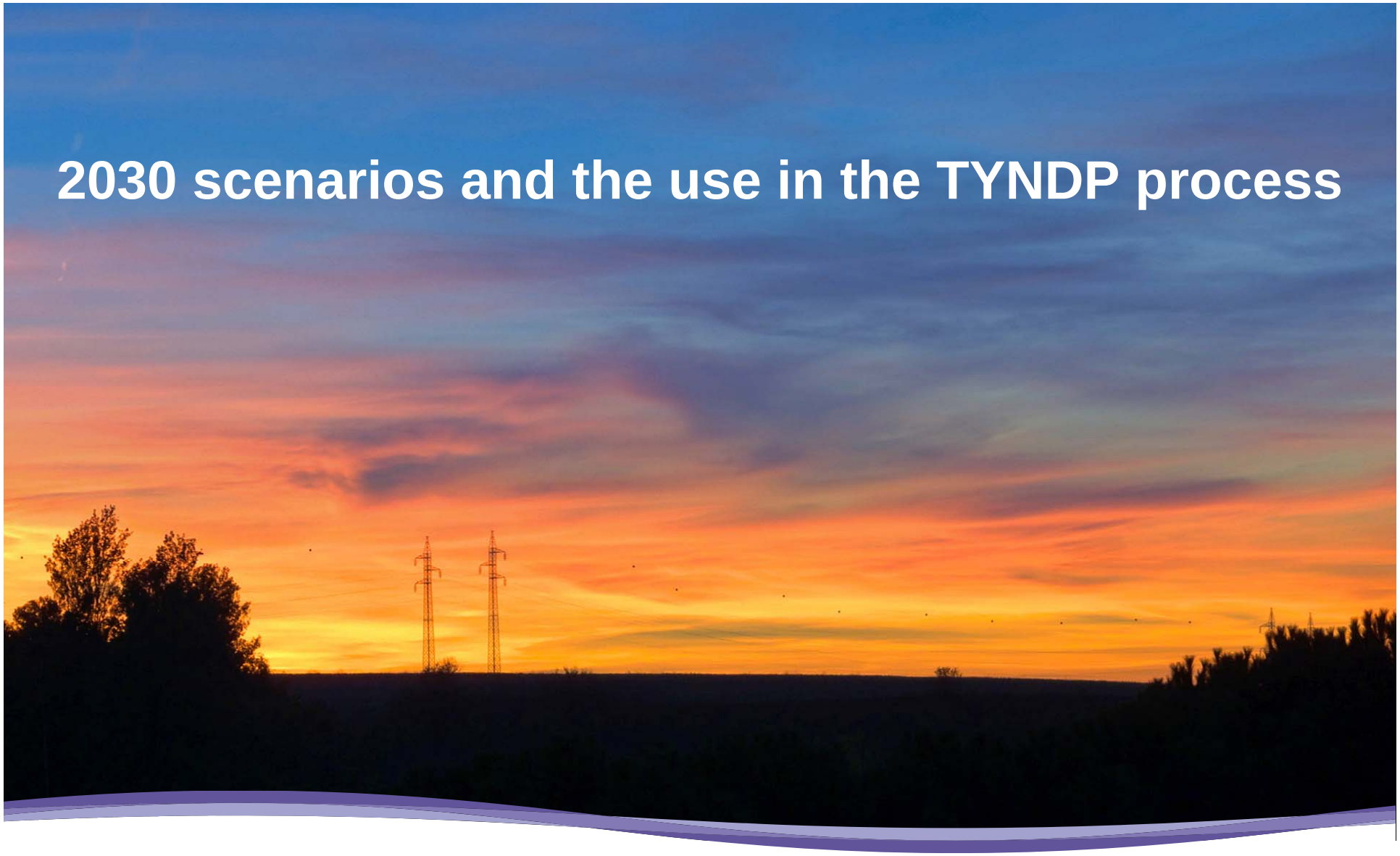
2030 scenarios and the use in the TYNDP process



Jesus Mendiola

July 2nd 2013

entsoe

Reliable Sustainable Connected

2030 Visions in the TYNDP 2014 Process

June 2012 | Sept. 2012 | Dec. 2012 | Mar. 2013 | June 2013 | Sept. 2013 | Dec. 2013 | Mar. 2014

Pan-European inputs (MS, PSM…)

Phase 1: multilateral 2030 exploration studies

-Identification/characterisation of new investment needs

-Identification/characterisation of new projects with GTC (first) assessment

Phase 2: RG projects assessment studies 2030 (& 2020)

-Assessment of projects (based on RG Market Studies and Network Studies)

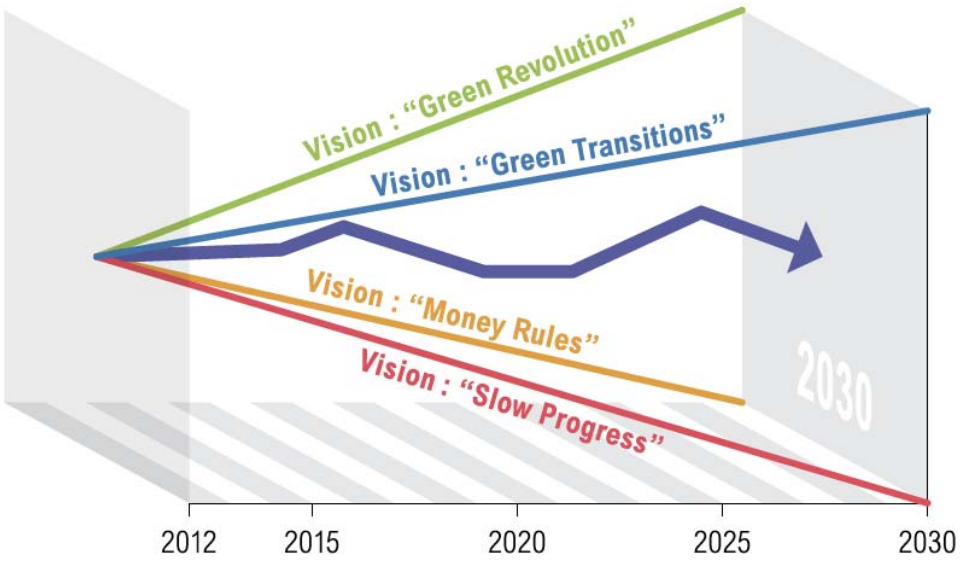
Phase 3: TYNDP& RgIPs drafting

3rd party projects

Notification of CBA results to 3rd party promoters

entsoe

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

Vision 3 : Green transition

- Favourable economic and financial conditions
- Reinforced national energy policies
- Parallel national R&D research schemes
- High CO2 prices and low primary energy prices (IEA – WEO 2010 450 scenario)
- Electricity demand higher than Vision 2
- demand respons potential is partially used
- Electric plug-in vehicles (with flexible charging)
- Smart grid partially implemented
- CCS not is not commercially deployed

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)
- Electricity demand higher than Vision 3
- demand respons potential is fully used
- Electric plug-in vehicles (with flexible charging & generation)
- Smart grid implemented
- CCS is commercially deployed

A loose European framework

A strong European framework

Vision 1 : Slow progress

- Less favourable economic and financial conditions
- No reinforced national energy policies
- Parallel national R&D research schemes
- Low CO2 prices and high primary energy prices (IEA – WEO 2010 current policies scenario)
- Electricity demand (lowest level)
- no demand respons
- No Electric plug-in vehicles
- Smart grid partially implemented
- CCS is not commercially deployed

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)
- Electricity demand slightly higher than Vision 1
- demand respons potential is partially used
- Electric plug-in vehicles (with flexible charging)
- Smart grid implemented
- CCS commercial deployment is facilitated

Delay of Energy roadmap 2050

Parameters overview

- **Economy and Market**
  - economic and financial conditions
  - new market designs
  - national schemes regarding R&D expenses
  - Merit order : primary fuel pricing - carbon pricing
- **Demand**
  - energy efficiency developments
  - New usages (Heat pumps, Electric vehicles)
  - demand response potential
- **Generation**
  - RES (wind, solar, RoR, biomass)
  - Flexibility of generators
  - back up capacity (nuclear, CCS)
  - Decentralized storage
  - Centralized storage
- **Grid**
  - smart grid and the impact on load & generation patterns

Overview of the different 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

Methodology for Market Modeling data collection

Increase stakeholder's input on the scenarios

- **Workshops to establish default values and general common framework.**
- 17 April 2012
- 22 November 2012
- 2 July 2013 (results)

Coherence with general common framework

- **data for vision 1 "Slow Progress" and 3 "Green Transition" provided by Long-term Adequacy Correspondent**

top-down & bottom-up

- **The top-down approach for visions 2 "Money Rules" & 4 "Green Revolution" established at a centralized European level**

Construction process for 2030 visions, steps

1. Input from National Long term Adequacy correspondents regarding national scenarios
2. Compilation/check of data by Expert team & construction of European scenarios – European level
3. ENTSO-E System Development Committee validates work of Expert team & national LACs
4. Expert Team performs market studies at European level
5. Regional groups use output of European market studies to model other regions & add detailled market analyses of the own region

Input from first stakeholder workshop 17/4/2012 for construction of guidelines & default values

Input from Second stakeholder workshop 22 November 2012 for methodology for constructing European scenarios

Scenario building main steps

Hydro & Load Modification for top – down approach

- Load curve and generation park adaptations
- Market and adequacy simulations

GTC Increase

- Market simulations

Thermal Capacity Reduction

- Market and adequacy simulations

GTC increase based on stakeholders feedback

- Adaptation of the original methodology in response to stakeholders suggestions:
  - reinforcement or new interconnections based on the **annual average difference of the marginal cost** between countries (+rough CBA*)
  - the analysis uses a **lower bound of at least 2 € difference** for considering possible additional interconnection capacity
  - a level of electricity interconnections equivalent to at least **10%** of their installed production capacity should be respected.
  - Limits on the increase in capacity per border included. Guidelines could be relaxed in the case of non-compliance with the 10% rule

Thermal reduction based on stakeholders feedback

- The methodology for reducing thermal generation capacity in a European top-down scenario was modified taking into account:
  - **equivalent full power hours** (EFPH)
  - **economic evaluation** of the feasibility of the thermal installed capacity from an investor's perspective.

Adequacy

The methodology regarding the interconnection possibilities in extreme circumstances was developed based on input from grid experts.

Thank you

Jesus Mendiola

July 2nd 2013

entsoe

Reliable Sustainable Connected