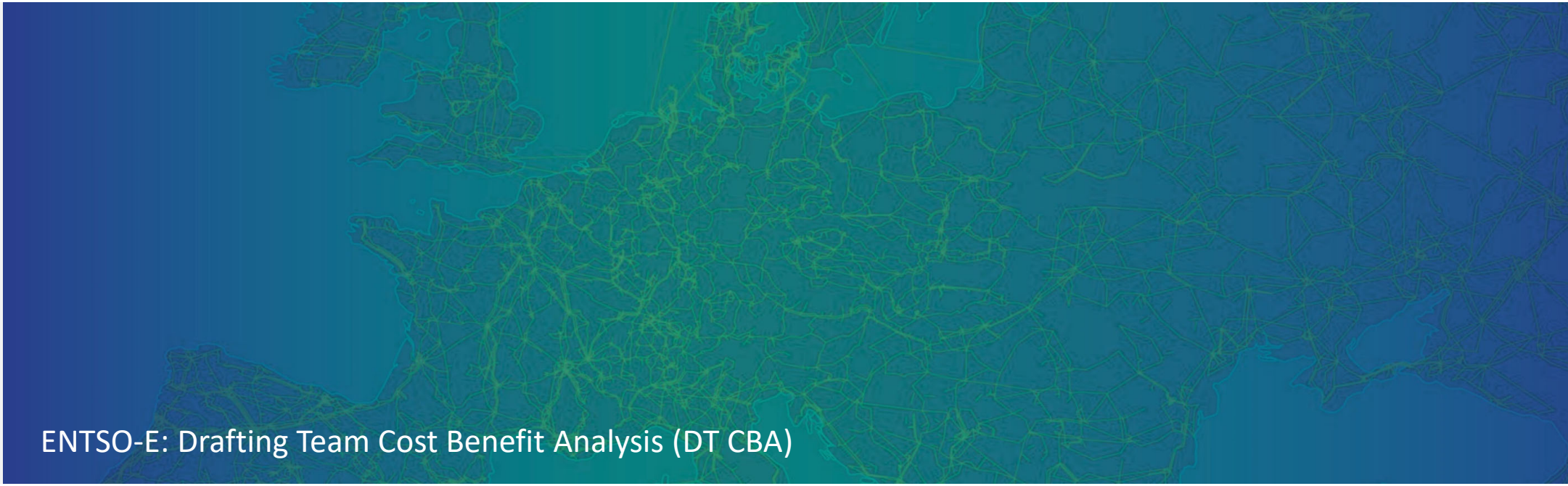
TYNDP 2022 CBA Implementation Guidelines

ENTSO-E public workshop, 3 December 2021

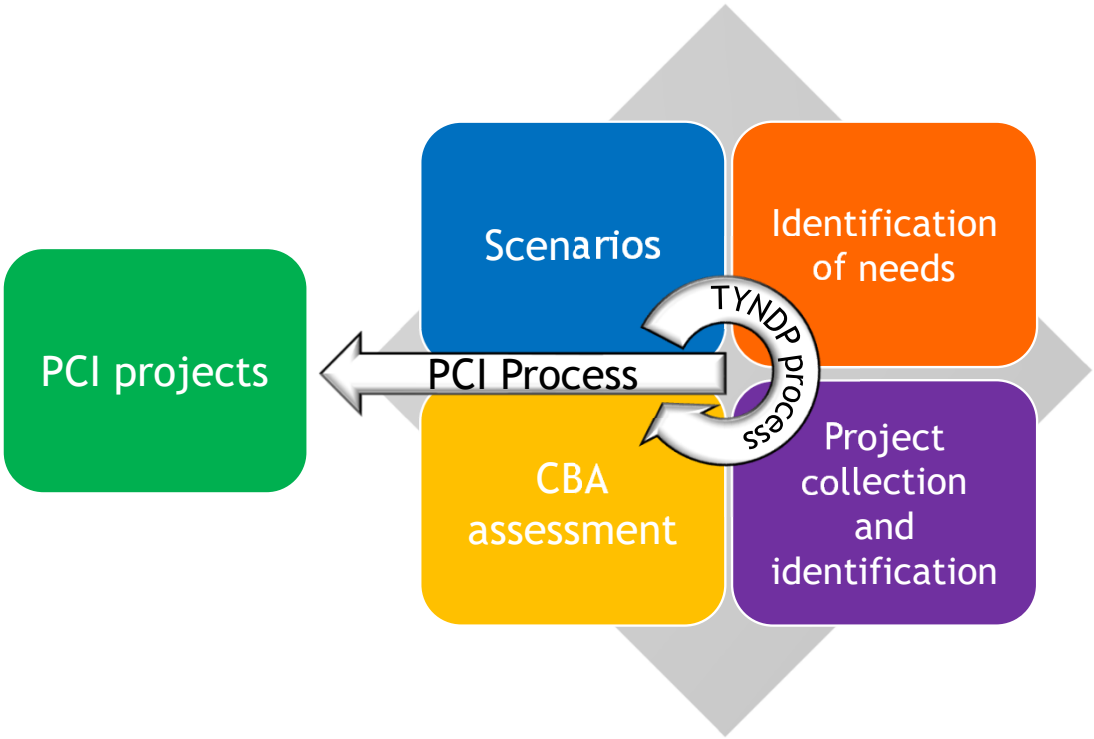


ENTSO-E: Drafting Team Cost Benefit Analysis (DT CBA)

entsoe

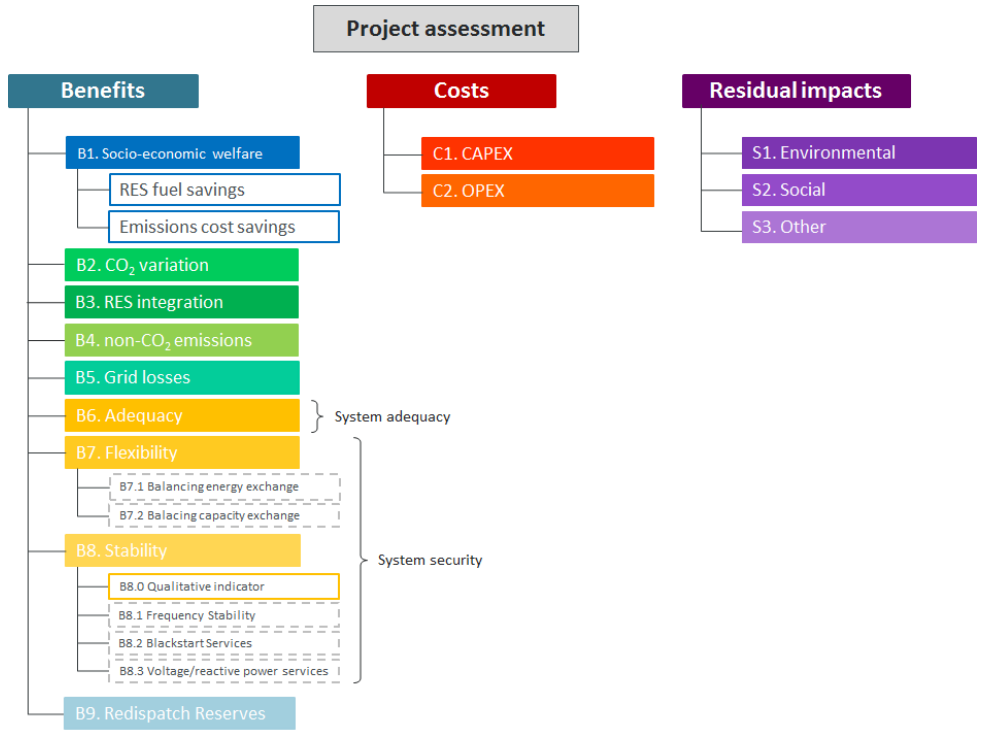
Reliable Sustainable Connected

Process Overview



Purpose of the Implementation Guideline

CBA Guideline



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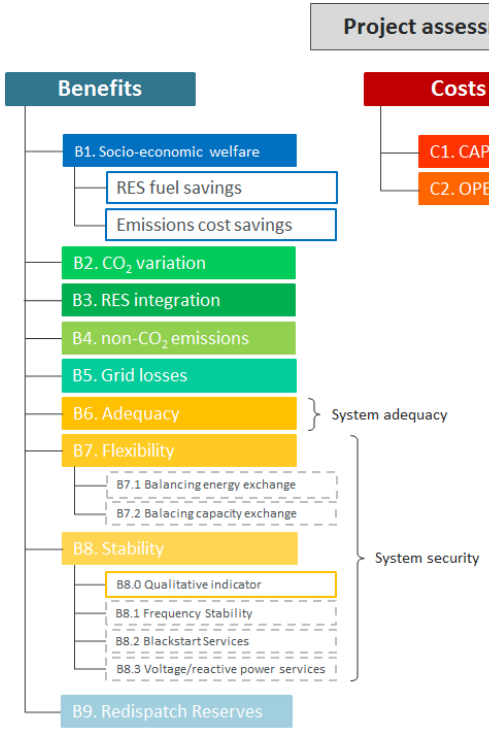

Translation of general concepts to concret application

TYNDP 2022

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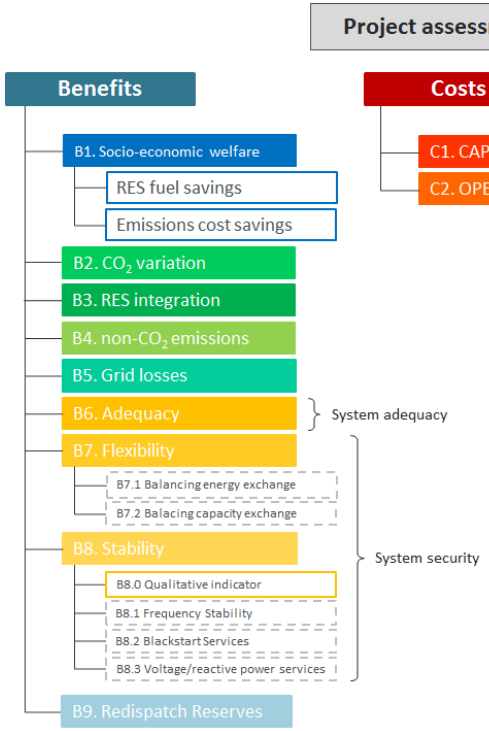


Translation of general concepts to concret application

TYNDP 2022 CBA Implementation Guidelines

TYNDP 2022

General Overview

The TYNDP Implementation Guidelines

- Based on CBA 3 – although not yet approved by the European Commission
- official addition to the CBA Guideline as by CBA 3
- Has to be published
- to be ready before the assessment phase starts

To be noted:

- the Implementation Guidelines has not yet been internally approved
- final approval is planned after internal and external feedback to be considered

Content of the Implementation Guideline

The TYNDP Implementation Guidelines

- More explanation where deemed needed for the application
- Complementary information where CBA 3 remains general
- Publication of concrete data needed for the CBA assessment
- Overview of used tools an models

Main fields of improvements since TYNDP 2020

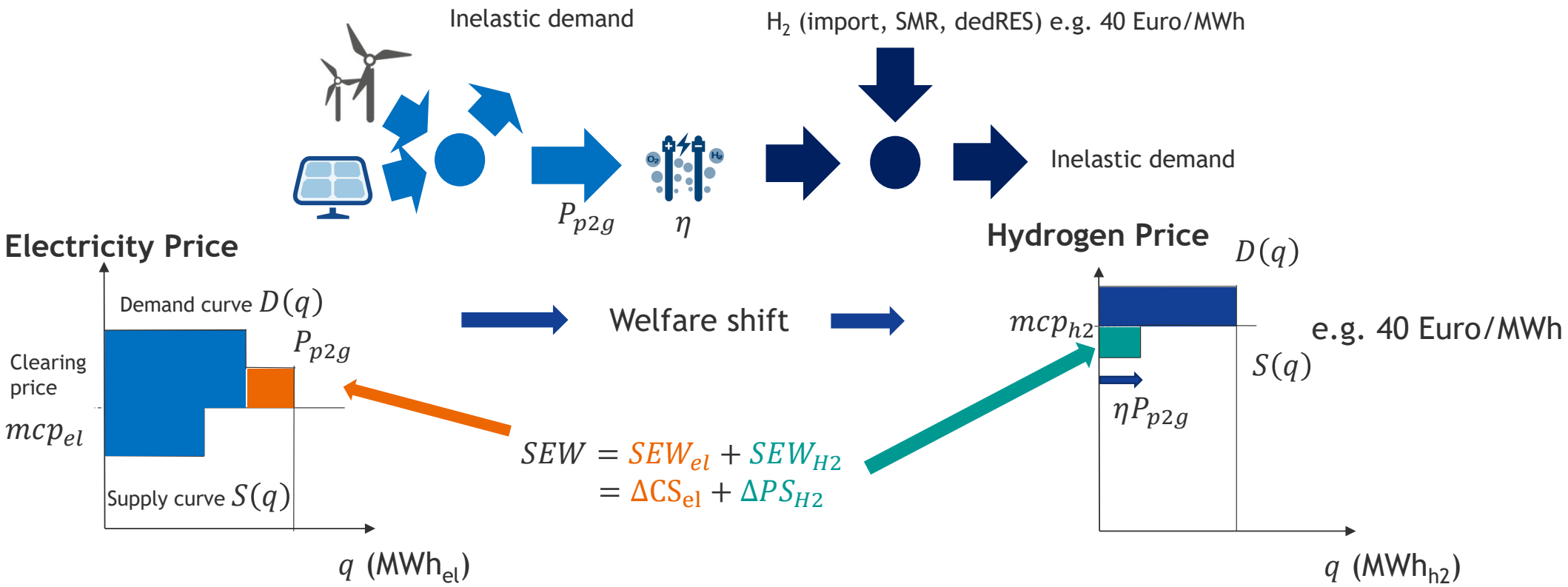
- Generally streamlined, additional explanation included
- Updated to be fit for the TYNDP 2022
- Project level indicators
- Inclusion of the Interlinked model
- Assessment of hybrid projects
- Assessment of commissioning years

Inclusion of the Interlinked Model and methodology for the dual assessment

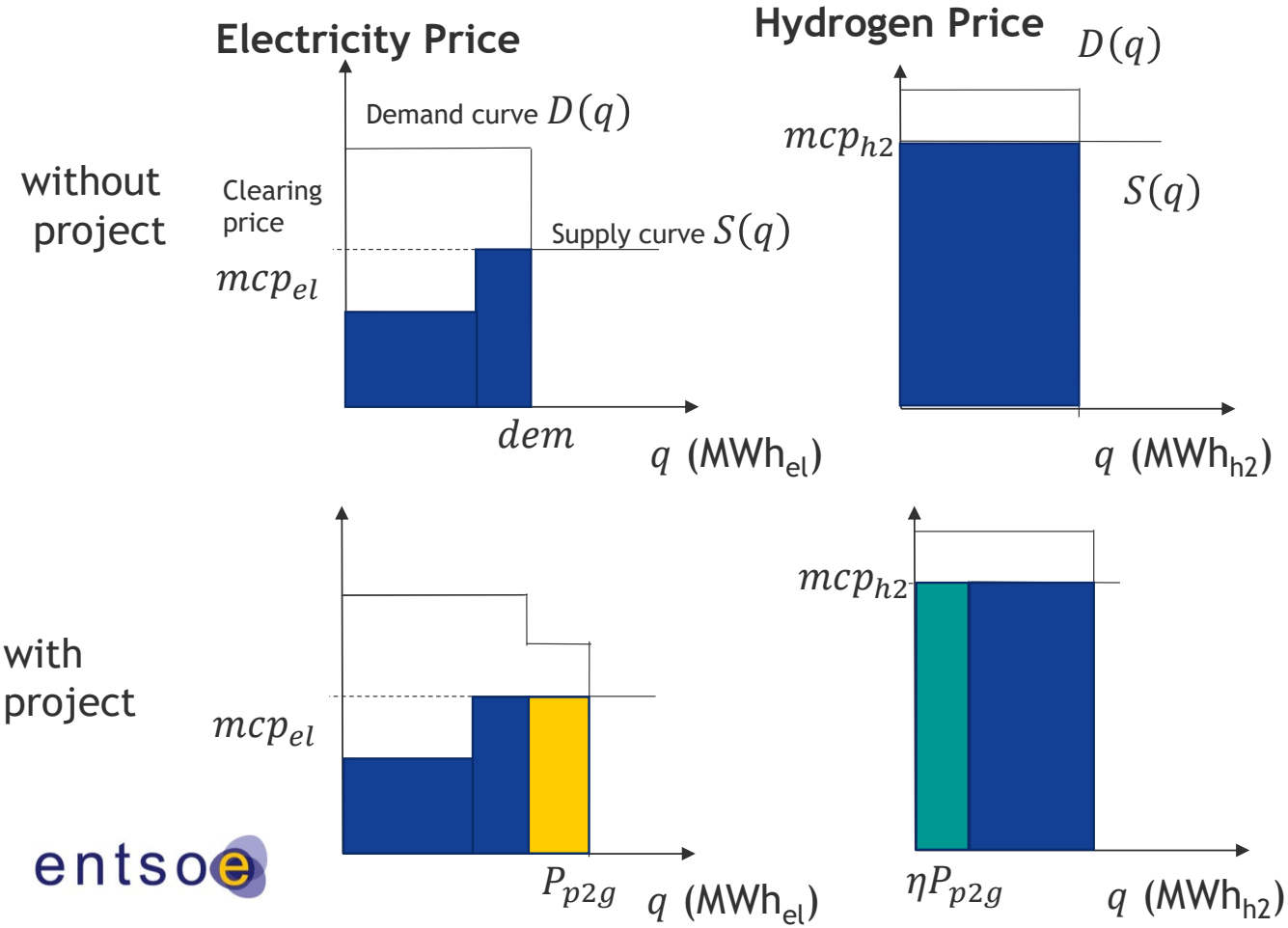
Background

- Scope of implementation guidelines
  - Assessment of electricity projects to capture the impact on the hydrogen sector (dual sector assessment)
  - Will be used for all projects to better acknowledge the hydrogen value
- How?
  - Power market simulations and ex-post attribution of hydrogen value (SEW adjustment)
  - No fully-interlinked dispatch model needed, no hydrogen demand data needed, P2G Operation with strike price (Config 3)
- What is new?
  - P2G demand profile is not fixed in PINT or TOOT phase
  - SEW adjustment specified for total generation cost and total surplus approach

Sector coupling has an impact on the global Social Welfare



Inclusion of the ILM in TNYDP 2022



$$SEW = SEW_{el} + SEW_{h2}$$

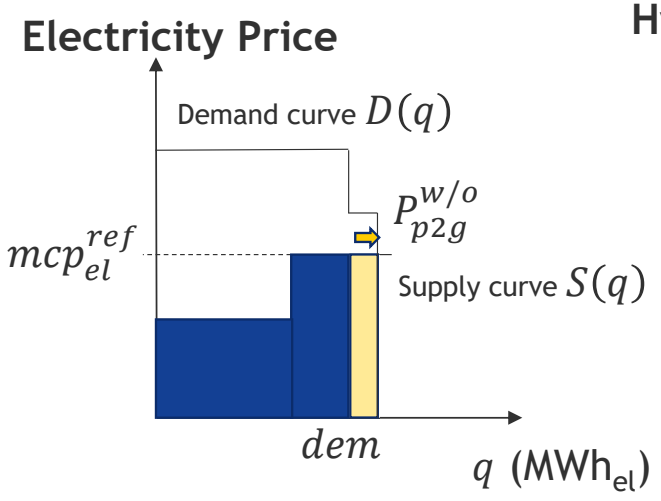
SEW_{h2}: H2 produced times H2 price

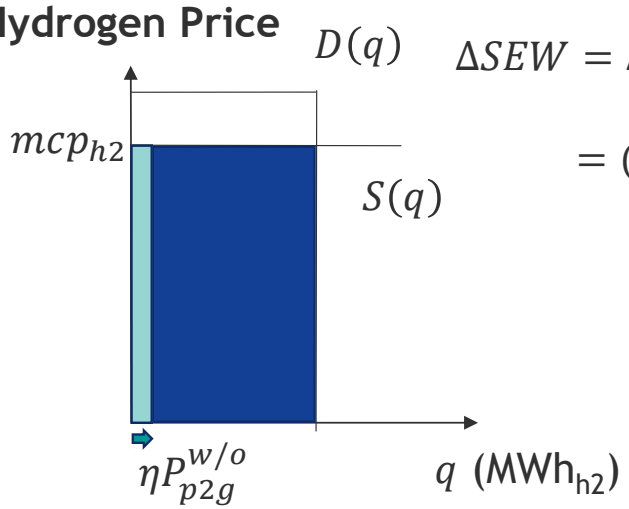
To be calculated for all projects in TNYDP 2022

Total Generation Cost Approach

P2G in base case and price setter in electricity market

without project





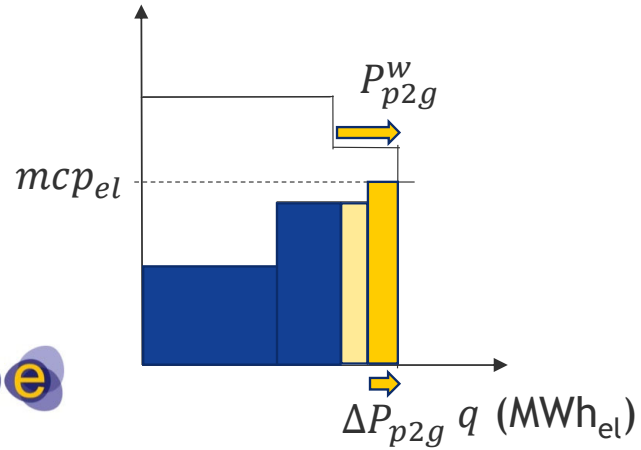
$$\Delta SEW = \Delta SEW_{el} + \Delta SEW_{h2}$$

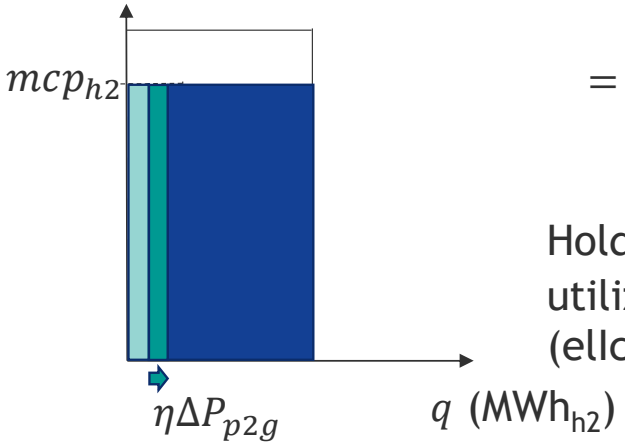
$$= (cost_{el}^{w/o} - cost_{el}^{w}) + (cost_{h2}^{w/o} - cost_{h2}^{w})$$

Additional Cost to dispatch P2G (**not** price-taker)

Benefit: Avoided cost for h2 supply (price-taker)

with project (ellc, P2G)





$$= -\int_{dem+P_{p2g}^{w/o}}^{dem+P_{p2g}^{w}} S(q)dq + \eta \Delta P_{p2g} mcp_{h2}$$

Holds also for negative ΔP_{p2g} (less P2G is utilized due to an interconnector project (ellc)!!)

Additional notes

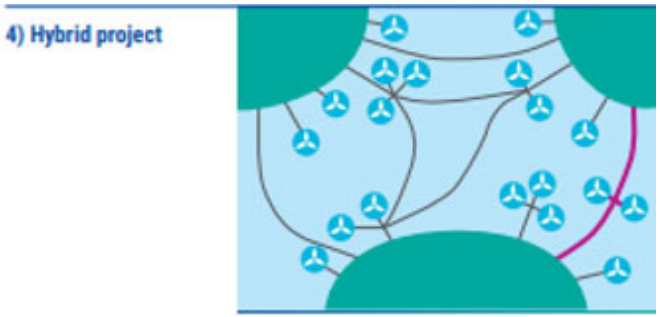
- The method will be tested in TNYDP 2022 and if positive: results to be included in the project sheets as additional information

- In parallel ENTSO-E and ENTSOG are working on a fully-interlinked model that might be run as additional test based on TYNDP 2022
  - Dual (hybrid) project assessments
  - Development of methods to capture mutual impacts / cross-couplings to assess hybrid (parallel) infrastructures

Assessment of the hybrid projects

Definition – Hybrid Interconnectors

"A project which enables an interconnector function between MS bidding zones (either onshore or offshore), whilst at the same time facilitates a client connection with a certain technology (RES or non RES; generation, load or storage; AC or DC)"

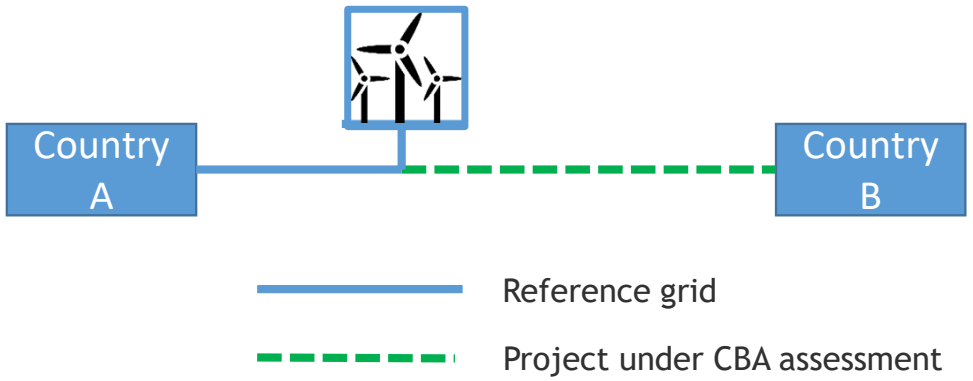


2 possible options, based on how the project is developed

- Option 1: XB interconnection (IC) integration, by expansion of an existing radial client connection (RES)
- Option 2: RES and XB interconnection integration, either project developed anew as hybrid interconnection (2 legs + RES) or only RES addition onto a XB-link or RES and second leg of an XB-link

Hybrid Interconnector - CBA option 1

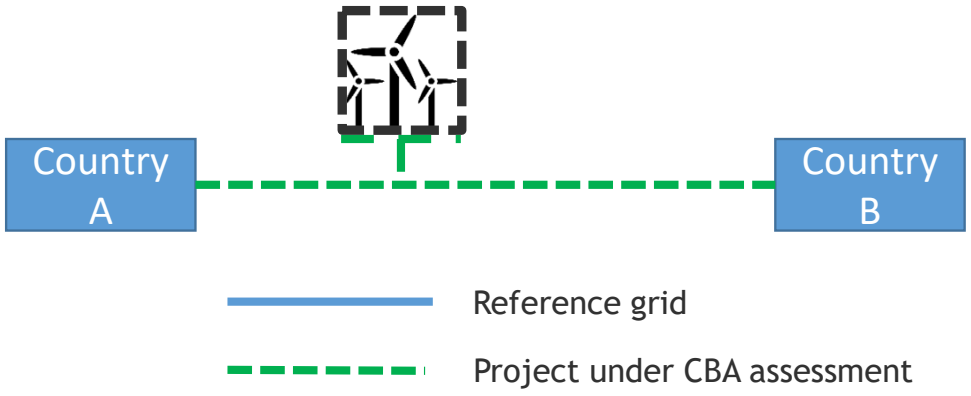
Variant 1 – only IC benefits (second leg)



⇒ Similar as existing XB-IC evaluation, but with acknowledgement of OWF-infeed
⇒ OWF-infeed to be acknowledged via OBZ setup (2 separate NTCs)
⇒ Or OWF-infeed reducing the equivalent NTC between A and B via HM setup (reduced NTC)

Hybrid Interconnector - CBA option 2

Variant 2 – IC + RES addition benefit (setup = both legs + platform)



⇒ Only CBA in TYNDP for societal transmission grid assets (not OWF)
⇒ Res integration & XB-IC benefits are counted as a whole – but SEW to be reduced with OWF-PS since no free lunch
⇒ DT CBA proposes to vary RES capacity in hybrid CBA PINT/TOOT – in coherence with reference grid position of project
⇒ Results to be sanity checked by DT-CBA during TYNDP22 CBA analysis prior to including results in project sheets

Hybrid Interconnector - OBZ and HM - overview

Context

- ENTSOE analysis from 2020-2021 via public papers from ODCG show clear preference for OBZ modelling only
- However, the OBZ-decision is not a TSO-only decision, but subject to NRA/MS approval and no imposition yet on a fixed model
- OBZ or HM modelling – in light of hybrid CBAs
  - it affects the level of OWF producer surplus
  - in case of negative prices, could affect the EU dispatch result & related market benefits & losses
  - it also affects how the NTC must be calculated (reduced NTC in HM-setup, or 2 separate NTCs in OBZ).
- If both OBZ/HM are allowed, they need to be modelled separately & a clear distinction should be kept in TYNDP sheets / databases etc.
  - less comparabale results

❑ DT CBA proposes to model OBZ as default

Assessment of the Commissioning Years

Assessment of the commissioning years

- To be applied when no information is given within the most recent NDP or where no specific agreement with the NRA exists.
- **Main idea**: develop a methodology to compare projects and their related commissioning dates
- **Basic assumption**: the more a project costs, the longer it will take to build it. Linear size of a project usually do not have a major impact on the construction times, since tenders can be split in separated lots (especially for onshore interconnection infrastructure), realized in parallel. But can depend on the capacity, the geographical location and permitting difficulties.
- A new parameter is under evaluation, linking the cost, the capacity and the lenght of a project (for interconnection projects)

$$\frac{cost}{capacity} \cdot length = \frac{€}{MW} \cdot km$$

- Punctual projects (i.e. Transformers, substations, synchornous condensers) can be assessed with a similar parameter

$$\frac{cost}{capacity} = \frac{€}{MW}$$

Assessment of the commissioning years

- The scope of this parameter is to relate the three mentioned characteristics, for the comparison of the projects to be possible.
- This parameter should be associated with the timeframe during which the costs will be sustained.
- It will represent a tool for ENTSO-E to verify ‚new' information that is not included in any national development plan.

IMPORTANT: The parameter is still under discussion, since **tests are still ongoing.**

- ✓ **Calculation of the parameter for a list of known projects and**
- ✓ **Check the results against the confirmed commissiong years**

- 2 questions are included in the ongoing public consultation, regarding the general approach and the dependency of the construction time on the lenght of the transmission infrastructure.

Project Level Indicators

PLI and other improvements

✓ Project Level Indicators based on promoters

- Benefits indicators that are relevant for the assessment but cannot presently be computed by ENTSO-E at pan-European level because there does not exist a verified guidance allowing pan-European computation
- The main principles of these indicators are defined in the 3rd CBA Guideline
- Their assessment relying on a regional, or even national, perimeter due to their inherent complexity and the assessment is performed by project promoters
- ENTSO-E verified this benefits during a review process (as part of the TYNDP process)
- The benefits presented in the PLI are applied to both transmission and storage projects
- In the TYNDP 2020, project promoters submitted 66 PLI (29 for storage projects and 37 for transmission projects). ENTSO-E accepted 25 PLI (38%)

✓ Other improvements

Project Level Indicators - examples for

B7.1 - Balancing Energy exchange

Computation of indicator B7.1 for a project of interconnection between two countries, A and B

Complete example for all the 6 steps, including numerical examples

B8.1 - Frequency Stability

no change compared to TYNDP 2020

B8.2 - Blackstart Services: methodology for synchronization with Continental Europe

no change compared to TYNDP 2020

B9 - Reduction of necessary reserve for re-dispatch power plants

Added a detailed example

Inclusion of ACER in the process

Interactions with ACER

TYNDP 2020 consultation comments (main actions by ENTSO-E):

ACER Comment	ENTSO-E action
Provide more information on the modelling tools	Add the links to the tool specific documentations
Market Modelling: provide more details on modelling assumptions	Added additional information (e.g. list of the different cost-types used for the optimisation)
Facilitate a comparision between AC and DC load-flow calculations	Test and evaluation the results ongoing
Methodology for assessing commissioning years	Method developed and included (still in finalisation)
Give more description on the relation of the different SEW parts	Additional explanation included
Give more explanation on the B6 indicator calculation details	More explanation on how to derive the Monte-Carlo years included; text streamlined
Give more explanation on the B7.1 indicator	Added a concrete and detailed example

Interactions with ACER

Direct bilateral communication during the development process:

- Four calls have been organised between ACER and ENTSO-E
- Each of the four „main topics“ have been presneted by ENTSO-E
- Detailed discussions on each of the topics

Next steps, approval process and set-up of the public consultation

Next steps, approval process and public consultation

Next steps:

- **23 November – 05 December 2021**: ENTSO-E internal commenting
- **24 November 2021 – 22 December 2022:** Public Consultation on specific point of the document
- **3 December 2021:** ENTSO-E public workshop
- **Beginning of February 2022:** Publication after ENTSO-E internal approval

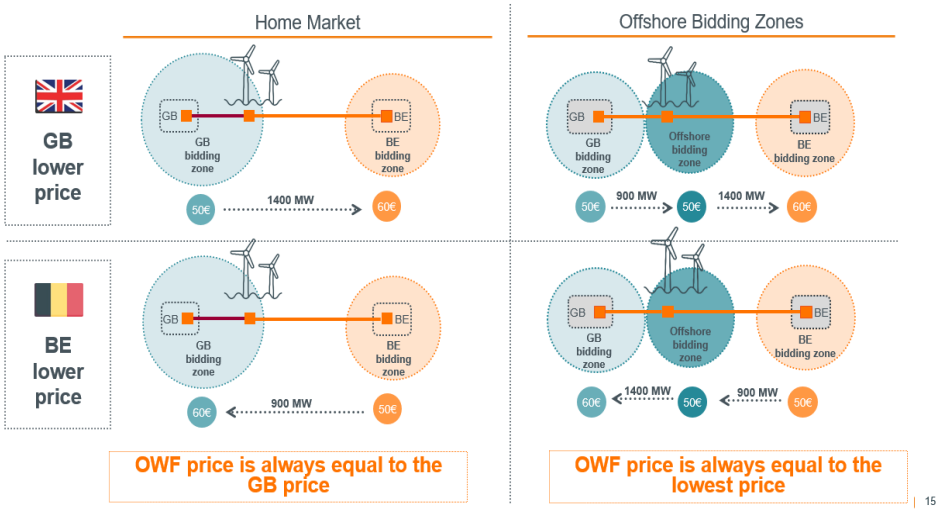
The public consultation won't foresee the release of the entire document. The process will be organized as a 'survey', with specific questions on single aspects of the deliverable (mainly the improvements).

Backup

Offshore bidding zone (OBZ) versus home market (HM) setup

Illustration of market flows

When prices are positive, the flows are the same in the Home Market and the Offshore Bidding Zones



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When BE prices are negative and GB prices positive, OWF generation will cease in the Offshore Bidding Zone