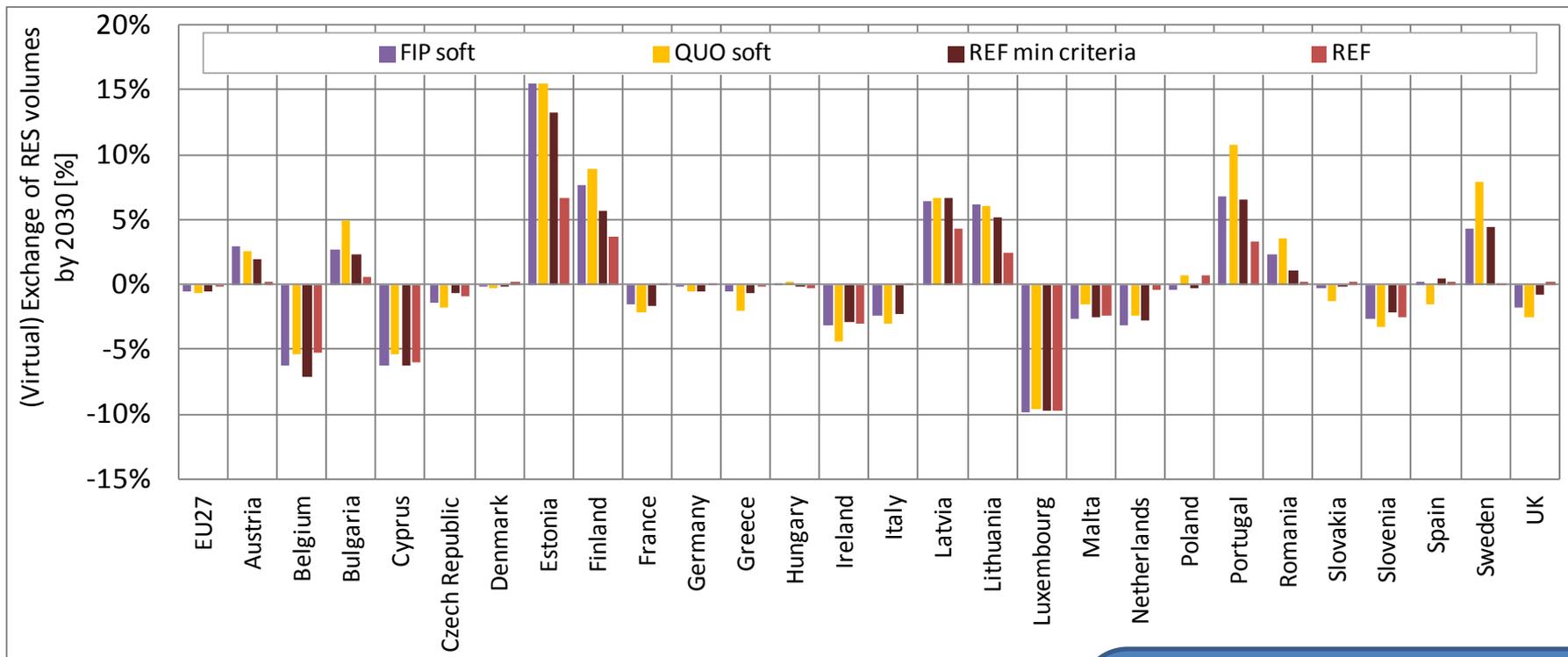
- with minimum design criteria → intensified RES cooperation
- without minimum design criteria (default reference case) → low RES cooperation



Minimum / No harmonisation
 •Reference case(s) of national support with /without minimum design standards

Soft harmonisation
 •National targets for RES 2030
 •One instrument
 •MS can decide on detailed design

Results: National 2030 RES targets & resulting deployment / (virtual) exchange

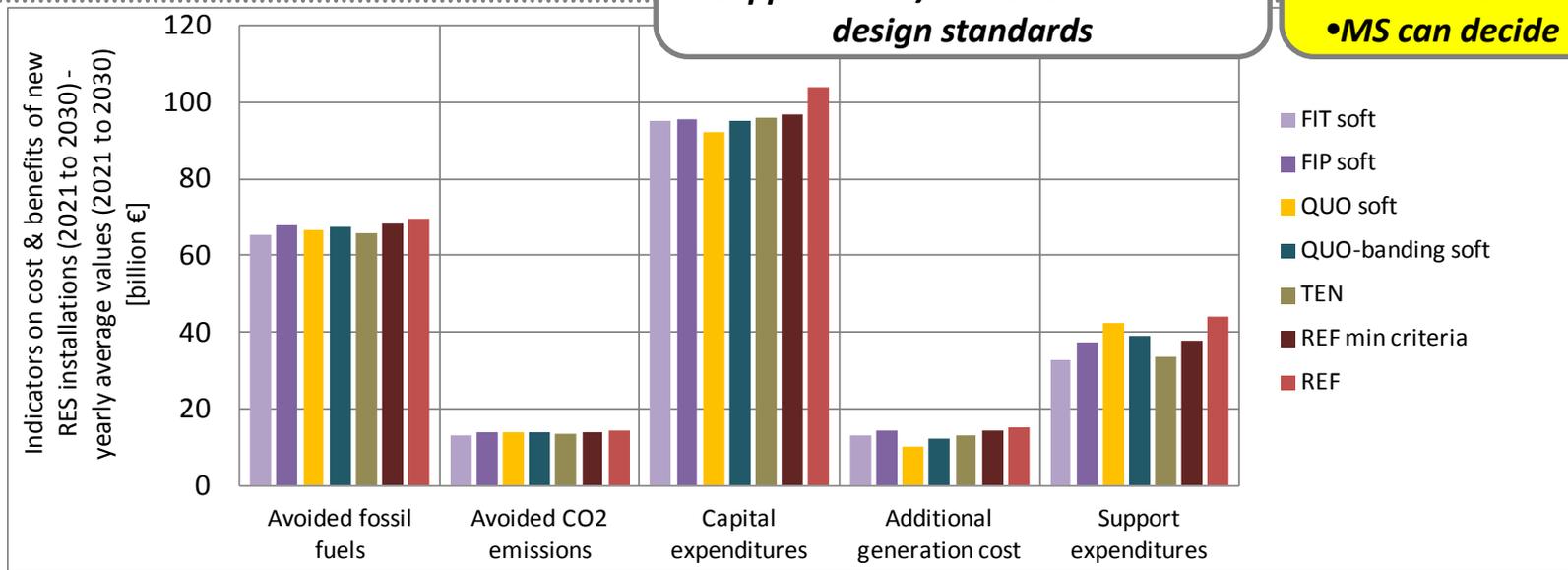


Comparison of (virtual) exchange of RES volumes by 2030 for selected cases of no, minimum or soft harmonisation

Intensified RES cooperation and/or virtual exchange to fulfil national targets contributes to more equity in cross-country effort sharing

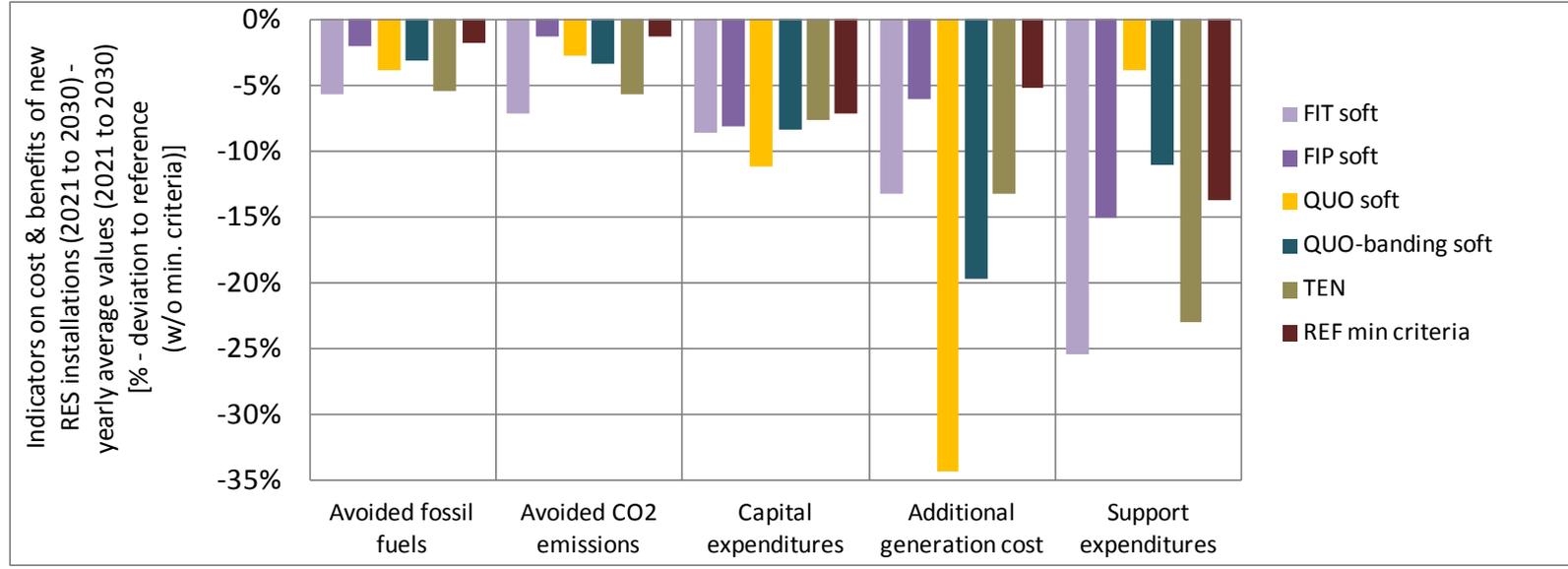
Minimum / No harmonisation
 •Reference case(s) of national support with /without minimum design standards

Soft harmonisation
 •National targets for RES 2030
 •One instrument
 •MS can decide on detailed design



Comparison of (yearly average) **costs & benefits** of new RES installations (2021 to 2030)

- in absolute terms (monetary expression)
- In relative terms (deviation to reference (no harmonisation)) in the EU-27 for all assessed cases



Next steps

- ▶ Conduct a comprehensive sensitivity analysis

Remark on (to be) assessed cases:

- 15 default cases (i.e. one for each pathway)

- 11 sensitivity cases PRIORITY A (**Network extension**: Electricity markets / Grid aspects: Market values, reflecting a less interconnected EU power market)

- 14 sensitivity cases PRIORITY B (**Energy demand & prices**: high/low demand price case based on PRIMES)

- 4...8 sensitivity cases PRIORITY C (**Non economic barriers and / or height of 2030 RES target**)

Overview on RES policy pathways beyond 2020

Degree of harmonisation		Characterisation	Instrument					
			FIT (feed-in tariff)	FIP (feed-in premium)	QUO (quota system with uniform TGC)	QUO banding (quota system with banded TGC)	ETS (no dedicated RES support)	TEN (Tendering for large scale RES)
Full	<ul style="list-style-type: none"> •EU target •One instrument 	1a	2a	3a	4a	5	6 •Sensitivity to 7 (national support, but harmonisation for selected technologies)	
Medium	<ul style="list-style-type: none"> •EU target •One instrument •Additional (limited) support allowed 	1b	2b	3b	4b			
Soft	<ul style="list-style-type: none"> •National targets •One instrument •MS can decide on various design elements incl. support levels 	1c	2c	3c	4c			
Mini- mum	<ul style="list-style-type: none"> •With minimum design standards for support instruments •National targets •Cooperation mechanism (limited/strong RES cooperation) 	7						
No	<ul style="list-style-type: none"> •No minimum design standards for support instruments •National targets •Cooperation mechanism (limited/strong RES cooperation) 	Reference (national RES support with cooperation) <i>((limited or) strong cooperation ... (without or) with minimum design standards)</i>						



The RES directive (Directive 2009/28/EC) lays the ground for the RES policy framework until 2020 ... ***but a strategy and clear commitment to, with dedicated support for RES beyond 2020 is of need*** (if RES shall deliver what is expected)

- ▶ *Ignore “simplistic approaches” for RES policy harmonisation!*
... a harmonisation of RES support based on simplistic policy options offering uniform support e.g. via a uniform RES certificate trading cannot be recommended (- for the 2020 and the 2030 perspective -).
- ▶ Final modelling outcomes have shown that *several other RES policy pathways show a similar performance on costs/benefits for the post-2020 period* ... ranging from *full to soft/minimum harmonisation*, including *feed-in premiums/tariffs and quotas with banding* ... as well as keeping *strengthened national support* - but with intensified coordination /cooperation (and with or w/o complementary harmonised tenders (for large-scale RES)).
- ▶ Cooperation & coordination among Member States is beneficial *and required to tackle current problems/challenges in RES markets*

Thanks for your attention!

Further information to be published in forthcoming weeks,
then made available at

www.res-policy-beyond2020.eu

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