



Interconnector

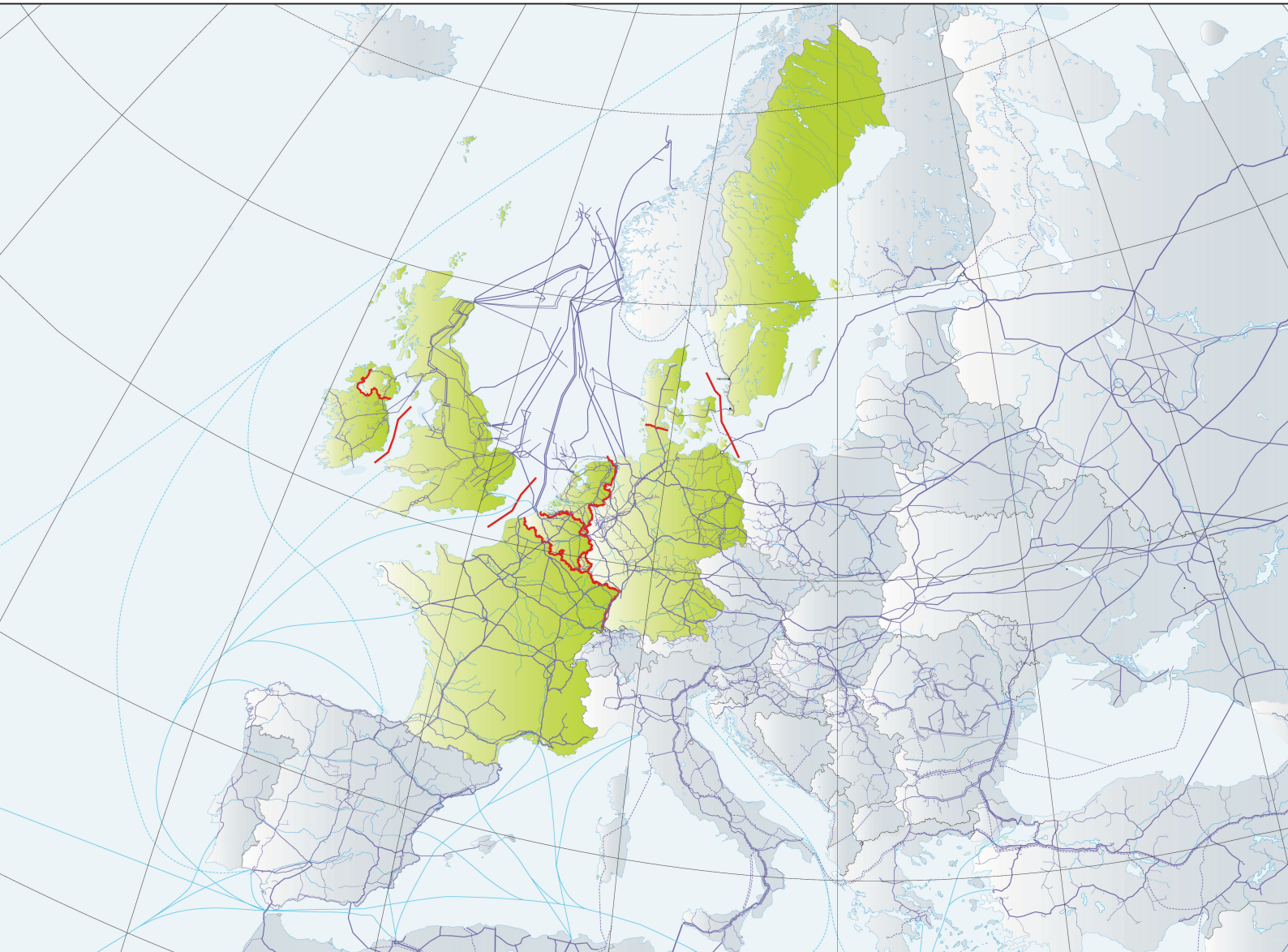
nationalgrid



ontras  
VNG Gastransport GmbH



Open Grid Europe  
The Gas Wheel



# North West Gas Regional Investment Plan

## 2011 - 2020

## Table of contents



© Image courtesy of Media Fluxys

### Table of content

1. Foreword .....	3
2. Introduction .....	4
3. North West Europe Specifics .....	5
4. Supply & Demand .....	7
5. Transmission Projects .....	13
6. Conclusions and the Way Forward .....	16

APPENDIX I : GRIP North West detailed projects .....	18
APPENDIX II : Country profiles .....	35
APPENDIX III : Border Review .....	51

### List of Figures

Figure 1: NW peak demand, gas and electricity .....	6
Figure 2: Total Supply Potential for Europe outlook 2011-2020 .....	8
Figure 3: Share of NW region in EU Demand .....	9
Figure 4: Comparison demand and supply potential NW-EU .....	10
Figure 5: Gas prices in Europe : hubs vs LT (€/MWh) .....	12

## 1. Foreword



© Image courtesy of National Grid

The European Union is now importing a major part of its gas demand, 62% in 2011 and forecast to rise to 78% in 2021<sup>[1]</sup>. The importation of gas from outside the EU has been occurring for many years, and as such Transmissions System Operators (TSOs) have been cooperating for decades in order to ensure there is sufficient cross border capacity available. The close interaction and cooperation between European TSOs has been crucial for supporting market integration and developing the security of supply of all Member States.

At a European level the Transmission System Operators have worked together in order to fulfil the European Network of Transmission System Operators for Gas (ENTSOG) obligation to produce the Community-wide Ten-Year Network Development Plan (TYNDP) for the period 2011-2020, this TYNDP was published on 17th February 2011 and is available on the ENTSOG website<sup>[2]</sup>.

The requirement to promote regional cooperation has now been enshrined in European law through the European Directive 2009/73/EC in Article 7 and further detailed by the European Regulation 715/2009 in Article 12. Transmission System Operators will now publish every two years, a Gas Regional Investment Plan (GRIP) based on regional co-operation, which will contribute towards the fulfilment of tasks listed in the Gas Directive and Gas Regulation<sup>[3]</sup>.

This North West Gas Regional Investment Plan (NW GRIP) serves to fulfil the requirements of Regulation 715/2009 and its primary objectives are to create an awareness of infrastructure developments within the North West region of Europe and to provide sound basis for subsequent NW GRIPs. The Transmissions System Operators of the North West region believe that this document will provide useful information to stakeholders and will support informed discussion in assessing the ability of investment projects to answer regional market needs.

This is the first such edition of the NW GRIP and as such it should be acknowledged that this first publication is intended to present a foundation upon which subsequent reports can be developed. It is anticipated that the format and content of the GRIP will change over time. The NW region GRIP working group would welcome any comments, advice or feedback that will assist in improving the effectiveness of the document in the future.

[1] ENTSOG TYNDP Figures

[2] Available at : [www.entsog.eu/publications/index\\_g\\_investment.html](http://www.entsog.eu/publications/index_g_investment.html).

[3] The 'Gas Directive' is European Directive 2009/73/EC and the 'Gas Regulation' is European Regulation 715/200

## 2. Introduction



© Image courtesy of National Grid

This North West Gas Regional Investment Plan (NW GRIP) aims to provide the most recent information on the transmission projects in the NW region. The core focus of the NW GRIP has been to highlight how these projects impact the Interconnection Points within the NW region, along with the entry points into the region from countries where gas is directly imported from outside the EU<sup>[4]</sup>.

With this document, the TSOs of the NW region wish to facilitate the market by showing which projects to support in order to increase the interconnectivity on specific cross border points.

With the use of a matrix, this report lists the Interconnection Points affected by transmission projects. Further details about the different projects and national networks can be found in the annexes to this report.

This Gas Regional Investment Plan covers gas transmission projects in North West Europe, from the countries: Belgium, Denmark, the Republic of Ireland, Germany, France, Luxemburg, the Netherlands, Sweden and the United Kingdom.

[4] The TSOs of the North West region understand that EU Regulation 994/2010 concerning measures to safeguard security of gas supply is currently being implemented by respective member state competent authorities (CAs). The TSOs wish to respect the role and obligations of the CAs, especially with regard to the publication of the National Risk Assessments. With CAs publishing their Risk Assessments in late 2011, this GRIP has not attempted to identify potential risks. In following editions this aspect might be included. This GRIP should therefore be seen as a snapshot that can and will be reviewed based on new insights and factual information.

### 3. North West Europe Specifics



© Image courtesy of Media Fluxys

#### The North West European Region

The North West region is internally well connected in terms of gas transmission infrastructure; it is a relatively mature region, with a stable and secure history of cross border co-operation.

The North West region had a central role in the formation of the European gas market, beginning in 1959 with the discovery of the Groningen field in the Netherlands, followed a few years later by the first discoveries of gas in the UK sector of the North Sea. During the 1960s and 1970s the demand for natural gas increased dramatically, especially in France and Germany, which meant that European demand started to outpace indigenous production. The increased demand, and requirement for imported gas resulted in the NW cross border gas transportation grid being built. Denmark and Sweden joined the grid in the 1980s based on North Sea production with the surplus exported to Germany and the Netherlands.

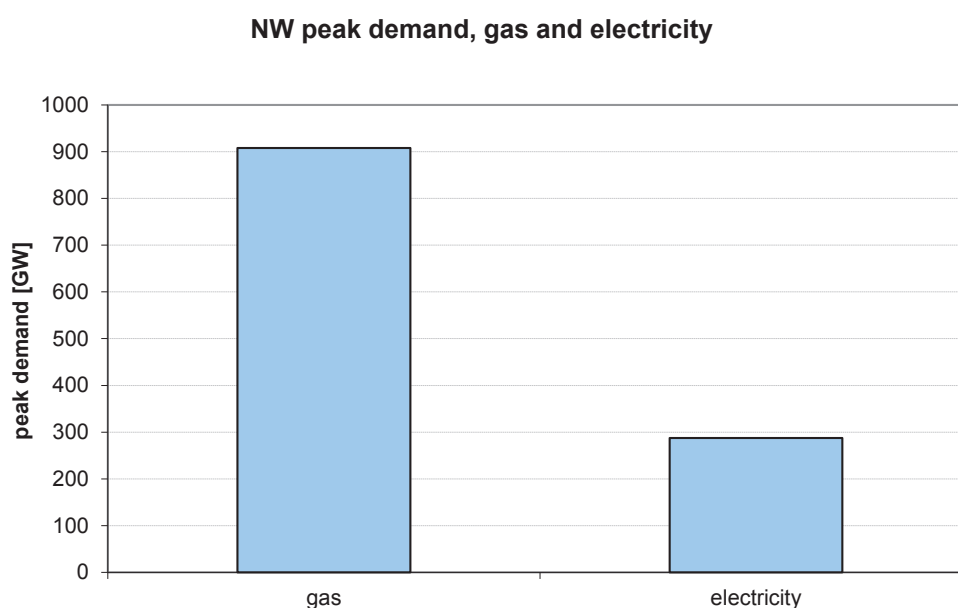
The North West region gas transportation grid was built to transport indigenous production from Dutch and UK gas fields to regional demand centres. Yet due to dwindling indigenous production, the requirement to source gas from further afield became a necessity resulting in infrastructure projects undertaken to bring gas to the North West region from Norway and Russia (e.g. Langeled,

Nordstream). In order to diversify supply sources further there has been an increasing trend to build LNG supply terminals within North West Europe, utilising gas fields all over the globe, but especially tapping into the vast resources of Qatar (e.g. Fos, Dunkerque, Zeebrugge, GATE, Milford Haven). With more and more gas supplies originating from distant sources additional local swing is required, through an increase in Storage capacity, (e.g. Bergermeer and Loenhout). In order to provide the whole of the North West region with sufficient molecules and swing capacity, Interconnection Points within the region were required and expanded.

Currently the North West region has one of the worlds' highest levels of gas penetration in households, industries and power plants. The North West market represents approximately 50-60% of the total EU27 peak gas demand. The importance of gas in this region is illustrated by the fact that peak gas demand is about three times higher than peak electricity demand as shown in the graph below. The North West region is interconnected by an extensive infrastructure of pipelines, storages and LNG terminals, which is able to supply three times as much energy to the market as the existing electricity network.

With regards to the North West region, the ENTSOG Ten Year Network Development Plan (TYNDP) identified that investment gaps were limited to Luxemburg and the Denmark-Sweden region needing better interconnection to the rest of Europe.

However, it should be noted that, as clearly expressed in the TYNDP, the model used to signal potential investment gaps was based on the (simplified) assumption that each country is a single de-coupled entry/exit zone. National plans also address a



Source: ENTSOG TYNDP 2011 (gas) and Eurelectric, Power Statistics, 2010 edition, (electricity)

Figure 1: NW peak demand, gas and electricity

myriad of investment requirements, from potential within country bottlenecks, to gas quality issues to increasing network flexibility to ensure binding EU targets are met.

The TYNDP presented a long list of planned (FID) and foreseen (non-FID) infrastructure projects in the North West region. The North West region is still seen as a positive proposition for investors, however continued success in this regard is far from guaranteed and is becoming more and more of a challenge. Existing and future infrastructure projects will only come online if there is:

- a) Stable investment climate, ensuring that system owners are incentivised to invest in infrastructure projects
- b) Favourable regulatory framework (in the project's definition, execution and operation phase).

The resilience of the European network was assessed in the recent TYNDP. Specifically for the North West region, it was concluded that the network is resilient to specific disruptions and that portfolio diversification will be further improved when currently non-FID projects come on line. For the purpose of this first North West GRIP, no further network modelling analysis has been carried out.

To support a better understanding of the specifics of the gas-intensive North West region a supply and demand analysis has been included; detailing and elaborating the TYNDP 2011 data.

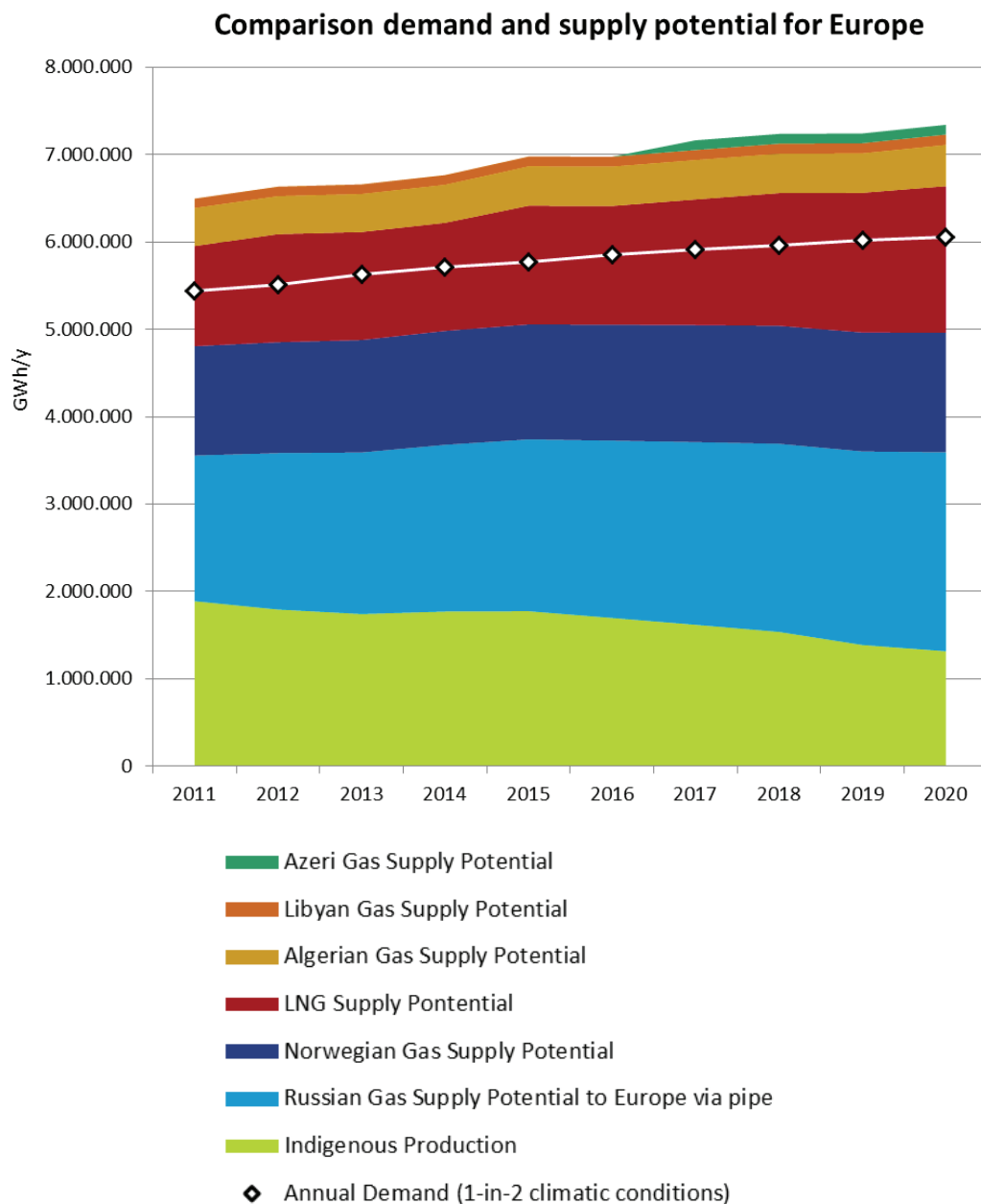
## 4. Supply & Demand



### European background

The potential European production of gas declines over the next 10 years, based on the information provided to the TYNDP. Simultaneously, annual demand scenarios provided by TSOs show demand rising over the same 10 year period, thus with declining indigenous production combined with

ever higher demand levels, it is clear that the European reliance on imported gas will continue. The following graph taken from the TYNDP shows the aggregate supply potential for Europe combined with the ENTSG demand outlook on a yearly basis.



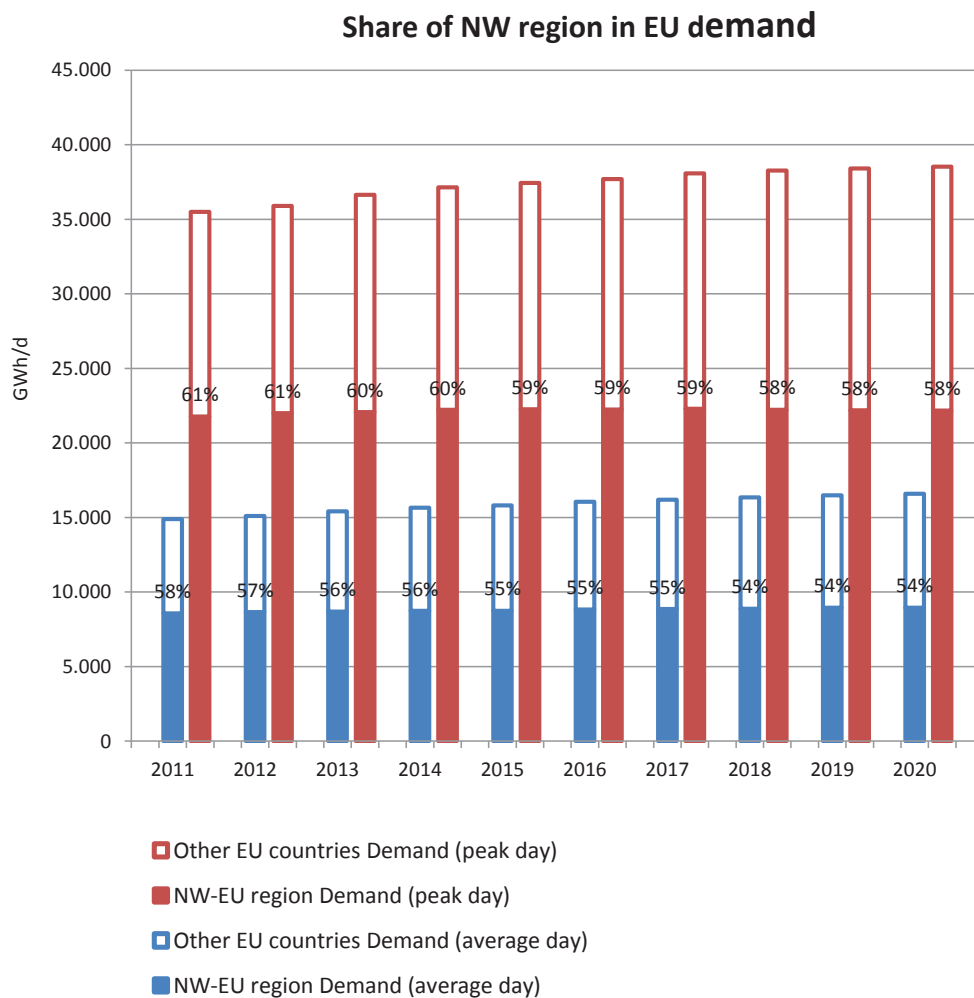
Source: ENTSG TYNDP 2011 – Annex C

Figure 2: Total Supply Potential for Europe outlook 2011-2020

### North Western Europe

The following graph shows the importance of the North West region in the European demand mix, based on the scenarios presented in the TYNDP. The North West region accounts for approximately

50% to 60% of the total European demand, (on an average and peak demand day), and this level of demand is expected to continue over the coming ten-year period.

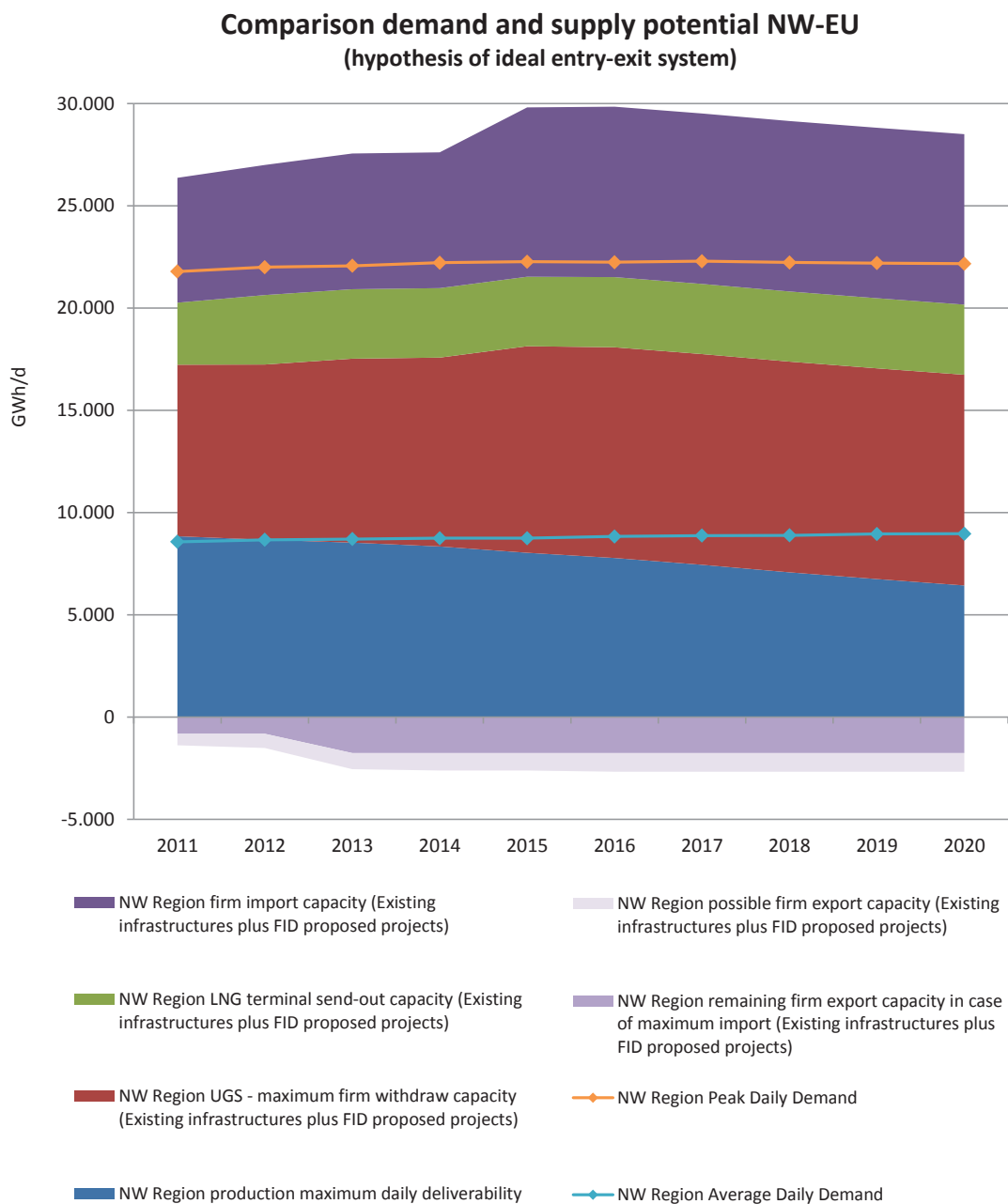


Source: ENTSOG TYNDP 2011 – Annex C

Figure 3: Share of NW region in EU demand

The following graph compares the demand levels with the potential supply capacity of the North West region. The supply capacities are split up by, National Production, Storage, LNG, and importation capacities from countries outside the region. The supply capacity shown in the chart is based on existing infrastructure and FID projects. Export capacities from the North West region are not considered in the equation but are provided as supplementary information under the horizontal axis, also intra

regional capacities are not taken into account in the below chart. The information shown is based on the North West region as a whole being considered an ideal entry-exit system, which in reality is not the case. Further Market Integration requires an optimisation of interconnection capacities within the region through new investment projects; this GRIP will provide useful information on potential projects in subsequent chapters.



Source: ENTSOG TYNDP 2011 – Annex D

Figure 4: Comparison demand and supply potential NW-EU

If all the available supply potential of the North West region could be fully utilised, be that national production, LNG terminals, and storage facilities, combined with no gas being exported to other regions, the additional importation needs for the region as a whole would be limited, even on a peak day with maximum demand. In reality these conditions would never fully occur due to a myriad of reasons, including:

- installations temporarily unavailable due to technical issues
- limited storage levels
- exportation of gas to outside the region
- maintenance of assets
- shippers choosing between different supply routes.

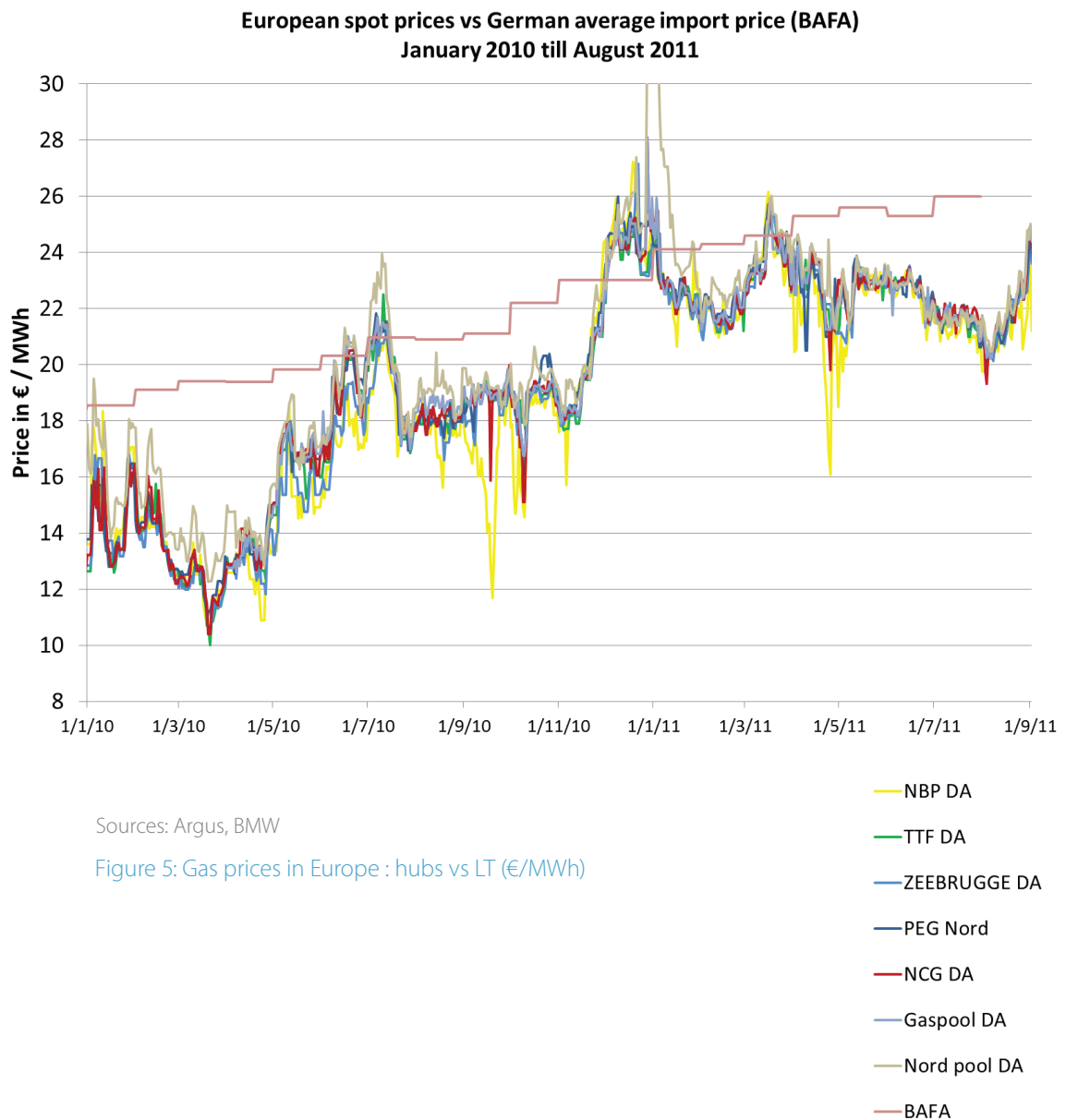
Although export capacities to other regions is currently rather limited, thus having a limited impact on the supply-demand equation, there is an expectation that the capacity to export gas from the region will rise over the next decade.

It should also be highlighted that there is no guarantee that on a peak day molecules will be available to cover the full demand for the region, which would result in possible flexibility constraints for the market. However, on average days with a limited demand, market flexibility will be available since the network infrastructure is built for peak capacity.

Evolution towards a fully integrated and liberalised market with enough supply flexibility will give rise to additional project possibilities in the North West region.



## Investments aiming at market integration



In 2010 and 2011 in the North West Region, spot gas prices are closely related and their global evolution is consistent with long term gas price. Nevertheless, the volatility of spot gas prices is very significant (about 10€/MWh in the period), and the spread between the spot and the long term gas prices can be

considerable, often exceeding the transmission cost. Therefore, even in this already well supplied region, new investments in gas infrastructure could help decrease price spreads and volatility. By improving the competition between supply sources, this will support further market integration of the region.

## 5. Transmission Projects



© Image courtesy of Gas Transport Services

The North West GRIP now presents a list of potential future transmission projects for the North West region. Both FID (financial investment decision made) and non FID projects are listed. Given that certain non FID projects may be deemed to be in competition, this investment plan has, in the interest of fairness, deliberately avoided providing a descriptive narrative of potentially competing projects.

The market will acknowledge with interest some projects that emerged since the release of the TYNDP. These projects are displayed under the name "New Projects". The emphasis of the NW GRIP has been placed on outlining the range of the transmission developments within the region.

The primary focus of the NW GRIP is to show which Interconnection Points inside the NW region are influenced by these transmission projects. Please note that the participating TSOs publish individual infrastructure statements which provide further details in relation to not only perimeter infrastructure but also to internal national infrastructure developments.

The quantity and variety of infrastructure developments proposed in the region, not only demonstrates genuine competition in the market but the alignment of projects also illustrates the efficient evolution of the North West gas regional network.

						FID Projects										Non FID Projects										New Projects						
Entsog Capacity Map 2011 Number	Name Location	System Operator 1	Country	Direction	System Operator 2	Country	FID Projects										Non FID Projects										New Projects					
							BE: Fluxys - CS Berneau	BE: Fluxys - CS Winksele	DE: Sannerz-Rimpar	DE: Reverse Flow Stolberg-Porz	DE: System Capacity Enhancements	DE: Loop MEGAL Bis	DK: Egedved Compressor	DK: Ellund-Egedved looping	FR: System devmt to increase the entry capacity at Taisnières IP (+50 GWh/d)	NL: GTS System Capacity Enhancements FID	DE: Extension of the WINGAS TRANSPORT Grid*	FR: System devmt for Dunkerque LNG	DE: GUD Capacity Enhancement	FR: System devmt for Montoir LNG expansion	FR: System devmt for Fos Tonkin LNG expansion	FR: System devmt for Fos Cavaou LNG expansion	FR: System devmt for Fos Faster LNG	FR: System devmt for Antifer LNG	NL: GTS System Capacity Enhancements non-FID	SE: Skarled	UK: Cluden	BE: Fluxys - Alveringem-Maldegem	FR: Fluxys - Wissele-Loenhout	FR: IP devmt between FR > LU	LU: IP devmt between FR > LU	NL: Further Gas Roundabout Enhancements
CROSS-BORDER IP																																
1	Zeebrugge IZT / HUB	Interconnector	UK	>	Fluxys	BE		X																							X	
1	Zeebrugge IZT / HUB	Fluxys	BE	>	Interconnector	UK		X																					X	X		
2	Zelzate	Fluxys	BE	>	GTS	NL		X							X														X	X		
2	Zelzate	GTS	NL	>	Fluxys	BE		X							X														X		X	
2	Zelzate	Fluxys	BE	>	Zebra Pijpleiding	NL		X																					X	X		
4	Hilvarenbeek (NL)	GTS	NL	>	Fluxys	BE									X																	
6	's Gravenvoeren (NL) // 's Gravenvoeren Dilsen (BE)	GTS	NL	>	Fluxys	BE	X	X							X															X		X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Wingas Transport	DE	X	X																					X	X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Wingas Transport	DE	>	Fluxys	BE		X								X														X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	OGE	DE	X	X	X	X																			X	X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	OGE	DE	>	Fluxys	BE		X	X	X																				X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Eni Gastransp. Deutschland	DE	X	X																					X	X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Eni Gastransp. Deutschland	DE	>	Fluxys	BE		X																						X		
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Thyssengas	DE	X	X																					X	X		
12	Blaregnies Segeo (BE) / Taisnières (H) (FR)	Fluxys	BE	>	GRTgaz	FR	X	X						X																X		
13	Blaregnies Troll (BE) / Taisnières (H) (FR)	Fluxys	BE	>	GRTgaz	FR	X	X							X															X		
15	Bocholtz	GTS	NL	>	OGE	DE			X	X						X																
16	Zevenaar	GTS	NL	>	OGE	DE					X					X																
19	Bunde (DE) / Oude Statenzijl (H) (NL) I	GTS	NL	>	OGE	DE										X																X
19	Bunde (DE) / Oude Statenzijl (H) (NL) I	OGE	DE	>	GTS	NL											X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL) II	GTS	NL	>	OGE	DE											X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL) II	OGE	DE	>	GTS	NL											X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	GTS	NL	>	Wingas Transport	DE											X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	Wingas Transport	DE	>	GTS	NL										X	X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	GTS	NL	>	GUD	DE										X	X															X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	GUD	DE	>	GTS	NL										X	X															X
19	Bunde (DE) / Oude Statenzijl (L) (NL)	GTS	NL	>	GUD	DE											X															
20	Julianadorp (GTS) / Balgzand (BBL)	GTS	NL	>	BBL company	UK										X																X
21	Bacton (BBL / IUK)	NationalGrid	UK	>	Interconnector	UK																										X
23	Twynholm	Gaslink	IE	>	Premier Transmission	UK NIR																						X				
24	Oberkappel	OGE	DE	>	BOG	AT							X																			
24	Oberkappel	BOG	AT	>	OGE	DE							X																			
39	Ellund	Energinet.dk	DK	>	OGE	DE								X	X																	
39	Ellund	Energinet.dk	DK	>	GUD	DE								X	X																	
39	Ellund	OGE	DE	>	Energinet.dk	DK								X	X																	
39	Ellund	GUD	DE	>	Energinet.dk	DK											X															
40	Dragør	Energinet.dk	DK	>	Swedegas	SE							X	X																		
NA	FR > BE (New IP or reverse flow at Taisnières)	GRTGaz	FR	>	Fluxys	BE											X							X				X				
NA	New IP : FR > LU	GRTGaz	FR	>	CREOS	LU												X												X	X	

[illegible]

## 6. Conclusions and the Way Forward



© Image courtesy of Media Fluxys

The North West European Gas Network will face various challenges in the next 10 years. Regional cooperation will be vital for the North West region when facing the challenges ahead, as experience over the past 50 years has proven. Infrastructure projects that seek to increase cross-border capacity, should especially expect to reap the benefits of regional co-operation between all parties and stakeholders. The NW GRIP is an additional opportunity for NW TSOs to interact, discuss, and go beyond usual borders; this has led to the production of the first North West Gas Regional Investment plan. It should nevertheless be noted that (especially for TSOs in more than one GRIP region) the obligation to develop and publish a GRIP, together with all other European and national publication requirements, is very challenging.

In order to improve subsequent versions of the North West Gas Regional Investment plan, the TSOs would therefore like to discuss with related parties the scope and the content, which could be developed in the future.

To do so, a formal stakeholder consultation process will be launched together with the publication of the GRIP through the ENTSOG website. A first presentation will be held on November 25<sup>th</sup> 2011 at a Gas Regional Initiative stakeholder meeting. The outcome of the consultation process and our way forward for the next GRIP will be presented in Q1 2012 during a Gas Regional Initiative workshop, which is to be confirmed.

The North West Region GRIP working group would therefore be very pleased to receive any comments, advice or feedback from stakeholders and market players in order to improve the document in the future.

## Legal Disclaimer



© Image courtesy of Gas Transport Services

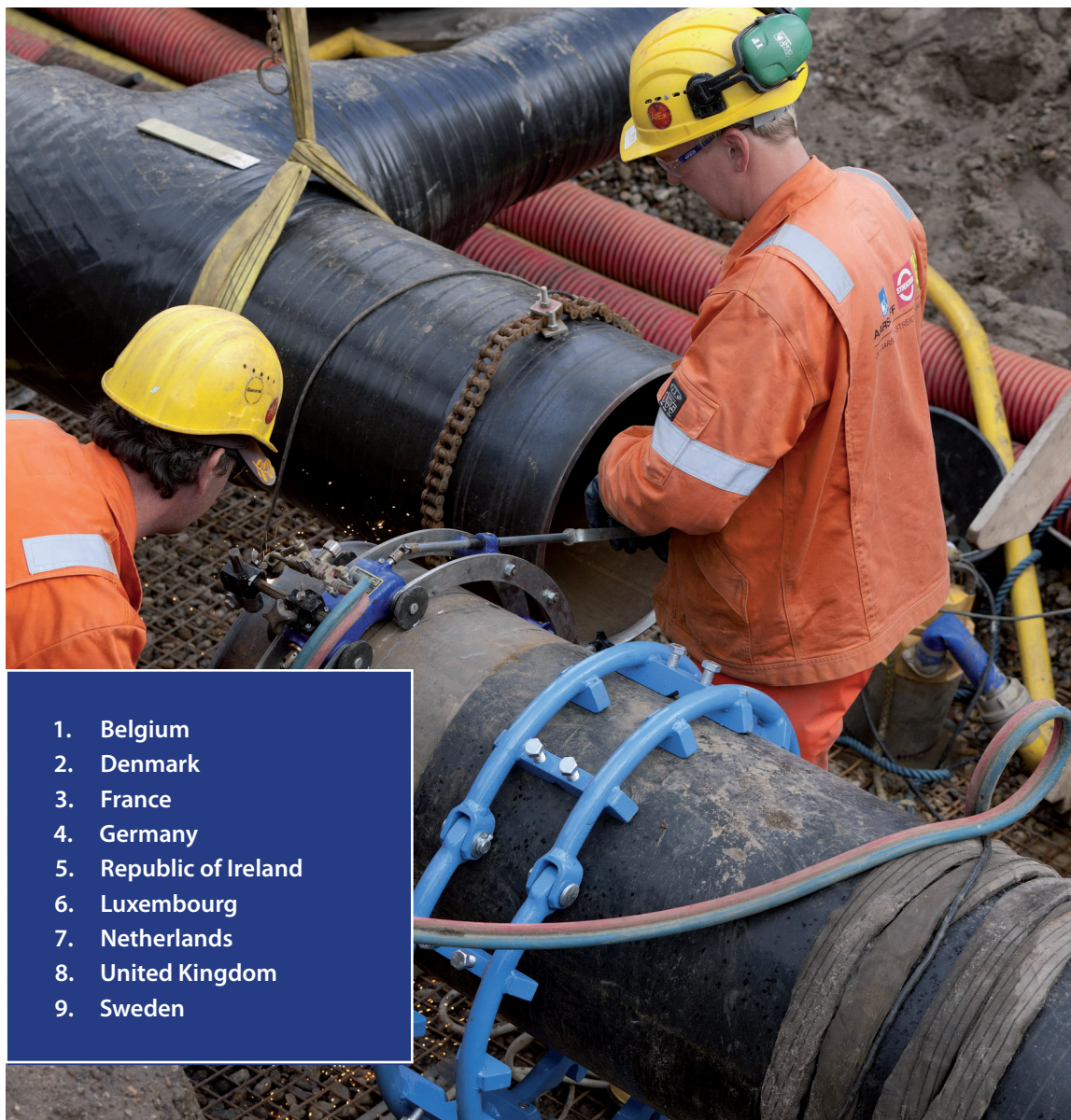
GRIP co-authors have prepared this Report based on information collected and compiled from their internal source, from stakeholders and from other sources as of Q2 2011. GRIP co-authors do not audit or verify the truth or accuracy of any such third parties' information.

The content of the Report (hereinafter referred to as "Content") is provided on an "as is" basis. GRIP co-authors do not guarantee the accuracy, completeness or timeliness of the Content. GRIP co-authors are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content.

In no event shall GRIP co-authors be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses, including, without limitation, lost income or lost profits and opportunity costs, in connection with any use of the Content.

All analyses and forecasts are mere statements of opinion as of the date they are expressed and not statements of fact or recommendations. When making decisions of any nature, any party shall rely exclusively on its own information, forecast, skill, judgment and experience and not on the Content.

## APPENDIX I : GRIP North West detailed projects



© Image courtesy of Energinet.dk

The following Transmission projects questionnaires provide detailed information on the (potential) future gas infrastructures in each of the countries covered by the North West region. Both FID and Non-FID projects are covered in this Annex. The questionnaires provide capacity information related to the new and/or incremental capacity. Two capacity figures for an IP given under the Technical capacity section thus refer to two separate increases. The information was supplied by the respective TSOs.

Please also note the following when interpreting the data provided:

- The FID status row/column gives information about the exact/expected year in which the FID was/is to be taken or only indicates the status (FID / Non-FID) where the year is not available or not known.
- The commissioning date with regards to the non-FID projects is to be understood as the best estimate for the purpose of this GRIP.
- No reference is made to the legal form of the transmission system operators.

## BELGIUM

### Fluxys - Transmission Projects



#### General Information

#### Types of Project

✓	Pipeline (incl. compressor stations)
✓	LNG terminal

#### List of projects

Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes <sup>6</sup></b>			
Willele-Loenhout	non-FID	2014	
Alveringem-Maldegem	non-FID	2015	
<b>Compressors</b>			
Winksele	FID	2012	EEPR project
Berneau	FID	2012	EEPR project
<b>Others</b>			
Zeebrugge LNG terminal 2 <sup>nd</sup> Jetty	FID	2014	preliminary studies co-financed by EU (TEN-E)
Zeebrugge LNG terminal capacity extension	non-FID	2016	

Link to the TSO's website

<http://www.fluxys.com>

#### Technical Information

Total length of new pipes (based on the above list)	175 km
Diameter range of new pipes	600-1000 mm

#### Technical capacity

Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks
Alveringem new interconnection FR-BE	Entry : 24 - 36	
LNG terminals	Send-out (in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Annual capacity (in 10 <sup>6</sup> Nm <sup>3</sup> /y)
Zeebrugge LNG terminal capacity extension	Additional : 10.8	Additional : 3000
Compression	(in MW)	
Berneau & Winksele	Additional : 94 MW	

<sup>6</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)

<p><b>Expected Benefits</b></p> <ul style="list-style-type: none"> <li>• Strengthen the interconnection between transmission networks in NW region <ul style="list-style-type: none"> <li>- New interconnection between France and Belgium</li> <li>- Additional LNG in Zeebrugge for NW region</li> <li>- Increase market liquidity with all neighbouring countries</li> </ul> </li> <li>• Security Of Supply</li> <li>• Implementation of Entry-Exit model</li> </ul>
<p><b>Inter-governmental Agreements if applicable</b></p> <p>Fluxys and GRTgaz jointly launched a market consultation process to assess the level of demand for long-term transmission capacity from France to Belgium.</p>
<p><b>Changes as compared to TYNDP 2011-2020</b></p> <p>Three non FID projects added : Zeebrugge extension capacity and 2 pipelines (Wilsele-Loenhout, Alveringem-Maldegem)</p> <p>One FID project added : Zeebrugge extension (second Jetty)</p>

## DENMARK

Energinet.dk - Transmission Projects



### General Information

#### Types of Project

✓ Pipeline (incl. CSs)

#### List of projects

Other projects			
Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
Pipes			
Ellund-Egtved	2010	2013	TEN-E project of common interest EEPR project
Compressors			
Egtved Phase I	2010	2013	TEN-E project of common interest EEPR project
Egtved Phase II	2010	2013	
Link to the TSO's website		<a href="http://www.energinet.dk/EN/ANLAEG-OG-PROJEKTER/Anlaegsprojekter-gas/Sider/default.aspx">http://www.energinet.dk/EN/ANLAEG-OG-PROJEKTER/Anlaegsprojekter-gas/Sider/default.aspx</a>	

### Technical Information

Total length of new pipes (based on the above list)	94 km
Diameter range of new pipes	762 mm

#### Technical capacity

Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks
Ellund entry	Entry: 16.8 Exit: 4	GCV expected: 10,8 - 11,3 kWh/Nm <sup>3</sup> GCV: 11-12 kWh/Nm <sup>3</sup>
Dragør exit	Exit: 1.2	Extra compressor of 5 MW
Compression	(in MW)	
Egtved	15	FID
	5	FID

Expected Benefits	
<ul style="list-style-type: none"> <li>• Security of Supply</li> <li>• Market integration</li> </ul> <p>The project will ensure supply of gas to the Danish and Swedish markets when the gas production from the Danish North Sea is declining. The project also ensures integration with the gas market in Germany. Furthermore, the project will enhance security of supply also in emergency situations by providing diversification of sources and routes.</p>	
Inter-governmental Agreements if applicable	
N/A	
Financing Structure	
Expected or obtained share of public financing	50% European Economic Recovery Programme – co-financing of 100 million EUR.
Expected or obtained share of private financing	50% Financed by Energinet.dk
Expected or obtained share of multilateral financing	0%
Changes as compared to TYNDP 2011-2020	
<p>The Ellund IP expansion will enable 700,000 Nm<sup>3</sup>/h in entry capacity from 2013. FID confirmed by Minister of Energy in June 2011. Project entered construction phase and on track for operation by October 2013. Approval process completed in 2011.</p> <p>The project intends to increase import capacity for the Danish and Swedish markets after 2013 and is essential to supplement rapidly declining indigenous production. As such, the project is based on matching investments in infrastructure south of the Danish border in the Northern German transmission system. Investment decision was based on shipper demand expressed on Danish and German side of the Ellund IP in Open Season processes conducted in 2008-10. Final investment decisions in Germany have since been prolonged threatening to extend the date of required and matching capacities for the Ellund IP. As of October 2011, FID on 310 - 350,000 m<sup>3</sup>/h firm capacity has been obtained as German Ellund Exit capacity from October 2014. Additional capacity is dependent upon FID on a second expansion step in Northern Germany.</p>	

## FRANCE

### GRTgaz- Transmission Projects



#### General Information

#### Types of Project

✓ Pipeline (incl. CSs) linked to interconnections developments

#### List of projects

Project	FID	Commissioning	Remarks
Developments for the interconnection BE→FR	2010	2013	EEPR project
Developments for the interconnection FR - ES	See GRIP PT-ES-FR		
Developments for the Dunkerque LNG new terminal	FID expected in 2011	2015	
Creation of a new interconnection with Luxembourg	Non-FID		Open season (bind. stage) in H1 2012
Developments for the Antifer LNG new terminal	Non-FID		
Developments for the Montoir LNG terminal expansion	Non-FID	Phase 1 : 2014 Phase 2: 2017	
Developments for the Fos faster LNG new terminal	Non-FID	2016	
Development for the Fos Tonkin LNG terminal expansion	Non-FID	2016	
Developments for the FR→BE new IP at Veurne	Non-FID	2015/2016	
Development for the FR→LU new IP	Non-FID	2016	
Developments for the interconnection between GRTgaz North and GRTgaz South	Non-FID	Study ongoing	for a merger
Development for Fos Cavaou LNG expansion	Non-FID	2019*	
Oltingue IP development (FR-CH-IT)	See GRIP IT-CH-FR-DE		
New IP for Corsica from Italy	See GRIP IT-CH-FR-DE		

Link to the TSO's website

<http://www.grtgaz.com/en/home/major-projects/projects-in-study/10-year-development/>

Technical Information (capacity)		
Interconnections	(in 10^6 Nm³/d)	Remarks
Developments for the interconnection BE→FR (Taisnières IP)	Entry: 6.1	Additional capacity (from 570 GWh/d to 640 GWh/d)
Developments for the interconnection FR-ES	See GRIP PT-ES-FR	
Creation of an interconnection with Luxembourg	Exit : 0.8 or 3.5	
Developments for the Dunkerque LNG new terminal	22	
Developments for the Antifer LNG new terminal	27	For 9 Gm³/y
Developments for the Montoir LNG terminal expansion	6 12	Expansion of 2.5 Gm³/y Additional expansion of 4 Gm³/y
Developments for the Fos Faster LNG new terminal	22 11	for 8 Gm³/y (initial) for an expansion of 4 Gm³/y
Development for the Fos Tonkin LNG terminal expansion	21	For 7 Gm³/y
Developments for the FR→BE interconnection : new IP at Veurne	24-36 (#9 for GRTgaz)	Open Season ongoing
Development for the FR→LU new IP	0.8 - 3.5	Open Season ongoing
Developments for the interconnection between GRTgaz North and GRTgaz South	Merger	Study ongoing
Development for Fos Cavaou LNG expansion	28	For an expansion of 8.25 Gm³/y
Oltingue IP development (FR-CH-IT)	See GRIP IT-CH-FR-DE	
New IP for Corsica from Italy	See GRIP IT-CH-FR-DE	
Expected Benefits		
Market integration (increase of competition) and security of supply		
Changes as compared to TYNDP 2011-2020		
<p>Since the TYNDP 2011, one FID was taken, one is expected to be taken before end 2011 :</p> <ul style="list-style-type: none"><li>The looping of the Rhône pipeline, between Saint-Martin-de-Crau and Saint-Avit, is a key development for the South zone and its entries/exits. This development will contribute to the North-South Corridor in Western Europe defined by the European Commission in the Energy Infrastructures Priorities.</li><li>The new LNG terminal at Dunkerque will involve a connection and the reinforcement of the core system in the North zone with the looping of the Hauts-de-France Pipeline (from Pitgam to Cuvilly), a new Cuvilly-Dierrey pipeline, the looping of the Dierrey-Voisines pipeline and upgrades of compressor and interconnection stations (FID expected before end 2011).</li></ul> <p>These two major projects are very significant steps forward for other developments such as the merger between the two GRTgaz zones and the development of other interconnection and/or LNG capacities.</p> <p>Two new projects were identified in the NW region since the TYNDP 2011-2020:</p> <ul style="list-style-type: none"><li>A New IP between France and Luxembourg: the results of the open season will be finalized in early 2012 with the binding phase.</li><li>Creation of firm capacity to Germany at Obergailbach : Preliminary studies have been launched on this reverse capacity which is crucial for market integration (part of the South-North corridor in Western Europe). This development is contingent upon technical requirements on odorization in Germany and France.</li></ul>		

## GERMANY

### Gasunie Deutschland - Transmission Projects



#### General Information

#### Types of Project

✓ Pipeline (incl. compressor stations)

#### List of projects

Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes <sup>7</sup></b>			
Exit Ellund H (Fokbeck-Ellund)	./.	not yet decided	FID pending
<b>Compressors</b>			
Exit Ellund H (Achim, connection of GUD Network to NEL)	06/2011	10/2014	Project executed by Gasunie Ostsee Anbindungsleitung GmbH
Exit Ellund H (Quarnstedt)	./.	not yet decided	FID pending

<sup>7</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)

Link to the TSO's website

[www.gasunie.de](http://www.gasunie.de)

#### Technical Information

Total length of new pipes (based on the above list)	63 km
Diameter range of new pipes	900 mm

#### Financing Structure

Expected or obtained share of public financing	Financing still open
Expected or obtained share of private financing	Financing still open
Expected or obtained share of multilateral financing	Financing still open

#### Changes as compared to TYNDP 2011-2020

For the extension of existing gas transmission capacity in the direction to Denmark (Exit Ellund) FID has been taken for parts of the project as mentioned in the TYNDP 2011-2020.

For the non-FID projects to extent existing gas transmission capacity to and from The Netherlands (Oude Statenzijl) mentioned in the TYNDP 2011-2020 the scope of the project has changed in the meanwhile, so that they are no longer listed as infrastructure projects of Gasunie Deutschland Transport Services GmbH.

## Open Grid Europe - Transmission Projects



## General Information

## Types of Project

✓	Pipeline (incl. compressor stations)
✓	Interconnection with gas-fired power plant
✓	Interconnection with storage facility

## List of projects

Project	FID	Commissioning	Remarks
Open Season 2008 Projects (two pipeline projects (Sannerz-Rimpar and Schwandorf-Deggendorf) as well as numerous enhancements (like the Porz-Stolberg-Reversion)	under construction	2012-2013	
Stepwise change-over to physical H-gas operation of L-gas networks (due to decreasing L-gas supply)	up to 2020 and beyond	up to 2020 and beyond	
Further connection of market areas	up to 2020	up to 2020	
Connection of gas-fired power stations and storages including capacity enhancement	up to 2020	up to 2020	

Link to the TSO's website

<http://www.open-grid-europe.com>

## Technical Information

Total length of new pipes (based on the above list)	137 km (FID)
Diameter range of new pipes	1000 mm (FID)

## Additional Technical capacity (Open Season 2008)

Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks
Bocholtz Entry	6.8	Capacity offer based on current legal, regulatory and contractual framework.
Dornum Entry	0.6	
Emden EPT Entry	1.9	
Eynatten Entry	8	
Oberkappel Entry	1.1	
Elten Entry <sup>8</sup>	1.7	
Vreden Entry <sup>8</sup>	2.3	
Eynatten Exit	7	
Oberkappel Exit	10	
Oude Statenzijl Exit <sup>8</sup>	2.2	

<sup>8</sup> This additional capacity has been marketed in the Open Season 2008 and has been realized by other means than the transmission projects given in the project section above

**Expected Benefits**

- Security of Supply
- Market Integration (Increase of competition)
- A decline in availability of L-gas necessitates action.

Open Season 2008: The project prioritisation process has been carried out in a non-discriminatory manner based on criteria suggested by BNetzA. It takes into account the factors competition, security of supply, as well as network efficiency. Capacities were allotted to new market entrants. North-south and west-east de-bottlenecking strengthens security of supply.

Future projects: The overall economic benefit of a physical change-over from L (low calorific) to H-gas (high calorific) is higher than permanent conversion. Furthermore, enabling access of storage and gas fired power stations to the network necessitates investments. These measures also serve both market integration and security of supply.

**WINGAS TRANSPORT - Transmission Projects****General Information****Types of Project**

✓ Pipeline (incl. compressor stations)

**List of projects**

Project	FID (yyyy)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes<sup>9</sup></b>			
Extension WINGAS TRANSPORT Grid	2011	2014	
<b>Compressors</b>			
Extension WINGAS TRANSPORT Grid	2011	2012 - 2014	

<sup>9</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)

Link to the TSO's website

[www.wingas-transport.de](http://www.wingas-transport.de)

**Technical Information**

Total length of new pipes (based on the above list)	about 100 km
Diameter range of new pipes	500 – 1000 mm

**Technical capacity**

Interconnectors	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks
Bunde	20	(additional)
Eynatten	2,64	(additional)
Compressors	(in MW)	
Several CS	about 60	(additional)

<b>Expected Benefits</b>	
<ul style="list-style-type: none"> <li>• Security of Supply</li> <li>• Extension of transport capacity of Russian gas to west</li> <li>• Integration of Nord Stream Off- and On-Shore in the European gas infrastructure</li> </ul>	
<b>Financing Structure</b>	
Expected or obtained share of public financing	
Expected or obtained share of private financing	100%
Expected or obtained share of multilateral financing	
<b>Changes as compared to TYNDP 2011-2020</b>	
Final investment decision taken; adjustments in technical planning (length of pipes, diameter range)	

REPUBLIC OF IRELAND

Gaslink - Transmission Projects



1 project proposed for Ireland ( Culden to Brighthouse Bay Pipeline) is located in UK ( Scotland).

## LUXEMBOURG

### CREOS - Transmission Projects



General Information			
Types of Project			
✓	Pipeline (incl. CSns)		
List of projects			
Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes <sup>10</sup></b>			
Creation of a new interconnection with France	Expected 2012	2016	Open season (binding phase) in H1 2012
<sup>10</sup> for genuine Interconnections include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)			
Link to the TSO's website		<a href="http://www.creos.net/">http://www.creos.net/</a>	
Technical Information			
Technical capacity			
Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks	
Cross-border interconnection with France	Entry: 0.8 or 3.5		
Expected Benefits			
<p>The Project represents an opportunity:</p> <ul style="list-style-type: none"> <li>• to increase firm capacity on the Luxemburg market,</li> <li>• to increase competition in supply by a new access to the French market,</li> <li>• to cover the future need on capacity growth</li> </ul>			

## NETHERLANDS

### GTS - Transmission Projects

### gastransportservices

#### General Information

#### Types of Project

✓ Pipeline (incl. compressor stations)

#### List of projects

Project	FID	Commissioning	Remarks
<b>Pipes <sup>11</sup></b>			
Various system capacity enhancements (a.o. Open Season Projects, connection of LNG terminal and storage facilities, nitrogen storage). Connection to Bergermeer Storage and Integrated Open Season	FID	2011 - 2014	TEN-E project: Integrated Open Season
Connection of LNG terminal and storage facilities	Non-FID	2015 or later	
Further Gas Roundabout Enhancements	Non-FID	2017 or later	

<sup>11</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)

Link to the TSO's website

[www.gastransportservices.nl](http://www.gastransportservices.nl)  
[www.integratedopenseason.com](http://www.integratedopenseason.com)

#### Technical Information

Total length of new pipes (based on the above list)	> 700 km
Diameter range of new pipes	Mostly 1200 mm

#### Technical capacity

Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks
Cross-border interconnections	Entry: 130 Exit: 130	FID projects
Connection with storage- and LNG facilities	80 mln m <sup>3</sup> /d	Non FID projects
Connection with import points and cross-border interconnections		New project

#### Expected Benefits

- Security of Supply (additional and diversification of import, storage capacity)
- Market Integration (expansion of interconnection capacity with neighbouring networks)
- Quality Conversion

#### Changes as compared to TYNDP 2011-2020

- Connection Bergermeer Storage and Integrated Open Season moved from non-FID to FID
- New project is foreseen to facilitate import, cross-border connections and storage capacity

## SWEDEN

### Swedegas - Transmission Projects



General Information			
Types of Project			
✓	Pipeline (incl. compressor stations)		
List of projects			
Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes <sup>12</sup></b>			
Skanded	2012	2013	TEN-E: Priority project
<small><sup>12</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)</small>			
Link to the TSO's website		<a href="http://www.swedegas.se">http://www.swedegas.se</a>	
Technical Information			
Total length of new pipes (based on the above list)		650 km	
Diameter range of new pipes		500 mm	
Technical capacity			
Interconnections	(in 10 <sup>6</sup> Nm <sup>3</sup> /d)	Remarks	
Lysekil IP	1	GCV: 11.17-12.78 kWh/Nm <sup>3</sup>	
Vallby Kile IP	6	GCV: 11.17-12.78 kWh/Nm <sup>3</sup>	
Expected Benefits			
<ul style="list-style-type: none"> <li>• SoS</li> <li>• Market Integration (Increase of competition)</li> <li>• Market expansion</li> </ul>			
Financing Structure			
Expected or obtained share of public financing			
Expected or obtained share of private financing		100%	
Expected or obtained share of multilateral financing			
Changes as compared to TYNDP 2011-2020			
Expected FID delayed by one year due to delay in government approval			

## UNITED KINGDOM

### BGE - Transmission Projects



#### General Information

##### Types of Project

✓	Pipeline (incl. compressor stations)
	Capacity & Security of Supply enhancement of Ireland / UK Interconnector system Proposed by Gaslink, Republic of Ireland TSO. Project in UK (Scotland)

##### List of projects

Project	FID (yyyy) / (under constr.)	Commissioning (yyyy)	Remarks (TEN-E project information, EEPR project info etc.)
<b>Pipes <sup>13</sup></b>			
Cluden to Brighthouse Bay Pipeline	2012	2014	Twinning 50km of the onshore Scotland transmission pipeline system, between Cluden and Brighthouse Bay.

<sup>13</sup> for genuine Interconnections include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)

Link to the TSO's website	<a href="http://www.gaslink.ie/">http://www.gaslink.ie/</a>
---------------------------	---

#### Technical Information

Total length of new pipes (based on the above list)	50 km
Diameter range of new pipes	900 mm

#### Technical capacity (tba)

Compressors	(in MW)	
N/A		

#### Expected Benefits

- Provided additional capacity
- Security of Supply (particularly in-line with new legislation)
- Contributes to the viability of physical reverse flows to the UK
- Operational Efficiencies
- Supports Common Arrangements for Gas (CAG) between ROI and NI.

#### Financing Structure

Expected or obtained share of public financing	Not known
Expected or obtained share of private financing	Not known
Expected or obtained share of multilateral financing	Not known

## Interconnector - Transmission Projects



Interconnector













<b>General Information</b>			
<b>Types of Project</b>			
✓	Pipeline (incl. compressor stations)		
<b>List of projects</b>			
<b>Project</b>	<b>FID</b>	<b>Commissioning</b>	<b>Remarks</b>
<b>Pipes <sup>14</sup></b>			
<b>Compressors</b>			
Forward Flow Enhancement (UK Export & Belgian Import)	Not known	Not known	Requires commitment from new and/or existing customers
<small><sup>14</sup> for genuine interconnectors include the name of the IP or the CC-CC indication in brackets (to be used under the Technical Capacity listing)</small>			
Link to the TSO's website		<a href="http://www.interconnector.com">www.interconnector.com</a>	
<b>Technical Information</b>			
Total length of new pipes (based on the above list)		- km	
Diameter range of new pipes		- mm	
<b>Technical capacity</b>			
<b>Interconnectors</b>	<b>(in 10<sup>6</sup> Nm<sup>3</sup>/d)</b>	<b>Remarks</b>	
Entry to Interconnector from National Grid (at Bacton)	Not known	Current maximum forward flow capacity is 20 bcm/y versus a maximum reverse flow capacity of 25.5 bcm/y	
Exit from Interconnector to Fluxys (at Zeebrugge)	Not known		
<b>Compression</b>	<b>(in MW)</b>		
Interconnector compression facility at Bacton	Not known	Additional capacity will require additional compressor power at Bacton and other terminal upgrades	
<b>Expected Benefits</b>			
<ul style="list-style-type: none"> <li>Increased Security of Supply</li> <li>Increased transport capacity – UK Import to Continental Europe via the Interconnector</li> <li>Increased Market Integration</li> </ul> <p><i>Note: The Interconnector, has on occasion been at Forward Flow Capacity during summer/autumn 2010 and summer 2011.</i></p>			
<b>Financing Structure</b>			
Expected or obtained share of public financing	Not known		
Expected or obtained share of private financing	Not known		
Expected or obtained share of multilateral financing	Not known		
<b>Changes as compared to TYNDP 2011-2020</b>			
IUK has confirmed to the market that a Forward Flow Enhancement is possible by upgrading existing terminal facilities. Interested parties should contact IUK to discuss their requirements.			

## APPENDIX II : Country Profiles



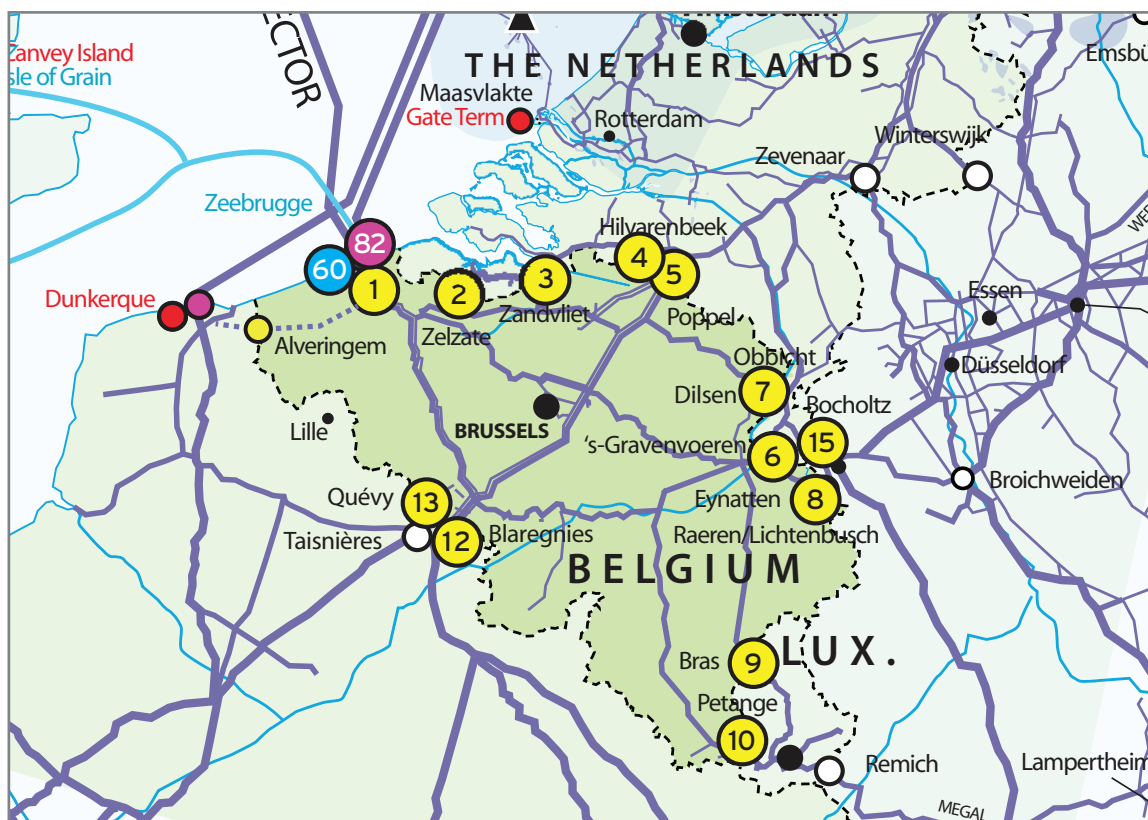
© Image courtesy of National Grid

### MAP KEYS

- |  |   |
|--|---|
| <p> Cross-border interconnection point within EU and with non-EU third country (export)</p> <p> Cross-border interconnection point with non-EU third country (import)</p> <p> Intra-country or intra balancing zone points</p> <p> Non-EU Cross-border interconnection point</p> <p> (undersea) pipeline <i>Project</i> interconnection</p> <p> Dockside regasification facility</p> | <p> LNG Terminals' entry point into transmission system / <i>Operational</i></p> <p> LNG Terminal / <i>Under constr. or Projected</i></p> <p> LNG Export Terminal / <i>Operational</i></p> <p> LNG Export Terminal / <i>Project</i></p> <p> Small scale LNG liquefaction plant / <i>Operational</i></p> <p> Small scale LNG liquefaction plant / <i>Project</i></p> |
|--|---|

## BELGIUM

### MAP OF COUNTRY



#### BELGIUM

##### Country Profile Overview

Number of TSO's	1
Name of TSO's	FLUXYS
Total length of the transmission network	4000 km
Total compressor power	116 MW
Number of IP's	17
Number of LNG terminals	1
Number of storage facilities	1
Total Transported Energy in 2010	440,4 TWh
Total Demand in 2010	194,6 TWh
Number of Physical TS-DS Connections	200

##### Network Overview

Fluxys is the independent operator of both the natural gas transmission grid and storage infrastructure in Belgium. The company also operates the Zeebrugge LNG terminal.

Belgium has no natural gas of its own and so is entirely reliant on imports. The 17 interconnection points on the Fluxys grid connect Belgium to natural gas supplies piped from the United Kingdom, Norway, the Netherlands, Germany and Russia, while the Zeebrugge LNG terminal enables LNG to be supplied by seaborne transport from producing countries worldwide. LNG for Belgium is currently sourced mainly from Qatar.

Fluxys has developed the Zeebrugge area into a crossroads of international natural gas flows in North-Western Europe. The Zeebrugge area has an annual landing capacity of 48 billion cubic metres. It is a reception point for LNG imported by ship as well as the place where two key gas pipelines meet: the east/west route between Russia and the UK and the north/south route between Norway and the Netherlands, the UK and Southern Europe. Zeebrugge is also a trading centre for the natural gas industry.

## DENMARK

### MAP OF COUNTRY



### DENMARK

#### Country Profile Overview

Number of TSO's	1
Name of TSO's	Energinet.dk
Total length of the transmission network	831 km
Total compressor power	0 MW
Number of IP's	2
Total Transported Energy in 2010	96 TWh
Total Demand in 2010	49,3 TWh
Number of Physical TS-DS Connections	40 (excluding 3 direct connections to individual consumers)

#### Network Overview

Energinet.dk is the independent operator of the Danish natural gas and electricity transmission systems since 2004. The company also operates one of two national underground gas storages (Lille Torup). Offshore pipelines to the production areas in North Sea are upstream facilities and operated independently by DONG Energy. Production fields are also connected through offshore pipelines to the Netherlands. Energinet.dk operates the only IP to the adjacent Swedish market and incorporates Swedish demand in system planning.

Denmark has been self-sufficient and net exporter of gas since the 1980s. Domestic production expected to decline below Danish-Swedish demand from year 2012. Ellund IP (to Germany) is under capacity expansion to facilitate significant and increasing import from October 2013.

Supply situation is tight in coming years and until new infrastructure on both sides of Ellund IP is in operation. Auctions on the two interconnection points to Germany and Sweden are introduced from 2011 to effectively allocate scarce import/export capacity.

FRANCE

MAP OF COUNTRY



FRANCE	
Country Profile Overview	
Number of TSOs	2
Name of TOS's	<ul style="list-style-type: none"> <li>• GRTgaz</li> <li>• TIGF</li> </ul>
Total length of transmission network(s)	37,300 km
Total compressor power	650 MW
Number of Cross-border interconnection points	7
Number of LNG terminals	3
Number of storage facilities	16
Number of production facilities	1
Number of Physical connections with Distribution systems Operators (DSOs) or directly connected customers	4820
Total transported gas	700 TWh (2010)
Total gas demand	550 TWh (2010)
Network Overview	
<p>France transmission system is interconnected :</p> <ul style="list-style-type: none"> <li>• At the borders with Belgium, Germany, Switzerland and Spain,</li> <li>• On the coasts, with Norway GASSCO system and LNG terminals at Montoir and Fos,</li> <li>• With underground storage facilities spread across the country,</li> <li>• With directly connected customers and downstream distribution networks, which carry the gas to the end consumers.</li> </ul> <p>In France, the transmission services is sold in the form of access to entry/exit zones. Each of the current three zones is a balancing zone for the shippers. Once the gas has entered the zone, it is carried to any point in a unrestricted way to the costumer.</p> <p>The development of GRTgaz transmission system responds to the following objectives :</p> <ul style="list-style-type: none"> <li>• To create new entry/exit capacities according to market and/or for security of supply needs;</li> <li>• To create new transmission capacities for LNG terminals or storages;</li> <li>• To connect new consumption sites, particularly combined-cycle gas turbine power plants;</li> <li>• To reinforce the core transmission system, consistently with the other developments.</li> </ul> <p>In 2011, two major projects have been decided by GRTgaz but still remain to be fully approved by the French regulator :</p> <ul style="list-style-type: none"> <li>• The looping of the Rhône pipeline, between Saint-Martin-de-Crau and Saint-Avit, is a key development in the South GRTgaz zone.</li> <li>• The new LNG terminal at Dunkirk will involve the reinforcement of the core system in the North GRTgaz zone, particularly with a new Cuvilly-Dierrey-Voisines pipeline.</li> </ul> <p>These developments will contribute to the North-South Corridor in Western Europe defined by the European Commission in the Energy Infrastructures Priorities.</p>	

GERMANY

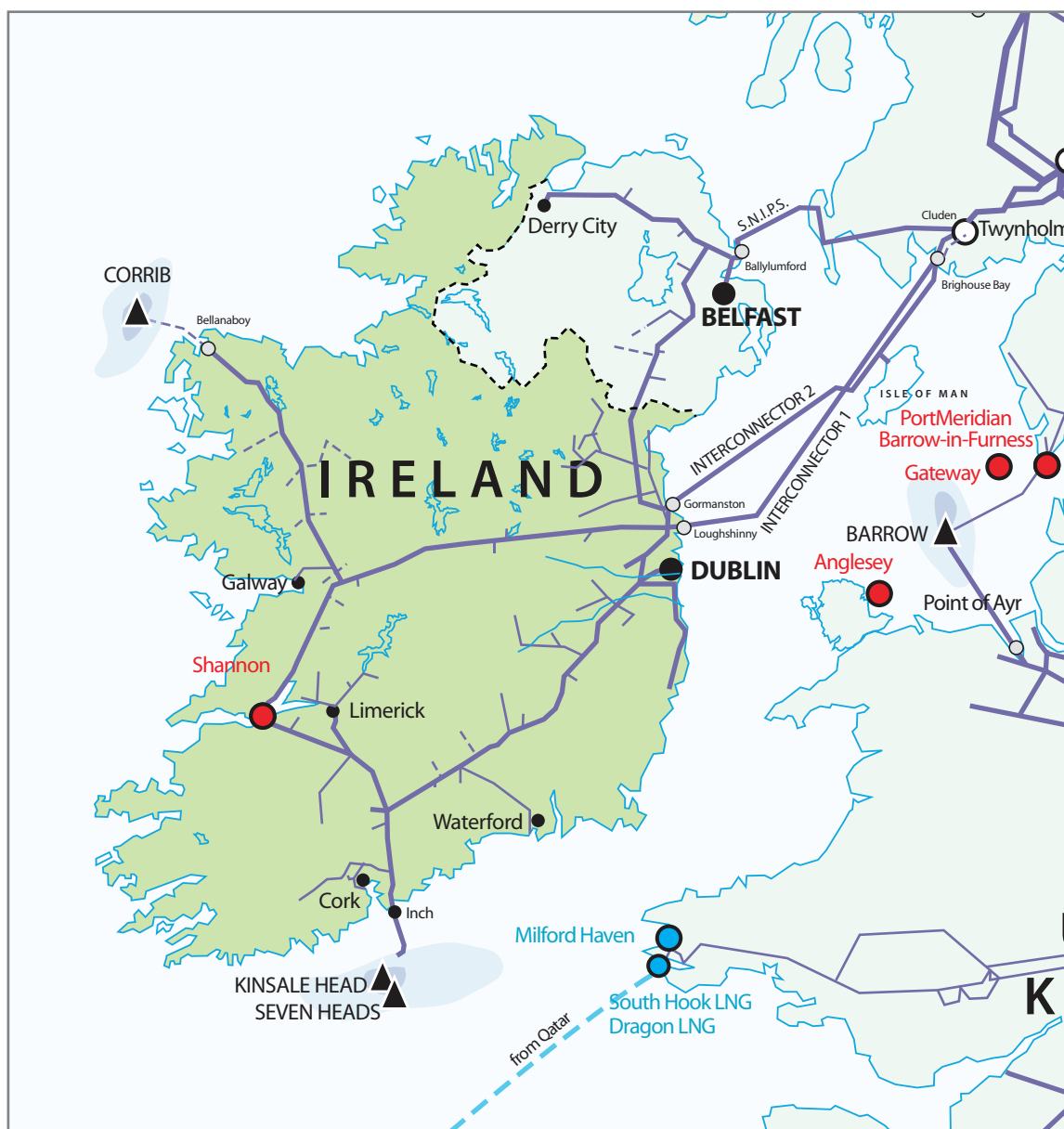
MAP OF COUNTRY



GERMANY	
Country Profile Overview	
Number of TSO's	12
Name of TSO's	<ul style="list-style-type: none"> <li>• bayernets</li> <li>• Eni Gas Transport Deutschland</li> <li>• Erdgas Münster Transport</li> <li>• EWE Netz</li> <li>• Gasunie Deutschland (GUD)</li> <li>• GRTgaz Deutschland</li> <li>• GVS Netz</li> <li>• ONTRAS – VNG Gastransport</li> <li>• Open Grid Europe</li> <li>• Statoil Deutschland Transport</li> <li>• Thyssengas</li> <li>• WINGAS TRANSPORT</li> </ul>
Total length of the transmission network	Approx. 37,500 km
Total compressor power	Approx. 2,000 MW
Number of IP's	82
Total Transported Energy in 2009	1116,3 TWh
Total Demand in 2010	942 TWh
Network Overview	
<p>In the recent years market participants in the German gas transmission industry have seen fundamental change taking place. The European parliament has accelerated the process of change with its third European internal energy market package. The first transitions from formerly Vertically Integrated Undertakings towards the first Independent Transmission Operators took place in Germany, and the first period of revenue regulation for the gas sector has begun. Because multiple gas transmission system operators are active in Germany by contrast with most other EU Member States, a large number of market areas has been established. In the past years the merging of market areas under cooperation agreements continued to advance. The six market areas of 2010 (three for H-Gas and L-Gas each) have been merged in two gas quality compounding market areas (Gaspool, NetConnect Germany) by the end of 2011. Germany is depending on imported supplies. The major import suppliers to the market are Russia with a share of 33 % in 2010, Norway (29 %) and the Netherlands (22 %). The domestic gas production accounted for 11 % of the gas supply mix in 2010. According to published data of producers the production of L-Gas in Germany is supposed to cease in the following years.</p>	

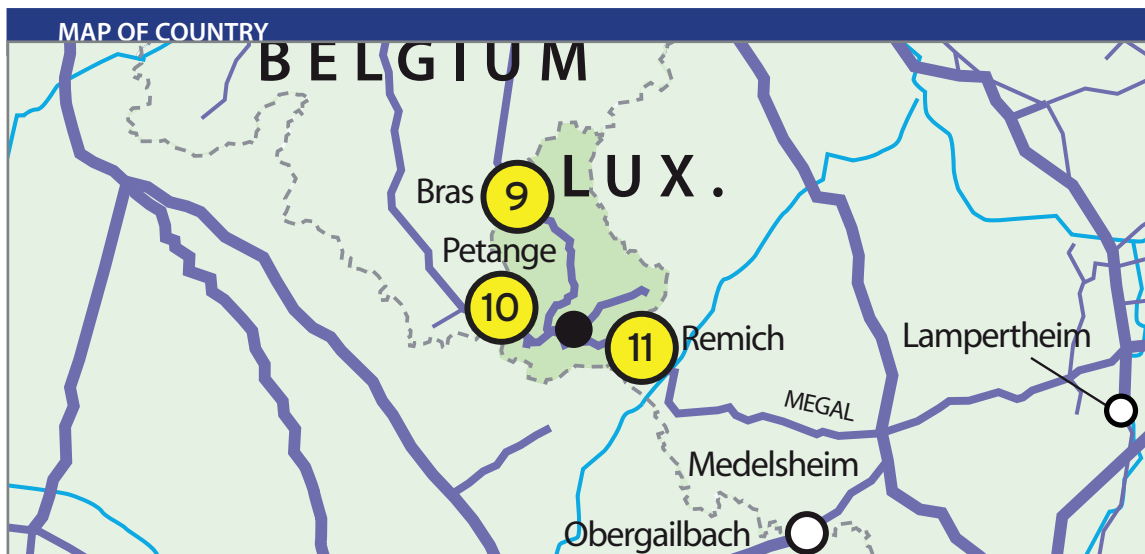
## REPUBLIC OF IRELAND

### MAP OF COUNTRY



REPUBLIC OF IRELAND	
Country Profile Overview	
Number of TSO's	1
Name of TSO	Gaslink
Total length of the transmission network	~ 2, 147 km
Total compressor power	94 MW
Number of IP's	2
Total Transported Energy in 2010	~79.3 TWh
Total Demand in 2010	~60.8 TWh
Number of Physical TS-DS Connections	~105
Network Overview	
<p>Gaslink, as the Independent System Operator operates, maintains and develops the ROI transportation system (transmission and distribution). BGÉ, as system owner, hold a licence to relating to its ownership of the transportation system.</p> <p>The ROI transmission system includes the Inter-connector (IC) system and the onshore ROI system. The IC system includes two subsea Interconnectors to Scotland; two compressor stations at Beattock and Brighthouse Bay, and the 110-km of onshore pipeline between Brighthouse and Moffat in Scotland.</p> <p>The IC system connects the onshore ROI system to the GB National Transmission System (NTS) at Moffat in Scotland. It also supplies gas to the NI market from Twynholm and to the Isle of Man market from IC2. The IC system is also used to provide a gas inventory service to ROI shippers. The majority of the IC system is comprised of twinned pipeline, however there is a 50 km section of single pipeline between Cluden and Brighthouse Bay in South West Scotland.</p> <p>The onshore ROI system consists of a ring-main system between Dublin, Galway and Limerick, with cross-country pipelines running from the ring-main system to Cork, Limerick, Waterford, Dundalk and the Corrib Bellanaboy terminal in Mayo. It also includes a compressor station at Midleton.</p> <p>The current long-term network development statements published by the Irish TSO and Regulatory Authorities (RAs), identify potential capacity constraints in the IC system within the next 3 years. The RAs have decided to undertake a market consultation to determine the most economic and flexible solution to this constraint. The ROI TSO is recommending the reinforcement of the single 50 km pipeline in Scotland as the solution to the potential constraints.</p> <p>Approximately 93.0% of the ROI gas demand was supplied from GB gas imports through the Moffat entry point in south-west Scotland and IC system during 2010. The remaining 7.0% of ROI gas demand was supplied from Celtic Sea production and storage gas through the Inch entry point in Cork. The majority of ROI gas demand will continue to be met from GB imports through the Moffat entry point until Corrib comes on-stream (expected spring 2014).</p> <p>In addition to Corrib, there are a number of other potential future supply sources on the Island of Ireland; an LNG terminal on the River Shannon in the south west of Ireland, salt cavity gas storage facility near Larne in Northern Ireland, offshore gas storage on the east coast and further development of existing facilities upstream of the Inch entry point. Also, investigations are presently ongoing to examine the potential development of shale gas resources in north west Ireland.</p> <p>The Island's RAs and TSOs in the two jurisdictions (ROI and NI) are currently progressing the Common Arrangements for Gas (CAG) project, which will see a single all Island gas market and the operation of the two transmission networks in the ROI and NI, as a single all Island network.</p>	

## LUXEMBOURG



### LUXEMBOURG

#### Country Profile Overview

Number of TSO's	1
Name of TSO's	CREOS Luxembourg SA
Total length of the transmission network	411 km
Total compressor power	0 MW
Number of IP's	3
Total Transported Energy in 2010	15,5 TWh
Total Demand in 2010	15,5 TWh
Number of Physical TS-DS Connections	37

#### Network Overview

Creos, as part of the Enovos Group, is the legal owner of the natural gas transmission system in Luxembourg. Creos provides connection and assume the delivery of natural gas to large and medium-sized industrial customers connected to the transmission system, as well as to the local distribution systems. The transmission grid of Creos is interconnected with the Belgium and German market.

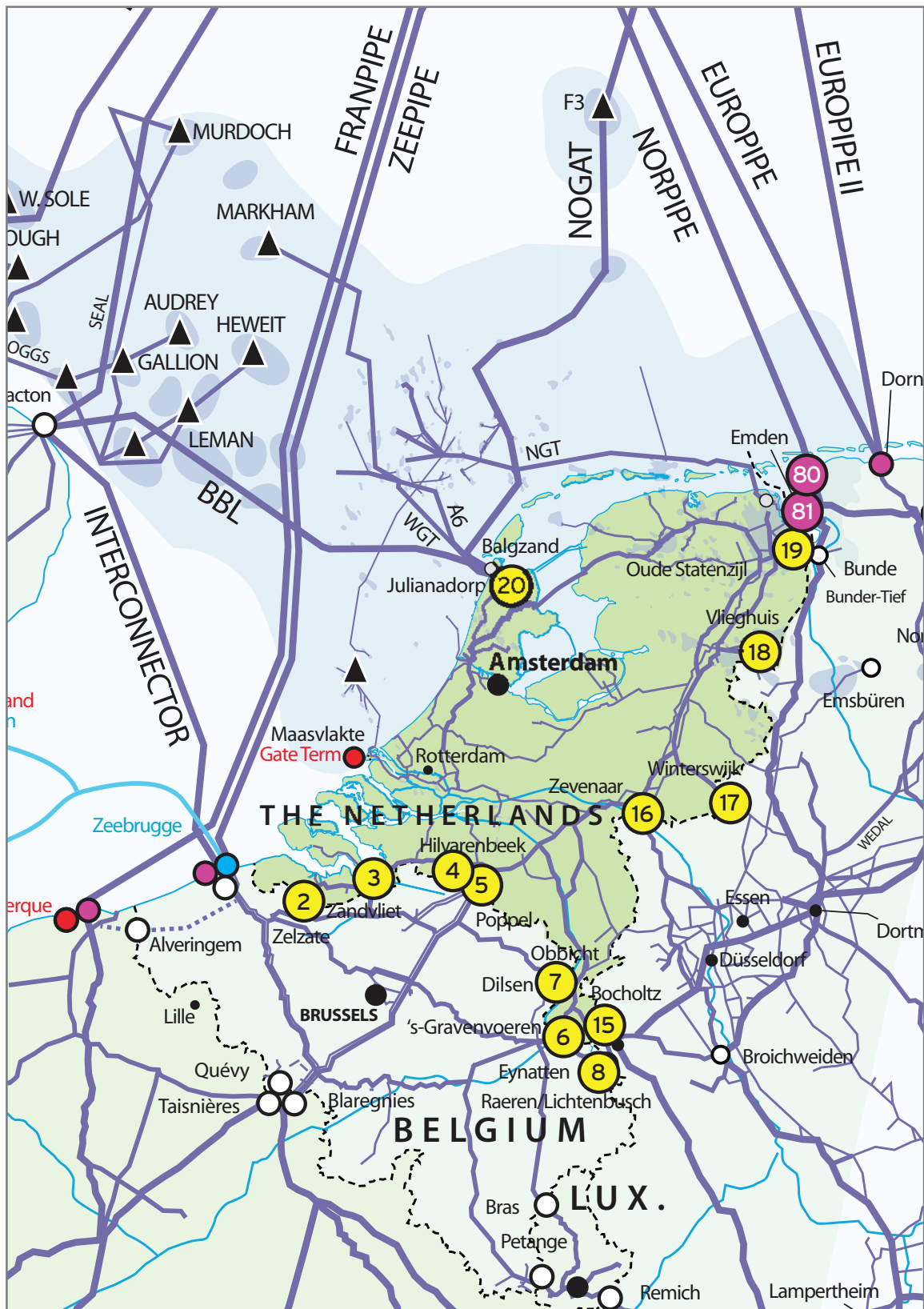
Creos, responsible for the commercialization of its gas network, is trying to provide an entirely even-handed service to all parties wishing to become active on the Luxembourg gas market. The Creos network, with no external storage capacities, is relatively young. 75 % of the transmission system was built after 1986. The network is a radial system without compressor stations.

In addition, Creos is also TSO and DSO system operator for electricity in Luxembourg (length of power grid: +/- 7400 km), supplying over 170000 customers within all voltage levels.

Website: [www.creos.net](http://www.creos.net)

## THE NETHERLANDS

## MAP OF COUNTRY



THE NETHERLANDS	
Country Profile Overview	
Number of TSO's	1
Name of TSO	Gas Transport Services
Total length of the transmission network	~ 11 500 km
Total compressor power	Over 900 MW
Number of IP's	25
Total Transported Energy in 2010	1100 TWh
Total Demand in 2010	470 TWh
Number of Physical TS-DS Connections	Over 600 Domestic Exit Points ~ 1100
Network Overview	
<p>The Netherlands is the largest producer of gas within the EU. Over 80% of the transported volume in the network is produced in the Netherlands and over 50% of the gas transported through the network has a destination outside the Netherlands.</p> <p>Indigenous production will decrease in future. Dutch policy is to compensate for the declining reserves by increasing import capabilities (X-border connections with neighbouring countries, import of pipeline gas from outside the EU and import of LNG), by adding flexibility and by encouraging trade.</p> <p>To this end, major expansions of the network and adjacent infrastructure have been and are being implemented to increase import capacity and to increase X-border connection capacity. An LNG terminal has been constructed and connected to the network. Additional storage capacity is being constructed and connected to the network. Also a decoupled entry/exit system (encompassing both Hical gas and Groningen gas) and a virtual hub (TTF) have been introduced, supported by trading floors.</p>	

## SWEDEN

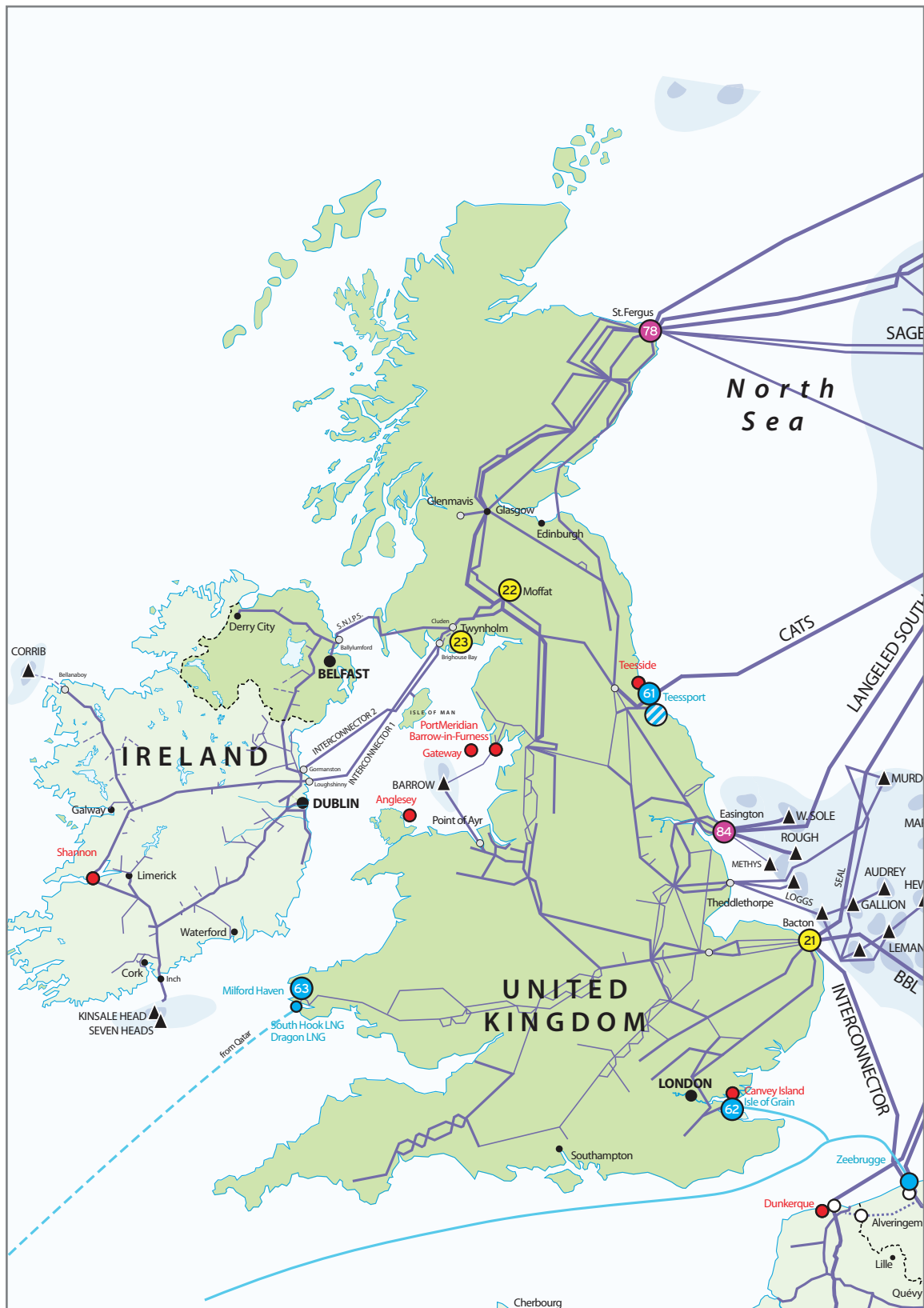
### MAP OF COUNTRY



SWEDEN	
Country Profile Overview	
Number of TSO's	2
Name of TSO's	<ul style="list-style-type: none"> <li>Swedegas AB, owning and operating the grid , responsible for transportation</li> <li>Svenska kraftnät, responsible for system balancing</li> </ul>
Total length of the transmission network	620 km
Total compressor power	0 MW
Number of IP's	Dragör /Energinet.dk (only marketed by Energinet.dk according to the legal CAM set in the Swedish Natural Gas Act)
Total Transported Energy in 2010	19,0 TWh
Total Demand in 2010	19,1 TWh
Number of Physical TS-DS Connections	39
Network Overview	
<p>The Swedish natural gas grid covers the southern and western parts of the country. With effect October 2011, Swedegas acquired 230 km of branch lines, 23 M/R-stations and the only storage facility (10 Mm<sup>3</sup>) from E.ON. Swedegas thereby becomes sole owner and operator of the Swedish transmission network.</p> <p>In 2005, the legislator imposed a market organisation giving the state owned authority Svenska kraftnät the responsibility for system balancing. This division of responsibilities is now about to change. A commission ordered by the government recently proposed changes in legislation to transfer the balancing responsibility to Swedegas. This change is likely to take place mid 2012.</p> <p>Also according to Swedish legislation, capacity is booked in the transmission system by DSOs and directly connected end consumers. There are 5 DSOs and 5 end consumers presently using the transmission system.</p> <p>In May of this year, a LNG terminal with a storage volume of 9000 tons was taken in operation in Nynäshamn south east of Stockholm. This is an area not covered by pipelines and the terminal will supply a local refinery, the local town gas market in Stockholm and industries to be supplied by trucks. The terminal is owned by the industrial gas company AGA being part of the Linde group.</p> <p>The 19 TWh of natural gas consumption in Sweden forms 2,8% of the national energy balance, but covers 20-25% in the south and western areas covered by the pipeline system. The Swedish market segments in 2010, based on estimates by Swedegas, were 57% power and heat production, 31% industrial needs and remaining 12% divided between household, small industry and vehicle fuel. The market has grown by more than fifty percent over the past 2-3 years, mainly due to increased CHP production and high industrial volumes.</p> <p>Production of biogas in Sweden amounts to approximately 1,4 billion kWh in 2009. 50% of the volume is used locally for heating purposes and about 35% as vehicle fuel. 10% of the total volume was upgraded and distributed via the natural gas distribution grids.</p> <p>Until October 2010 all gas fed into the Swedish system originated from the Danish North Sea. From October 2010 physical flow from northern Germany into Denmark was opened up, also influencing the Swedish market. Due to the expected decline of the Danish production, Energinet.dk in Denmark and Gasunie Deutschland in Germany are planning to invest in increased capacity from Germany to Denmark and Sweden. As an alternative, Swedish market actors are evaluating a possible supply from Norway in the form of a revised Skanled project. An application for concession was approved by the responsible authority, partly due to SoS reasons, mid 2010. Project activities are presently on hold awaiting a necessary decision by the Swedish government.</p>	

## UNITED KINGDOM

### MAP OF COUNTRY















UNITED KINGDOM	
Country Profile Overview	
Number of TSO's	5
Name of TSO's	<ul style="list-style-type: none"> <li>• <b>Belfast Transmission Limited</b></li> <li>• <b>BGE UK</b></li> <li>• <b>Interconnector UK</b></li> <li>• <b>National Grid</b></li> <li>• <b>Premier Transmission Limited</b></li> </ul>
Total length of the transmission network	8513 km
Total compressor power	1455 MW
Number of IP's	3
Total Transported Energy in 2010	1317,7 TWh
Total Demand in 2010	1036,9 TWh
Number of Physical TS-DS Connections	128
Network Overview	
<p>The gas transmission systems of the UK are entering a period of significant development. The energy industry is set to change dramatically over the next four decades, driven by the need to provide secure, affordable and low carbon energy.</p> <p>Gas from the UK Continental Shelf (UKCS) is declining and the UK will increasingly rely on imported supplies. Gas supplies from the UKCS will meet less than 25% of our annual demand by 2020/21. Since 2004, the UK has become a net importer of gas, and with limited UKCS developments and plateauing Norwegian imports over the next decade, the options for bridging the demand and supply gap will come largely from LNG, sourced from the global market and continental imports via the IUK and BBL pipelines. IUK specifically allows shippers to reach the gas markets of continental Europe and the UK by transporting and/or trading between the two hubs linked by the Interconnector pipeline.</p> <p>Importantly for security of gas supplies going forward, transmission systems will need to be able to manage the changing location and unpredictable behaviour of gas inputs on a daily basis. At the same time, networks will need to transport gas to new Combined Cycle Gas Turbines (CCGTs) that will connect in the coming decade. Historically, gas entered the network primarily from the UKCS into the northern terminals and gas flowed south towards the southern centres of demand. Today, flows are more central and southerly based, with an increase in single entry point size. There are more sources of gas than previously which drives increasing uncertainty over where gas enters the transmission system and will drive investment in the network to ensure there is the capability to move gas quickly from where it arrives on the network to satisfy increasingly unpredictable demand, as gas fired power stations respond to variations in wind output on the electricity network.</p> <p>Gas flowing from GB to Northern Ireland through the Scotland Northern Ireland Pipeline (SNIP) continues to provide 100% of the current gas demand, however there are numerous potential investment projects which could result in the exportation of gas from Northern Ireland potentially into the Republic of Ireland and GB market.</p> <p>There is considerable uncertainty regarding how many new sources of LNG importation, storage facilities and gas fired power stations will connect to the networks in the future. This will have a significant impact on the likely network investment requirements. What is certain though is that the network must facilitate the move towards low-carbon sources of energy, by connecting gas-fired power stations, which combine lower carbon generation with the reliability and flexibility necessary to support less predictable sources such as wind.</p>	

## APPENDIX III : Border Review



© Image courtesy of Gas Transport Services

### MAP KEYS

- |   |  |
|---|--|
|  Cross-border interconnection point within EU and with non-EU third country (export) |  LNG Terminals' entry point into transmission system / <i>Operational</i> |
|  Cross-border interconnection point with non-EU third country (import)               |  LNG Terminal / <i>Under constr. or Projected</i>                         |
|  Intra-country or intra balancing zone points  |  LNG Export Terminal / <i>Operational</i>                                 |
|  Non-EU Cross-border interconnection point   |  LNG Export Terminal / <i>Project</i>                                     |
|  (undersea) pipeline <i>Project</i> interconnection                                  |  Small scale LNG liquefaction plant / <i>Operational</i>                  |
|  Dockside regasification facility  |  Small scale LNG liquefaction plant / <i>Project</i>                      |

## Belgium ↔ France



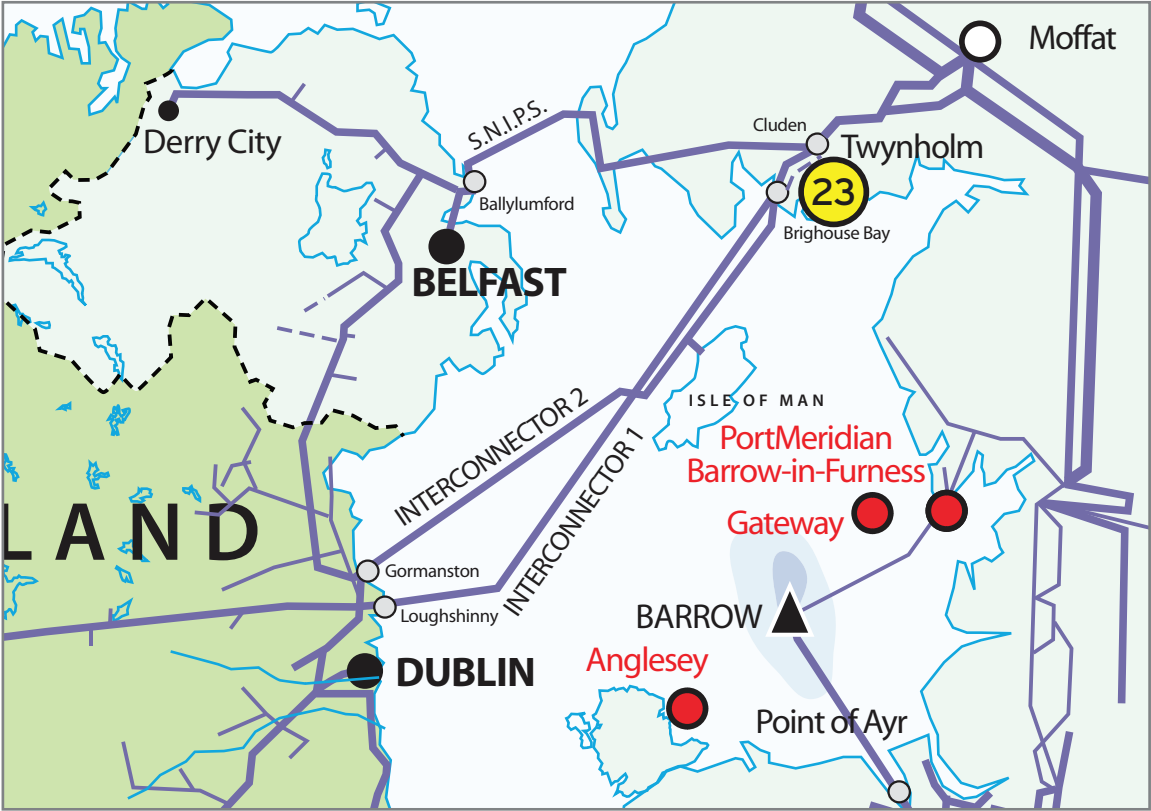
													New
													BE : Fluxys - Wilscele-Loenhout
													BE : Fluxys - Alveringem-Maldegem
													FR : Reverse Flow between FR>BE
													FR : System devnt for Dunkerque LNG
													FR : System devnt to increase the entry capacity at Taisnières IP (+50 GWh/d)
													BE : Fluxys - CS Winksele
													BE : Fluxys - CS Berneau
													Country
													System Operator 2
													Direction
													Country
													System Operator 1
													Name Location
													Entsog Capacity Map 2011 Number
CROSS-BORDER IP													
12	Blaregnies Segeo (BE) / Taisnières (H) (FR)	Fluxys	BE	>	GRTgaz	FR	X	X	X				X
13	Blaregnies Troll (BE) / Taisnières (H) (FR)	Fluxys	BE	>	GRTgaz	FR	X	X	X				X
NA	FR > BE (New IP or reverse flow at Taisnières)	GRTGaz	FR	>	Fluxys	BE				X	X	X	

## Belgium ↔ Germany



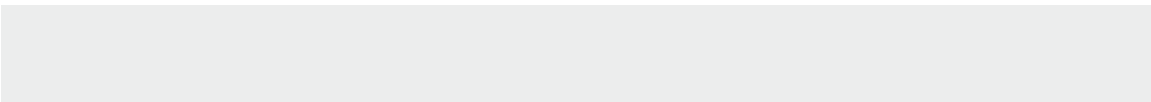
													New
BE : Fluxys - Wilsela-Loenhout													
BE : Fluxys - Alveringem-Maldegem													
DE : Extension of the WINGAS TRANSPORT Grid"													Non FID
DE : Reverse Flow Stolberg-Porz													
DE : Sannerz-Rimpar													
BE : Fluxys - CS Winksele													
BE : Fluxys - CS Berneau													
FID													
Country													
System Operator 2													
Direction													
Country													
System Operator 1													
Name Location													
Entsog Capacity Map 2011 Number													
CROSS-BORDER IP													
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Wingas Transport	DE	X	X				X	X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Wingas Transport	DE	>	Fluxys	BE		X			X		X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	OGE	DE	X	X	X	X		X	X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	EG	DE	>	Fluxys	BE		X	X	X			X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Eni Gastransp. Deutschland	DE	X	X				X	X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Eni Gastransp. Deutschland	DE	>	Fluxys	BE		X					X
8	Eynatten (BE) // Lichtenbusch / Raeren (DE)	Fluxys	BE	>	Thyssengas	DE	X	X				X	X

Ireland ↔ United Kingdom

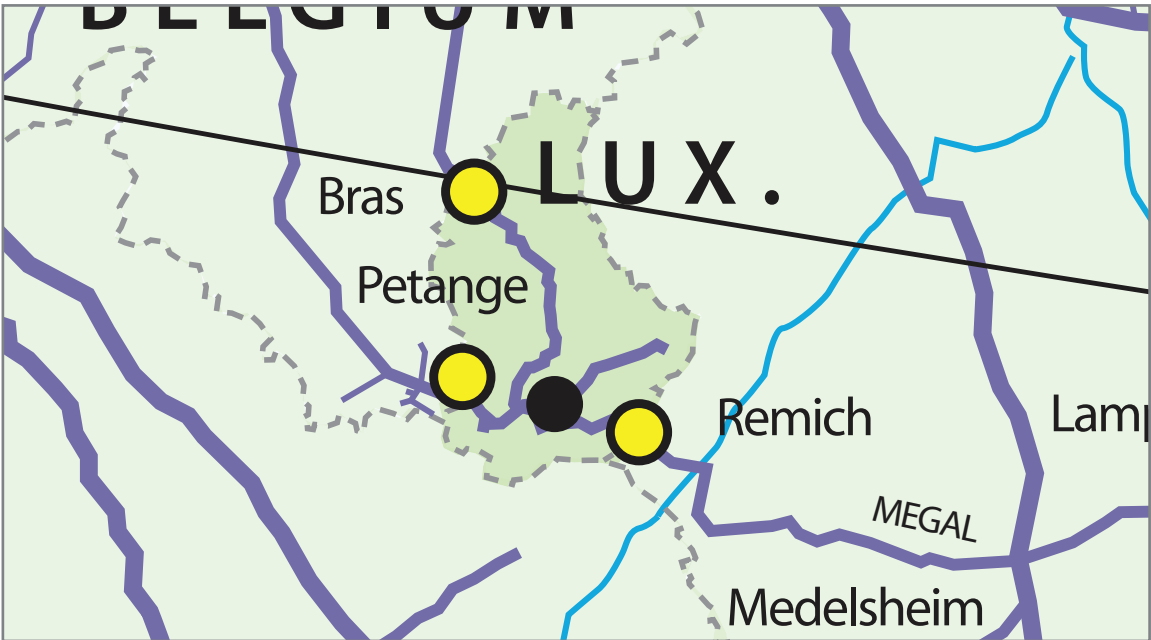


Non FID							
UK : Cluden							
Country							
System Operator 2							
Direction							
Country							
System Operator 1							
Name Location							
Entsog Capacity Map 2011 Number							
CROSS-BORDER IP							
23	Twynholm	Gaslink	IE	>	Premier Transmission	UK NIR	X





France ↔ Luxembourg



New	
LU : IP devnt between FR > LU	
FR : IP devnt between FR > LU	
FR : System devnt for Dunkerque LNG	
Country	
System Operator 2	
Direction	
Country	
System Operator 1	
Name Location	
Entsog Capacity Map 2011 Number	
CROSS-BORDER IP	
NA	New IP : FR > LU
	GRTGaz
FR	>
	CREOS
LU	X
	X
	X

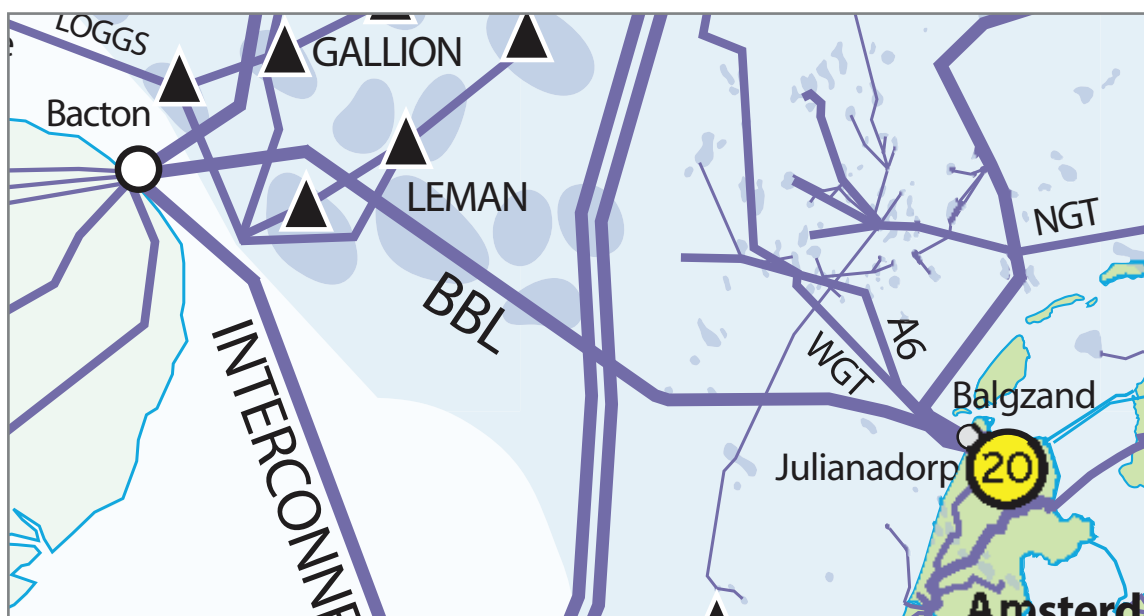
## The Netherlands ↔ Germany



New	NL : Further Gas Roundabout Enhancements
Non FID	DE : GUD Capacity Enhancement
	DE : Extension of the WINGAS TRANSPORT Grid"
	NL : GTS System Capacity Enhancements FID
	DE: System Capacity Enhancements
	DE : Reverse Flow Stolberg-Porz
FID	DE : Sannerz-Rimpar
	Country
	System Operator 2
	Direction
	Country
System Operator 1	
Name Location	
Entsog Capacity Map 2011 Number	

CROSS-BORDER IP													
15	Bocholtz	GTS	NL	>	OGE	DE	X	X		X			
16	Zevenaar	GTS	NL	>	OGE	DE			X	X			
19	Bunde (DE) / Oude Statenzijl (H) (NL) I	GTS	NL	>	OGE	DE				X			X
19	Bunde (DE) / Oude Statenzijl (H) (NL) I	Open Grid Europe	DE	>	GTS	NL				X			X
19	Bunde (DE) / Oude Statenzijl (H) (NL) II	GTS	NL	>	OGE	DE				X			X
19	Bunde (DE) / Oude Statenzijl (H) (NL) II	Open Grid Europe	DE	>	GTS	NL				X			X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	GTS	NL	>	Wingas Transport	DE				X			X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	Wingas Transport	DE	>	GTS	NL				X	X		X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	GTS	NL	>	Gasunie DE TS	DE				X		X	X
19	Bunde (DE) / Oude Statenzijl (H) (NL)	Gasunie DE TS	DE	>	GTS	NL				X		X	X
19	Bunde (DE) / Oude Statenzijl (L) (NL)	GTS	NL	>	Gasunie DE TS	DE						X	

## The Netherlands ↔ United Kingdom



New	
NL : Further Gas Roundabout Enhancements	
NL : GTS System Capacity Enhancements FID	
Country	
System Operator 2	
Direction	
Country	
System Operator 1	
Name Location	
Entsog Capacity Map 2011 Number	

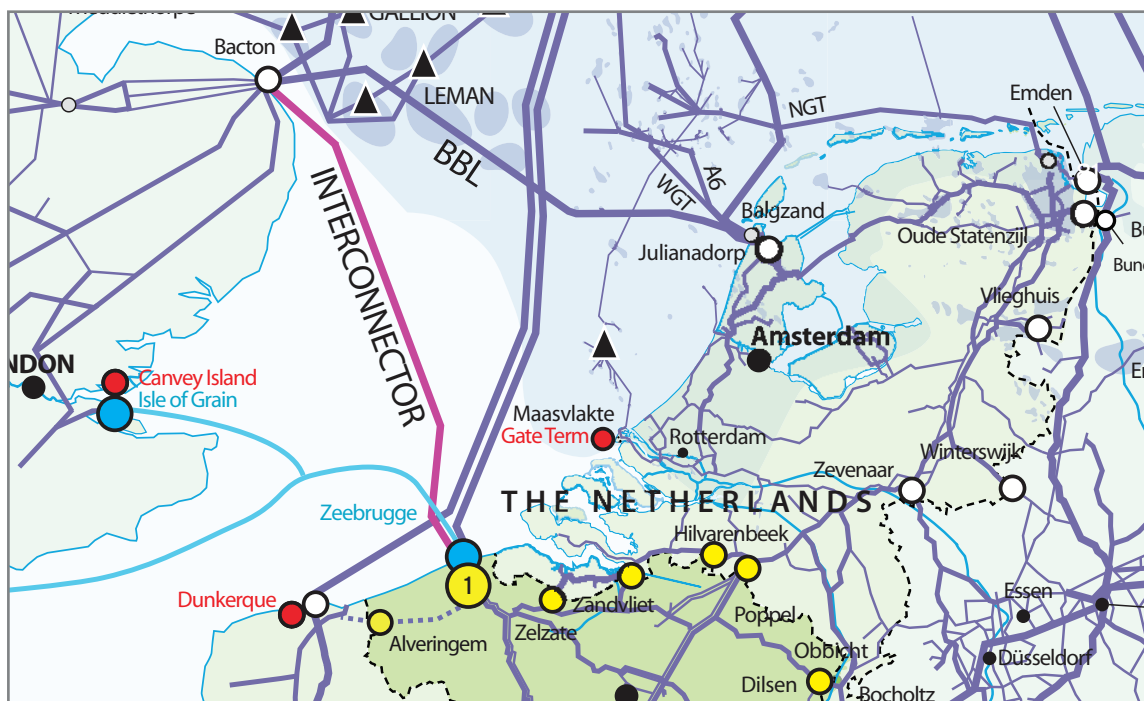
CROSS-BORDER IP									
20	Julianadorp (GTS) / Balgzand (BBL)	GTS	NL	>	BBL company	UK	X	X	

## Belgium ↔ The Netherlands

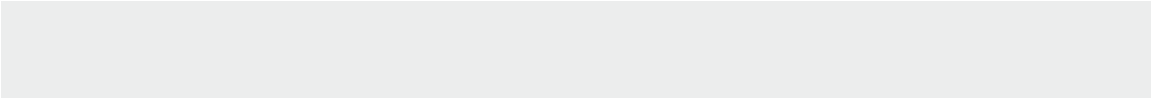


New													
NL : Further Gas Roundabout Enhancements													
BE : Fluxys - Wilsede-Loenhout													
BE : Fluxys - Alveringem-Maldegem													
NL : GTS System Capacity Enhancements FID													
BE : Fluxys - CS Winksele													
BE : Fluxys - CS Berneau													
FID													
Country													
System Operator 2													
Direction													
Country													
System Operator 1													
Name Location													
Entsog Capacity Map 2011 Number													
CROSS-BORDER IP													
2	Zelzate	Fluxys	BE	>	GTS	NL		X	X		X	X	X
2	Zelzate	GTS	NL	>	Fluxys	BE		X	X			X	X
2	Zelzate	Fluxys	BE	>	Zebra Pijpleiding	NL		X			X	X	
4	Hilvarenbeek (NL)	GTS	NL	>	Fluxys	BE			X				
6	's Gravenvoeren (NL)// 's Gravenvoeren Dilsen (BE)	GTS	NL	>	Fluxys	BE	X	X	X			X	X

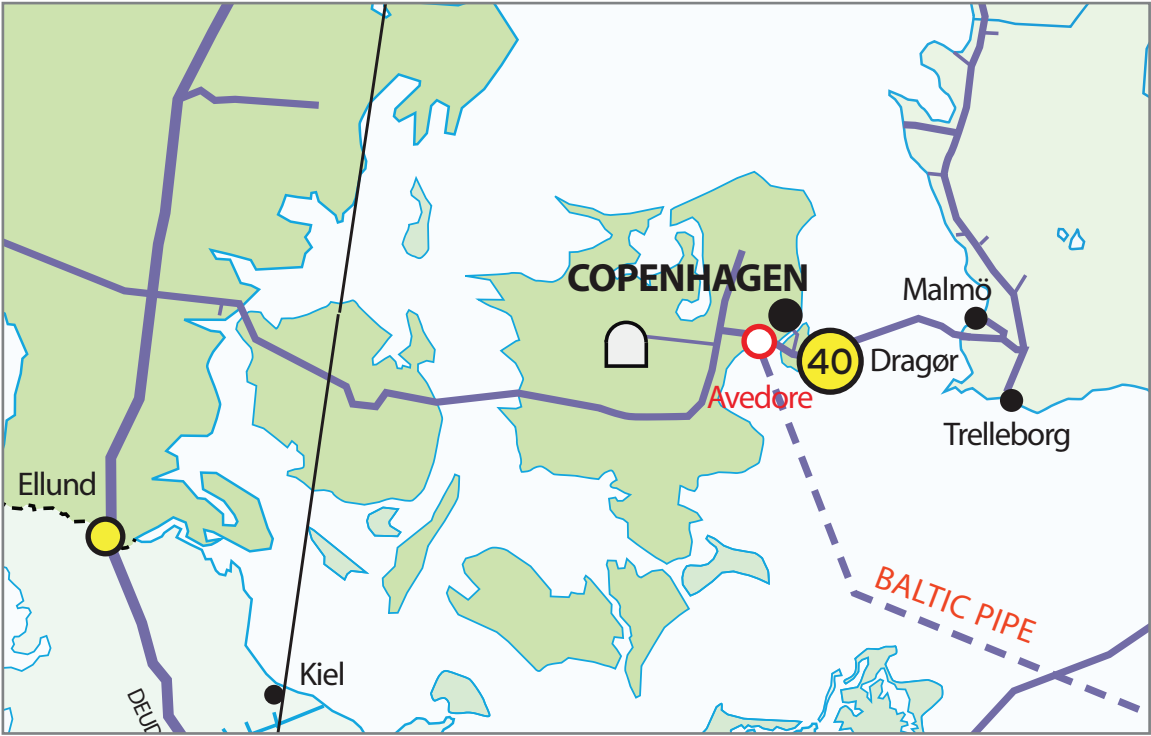
## Belgium ↔ United Kingdom



New										
UK : Interconnector Forward Flow Enhancement										
BE : Fluxys - Wilsede-Loenhout										
BE : Fluxys - Alveringem-Maldegem										
BE : Fluxys - CS Winksele										
FID										
Country										
System Operator 2										
Direction										
Country										
System Operator 1										
Name Location										
Entsog Capacity Map 2011 Number										
CROSS-BORDER IP										
1	Zeebrugge IZT / HUB	Interconnector	UK	>	Fluxys	BE	X		X	X
1	Zeebrugge IZT / HUB	Fluxys	BE	>	Interconnector	UK	X	X	X	

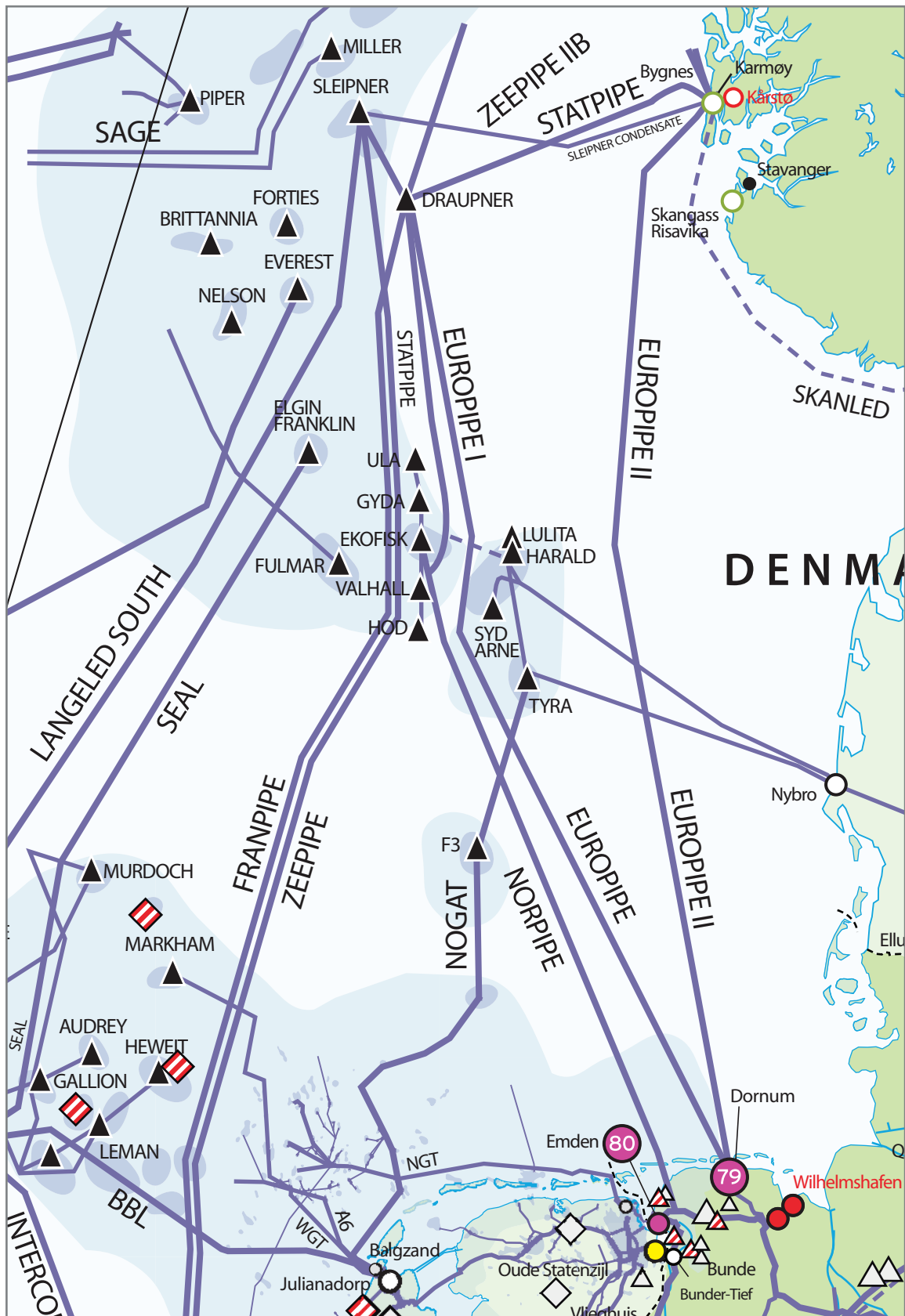


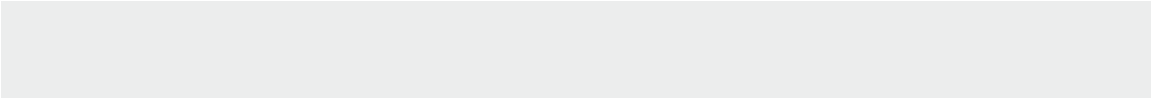
Denmark ↔ Sweden



Non FID									
FID		DE : GUD Capacity Enhancement							
		Dk : Ellund-Egtved looping							
		Dk : Egtved Compressor							
		Country							
		System Operator 2							
		Direction							
		Country							
System Operator 1									
		Name Location							
		Entsog Capacity Map 2011 Number							
CROSS-BORDER IP									
40	Dragør	Energinet.dk	DK	>	Swedegas	SE	X	X	

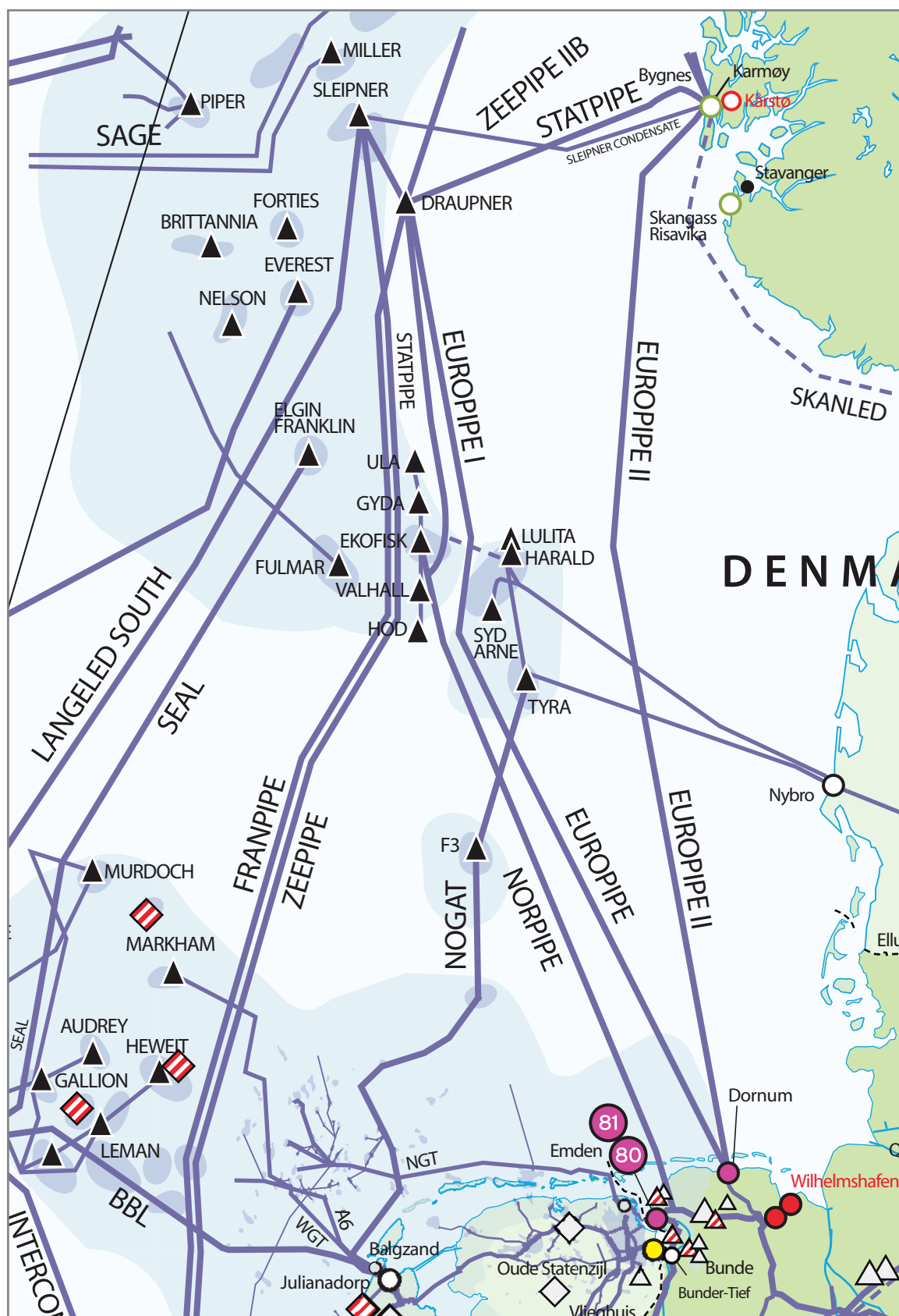
# Norway ↔ Germany

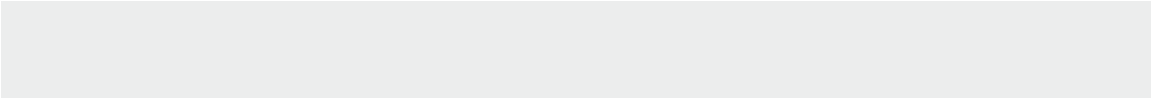




FID									
DE : Sannerz-Rimpar									
Country									
System Operator 2									
Direction									
Country									
System Operator 1									
Name Location									
Entsog Capacity Map 2011 Number									
NON-EU (import)									
79	Dornum / NETRA	Gassco	NO	>	OGE	DE	X		
80	Emden (EPT1)	Gassco	NO	>	OGE	DE	X		

## Norway ↔ The Netherlands





FID									
NL : GTS System Capacity Enhancements FID									
Country									
System Operator 2									
Direction									
Country									
System Operator 1									
Name Location									
Entsog Capacity Map 2011 Number									
NON-EU (import)									
80	Emden (EPT1)	Gassco	NO	>	GTS	NL		X	
81	Emden (NPT)	Gassco	NO	>	GTS	NL		X	

## Norway ↔ Sweden



Non FID

SE : Skanled							
Country							
System Operator 2							
Direction							
Country							
System Operator 1							
Name Location							
Entsog Capacity Map 2011 Number							
NON-EU (import)							
NA	Lysekil / Vallby Kile	Gassco	NO	>	Swedegas	SE	X



© Image courtesy of Energinet.dk

