

System Adequacy Forecast 2012 - 2030

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System Adequacy and Market Modelling

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SO&AF 2012-2030 included in the TYNDP package

In consultation
until 26th April



**SCENARIO OUTLOOK &
ADEQUACY FORECAST
2012 - 2030**

Contents of the SO&AF report 2012

1. Executive Summary
2. Introduction
3. 2030 Visions (*new dedicated Chapter*)
4. Scenario Outlook Section (*update to year 2012*)
5. Adequacy Forecast Section
6. General Conclusions
7. Appendixes (*including Regional Adequacy Forecast based on indicators provided by RGs by using market studies and analysis*)

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Together with SO&AF Report the updated methodology document is published in the TYNDP 2012 reflecting:

- The SO&AF 2011 consultation feedback
- The definitions' clarification

Aim of the SO&AF 2012 report

The ENTSO-E Scenario Outlook & Adequacy Forecast (SO&AF) assesses the mid- and long-term time horizon

Overview of generation adequacy for the ENTSO-E interconnected system

- Three contrasting scenarios, covering different evolutions for generating capacity and load, for the period 2012 – 2025
- Providing national and regional overviews on the ENTSO-E generation adequacy.

Presenting the visions of ENTSO-E in 2030

Main Items

Scenario Outlook

- Scenario A (2012-2015-2016-2020)
- Scenario B (2012-2015-2016-2020-2025)
- EU 2020 Scenario (2012-2015-2016-2020)

Adequacy Assessment

2030 Visions as high level commentaries

Geographical perimeter of the Regions

North Sea:

BE,DK,FR,DE,GB,LU,NL,NI,NO,IE

Baltic Sea:

DK,EE,FI,DE,LV,LT,NO,PL,SE

Continental South West:

FR,PT,ES

Continental South East:

BA,BG,HR,MK,GR,HU,IT,ME,RS,RO,SI

Continental Central South:

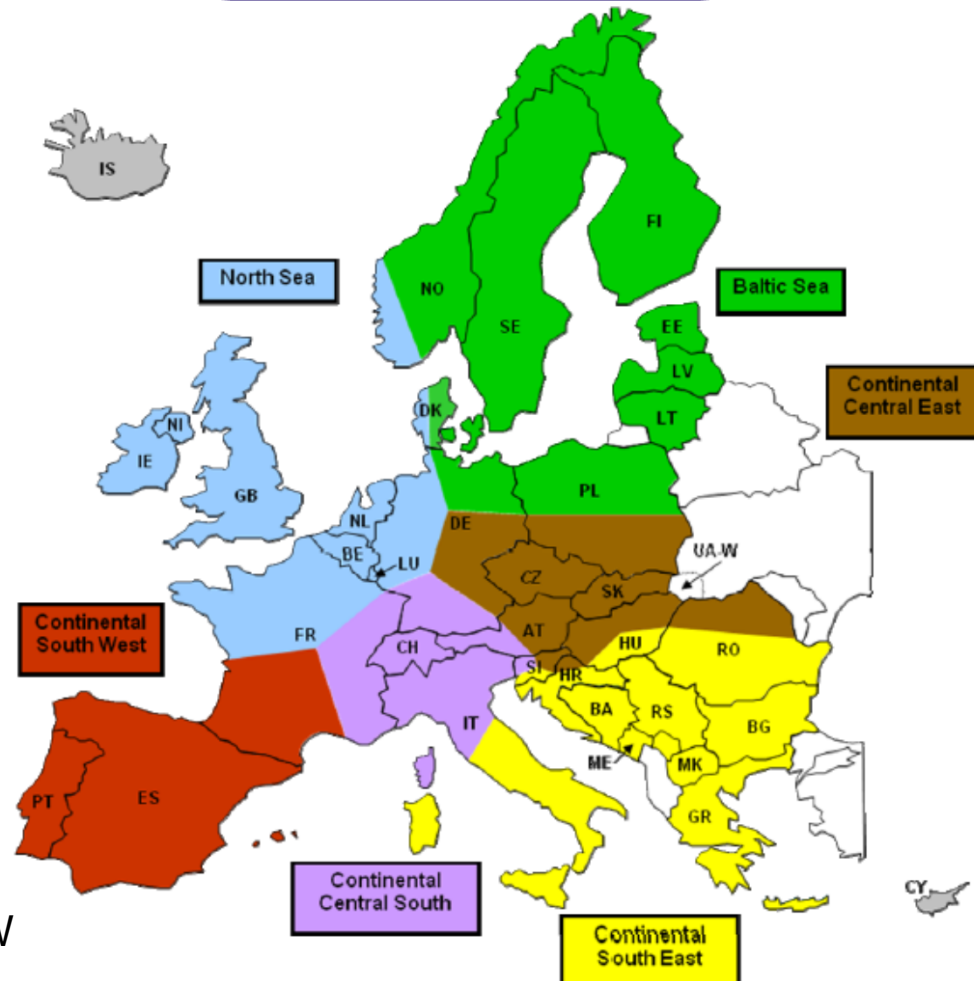
AT,FR,DE,IT,SI,CH

Continental Central East:

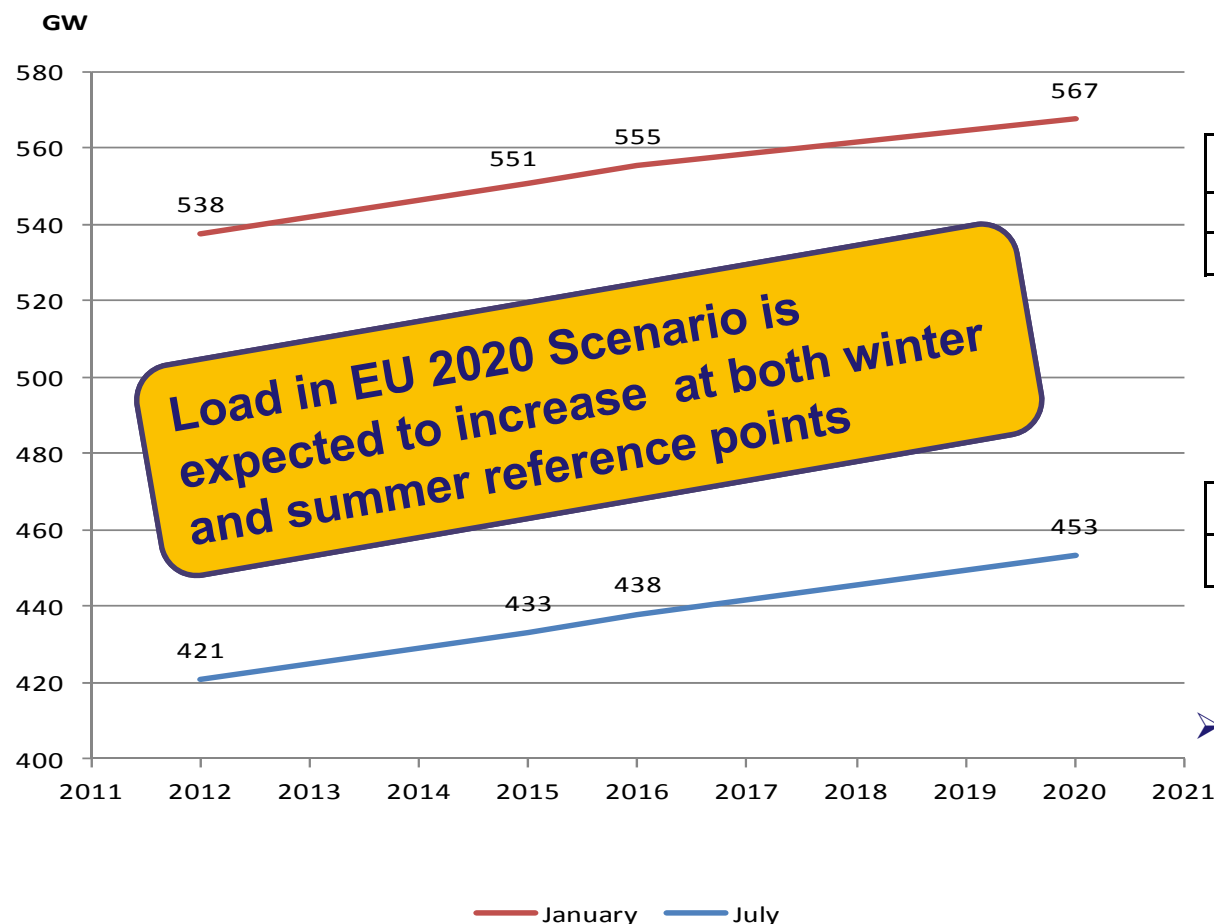
AT,HR,CZ,DE,HU,PL,RO,SK,SI

Isolated systems: CY,IS

Additional contributing country: UA-W



SO&AF 2012-2030 Report - MAIN RESULTS: LOAD Sc EU20



[%]	2011 to 2015	2015 to 2020
January	0.8	0.6
July	1	0,9

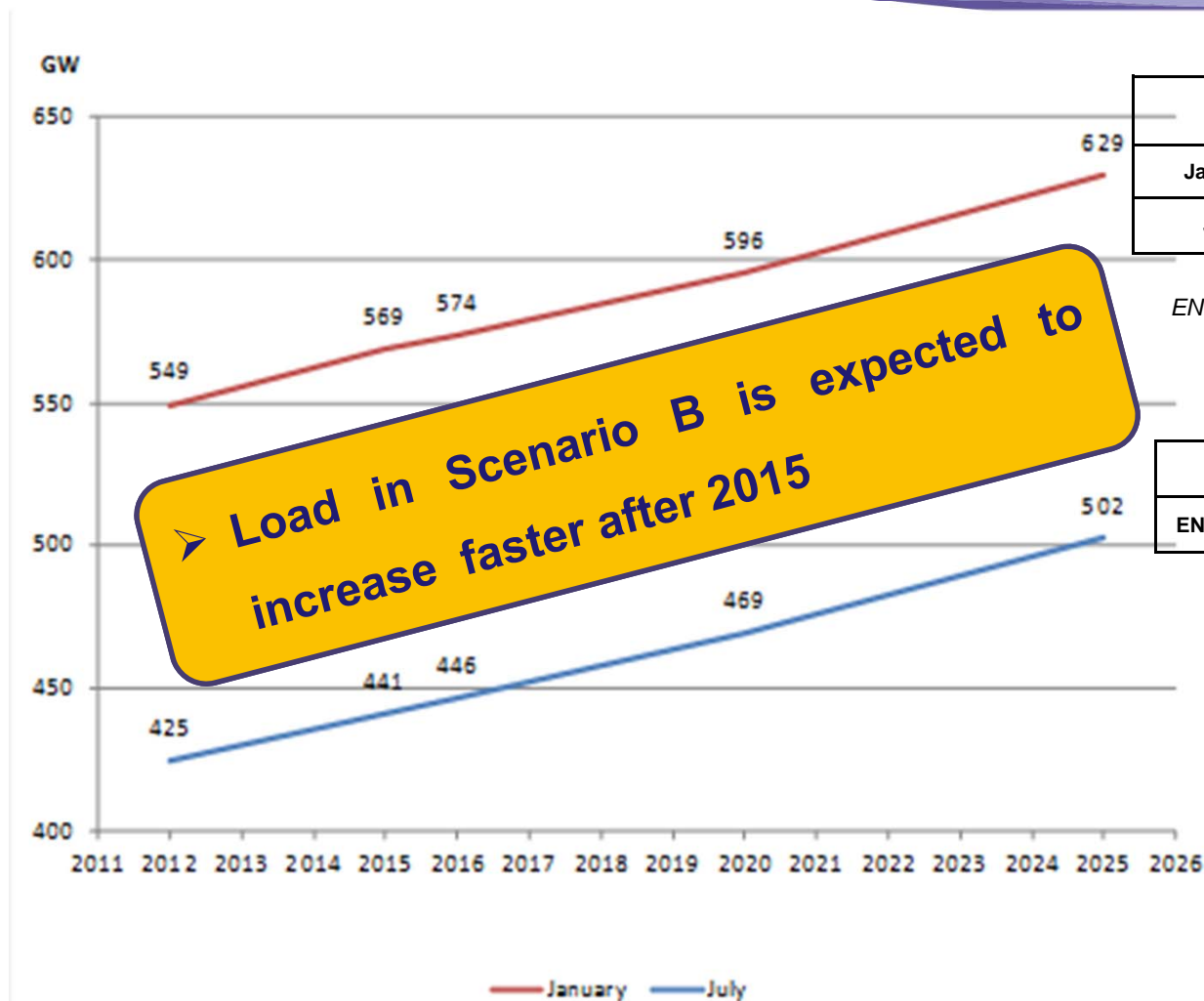
ENTSO-E average annual load increase rate for Scenario EU 2020

[TWh]	2012	2015	2016	2020
ENTSO-E Consumption	3 400	3 470	3 497	3 615

ENTSO-E consumption for EU 2020

- **Energy consumption at ENTSO-E level in Scenario EU 2020 is also expected to increase (up to 3500 GW after 2016)**

SO&AF 2012-2030 Report - MAIN RESULTS: Load Sc B



[%]	2012 to 2015	2015 to 2020	2020 to 2025
January	1.6	0.9	1.1
July	1.3	1.2	1.4

ENTSO-E average annual load increase rate for Scenario B

[TWh]	2012	2015	2016	2020	2025
ENTSO-E Consumption	3 389	3 493	3 524	3 663	3 851

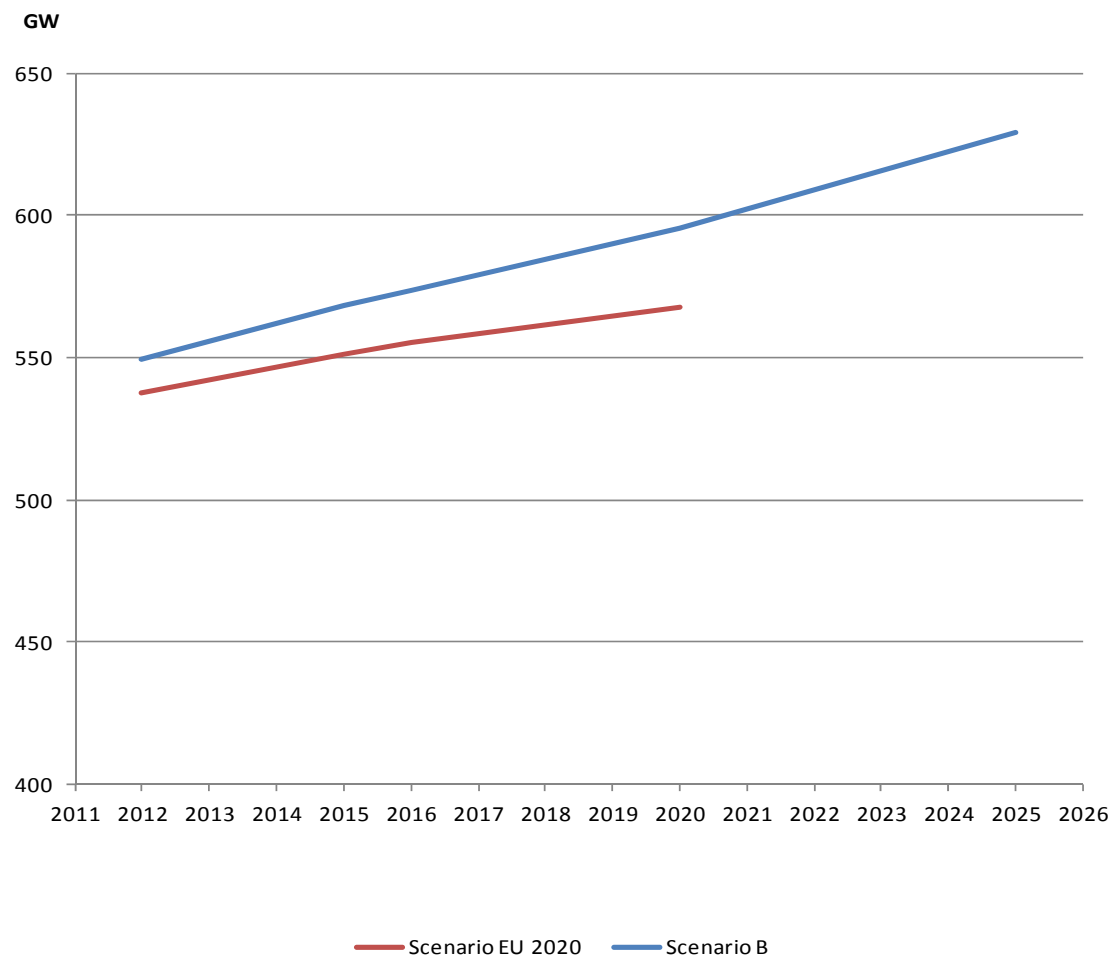
Table 1.2: ENTSO-E consumption for Scenario B

- Among the main factors influencing consumption TSOs reported energy efficiency as well as weather conditions and Gross Domestic Product (GDP) growth rate

SO&AF 2012-2030 Report - MAIN RESULTS: Load

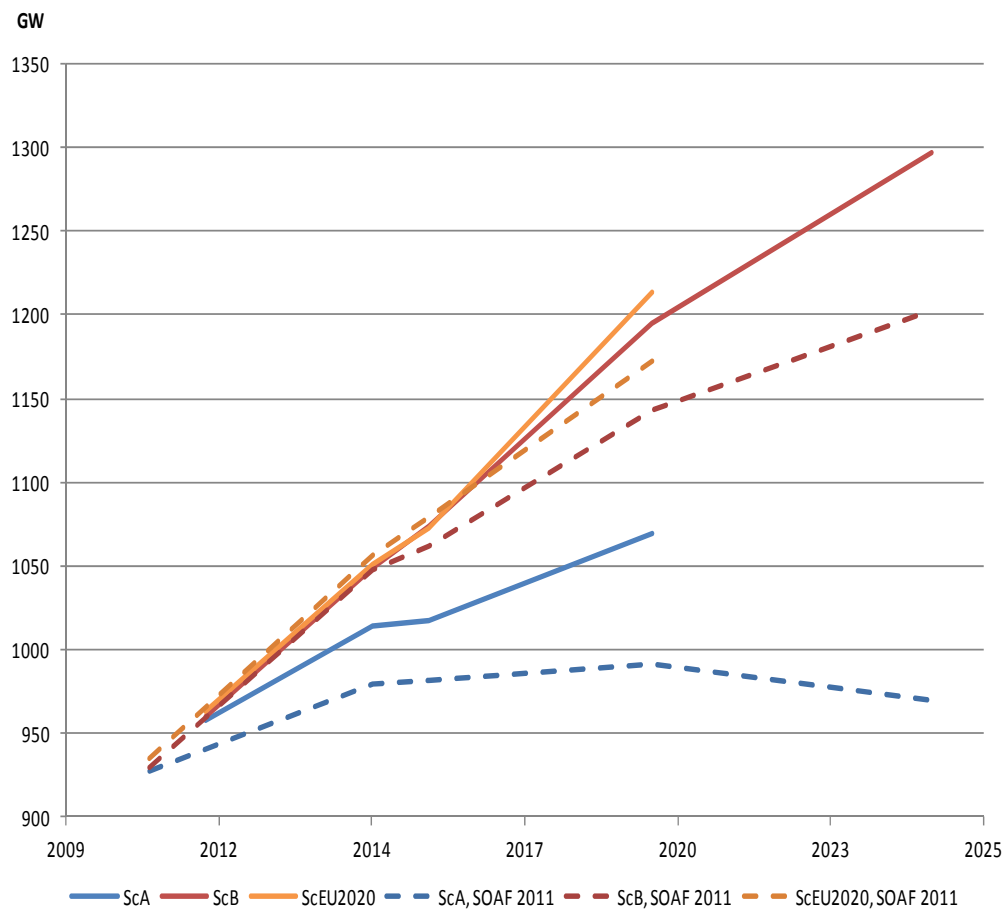
The difference in Load is mainly due to the fact that EU 2020 is based on NREAPs and it reflects the political targets while Scenario B reflects the best TSOs estimate

Load in Scenario B is higher and it is expected to increase more (higher growth rates)



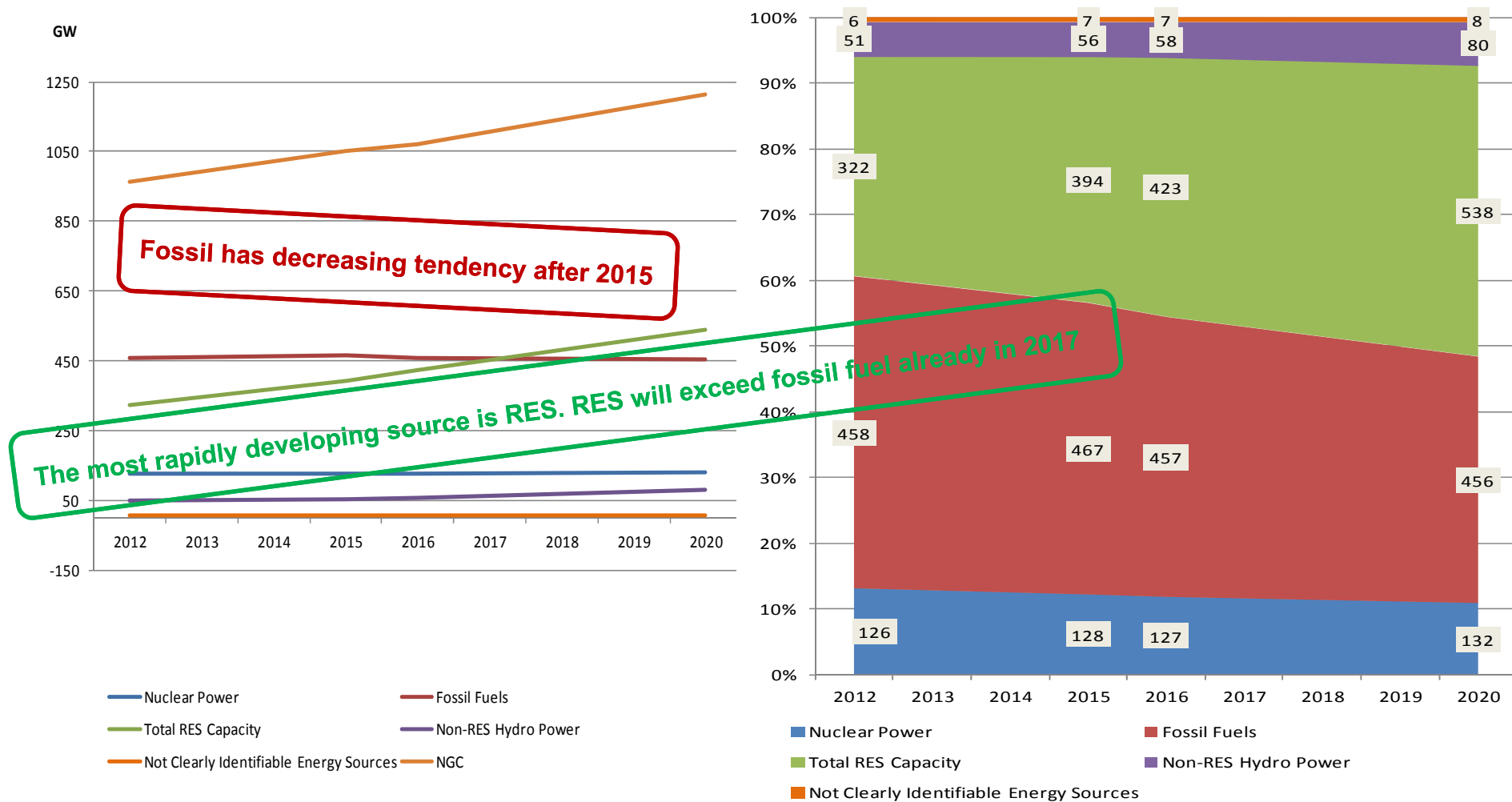
SO&AF 2012-2030 Report - MAIN RESULTS

NGC: Comparisons of Scenario EU 2020 and Scenario B



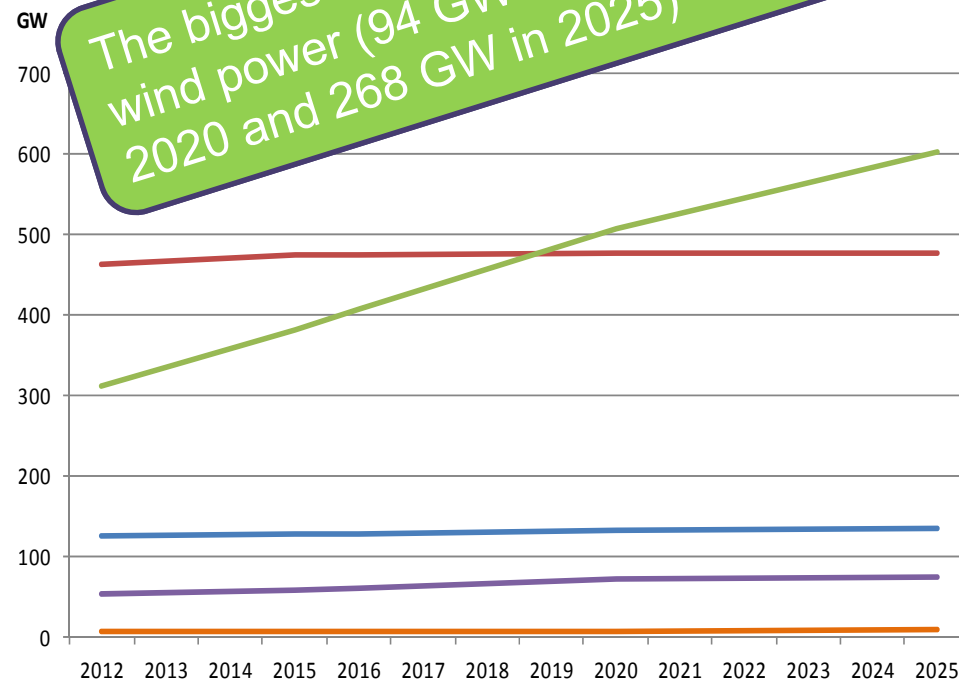
The increasing trend of NGC seems to be higher in SO&AF 2012 in comparison to the previous year (SO&AF NGC lines are above the curves of SO&AF2011)

SO&AF 2012-2030 Report - MAIN RESULTS NGC Sc EU20

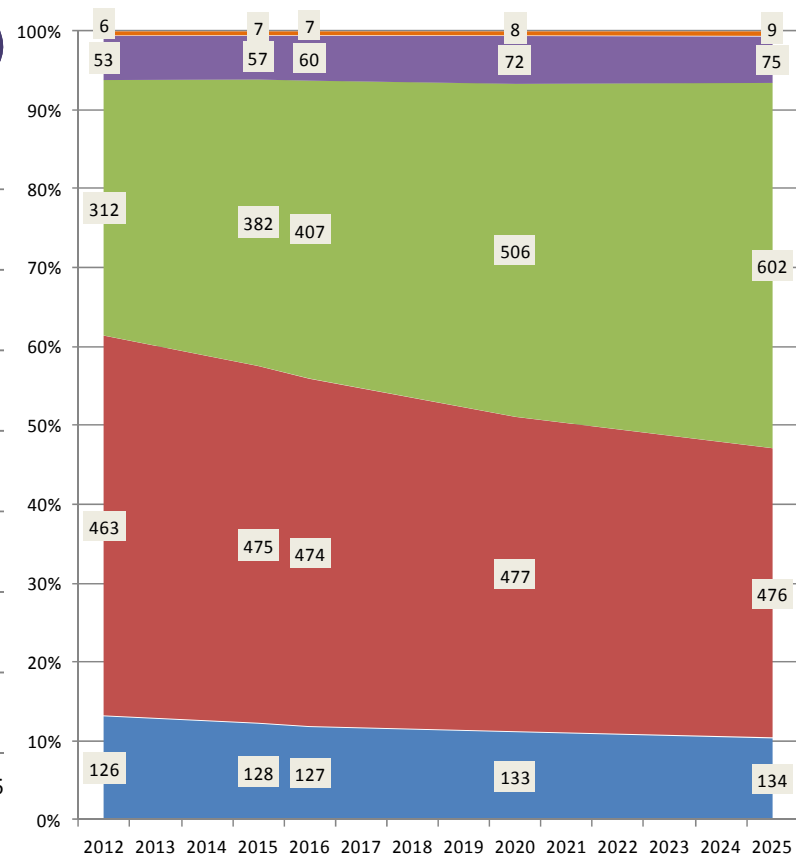


SO&AF 2012-2030 Report - MAIN RESULTS NGC SC B

The biggest increase is expected for wind power (94 GW to 210 GW in year 2020 and 268 GW in 2025)

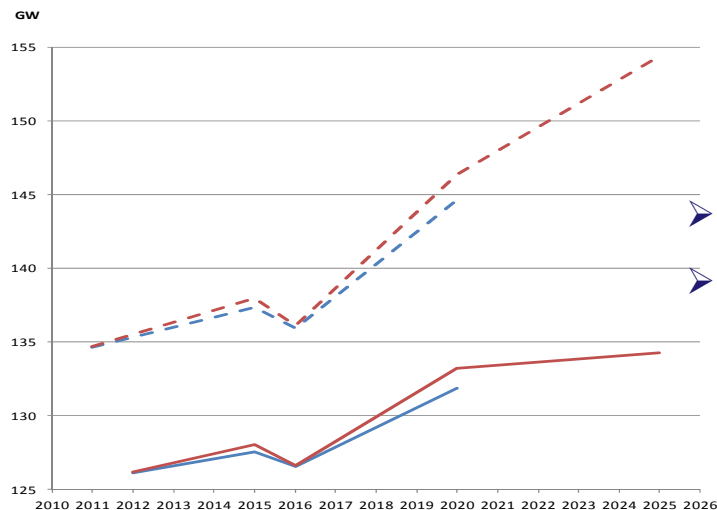


— Nuclear Power — Fossil Fuels
— Total RES Capacity — Non-RES Hydro Power
— Not Clearly Identifiable Energy Sources



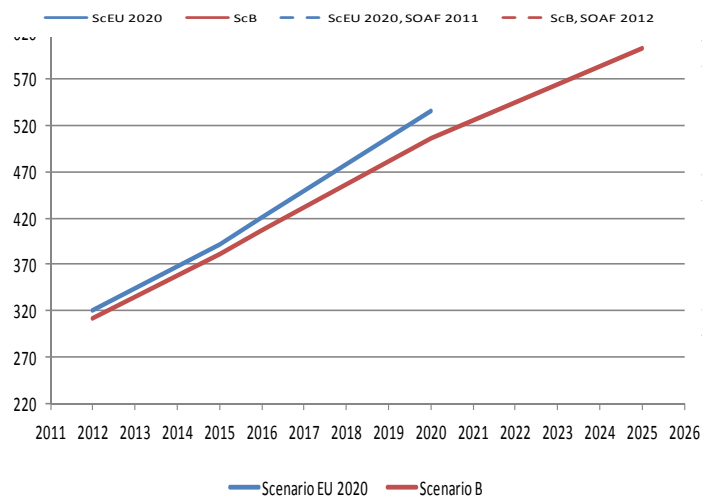
■ Nuclear Power ■ Fossil Fuels
■ Total RES Capacity ■ Non-RES Hydro Power
■ Not Clearly Identifiable Energy Sources

SO&AF 2012-2030 Report - MAIN RESULTS: NGC comparison



- Nuclear power is expected to increase in Scenario B
- Comparing to SO&AF 2011 the difference in Nuclear is due to 8 GW shut down

Comparison of Nuclear power plants installed capacity per scenario between SO&AF 2011 and SO&AF 2012, January 7 p.m.



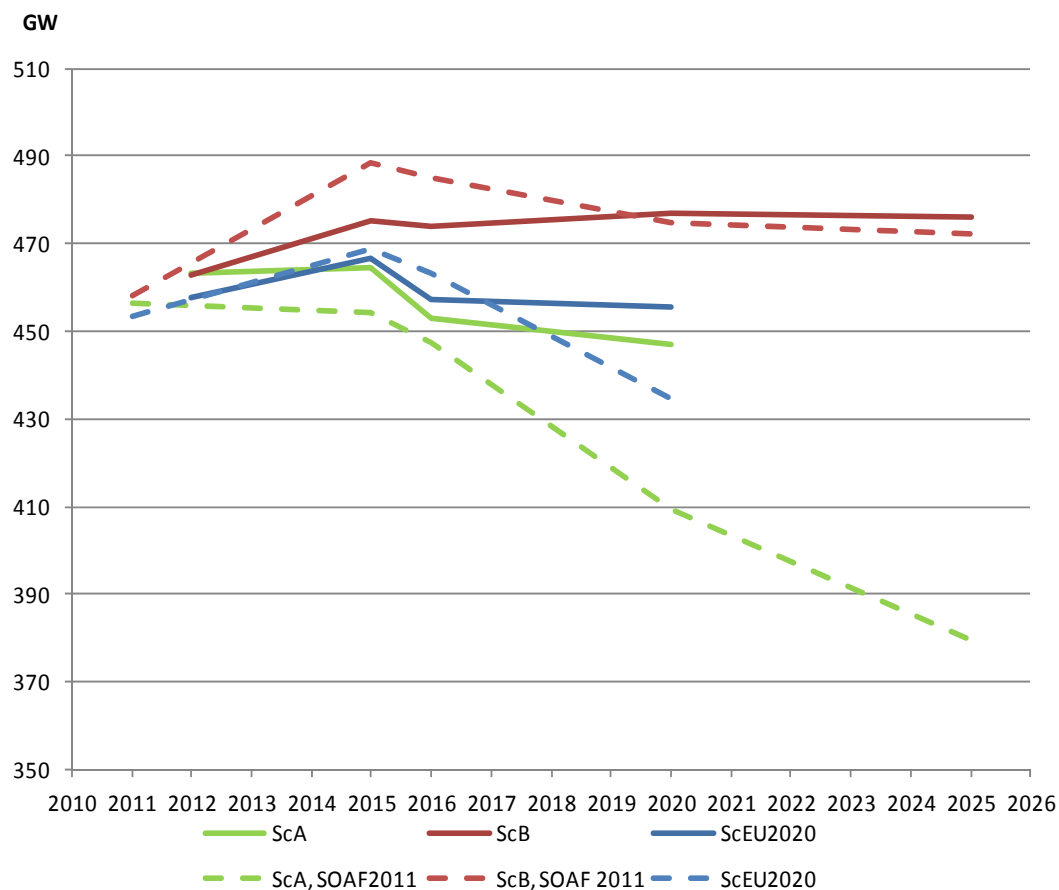
- RES is expected to grow fastly both in Scenario B and EU 2020
- The biggest increase is expected for Wind and Solar power
- The total increase of RES is 216 GW (from 2012 up to 2020) in EU 2020 Scenario and 194 GW in Scenario B

Comparison of RES installed capacity Scenario B and EU 2020

SO&AF 2012-2030 Report - MAIN RESULTS: Nuclear

Notwithstanding Fukushima reactions, the nuclear power is expected to increase

New nuclear power plants, and reinvestments in existing plants.



Main conclusions

Load and consumption are expected to increase throughout the whole forecasted period in each scenario.

The total ENTSO-E Net Generating Capacity (NGC) is increasing in each scenario as well.

Of all primary energy sources, the biggest development is reported for RES.

The development of RES capacity (excluding hydro) still corresponds mainly with the wind farms, solar power plants development.

Within fossil fuels, gas power units are leading the development. Lignite, hard coal and oil power plants are on the decrease in each scenario.

The report also notes that the generation adequacy is expected to be maintained, even after the reactions to Fukushima disaster.

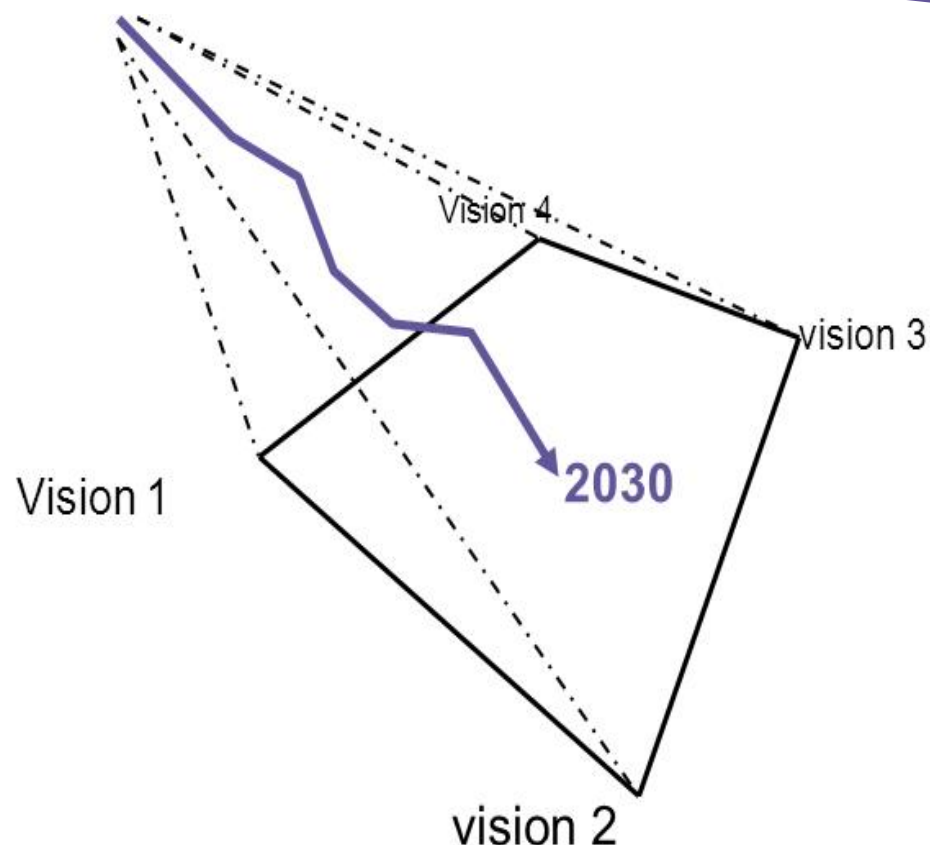
When comparing these results to the previous SO&AF 2011, no worsened situation is foreseen.

Contents of the SO&AF report 2012



Backup Slides

2030 Visions: a bridge between the European energy targets for 2020 and 2050



Objectives for the visions:

- Look beyond 2020.
- Differ enough from each other
- The visions are not forecasts (no probability attached to the visions).

The pathway realised in the future falls with a high level of certainty in the range described by the four described visions

2030 Visions: a bridge between the European energy targets for 2020 and 2050

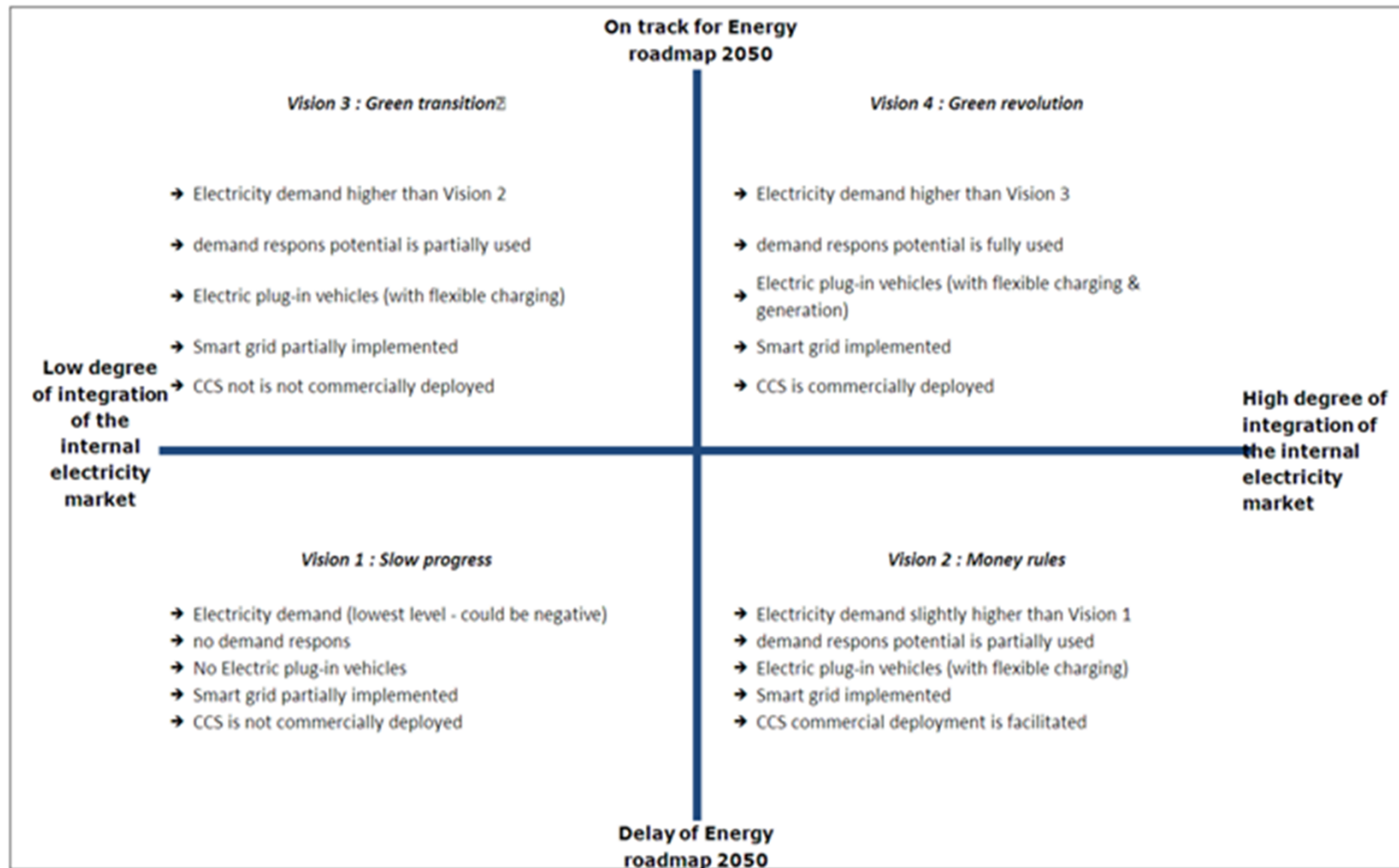
VISION 3:
“GREEN
TRANSITION”

VISION 4:
“GREEN
REVOLUTION”

VISION 1:
“SLOW
PROGRESS”

VISION 2:
“MONEY
RULES”

2030 Visions





Thank you for your attention

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Main Differences between SO&AF 2011/SO&AF 2012

Load

ENTSO-E Load Scenario A & Scenario B [GW]		2012	2015	2016	2020	2025
January	ScA January	0,2%	2,4%	2,3%	1,9%	0,0%
	ScB January	3,4%	2,1%	1,5%	-0,7%	-1,2%
July	ScA July	2,2%	0,3%	0,4%	0,2%	0,0%
	ScB July	2,0%	0,0%	-0,4%	-2,5%	-2,4%

ENTSO-E Load Scenario EU2020 [GW]		2012	2015	2016	2020
January		2,7%	2,1%	2,0%	0,9%
July		1,5%	0,3%	0,2%	-0,9%

Main Differences between SO&AF 2011/SO&AF 2012

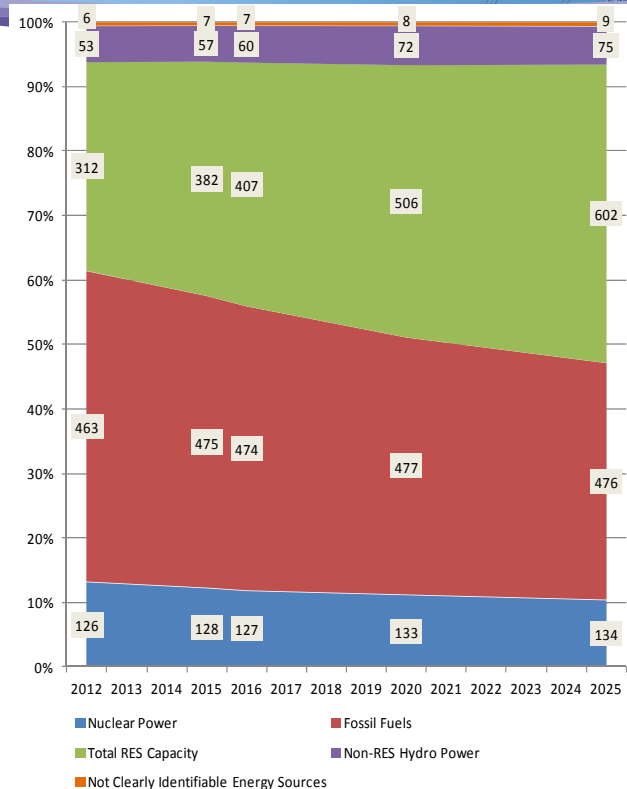
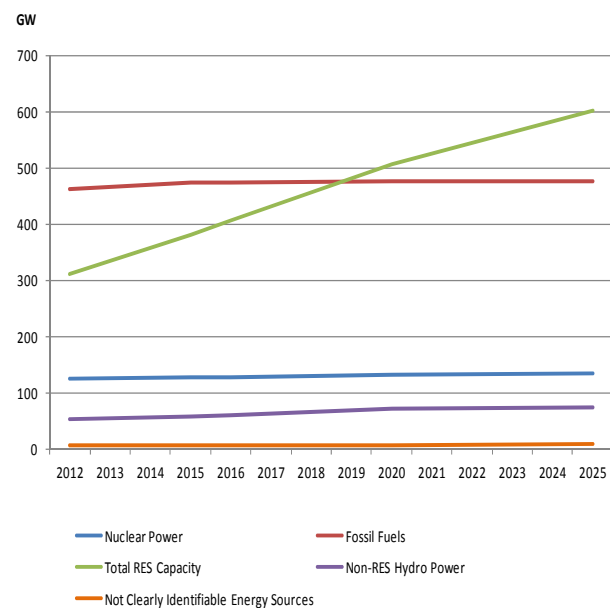
NGC

ENTSO-E NGC [GW] January 7 p.m.	2012	2015	2016	2020	2025
ScA	3,2%	3,5%	3,7%	7,8%	
ScB	3,2%	0,1%	1,1%	4,5%	7,8%
ScEU20	3,0%	-0,5%	-0,7%	3,5%	
ENTSO-E NGC [GW] July 11 a.m.	2012	2015	2016	2020	2025
ScA	3,0%	3,8%	3,9%	8,1%	
ScB	3,2%	0,4%	1,4%	4,7%	7,6%
ScEU20	2,7%	-0,4%	-0,5%	3,2%	

Conclusions

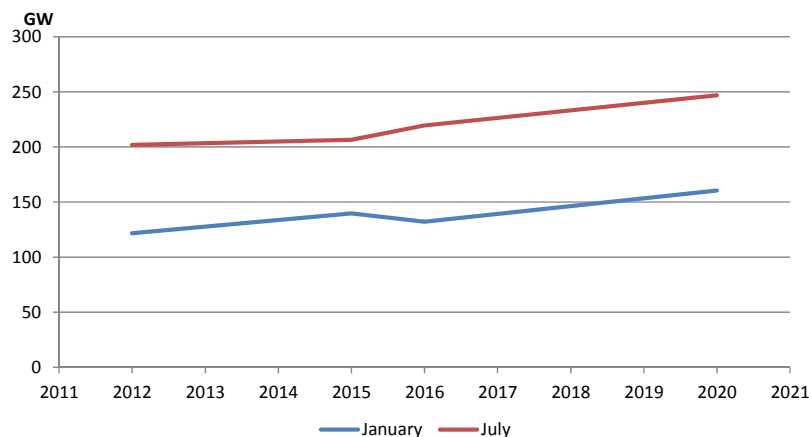
- **ENTSO-E Load is expected to increase throughout the whole forecasted period in each scenario.**
- **The total ENTSO-E Net Generating Capacity (NGC) is increasing in each scenario as well**
- **The biggest development is reported for RES (including renewable part of hydro power plants)**
- **The main developing capacities within fossil fuels are gas power units in each scenario**
- **Only Scenario A (January) → after 2016 a shortfall in generation adequacy is expected**
- **A 50 GW increase in NGC (January 2016) and 72GW (in January 2020) is required to maintain generation adequacy at the current level (**not final values**)**

NGC in Scenario B



- Net Generating Capacity in Scenario B is also increasing (evolution of NGC similar to EU 2020 scenario)

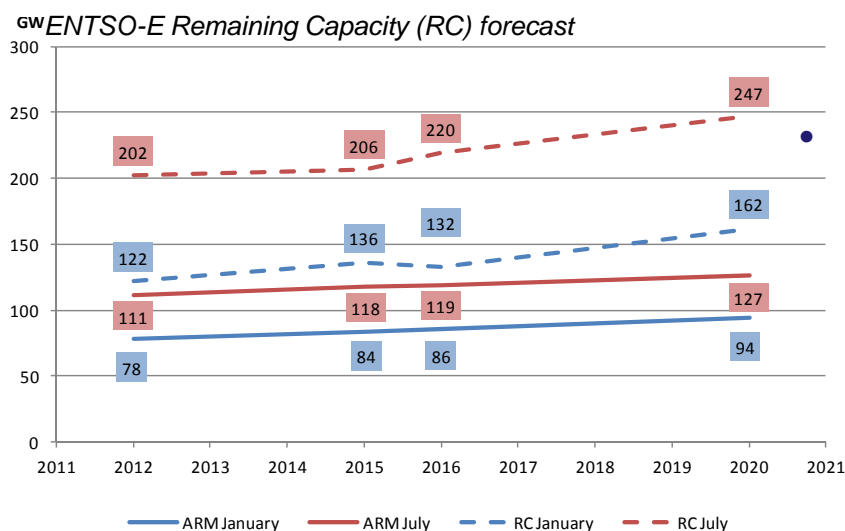
SO&AF 2012-2030 Report - MAIN RESULTS Generation adequacy Sc EU2020



- Remaining Capacity is positive and is increasing for the whole period (only slight decrease in 2016)

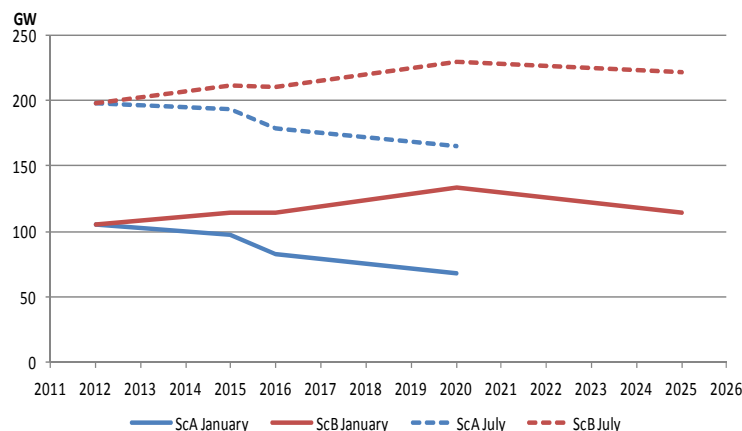
[GW]	2012	2015	2016	2020
January	122	136	132	162
July	202	206	220	247

ENTSO-E RC for Scenario EU 2020



- Remaining Capacity is expected to be maintained during the forecasted period (as the difference between Remaining Capacity and ARM is positive)

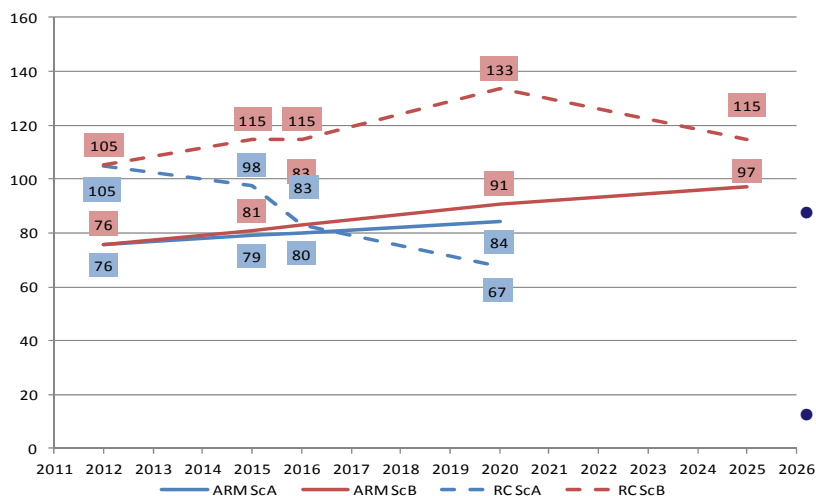
SO&AF 2012-2030 Report - MAIN RESULTS Generation adequacy Sc B & Sc A



- Remaining Capacity in Scenario B is more optimistic than Scenario A (where a lower level of commissioning is expected)
- A decrease can be observed between 2015-2016 and 2020-2025

[GW]		2012	2015	2016	2020	2025
January	Scenario A	105	98	83	67	
	Scenario B	105	115	115	133	115
July	Scenario A	197	193	179	165	
	Scenario B	198	211	210	230	222

ENTSO-E RC for Scenarios A&B



- Remaining Capacity is expected to be maintained within the Whole ENTSO-E System in Scenario B and during the whole forecasted period (2012-2025).
- In Scenario A RC is expected to be maintained till 2016.