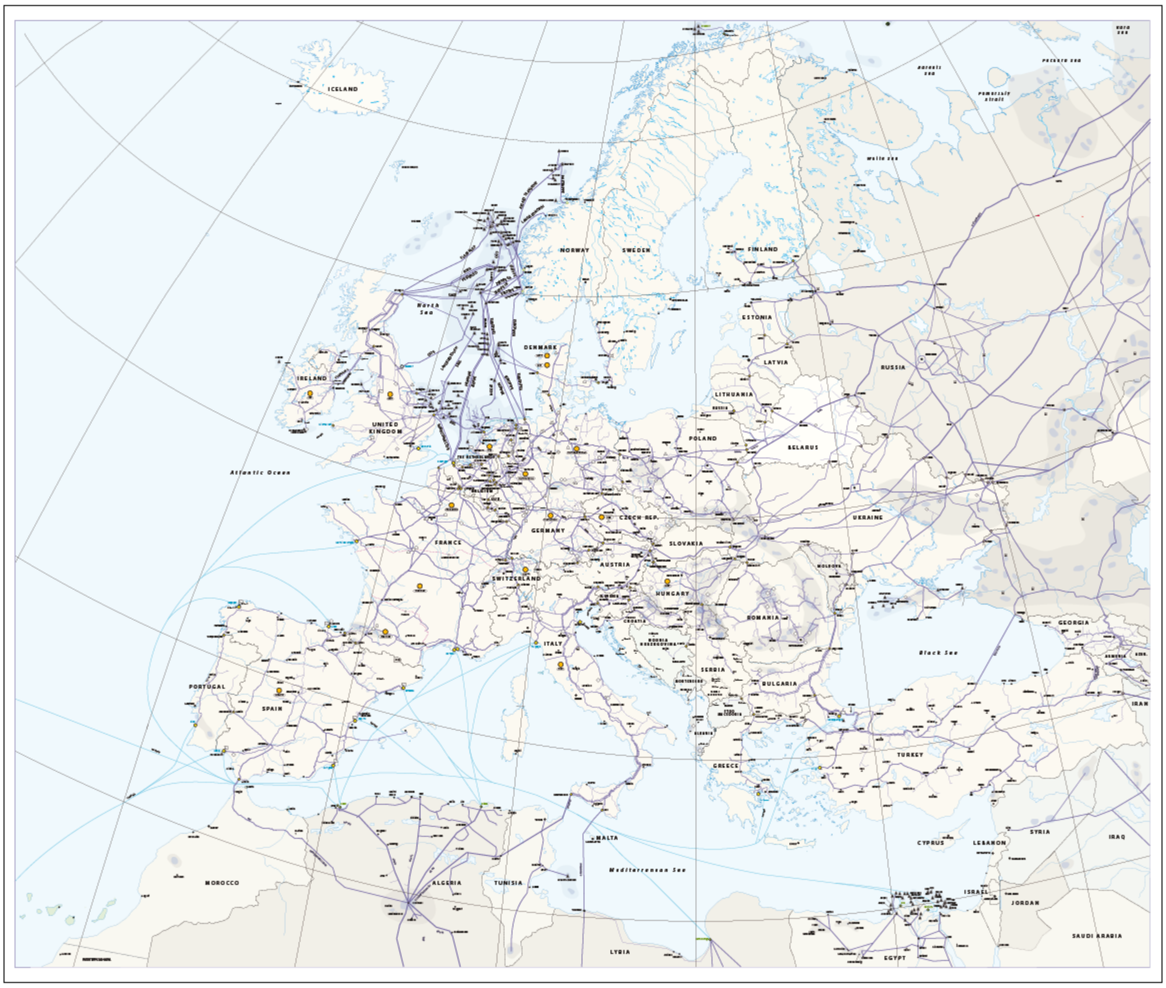

Winter Supply Outlook 2011-2012

&

Seasonal reviews:

Summer 2010, Winter 2010-2011

& Summer 2011 (preliminary)

14 December 2011

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ENTSOG Winter Outlook 2011-2012

Executive Summary

ENTSOG has undertaken an assessment of the European gas network to analyse the flexibility for supply the grid is able to provide when meeting a High Daily Demand, and the evolution of UGS stock level during Winter 2011-2012 (October to March). The conclusions are:

Gas in UGS on 1 October 2011 is sufficient to cover at least a 10% increase in the overall European winter demand in comparison with an average winter (equivalent to about 365 TWh of additional consumption which is as high as the French total winter demand).

The European gas network is sufficiently robust in all parts of Europe to offer significant flexibility even under High Daily Demand conditions

Sensitivity studies have been carried out to further illustrate:

- The impact of a change in winter demand on UGS stock level (volume perspective)
- The flexibility offered by the network to enable shippers to optimize their supply under High Daily Demand conditions (capacity perspective).

The integrated flow patterns used in the analysis are developed specifically for this Winter Supply Outlook. They should not be considered as forecast not withstanding that they result from TSOs experience and ENTSOG modelling and supply assumptions.

Introduction

As part of ENTSOG continuous efforts to ensure greater transparency and knowledge regarding the development and operation of the European gas transmission network, ENTSOG presents this Winter Supply Outlook 2011/2012. This Outlook aims to provide an overview of the ability of both the European gas network and potential supply to face winter demand. This ability has been tested along both the whole winter and potential High Daily Demand periods.

The winter months require storage withdrawal to cover both short peak periods and the overall winter additional demand. The level of withdrawal by shippers varies from one country to the other and from time to time due to climatic, price and legal parameters.

In order to handle such uncertainty, ENTSOG has used a sensitivity study around a Reference case to check if the European gas infrastructures are able to both:

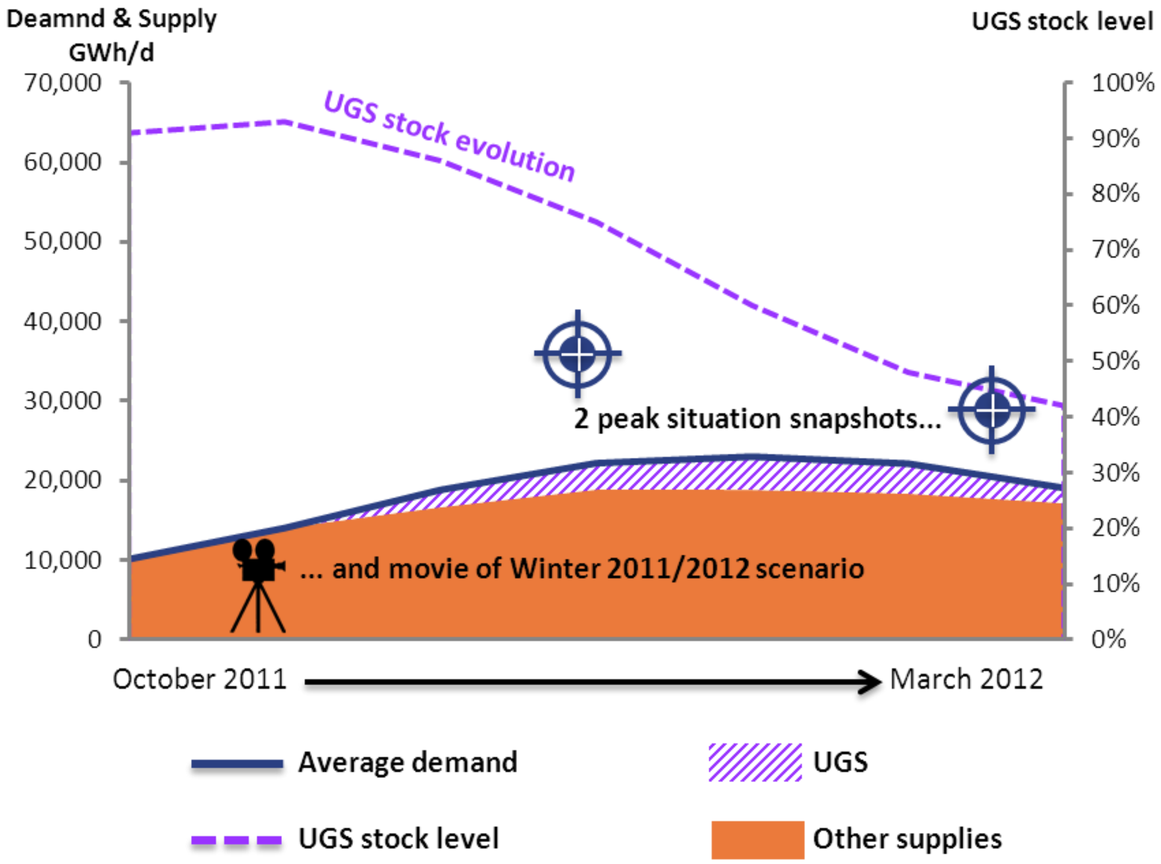
- cover the full winter demand under different supply and demand conditions
- enable shippers to meet High Daily Demand in each country as it can occur in January and March with sufficient flexibility in their supply strategies

When assessing the supply adequacy at European level both through TYNDP and Outlooks, ENTSOG aims at enlarge the geographical scope of the study behind its own perimeter. Winter Supply Outlook 2011/2012 covers the EU-27 (less Cyprus and Malta) plus Croatia, Serbia, FYROM and exports to Turkey and Kaliningrad.

Applied methodology

Winter Supply Outlook 2011-2012 will capture 2 different but still linked visions of the season. The first one is an outlook of demand and supply evolution along the winter and especially UGS stock level evolution. The second one is the addition of two pictures of very specific and hypothetical events being High Daily Demand in January or March 2012.

These two visions are linked as the level of stock in UGS facilities has some influence on withdrawal deliverability. This may impact UGS ability to cover peak demand especially in March and then shippers would consider this fact when managing their supply portfolio.



Winter Supply vs. Demand balance (volume perspective)

This part of the report intends to capture the temporal dimension of Winter supply by considering the evolution of UGS level.

In order to assess the influence of supply and demand on UGS stock evolution, a sensitivity study has been carried out around a Reference Case. For each month and source, supply is defined by the average supply of last 2 winters using UGS as last resort supply. Such supply definition is a standard approach to define a reference case and not the forecast of shippers' supply strategies.

In order to investigate the impact of supply and demand variation on UGS stock levels, the sensitivity study has been carried out by respectively increasing and decreasing winter demand by 10% under different import scenarios.

High Daily Demand coverage (capacity perspective)

As last year's report, the Winter Supply Outlook 2011-12 has checked if the capacity of the European gas network is sufficient to cover High Daily Demand in January and March in each country.

In order to assess the range of possible supply patterns, a sensitivity study has been carried out around a Reference Case:

Supply is defined by the highest flows by source reached last 2 winters using UGS as last resort supply. Such supply definition is a standard approach to define a reference case and not the forecast of shippers' supply strategies.

In order to investigate which supply flexibility shippers may enjoy, a sensitivity study has been carried out by minimizing each supply source (except National Production) against the others (having UGS increasing or staying at Reference Case level).

Results from market integration scenarios of ENTSOG TYNDP 2011-2020 (§"Capacity limitation to supply predominance on Average daily demand", page67) showed no limitation to single supply predominance between 2011 and 2015, except for LNG spread from Spain to France and Greece to Bulgaria. These only limitations disappear under High Daily Conditions when higher demand reduces transmission distances as additional supply is consumed locally due to high level of demand.

Results of Supply vs. Demand balance over the Winter (volume perspective)

Reference Case

European Monthly Demand is defined as the sum of the national monthly average demand values as it occurs statistically every 2 years. A flat daily demand has been considered within each month.

For each supply source (being Algeria, Libya, LNG, National Production, Norway and Russia), the average level of last 2 winters has been considered month by month.

UGS are used as last resort supply in order to balance supply with demand.

Aggregated European UGS level decrease has then been calculated day by day, taking into account the influence of stock level on withdrawal deliverability (see Annex B). Initial level on 1 October 2011 comes from AGSI platform (same relative stock of 91% has been used for SSOs facilities not being part of GSE).

Cold Winter

This part of the sensitivity study investigates the impact of a colder winter (higher demand) on the evolution of UGS stock level.

Demand is increased by 10% evenly across the Winter. This additional demand is faced either:

- By UGS only
- First by an increase of alternative supplies at 105% of Reference Case level (except National Production) then by UGS

Warm Winter

This part of the sensitivity study investigates the impact of a warmer winter (lower demand) on the evolution of UGS stock level.

Demand is decreased by 10% evenly across the Winter. This reduced demand is impacted either:

- on UGS only
- first on alternative supplies decreased at 95% of the Reference Case level (except National Production) then on UGS

Resulting UGS stock level on 31 March 2012

TWh on Winter 2011/2012	Reference Case	Cold Winter		Warm Winter	
		UGS only	Imports & UGS	UGS only	Imports & UGS
Winter demand *	3,654	4,019		3,289	
National production	1,063				
Other supplies	2,141	2,141	2,248	2,141	2,034
UGS supply **	450	815	708	85	192
UGS level on 31 March 2012	42%	1%	13%	83%	71%

(*) including exports to Kaliningrad and Turkey

(**) European aggregated UGS stock level evolution can be found in Annex B

Under the Reference Case UGS stock level at the end of Winter 2011-2012 could still be as high as 42%. When demand is 10% higher (cold winter), demand can still be met, either through additional UGS withdrawal, or a combination of UGS and additional import. When the winter will be warmer than average, significant storage volumes could still be available after the end of the winter period.

The extreme case of a Cold Winter whose additional demand is only covered by UGS, leads to a 1% stock level at the end of Winter. This does not reflect the behaviour of shippers and SSOs using injection opportunities to have even at the end of the season sufficient gas in stock to face potential peak.

For comparison purpose, Winter Supply Outlook 2011/2012 Reference Case is as high as 103% of Winter 2009-2010 and 2010-2011 demand.

According to the Cold Winter scenario (with other supplies at 105% of the Reference Case) and UGS deliverability curve (see Annex B), aggregated European stock level of UGS is above (see Annex B for comprehensive results):

- 41% until end of January (87% withdrawal deliverability in comparison with full storage situation)
- 13% until end of March (48% withdrawal deliverability in comparison with full storage situation)

Results of High Daily Demand conditions (capacity perspective)

Reference Case

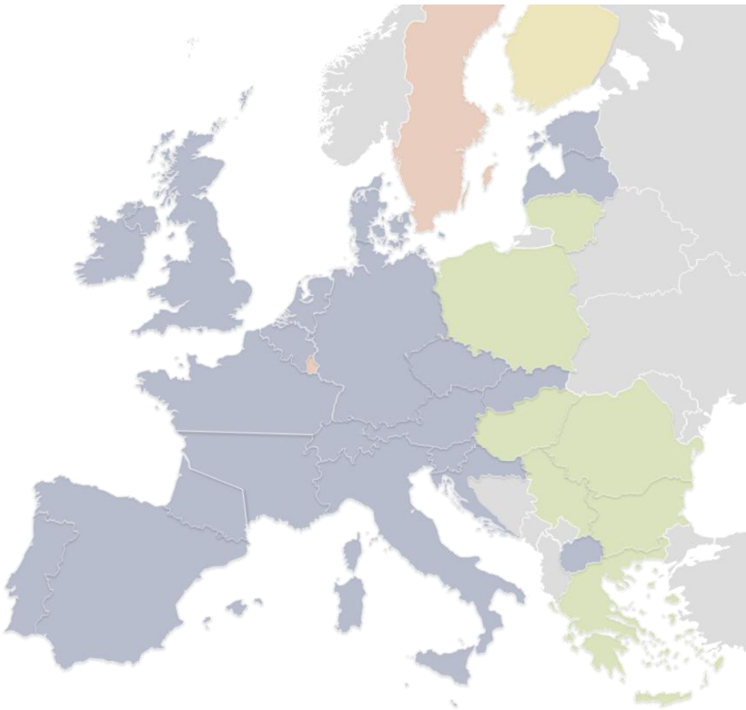
European High Daily Demand is defined as the sum of the national High Daily Demand values reported by TSOs. This is a conservative approach based on the simultaneous reach of such level across Europe.

For each supply source (being Algeria, Libya, LNG, National Production, Norway and Russia), the highest daily flow level of last 2 winters has been considered. Transit routes from each supply source to Europe have been limited to the highest level reached last 2 winters. These levels do not represent actual maximum supply but help to define a realistic still conservative supply when facing peak conditions.

UGS are used as last resort supply in order to balance supply with demand. Resulting usages for UGS are 74% for January scenario and 46% of March one. These loads are consistent with UGS deliverability on those periods (see results of “Supply vs. Demand balance over the Winter” chapter)

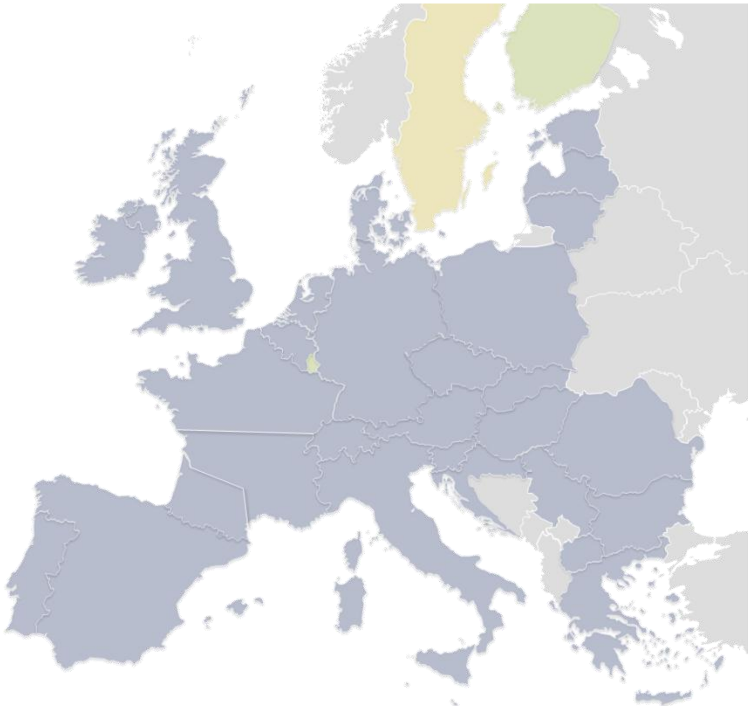
Maps on next page illustrate the remaining flexibility offered by the different European systems. This indicator is defined at system level as below:

$$1 - \frac{\sum Entering\ flows}{\sum Entry\ capacity}$$



January 2012 scenario

Sweden and Finland show the lowest flexibility when facing High Daily Demand conditions. These systems have alternative ways to mitigate such situation. In case of Sweden, additional interruptible capacity from Denmark is available at low temperatures. For Finland, a large part of national demand can switch to a back-up fuel.



March 2012 scenario

At European aggregated level, decrease in demand is higher than the one in UGS withdrawal deliverability. Then transmission capacity is sufficient to ensure an increased remaining flexibility in all parts of Europe.

Remaining flexibility

< 1%
1 to 5%
5 to 20%
> 20%

Supply source minimisation (capacity analysis)

This part of the sensitivity study investigates flexibility of the European gas network when facing different supply patterns.

Each supply source has been minimized one by one. Missing gas has been compensate once through additional imports (up to 95% of import capacity for pipe gas and up to 80% of LNG terminal sendout capacity), once through additional storage withdrawal. In both cases National Production stays at Reference Case level.

Following tables summarize the results of modelled scenarios providing the minimum level for each supply required to balance demand in each country and limiting factors when minimum is higher than 0:

- For January High Daily Demand conditions on one day:

GWh/d	Reference Case	Compensate by additional imports		Compensate by additional withdrawal	
		Min. level	Limiting factor	Min. level	Limiting factor
Algeria	1,580	0	None	0	None
Libya	349	0	None	0	None
LNG	3,575	2,731 (-24%)	**Imports**	1,848 (-48%)	BG>GR, DE>FR (or BE) & FRt>ES
Norway	3,893	1,089 (-72%)	**Imports** & ES>FRt	928 (-76%)	DK>DE, NL>UK, DE>BE, DE>FR
Russia	6,186	4,271 (-31%)	**Imports** & ES>FRt	3,199 (-48%)	DK>DE & LV>LT
UGS	12,792	9,491 (-24%)	**Imports** & PT>ES & ES>FRt	na	na

- For March High Daily Demand conditions on one day:

GWh/d	Reference Case	Compensate by additional imports		Compensate by additional withdrawal	
		Min. level	Limiting factor	Min. level	Limiting factor
Algeria	1,580	0	None	0	None
Libya	349	0	None	0	None
LNG	3,575	2,209 (-38%)	**Imports**	1,207 (-66%)	BG>GR & FRt>ES
Norway	3,893	901 (-77%)	**Imports** & PT>ES & ES>FRt	0	None
Russia	6,186	4,001 (-35%)	**Imports** & PT>ES & ES>FRt	1,273 (-79%)	LV>LT, DE>PL, CZ>PL & HU>RO
UGS	7,769	4,541 (-41%)	**Imports** & PT>ES & ES>FRt	na	na

Under all scenarios, flexibility to decrease supply is quite high (at least 24% during January peak and 38% during March one) especially when comparing the minimum level with the historical values of last 2 winters (see Annex C). Minimum levels could be even lowered by a simultaneous compensation through imports and UGS.

When considering additional imports, main limiting factor is the lack of import availability (gas or capacity) rather than internal EU transmission.

Modelled scenarios show that even under High Daily Demand conditions, the European gas network still offers a lot of supply flexibility to shippers when optimizing their supply portfolio.

Conclusion

According to the ENTSOG modelling and supply assumptions, this Winter Supply Outlook confirms the ability of the European gas infrastructures to face Winter 2011-12 with significant flexibility.

On volume:
Import and UGS stock level are sufficient to face at least a winter demand as high as 110% of the average winter demand.

On capacity:
The European gas network will provide significant flexibility when facing High Daily Demand conditions in most parts of Europe. This flexibility would enable shippers to cover peak demand through a wide range of supply strategies.

Please note that the integrated flow patterns used in this report is a hypothetical case just for the purposes of this Winter Supply Outlook.

Annex A

Methodology

Modelling tool for High Daily Demand conditions

Modelling has been carried out with an enhanced tool using linear programming of cross-border flows. Simulation used country basic blocks except for:

- France: separate blocks for GRTgaz North, GRTgaz South and TIGF zones
- Poland: separate blocks for Gaz-System zone and Yamal Europe
- Romania: separate blocks for Transgaz zone and the pipe between Isaccea (UA/RO border) and Negru Voda (RO/BG border)

Following tables show the assumptions used by ENTSOG

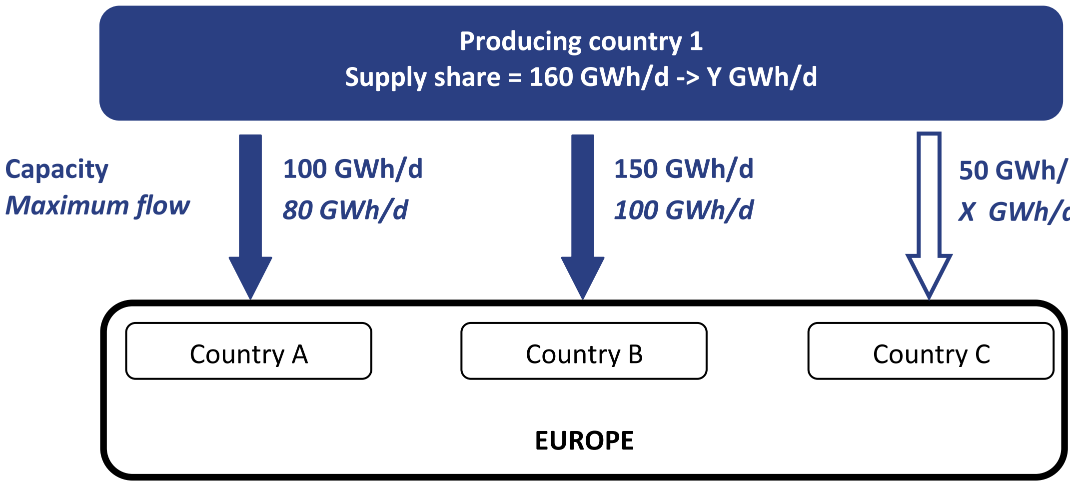
<table>
<tr><th rowspan="2"></th><th colspan="5">1-in-2 Winter</th></tr>
<tr><th>Ref. Case</th><th colspan="2">Cold winter</th><th colspan="2">Warm winter</th></tr>
<tr><td>Demand</td><td>Average monthly demand forecast provided by TSOs</td><td colspan="2">Ref. Case +10%</td><td colspan="2">Ref. Case -10%</td></tr>
<tr><td>NP</td><td colspan="5">Monthly average of last 2 winters</td></tr>
<tr><td>Import</td><td>Monthly average of last 2 winters</td><td>Same level as Ref. Case</td><td>Ref. Case level +5%</td><td>Same level as Ref. Case</td><td>Ref. Case level -5%</td></tr>
<tr><td>UGS</td><td colspan="5">Last resort supply</td></tr>
<tr><td>X-border capacity</td><td colspan="5">Firm technical capacity as provided by TSOs</td></tr>
</table>

<table>
<tr><th rowspan="2"></th><th colspan="3">High Daily Demand conditions</th></tr>
<tr><th>Ref. Case</th><th colspan="2">Supply minimization</th></tr>
<tr><td>Demand</td><td colspan="3">1-in-20 daily demand forecast provided by TSOs</td></tr>
<tr><td>NP</td><td colspan="3">Daily maximum of last 2 winters</td></tr>
<tr><td>Import</td><td>Daily maximum of last 2 winters</td><td rowspan="2">Decrease one-by-one down to minimum possible</td><td>Decrease one-by-one down to minimum possible</td></tr>
<tr><td>UGS</td><td>Last resort supply</td><td>Same level as Reference Case</td></tr>
<tr><td>X-border capacity</td><td colspan="3">Firm technical capacity as provided by TSOs</td></tr>
</table>

Supply definition of new import route under High Daily Demand Day conditions

When a new import infrastructure will come on stream in comparison with last winter, initialisation methodology has been:

- Supply route maximum load factor: average of maximum load factor of the other routes coming from the same supply source
- Update of the supply share: supply is increased based on the prorate between the sum of route maximum flows and supply before the new route comes on stream



Maximum flow of the new infrastructure:

$$X = [(80 + 100) / (100 + 150)] \times 50 = 36 \text{ GWh/d}$$

Update supply provided to Europe by Producing Country 1:

$$Y = [(80 + 100 + 36) / (80 + 100)] \times 160 = 192 \text{ GWh/d}$$

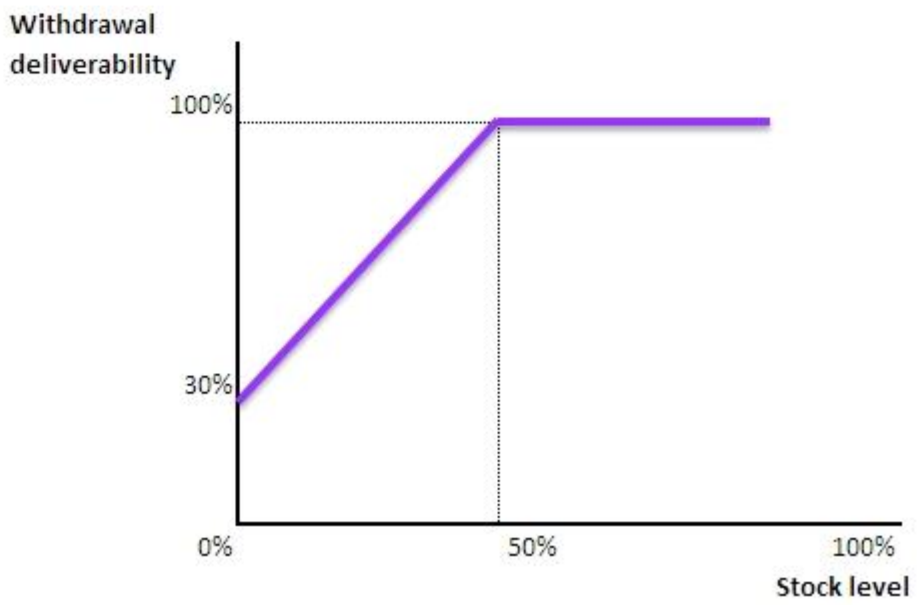
This supply approach for new infrastructure favours imports against UGS as they are used as last resort supply. Regarding potential physical congestion, this is a conservative approach as imported gas has to be transported on longer distance.
Actual use of new infrastructure will be factored in next report through historical value serving as a basis of the whole supply approach.

Annex B

Under Ground Storages assumptions and outputs

UGS deliverability curve

In order to capture the influence of UGS stock level on the withdrawal capacity, ENTSOG has used a standard curve not considering at this stage differences between aquifers, salt caverns and depleted fields. Nevertheless the curve being conservative it still guarantees trustful results.



Winter 2011-2012 stock evolution according modelled scenarios

Below table provides the picture of UGS stock evolution under Results of Supply vs. Demand balance over the Winter 2011/2012 (volume perspective):

Stock level at the of each month		Sept. 2011	Oct. 2011	Nov. 2011	Dec. 2011	Jan. 2012	Feb. 2012	Mar. 2012
Reference CA		91%	93%	86%	75%	60%	48%	42%
Cold Winter	UGS only		88%	75%	56%	33%	14%	1%
	Imports & UGS		90%	78%	61%	41%	23%	13%
Warm Winter	UGS only		98%	97%	94%	87%	83%	83%
	Imports & UGS		96%	94%	88%	79%	72%	71%

Annex C

Data for Winter Supply Outlook 2011-2012

Demand forecast

GWh/d	Average Demand						High Daily Demand	
	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Jan 2012	Mar 2012
AT	298	331	418	433	416	334	664	664
BE	1,012	1,125	1,192	1,205	1,195	1,133	1,572	1,404
BG	67	86	117	134	130	107	174	166
HR	35	33	31	25	33	29	132	112
CZ	244	344	421	469	440	366	712	600
DK	108	146	167	174	174	148	183	170
EE	19	26	30	31	30	26	56	48
FI	104	135	142	160	165	144	216	205
FRn	1,217	1,912	2,259	2,275	2,158	1,855	2,721	2,051
FRs							1,127	849
FRt	83	131	155	156	148	127	316	269
FY	14	18	21	22	21	18	13	11
DE	2,410	3,140	3,680	3,880	3,740	3,170	5,495	4,400
GR	137	148	152	161	152	147	247	241
HU	300	401	595	572	573	426	709	577
IE	139	153	180	174	178	150	279	195
IT	2013	2777	3443	3709	3390	2864	5219	4492
LV	29	39	46	47	46	39	133	113
LT	81	108	137	131	147	120	157	142
LU	42	45	52	56	53	46	71	60

NL	1,194	1,411	1,926	1,900	1,786	1,449	4,681	4100
PL	404	480	548	593	547	521	781	649
PT	139	139	168	168	185	185	338	337
RO	346	465	575	588	573	492	825	700
RS	57	76	89	93	89	77	140	119
SK	109	187	235	271	265	198	349	281
SI	27	35	37	47	45	39	60	57
ES	938	1,271	1,302	1,285	1,255	1,152	2,075	1,764
SE	46	62	67	69	74	68	**90**	**77**
CH	77	95	123	127	117	94	187	159
UK	2,368	3,097	3,459	3,597	3,529	3,106	4,986	4,673
TK**	368	398	418	435	468	425	413	413
KAL**	37	45	55	60	64	58	59	59
Total	**14,462**	**18,859**	**22,240**	**23,047**	**22,186**	**19,113**	**35,180**	**30,151**

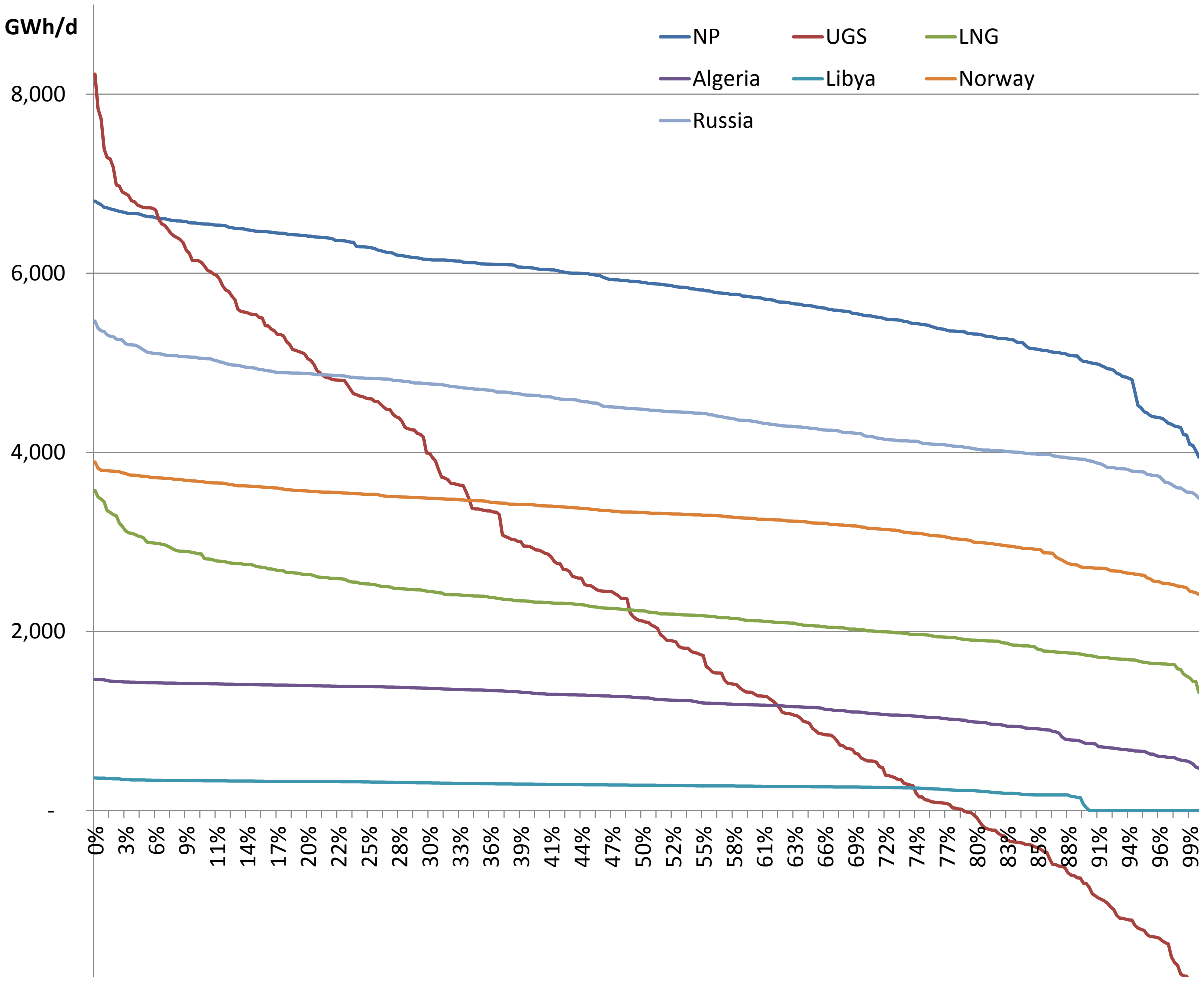
(*): France split into 3 blocks: GRTgaz North (FRn), GRTgaz South (FRs) and TIGF (FRt) balancing zones
(**): Export to Turkey and Kaliningrad

<u>Supply assumption</u>

GWh/d	**Average Supply**						**High Daily Supply**	
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Jan**	**Mar**
NP	4,894	5,611	6,235	6,201	6,195	5,738	6,805	
AL	833	1,090	1,185	1,308	1,289	1,356	1,580	
LI	272	245	277	294	266	169	349	
LNG	2,154	2,421	2,625	2,189	2,152	2,000	3,575	
NO	2,760	3,175	3,447	3,484	3,475	3,331	3,893	
RU	4,019	4,188	5,174	5,357	5,076	4,604	6,186	
Total	**14,932**	**16,730**	**18,943**	**18,833**	**18,453**	**17,198**	**22,388**	

Historical supply ranked by level

Below graph illustrates for each supply source, levels met last 2 winters and their occurrence:



This graph confirms the ENTSOG assumptions on:

- Supply level, as the highest values are in line with winter profiles of each source
- UGS being used as last resort supply as they are used as a flexibility tool

It could be also pointed out that the sharp profile of LNG when reaching the highest values is linked to its role of peak shaving through LNG tank in some countries. This storage function of some LNG terminals explains also the sharp decrease on the left hand side when facing low demand.

Zero values for Libya are explained by the fact that historical reference period covers the Green Stream shut down due to political events in the supplying country.

ENTSOG Seasonal Reviews:

Summer 2010

Winter 2010-11

Summer 2011 (preliminary considerations)

Executive Summary

ENTSOG has completed the review of the European gas supply and demand pictures for Summer 2010 and Winter 2010/11 investigating actual demand and supply on the 6-month periods from April to September 2010; October 2010 to September 2011. A qualitative analysis of Summer 2011 (April to September 2011) is also included prior to the publication of the full review next year in parallel of Summer Supply Outlook 2012.

The report aims to provide an overview of European trends that could not be captured at a national level and to build experience for future reports (mostly Seasonal Outlooks and TYNDP). This report should not be seen as a direct review of the Seasonal Outlooks as outlooks do not aim to provide a forecast but to better explore infrastructure resilience.

Regarding European dynamics, the report highlights the wide heterogeneity of national demand profiles and supply sources. These differences are directly linked to physical rationales such as climate, demand breakdown or producing field flexibility for example.

Producing this pilot report, ENTSOG also aims at making a first proposal in order to foster stakeholders' feedback. Stakeholder feedback is of a particular importance when supply and injection analysis is beyond the usual scope of TSOs activities.

Introduction

With this report ENTSOG aims at providing a European overview of demand and supply balance during Summer 2010 (April to September 2010) and Winter 2010-11 (October 2010 to March 2011). Some preliminary considerations on Summer 2011 (April to September 2011) are also included, in particular events that could have some influence on the following season Winter 2011-2012 (October 2011 to March 2012). The considered geographical scope includes EU-27 plus Croatia, FYROM, Serbia and Switzerland.

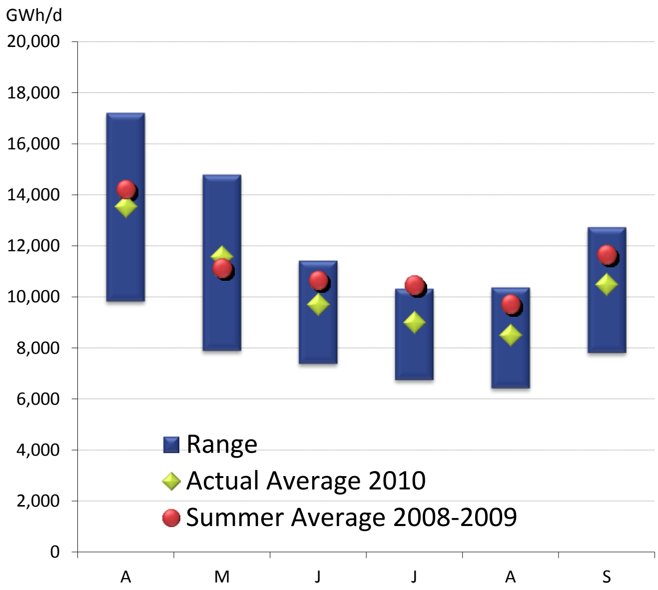
A bottom-up approach along with a top-down analysis methodology have been used in order to identify potential regional and supply specificities that a straight forward top-down approach or national reports would have missed. All the data used in this report come from TSOs except UGS stock levels coming from GSE Aggregated Gas Storage Inventory (AGSI) platform.

Summer 2010 Review

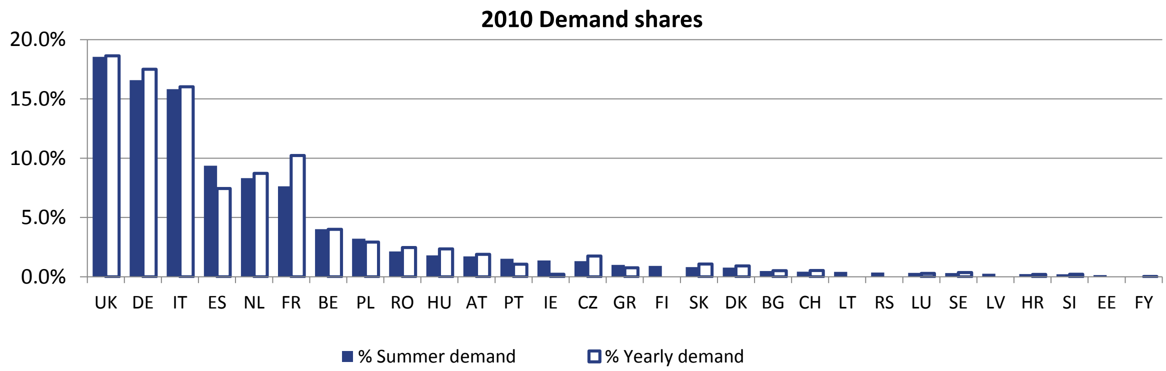
Demand

Actual 2010 Summer demand was moderately lower (-8%) than the value used within the Summer Outlook 2010, where the average demand of the respective months of 2008 and 2009 was considered as an approximation of the (1 in 2) summer demand.

The graph reflects the difference of Summer 2010 with the 2 previous summers (both under a climatic and an economic perspective). This deviation was neither homogeneous over the summer, achieving the higher differences in July (-16%), nor throughout Europe, where the deviation at country level could range between -24% and +848%.



The effect of a country forecast deviation on the European forecasts accuracy is determined by the weight of its demand in the total European demand.



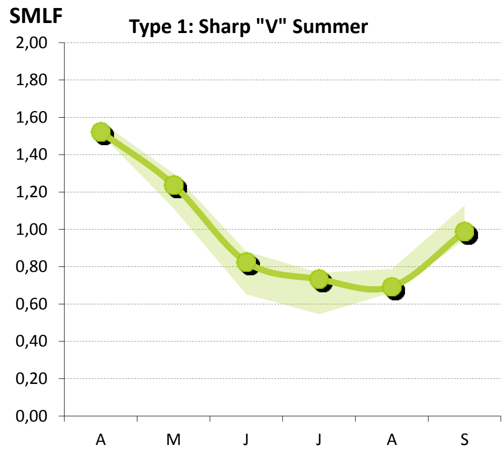
The weight distribution during the summer months and the yearly demand distribution are slightly different due to the changing demand composition and weather specificities across Europe, e.g. in 2010 the natural gas demand of France was the 4th biggest in Europe, after the UK, Germany and Italy, but as its main demand component is residential demand, which is highly dependent on heating needs, during the warmer summer months France's demand falls into 6th place in the European ranking.

The demand composition and weather specificities have effect not only over the summer vs. winter demand distribution. It also determines the curve followed by the demand along the summer months. Defining the "Summer monthly load factor" (SMLF) as the relation between a summer month daily average demand and the summer daily average demand, three different demand patterns can be distinguished for Summer 2010. Such classification is based on the qualitative analysis of Summer 2010 and could vary from one year to another.

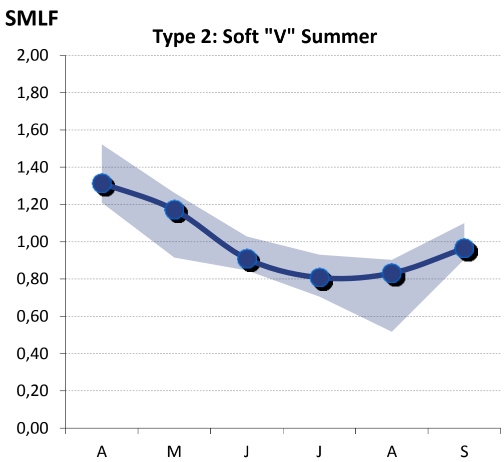
For each pattern, a graph provides the average SMLF monthly value with the envelope showing the lowest and highest SMLF values of the countries following each pattern per month.

Average monthly SMLF SMLF envelope

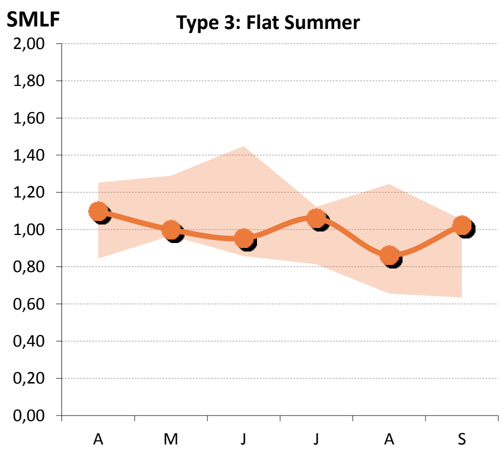
- *Type 1: Sharp "V" Summer:* High share of residential demand in the demand composition combined with cold "summer-shoulder" months (April, May and September) may explain a well-defined "v" pattern. This is the pattern shown by summer demand in Czech Republic, Denmark, France, Lithuania and Slovakia, accounting for 11% of the European summer gas demand.



- *Type 2: Soft "V" Summer:* Similar to type 1; moderately cold "summer-shoulder" months and a lower share of residential demand in the demand composition, may explain a softer "v" summer pattern. Summer demand of Austria, Belgium, Bulgaria, Germany, Hungary, Luxemburg, Netherlands, Poland, Romania, Slovenia, Sweden, Switzerland and UK follow a soft "V" pattern accounting for 59% of the European summer gas demand.



- *Type 3: Flat Summer:* Warm "summer-shoulder" months with low heating requirements, combined with a high share of gas demand for power generation in the demand composition possibly driven by a high use of air conditioning during June, July and August, may explain a quite flat demand during the summer months. This pattern accounts for 30% of the European summer demand from Croatia, Bosnia and FYROM, Greece, Italy, Ireland, Portugal and Spain.

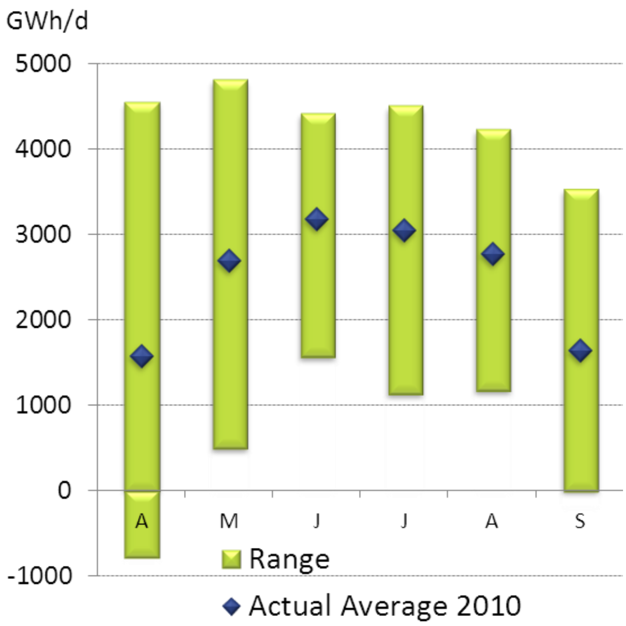


Underground gas storage

Injection season development depends on many factors in particular the willingness of shippers to inject gas and the actual amount of gas available for injection when considering gas demand. The first factor may be linked to price signals such as summer-winter spread unless the national regulatory framework implies some mandatory injection. The second one is linked to climatic and economic considerations having an impact on gas demand.

The next graph provides for every month of the Summer 2010 the average injection and the daily range between the lowest and highest injection for the whole Europe.

It is noticeable that the injection range was higher for April, May and September. This is likely linked to the wide temperature range that occurs during these shoulder months impacting gas availability for injection (with even some net withdrawal across Europe in April).



The next table provides the level of stock on 30 September 2010 for the GSE operator areas (source GSE AGSI platform).

It is to be noted that for many operators, injection continued in October 2010.

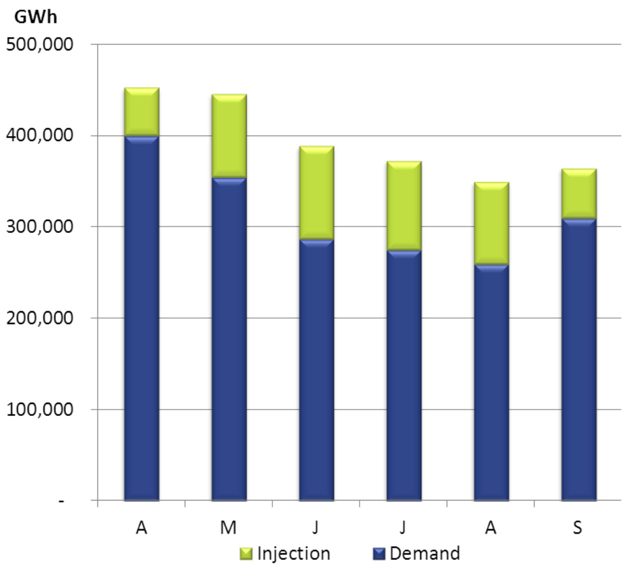
**: Areas are the ones defined under the AGSI platform*

Hub areas *	Countries	Level on 30 Sept. 2010
Baumgarten	AT,CZ,SK,HU	92%
France	FR	84%
Germany	DE	93%
Iberian	ES	92%
NBP	UK	87%
PSV	IT	90%
TTF (Eurohub)	NL, DK	87%
Zeebrugge	BE	91%

Transported gas

The overall transported gas at the EU aggregated level is the sum of gas demand and injection for each month excluding transit to non-EU countries.

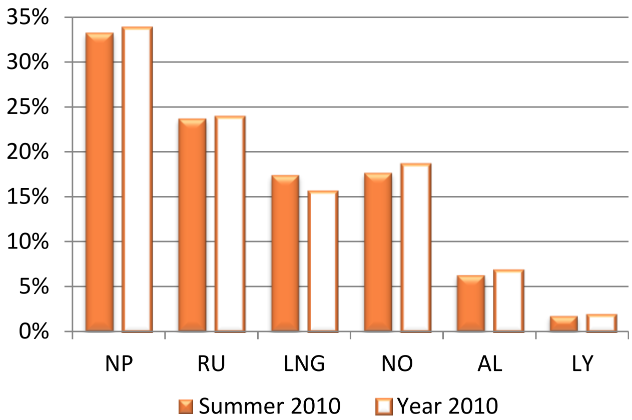
The graph shows the basic connection between demand level and injection.



In April and May, while injection capacity availability is high, a large part of the gas supply is being used to face demand, including significant withdrawals from storages occurring in early April. From June to August, demand is lower and injection capacity availability is still high (except for maintenance) so actual injection is higher. Also in September, a large part of gas is being used to face demand. In parallel, there is a lower availability of injection capacity depending on storage type and stock level.

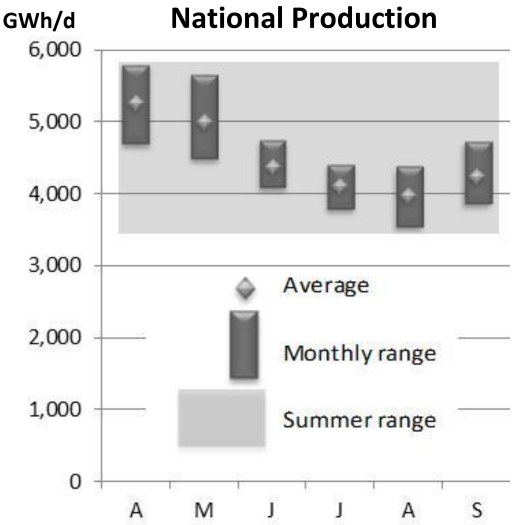
Supply

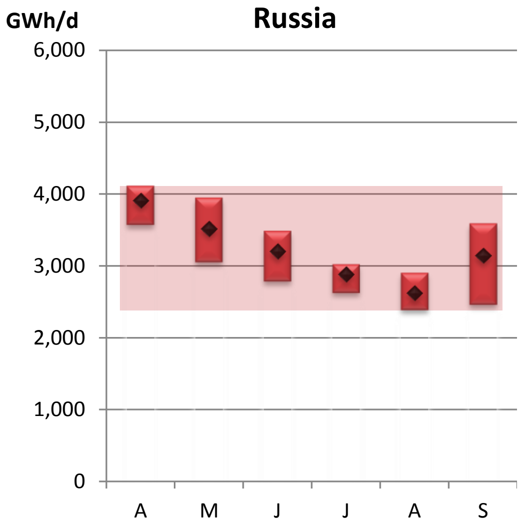
The next graph provides an overview of import and National Production supply shares during Summer and the whole year 2010 in relative terms.

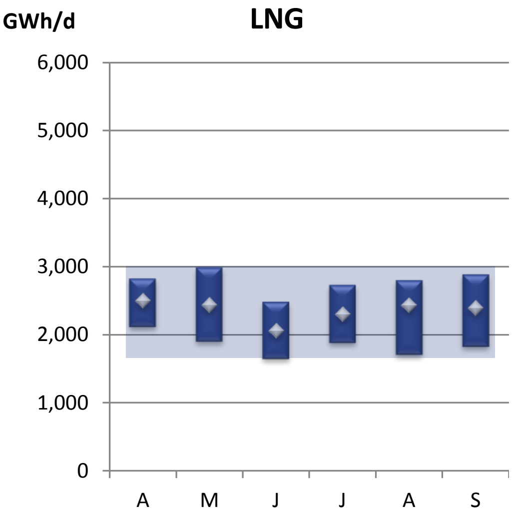


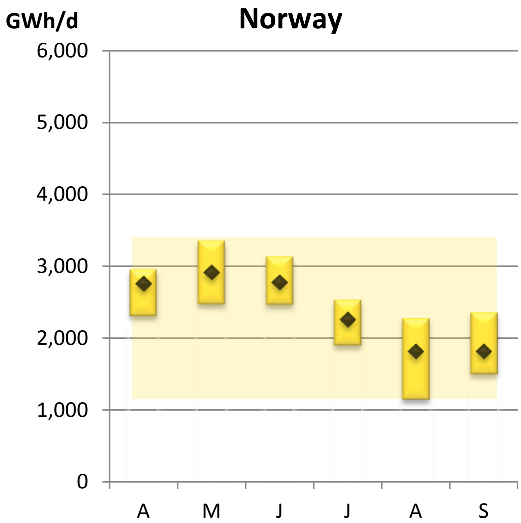
It is to be noted that some supply source shares differ slightly between the summer and the full year.

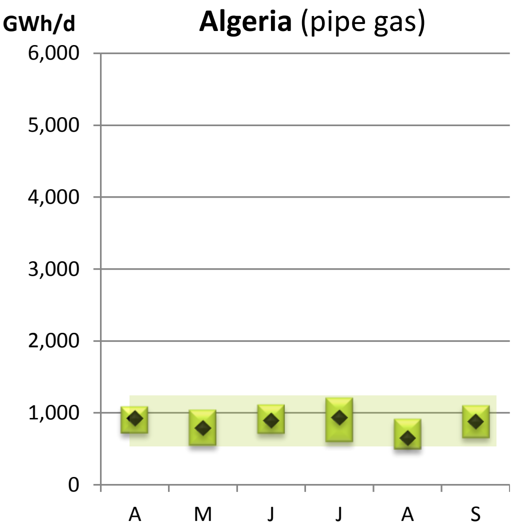
Sources contribute at different levels to European supply and their use is very different in term of seasonal and daily flexibility (linked among others to different underlying contractual flexibility). The graphs on the following page illustrate for each supply source and month the average flow and the monthly and seasonal range (between the lowest and highest daily flow of each month and for the whole Summer 2010):

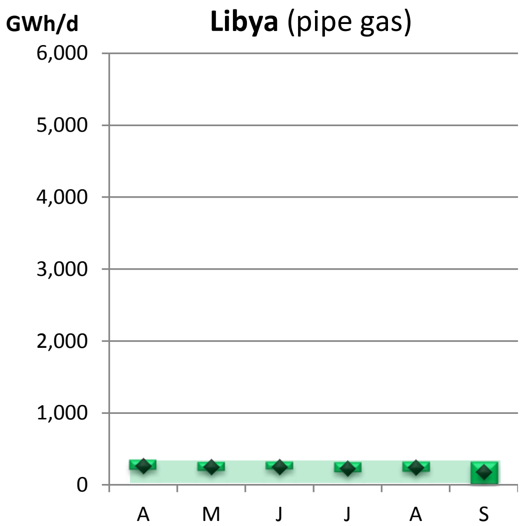










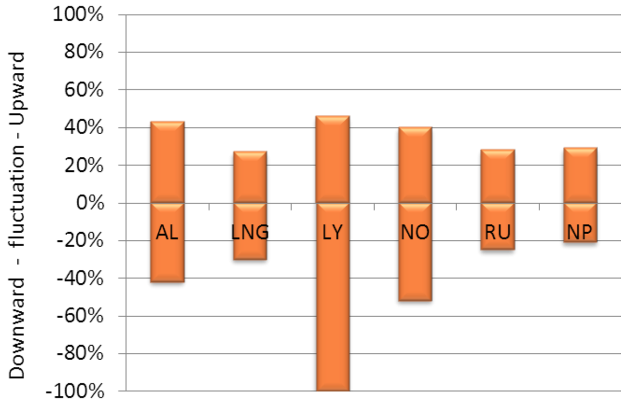


For each supply source two indicators measuring the actual supply fluctuation across the season have been defined as:

- The ratio between the highest daily flow compared to the average seasonal flow minus one (upward fluctuation)
- The ratio between the lowest daily flow compared to the average seasonal flow minus one (downward fluctuation)

The next graph provides an overview of indicators for each supply source during Summer 2010:

These indicators are impacted by many factors such as supply contract flexibility, maintenance, unexpected technical events etc.

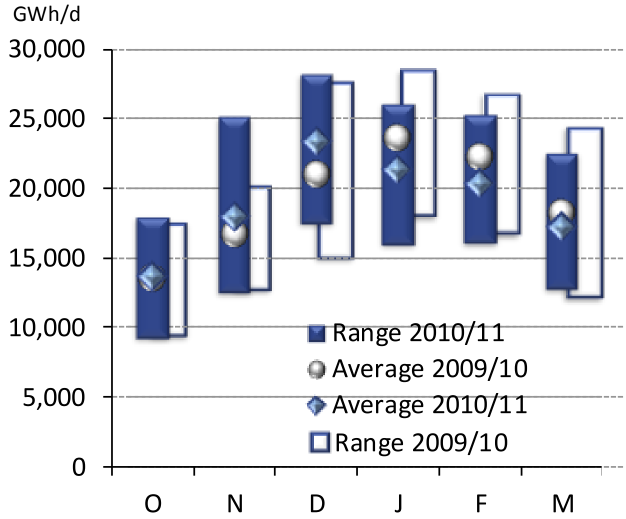


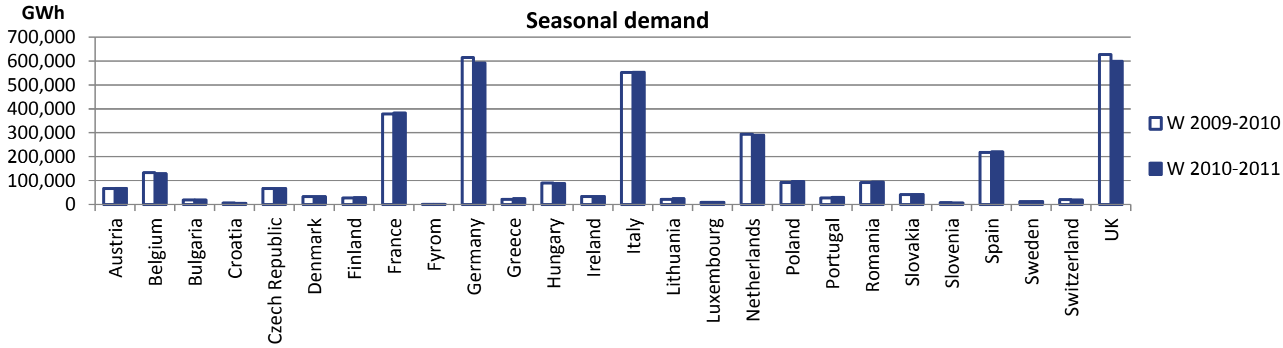
Winter 2010-11 Review

Demand

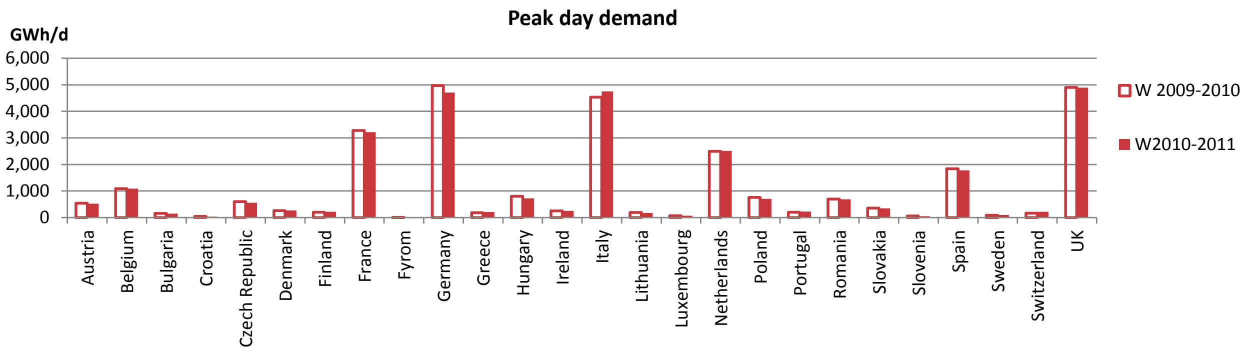
European 2010-2011 Winter demand was marginally lower (-1%) than the gas demand of the previous winter.

This deviation was neither homogeneous over the winter, achieving the highest differences in December (+11%) and January (-9%), nor throughout Europe, where the deviation at country level could range between -15% and +14%.



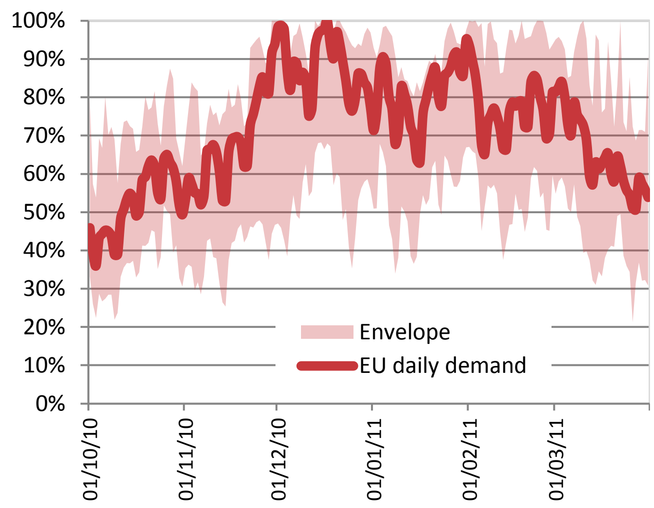


From the transmission system point of view, one of the most significant aspects of winter demand to be taken into account is the daily peak. During winter 2010/11 the European peak-day gas demand was reached on17 December 2010, and accounted for 26,568 GWh. This peak value was slightly lower (- 1%) than the 26,898 GWh consumed during the peak day of the previous winter (26/01/2010). As with seasonal gas demand, the deviation from the previous winter was not homogeneous through Europe. On a country level, differences ranged between -13% and +15%.



The next graph presents the daily behaviour of European gas demand in relation with the daily peak reached during winter 2010-11, while the pattern followed by individual countries is aggregated in the background envelope.

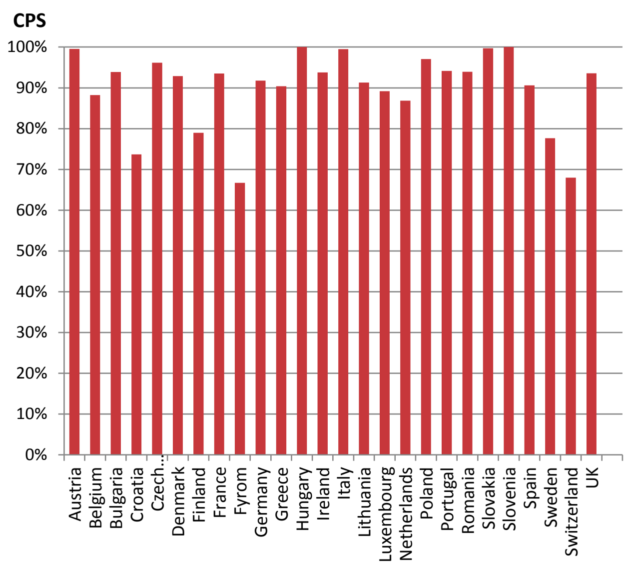
Along with an infrequent low demand level during mid-January, the graph shows the simultaneity of the individual country demand with the European peak, fluctuating between 70% and 100% of the respective country peak day demand.



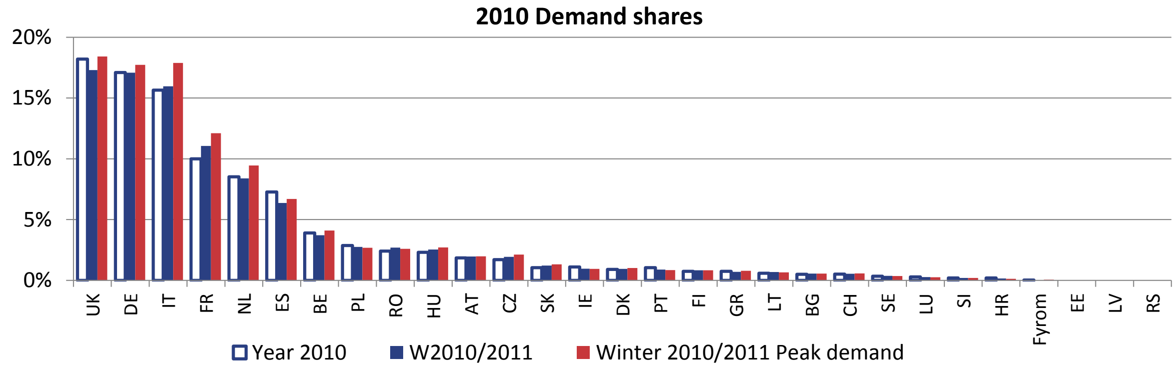
In order to measure the simultaneity between the peak days in different countries, the "Un-simultaneous Peak" is described as the sum of the peak day demands of the individual countries having occurred un-simultaneously, defining:

- The European peak simultaneity (EPS):
  - EPS = European Peak Demand / Un-simultaneous Peak (%)
- The simultaneity of an individual country in the European peak day (CPS):
  - CPS= Country demand on the European peak day/Country peak demand (%)

So defined, the European peak simultaneity during the peak day on 17th December 2010, was 94%, while the simultaneity of the individual countries ranged between 70% and 100%.

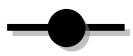


The weight of a country in the European demand may vary when considering yearly, seasonal or peak day demand, consequence of the demand breakdown and weather specificities in each country.

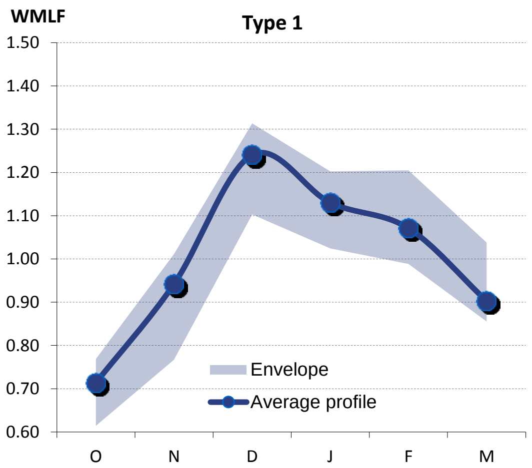


Besides, the demand composition and weather specificities determine the curve followed by the demand along the weather months. Defining the "Winter monthly load factor" (WMLF) as the relation between a winter month daily average demand and the winter daily average demand, two different demand patterns can be distinguished for Winterr2010/11. Such classification is based on the qualitative analysis of Winter 2010/11 and could vary from one year to another.

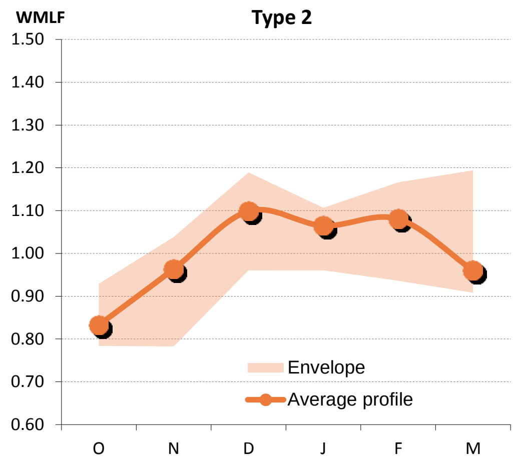
For each pattern, a graph provides the average WMLF monthly value with the envelope showing the lowest and highest WMLF values of the countries following each pattern per month.

 Average monthly WMLF  WMLF envelope

- *Type 1:* High share of residential demand in the demand composition combined with cold temperatures during the central months of the winter (December and January) may explain a well-defined "A" pattern. This is the pattern shown by winter demand in Belgium, Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Italy, Netherlands, Romania, Slovakia, Sweden, Switzerland and UK, accounting for 84% of the European winter gas demand.



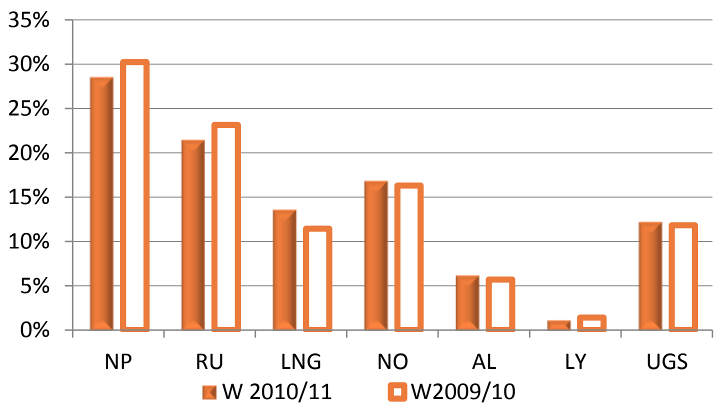
- *Type 2*: Either long winters, with similar heating requirements along the different months, or low shares of residential demand combined with soft winters could explain a flat "A" pattern. This is the pattern shown by winter demand in Austria, Finland, Greece, Ireland, Latvia, Luxembourg, Poland, Portugal, Slovenia and Spain, accounting for 16% of the European winter gas demand.



Supply

The next graph provides an overview of Import, National Production and UGS supply shares during Winters 2010/11 and 2009/10 in relative terms.

It is to be noted that supply source shares differ slightly between winters.

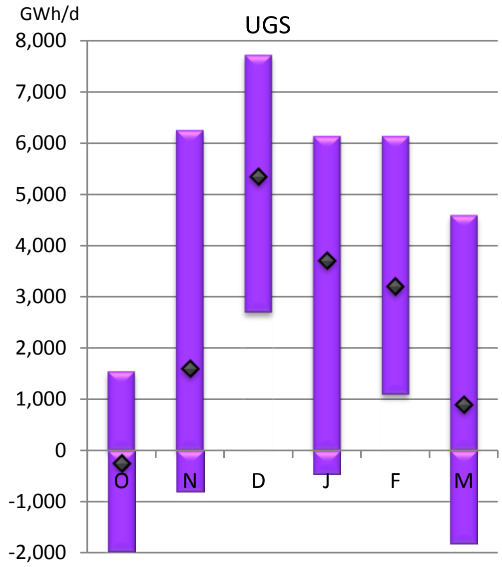


Sources contribute at different levels to European supply and their use is very different in term of seasonal and daily flexibility (linked among others to different underlying contractual flexibility).

Underground storage withdrawal season development depends on many factors in particular the willingness of shippers to withdraw gas and the actual amount of gas available in the underground storage facilities. The first factor may be linked to price signals such as summer-winter spread while the second one is linked to climatic and economic considerations having an impact on gas demand.

The next graph provides for every month of the Winter 2010-2011 the average withdrawal and the daily range between the lowest and highest withdrawal for the whole Europe.

The withdrawal range was considerably higher for November, January and March, supported by some net injection that was likely linked to the wide temperature range that occurs during the shoulder months of November and March and the unusually low demand levels observed in mid-January.

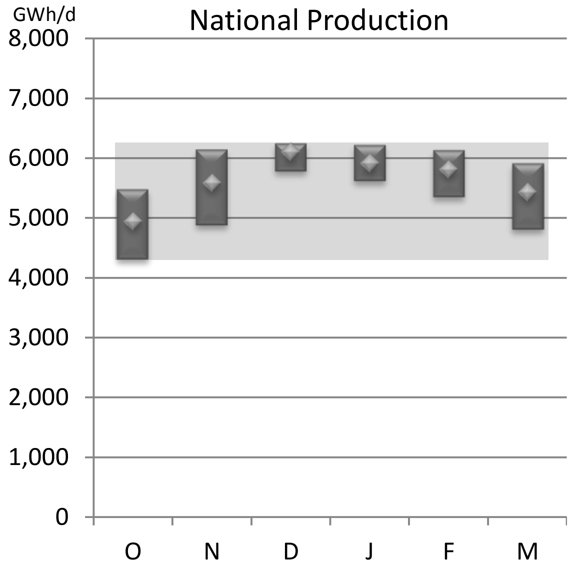


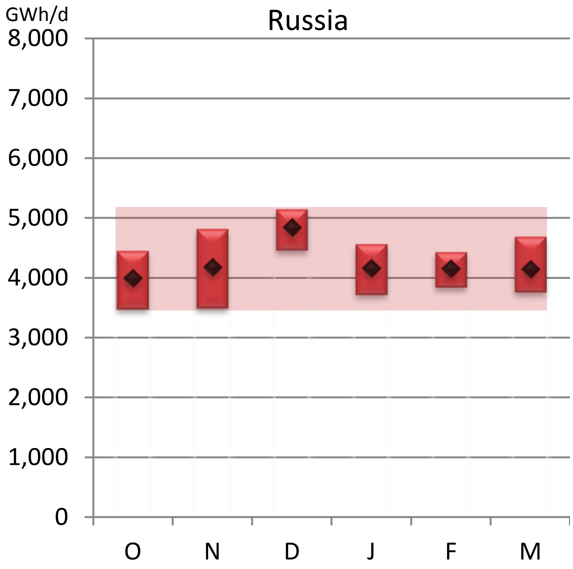
The next table provides the level of stock evolution during winter for the GSE operator areas (source GSE AGSI platform).

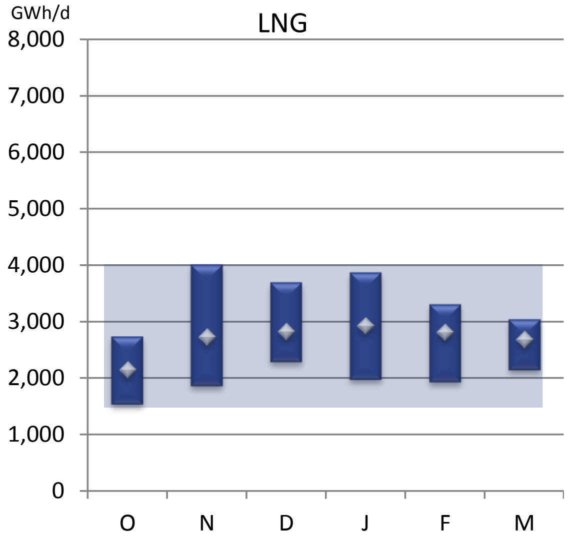
**: Areas are the ones defined under the AGSI platform*

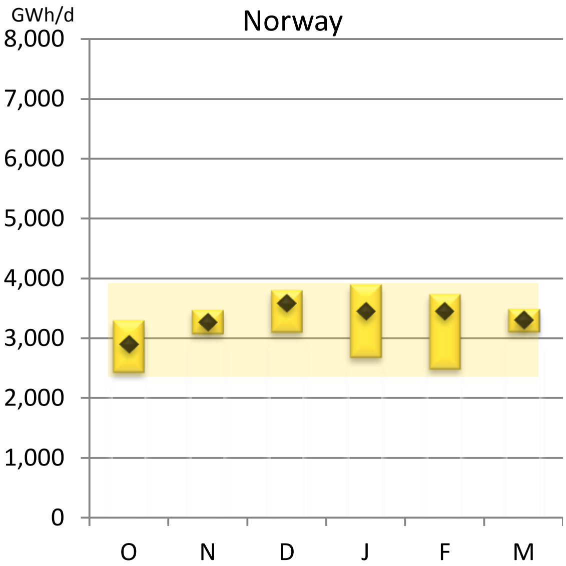
Hub area *		1-Oct-10	1-Nov-10	1-Dec-10	1-Jan-11	1-Feb-11	1-Mar-11	31-Mar-11
Baumgarten	AT, CZ, SK, HU	92 %	90 %	86 %	71 %	57 %	45 %	42 %
France	FR	84 %	88 %	73 %	48 %	31 %	20 %	23 %
Germany	DE	94 %	94 %	88 %	66 %	54 %	43 %	43 %
Iberian	ES	92 %	89 %	82 %	61 %	48 %	37 %	44 %
NBP	UK	87 %	87 %	76 %	46 %	33 %	27 %	33 %
PSV	IT	91 %	96 %	93 %	79 %	66 %	56 %	49 %
TTF	NL, DK	86 %	85 %	84 %	66 %	58 %	52 %	56 %
Zeebrugge	BE	92 %	94 %	88 %	72 %	53 %	34 %	17 %

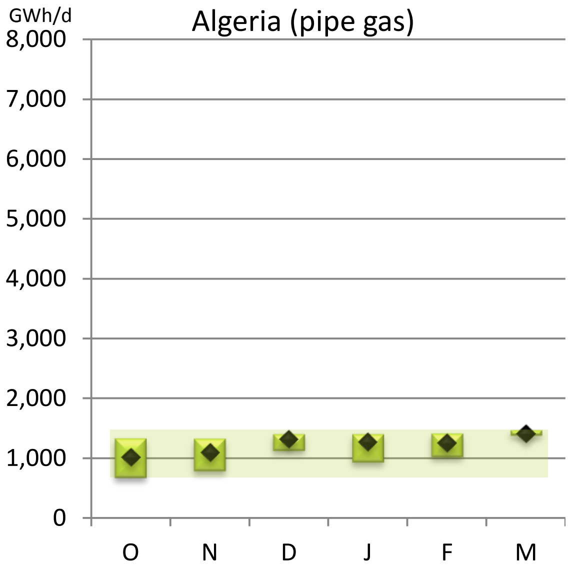
The following graphs illustrate for national production and each import supply source and month the average flow and the monthly and seasonal range (between the lowest and highest daily flow of each month and for the whole Winter 2010/11)

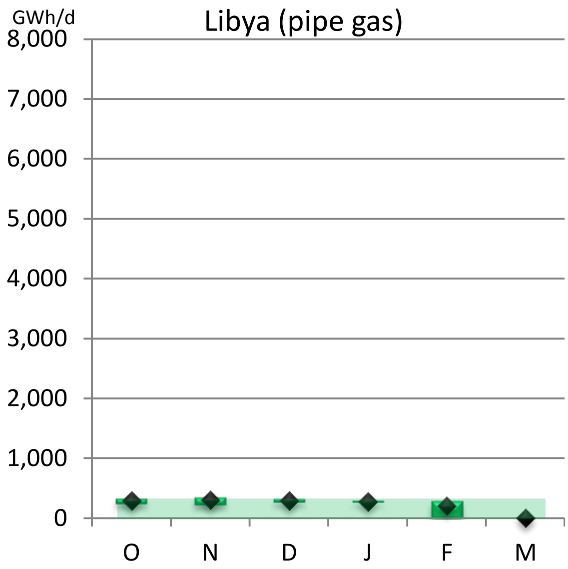

National Production
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M


Russia
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M


LNG
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M


Norway
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M

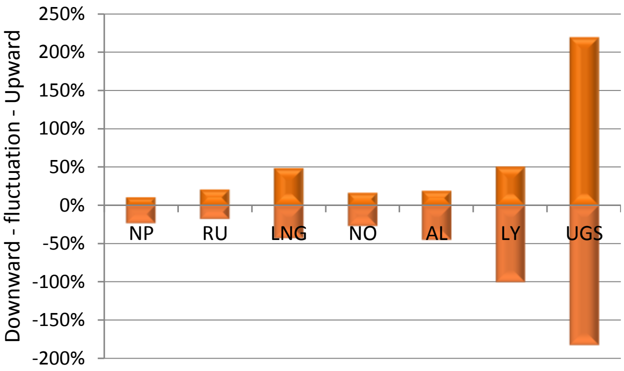

Algeria (pipe gas)
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M


Libya (pipe gas)
GWh/d
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
O
N
D
J
F
M

For each supply source two indicators measuring the actual supply fluctuation across the season have been defined as:

- The ratio between the highest daily flow compared to the average seasonal flow minus one (upward fluctuation)
- The ratio between the lowest daily flow compared to the average seasonal flow minus one (downward fluctuation)

The next graph provides an overview of indicators for each supply source during Winter 2010/11:



These indicators are impacted by many factors such as supply contract flexibility, unexpected technical and political events etc.

Summer 2011 (preliminary considerations)

Seasonal reviews aim both at:

- feeding the analysis of next respective season
- highlighting events and trends that could impact the following season

This preliminary review of Summer 2011 (April to September 2011), identifies events that could have some impact on Winter 2011/2012 (October 2011 to March 2012) in addition to the stock level reached on 1 October 2011.

Potential trend in aggregated European gas demand

Demand was lower at the beginning and the end of Summer 2011 while it was at approximately the same level as last year from June to August. Such a difference could be explained by a stable economic situation and warm temperatures.

New import infrastructures

Medgaz commercial operation

Commercial operation started on 1 April 2011, and flows increased over the Summer by 13% and 44% in comparison with Summer 2009 and 2010 respectively. This new import route to Europe seems to bring additional gas as total Algerian pipe gas exports have increased by 8% and 3% in comparison with Summer 2009 and 2010 respectively.
This new infrastructure brings 260 GWh/d of additional import capacity.

Gate LNG Terminal

Official opening and commercial operations took place on 23 September 2011. This new infrastructure brings 365 GWh/d of additional import capacity.

Supply and infrastructure disturbances

Green Stream halted flows

Political events in Libya have halted pipe operation since 22 February 2011. Situation remained the same over the course of Summer 2011 not impacting the ability of the Italian UGS to reach stock levels higher than in the last 2 Summers.
Flows might resume during the course of the Winter.

Impact on Winter 2011-2012

The above elements show that, notwithstanding extraordinary events or change in demand trends, European gas market is well prepared for the winter.

Conclusions

The Seasonal Reviews highlight the value of a bottom-up approach as a way to capture national or supply specificities that could be factored in future top-down approaches.

In this regard, the review illustrates how different demand can be depending on the climate and the demand breakdown.

The same diversity can be found on the supply side where some supply sources follow a seasonal strong modulation while others remain flat. The range of use in a given month is also very different.

This report provides a mostly quantitative analysis and intends to be the basis of fruitful discussion with stakeholders on the orientation to be given to such report. Stakeholder feedback is crucial as a large part of the seasonal analysis is beyond TSOs scope.

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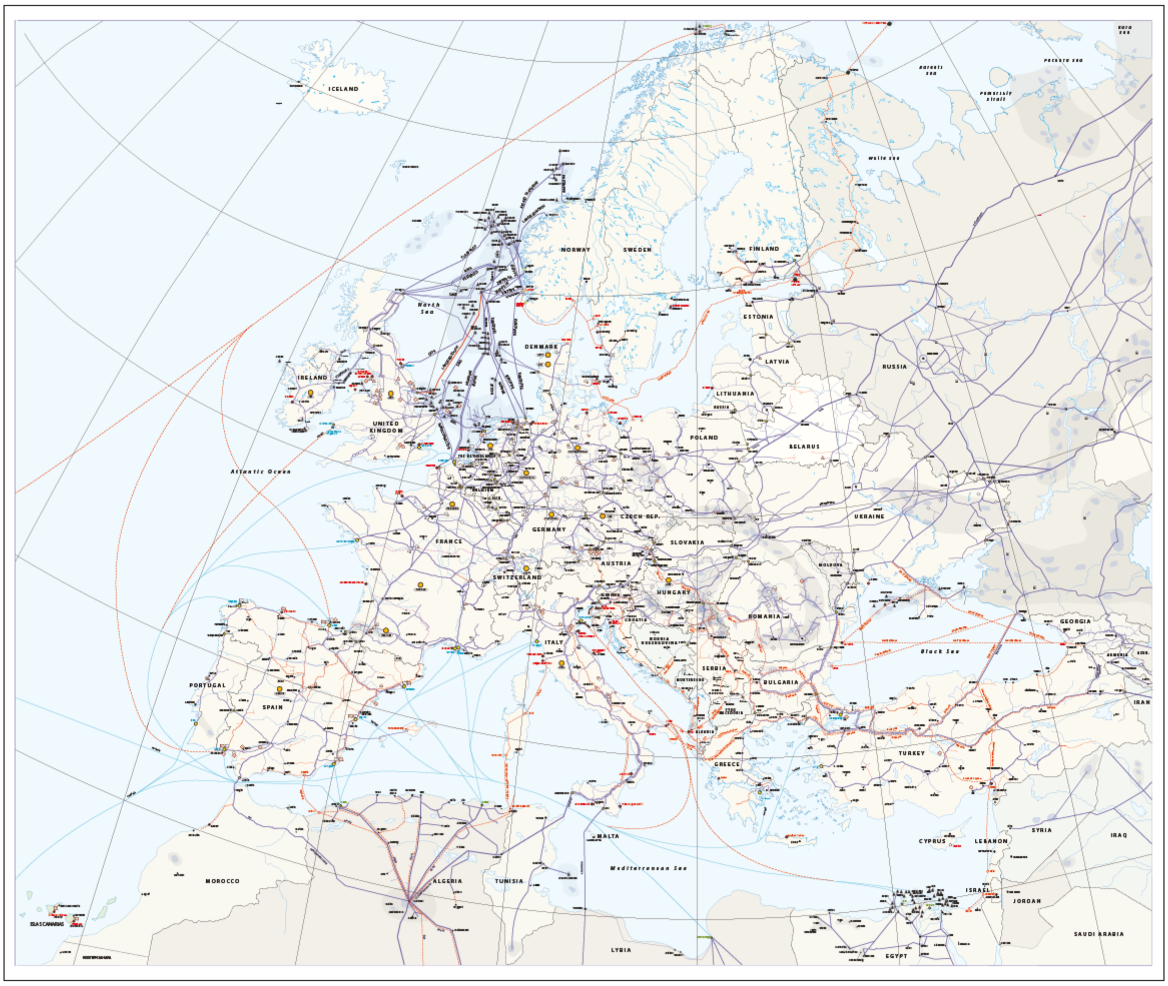
ENTSOG has prepared the Winter Supply Outlook and the seasonal Reviews in good faith and has endeavoured to prepare this document in a manner which is, as far as reasonably possible, objective, using information collected and compiled by ENTSOG from its members and from stakeholders together with its own assumptions on the usage of the gas transmission system. While ENTSOG has not sought to mislead any person as to the contents of this document, readers should rely on their own information (and not on the information contained in this document) when determining their respective commercial positions. ENTSOG accepts no liability for any loss or damage incurred as a result of relying upon or using the information contained in this document.



ENTSOG AISBL

Av. de Cortenbergh, 100
1000 Brussels
Belgium
T: + 32 2 894 5100
EML: info@entsog.eu