

TYNDP process and scenarios 2030 visions approach

Saša Cazin
HOPS

ENTSO-E Regional Workshop with Stakeholders on
“European Ten Year Network Development Plan and
Regional Investment Plans 2014”

ZAGREB, 27th March 2014



1. TYNDP process overview
2. 2030 visions description and brief pan-EU outcome
 - Vision 1 – slow progress
 - Vision 2 – money rules
 - Vision 3 – green transition
 - Vision 4 – green revolution
3. 2030 visions and 2050 targets



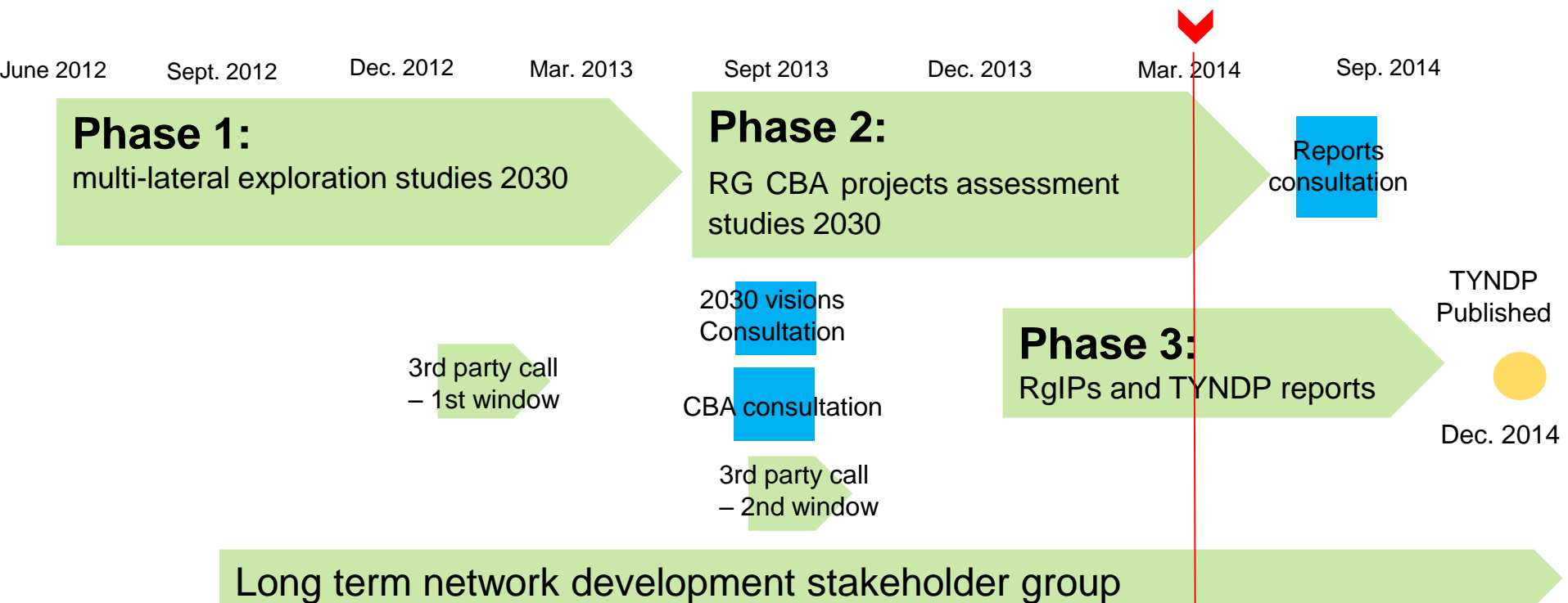
1. TYNDP process overview

2. 2030 visions:

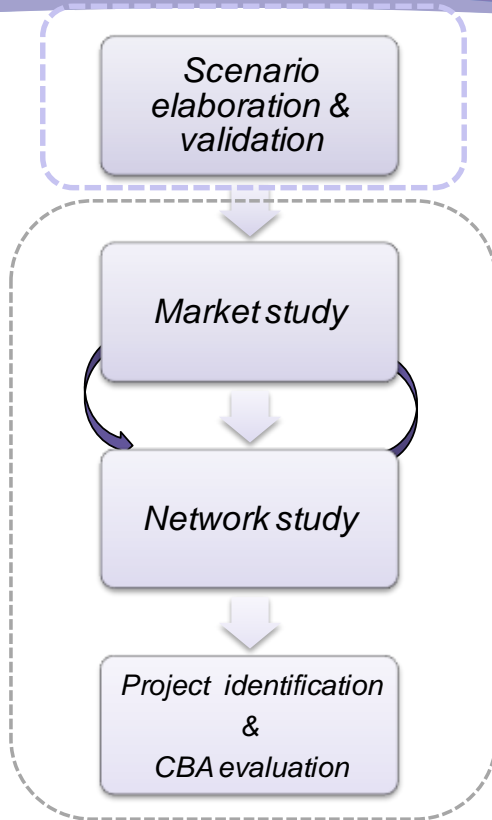
- Vision 1 – slow progress
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3. 2030 visions and 2050 targets

On the way to prepare TYNDP 2014



Regional Groups task within the TYNDP process



✓ **Regional Groups:**

- ✓ *Run regional market and network studies*
- ✓ *Evaluate the TYNDP projects:*
 - ✓ *ENTSO-E's TSOs*
 - ✓ *Third party projects*
- ✓ *Identify the needs and necessary network reinforcements*
- ✓ **Regional Groups** may improve the scenario considering specific characteristics of the area (e.g: temperature sensitivity, hydro conditions,...)

TYNDP 2014

- ✓ Ten-Year Network Development Plan
- ✓ Scenario Outlook and Adequacy Report
- ✓ 6 Regional Investment Plans



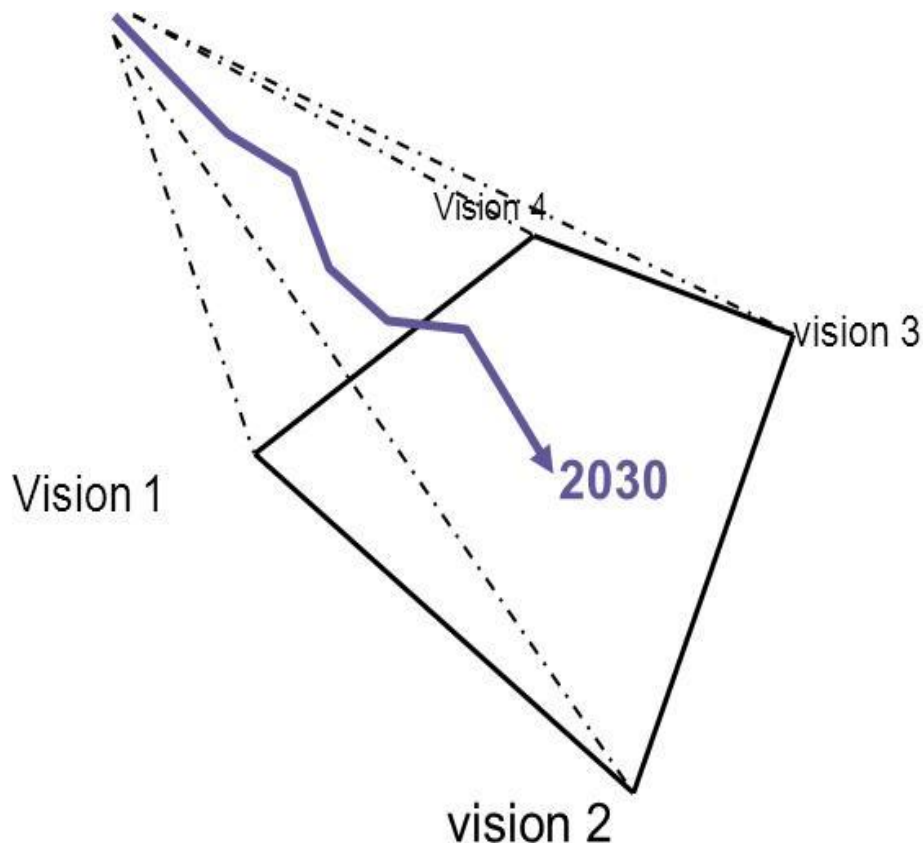
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2030 Visions: a bridge between the European energy targets for 2020 and 2050

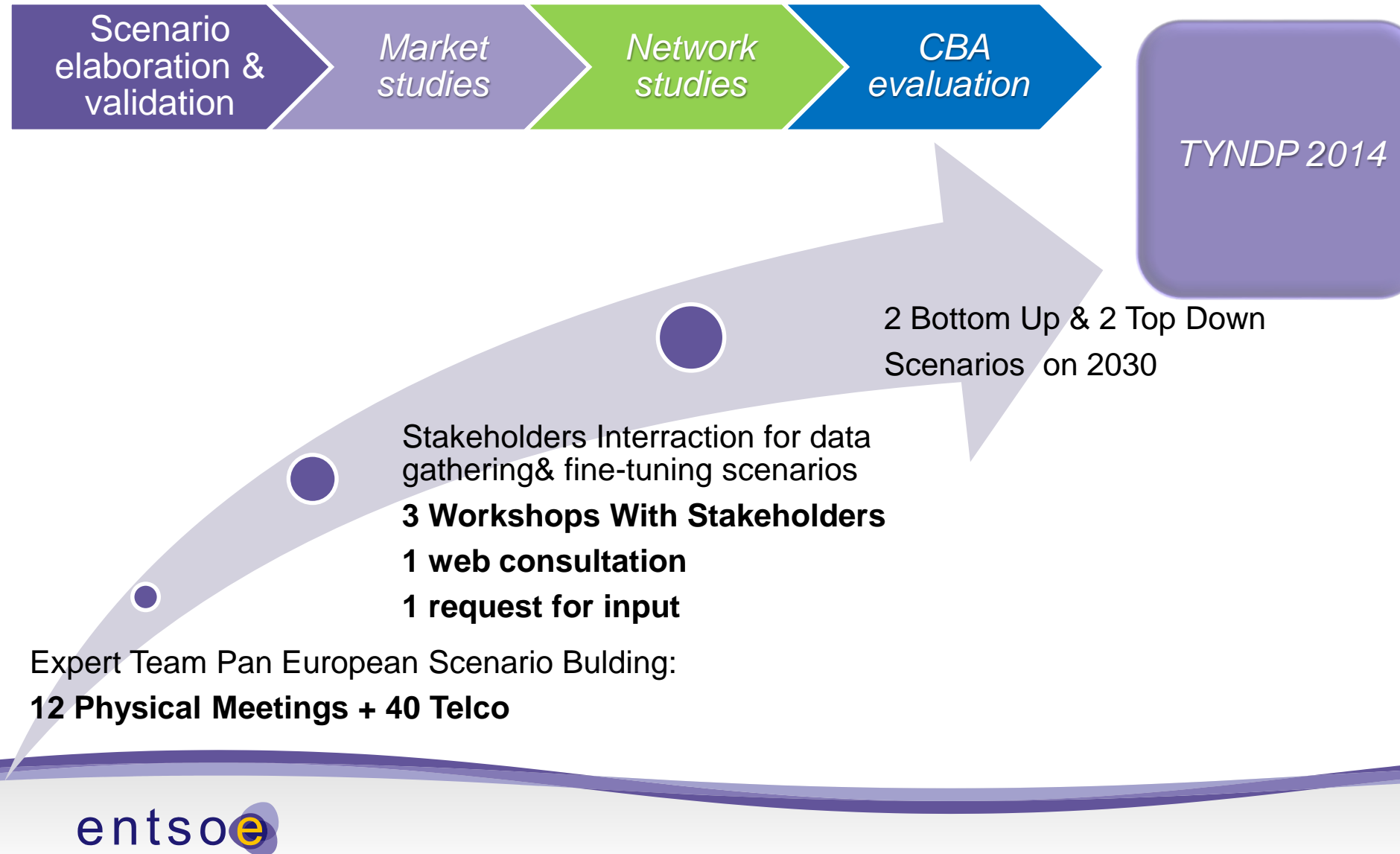


Objectives
for the
visions:

- 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

Process at a glance: scenario elaboration and validation





On track for
Energy Roadmap 2050

Vision 3: “Green Transition”

- Favourable economic and financial conditions
- Reinforced national energy politics
- Parallel national R&D research schemes
- High CO₂ prices and low primary energy prices (IEA – WEO 2010 450 scenario)

Vision 4: “Green Revolution”

- Favourable economic and financial conditions
- European energy policy
- European R&D research scheme
- High CO₂ prices and low primary energy prices (IEA – WEO 2010 450 scenario)

A loose

European
Framework

Vision 1: “Slow Progress”

- Less favourable economic and financial conditions
- Reinforced national energy politics
- Parallel national R&D research schemes
- Low CO₂ prices and high primary energy prices (IEA – WEO 2010 current policies scenario)

A strong

European
Framework

Vision 2: “Money Rules”

- Less favourable economic and financial conditions
- European energy policy
- European R&D research scheme
- Low CO₂ prices and high primary energy prices (IEA – WEO 2010 current policies scenario)

Delay of
Energy Roadmap 2050

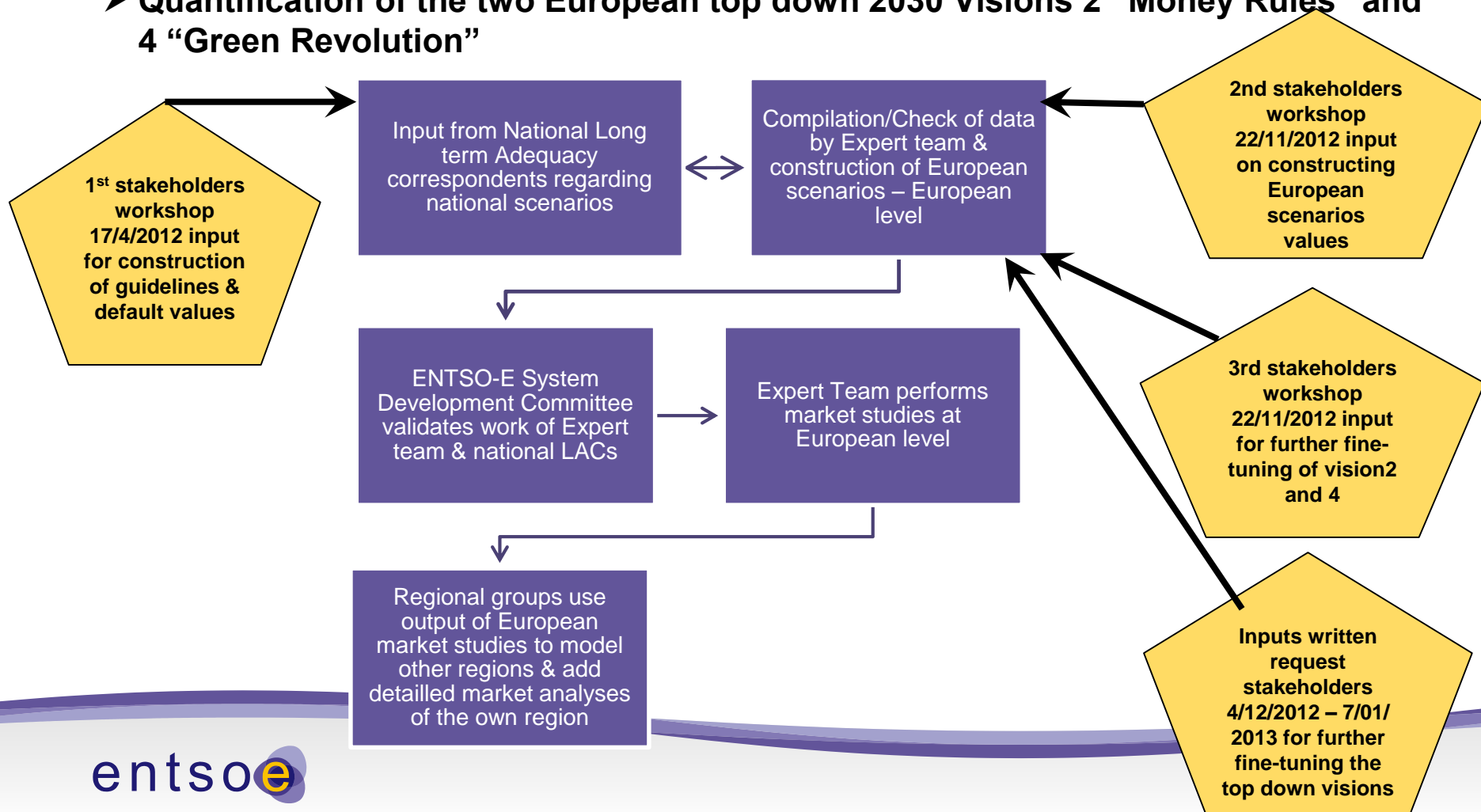
General Characteristics of all 2030 Visions



	Vision 1 : Slow progress	Vision 2 : Money rules	Vision 3 : Green transition	Vision 4 : Green revolution
Economic and financial conditions	Less favourable	Less favourable	Favourable	Favourable
Focus of energy policies	National	European	National	European
Focus of R&D research schemes	National	European	National	European
CO ₂ prices and primary energy prices	Low CO ₂ prices and high primary energy prices	Low CO ₂ prices and high primary energy prices	High CO ₂ prices and low primary energy prices	High CO ₂ prices and low primary energy prices
Electricity demand	Lowest level	Higher than in Vision 1	Higher than in Vision 2	Higher than in Vision 3
Demand respons potential	Used as today	Partially used	Partially used	Fully used
Electric vehicles	No commercial break through of electric plug-in vehicles	Electric plug-in vehicles (with flexible charging)	Electric plug-in vehicles (with flexible charging)	Electric plug-in vehicles (with flexible charging and generation)
Heat pumps	Implemented (although not evenly spread around Europe)	Implemented (although not evenly spread around Europe)	Implemented (although not evenly spread around Europe)	Much more heat pumps implemented (although not evenly spread around Europe)
Back-up generation	Level of back-up generation higher than in Vision 2 but lower than in Vision 4	Lowest level of back-up generation	Highest level of back-up generation	Level of back-up generation higher than in Vision 2 but lower than in Vision 3
Nuclear	National view	Public acceptance	National view	Public acceptance
CCS	Not commercially implemented	Partially implemented	Not commercially implemented	Fully implemented
Storage	As planned today	As planned today	Decentralised storage (limited amount but higher than in Vision 4)	Mainly additional centralised hydro storage + some decentralised storage
Smart grid solutions	Partially implemented	Fully implemented	Partially implemented	Fully implemented

Construction process of the 2030 visions

- a dedicated ENTSO-E TSO Expert Team
 - **Consistency checks of Visions 1 “Slow Progress” and 3 “Green Transition”**
 - **Quantification of the two European top down 2030 Visions 2 “Money Rules” and 4 “Green Revolution”**



Market modelling for long-term grid development

Inputs

- Multiple scenarios with hypotheses regarding
 - Demand profile
 - Generator characteristics
 - Other generation profile
 - Wind and Solar Profiles
 - Transfer Capacities
 - Reserve
- Fuel and CO₂ prices

Modelling

- Chronological Unit Commitment
- Economic Dispatch model
- Hourly model
- Each country is a single market node
- Minimise the system cost (fuel bill/operating costs) subject to constraints such as must-run, reserve, generator capabilities.

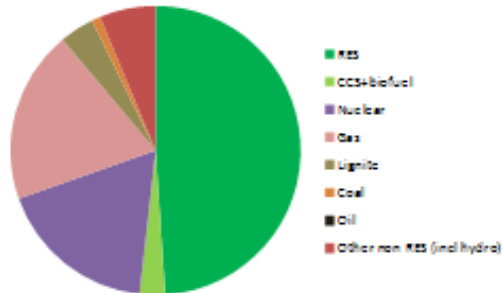
Outputs

- National Balances
- Market Node Marginal costs
- Hourly generation pattern for each generator
- System/Fuel cost
- Fuel consumption by fuel type
- CO₂ emissions

Market Simulation Results from all Visions (revised V4)

On track for energy roadmap 2050

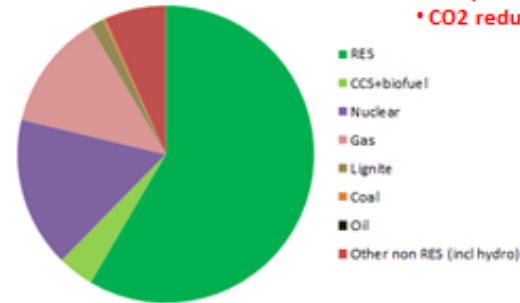
generation mix vision 3



- Total cross-border exchanges in Europe ≈ 605 TWh
- Load including pumping 4167 TWh

Gaz scenario

generation mix vision 4

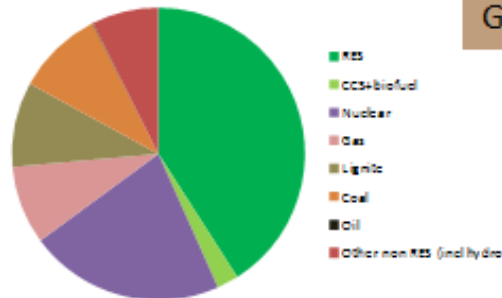


- RES penetration: 60%
- CO2 reduction (vs. 1990 level): 78%

- Total cross-border exchanges in Europe ≈ 734 TWh
- Load including pumping 4327 TWh

High degree of integration of the internal electricity market

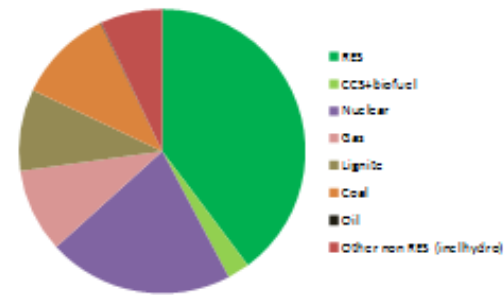
generation mix vision 1



- Total cross-border exchanges in Europe ≈ 660 TWh
- Load including pumping 3610 TWh

Gaz/Coal/Lignite scenario

generation mix vision 2



- Total cross-border exchanges in Europe ≈ 757 TWh
- Load including pumping 3712 TWh



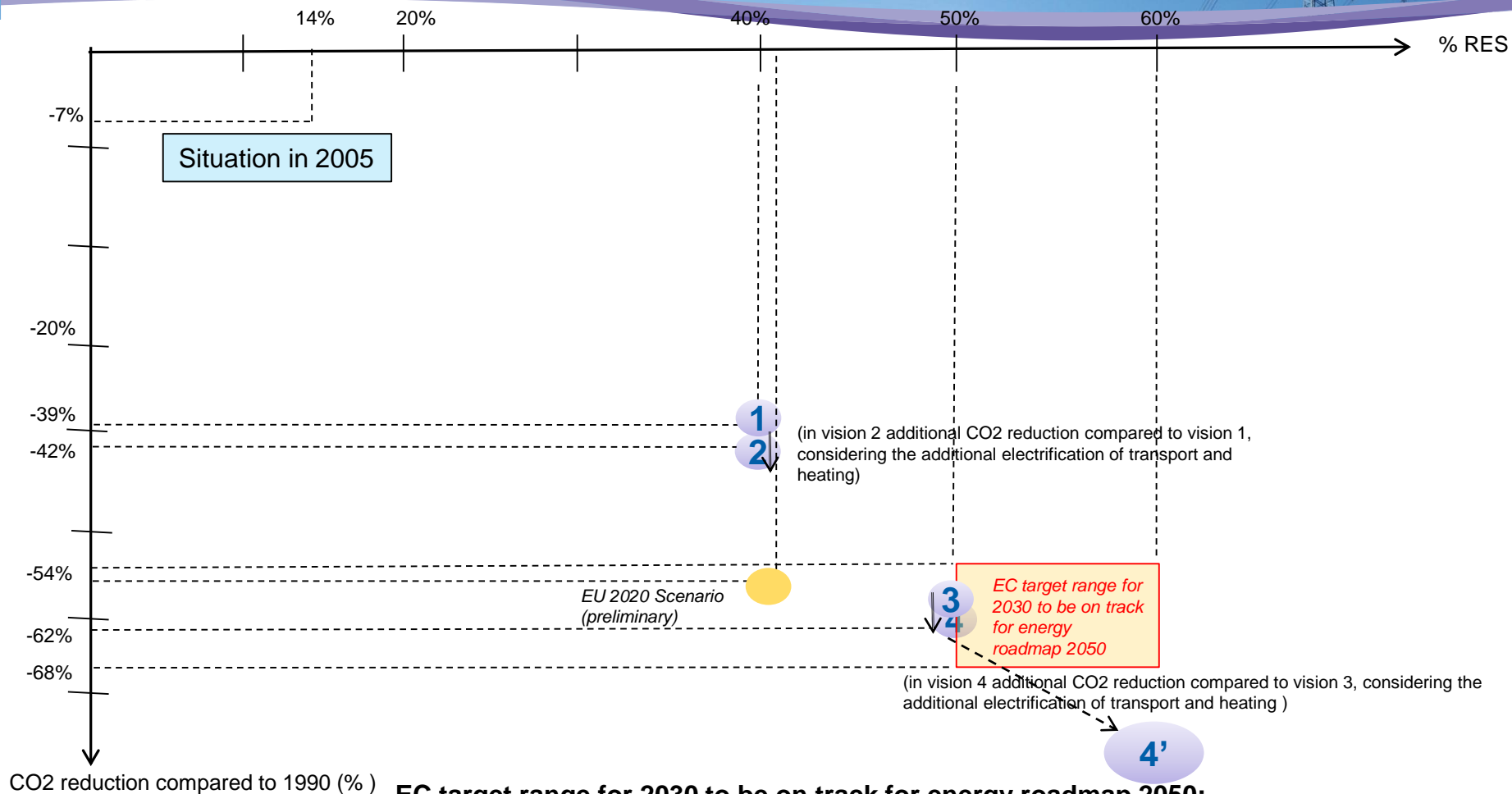
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A Bridge towards the Energy Roadmap for 2050



EC target range for 2030 to be on track for energy roadmap 2050:

- Visions 1 and 2 are not on track for both indicators (but ok against Current Trend Scenarios)
- Visions 3 and old 4 are in the range for CO₂ reductions (-62%) / slightly inferior for RES integration (vs. Decarbonisation Scenarios)
- Vision 3 and Vision 4 can be seen as projection of the EU2020 scenario, where the CO₂ emission is less than Visions 1 and 2 because of additional nuclear generation
- New Vision 4 gets beyond required CO₂ reduction (-78%)

THANK YOU !
Questions?