

# Identification of gas system needs for the TEN-E priority corridors

## PCI 2018-2019 exercise

19 March 2019

### Why the needs exercise

A well-interconnected and integrated European grid benefits citizens and local communities by ensuring that our energy crosses borders and it is delivered where it is most needed.

In its motion for a resolution B8-0136/2018 on the Union list of projects of common interest (2017/2990(DEA)), the European Parliament called for a “process of identifying and selecting Projects of Common Interest” that is “as transparent as possible, based on independent data”. This call was already made by the Court of Auditors in its 2015 report, on improving the security of energy supply by developing the internal energy market (ECA Special Report 2015 No.16), which concludes that “a comprehensive assessment of EU- level infrastructure needs is necessary to inform the decisions about development of the internal energy market and security of energy supply and other EU policy commitments for which the energy sector plays an important role, especially those relating to climate action.” This view has also been expressed by different stakeholders involved in the 1<sup>st</sup> and the 2<sup>nd</sup> PCI process.

PCIs are proving to be a strong tool for building well interconnected energy networks. The challenge is to ensure that only the projects which are essential for the European Union will be given PCI status.

Building on previous discussions and recommendation by a wide variety of concerned actors, the Commission proposes a further developed needs assessment exercise as a first step in the 2018-2019 PCI process. This step, which involves all relevant parties (governments, regulatory authorities, transmission system operators, project developers, stakeholders) is instrumental in identifying the pressing system needs that can be addressed through infrastructure.

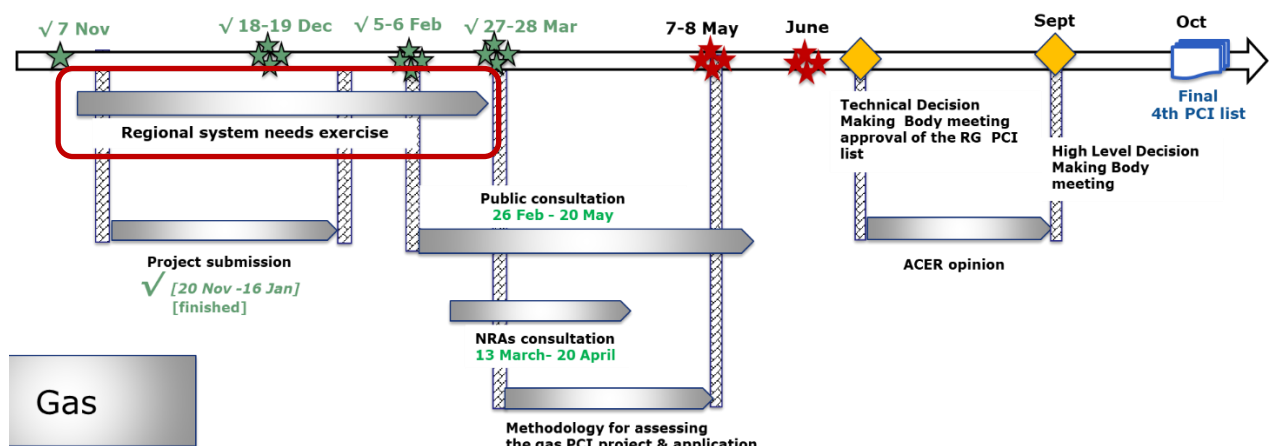


Figure 1. Gas PCI process 2018-2019

## 0. Introduction

This document concerns all four gas priority corridors [North-South gas interconnections in Western Europe ('NSI West Gas'), North-South gas interconnections in Central Eastern and South Eastern Europe ('NSI East Gas'), Southern Gas Corridor ('SGC') and Baltic Energy Market Interconnection Plan in gas ('BEMIP Gas')].

This document is to illustrate the first step in the selection of the priority projects having the objectives to “support the completion of the Union internal energy market while encouraging the rational production, transportation, distribution and use of energy resources, to reduce the isolation of [...]regions, to secure and diversify the Union’s energy supplies [...], including through cooperation with third countries, and to contribute to sustainable development and protection of the environment” [as stated in Recital (5) of Regulation (EU) 347/2013].

This methodology was prepared and discussed within the frame of the Cooperation Platform, which consists of representatives of the European Commission (DG Energy), the Agency for the Cooperation of the Energy Regulators (ACER) and the European Network of Transmission System Operators for Gas (ENTSOG). The Platform is based on the informal interaction between the three bodies and was created to provide technical support to the work of the Regional Groups. This methodology was also consulted with the Regional Groups members and stakeholders within the 25 January – 18 February 2019.

The main source of data for the needs exercise is the ENTSOG TYNDP 2018 data<sup>1</sup> and ACER Market Monitoring report.

This document describes the methodology to be used by the Regional Groups, in order to identify the relevant energy system needs, within each TEN-E priority corridor, for the PCI 2018-2019 process.

## 1. Principles

Within the PCI needs exercise, the below main principles are to be followed:

- The PCI needs identification is to reflect the objectives of Regulation (EU) 347/2013, along the pillars of the EU energy policy
- The Regional Groups are to use the same methodology for the needs identification;
- The thresholds used to frame the needs are to be identical along all the Regional Groups
- The timeframe to be considered for the PCI needs analysis is 2030<sup>2</sup> in line with the EU 2030 targets and consistent with the electricity PCI exercise;
- The infrastructure level used for this exercise is to be the “low infrastructure level<sup>3</sup>”
- The scenario to be used in this exercise is “Distributed Generation<sup>4</sup>”.

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<sup>1</sup> [ENTSOG System assessment report 2018](#) and [ENTSOG TYNDP gas 2018](#)

<sup>2</sup> Except the market integration indicator which relates to historic data – source: ACER Market Monitoring report

<sup>3</sup> Source ENTSOG System assessment report 2018, chapter 2

<sup>4</sup> [ENTSO-E and ENTSOG common TYNDP 2018 scenarios](#)

## 2. Regional needs identification methodology

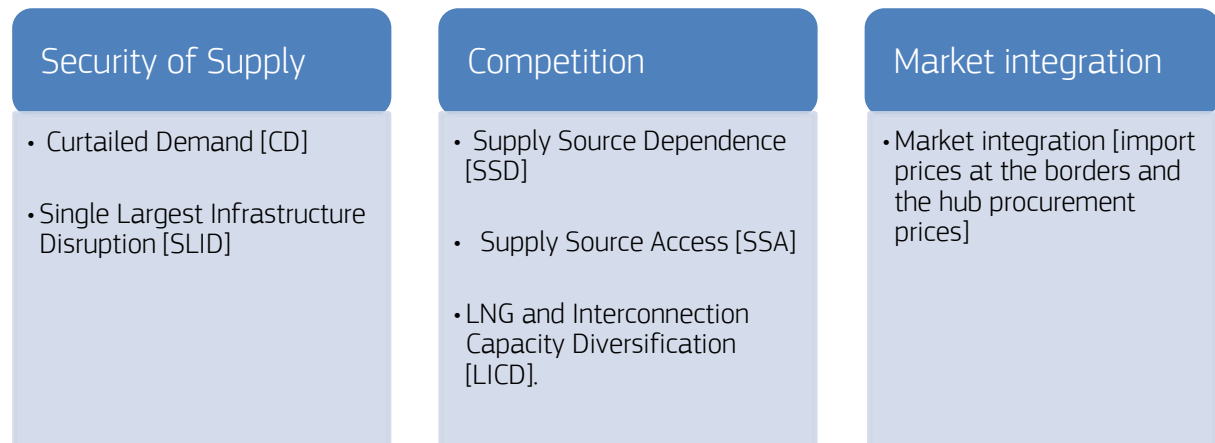
A need in the framework of the current PCI process means a problem/issue related to market integration, security of supply and competition, which proves to have as sole solution, the further development of infrastructure.

A need can be, in the first instance, made visible through a number of indicators on top of which relevant thresholds are applied. All the indicators and thresholds are explained in this methodology. The purpose of these thresholds is twofold: 1) it helps identifying the countries in which a need is evident and 2) represents the target value against which the candidate projects are measured [meaning to what extent a project helps mitigating a need]. The point 2) pertains to the PCI assessment methodology, which is to be developed after this needs identification exercise will be concluded.

For a need to become of regional relevance it must:

- be corroborated with the information coming from the regional groups' members and
- manifest itself in a reasonable/relevant number of Member States in the region. The number of countries for which the need should manifest itself in order to be relevant in the region may depend on the specificities of the need and are to be agreed in the Regional Groups meetings.

As previously mentioned, all the regional system needs are to be in line with the objectives of Regulation (EU) 347/2013, along the pillars of EU energy policy: market integration, security of supply, competition and sustainability. By mapping these objectives against the ENTSOG TYNDP 2018 material and ACER Market Monitoring report, the following relevant indicators [for which consistent available data is available] were identified:



Sustainability is a key pillar for the European Union and the European Commission is currently looking into the best approach to incorporate this pillar in the PCI process. This being said, in order to identify a need related to the sustainability pillar one must have access to concrete and consistent data. Currently neither ENTSOG nor ACER have relevant data that can be used in the current needs identification exercise. As such, this pillar will not be detailed in this step of the process.

Although there is no concrete data for the needs' exercise, the projects' CBA assessment, run by ENTSOG, includes information on CO2 mitigation and fuel switch. The European Commission will further look into the possibility of considering this information in the next phase [PCI assessment methodology] as a proxy for the sustainability pillar.

## 2.1 Security of supply (SoS)

The security of supply needs are identified through two indicators detailed below: Curtailed Demand and Single Largest Infrastructure Disruption.

- a) The **curtailed demand [CD]** is the demand that cannot be satisfied in a given area due to:
- climatic stress conditions meaning extreme temperatures with lower probability of occurrence than normal conditions (e.g. occurring with a statistical probability of once in 20 years, 1/20) and
  - supply stress conditions due to specific route disruptions (Ukraine transit, Belarus transit, Baltic States and Finland imports, Algeria route).

Steps to follow in order to identify the countries that have security of supply needs [related CD], which are relevant for the TEN-E regions:

- Step 1: Set disruption route which is relevant for the region. In this case, the recommended disruption routes to be considered for each Regional Group are:

Route Disruption/ Regional Group	NSI WEST	NSI EAST	SGC	BEMIP
Ukraine transit disruption	X	X	X	
Belarus transit disruption	X	X		X
Baltic states and Finland disruption				X
Algerian route disruption	X			

- Step 2: compute the CD for each of the Member State. The CD is calculated directly in the TYNDP for each European country.
- Step 3: apply the **threshold of 100 [percentage - %]** - meaning that we look to having all the demand being covered -> any country below 100% is a country showing a security of supply issue. This **threshold is common for all the TEN-E regional groups.**

Example:

Country 1	100%
Country 2	153%
Country 3	125%
Country 4	177%
Country 5	-28%
Country 6	100%
Country 7	161%
Country 8	-54%
Country 9	-55%
Country 10	128%
Country 11	100%
Country 12	189%
Country 13	151%

In this example: Countries 5, 8, 9 have a curtailed demand problem – in other words in case of the relevant route disruption these countries will not be able, even after having support from the neighbours, to cover their national demand.

- Step 4: analyse the results in corroboration with the Member States input and the overall regional discussion.

- b) The **Single Largest Infrastructure Disruption [SLID]** measures the [%] of demand in a specific country that risks being curtailed in case of the disruption of a country single largest infrastructure. It is a N-1 modelled which take into account the impact of such disruption on the analysed country but also on other European countries.

Steps to follow in order to identify the countries, which have security of supply issue [related SLID], which are relevant for the TEN-E regions:

- Step 1: compute the curtailed demand value [under single largest infrastructure disruption in the country], for each of the Member State
- Step 2: apply the **threshold of zero [percentage - %]** - meaning that we look to having all the demand being covered-> any country below zero is a country showing a security of supply issue. This **threshold is common for all the TEN-E regional groups.**

Example:

Country 10	-21%
Country 13	0%
Country 14	-5%
Country 15	0%
Country 18	-29%
Country 2	0%
Country 20	0%
Country 23	-37%
Country 24	-39%
Country 25	0%
Country 3	-85%
Country 6	0%
Country 7	-20%

In this example: Countries 10, 14, 18, etc...have curtailed demand problems – in other words in case of the single national largest infrastructure disruption these countries will not be able to cover fully its national demand.

- Step 3: analyse the results in corroboration with the Member States input and the overall regional discussion.

Note: Another element valuable to look into as part of the SOS pillar is the long term changes in the physical flow from gas entry points to the European Union' gas infrastructure. This element is not possible to look into in the current process but is relevant to mention for the future PCI processes.

## 2.2 Competition

The competition related needs are identified through three indicators detailed below: Supply Source Dependence, Supply Source Access and LNG and Interconnection Capacity Diversification.

- a) **Supply source dependence [SSD]** identifies countries showing a strong dependence to a specific supply source [e.g. RU, NO and LNG] and allows identifying cases where this dependence is related to an infrastructure bottleneck (physical dependence). In other words, the SSD represents the minimum share of a given source in the supply mix being the source share, which cannot be substituted by other supply sources.

SSD is a year around value calculated under the cooperative approach within the relevant regions [as defined in the Security of Gas Supply Regulation (EU) 2017/1938]. The cooperative approach assumption means that in case there are no physical bottlenecks the countries within the same region will share the same dependence.

Steps to follow in order to identify the countries, which have competition related need [seen from the SSD perspective], which are relevant for the TEN-E regions:

- Step 1: compute the SSD value for each of the Member State. The SSD is calculated directly in the TYNDP for each Member State..
- Step 3: apply the [threshold of 25 \[percentage - %\]](#)-> any country showing more than 25% dependence of a specific supply source is a country showing a competition problem. This threshold is in line with the previous PCI process. This [threshold is common for all the TEN-E regional groups](#).

Example:

Country 1	7%
Country 2	3%
Country 3	1%
Country 4	0%
Country 5	27%
Country 6	26%
Country 7	13%
Country 8	45%
Country 9	45%
Country 10	3%
Country 11	0%
Country 12	9%
Country 13	0%
Country 14	27%
Country 15	0%

In this example: Countries 5, 6, 8, 9 ,etc...have a supply source dependence problem, meaning that they depend more than 25% of a specific supply source, share which cannot be substituted by other supply sources.

- Step 3: analyse the results in corroboration with the Member States input and the overall regional discussion.

**b) Supply source access [SSA]:** The Supply Source Access indicator (SSA) measures the number of supply sources an area can access. The ability of an area to access a given source is measured through a supply source diversification metric. SSA provides the aggregate view across all supply sources. This supply source diversification ability is calculated from a market perspective, as the ability of each area to benefit from a decrease in the price of the considered supply source (such ability does not always mean that the area has a physical access to the source). It is calculated for each area under a whole year.

Steps to follow in order to identify the countries, which have competition related need [seen from the SSD perspective], which are relevant for the TEN-E regions:

- Step 1: apply the 20 [percentage -%] threshold to the ENTSOG market data for 2030 – meaning that the supply cost of a country is 20 % responsive to a decrease in price of source S. This [threshold is common for all the TEN-E regional groups](#) and is identical with the previous PCI process.

- Step 2: Sum up the number of sources [as identified in Step 1] a Member State has access to. If a country has access to less than three sources, that country has a SSA problem. This **threshold is common for all the TEN-E regional groups** and is identical with the previous PCI process.

Example:

Country 1	3
Country 2	3
Country 3	5
Country 4	4
Country 5	4
Country 6	3
Country 7	3
Country 8	3
Country 9	2
Country 10	3
Country 11	2
Country 12	3

In this example: Country 9 and 10 do have access to less than three supply sources, therefore are considered countries having SSA problem.

- Step 3: analyse the results in corroboration with the Member States input and the overall regional discussion.

- c) **LNG and Interconnection Capacity Diversification indicator [LICD]** measures how balanced the import capacity of a given country is. This indicator shows the diversification from the perspective of market integration. It measures the diversification of paths that gas can flow through to reach a market area. The LICD ranges from zero to 10.000. The lower the value, the better the diversification is.

Steps to follow in order to identify the countries, which have competition related need [seen from the LICD perspective], which are relevant for the TEN-E regions:

- Step 1: compute the LICD value for each of the Member State. The LICD indicator is calculated directly in the TYNDP for each Member State.
- Step 2: apply the **threshold of 5000-** meaning that all the countries with the LICD higher than 5000 have a competition problem. . This **threshold is common for all the TEN-E regional groups** and is identical with the previous PCI process.

Example:

Country 1	3333
Country 2	2096
Country 3	10000
Country 4	10000
Country 5	5070
Country 6	5000
Country 7	10000
Country 8	5000
Country 9	10000
Country 10	3070
Country 11	1670
Country 12	10000
Country 13	3558

In this example: Country 3, 4, 5, etc..., have problems concerning balancing their entry points.

- Step 3: analyse the results in corroboration with the Member States input and the overall regional discussion.

## 2.3 Market integration

A **Market integration need** is identified by assessing the import prices at the borders and the hub procurement prices [Euros/MWh] in each of the EU member states for the period 2015-2018 [inclusive].

Steps to follow in order to identify the countries, with have market integration needs, which are relevant for the TEN-E regions:

- Step 1: collect the average import prices at the border and the hub procurement prices in each of the EU member states for 2015 to 2018 inclusive. The source of data for this indicator is ACER Market Monitoring report.
- Step 2: calculate the threshold to be used - for each of the considered year the threshold is defined as followed:
  - Identify the Member State with the lowest price value [= average of yearly import prices at the borders and the hub procurement prices] in the European Union
  - Apply a 10% on top of the minimum value [ e.g. if minimum is 10 Euro/MWh then the threshold is 110 Euro/MWh]

This **threshold is common for all the TEN-E regional groups**. All the countries that have a price value higher than the min EU+10% for least three [analysed] years are country with market integration issues.



Example:

	2018	2017	2016	2015
Country 3	26,76	16,16	19,74	18,29
Country 20	24,71	18,42	20,39	18,59
Country 7	22,50	17,00	19,64	18,60
Country 24	23,44	17,57	20,76	20,24
Country 25	26,72	20,15	19,47	20,25
Country 23	23,98	18,25	21,17	20,39
Country 6	22,23	17,53	19,79	20,69
Country 18	22,05	15,87	19,76	20,71
Country 10	23,18	17,63	20,74	20,71
Country 2	22,00	15,93	19,63	20,78
Country 15	23,88	17,91	20,24	20,94
Country 14	23,24	17,74	20,24	21,32
Country 13	24,39	17,68	21,26	21,46
Country 17	28,91	17,73	19,78	21,54
Country 21	26,50	17,21	19,66	21,69
Country 26	21,99	16,18	19,97	21,85
Country 8	28,22	20,48	22,02	22,52
Country 9	27,21	18,35	23,49	24,19
Country 4	24,42	20,51	22,24	24,21
Country 5	24,42	20,51	22,24	24,21
<b>Threshold - Min EU value+10%</b>	<b>24,19</b>	<b>17,45</b>	<b>21,42</b>	<b>20,12</b>

In this example: Country 25, 13, 17, 8, 9, 4 and 5, have market integration problems. This issue may appear due to national tariffs and or due to the need of further infrastructure.

- Step 3: analyse the results in corroboration with:
  - the reason of this high prices – is this due to the tariffs or due to need of infrastructure? If due to tariffs, the identified need is not to be considered.
  - HHI indicator computed by ACER in its Market Monitoring report.
  - the Member States input and the overall discussions in the Regional Groups.

## 2.4 Other indicators identifying a infrastructure need

Within this category, we include:

- Physical isolation – meaning Member States that are physically isolated from its EU neighbours and are at the periphery of Europe.
- Access to a new source – meaning allowing the European Union to tap into new sources of gas that currently are not reaching any of the European Union Member States markets. This indicator does consider European Union as one entry point and it does not look if a region within Europe increases its access to other sources, which are currently accessed by other EU regions.

### 3 List of needs per Regional group

[to be completed after Regional Group meeting 27-28 March].