Empowering Mediterranean regulators for a common energy future.

Working Group on Gas (GAS WG)

GAS INFRASTRUCTURE MAP OF THE MEDITERRANEAN REGION

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FINAL REPORT

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1. Introduction

The natural gas sector in the Mediterranean region has been fundamentally transformed by some field discovery (i.e. Zohr) and technological development in the drilling process that have enabled the economic extraction of natural gas from shale formations. This breakthrough has in turn unlocked new geographically diverse natural gas resources that are unprecedented in size.

The availability of abundant, low-cost natural gas has increased demand for natural gas from multiple end-use sectors. The electric power sector is currently the largest consumer of natural gas in the Mediterranean south shore and at the same time Algeria is one of the main gas exporters. After the recent developments, gas has regained some of its market share because of gradually rising natural gas prices, the combination of favourable economics and the lower conventional air pollution and greenhouse gas emissions associated with natural gas relative to other fossil fuels is likely to contribute to expansion of use of natural gas in the electric power sector in the future.

However, increased use of natural gas in the electric power sector also presents some potential challenges. Unlike other fossil fuels, natural gas cannot typically be stored on-site and must be delivered as it is consumed since natural gas can only be stored in specific geological formations in gaseous form. Because adequate natural gas infrastructure is a key component of electric system reliability (generation diversification) in many regions, it is important to understand the implications of greater natural gas demand for the infrastructure required to deliver natural gas to end users, including electric generators.

Natural gas consumption studies show a large diversity among the Mediterranean countries. While almost half of the gas consumption is allocated to the residential/commercial sectors, the other half is nearly equally shared by power generation and industry. A high level of residential consumption in the winter is not expected, considering the warm climate of the region. On the production side perspective, it is important to notice that some countries do not even have access to gas, other countries do not have any gas production and others are gas exporters.

The purpose of this report is to understand the actual infrastructure present in the Mediterranean region and potential infrastructure developments in the natural gas transmission systems under several future natural gas demand scenarios. This assessment will include three main deliverables:

- The **first deliverable**, the work's methodology description, which is presented in this report.
- The **second deliverable**, to be finished during the second semester of 2017, correspond to a questionnaire[1] by which it will be possible to obtain a brief description about the natural gas infrastructure in each MEDREG member.
- A **third deliverable**, to be finalized by December 2017, corresponds to the Final Assessment Report with the compilation of the different MEDREG member's inputs concerning their infrastructure map.

[1] Based on MEDREG Investment report questionnaire for gas

2. Work's methodology description

The present report intends to provide a clear picture of the gas infrastructure including interconnection points, transmission pipelines crossing the country, transmission and storage capacities, usage of the above-mentioned capacities and future investment plans across MEDREG members.

Given the diversity of situations in the different countries, this assessment work intends to evaluate the data that members have provided through a questionnaire. At the same time members will be asked if they can share their gas infrastructure map to be included in the final report. The assessment work also includes the collection and the analysis of data related to their new investment plan and can serve as an update to MEDREG Investment report for the Gas chapter.

At present, there are several realities among the MEDREG members concerning the gas infrastructure:

- For some countries, their transmission pipelines are overloaded and require a compressor station upgrade or construction of a new pipeline.
- Other situations exist among MEDREG members where the pipeline capacity is not being used to its full extent.

The information from the different MEDREG members was obtained by a questionnaire. The questions were based on the most recent situation of each country (31stDecember 2015).

When data is available in the Ten-Year-Network-Development of ENTSOG, MEDREG members can provide their own data or indicate whether the ENTSOG data can be used in for the MEDREG gas infrastructure map.

Table 1: Contributions received from the MEDREG countries

COUNTRIES		Answer received	Observation
1.	Albania	√	No gas market established
2.	Algeria		
3.	Bosnia – Herzegovina		
4.	Croatia	√	
5.	Cyprus	√	
6.	Egypt	√	
7.	France	√	
8.	Greece	√	
9.	Israel	√	
10.	Italy	√	
11.	Jordan	√	
12.	Libya		n/a
13.	Malta	√	No gas consumption
14.	Montenegro	√	No gas consumption
15.	Morocco		No gas Regulatory Authority
16.	Palestine		No gas Regulatory Authority
17.	Portugal	√	
18.	Slovenia		
19.	Spain	√	
20.	Tunisia		No gas Regulatory Authority
21.	Turkey	√	
Total		**14**	

3. Analysis of the Results

Although the data for the years 2015 and 2016 are also collected from the countries that can provide them, the 2014 values are taken as a basis for the comparisons made in this study in order to provide better consistency since the verified data for the years 2015 and 2016 acquired from different MEDREG members vary considerably both in means of collection and reporting methodology, and in some cases is absent at all. This report will present both numeric and non-parametric data about selected points, while other consolidated data can be found in the appendices.

3.1 TPA regimes in a nutshell

The data acquired from the questionnaires shed light to several characteristics of the natural gas infrastructure of the contributing countries. Besides the physical characteristics of these infrastructures such as capacities, pipeline lengths, directions of flow and connected points, an important point of note that shall be examined from the perspective of a regulator is the third party access (TPA) regimes of these facilities.

When analysing the TPA regimes of the existing and the planned infrastructure projects (Appendices I, II and IV), it can be seen that most countries regulate third party access to LNG terminals and storage facilities as well as the entry and the exit points, with the exception of Egypt, Jordan and Italy. While Egypt and Jordan prefer to not to regulate the access to any of these facilities, Italy grants a partial exemption by TPA regime for a LNG terminal. By looking at the examples, it can be concluded that decision to adopt nTPA or rTPA regimes is a matter of policy rather than how mature, big or well-established the gas market is.

3.2 A growing trend: LNG and FSRUs

Another point worth mentioning about the existing and planned infrastructure projects is the interest in LNG projects, particularly floating storage and regasification units. Besides the Floating Storage Regasification Units (FSRUs) that are recently facilitated in Egypt, Jordan and Malta, the projected investments in Egypt, Greece and Malta indicate the growing interest in this relatively new technology that has considerable advantages over traditional LNG facilities. The advantages of FSRUs over conventional LNG terminals, such as needing shorter time to start operation and less start-up cost, makes the investments for these facilities realisable more easily and quickly. Other advantages like the ability to be relocated according to demand and lesser environmental impact are just the icing on the cake for FSRUs.

Although they are nothing new on the natural gas scene and building them requires longer-term projects compared to FSRUs, the interest in traditional LNG terminals has not faded, thanks to the price dynamics in the international markets. While some of the subject countries, such as Greece, prefer to upgrade the existing LNG terminals for increasing the entry capacity in a cost-efficient manner, it is also worth noting that Italy and Spain have several projects for new LNG infrastructure. On the other hand, countries such as Turkey opt to invest in both utilising new FSRUs and increasing the capacities of the existing infrastructure, in order to increase the LNG input of the market.

3.3 Benefits and impacts of the investments

The part of the questionnaire about the benefits and impacts of the projects (Appendix 5) depicts a clear picture of the driving forces behind infrastructure investments. Benefits identified by MEDREG regulators lay in three areas; Security of Supply, Market development

and Regional Market Integration. Regulators perceive that the route and source diversification is the most significant benefit derived from interconnection and LNG facility investments. These data may also been taken as a clue for why, how, where and when a new infrastructure investment may be made in order to gain most benefit from an infrastructure investment.

Although the biggest perceived benefit of the storage facilities is security of supply as expected, the flexibility these facilities provide to the market players should not be neglected. In this regard, the types of storage facilities also play an important role. Salt caverns, which allow the working gas to be withdrawn and replenished very quickly, are very good means for market flexibility. Although these facilities are relatively expensive to build, their ability to send out gas in a very short time, make them also valuable tools for emergency situations and peak shaving.

3.4 Implementation barriers

As noted while discussing the benefits and the impacts of infrastructure projects, besides the security of supply and market integration, an equally important role an infrastructure investment shall pay is increasing competition and flexibility of the market. Evaluating an investment according to the market dynamics can only be made through a cost-benefit analysis, in other words, by determining the return of the investment. Such a feasibility study brings forward the factors such as attractive tariffs, exemptions, open season practices and incentives.

In this respect, another important focus of the project is the barriers affecting the investment plans (Appendix 7), which aims to determine the shortcomings of the markets that shall be dealt with for betterment of the investment environment. The most important barrier voted as the highest priority by six countries, namely by Spain, Portugal, France, Jordan, Croatia and Turkey, and voted as the second priority by Greece, Malta and Israel is the insufficiency of the market demand.

The second priority according to the rankings is again an indicator regarding the market dynamics, the financial feasibility of the projects and the expected revenues, which is ranked as number one by Italy, Greece and Cyprus; and number two as for France, Croatia and Turkey. Regulatory and legal obstacles are determined as higher priorities by countries that are newly starting or have recently started to regulate the gas markets, such as Jordan (*ex-aequo* with insufficiency of market demand), Israel and Egypt, which ranked the obstacle as the first priority; and Cyprus, which ranked it as the second. The lack of interest in interconnection projects is ranked as the second priority by only Portugal, while the lack of internal reforms is determined to be second most important barrier by Egypt following regulatory and legal barriers. Lack of coordination, technical barriers and political instability are regarded as the least important barriers affecting the investments, ranked among the top two priorities by none of the countries.

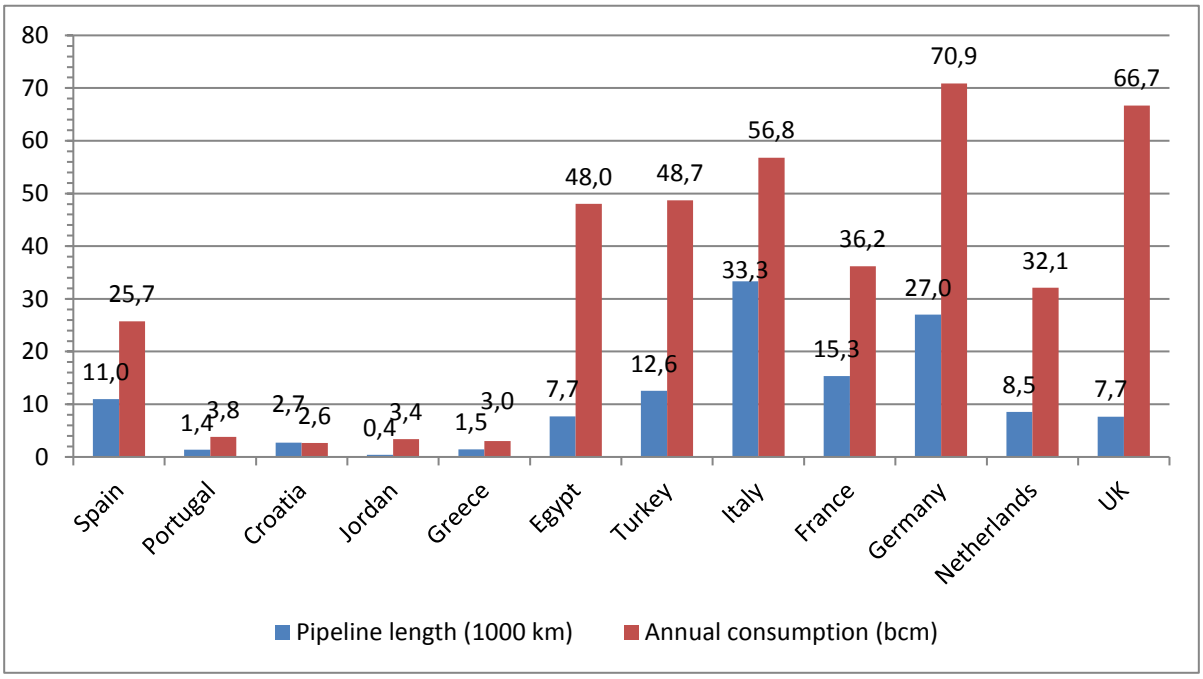
3.5 Key performance indicators

In order to compare the effectiveness and sufficiency of natural gas infrastructures, measurable and objective indicators are needed. In this study, these indicators are referred to as key performance indicators (KPI), a term highly popular in management, for lack of a better term. While evaluating the KPIs of the contributing countries (Appendix I), datasets for the year 2014 values are taken into account in order to provide better consistency. Three

major European markets outside MEDREG, namely Germany, the Netherlands and the UK are included in the comparisons, as benchmarks for the examined indicators.

3.6 Infrastructure investments and natural gas demand

Since efficiency can be defined as the ratio of the outputs and inputs of a system, the efficiency of a natural gas infrastructure may most basically be measured as the gas supplied by the system, divided by an indicator of the size of the system, namely length of the transmission system.



When we compare the pipeline lengths of the selected members with benchmark EU countries, we can see that annual consumptions per length of transmission pipeline differs greatly, which may be due to geographical and socio-economic reasons, as well as market maturity and the sectors mainly using natural gas. The leader among MEDREG countries with respect to unit consumption per network length is Jordan with 8 mcm/km, second only to UK among the selected EU countries. Egypt, having a significant amount of annual demand, follows Jordan with a ratio of 6,26 mcm/km.

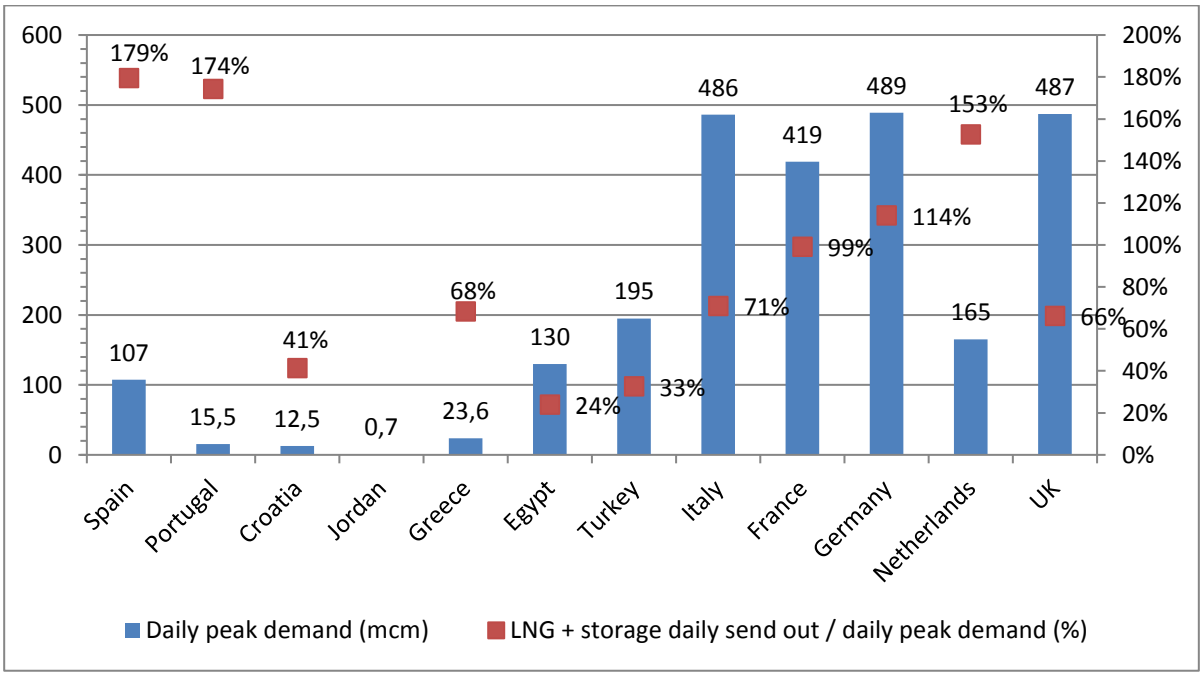
It may be beneficial to note here that since a high ratio may be the sign of an efficient transmission system, a lower ratio may mean that the transmission system is widely spread in the country and/or natural gas penetration in households is lower. Another point of note is that smaller countries with higher population densities like Netherlands tend to have higher ratios in contrast to countries that are wider in an axis, such as Italy and Turkey, for which the locations and distances between the nodes of supply, demand and storage is an important factor.

	Spain	Portugal	Croatia	Jordan	Greece	Egypt	Turkey	Italy	France	Germany	Netherlands	UK
Pipeline length (km)	11.000	1.375	2.694	423	1.459	7.667	12.561	33.339	15.322	26.985	8.531	7.660
Annual Consumption (mcm)	25.730	3.800	2.627	3.400	2.990	48.019	48.717	56.800	36.200	70.900	32.100	66.700

Annual Consumption /Length of pipeline	2,34	2,76	0,98	8,04	2,05	6,26	3,88	1,70	2,34	2,63	3,76	8,71

3.7 LNG and storage capacities versus demand

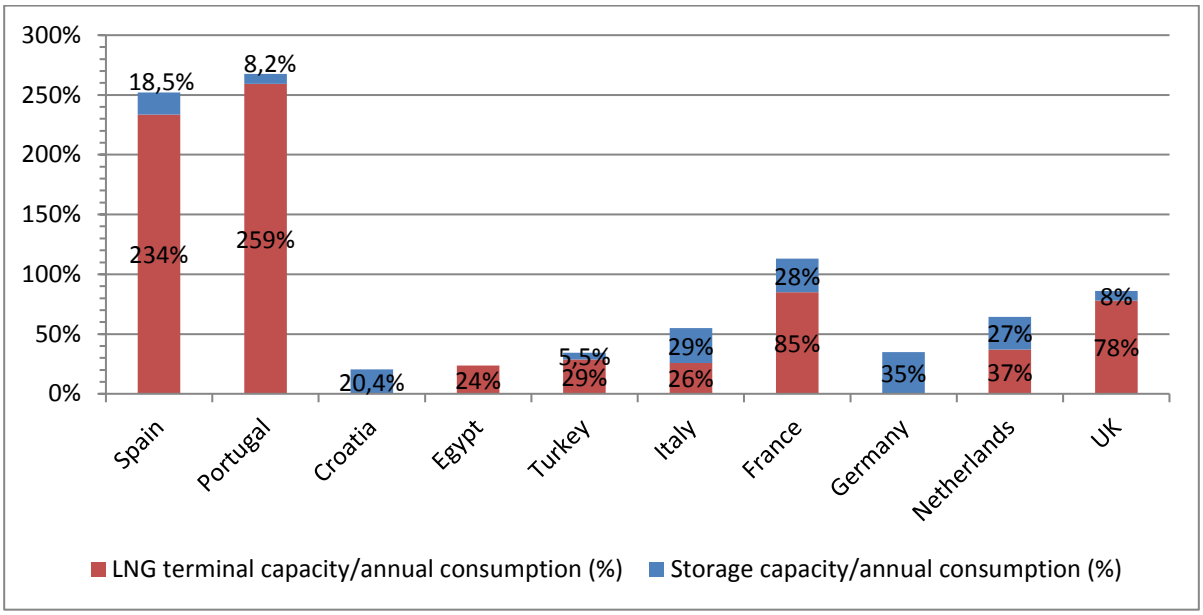
Another way of determining how sufficient a country's infrastructure with regards to security of supply is comparing its means of storing natural gas with the demand in the country. Storage and LNG facilities, both being effective instruments for dealing with seasonal demand swings, supply disruptions and peak demand, can be evaluated particularly in two ways: by comparing the daily send-out capacities with daily peak demand and by comparing the annual capacities with annual consumption.



When looking at the graph of daily peak demands of the MEDREG countries, we can note that two countries with historically high daily peak demands, Italy with 486 mcm/day and France with 419 mcm/day, have the highest send-out/peak demand ratios after the leader, Spain, with 71% and 99% respectively. Spain, also the leader among EU countries thanks to its enormous LNG send-out capacities has a 179% send-out/peak demand ratio, comfortably securing its peak demand of 107 mcm/day. Other relatively large Mediterranean markets, Turkey with 195 mcm/day and Egypt with 130 mcm/day, have the lowest send-out/peak demand ratios with 33% and 24% respectively, while Portugal has a 174% ratio, ranking among the most secure EU countries in this regard.

Another way to look at storage capacity is comparing the annual send-outs with annual consumptions of the subject countries. For this comparison, which is a theoretical study of security of supply, some assumptions are made. Assuming that the underground storage facilities are filled before the maximum capacity before the winter season and the gas in the reserves are withdrawn and dispatched once in the peak season, as it is the case for most countries when the demand is high and the gas is scarce, maximum storage capacities are taken as a basis. For LNG facilities, it is assumed that maximum capacities are used throughout the year, which is a situation likely to happen in a long disruption from a certain source, such as an N-1 situation. An alternative approach could be taking the tank capacities

of the LNG terminals into consideration, which would be less than fair to these facilities, since their storage capacities are negligible when compared to underground storage and assuming that they will be utilised once throughout the year is by no means realistic.



When comparing the annual send-out and withdrawal capacities of the countries with annual demands, it can be seen that countries with LNG infrastructure, Portugal and Spain, can meet more than twice their annual demands assuming maximum LNG send-out throughout the year. We see that France not only can meet its annual demand with underground and LNG send out capacities, but also has a 28% underground storage/annual demand ratio, second among the MEDREG countries to only Italy, which has a 29% storage/annual demand.

Although having no LNG facilities, Croatia has an adequate underground storage capacity, meeting 20% of its annual demand. Spain, besides its LNG facilities that can double its annual demand, can meet 18,5% of the annual demand with underground storage withdrawal. Portugal, which has the highest LNG send-out/consumption ratio and Turkey, which is carrying out projects that will increase its storage and LNG capacities considerably in the upcoming years, have less than 10% storage/consumption ratios. This comparison could be made by comparing the underground storage capacities and LNG send-out capacities during the winter with the winter demand for another point of view, but further data is needed to be collected for such a study, since seasonal consumption statistics are not present.

4. Final Remarks

The study on Gas Infrastructure Map of the Mediterranean Region is an important and hopefully beneficial one, which has the potential to provide an insight to regulators and other decision makers. This report not only provides valuable data that can be used to examine the characteristics of the natural gas infrastructures of the contributing countries, but also makes it possible to better understand what the expectations, aims and motives of the Mediterranean countries are when making an infrastructure investment. These aims and motives reported by the countries, such as increasing security of supply, providing market

security and diversifying natural gas sources or routes, may pave the way for better communication and cooperation between the neighbouring countries.

This research, which evaluates the data collected from the contributing countries for the period 2014-2016 and utilises it according to availability, can be regarded as a preliminary work, and may be repeated when more accurate and up-to-date data is present, since the recent years witnessed considerable developments with regards to infrastructure investments, particularly LNG terminals and FRSUs, as well as the fluctuations in the demand structures. A point to note for the further studies is that the data required and the way inputs shall be sent may be defined more clearly in order to have the answers and the data sent more standardised among the contributing countries.

5. APPENDIX

1- Existing interconnection infrastructure

Country	Name of the facility	Operating Year	Connected country	Sort of capacity (Entry/exit/bilateral)	Capacity (bcm/year)	Access Conditions: rTPA or nTPA	Transmission pipeline (km)
Albania	*National Grid (TSO+DSO)*	1967;1980;1985	Interial	Bilateral	1		400 km
Croatia	Plinacro Ltd						2693 km
Egypt	Al Arish-Taba-Aqaba (Arab Gas Pipeline) Arab Gas Pipeline Arab Gas Pipeline Arab Gas Pipeline EMG Pipeline	July 2003 January 2006 2007 2008 2008	From EL Arish in EGYPT to Aqaba Jordan From Aqaba in Jordan to EL-Rehab From EL-Rehab in Jordan to the Jordan-Syria border From Jordan-Siria border to AL Rayan in Syria Arish in Egypt to Ashkelon in Israel		10 bcm 10 bcm 10 bcm 10 bcm 7 bcm	nTPA nTPA nTPA nTPA nTPA	264 km 393 km 30 km 317 km 100 km
Greece	Transbalkan (Kulata-Sidirokastro Interconnection Point)	1996	Bulgaria	Entry / Bilateral	3.5 bcm / Reverse 0.36 bcm	rTPA	0
	Kipi Interconnection Point	2007	Turkey	Entry	1.4 bcm	1.4 bcm	0
France	Oltingue	2018	Switzerland	Entry (Exit capacity was already existing)	3,7	rTPA	0
Italy	Transmed	1978	Italy, Algeria	Entry Algeria-Exit Italy	30 bcm	rTPA	2200 km
	Green Stream	2004	Italy, Libya	Entry Libya-Exit Italy	8 bcm	rTPA	520 km
	TAG			Entry Austria - Exit Italy	107 m^3/d	rTPA	
	TRANSITGAS			Entry Switzerland - Exit Italy	59 m^3/d	rTPA	
	Panigaglia LNG					rTPA	

	Rovigo LNG	2010				80% Exemption 2nd Package and 20% rTPA	
	Livorno LNG	2015				rTPA	
	Storage Stogit, Edison					rTPA	
Jordan	Arab Gas pipeline Project / second phase	2006	Egypt-Jordan	Bilateral	10	nTPA	423
	Arab Gas pipeline Project / second phase	2008	Egypt-Syria	Bilateral	10	nTPA	423
	Alshaikh Subah LNG Terminal at Aqaba LNG	2015				nTPA	423
Portugal	Campo Maior	1997	Spain	Entry	0,47	rTPA	220
	Campo Maior	1997	Spain	Exit	0,1225	rTPA	220
	Valença do Minho	1998	Spain	Entry	0,105	rTPA	74
	Valença do Minho	1998	Spain	Exit	0,0875	rTPA	74
Spain	Larrau	1993	Spain-France	Bilateral	165 GWh/day	rTPA	
	Larrau	1993	France-Spain	Bilateral	165 GWh/day	rTPA	
	Irún	2006	Spain-France	Bilateral	5 (winter) /9 (summer) GWh/day	rTPA	
	Irún	2006	France-Spain	Bilateral	0 (winter) / 10 (summer) GWh/day	rTPA	
	Tarifa	1996	Morocco-Spain	Entry	444 GWh/day	rTPA	
	Almería	2011	Algeria-Spain	Entry	266 GWh/day	rTPA	
	Badajoz	1996	Spain-Portugal	Bilateral	134 GWh/day	rTPA	
	Badajoz	1996	Portugal-Spain	Bilateral	35 (winter) /70 (summer) GWh/day	rTPA	
	Tuy	1998	Spain-Portugal	Bilateral	30 (winter) /40 (summer) GWh/day	rTPA	
	Tuy	1998	Portugal-Spain	Bilateral	25 GWh/day	rTPA	
Turkey	Malkoclar (Western Line) Gurbulak Durusu (Blue Stream) Turkgozu Kipi	1986 2001 2003 2006 2007	Russia Iran Russia Azerbaijan Greece	Entry Entry Entry Entry Exit	14 bcm/year 9,6 bcm/year 16 bcm/year 6,6 bcm/year 0.7 bcm/year	rTPA rTPA rTPA rTPA rTPA	842 km 1491 km 1261 km 113 km 296 km

2- Existing natural gas storage/lng terminal projects

Country	Name of the facility	Operating Year	Capacity			Access Conditions: rTPA or nTPA	Transmission pipeline (km)
			Send-out / Withdrawal (mm3/day)	Injection (mm3/day)	Tank (bcm)		
Albania	N/A						
Croatia	**Okoli / Podzemno skladište plina d.o.o.**						
Egypt	**Hoegh Gallant FSRU ''FSRU-1''** **BW Singapore FSRU ''FSRU-2''**	April 2015 November 2015	Capacity 5 bcm/year Send-out/Withdrawal rate: 14.16 mm^3/day (NG) Capacity 6 bcm/year Send-out/Withdrawal rate: 17 mm^3/day (NG)		170,000 m^3 LNG = 0.12 bcm (NG) 170.000 m^3 LNG = 0.12 bcm (NG)	nTPA nTPA	6 km with 32 inc 300 meters of pipeline 24 inc. connecting with the above transmission pipeline
Greece	LNG terminal in Revithoussa	2000	12.47	rTPA		LNG terminal in Revithoussa	
Jordan	Alshaikh Subah LNG Terminal at Aqaba FSRU	2015	490 MMSCF/D- Storage 160000 m^3	nTPA	423	Alshaikh Subah LNG Terminal at Aqaba FSRU	2015
Italy	Panigaglia LNG Rovigo LNG Livorno LNG Storage Strogit, Edison, scc Storage Cornegliano	2000 2010 2015 2010 2014	13 26.4 15 16.6		 16 bcm	rTPA Exemption as 2 Energy Pacage rTPA rTPA rTPA	200
Malta	FSU and regasification plant	2016	Discharge flow rate nominal 75840 Nm^3/hr (gas)		125.000 m^3	rTPA	n/a

	PCI code:LNG-N-211 Connection of Malta to the European Gas Network-LNG Regasification infrastructure	2031	5.5 mcm/day		180.000 m^3	rTPA	12 km from offshore FSRU to Malta; 155 km from Malta to Sicily
Portugal	Sines (LNG terminal)	2003	27,0 (NG)	0,24 (LNG)	0,39 (LNG)	rTPA	NA
	Carriço (Storage)	2005	7,2	2,0	322,6	rTPA	NA
Spain	Barcelona (LNG)	1969	46800 (send-out)/0.00076 (tank)	rTPA		Barcelona(LNG)	1969
	Huelva (LNG)	1988	32400(send-out)/0.0006195(tank)	rTPA		Huelva (LNG)	1988
	Bilbao (LNG)	2003	19200 (send-out)/0.00045 (tank)	rTPA		Bilbao (LNG)	2003
	Cartagena (LNG)	1989	32400(send-out)/0.000587 (tank)	rTPA		Cartagena(LNG)	1989
	Mugardos (LNG)	2007	9907.2 (send-out)/0.0003 (tank)	rTPA		Mugardos LNG)	2007
	Segunto (LNG)	2006	24000 (send-out)/0.0006 (tank)	rTPA		Segunto (LNG)	2006
	Gaviota	1996	5700/4500/0.980	rTPA		Gaviota	1996
	Serrablo	1988	6800/3800/0.680	rTPA		Serrablo	1988
	Yela	2012	15000/10000/1.05	rTPA		Yela	2012
	Marismas	2012	400/400/0.062	rTPA		Marismas	2012
Turkey	BOTAS Silivri Underground Storage BOTAS Marmara LNG Terminal EGEGAZ Aliaga LNG Terminal	2007 1994 1998	25 mm^3/day 22,5 mm^3/day 8.2 bcm/year 16,44 mm^3/day 6 bcm/year	16 mm^3/day 151 mm^3/day 81 mm^3/day	2.8 bcm 0.153 bcm 0.168 bcm	rTPA rTPA rTPA	

3 - INVESTMENT PLANS

Country	Time span of the investment plans	Period of investment plans
Albania	2016	8
Croatia		10
Italy	2020	10
Malta	2026	
Portugal		10
Spain	2016	8

4 - Projected investments interconnection and storage

Country	Name of Project *Project Type (Interconnection/LNG)*	Project type: New or Upgrade	The phase of the project: Planning; Preliminary; Construction	Estimated operation year	Connected country	Sort of capacity: Entry; Exit; Bilateral	Target Capacity Capacity Increase (bcm/year)	Access Conditions: rTPA or nTPA	Required Transmission pipeline (km)
Albania	TAP *Interconnection*	New	2015	2020		Entry / Exit	10-20		870
	IAP *Interconnection*	New	Nd	nd					516
	Fier *LNG Regasification*	Upgrade	Nd	Nd		Entry / Exit	8-12		
Croatia	Lučko-Zabok-Rogatec (HR/SLO) + compressor stations *Interconnection*	New	Preliminary	2018	Croatia - Slovenia	Entry / Exit	5,547	rTPA	77
	LNG evacuation pipeline Omišalj-Zlobin-Bosiljevo-Sisak-Kozarac - PHASE I (HR/HU)	New	Preliminary	2020	Croatia - Hungary	Entry / Exit	16,716	rTPA	198
	LNG evacuation pipeline Kozarac-Slobodnica - PHASE II (HR/HU)	New	Planning	2023	Croatia - Hungary		7,788	rTPA	128
	Peak storage facility Grubišno Polje	New	Preliminary	2021	5,520 (1st phase-floating terminal)	-		rTPA	
	LNG Terminal on island Krk	New	Preliminary	2018 (1st phase-floating terminal) 2023 (2nd phase-onshore terminal)	9,600 (2nd phase- onshore terminal)	-	150.000 m^3 LNG (2nd phase)	rTPA	
Cyprus	East-Med pipeline (The project is included in the PCI list-code 7.3.1.)	New		2020 (3Q)	Greece	The pipeline will have an estimated capacity of 450 GWh/day	The main flow of the pipeline westbound will have	Nd	1900km (1400 km offshore, 500 km onshore

						with delivery capacity of 30 GWh/day to Cyprus and 420 GWh/day to Greece. Power of the compressor 320 MW.	an annual foreseen capacity in the range of approximately 7-15 bcm/year		
	Cyprusgas 2EU	Renaming of Mediterranean Gas Storage	Preliminary studies (Prefeasibility/Feasibility Studies)	2022				Not decided yet	Yes (Landing in Vasilikos area, south of Cyprus)
Egypt	Cyprus Pipeline FRSU-3	New PL New	Planning Q2-2017	2020 2017	Aphrodite in Cyprus to Idku in Egypt		7 bcm Total storage capacity:170.000 m^3 LNG=0.12 bcm (NG) Send-out/Withdrawal rate:21 mm^3/day (NG)	nTPA nTPA	340 km 5.5 km with 32 in
France	STEP	New	Under study, not decided	Not decided	Spain	Interruptible bilateral	F→S: 3,0 S→F: 4,5	rTPA	224km (120 km in France)
	MidCat	New	Under study, not decided	Not decided	Spain	Firm bilateral	F→S: 3,0 S→F: 4,5	rTPA	>320km (in France)
Greece	Trans Adriatic Pipeline (TAP)	New	Design and permitting, FID	2020	Greece, Albania, Italy	Entry-Exit plus Reverse-Flow	10 bcm/y up to 20 bcm/y	Exemption as for Directive 2009/73/CE	878 km
	Interconnection Greece – Bulgaria (IGB)	New	Permitting	2020	Greece, Bulgaria	Entry-Exit plus Reverse-Flow	up to 3bcm/y, up to 5bcm/y (2^{nd} phase)	applied for exemption, not yet granted	182 km

	ITGI - POSEIDON	New	Permitting	2020	Italy- Greece	Entry-Exit plus Reverse-Flow	8 bcm/y	Exemption as for 2° Energy Package	216 km
	EastMed Pipeline	New	Planned	2022	Greece, Cyprus		Up to 16 bcm/y		1900 km
	Revithoussa LNG Terminal (2nd upgrade)	Upgrade	Under engineering-procurement-construction	2018				Revithoussa LNG Terminal (2nd upgrade)	Upgrade
	FSRU in Northern Greece (Alexandroupolis)	New	Permitting completed	2020				FSRU in Northern Greece (Alexandroupolis)	New
Jordan	Alshaikh Subah LNG Terminal at Aqaba *LNG*	New	Nd	Nd				rTPA	423
Israel	Sodom- Jordan (North Jordan)	New	planning		Israel-Jordan	exit	3 bcm		22.7
	Palestinian Authority	New	preliminary		Israel-PA	exit	0.5 bcm		
	Sodom- Jordan (North Jordan)	New	planning		Israel-Jordan	exit	3 bcm		22.7
Italy	GALSI *Interconnection*	New	Planning	2020	Italy-Algeria	Entry Algeria-Exit Italy	8	Regulated	861
	TAP *Interconnection*	New	Planning	2020	Albania, Greece, Italy	Entry-Exit plus Reverse Flow	10-20	Exemption as for Directive 2009/73/CE	870
	ITGI-POSEIDON Interconnection	New	Planning	2020	Italy-Greece	Entry-Exit plus Reverse Flow	8	Exemption as for 2nd Energy Package	207
	LNG Falconara	New	Planning	2020			19.8 mm^3/day		
	LNG Porto Empedocle	New	Planning	2020			26.4 mm^3/day		
	LNG Gioia Tauuro	New	Planning	2020			39.6 mm^3/day		
	LNG Zaule	New	Planning	2025			26.4 mm^3/day		
	LNG Monfalcone	New	Planning	2025			800mcm/y		
	LNG Trieste	New	Planning	2025			8 bcm/y		

Malta	PCI Code TRA-N-031 Connection of Malta to the European Gas Network-Pipelines	New	2026	2018	Malta-Italy	The pipeline will be designed for bilateral capacity but initially it will be operated in the Italy-to-Malta flow direction	Entry (Italy-to-Malta direction): 2bcm/year (in 2026) Exit (Malta-to-Italy direction): 2bcm/year (in 2031)	rTPA	155 km
	FSU and regasification plant	New	Construction	2016			12 bcm/y	rTPA	
	PCI Code:LNG-N-211 Connection of Malta to the European Gas Network-LNG regasification	New	Planning	2031			Nd	rTPA	12 km from offshore FSRU to Malta; 155km from Malta to Sicily
Portugal	3rd Interconnection Point	New	Planning	2024	Spain	Entry	2,6	rTPA	247
	3rd Interconnection Point	New	Planning	2024	Spain	Exit	2,1	rTPA	247
Spain	MIDCAT *Interconnection*	New	PCI (preliminary)		Spain-France	Bilateral	7,2 bcm (S-F)/ 2,5 (F-S)	rTPA	25 Km in Spain
	Portugal *Interconnection*	New	PCI (preliminary)		Spain-Portugal	Bilateral	4,5 bcm (both)	rTPA	85 Km in Spain
	El Musel *(LNG)*	New	Finished	Mothballed			0.0003	rTPA	
	Bilbao *(LNG)*	Upgrade	Planning	2014 (delayed)				rTPA	
	Tenerife *(LNG)*	New	Planning	2015 (delayed)			0.000150	rTPA	
	Gran Canaria (*LNG)*	New	Planning	2016 (delayed)			0.000150	rTPA	
Turkey	BOTAS Silivri Underground Storage	Upgrade	Construction	2020	Send-out/Withdrawal, 40 mm^3/day Injection, 40 mm^3/day Tank/reservoir, 4.3 bcm	rTPA		BOTAS Silivri Underground Storage	Upgrade

	BOTAS Tuz Golu Underground Storage	New	Construction	2017 2020	Send-out/Withdrawal ,40 mm^3/day Injection, 40 mm^3/day Tank/reservoir, 0,5bcm, 1 bcm	rTPA		BOTAS Tuz Golu Underground Storage	New
	EGEGAZ Aliaga LNG Terminal	Upgrade	Construction	2016 2017	Send-out/Withdrawal, 24 mm^3/day, 30 mm^3/day,40 mm^3/day Injection, 81 mm^3/day Tank/Reservoir, 0,168 bcm	rTPA		EGEGAZ Aliaga LNG Terminal	Upgrade
	Etki Liman FSRU Terminal	New	Construction	2016	Send-out/Withdrawal, 14 mm^3/day Injection, 86 mm^3/day Tank/reservoir, 0,084 bcm	rTPA		Etki Liman FSRU Terminal	New

5- The expected benefits and impact of each project listed, on security of supply (e.g. route and/or source diversification, emergency role, N-1 condition), market development (e.g. reduction of congestions, entry of new suppliers) and regional market integration.

Country	Name of the facility	Security of Supply	Market development	Regional Market Integration
Albania	**N/A**			
Croatia	Interconnection pipeline Lucko-Zabok-Rogatec (HR/SLO)+compressor station	Project will enable route diversification and will increase N-1 criteria for security of supply in Croatia and Slovenia	Project will reduce bottlenecks at Croatia/Slovenia border and in Croatia gas system which will enable full entry/exit capacity of Dravaszerdahely interconnection point at Croatia/hangar border	Project will enable supply of LNG from Adriaic coast to expected LNG markets:Slovenia, Austria and Slovakia. It will also provide enhanced access to Baumgarten and Italian gas market
	LNG evacuation pipeline Omisalj-Zlobin-Bosiljevo-Sisak-Kozarac-PHASE I (HR/HU)	Project will enable route diversification and will increase N-1 criteria for security of supply in Croatia and Hungary	Project will create new transit route for LNG supply in Croatia and for neighbouring countries. It will also reduce possible future bottlenecks.	Project will enable route diversification and will improve remaining flexibility for Croatia, Slovenia and hungary.
	LNG evacuation pipeline Kozarac-Slobodnica-PHASE II(HR/HU)			
	Peak storage facility Grubsino Polje	Project will increase N-1 criteria for security of supply in Croatia	Additional mid and and short term services will be offered to users which will consequently attract new shippers and support further development of Croatian and regional gas market.	Project will significantly increase remaining flexibility in Croatia with influence on Slovenia and Hungary.
	LNG Terminal on Island Krk	Project will enable source diversification and will increase security of supply in Croatia and Hungary.	Project will create new LNG supply source for south-eastern and central European countries. It will also reduce possible future bottlenecks.	Project will enable supply of LNG from Adriatic coast to expected LNG markets: Croatia, Slovenia, hungary, Austria, Serbia, Bosnia and Herzegovina, Slovakia and Czech republic. Additional potential markets are: Italy,Ukraine, Romania and Bulgaria. It will also improve remaining flexibility for Croatia, Slovenia and hungary.

Cyprus	Ast-Med pipeline CyprusGas2EU	Security of Gas Supply to Cyprus Security of Gas Supply to Cyprus	End Cyprus and Crete nergy isolation End Cyprus and Crete energy isolation	Connect Eastern Mediterranean countries with Europe Connect Eastern Mediterranean countries with Europe
Egypt	FSRU-1 FSRU-2 Arab Gas PL EMG PL FSRU-3 Cyprus pipeline	Emergency role to cover the gap between the supply & demand Emergency role to cover the gap between the supply & demand Could be used in the reverse direction to secure some of the domestic consumption Emergency role to cover the new demand of the New Capital's power generation plant Could be used to cover part of the domestic consumption	Cover the hight consumption of the power generation plant Cover the hight consumption of the power generation plant Cover the consumption of the New Capital's power generation plant	To export gas to Jordan To export gas to Israel The gas will be processed and liquefied in one the Egyptian LNG facilities
France	Oltingue	source diversification		Implementation of bilateral capacities
Greece	LNG terminal in Revithoussa	According to the Preventive Action Plan, Revithoussa is the largest infrastructure in terms of capacity. During the 2009 crisis, LNG from Revithoussa was driven, through reverse flow, to Bulgaria to cover vulnerable customers demand there.	As the capacity of the two pipeline entries to Greece was fully booked upstream, LNG cargoes to Revithoussa were, until recently, the only way of entry of new suppliers (in 2011-2012 when LNG prices were favourable, the incumbent had lost 12% of its market share via LNG spot cargoes). Today some competition is developing at the Bulgarian entry point, however, the importance of the LNG terminal remains crucial.	

	TAP			TAP will be crucial for the integration of the regional market, linking Turkish and Greek to the Italian gas market and thus the rest of Europe.
	IGB	IGB will mainly be important for the SoS of Bulgaria, as its nominal flow Greece to Bulgaria	It is expected to help the development of the greek market, opening the route to the North (Bulgaria, Romania, Ukraine)	
	EastMed Pipeline	It will add one more source of supply. However, its impact has not been studied yet in the Risk Assessment study.		It will integrate the middle-eastern to the greek and then European market.
Italy	Panigaglia LNG	200	13	rTPA
	Adratica LNG	2010	26,4	Exemption as 2° Energy Package
	Livorno LNG	2015	15	rTPA
	Storage Stogit, Edison, scc.	2010	16 bcm	rTPA
	Storage Cornegliano	2014	16,6	rTPA
Malta	FSU and regasification plant *PCI Code TRA-N-031* Connection of Malta to the European Gas Network-Pipelines	Energy in Malta is currently supplier by fossil fuels with a minor contribution from renewable energy. The new gas infrastructure is expected to strongly contribute to security of supply by providing a new vehicle for energy supply. The project is expected to result in a more reliable, secure and energy efficient from of energy The infrastructure is expected to strongly contribute to security of supply by providing a new vehicle for energy supply. The project is expected to result in a more reliable, secure and energy efficient form of transport of fuel. The pipeline is expected to provide for diversification of energy	The Malta LNG to Power Project shall introduce natural gas as a fuel source to Malta's electricity generation industry and shall be the sole supply of natural gas to the power station The project will end Malta's isolation from the Trans-European gas network and thus contribute to gas market integration and improved security of energy supply and diversification of fuels for the island. The project is expected to support objectives of sustainability as it	

		sources, will facilitate the formulation and implementation of preventive and emergency action plans, is a more reliable, secure and energy efficient form of transport of fuel, and is in itself a short term storage facility as compressed gas contained in the pipeline may be used in case that the gas flow is interrupted at the terminal point in the supplying infrastructure	will contribute towards the reduction of GHG emissions whilst also acting as a back-up for renewable energy. It will contribute towards diversification of imported sources. In Malta, it will provide access to a potentially lower cost fuel for both power generation and the inland market thereby improving competitiveness and affordability.	The pipeline can be expected to provide for more flexible market arrangements by, at the very least, introducing a competing form of transport. Furthermore price convergence to the Italian Market price is expected once the gas pipeline is in service. The gas pipeline interconnection will eliminate Malta's isolation from the European Gas Network and will thus contribute to the integration of the Internal Energy Market. The physical interconnection would replace the shipping of LNG, time of transport and externality costs. The project will also contribute to the overall flexibility and interoperability of the system as it will offer future possibility of capacity for reverse flows
	PCI Code LNG-N-211 Connection of Malta to the European Gas Network-LNG regasification Infrastructure	The 'LNG infrastructure' component besides meeting Malta's natural gas requirements including future demand for maritime LNG bunkering; shall also achieve the gas N-1 infrastructure requirement as there would be two sources of natural gas supply to Malta and shall provide for the possibility to export gas to Italy/Europe. This will enhance competition in Italy. The main project driver for this component of the PCI is the Gas Security of Supply EU Regulation No. 994/2010. This second phase of the PCI will contribute to the overall system flexibility and interoperability. The infrastructure will be capable to offer capacity for bi-directional flow through the gas pipeline interconnector.	Energy demand will be increasing over time and as LNG bunkering comes into with the establishment of criteria for the use by liquefied natural gas carriers of technological methods as an alternative to using low sulphur marine fuels in line with the sulphur reduction requirements of the EU Sulphur Directive 2012/33/EU. It is forecasted that bunkering will by 2054 account for about 80% of the total primary energy demand of the Maltese Islands. This therefore has a potentially stronger element of fuel demand associated with maritime bunkering activity centred in and around Malta, which already serves as a key bunkering hub within the Mediterranean, and will play a key role in the implementation of EU goals towards the supply of NG fuel for the purposes of shipping activities in the future. This serves as a basis for the quantification of the demand for the project itself, it informs the optimal	This project is expected to support the objective of sustainability as it will contribute towards the reduction of GHG emissions. The LNG component will also complement the provisions of Directive 2014/94/EU and the Energy Union diversification strategy in fuel by the added entry point of natural gas to the EU i.e. effectively contributing towards the diversification of sources,

			choice between alternative options for its implementation, furthermore serving to quantify economic benefits under each of the five dimensions to be served by the PCI listed above.	routes and suppliers of gas to the EU.
Portugal	Campo Maior	Yes	Yes	Yes
	Valença do Minho	Yes	No	No
	Sines (LNG terminal)	Yes	Yes	Yes
	Carriço (Storage)	Yes	Yes	Yes
Spain	MIDCAT	Route and source of diversification for Europe (alternative to Russian gas for central Europe)	Liquidity for the Iberian market	Creation of the European internal market
	Portugal	Diversification (for Portugal) Diversification, N-1 condition		Creation of the European internal market
	Musel			
	Tenerife	Supply of gas in isolated system (Canary Islands)		
	Gran Canaria	Supply of gas in isolated system (Canary islands)		
Turkey	Malkoclar (Western Line)	Only interconnection point That private companies have contracts	Entry of new suppliers	
	Gurbulak	Source and route Diversification, N-1 condition		
	Durusu (Blue Stream)	Route diversification, N-1 Condition		
	Turkgozu	Source and route Diversification, N-1 condition		
	Kipi	Source and route diversification And N-1 condition with the Possible investments for bilateral flow	Entry of new suppliers with the possible investments for bilateral flow	Only current exit to European markets
	BOTAS Silivri Underground Storage	Emergency role, seasonal storage		

	BOTAS Marmara LNG Terminal	Source and route diversification, N-1 condition	Entry of new suppliers	
	EGEGAZ Aliaga LNG Terminal	Source and route diversification, N-1 condition	Entry of new suppliers	
	BOTAS Silivri Underground Storage	Emergency role, seasonal storage	Provide flexibility to market players	
	BOTAS Tuz Golu Underground Storage	Emergency role, seasonal storage		
	EGEGAZ Aliaga LNG Terminal	Source and route diversification, N-1 condition	Provide flexibility to market players	
	Etki Liman FSRU Terminal	Source and route diversification, N-1 condition	Entry of new suppliers	
			Entry of new suppliers	

6- The role of national regulatory agency in the overall investment plan

Country	Approval of investment plan by NRA	Government sets investment plan and consults NRA
Albania		X
Croatia	X	
Cyprus	X	
France	X	
Greece	X	
Israel	X	
Italy		X
Jordan		X
Portugal		X
Spain		X

7 - Implementation barriers

Implementation Barriers	Albania	Cyprus	Croatia	Egypt	France	Greece	Jordan	Israel	Italy	Malta	Portugal	Spain	Turkey
a. Regulatory and/or legal obstacles (ex. administration, permitting, licencing, etc….)	8	2	5	1	8		1	1		4	8		5
b. Lack of interest in interconnection projects (ex. Inter-Governmental agreements)	8	6	3	7	8		8			5	2		8
c. Technical barriers	8	3	4	6	3		8			3	7		6
d. Financial feasibility of the project (e.g. adequate revenues)	3	1	2	5	2	1	4		x	1	8		2
e. Insufficient market demand	3	8	1	8	1	2	1	2		2	1	1*	1
f. Lack of internal reforms	3	7	7	2	8	3	4			6	8		4
g. Political instability and/or lack of clear institutional framework (including geopolitical barriers)	8	5	8	3	8		5			8	3	8	3
h. Lack of coordination and/or cooperation (ex. between TSOs, between TSOs and Regulators)		8	7	8		4	8	7	6		7	4	

8 - Infrastructure key performance indicators

		2014	2015	2016 (planned/forecast)
Croatia	Number of TSOs	1	1	1
	Pipeline length (km)	2.694	2.694	-
	Pipeline pressure **(bar)**	50 bar; 75 bar	50 bar; 75 bar	50 bar; 75 bar
	Annual consumption (bcm)	2,627	2,745	-
	Seasonal demand swing (%)	-	-	-
	Daily peak demand (mcm)	12,545	11,779	-
	Length of pipeline/consumption (km/bcm)	1.025,45	981,46	-
	Storage capacity/consumption (%)	20,40	19,34	-
	LNG terminal capacity/consumption (%)	-	-	-
	LNG + storage daily send out / peak demand (%)	41,3	40,5	-
	Number of entry zones	1	1	1
	Number of exit zones	1	1	1
	Number of compressor stations	0	0	0
	Pipeline length / # compressor stations	-	-	-

		2014	2015	2016 (planned/forecast)
Cyprus	Number of TSOs	-	-	-
	Pipeline length (km)	-	-	-
	Pipeline pressure (bar)	-	-	-
	Annual consumption (bcm)	-	-	-
	Seasonal demand swing (%)	-	-	-
	Daily peak demand (mcm)	-	-	-
	Length of pipeline/consumption (km/bcm)	-	-	-
	Storage capacity/consumption (%)	-	-	-
	LNG terminal capacity/consumption (%)	-	-	-
	LNG + storage daily send out / peak demand (%)	-	-	-
	Number of entry zones	-	-	-
	Number of exit zones	-	-	-
	Number of compressor stations	-	-	-
	Pipeline length / # compressor stations	-	-	-

		2014	2015	2016 (planned/forecast)
Egypt	Number of TSOs	1	1	1
	Pipeline length (km)	7667	7872	8000
	Pipeline pressure (bar)	7-70 bar	7-70 bar	7-70 bar
	Annual consumption (bcm)	48.019	47.812	51.627
	Seasonal demand swing (%)	20	20	20
	Daily peak demand (mcm)	130	136	151
	Length of pipeline/consumption (km/bcm)	59	58	53
	Storage capacity/consumption (%)			
	LNG terminal capacity/consumption (%)			
	LNG + storage daily send out / peak demand (%)		1000	1300
	Number of entry zones	20	21	22
	Number of exit zones	607	607	607
	Number of compressor stations	1	1	1
	Pipeline length / # compressor stations	7667	7872	8000

		2014	2015	2016 (planned/forecast)
Jordan	Number of TSOs	1	1	1
	Pipeline length (km)	423	423	423
	Pipeline pressure **(bar)**	Up to 80 Bars	Up to 80 Bars	Up to 80 Bars
	Annual consumption (bcm)	3.4		
	Seasonal demand swing (%)	-	-	-
	Daily peak demand (mcm)	25 MMSCF/D	200 MMSCF/D	444 MMSCF/D
	Length of pipeline/consumption (km/bcm)	-	-	-
	Storage capacity/consumption (%)	-	-	-
	LNG terminal capacity/consumption (%)	-	-	-
	LNG + storage daily send out / peak demand (%)	-	490 MMSCF/D	490 MMSCF/D
	Number of entry zones	-	-	-
	Number of exit zones	-	-	-
	Number of compressor stations	-	-	-
	Pipeline length / # compressor stations	423/1 compressor st.	423/1 compressor st.	423/1 compressor st.

		2014	2015	2016 (planned/forecast)
Greece	Number of TSOS	1	1	1
	Pipeline length (km)	1459.33	1466.17	1492.47
	Pipeline pressure	70 bar	70 bar	70 bar
	Annual consumption (bcm)	2.99	3.26	3.4
	Seasonal demand swing (%)	65%	65%	
	Daily peak demand (mcm)			
	Length of pipeline/consumption (km/bcm)	488.07	449.75	438.96
	Storage capacity/consumption (%)			
	LNG terminal capacity/consumption (%)	167%	153%	154%
	LNG + storage daily send out / peak demand (%)	68.25%	63%	
	Number of entry zones	3	3	3
	Number of exit zones	3 (39 exit point)	3 (41 exit point)	3
	Number of compressor stations	1	1	1
	Pipeline length / # compressor stations	1459.33	1466.17	1492.47

		2014	2015	2016 (planned/forecast)
France	Number of TSOS	2	2	2
	Pipeline length (km)	around 37 000 km	around 37 000 km	around 37 000 km
	Pipeline pressure	16 to 95 bar	16 to 95 bar	16 to 95 bar
	Annual consumption (bcm)	36,2	38,9	42,6
	Seasonal demand swing (%)			
	Daily peak demand (mcm)			
	Length of pipeline/consumption (km/bcm)			
	Storage capacity/consumption (%)	~28%	~28%	~28%
	LNG terminal capacity/consumption (%)	~85%	~85%	~85%
	LNG + storage daily send out / peak demand (%)			
	Number of entry zones	2	2	2
	Number of exit zones	2	2	2
	Number of compressor stations			
	Pipeline length / # compressor stations			

		2014	2015	2016 (planned/forecast)
Israel	Number of TSOs	1	1	1
	Pipeline length (km)		530	
	Pipeline pressure (bar)			
	Annual consumption (bcm)	7.5	8.4	9.4
	Seasonal demand swing (%)			
	Daily peak demand (mcm)	27.335	**37,101**	
	Length of pipeline/consumption (km/bcm)			
	Storage capacity/consumption (%)			
	LNG terminal capacity/consumption (%)			
	LNG + storage daily send out / peak demand (%)			
	Number of entry zones			
	Number of exit zones			
	Number of compressor stations			
	Pipeline length / # compressor stations			

		2014	2015	2016 (planned/forecast)
Italy	Number of TSOs	10	10	10
	Pipeline length (km)	32339	34857	
	Pipeline pressure	24-75 bar		
	Annual consumption (bcm)	61.9	67.5	
	Seasonal demand swing (%)			
	Daily peak demand (mcm)			
	Length of pipeline/consumption (km/bcm)			
	Storage capacity/consumption (%)			
	LNG terminal capacity/consumption (%)			
	LNG + storage daily send out / peak demand (%)			
	Number of entry zones*			
	Number of exit zones*			
	Number of compressor stations			
	Pipeline length / # compressor stations			

		2014	2015	2016 (planned/forecast)
Malta	Number of TSOs	0	0	0
	Pipeline length (km)	0	0	0
	Pipeline pressure **(bar)**	N/A	N/A	N/A
	Annual consumption (bcm)	N/A	N/A	4.4838
	Seasonal demand swing (%)	N/A	N/A	N/A
	Daily peak demand (mcm)	N/A	N/A	N/A
	Length of pipeline/consumption (km/bcm)	N/A	N/A	N/A
	Storage capacity/consumption (%)	N/A	N/A	N/A
	LNG terminal capacity/consumption (%)	N/A	N/A	0.03%
	LNG + storage daily send out / peak demand (%)	N/A	N/A	N/A
	Number of entry zones	N/A	N/A	
	Number of exit zones	N/A	N/A	
	Number of compressor stations	N/A	N/A	N/A
	Pipeline length / # compressor stations	N/A	N/A	N/A

		2014	2015	2016 (planned/forecast)
Portugal	Number of TSOs	1	1	1
	Pipeline length (km)	1375	1375	1375
	Pipeline pressure **(bar)**	70	70	70
	Annual consumption (bcm)	3,8	4,4	NA (Non Available)
	Seasonal demand swing (%)	0,43	0,47	NA
	Daily peak demand (mcm)	15,5	17,4	NA
	Length of pipeline/consumption (km/bcm)	361,8	312,5	NA
	Storage capacity/consumption (%)	8,2	7,6	NA
	LNG terminal capacity/consumption (%)	5,9	5,1	NA
	LNG + storage daily send out / peak demand (%)	174,2	155,2	NA
	Number of entry zones	1	1	1
	Number of exit zones	1	1	1
	Number of compressor stations	0	0	0
	Pipeline length / # compressor stations	NaN (Not a Number)	NaN	NaN

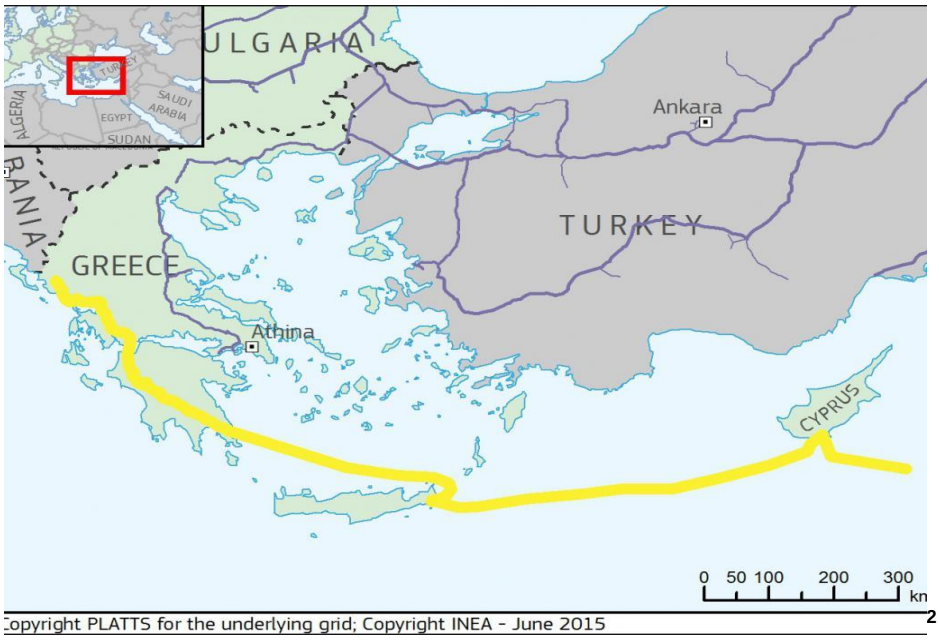
		2014	2015	2016 (planned/forecast)
Spain	Number of TSOs	4	4	
	Pipeline length (km)	Around 11000	Around 11311	
	Pipeline pressure			
	Annual consumption (bcm)	25.73	26.92	
	Seasonal demand swing (%)			
	Daily peak demand (mcm)	107350	115555	
	Length of pipeline/consumption (km/bcm)	427.52	408.61	
	Storage capacity/consumption (%)	18.5%	19%	
	LNG terminal capacity/consumption (%)			
	LNG + storage daily send out / peak demand (%)			
	Number of entry zones*	1	1	
	Number of exit zones*	1	1	
	Number of compressor stations	18	18	
	Pipeline length / # compressor stations	628	628	

		2014	2015	2016 (planned/forecast)
Turkey	Number of TSOS	1	1	1
	Pipeline length (km)	12.561	12.963	13.000
	Pipeline pressure	50-75 bar(g)	50-75 bar (g)	50-75 bar (g)
	Annual consumption (bcm)	48.717	47.999	46.500
	Seasonal demand swing (%)	0.14	0.20	0.20
	Daily peak demand (mcm)	195	224	220
	Length of pipeline/consumption (km/bcm)	258	270	280
	Storage capacity/consumption (%)	5.5%	5.9%	6.1%
	LNG terminal capacity/consumption (%)	29.1%	29.6%	41.3%
	LNG + storage daily send out / peak demand (%)	28.9%	27.4%	40.5%
	Number of entry zones	9	9	9
	Number of exit zones	1	1	1
	Number of compressor stations	9	9	9
	Pipeline length / # compressor stations	1396	1440	1444

9 - Infrastructure maps of the contributing countries

Croatia

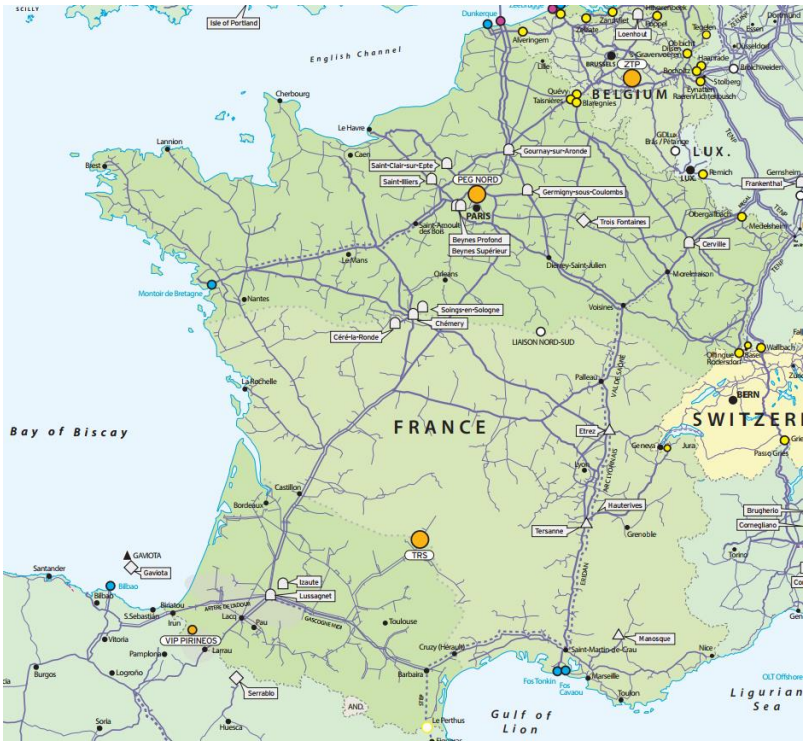
Cyprus



[2]

France

[2] Geographical location of PCI 7.3.1"Pipeline from offshore Cyprus to Greece mainland via Crete" namely 'EastMed' (https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/multi-country/7.3.1-0025-elcy-s-m-15)


English Channel
Bay of Biscay
FRANCE
BELGIUM
LUX.
SWITZERLAND
PEG NORD
PARIS
Trois Fontaines
Beynes Profond
Beynes Supérieur
Chémery
LIAISON NORD-SUD
TRS
Tersanne
Hauterives
Etrez
Lussagnet
VIP PIRINEOS
Serrablo
Gaviota
Isle of Portland
Cherbourg
Le Havre
Caen
Nantes
Orleans
Toulouse
Bordeaux
Marseille
Toulon
Gulf of Lion
Ligurian Sea

Jordan

TURKEY
SYRIA
LEBANON
MEDITERRANEAN SEA
JORDAN
EGYPT
RED SEA
BANIAS
HEMS
TRIPOLI
DAMASCUS
AMMAN
EAST AMMAN
QATRANAH
AL AQABA
TABA

Malta

Geographical Location of PCI 5.19: TRA-N-031 and LNG-N-211

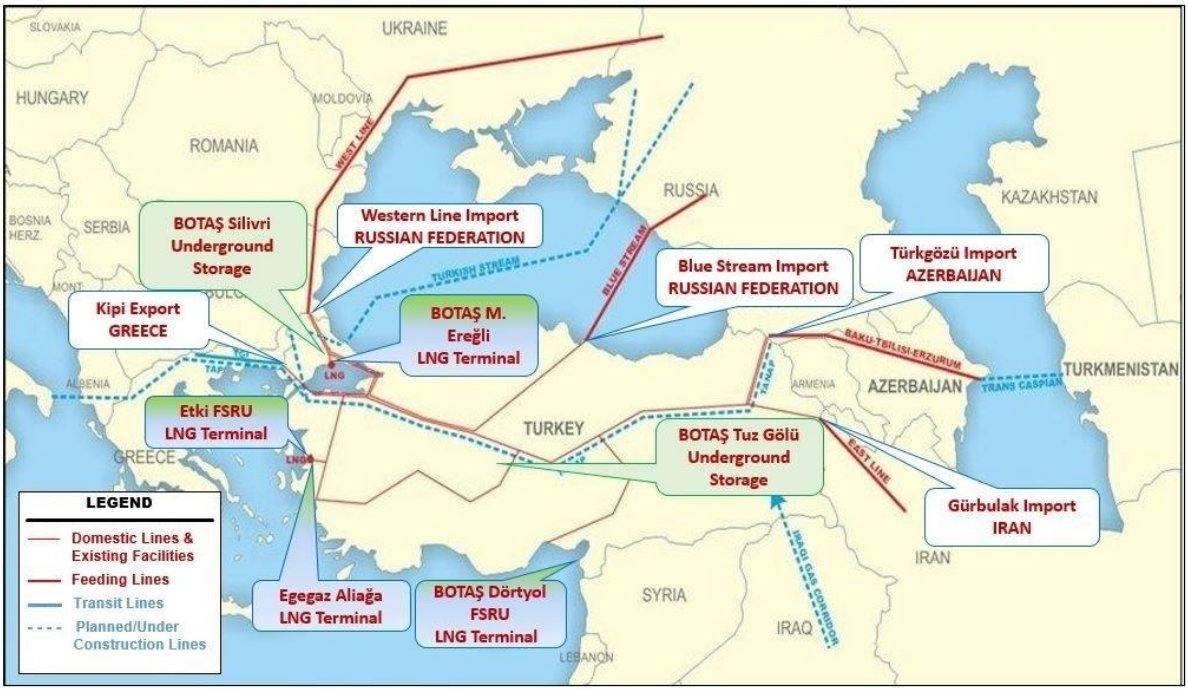
Note: Map has been updated from TYNDP 2015

Malta FSRU Offshore terminal

2

Spain

Turkey


SLOVAKIA
UKRAINE
HUNGARY
MOLDOVIA
ROMANIA
WEST LINE
RUSSIA
KAZAKHSTAN
BOSNIA HERZ.
SERBIA
BOTAŞ Silivri Underground Storage
Western Line Import RUSSIAN FEDERATION
TURKISH STREAM
BLUE STREAM
Blue Stream Import RUSSIAN FEDERATION
Türkgözü Import AZERBAIJAN
Kipi Export GREECE
BOTAŞ M. Ereğli LNG Terminal
BAKU-TBILISI-ERZURUM
TRANS CASPIAN
TURKMENISTAN
ALBENIA
TAP
LNG
TANAP
ARMENIA
AZERBAIJAN
Etki FSRU LNG Terminal
TURKEY
GREECE
BOTAŞ Tuz Gölü Underground Storage
EAST LINE
Gürbulak Import IRAN
IRAN
LEGEND
Domestic Lines & Existing Facilities
Feeding Lines
Transit Lines
Planned/Under Construction Lines
Egegaz Aliağa LNG Terminal
BOTAŞ Dörtyol FSRU LNG Terminal
SYRIA
IRAQI GAS CORRIDOR
IRAQ
LEBANON