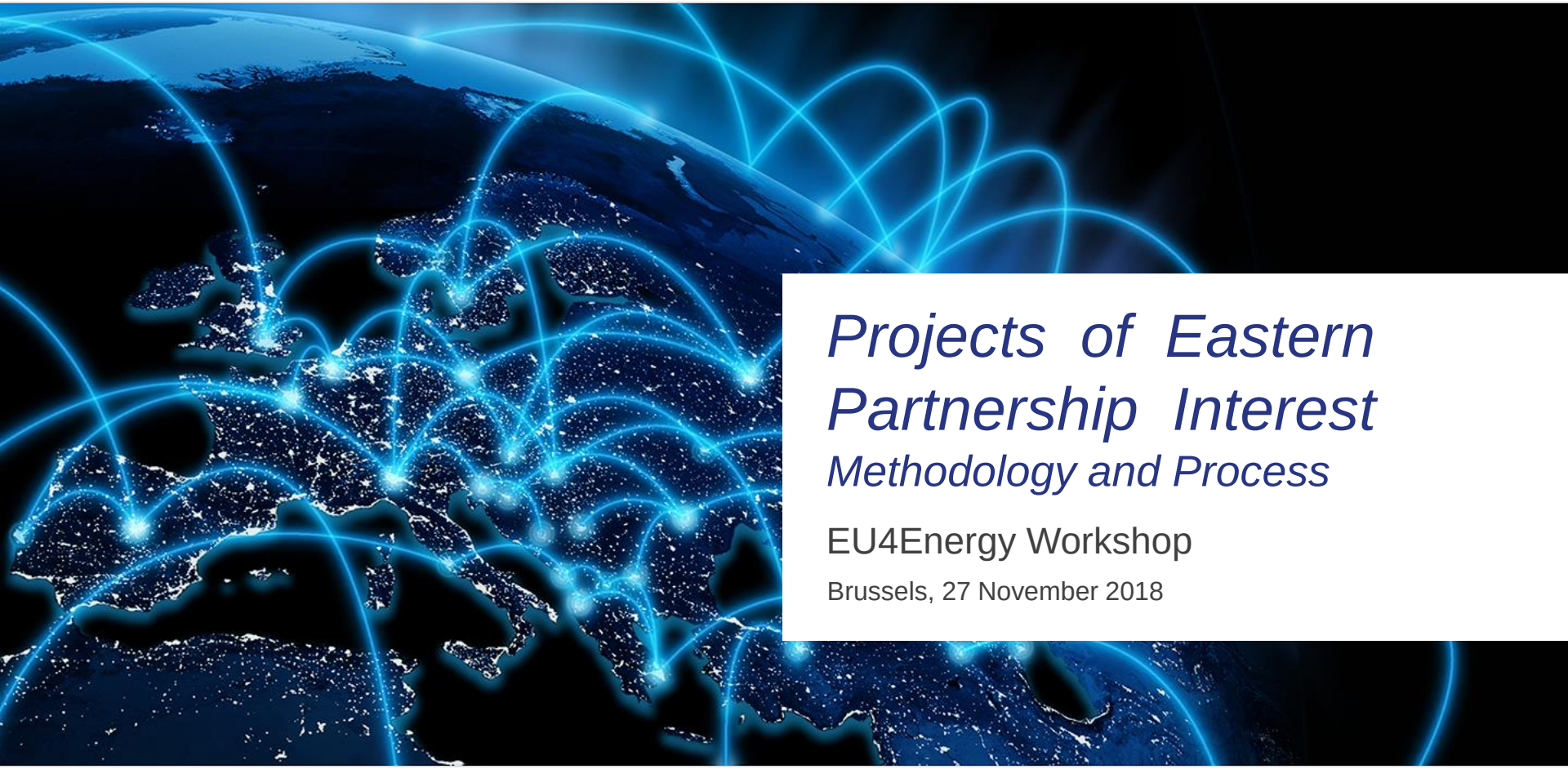


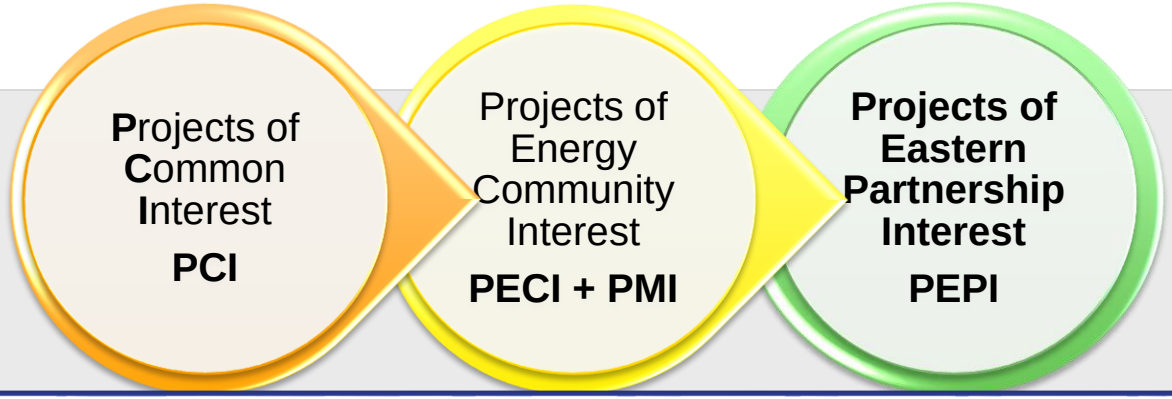
Projects of Eastern Partnership Interest

Methodology and Process

EU4Energy Workshop

Brussels, 27 November 2018

I. Introduction



The legal basis for PCI: Reg. 347/2013
The legal basis for PECI/PMI: Reg. 347/2013 as adapted and adopted by the EnC

PEPI is an initiative within EU4Energy to assist EaP countries to evaluate *regional* gas and electricity infrastructure project plans (transmission, storage, LNG, back-to-back station)
Projects, which connect EaP countries*, *but not EU or EnC*
Regional Significance and cooperation

Projects with positive B/C ratio are to be recognized as Projects of Eastern Partnership Interest - PEPI

The model is the PECI/PMI project assessment in a simplified way, on a case-by-case basis

II. The Work Program of EU4Energy

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RA1 WSs to discuss the process of key infra identification

Meetings in 2017 in Belarus, Armenia, Azerbaijan, Brussels

Preliminary data collection excercises in 2017

RA2 Development of Methodology, based on PECI

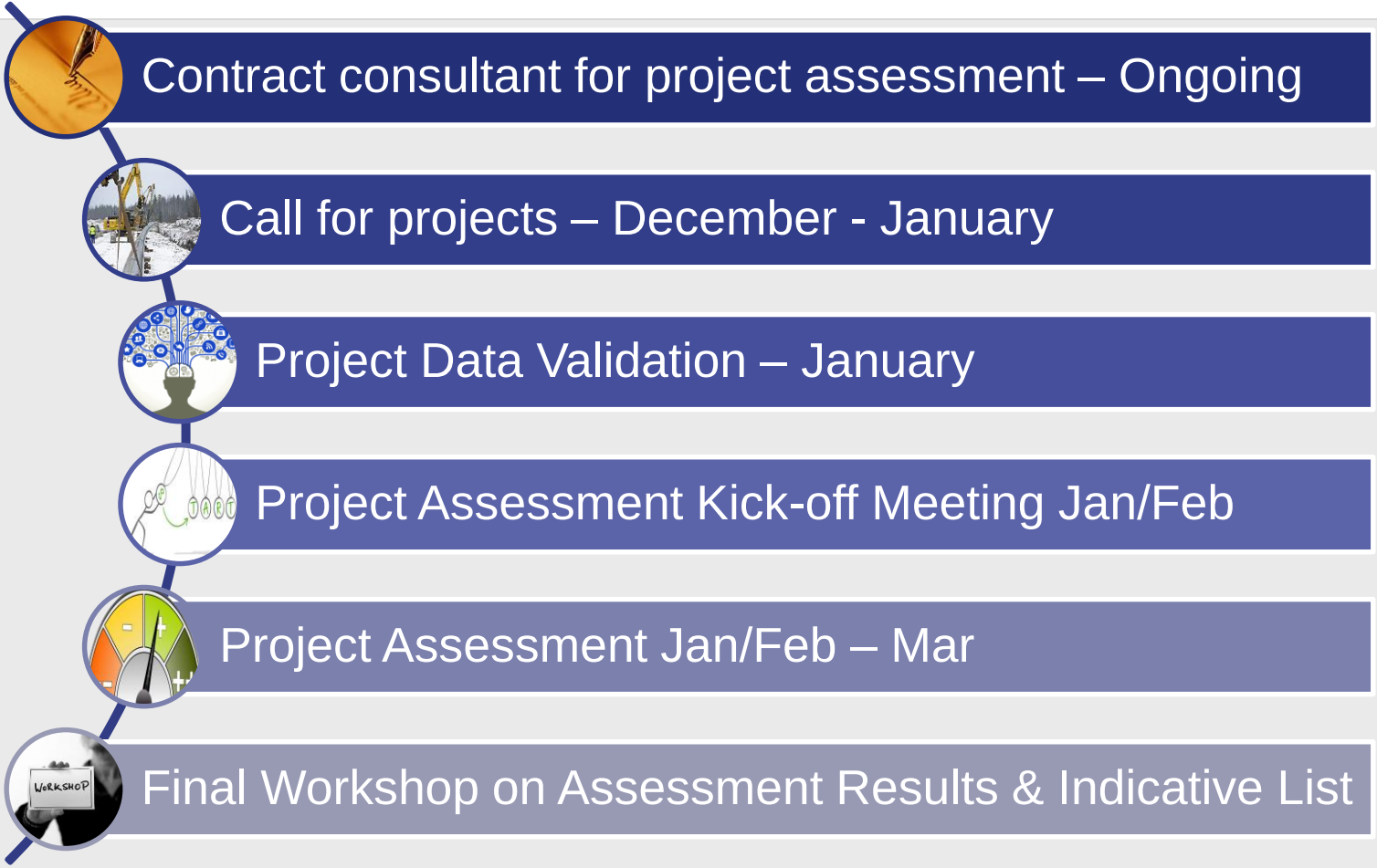
REKK was contracted end of May 2018	Draft Final Report submitted in October	Workshop on the Final Methodology - Now

RA3 Process to identify regional key infrastructure

Data Collection	Project Assessment	Publication and Finalization

III. Following Steps –

Process to identify regional key infrastructure



IV. Assessment Methodology

Tasks of the Consultant - Concluded

Assessment criteria for the methodology:

- Market Integration
- Security of Supply
- Competition
- Sustainability

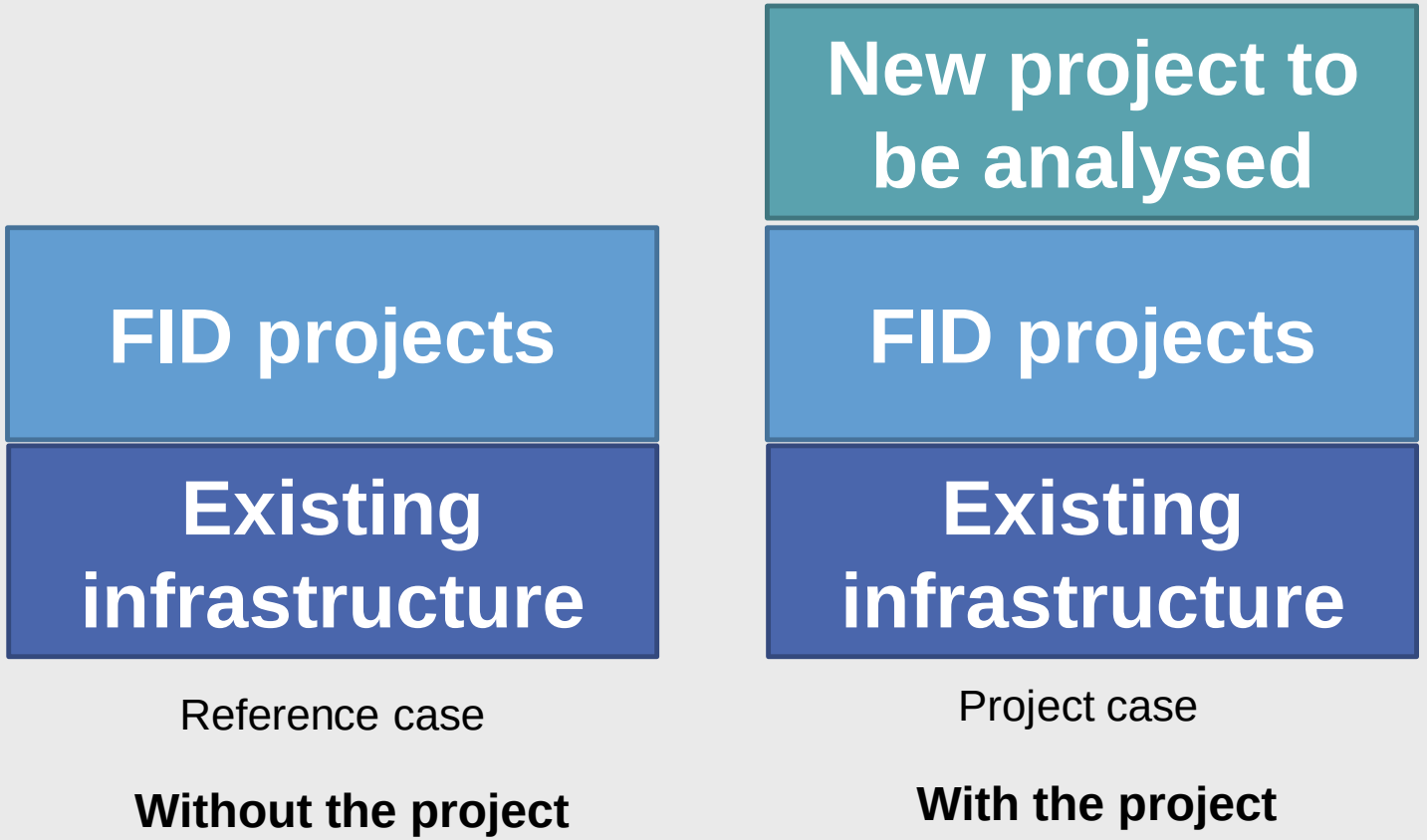
*See backup slide for details

1. Providing a pre-screening of new markets
2. Reviewing potential indicators
3. Testing the applicability of an alternative simplified calculation method
4. Testing the modelling based PECI/PMI methodology on example projects for the EaP region
5. Present a preliminary flowchart for assessment methodology
6. Outline the possible data need

IV. Assessment Methodology

Market Pre-screaning conclusions

- EaP countries have unique and loosely interconnected energy markets compared to the EU Member States.
- State ownership and limited competition on the wholesale level
- Missing transparent and reliable price signals
- No transmission tariffs available for gas for all EaP countries
- Missing data especially on forecasted demand
- Already high share of gas in the primary energy mix


FID projects
Existing infrastructure
Reference case
Without the project
New project to be analysed
FID projects
Existing infrastructure
Project case
With the project

IV. Assessment Methodology

Comparison of possible approaches

Approaches verified:

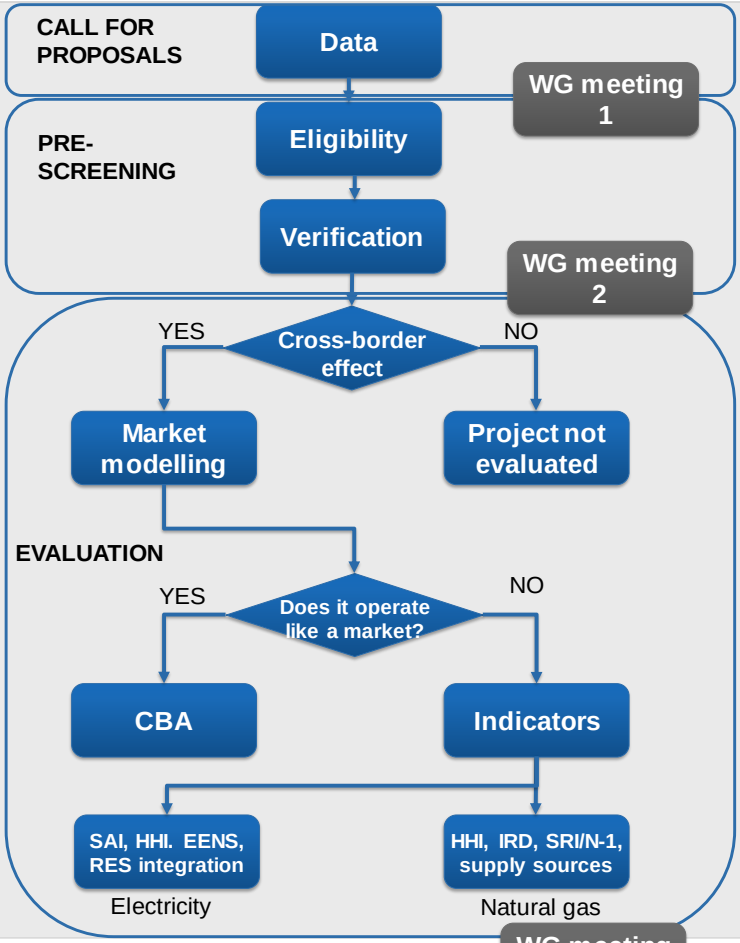
1) Indicators – No modelling
2) Avoided cost approach – No modelling
3) Market modelling

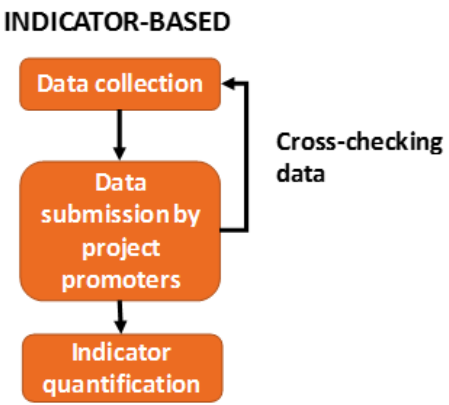
For electricity projects, no serious obstacle found to use modelling based assessment

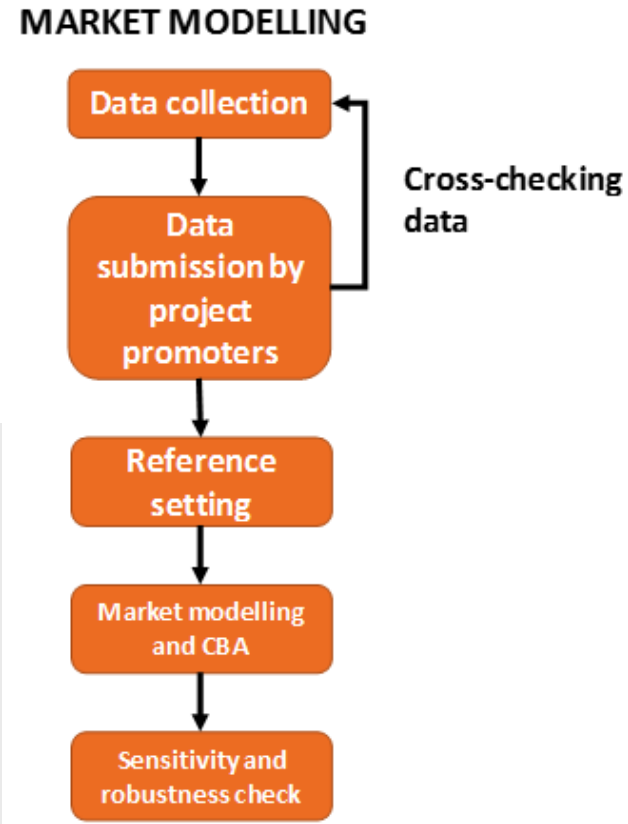
	Indicators (SRI, HHI, number of suppliers)	Simplified calculation (Avoided cost approach)	Market modelling
How difficult it is to calculate?	Easy to quantify	More complicated than indicators, but straightforward	Market modelling tool is needed
Reproducibility	Possible	Possible	Possible, but modelling tool is needed
Data need	Low	Moderate (fuel prices, detailed consumption structure)	High (consumption level, patterns, tariffs, network topology, etc.)
Possible usage	Narrow, only the indicator	CBA, based on assumptions	Market equilibrium, CBA and sectoral welfare analysis
Economic evaluation / Monetization	No	Yes	Yes
SOS evaluation	Yes (N-1)	No	Yes (SOS modelling scenarios)
Robustness	Robust	Highly sensitive to inputs	Sensitive to inputs
Sensitivity analysis	Not needed	Required	Required

IV. Assessment Methodology

Assessment Algorithm







IV. Final outcome of the project assessment

Sensitivity

- Electricity
  - Demand
  - Gas prices
  - …
- Gas
  - Demand
  - Critical infrastructure
  - Global gas market
  - …

Robustness of results

Positive projects

Pending projects

Negative projects

IV. Assessment Methodology
Data Need

Basic data of the projects:

For gas interconnectors:
capacity at IPs, length, diameter, compressor power, bidirectionality, tariff

For storage: working gas, withdrawal rate, injection rate, tariff

For LNG: regas capacity, storage, tariff

For electricity: Net Transfer Capacities, length, voltage level

For all: cost, year of commissioning

+ 2-3 page summary on project history and explanation why the project is important and how it would contribute to regional market integration/ regional security of supply /sustainability

V. Conclusions of the Kiev Workshop

The project promoters and regulators present did not express concerns about the proposed methodology and the proposed process schedule.

Moreover it was noted that the participants were ready to submit projects within the process. Each country's representatives expressed willingness and interest in submitting electricity and/or gas transmission projects with possible regional impact for assessment; some of these projects have also been mentioned during the discussion, among them an innovative project of series of back to b ack stations on Belarus/Ukrainian border when Ukraine will be synchronised with the Continental European Synchronous Area.

Participants thanked for the opportunity and are looking forward to this assessment.

Thank you
for your attention!

www.energy-community.org

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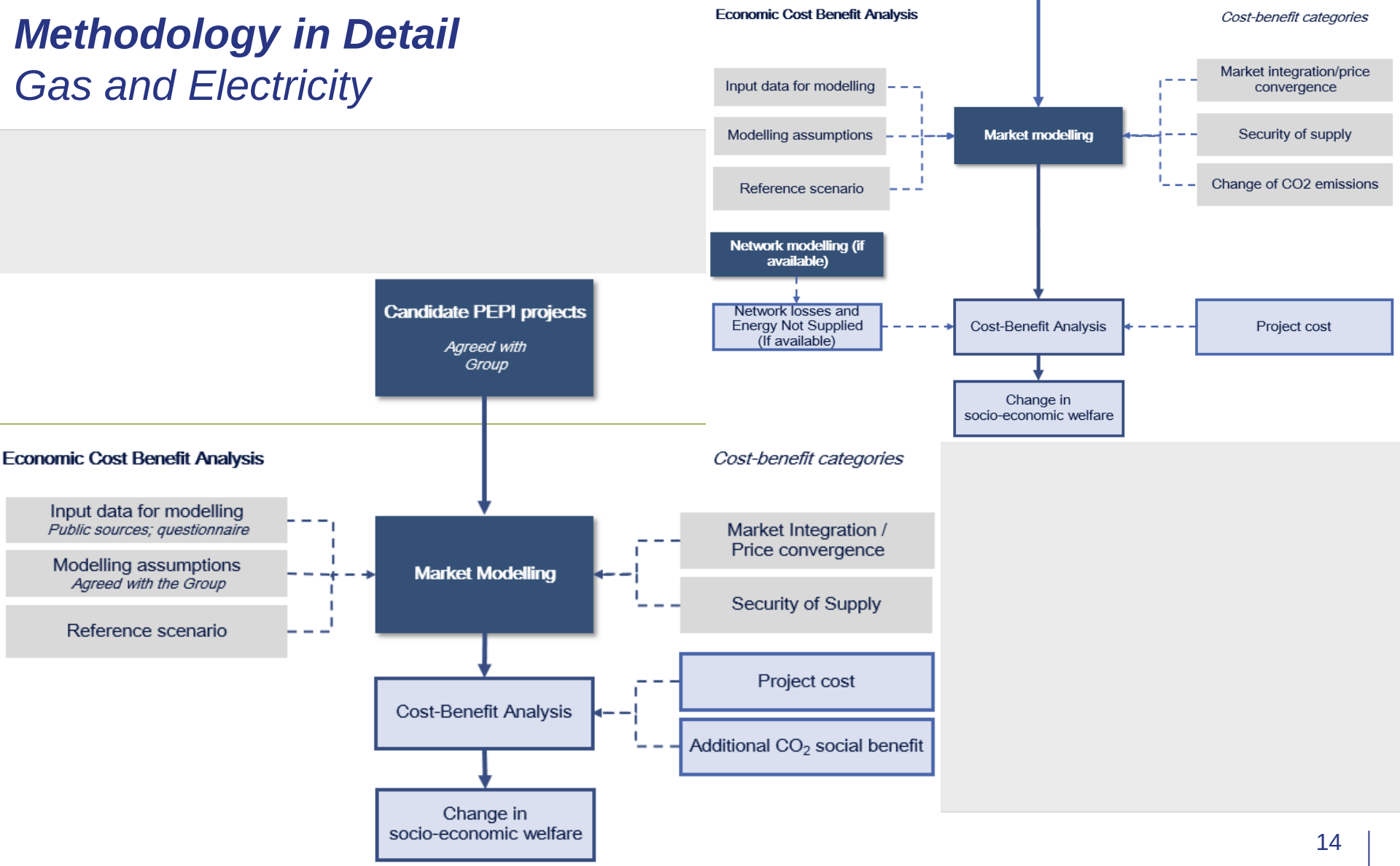
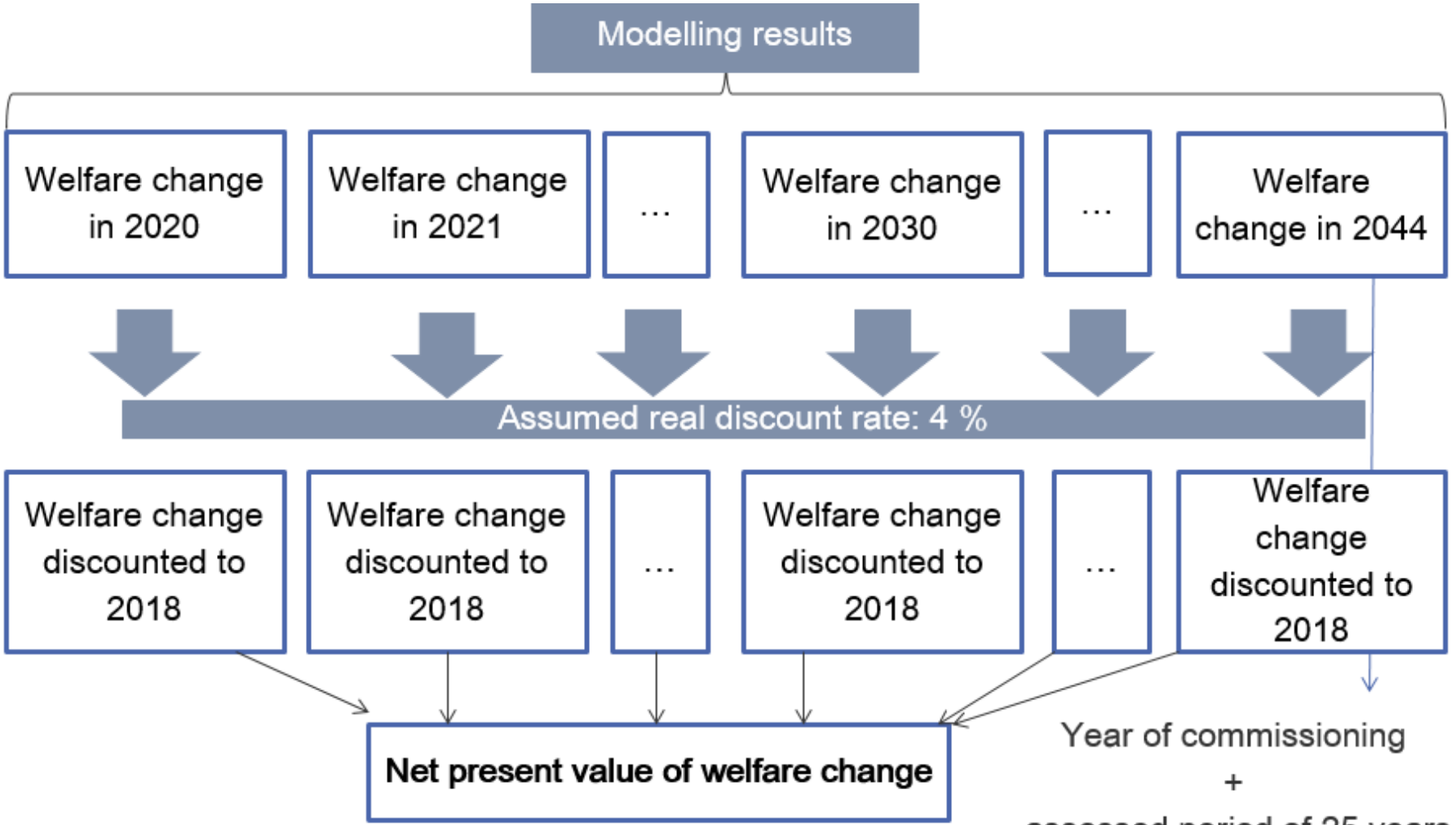
Methodology in Detail
Gas and Electricity



Methodology in Detail
Gas and Electricity



Avoided Cost Approach – Why Not ...?

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3. Applicability of alternative methodology

REKK

- DG Regio methodology
- Three possible positive gains
  - Savings on CO_2 costs (not applicable in EaP countries)
  - Savings on more expensive alternative fuel costs due to switching to gas (if gas consumption is high and no coal could be substituted, benefits are nil)
  - Savings due to cheaper gas source (no competition effect)
- Market-based approach from the view of an importing country
- No transit effects
- No regional effects, only one country
- No SOS dimension considered
- Parametrisation is arbitrary, high data need
- We suggest not to apply this approach

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Selected indicators - GAS

REKK Regional Centre for Energy Policy Research

In case market modelling is possible

Indicators	Type of indicator	Benefit categories			
		Market integration	Security of supply	Competition	Sustainability
Social welfare change	monetised via market modelling	X (normal situation)	X (supply disruption)		
System Reliability Index (SRI)	non-monetised indicator		X		
Import Route Diversification Index (IRD)	non-monetised indicator	X	X	X	
CO_2 emission	monetised via market modelling				X

In case market modelling is NOT possible

Indicators	Benefit categories			
	Market integration	Security of supply	Competition	Sustainability
System Reliability Index (SRI)		X		
Import Route Diversification Index (IRD)	X	X	X	
Bidirectionality of interconnectors	X	X	X	
Number of supply sources		X	X	
CO_2 emission				X

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REVIEWING POTENTIAL INDICATORS – ELECTRICITY

REKK Regional Centre for Energy Policy Research

Benefit category (Regulation)	Indicator category (ENTSO-E)	Indicator	Modelling needed?	Monetizable?
Market integration	Socio-economic welfare	Consumer and producer surplus, congestion rent	Yes	Yes
Security of supply	Security of supply	Expected energy not supplied	Yes	No
	Security of supply	Value of lost load	Yes	Yes
	Variation of losses	Savings from reduced thermal power losses	Yes	Yes
	Technical resilience	Contribution to system security during extreme situations	Yes	No
	Robustness/ flexibility	Ability of the system to meet future scenarios	Yes	No
Sustainability	RES integration	Increased RES generation	Yes	No
	Variation of CO_2 emissions	Variation of CO_2 emissions	Yes	Yes

ENTSO-E indicators of the CBA 1st methodology

Need for modelling

Selected Indicators:

- **Socio-economic welfare**
- **CO_2 emissions**
- RES integration
- EENS
- SAI
- HHI

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2. REVIEWING POTENTIAL INDICATORS – 1.

REKK

- **Market integration** (lifting the isolation, reducing energy infrastructure bottlenecks, interoperability and system flexibility)
- **Security of supply** (appropriate connections and diversification of supply sources, supplying counterparts and routes)
- **Competition** (diversification of supply sources, supplying counterparts and routes)
- **Sustainability** (reducing emissions, supporting intermittent renewable generation and enhancing deployment of renewable gas)