Evaluation of Projects of Common Interest under the Guidelines for trans-European energy network
(draft methodology)

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Institute for Energy and Transport

Energy Security, Systems and Market

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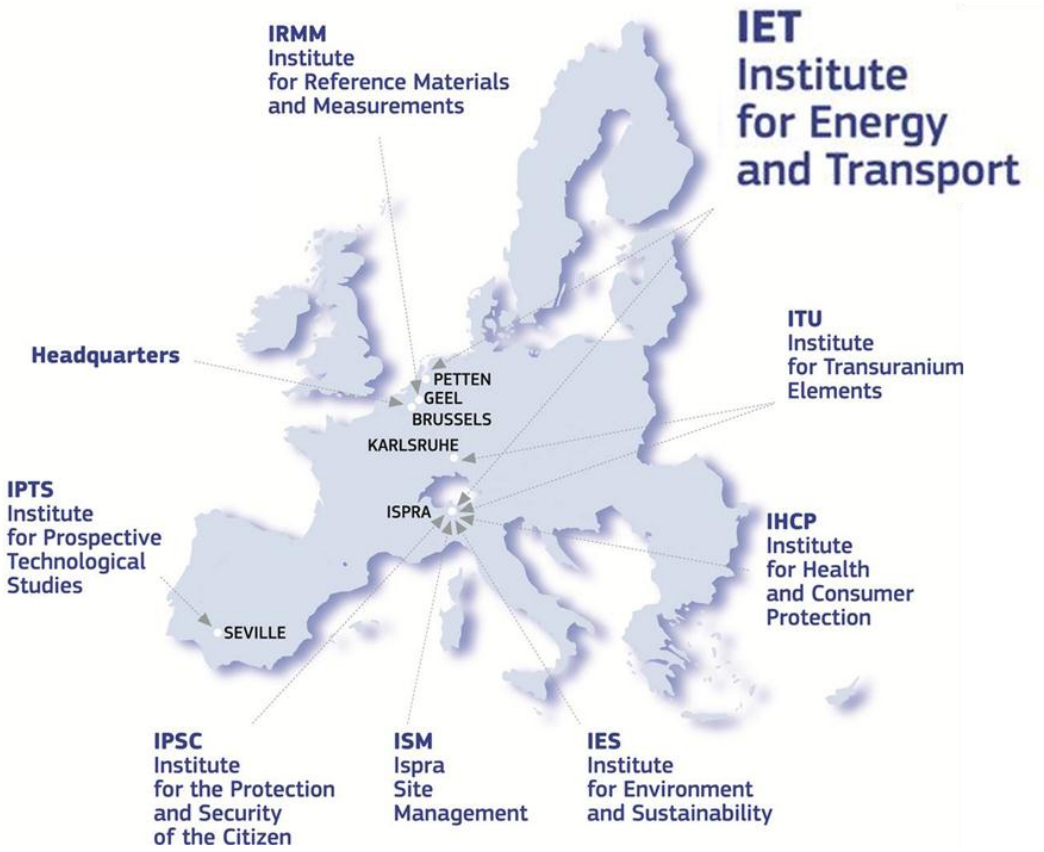
JRC ROLE AND EXPERTISE

Joint Research Centre

- EC's independent **in-house scientific service**
- A **self-standing DG** providing EU policy makers with impartial advice
- Our mission: ensure **science-based policy making** on a wide range of topics



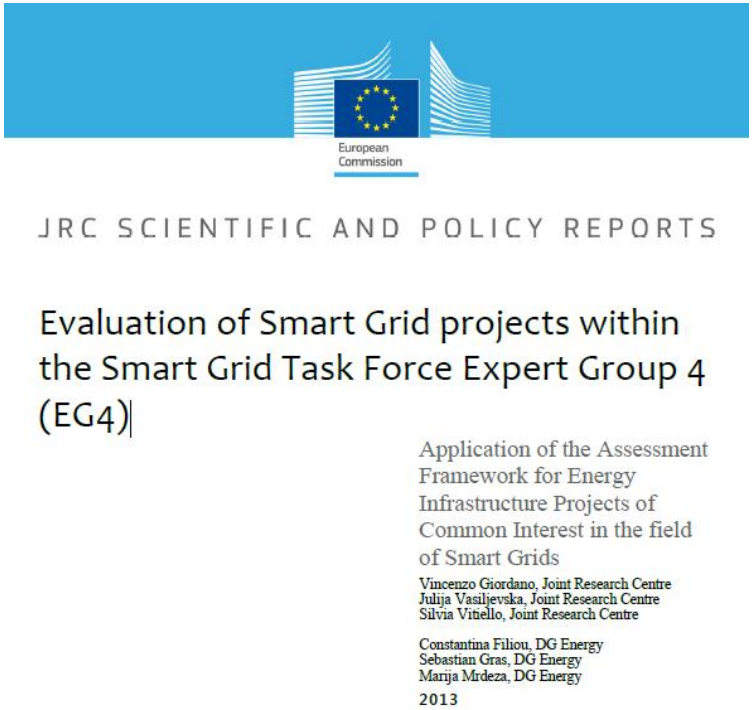
Unit activities in the area of gas

- European Science and Technology Network on Unconventional Hydrocarbon Extraction
- Risk Assessment of Gas: implementation of Regulation 994/2010 on the security of gas supply.
- Modelling gas crises: mass balancing and hydraulic models.
- Techno-economic analysis.
- Oil and Gas Offshore safety.
- Members of the Gas Coordination Group, EU Energy Economists etc.

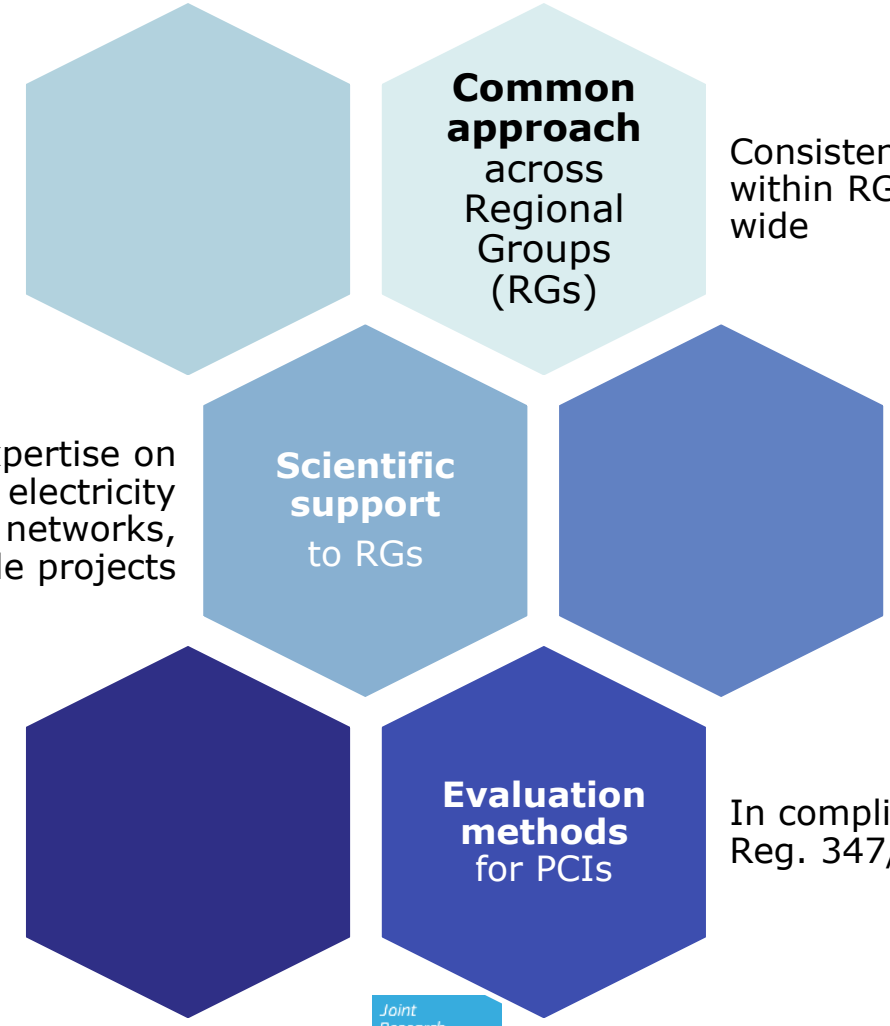
JRC experience in PCI CBA

- Assessment framework for the identification of smart grid Projects of Common Interest (PCI)
  - First Round PCI evaluation completed in 2013
  - New Round PCI evaluation ongoing (due in 2015)

- http://ses.jrc.ec.europa.eu/



JRC's role in the PCI process



METHODOLOGICAL CHALLENGES

Some challenges for evaluating project proposals:

- **Information glut and complexity**: many data points, heterogeneous data, configurations, indicators …

- **Heterogeneity** among the projects. This may impact the choice of assessment criteria – consistency needs to be assured to allow the comparison of results amongst the RGs.

- **Heterogeneity** among the Regional Groups in terms of type and **number of projects.**

- **Cost data are confidential.**

Some challenges for evaluating project proposals (2):

- **The data will be available at a late stage.** Statistical methodologies are dependent on the underlying data.
- The methodology must be **harmonized** across the Regional Groups.
- Overlaps of projects through grouping.

Some challenges for evaluating project proposals (3):

- The design of a methodology is always a dynamic process. Adjustments must be made when applying the methodology.

Examples:

- The Price Convergence Indicator will not be provided *per se*.
- The calculation of the supply curves.

Some challenges for evaluating project proposals (4):

- Large amount of outputs (data) from ENTSO-G's ESW CBA.

An example, **"Marginal price"** configurations:

- Global Scenarios: **2** (Green, Grey)
- Years: **5** (2015, 2020, 2025, 2030, 2035)
- Cluster: **2** (FID-, FID+)
- Price scenarios: **13** (AZ cheap, AZ expensive …)
- Balancing zones: **35*** (AT, EE, …)
- Temporal period: **4** (AS, AW, DC, 2W)

2 x 5 x 13 x 35 x 4 = 18200

** 52 in the files*

Some challenges for evaluating project proposals (5):

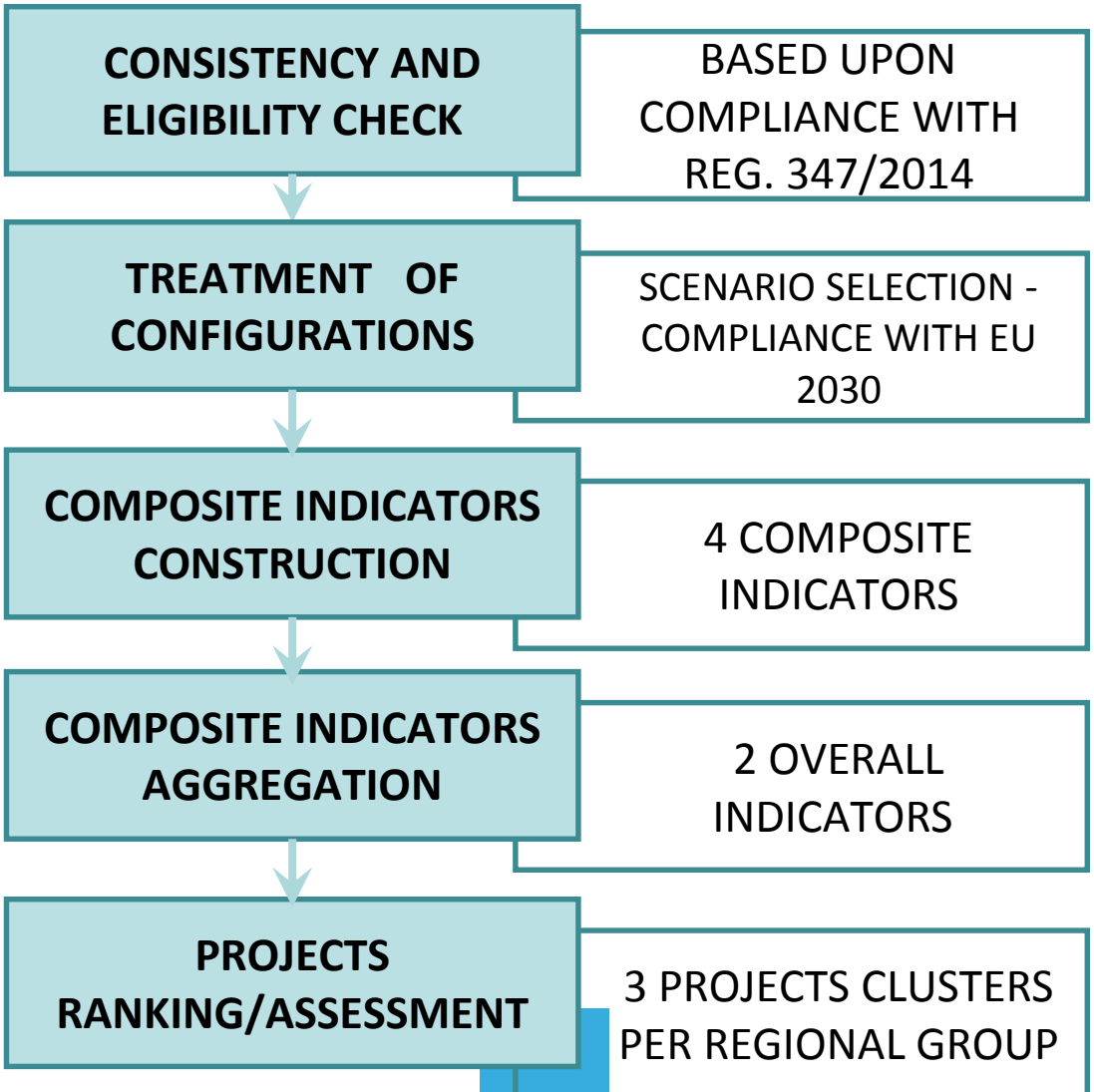
We start with **18200** and then apply expert judgment:

- Without the grey scenario = 9100
- Without the DC scenario = 4550
- Without the 2W scenario = **2275**

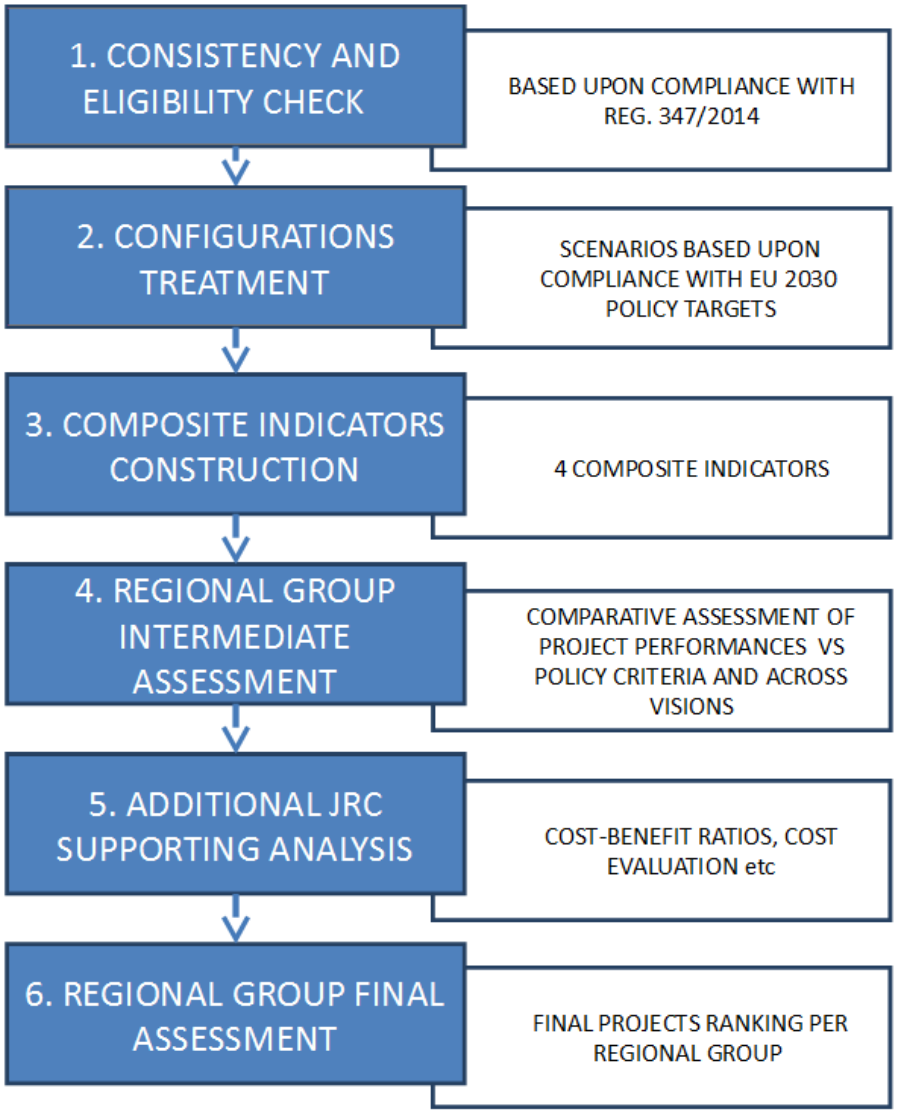
- ***2275 is eight times less than 18200***

JRC ASSESSMENT METHODOLOGY

The JRC Methodology: **Original proposal**



The JRC Methodology: **Updated**



Other information

For example, present cross-group comparisons of the:

- Financial Benefit/Cost ratio (FB/C)
- Economic Net Present Value (ENPV)

The nominal values should NOT be viewed in isolation.

- **Financial Benefit/Cost ratio (FB/C)**

$$FB/C = \frac{\sum_{t=f}^{c+19} \frac{R_t}{(1+i)^{t-n}}}{\sum_{t=f}^{c+19} \frac{C_t}{(1+i)^{t-n}}}$$

- **Economic Net Present Value (ENPV)**

$$ENPV = \sum_{t=f}^{c+19} \frac{R_t - C_t}{(1+i)^{t-n}}$$

COMPLIANCE WITH THE REGULATION

General criteria of Regulation (EU) No. 347/2013

Projects of common interest shall meet the following general criteria:

- *a. the project is necessary for at least one of the energy infrastructure priority corridors and areas;*
- *b. the potential overall benefits of the project, assessed according to the respective specific criteria in paragraph 2, outweigh its costs, including in the longer term; and*
- *c. the project meets any of the following criteria:*
- *i. involves at least two Member States by directly crossing the border of two or more Member States;*
- *ii. is located on the territory of one Member State and has a significant cross-border impact ..*

Specific criteria of Regulation (EU) No. 347/2013

- *for gas transmission, the project concerns investment in reverse flow capacities or changes the capability to transmit gas across the borders of the Member States concerned by at least 10 % compared to the situation prior to the commissioning of the project;*

- for gas storage or liquefied/compressed natural gas, the project aims at supplying directly or indirectly at least two Member States or at fulfilling the infrastructure standard (N-1 rule) at regional level in accordance with Article 6(3) of Regulation (EU) No 994/2010 of the European Parliament and of the Council;

HANDLING OF CONFIGURATIONS

Description of configurations (project specific step)

- Infrastructure: i) low and ii) high.
- Coal versus gas balance in power generation: i) green and ii) grey
- Import prices from 6 sources: i) cheap, ii) expensive and iii) reference
- Balancing zones (35) or countries (30)
- Temporal periods (4), where applicable

- Five time-steps (21 year horizon).
- With and without the specific project.

Configurations are not forecasts!

Price configurations

- Six import supply sources:
  - Algeria (pipe)
  - Azerbaijan (pipe)
  - Libya (pipe)
  - LNG
  - Norway (pipe)
  - Russia (pipe)

- Three scenarios:
  - High import price from one individual supplier ("source expensive").
  - Low import price from one individual supplier ("source cheap").
  - No price changes (same average import price of the selected Global context scenario).

The "green" scenario

- Consistent with ENTSO-E's "green transition."
- A high price of CO_2 emissions due to the introduction of a carbon tax.
- A continuous reduction in the oil-price linkage mitigating the increase of gas price.
- Favourable economic and financial conditions.
- Commercial breakthrough of electricity plug-in vehicles with flexible charging.
- High levels of back-up generation.
- CCS storage is not commercially implemented (decentralized and limited).
- Smart grid solutions are partially implemented.

Infrastructure scenarios

- **Low Infrastructure:** Existing Infrastructures + Infrastructure groups having a FID status
- **High Infrastructure**: Existing Infrastructures + Infrastructure groups having a FID status (whatever their PCI status is) + Infrastructure groups not having a FID status

For each infrastructure scenario:

- one scenario with the groups' data included
- one scenario with the groups' data excluded

Handling of configurations

- PCIs are selected based on their benefit to the whole EU.
- The EU has set environmental goals (e.g. Europe 2030).

We propose:

- Global context: the **"green"** scenario will be considered as this is more in-line with the Europe 2030 targets.
- Price configurations: although this is not a forecasting exercise, for the **reference case** we will use the cheap/expensive LNG prices.
- Infrastructure: "low infrastructure" scenario.

- Where relevant, the remaining configurations will also be examined.

RECEIVED COMMENTS

Disclaimer: some comments are aggregated and others paraphrased.

Will the methodology provide a benefit?

- *"JRC method will bring complexity to the interpretation of the results by hiding their physical meaning"*

- *"Although it appears to be objective and transparent, it will actually still label a part of the essential information as noise or as insignificant in most cases (depending on the dataset), thereby hiding it from decision-makers"*

Our aim is to have the exact opposite contribution.

Reality checks?

- *"We are concerned about the too important role of TSOs in all the planning process. Our concern is mainly due to the natural incentives TSOs have. Every TSO tend to propose more infrastructures than needed. (Their remuneration increases if they build more infrastructures). So, the process outcome can be an accumulation of infrastructures, instead of what Europe may really need. Moreover,* ***no hydraulic simulation is done of the European network as a whole.*** *Consequently, the technical role of the EC is crucial in the process."*

We view these comments as out-of-scope for the JRC's work, at least at this stage.

Reality checks?

- *"The methodology you propose is based on the database of TYNDP/CBA. However, we will not be able to countercheck the consistency of the data, so that there is a need of improvement regarding to transparency of the data."*

We view these comments as out-of-scope for the JRC's work, at least at this stage.

ENTSO-G's CBA

- *"Future improvements of the CBAs themselves … "*

- *"It is to be ensured that with the twenty year period of analysis to be adopted by ENTSO-G, a sufficient allowance for residual values in terms of capital costs and residual project benefits are included in the analysis."*

We view these comments as out-of-scope for the JRC's work, at least at this stage.

Is bigger better?

- *"it would be important to ensure that small peripheral Member States, … were not unfairly adversely impacted by this methodology."*

- *"How do you ensure that your assessment is not biased towards large projects?"*

To resolve these issues, we will try to incorporate/highlight the association between benefits and costs.

"Non-mature projects"

- *"The role of JRC should also clarify its role in the process of making a CBA for projects that do not fit the ENTSOG's methodology …"*

- *"Should JRC develop a methodology for each project in association with the promoter?"*

- *"Can the promoter use its own Cost Benefit Analysis with a validation from JRC?"*

Transparency of the methodology

- *"Full transparency is required in the evaluation of specific variables that will eventually be used to derive the ranking of projects in this regard."*

The exact indicators used for each composite indicator will be provided.

Extra-CBA information

- *"It is our understanding that the JRC method will not be the sole basis to determine the ranking of projects in the regional groups. Other important aspects will have to be taken into account ..."*
- *"We believe that it is important is for the methodology to adopt an approach whereby if a project is successful in solving specific problems to a significant extent, this will be preferable to addressing a larger number of issues, each in a minor manner."*
- *"We furthermore recommend that the solidarity element is included, focusing in particular on impacts on retail prices of energy."*

We believe that this is not for the JRC to decide.

Configurations

- *"JRC methodology should ... focus on how to help decision-makers to assess, for each scenario, its likeliness, its relevance at the regional level and its compliance with EU policy goals, by providing a comprehensive analysis of every of them and, in the end, help Regional Groups to hierarchize them."*

We view this comment as out-of-scope for the JRC.

Configurations

- *"The reference scenarios (reference configuration case) for the modelling produced by ENTSO-G cannot be the same across Europe. Different configurations are more realistic for different regions. How can this flexibility/sensitivity be addressed within the JRC methodology without losing the uniformity required to manage the volume of input data whilst ensure fair treatment of all projects?"*

The methodology must be harmonized, not identical, among the Regional Groups. Different configurations can be used for each Regional Group.

Be cautious!

- *" … it must be reminded that CBA indicators are intended to provide the Regional Groups with insights on the potential physical and economic impacts of a project. But the values of the indicators per se should be considered carefully since many other scenarios or indicators could have been chosen, leading to different numerical results.*
- *… JRC methodology should help Regional Groups to interpret and hierarchize the available information, but not aggregate numerical values which are of low interest per se."*

All analysis should be used with caution.

However, the insights obtained should be helpful for the Regional Groups.

Be cautious!

- *"As JRC states in the draft, the indicators in the TYNDP 2014 are characterised by a high level of uncertainty. Furthermore the indicators do not represent the full nature of a project's contribution to market integration, sustainability and security of supply. By using inexact and uncertain indicators as input data, the resulting outputs and ranking will have shortcomings. The JRC outputs should therefore be used with caution."*

All analysis should be used with caution.

However, the insights obtained should be helpful for the Regional Groups.

Only one indicator?

- *"When the grouping of the 12 composite benefit indicators into 4 indicators - one for each regulation criteria - is completed, the process to move to one single indicator per project should not be automatic but rather a product of discussion as the relative weight of each criteria and hence each indicator to a specific region and/or a specific type of project may vary from project to project."*

After the comments of the previous meeting, the JRC will not aggregate into a single indicator.

However, we do have the capability to do so and incorporate the Regional Group's preferences.

Issues of normalisation

- *"It remains unclear how the normalization procedure would work. How do you ensure that the choice of normalization does not privilege individual indicators, taking into account that the distribution of data points is unlikely to be a normal distribution?"*

We compare the characteristics of the original data with the normalized data (see example during the previous meeting).

- *"… from the experience of the first assessment of PCIs, the situation when pipeline projects always get higher rankings than LNG terminals or gas storages shall be avoided. From point of view of the European energy policy all these types of projects have equal importance and each of them serves market integration, security of supply, competition and sustainability on its own way, therefore it is disadvantage of the evaluation methodology clearly advance only one type of the projects. Moreover, during previous assessment it was assumed that, for example, LNG terminals and gas storages have no impact on price convergence or diversification of routes, which in many cases might be wrong."*