TYNDP process and scenarios
2030 visions approach

Irina Minciuna
System Development Adviser
ENTSO-E

ENTSO-E Stakeholders' Workshop
Regional Group North Sea
31 March 2014, Brussels

Reliable Sustainable Connected

Content

1. TYNDP process overview

2. 2030 visions description and brief pan-EU outcome
   - Vision 1 – slow progress
   - Vision 2 – money rule
   - Vision 3 – green transition
   - Vision 4 – green revolution

3. 2030 visions and 2050 targets

Content

1. **TYNDP process overview**

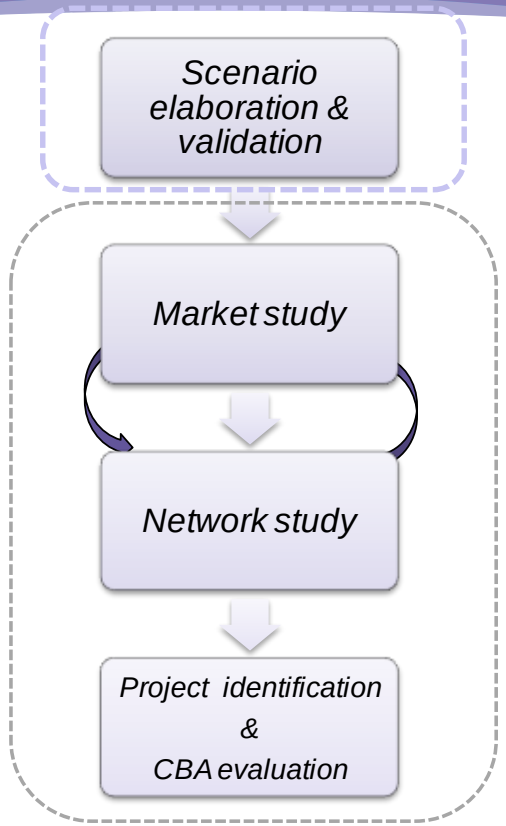
2. 2. 2030 visions:
   - Vision 1 – slow progress
   - Vision 2 – money rule
   - Vision 3 – green transition
   - Vision 4 – green revolution

3. 2030 visions and 2050 targets

On the way to prepare TYNDP 2014

entsoe

Regional Groups task within the TYNDP process



- ✓ **Regional Groups:**
  - ✓ *Run regional market and network studies*
  - ✓ *Evaluate the TYNDP proejcts:*
    - ✓ *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*

Content

1. **TYNDP process overview**

2. **<u>2030 visions:</u>**
   - **Vision 1 – slow progress**
   - **Vision 2 – money rule**
   - **Vision 3 – green transition**
   - **Vision 4 – green revolution**

3. 2030 visions and 2050 targets

Process at a glance: scenario elaboration and validation

Scenario elaboration & validation → *Market studies* → *Network studies* → *CBA evaluation* → *TYNDP 2014*

2 Bottom Up & 2 Top Down Scenarios on 2030

Stakeholders Interraction for data gathering& fine-tuning scenarios

3 Workshops With Stakeholders

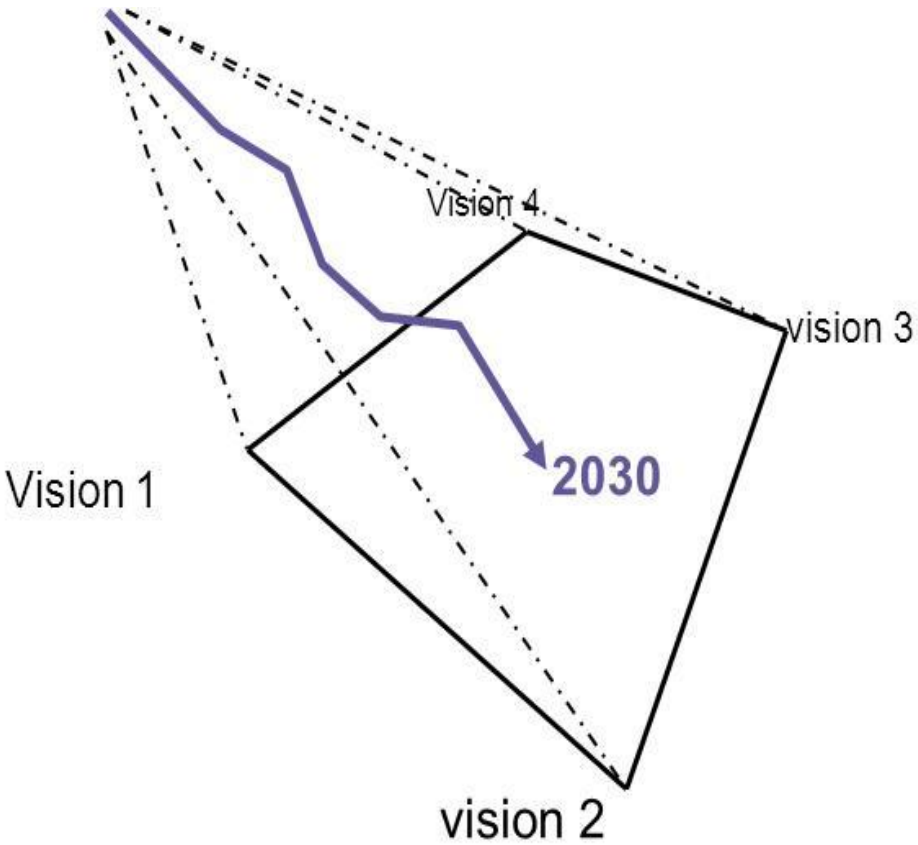
1 web consultation

1 request for input

Expert Team Pan European Scenario Bulding:

12 Physical Meetings + 40 Telco

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

On track for energy roadmap 2050

A strong European framework

VISION 3: "GREEN TRANSITION"	VISION 4: "GREEN REVOLUTION"
VISION 1: "SLOW PROGRESS"	VISION 2: "MONEY RULES"

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

VISION 1: "SLOW PROGRESS"

- Economic and financial conditions
- Energy politics
- R&D schemes
- CO_2 prices
- Primary Energy prices

NATIONAL

PARALLEL

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

VISION 3: "GREEN TRANSITION"

- Economic and financial conditions
- Energy politics
- R&D schemes
- CO_2 prices
- Energy prices

NATIONAL

PARALLEL

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

- Economic and financial conditions
- Energy politics
- R&D schemes
- CO_2 prices
- Energy prices

EUROPEAN

EUROPEAN

VISION 2: "MONEY RULES"

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

- Economic and financial conditions
- Energy politics
- R&D schemes
- CO_2 prices
- Energy prices

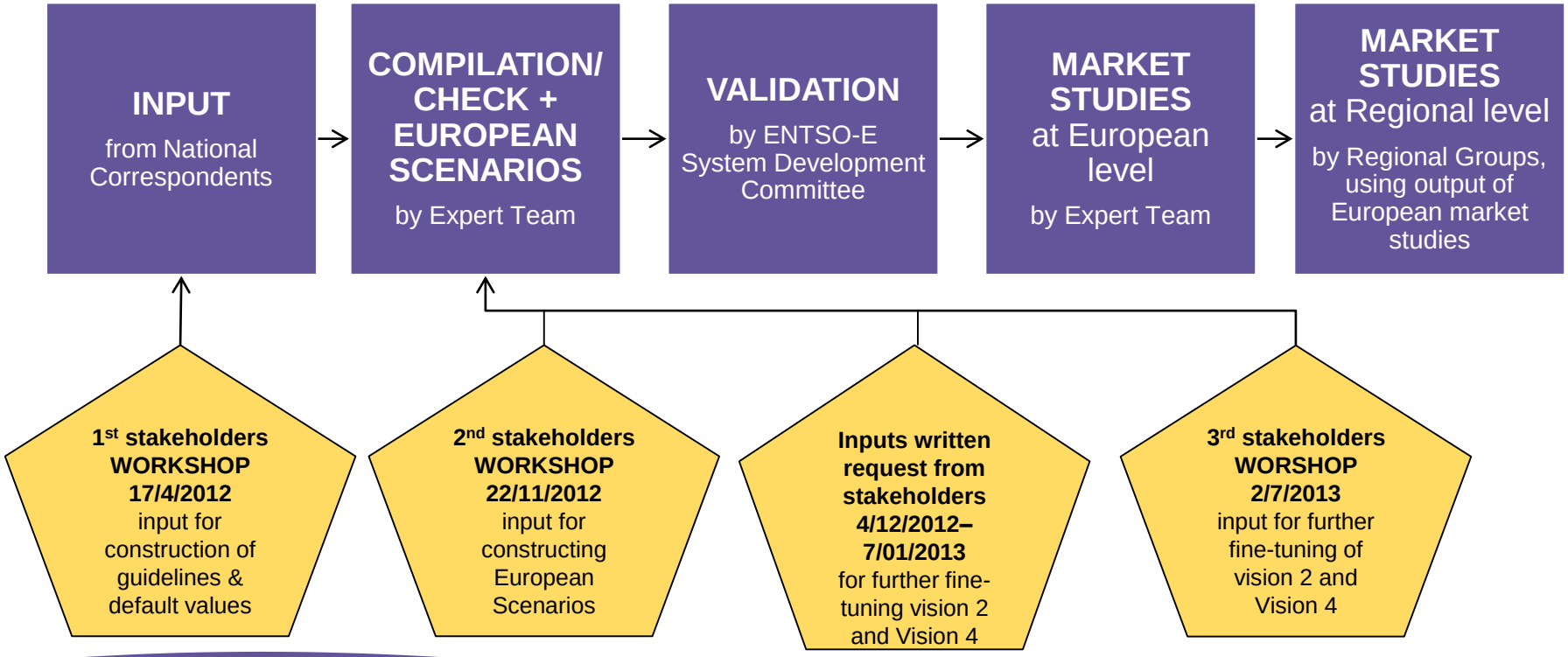
EUROPEAN

EUROPEAN

VISION 4: "GREEN REVOLUTION"

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: Vision 2 and Vision 4**



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
  - Exchanges to Rest of World profile
  - Fuel and CO_2 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.

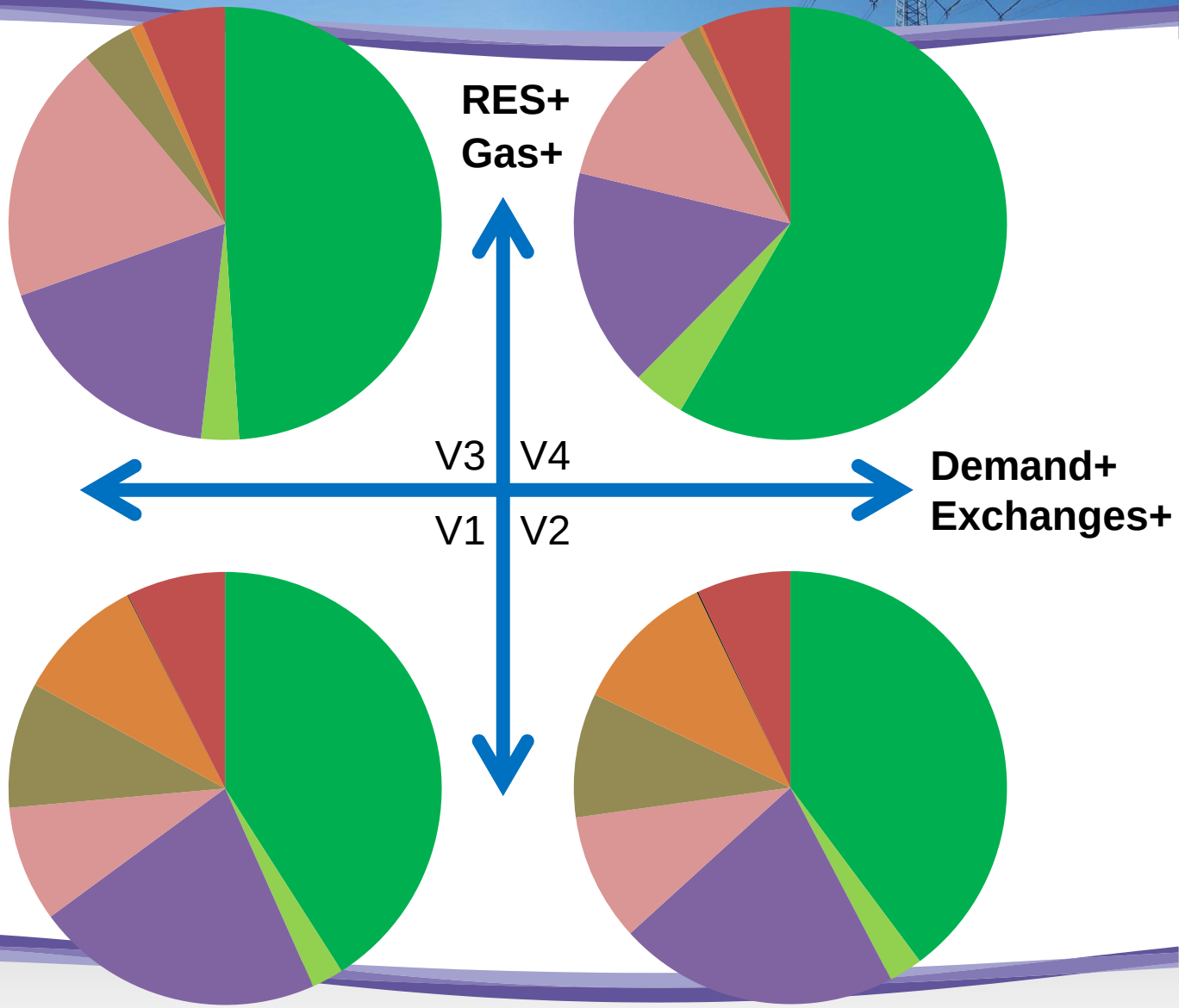
Outputs

- National Balances
- Market Node Marginal costs
- Hourly generation pattern for each generator
- System/Fuel cost
- Fuel consumption by fuel type
- CO_2 emissions

Market Simulation Results from Visions

GENERATION MIX

EUROPEAN APPROACH



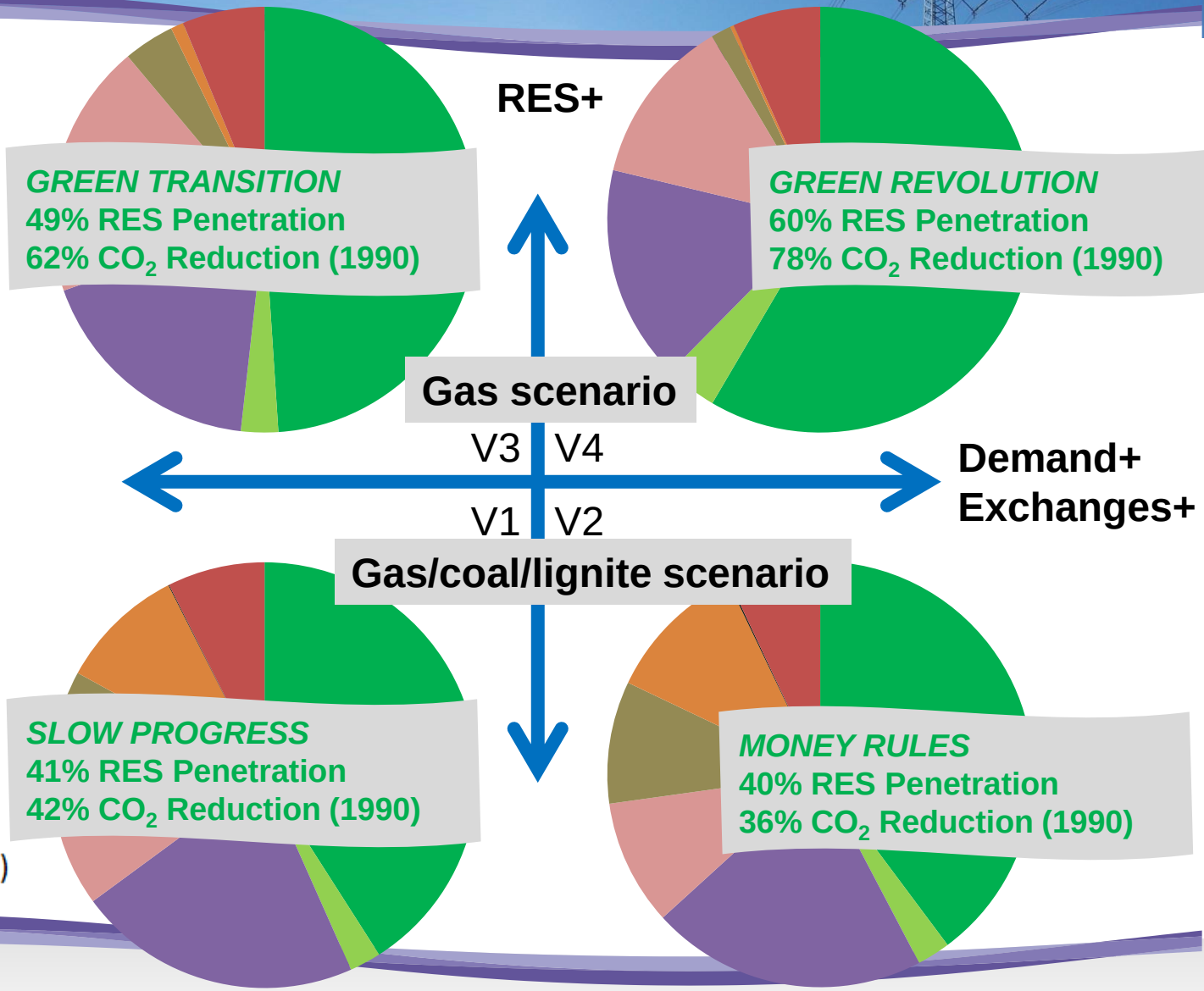
- RES
- CCS+biofuel
- Nuclear
- Gas
- Lignite
- Coal
- Oil
- Other non RES (incl hydro)

Market Simulation Results from Visions

GENERATION MIX

EUROPEAN APPROACH

- RES
- CCS+biofuel
- Nuclear
- Gas
- Lignite
- Coal
- Oil
- Other non RES (incl hydro)



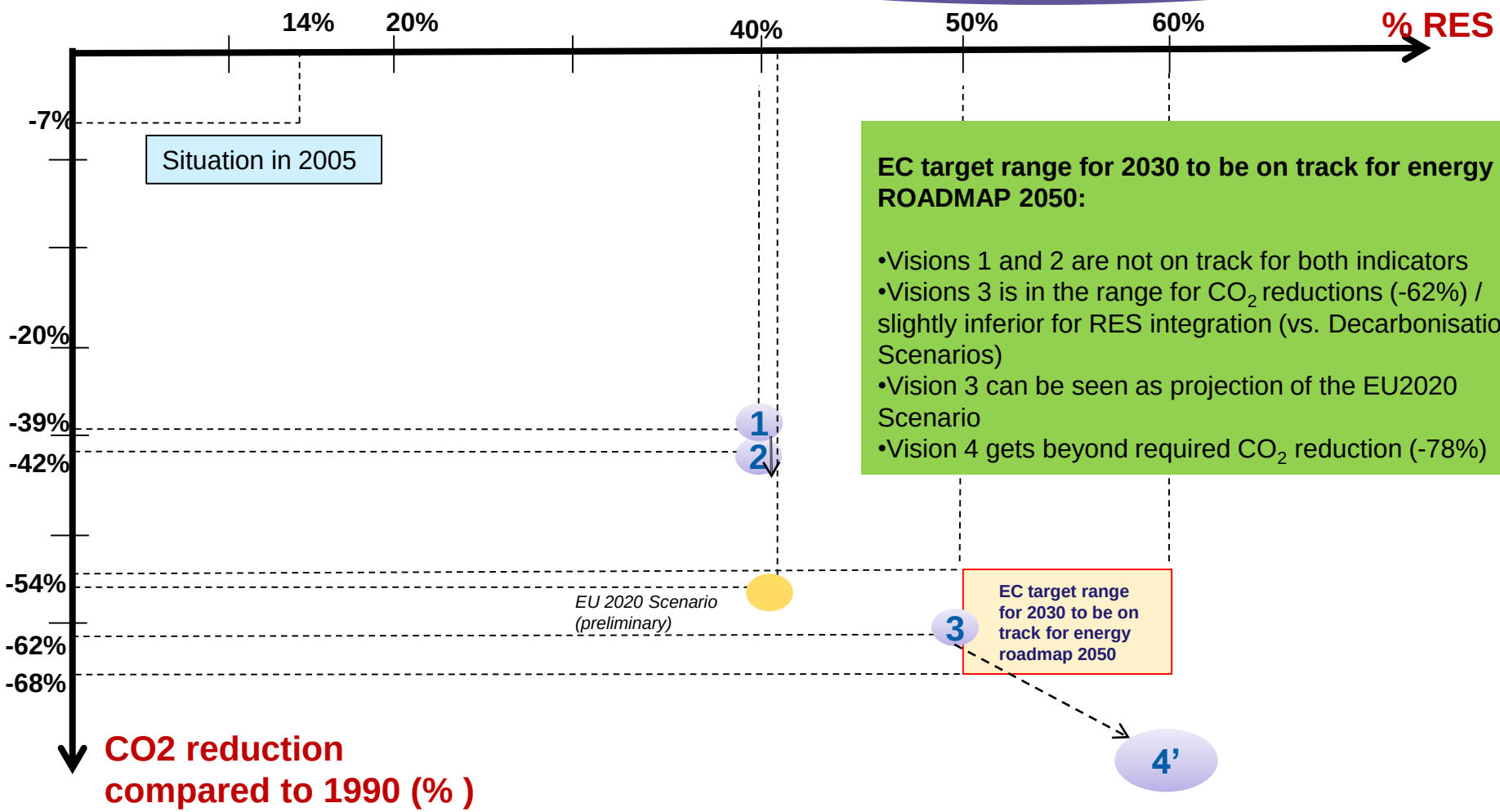
Content

1. **TYNDP process overview**

2. **2030 visions:**
   - **Vision 1 – slow progress**
   - **Vision 2 – money rule**
   - **Vision 3 – green transition**
   - **Vision 4 – green revolution**

3. **2030 visions and 2050 targets**

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
- Visions 3 is in the range for CO_2 reductions (-62%) / slightly inferior for RES integration (vs. Decarbonisation Scenarios)
- Vision 3 can be seen as projection of the EU2020 Scenario
- Vision 4 gets beyond required CO_2 reduction (-78%)

Questions?

entsoe

Reliable Sustainable Connected

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

entsoe