ENERGY VULNERABILITIES IN EUROPE

EUROPEAN ENERGY SECURITY: GAS FOCUS

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EUROPEAN ENERGY SECURITY: GAS FOCUS

- ❑ Dependency
- ❑ Vulnerability
- ❑ Affordability

Dependency

- Dependency and energy security. Two definitions of energy security

  - ✓ European Commission: the security of supply in the long term, must assure the welfare of the people and the good performance of the economy, with the availability without interruptions of energy products in the market, affordable prices for all consumers, and looking for the sustainable development.

  - ✓ IEA: suitable energy supply, affordable and reliable

- Gas demand and production in europe

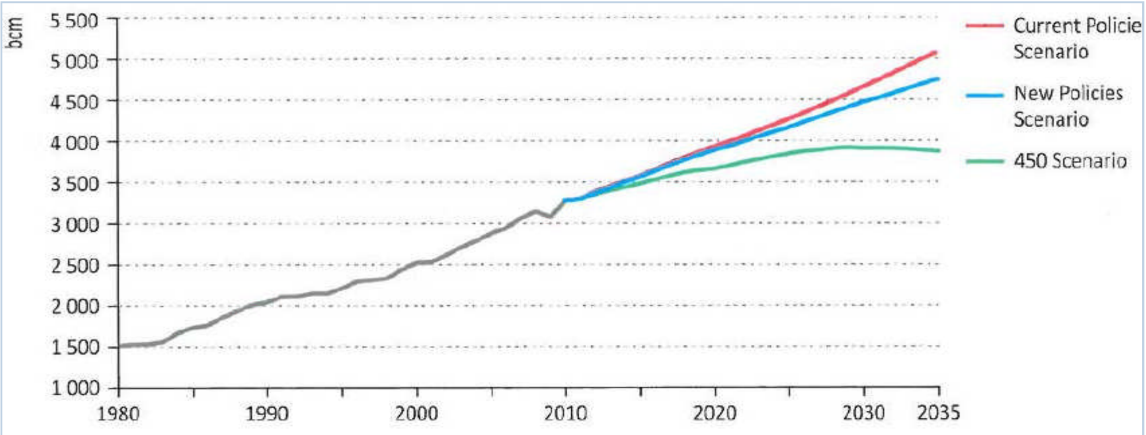
✓ Increasing needs of imports

		Gas Demand and Production in Europe				
		2010	2015	2020	2030	Annual growth rate 2010-2030
Europe	Demand	570	600	640	743	1,30%
	Production	301	270	220	155	-3,30%
	Deficit	-269	-330	-420	-588	

Source: "Cedigaz Energy Outlook 2030 (June 2012)

- IEA estimates gas growth worldwide but with lower rate in Europe

Bcm	1980	2009	2015	2020	2035	2009-2035
Europe	264	537	604	627	671	0.9%
Non-OECD	557	1558	1911	2183	2417	2.4%



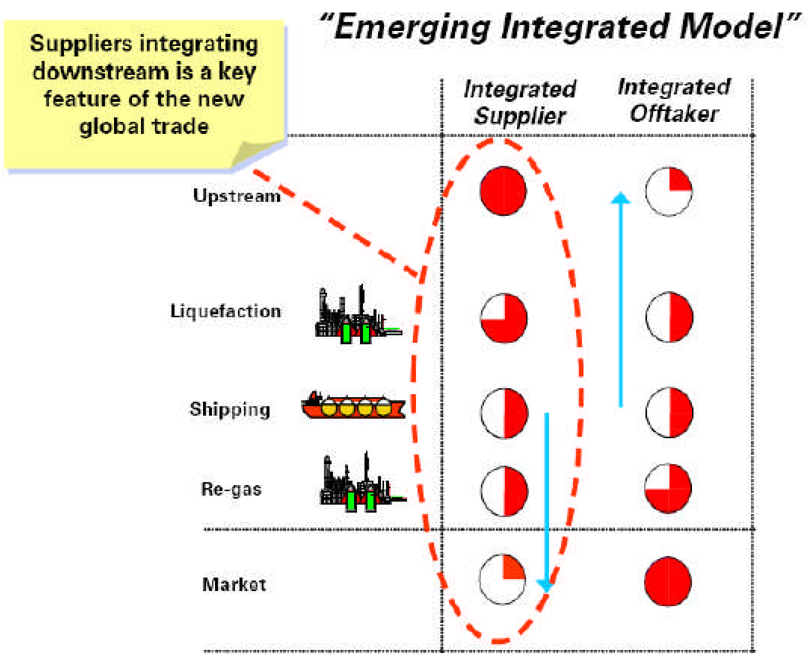
Source: WEC 2011

Dependency

- To mitigate dependency: vertical integration

Trends in vertical integration

- Integration being driven more out of necessity than desire
  - Particularly in the Atlantic Basin
  - But integration does help control project delivery
- An increasing proportion of trade is taking place within integrated portfolios
  - ~1/3 of total volumes by 2010
- As a result, some of the largest suppliers (including NOCs) are becoming the largest buyers of LNG
  - Qatar Petroleum largest supplier of gas for LNG and purchaser of LNG by 2010



Source: Wood Mackenzie

Source: Oil & Gas for Beginners 2010

- To mitigate dependency: "soft power"

Dimension	Objectives	Policy tipes	Characteriscs	Taken steps
Geopolitics	Decrease of geopolitics risk	Hard power	Power Politic	Coercive diplomacy Sovereignty
			Military power	Wars Alliance
			Economic power	Seizure Duties
		Soft power	Talks and negotiations	Foreign policies Agreements Collaborations Negotiations Treaties

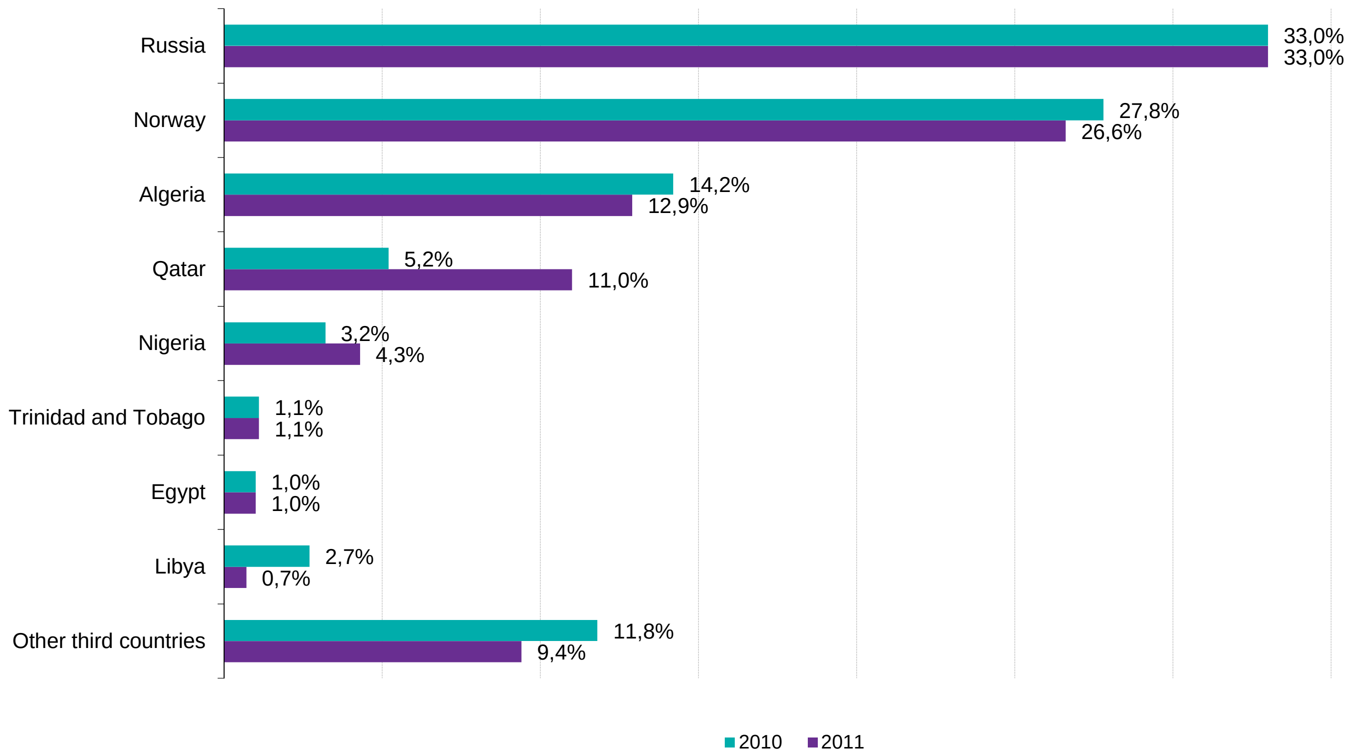
Source: "Seguridad del abastecimiento energético en la UE-27: Dimensiones, Políticas y Convergencia".
Laura Rodríguez Fernández

- Vulnerability: Three basic elements

  - ✓ Diversification of the imports
  - ✓ Strategic and operative storage
  - ✓ Connectivity: gas interconnections (and markets)

- Vulnerability: Three basic elements

✓ Diversification of the imports

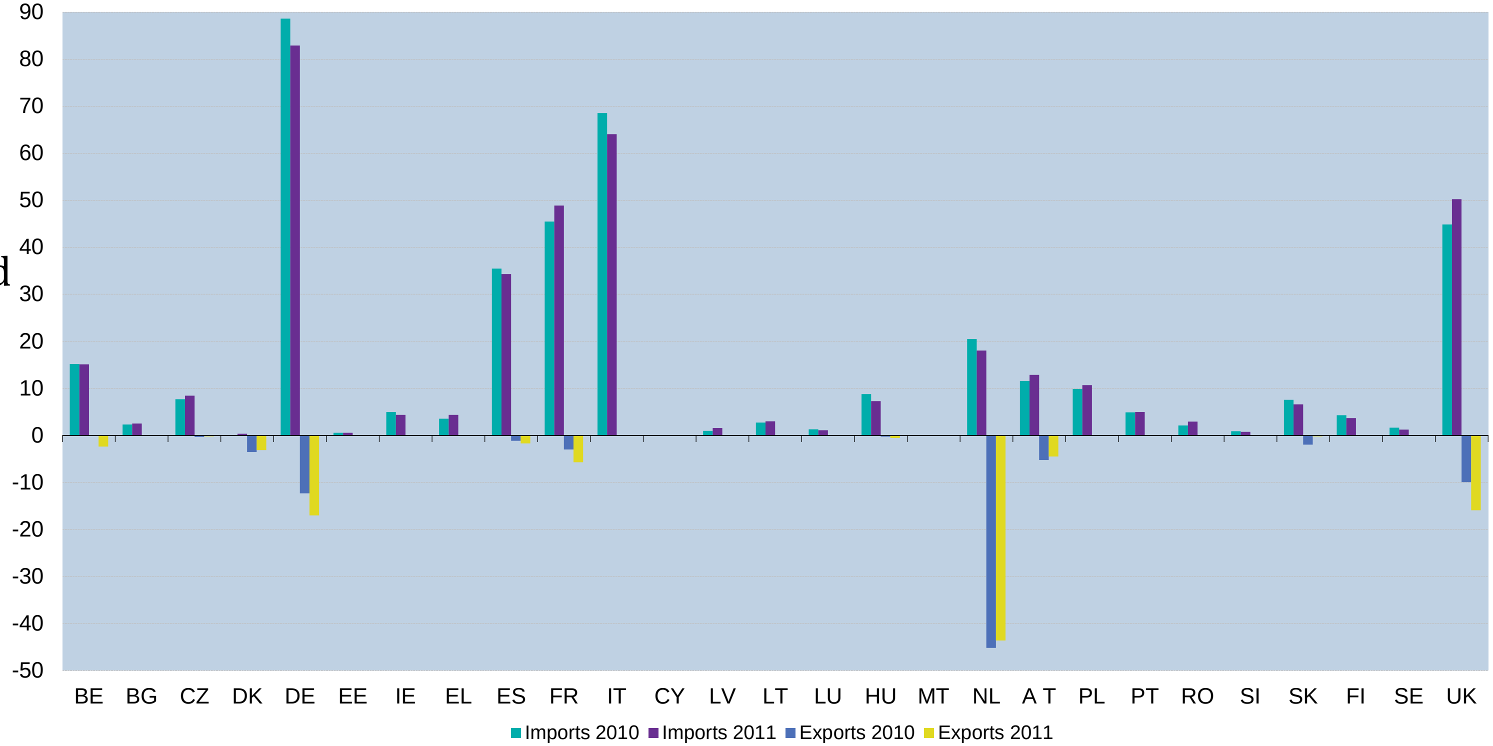


Source: Natural gas consumption statistics. Eurostat.
(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Natural_gas_consumption_statistics)

Vulnerability: Three basic elements

✓ Diversification of the imports

Total imports and exports, 2011, in million toe



Source: Natural gas consumption statistics. Eurostat.
(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Natural_gas_consumption_statistics)

Vulnerability: Three basic elements

- ✓ Diversification of the imports
  - ✓ Diversity of situations
  - ✓ Improvement from 2000 to 2010
  - ✓ LNG contribution

Países	Concentración 2000	Concentración 2010	Δ2000-2010, %
Concentración Alta			
Luxemburgo	70,4	100,0	41,9
Irlanda	99,9	100,0	0,1
Malta	70,4	99,4	41,1
Letonia	91,1	96,2	5,7
Lituania	98,9	93,5	-5,4
Estonia	98,3	91,5	-7,0
Finlandia	85,7	90,1	5,2
Suecia	76,4	85,9	12,5
R. Checa	60,3	84,0	39,4
Rumanía	95,5	83,7	-12,4

Países	Concentración 2000	Concentración 2010	Δ2000-2010, %
Concentración Media			
Holanda	96,0	76,5	-20,4
Bélgica	68,8	76,2	10,6
Dinamarca	98,8	75,6	-23,4
Bulgaria	100,0	73,6	-26,4
Chipre	81,9	73,3	-10,5
Eslovaquia	98,3	72,5	-26,2
Hungría	68,1	71,8	5,6
UE-27	**76,8**	**70,2**	**-8,6**
Austria	75,7	59,5	-21,4
Francia	35,2	55,9	58,8
Reino Unido	96,6	52,0	-46,1

Países	Concentración 2000	Concentración 2010	Δ2000-2010, %
Concentración Baja			
Alemania	51,2	49,9	-2,5
Portugal	94,6	46,4	-50,9
Grecia	59,5	46,1	-22,5
Polonia	60,8	43,4	-28,7
Italia	56,9	35,7	-37,2
Eslovenia	39,1	34,8	-10,9
España	45,8	28,5	-37,7

Source: "Seguridad del abastecimiento energético en la UE-27: Dimensiones, Políticas y Convergencia".
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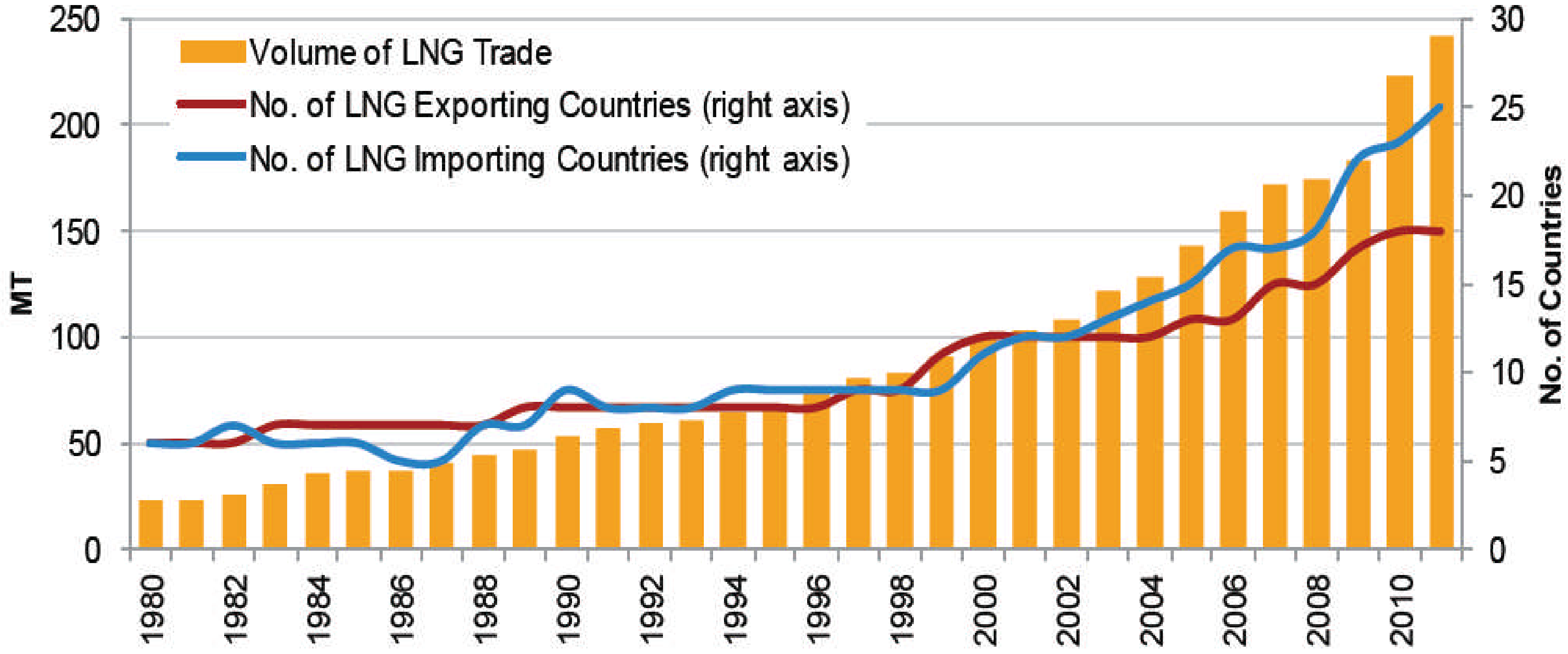
- LNG trade volumes diversification



Sources: Cedigaz, Waterborne LNG Reports, US Energy Information Agency (EIA), US Department of Energy (DOE), PFC Energy

• Vulnerability: Three basic elements

✓ Diversification of the imports

- In 2012, the main importer of LNG in the EU is Spain, with a share of 31%, the next one is the UK with the 24% and in the third position is France with the 15%

- The imports of LNG during the 2012 have decreased 28% respect the same period of 2011

Supply of LNG in Europe depending on the importer country

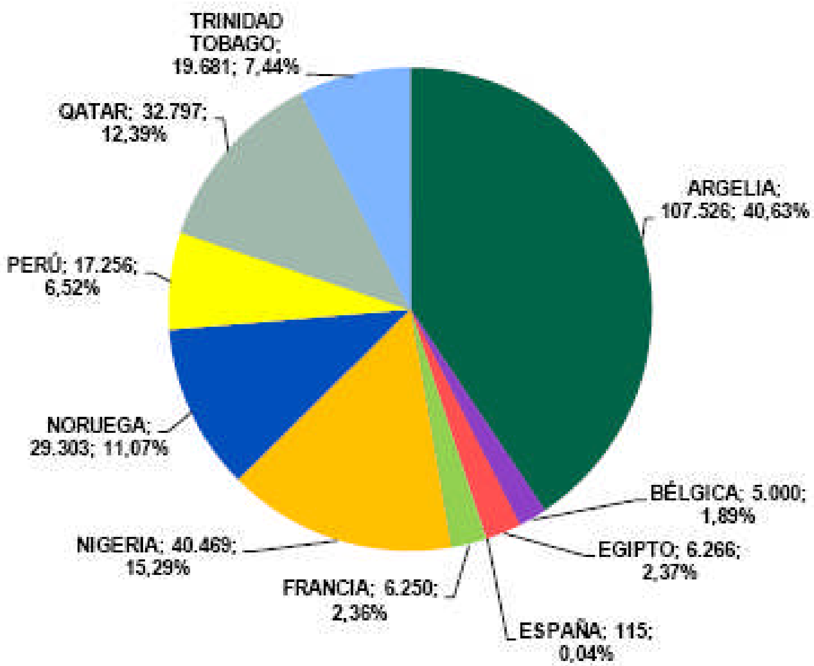
Enero-agosto 2012	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre	Total 2012 miles t	Total 2012 %
Bélgica	408	351	350	217	189	217	284	347					2.363	7,0%
Francia	686	898	713	685	440	604	514	665					5.205	15,4%
Grecia	139	177	89	62	56	57	104	97					781	2,3%
Italia	504	410	531	543	507	449	314	292					3.550	10,5%
Portugal	183	116	124	90	126	60	183	250					1.132	3,4%
España	1.405	1.431	1.264	1.406	1.247	1.029	1.242	1.534					10.558	31,3%
Holanda	121	0	64	56	0	0	118	0					359	1,1%
Turquía	636	419	564	232	440	398	346	454					3.489	10,4%
Reino Unido	1.036	846	888	1.168	1.279	875	647	1.363					8.102	24,0%
Re-exportaciones	-125	-191	-206	-444	-283	-133	-281	-179					-1.842	-5,5%
Total	**4.993**	**4.457**	**4.381**	**4.015**	**4.001**	**3.556**	**3.471**	**4.823**	**0**	**0**	**0**	**0**	**33.697**	**100%**

Source: CNE (http://www.cne.es/cne/doc/publicaciones/IAP_Abastecimient-Ago12.pdf)

- Vulnerability: Three basic elements

✓ Diversification of the imports

Structure of gas imports in Spain

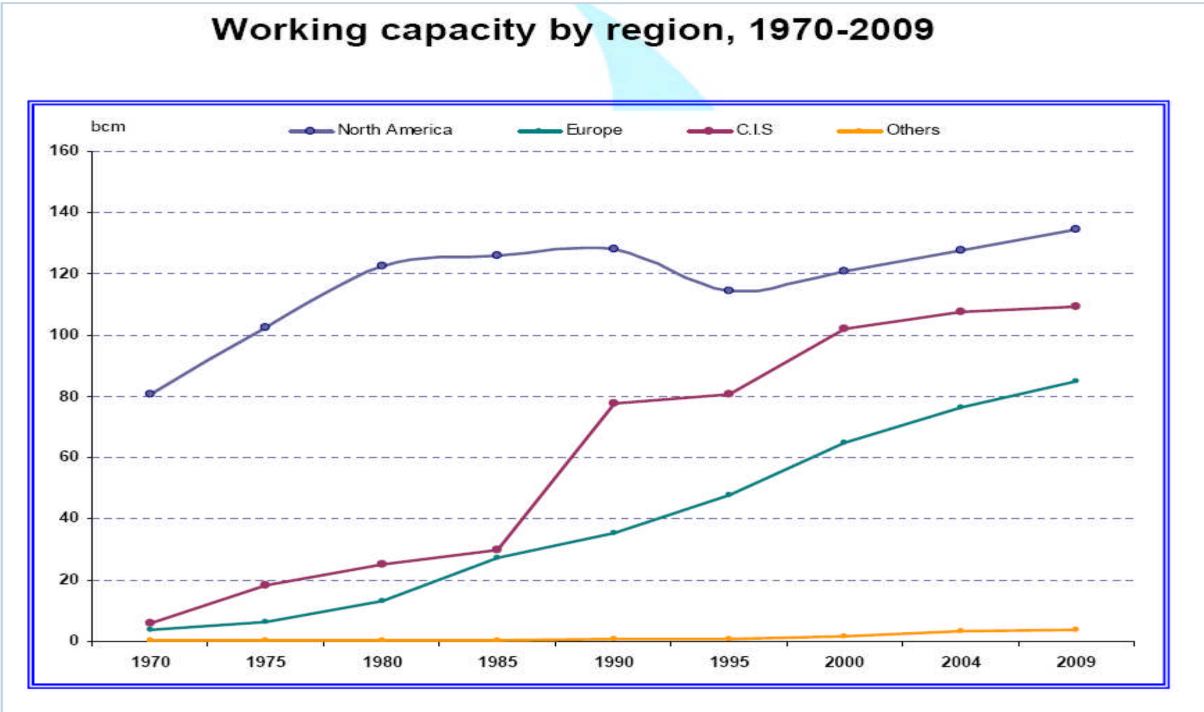


Source: CNE (http://www.cne.es/cne/doc/publicaciones/IAP_Abastecimient-Ago12.pdf)

- Three basic elements

✓ Strategic and operative storage

✓ Increasing volumes worldwide since 70's



Source: Rouaud T. Gas Storage, SMI Conference. (June, 2010)

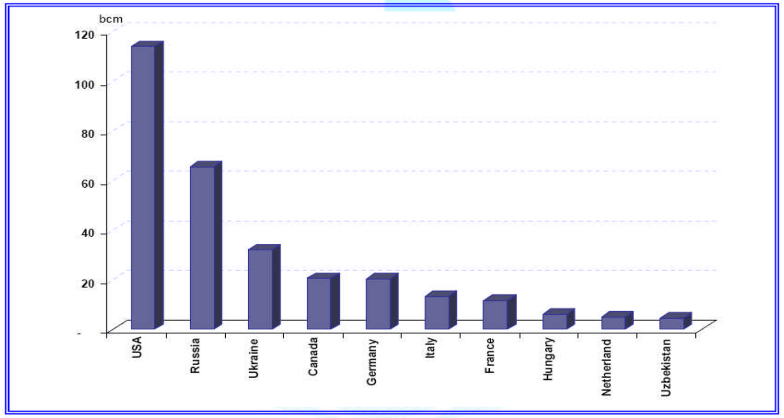
Vulnerability

- Three basic elements

✓ Strategic and operative storage

- Europe is below areas like North America and Russia

UGS working capacity, world top-ten countries, as of January 2010



Source: Rouaud T. Gas Storage, SMI Conference. (June, 2010)

UGS facilities in the world, as of January 2010

	Depleted fields	Aquifers	Salt caverns	Others
Americas	79.5%	11.1%	9.4%	-
Europe	55.0%	18.3%	24.4%	2.3%
C.I.S	72.5%	25.5%	2.0%	-
Asia/Oceania	91.6%	-	8.4%	-

Country	Number of UGS facilities in Operation					Working gas capacity	Max. withdrawal rate
	Depleted fields	Aquifers	Salt caverns	Others	Total	Mcm (10^6 m^3)	Mcm/d
AMERICAS	358	50	42	-	450	134,680	2,705.7
EUROPE	71	24	32	3	130	85,586	1,594.0
C.I.S	36	13	1	-	50	109,246	1,015.0
ASIA/OCEANIA	11	-	1	-	12	3,850	17.1
TOTAL	476	87	76	3	642	333,362	5,332.0

Source: Rouaud T. Gas Storage, SMI Conference. (June, 2010)

• Three basic elements

✓ Strategic and operative storage

- Underground storage is key for supporting seasonal variations and gas crisis situations

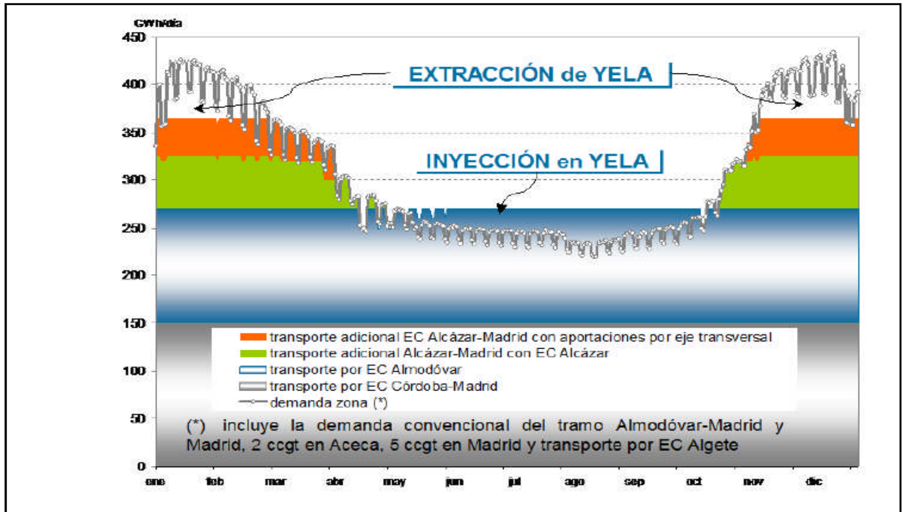
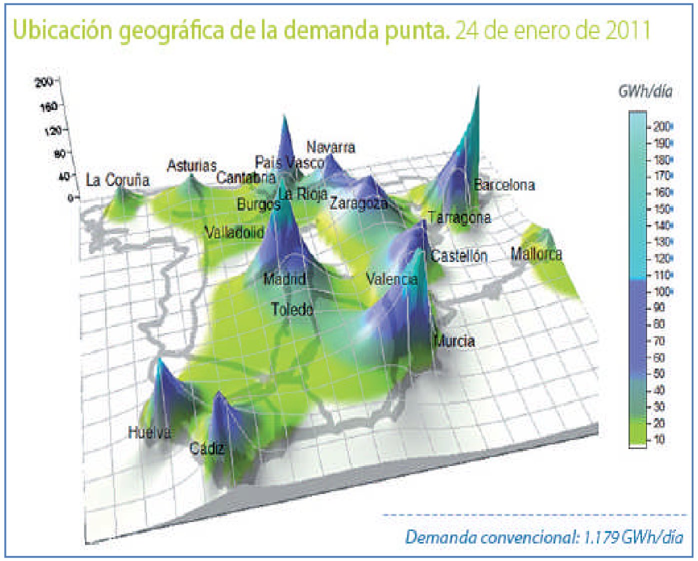


Figura 5: Contribución del AS de Yela a la modulación de la demanda del Sistema

Source: González Julia, J. Gestión Técnica del Sistema. Curso de Energía y Competitividad: Gas, Redes y Renovables. (2011).

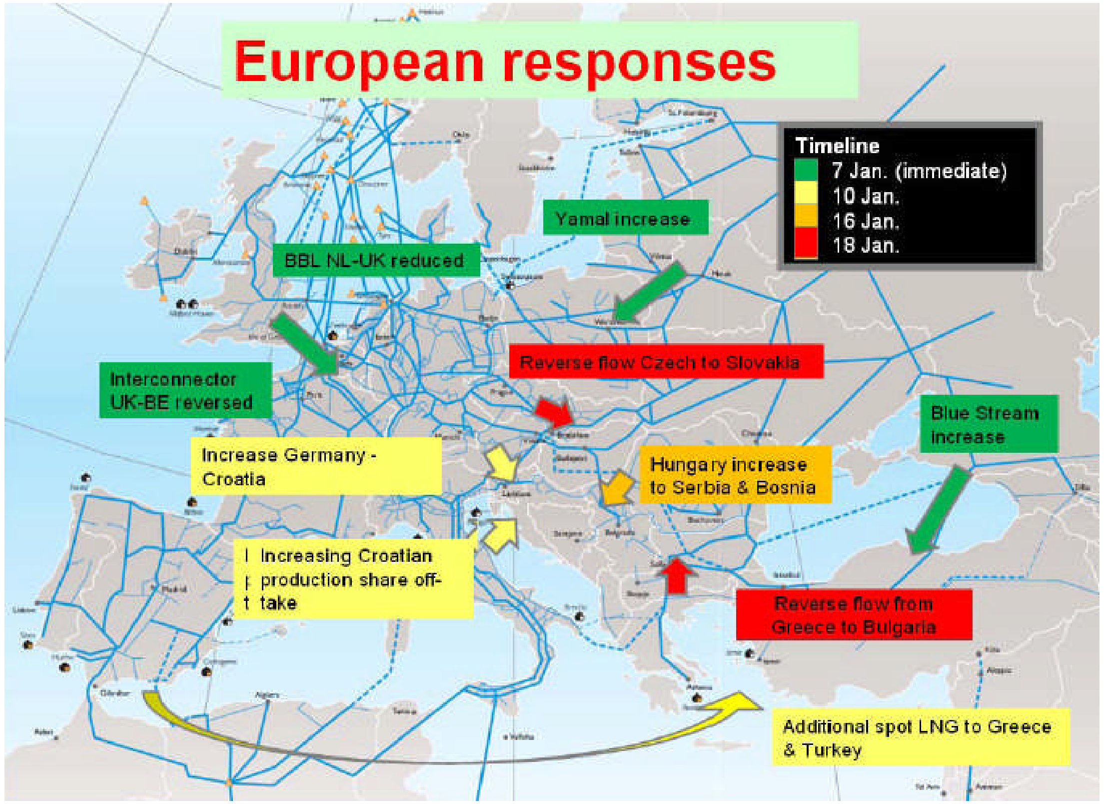


Source: Enagas (2011)

• Three basic elements

✓ Connectivity: gas interconnection and markets

Contribution in crisis situations

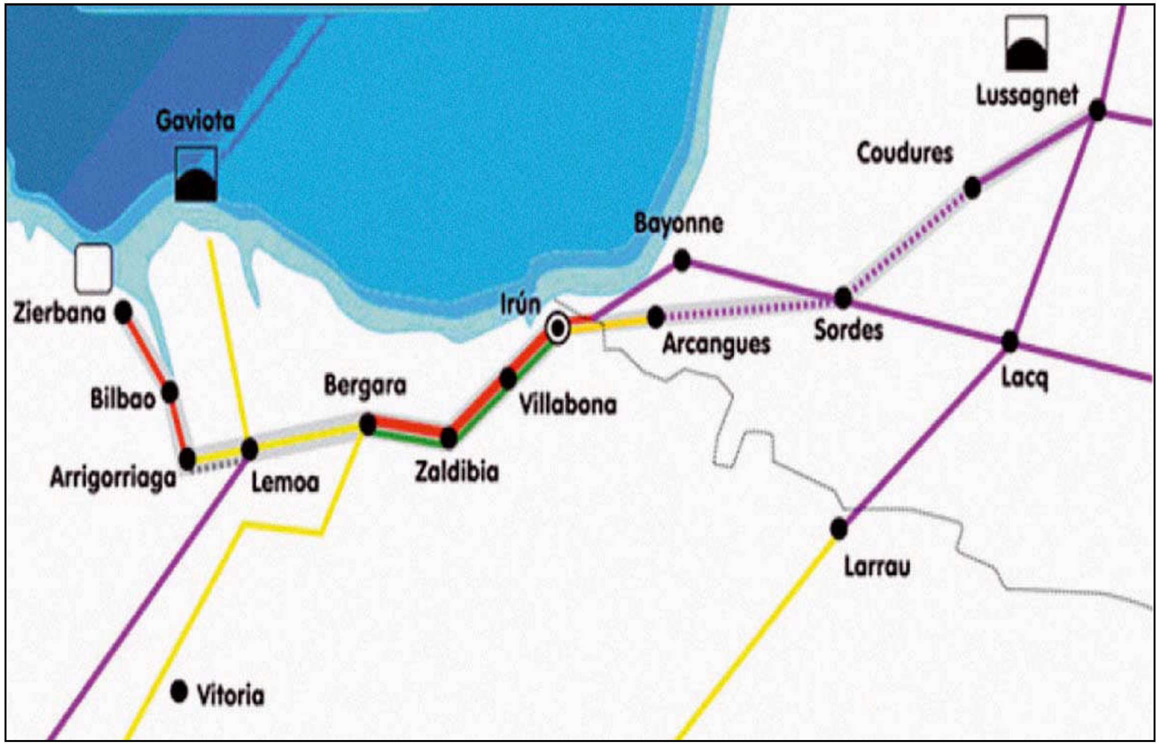


Source: *"Security of Supply in South Eastern Europe: Potential Contribution of Planned Pipelines, LNG and Storage".* Oxford Institute for Energy Studies

Vulnerability: Three basic elements

✓ Connectivity: gas interconnection and markets

- Need for improve physical interconnections

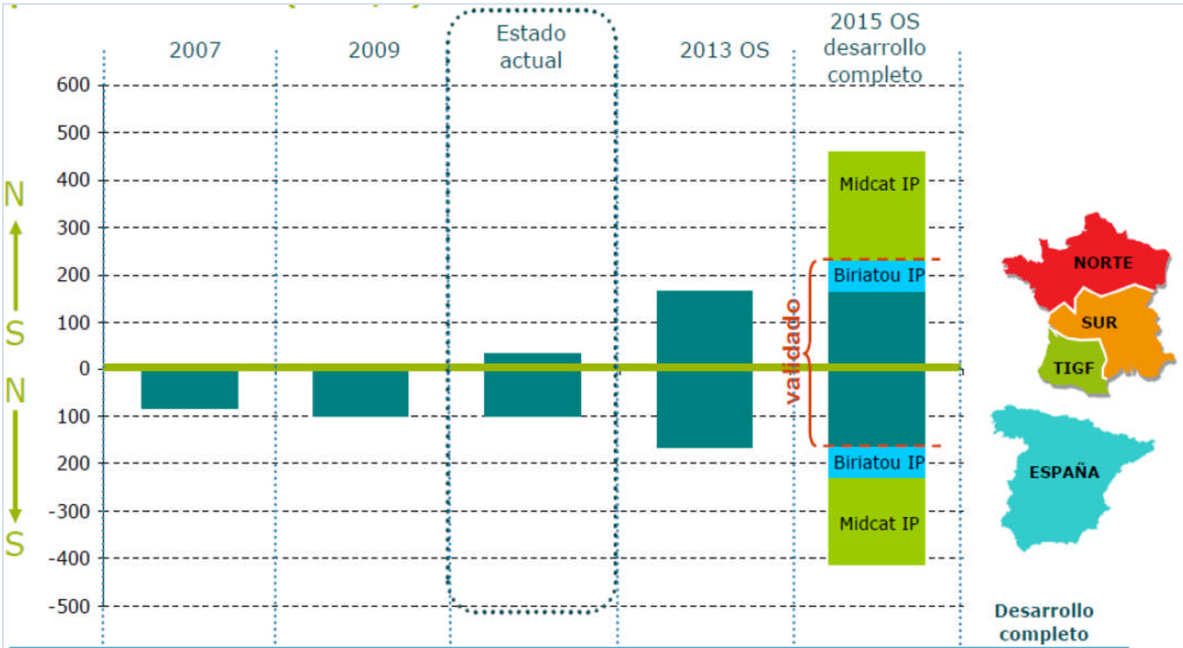


Source: Enagas (2011)

• Vulnerability: Three basic elements

✓ Connectivity: gas interconnection and markets

- European integration. Physical capacities (GWh/d)



	2007	2009	Estado actual	2013 OS	2015 OS desarrollo completo	Desarrollo completo
N → S	87 GWh/d 2,7 bcm/a	100 GWh/d 3,1 bcm/a	100 GWh/d 3,1 bcm/a	165 GWh/d 5,2 bcm/a	165 GWh/d 5,2 bcm/a	**405 GWh/d** **12,7 bcm/a**
S → N	-	5 GWh/d 0,1 bcm/a	35 GWh/d 0,9 bcm/a	170 GWh/d 5,2 bcm/a	225 GWh/d 7,1 bcm/a	**455 GWh/d** **14,3 bcm/a**

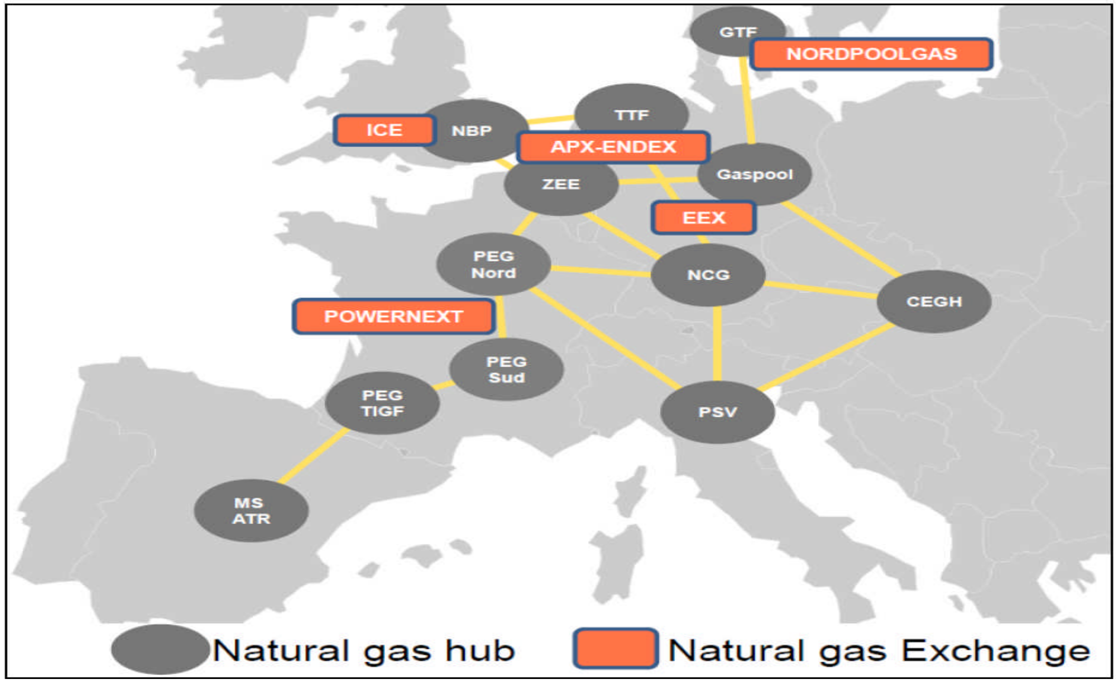
Source: "Regulación Básica Gasista". Raúl Yunta Huete

- Vulnerability: Three basic elements

✓ Connectivity: gas interconnection and markets

- Markets: Continuous evolution during the last 10 years with some differentiated roles and increasing volume in different type of Markets

Figure 1: European gas hubs and gas exchanges



Source: Patrick Heather. Oxford Institute for General Studies (Junio 2012)

• Vulnerability: Three basic elements

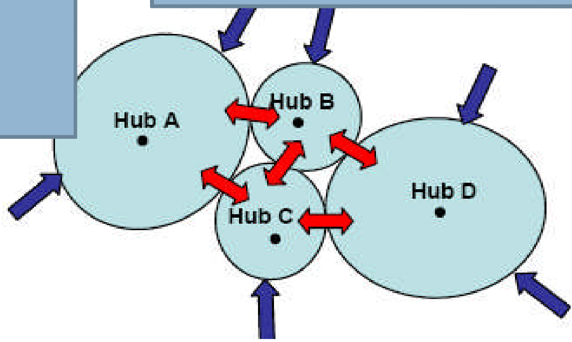
✓ Connectivity: gas interconnection and markets

- Role of European gas hubs and gas target model.

- ➢ Recent developments in Spain. Iberian gas Hubs. (Initially, EVE, Enagas, Kutxabank and CaixaBank).
- ➢ With the framework/objective of a gas target model.

• THE MODEL ENVISAGES THE DEVELOPMENT OF "LIQUID HUBS" CONNECTED.
• INTERCONNEXION CAPACITY WOULD BE AUCTIONED

• THE MODEL TRIES TO OBTAIN A BETTER INTEGRATION OF DOMESTIC MARKETS

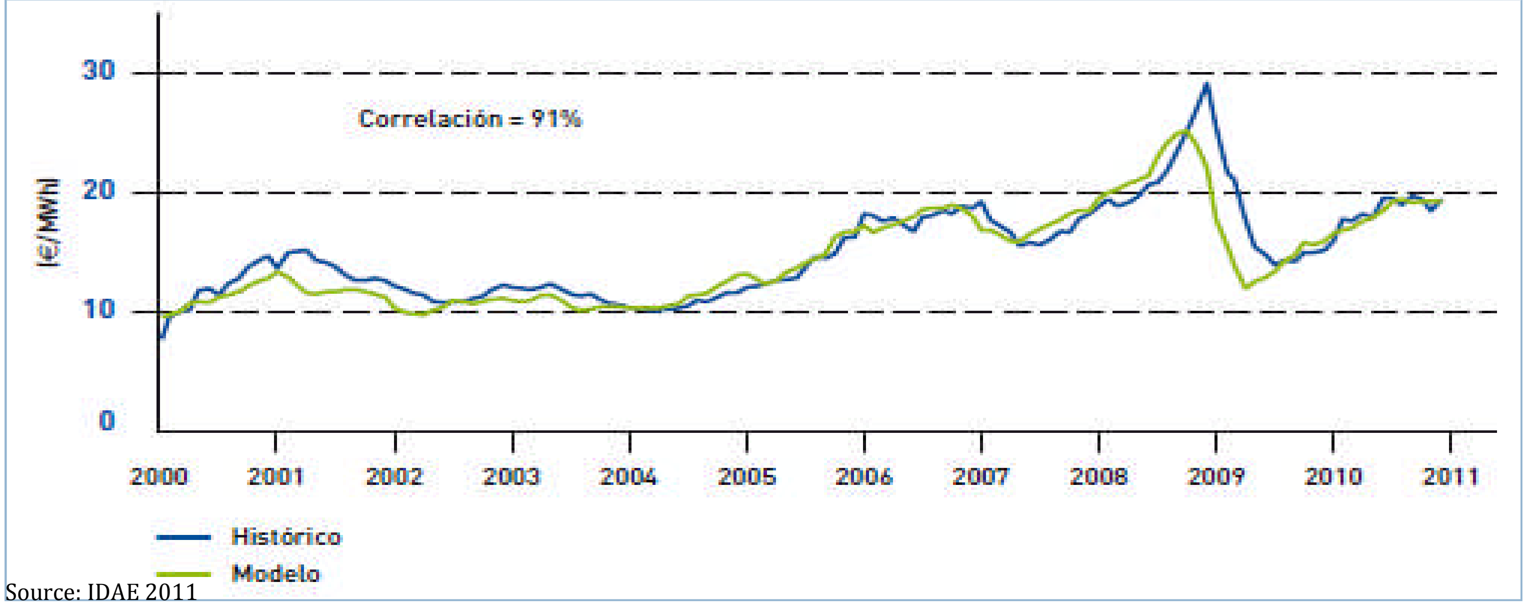


Source: Yunta, R. (2011)

• Competitiveness . Gas for the final consumers

✓ Increase in gas prices do not facilitate gas market penetration

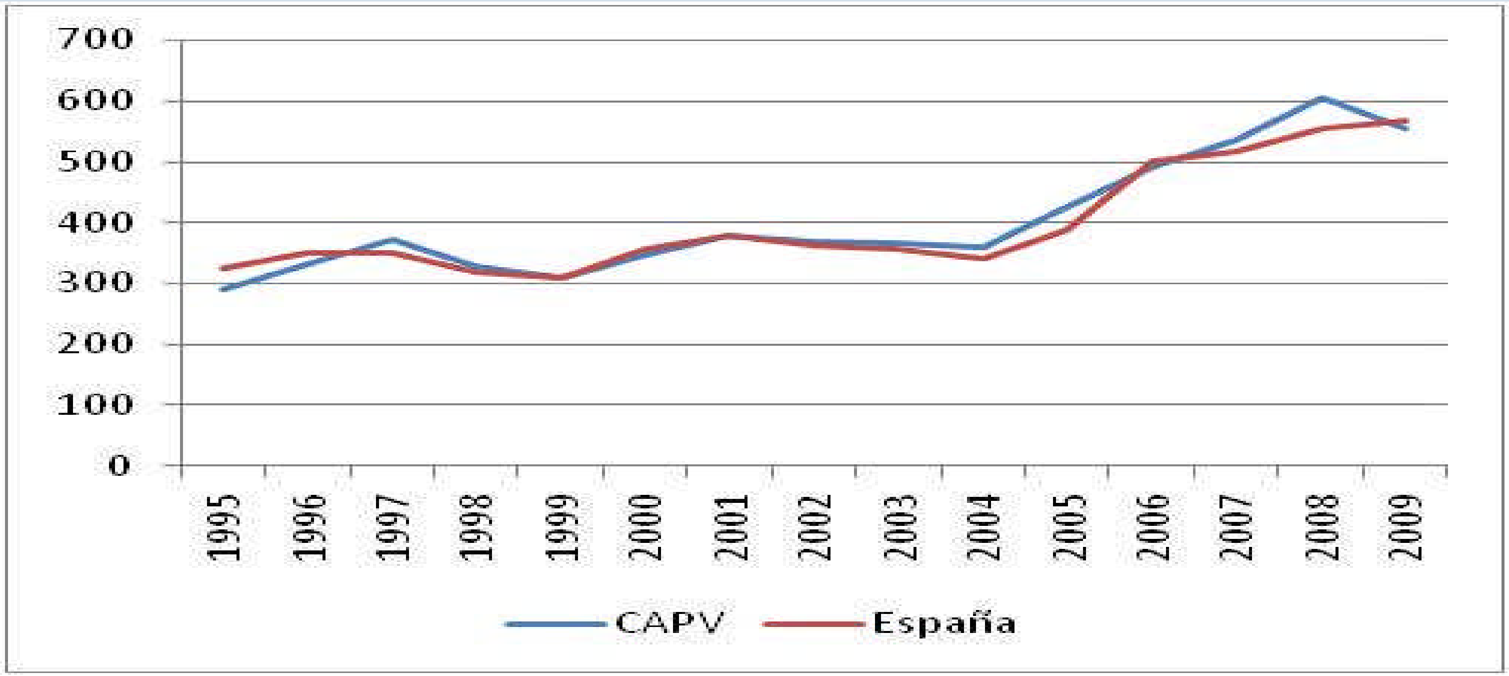
Declared price of the imported Natural Gas in the border in the period 2000-2011 vs. Prices' forecast done by the projection model



Source: IDAE 2011

- Gas and electricity are the key as input for the industry and it's competitiveness

Evolution of the average price of the energy. 1995-2009



Source: Díaz Mendoza, A.C; Arocena, P. (2012)

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