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LNG development across Europe: infrastructural and regulatory analysis

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LNG development across Europe: infrastructural and regulatory analysis

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ABSTRACT

In this paper a cross-section infrastructural and regulatory analysis of the European LNG sector is presented. The LNG chain is maintained as being a good tool to enlarge the number of natural gas exporters to Europe, adding in this way to competition and to the achievement of the targets of the liberalisation process, that is a decrease in price for final customers and security of supply. The main reason for this is to be identified in the minor specificity of the regasification plant related investment compared to pipeline transportation. As a matter of fact, as the infrastructural analysis will show, the construction of new LNG receiving terminals is likely to bring about an increase in the number of importers fostering competition among them and shrinking their margins among the value chain. In this context regulation is meant to play a key role in promoting investments without hindering competition. Nevertheless it is questionable whether LNG will be able to introduce competition beyond the European border (that is among producers) according to the forecasted supply and demand balance that is leading to a seller's market in the upstream sector. In this case a huger part of the rent would go to the exporters leaving minor scope for competition down the European border.

Keywords: Economics of regulation, gas utilities, tariffs

JEL Classification: L51; L95; Q48

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1. Introduction

The liberalisation process affecting the natural gas market in Europe (COM/30/98 and COM/55/03) is aimed at reducing prices paid by final consumers and, contemporarily, ensuring improvements in quality of service and security of supply. These targets should be achieved by favouring the transition of the industry from a concentrated market to a competitive environment. According to the microeconomic theory, pure competition leads to the most efficient resource allocation. In fact, competition causes commercial firms to develop new products, services, and technologies. This gives consumers greater selection and better products. Typically, the greater selection results in lower prices for the products compared to what the price would be if there was no competition (monopoly) or little competition (oligopoly). One of the fundamental conditions in order for competition to develop is (among others) represented by the presence of a plurality on the supply side. Unfortunately most of the demanded gas in the European Union is imported, that is to say, produced outside the European border by a few number of suppliers that do not compete among each other due to the rigidity of the pipeline transportation system. In other words the consumption market is separated from the production market which cannot be controlled. This means that competition (at least the one conceived by the economic theory) is by definition impossible to occur (unless the above mentioned situation does not change). Therefore, the European legislator has probably intended to promote competition among importers down the European border. If, on one side, this could lead to a shrinkage in the importers' margin, on the other, it could determine a fragmentation on the European importing side which might reduce the bargaining power of importers during the negotiations with non-European exporters[3].

2. The netback value pricing

The outcome of the liberalization "revolution" could then be different from what expected: it is true that competition could lower margins after import, (from the European border to the final customer), but the increase in the number of importers could enhance the bargaining power of exporters. The replacement of the monopoly-monopsony structure with the competition-oligopoly organisation could, in other words, yield the outcome of simply transferring margins from importers to exporters leaving aside final consumers.

The negotiation between producers and importers occurs in fact on the basis of their bargaining power, that is with reference to the netback value of gas which is calculated as follows:

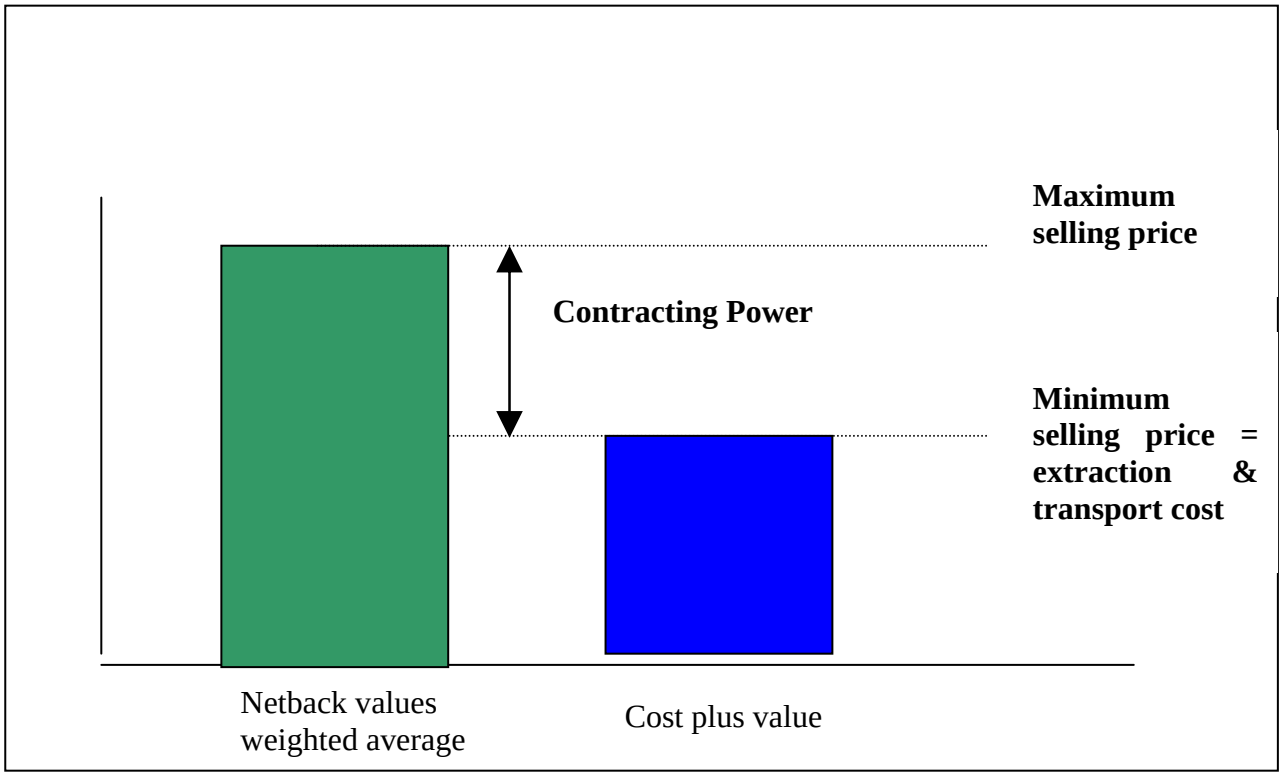
- Price of the cheapest alternative fuel (petroleum product)

[3] On the theory of bargaining power see Galbraith, 1952.

- Minus the cost of transporting gas from the border to the customer;
- Minus the cost of storing gas to meeting the customer's fluctuations of demand.

In this way the netback value can be defined as the maximum selling price of gas, should the latter be higher consumers would switch to the backstop fuel. In other words, the gas netback value is also the maximum price at which importers are willing to purchase it from producers in order to keep natural gas competitive with other fuels.

Figure 1: Netback value pricing



Source: IEFE, 2006.

There is also a minimum selling price of natural gas which consists in the price that allows the producer to cover extraction and transportation costs (the so called "cost plus value"). The difference between the netback value and the cost plus value therefore constitutes a rent that is shared among exporters and importers according to their bargaining power.
The latter is likely to be reduced for European importers as a consequence of the introduction of competition which will lead to a rise in the number of operators, and therefore to a decrease in the quantity individually purchased, while the number of exporters will not increase significantly.

3. LNG developments in European countries

In this section, data about European regasification terminals at various stages of authorization or completion are presented[4]. The aim of this analysis consists in verifying the diversification among importers that would result from the construction of new regasification terminals.
The following table summarizes the status of the European plants according to each country.

Table 1: Status of EU-25 regasification projects[5] by country (2006)

		Existing	Under construction	Proposed	**Total**
Country	Belgium	1	1	0	**2**
	Cyprus	0	0	1	**1**
	France	2	1	3	**6**
	Germany	0	0	1	**1**
	Greece	1	1	2	**4**
	Ireland	0	0	1	**1**
	Italy	1	2	13	**16**
	Latvia	0	0	1	**1**
	Netherlands	0	0	3	**3**
	Poland	0	0	1	**1**
	Portugal	1	0	1	**2**
	Spain	5	4	5	**14**
	Sweden	0	0	1	**1**
	UK	1	3	6	**10**
Total		**12**	**12**	**39**	**63**

Source: IEFE, 2006

As it is possible to note from table 1 there are currently 12 terminals in Europe. The country that has invested the most historically in the LNG chain is represented by Spain, followed by France.
12 terminals are also under construction with Spain on top of the list, followed by UK and Italy. It is then quite impressing to note the huge number of proposed plants which amount to 39.
Most of them are supposed to enter into operation in Italy, UK and Spain.
Of course it is necessary to take into consideration the possibility that not all the terminals listed on the table will be effectively built according to the authorisation difficulties and delays that often affect the LNG industry, and to the often fierce local oppositions.

[4] The sources of these data are represented by GTE, Drewry Shipping Cousultants Limited and company/governments press releases available on the web. In most cases the mentioned data were checked through interviews with at least one operator involved in each terminal.

[5] Both greenfields and expansions.

Table 2: Maximum capacity of EU-25 regasification terminals by country (2006)

		Existing	Under construction	Total	Proposed
Country	Belgium	4,5	4,5	9,0	-
	Cyprus	-	-	-	0,7
	France	14,8	8,3	23,1	16,0
	Germany	-	-	-	10,0
	Greece	2,3	4,3	6,6	n.a.
	Ireland	-	-	-	n.a.
	Italy	3,5	16,0	19,5	84,2
	Latvia	-	-	-	n.a.
	Netherlands	-	-	-	>12,0
	Poland	-	-	-	3,0
	Portugal	5,2	-	5,2	3,3
	Spain	39,9	12,8	52,7	>9,6
	Sweden	-	-	-	n.a.
	UK	4,6	26,5	31,1	>18,9
Total		**74,8**	**72,4**	**147,2**	**-**

Data in Bcm. Source: IEFE, 2006

As far as forecasted regasification capacity is concerned it is possible to note that terminals under construction will add 72 Bcm/year to already existing capacity leading to a total amount of almost 147 Bcm/year.

3.1 Capacity allocation on European terminals and the widening of the supply side (down the European border)

The LNG terminals overview presented above, is useful insofar as it allows collecting information in order to assess eventual new trends in receiving plants ownership and utilisation.
As a matter of fact, capacity allocation/utilisation seems to be more interesting than plant ownership if the fact that the operator that has access to the terminal, rather than the mere owner of the infrastructure, is actually able to compete on the final market is considered.
Nevertheless, also from an ownership point of view it is possible to make remarkable comments and observations, especially when data on capacity reservation are not available (and this is the case of planned terminals).

Given this, we will now present an infrastructural analysis whose main logic assumptions sound as follows:

- The exclusive presence of national incumbent operators on existing, under construction and planned terminals indicates that there is no competition at the border;
- On the contrary, the utilisation of national terminals by firms other than the national incumbent means a certain level of competition at the

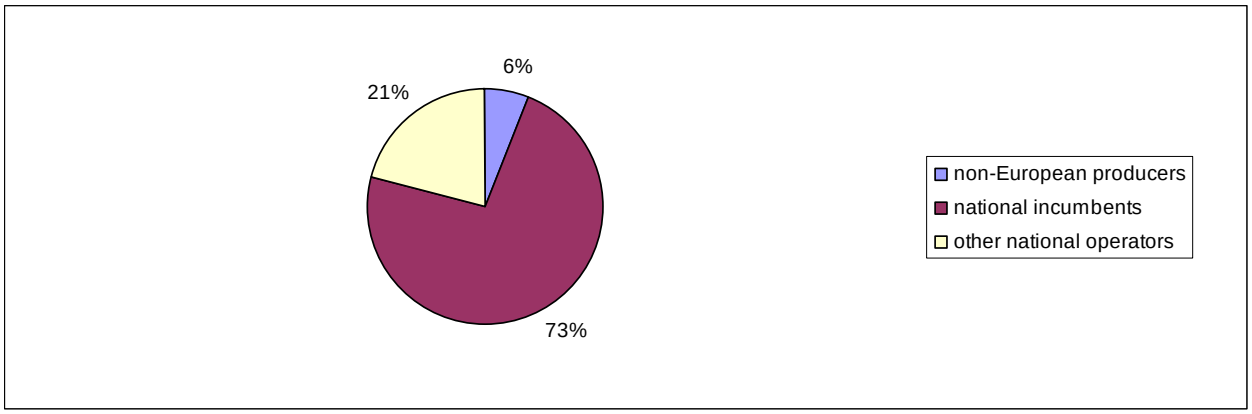
national (if the third entrant is not foreign) or at the international[6] (if the third party is not national) level, contributing to market integration in the latter case;

- The direct presence of non-European producers, both in the ownership and in the reservation of capacity at a terminal, reveals a new strategy on the production side that might consist in achieving options for arbitrages.

3.1.1 Existing terminals

Let us start from existing terminals[7]. As regards existing terminals, we can dispose of complete information, that is to say data for the whole available capacity, which amounts to almost 75 Bcm.
The majority (73%) of existing capacity is used by national incumbents, that is to say by incumbents in their country.
21% of existing capacity is prerogative of other national operators, that is to say firms that compete with the incumbent within the same member state, (both of them belonging to the considered member state), which indicates a certain degree of intra-state competition.
The remaining 6% is used by non-European producers, namely Qatar and Algeria, almost with the same share.

Figure 2: Allocation of capacity on existing European regasification terminals (75 Bcm)



Source: IEFE, 2006.

There are no foreign operators competing on domestic markets (that is foreign firms other than the national incumbent competing with it in its country of origin).

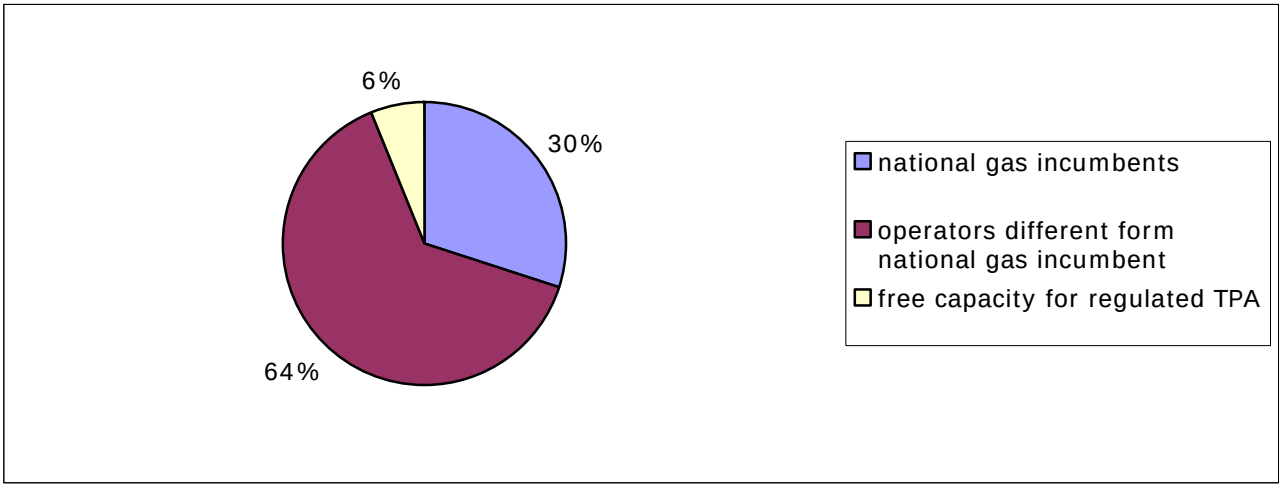
[6] The reference always goes to competition among importers down the European border.

[7] Please note that the categories reported in the graph relating to existing terminals are different from the ones relating to terminals under construction because of the fact that non-European Producers, national incumbents and other national operators are the only type of operators present on the existing terminals.

3.1.2 Terminals under construction

As far as terminals under construction are concerned, it is worth specifying that data was available for just 9 terminals[8] out of 12 that account for a capacity equal to 63 Bcm (87% of total capacity under construction).

Figure 3: Allocation of capacity on European terminals under construction (63 Bcm)

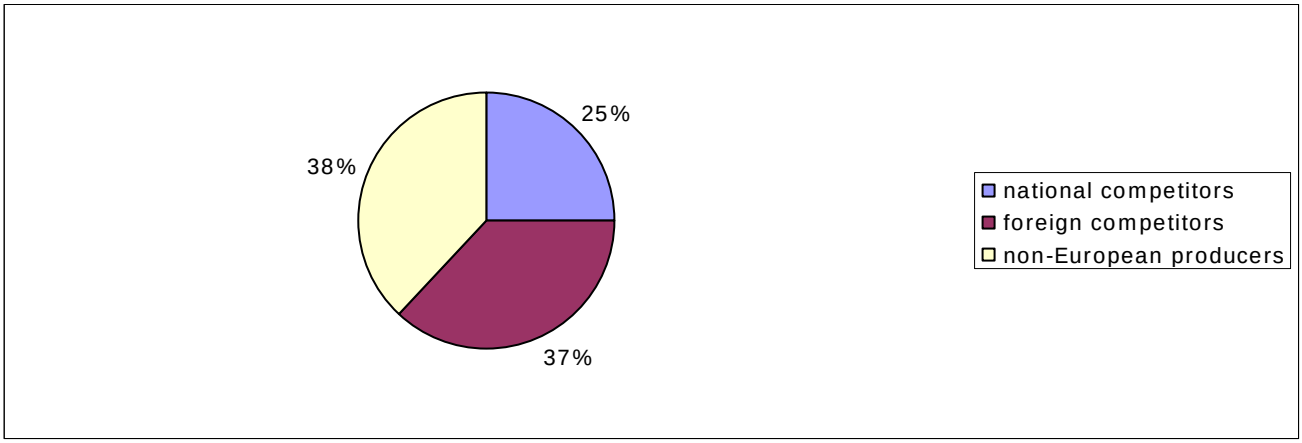


Source: IEFE, 2006.

As far as allocation of capacity is concerned, it is possible to note a striking fact: the amount of capacity controlled by national incumbents has decreased to 30% of total under construction capacity (73% on existing terminals as seen before), while the 64% will be held by operators different from national gas incumbents.
Only the remaining 6% is represented by free capacity to be assigned through TPA regulation (just in Italy).
It can be interesting to analyse the capacity held by firms that are not gas incumbents in the country where they have capacity at their disposal (intra-state or inter-state competition).

[8] Zeebrugge, Fos Cavaou, Revithoussa, Isola di Porto Levante, Brindisi, El Ferrol, Dragon LNG, Grain LNG, South Hook LNG.

Figure 4: Allocation of capacity on European regasification plants under construction to operators different from national incumbents (41 Bcm)



Source: IEFE, 2006.

As far as this point is concerned, it is worth mentioning that:

- 38% of this capacity is in fact allocated among non-European producers;
- 37% is held by foreign operators (inter-state competition) and;
- the remaining 25% will be used by national competitors (intra-state competition).

Let's try to further analyse this outcome by considering the three categories distinctly.

As far as allocation of capacity among non-European producers is concerned, it is possible to notice the major involvement of Qatar, Algeria and Malaysia.

In the majority of cases (65%) foreign operators are represented by European gas incumbents (operating, in this case outside their national boundaries). A clear tendency towards a European gas oligopoly is outlined here, but this fact could be appreciated if considering the limited plurality on the exporters' side and the producers' bargaining power.

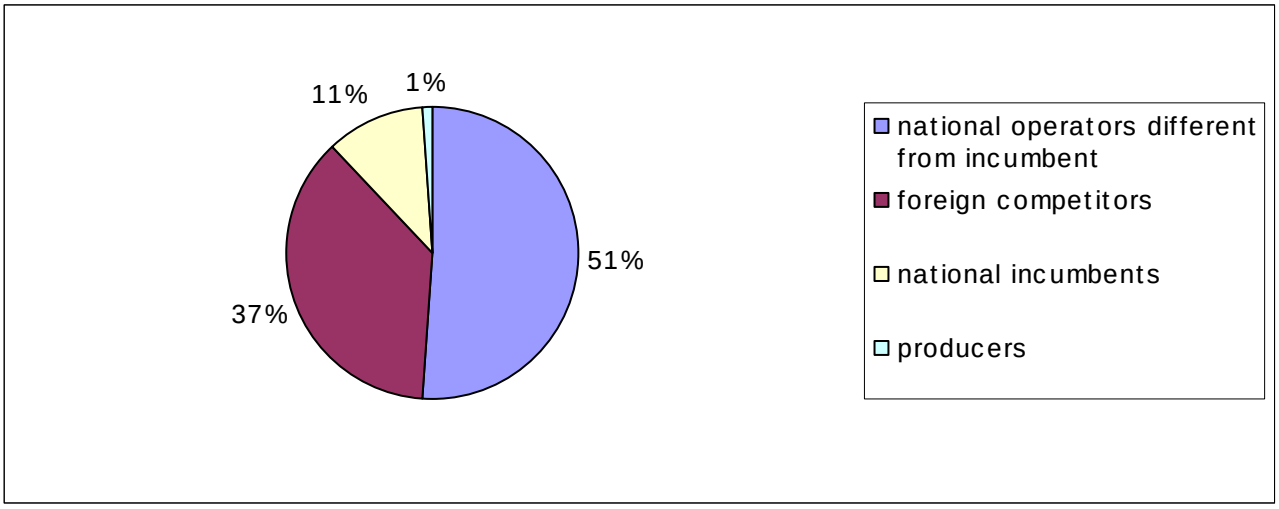
The remaining 35% will be used by other competitors, namely Exxon-Mobil in Italy and UK.

National operators which are different from gas incumbents are represented by national incumbents on the electricity market or by other national competitors.

The first category will hold the 36% of this capacity: it is the case of Union Fenosa and Endesa in Spain. The remaining will be used by national gas operators that are not incumbent in their native market, such as Edison in Italy, or by other large firms operating in other energy markets such as Total in France, or Hellenic Petroleum in Greece.

3.1.3 Planned terminals

Figure 5: Ownership of planned European LNG receiving terminals[9]



Source: IEFE, 2006

For planned terminals we do not have any data on reservation of capacity at our disposal: the only information we provide is, therefore, represented by shares in ownership.
The 99% of ownership is held by importers while producers own just the 1% of planned LNG receiving terminals.
A 37% participation to LNG capital is held by foreign competitors both European and non (such as Japanese and American companies), which adds to inter-state competition.
National operators other than national incumbents compete with a 51% share, and national incumbents hold the 11% of invested capital.
It is possible to conclude that, since ownership is very likely to turn into capacity reservation, the previously outlined tendencies seem (at least partially) to be confirmed, and that the construction of new LNG infrastructures is favouring market integration and competition among importers within the European gas sector.

4. LNG regulation in Europe (price regulation)

In order to exploit the outlined LNG potentiality in terms of favouring competition (down the European border) among importers, that is to say according to the possibility of newcomers gaining access to terminals in case of available, unused or TPA regulated capacity, even on the basis of spot transactions, the role of regulation seems to be crucial.

Access rules to an LNG facility mainly consist in:

[9] Data available for 30 planned terminals out of 39.

- Tariff methodology;
- Capacity allocation.

The main targets of the EU liberalisation process were mostly concerned with an increase in competition but also with security of supply.
As far as access rules to an LNG facility are concerned, the goal of competition seems, at first sight, to deal with capacity allocation mechanism rather than with tariffs paid for the regasification service, while security of supply is meant to be granted through the access charge which is supposed to assure the regasification plant owner a fair return on capital in order not to discourage future investments.
Nevertheless there is one aspect of the tariff methodology which is extremely important in favouring competition: the tariff design - fixed vs. variable components - rather than the total amount of it. This is the issue that will be discussed below.

4.1 Regasification tariffs in Europe

From the reading of the European Directives[10], aimed at creating a single and competitive market for natural gas in Europe, it is possible to clearly infer several principles that transport access prices should comply with in order to achieve the above mentioned target.
These principles can be summarised as follows:

- Allocative efficiency;
- Productive efficiency (X-efficiency);
- Dynamic efficiency;
- Fairness;
- Simplicity;
- Full cost recovery.

Let us explain the meaning of each criterion[11]:

- Allocative efficiency is one of the most important features of neoclassical economics: it allows for a greater adherence of prices to long run marginal costs, which means that every user (shipper) is charged with a

[10] Among the principles underlying the Directive 98/30, those with the most significant implications for open access and cross-border trade include the principle of *non-discrimination*, the goal of establishing a *competitive natural gas market*, and the promotion of interconnection and interoperability. The Directive repeatedly invokes the principle of *non-discrimination*, applying it to areas including: Member States' authorisation procedures (Articles 3, 4 and 5); Transmission, Storage and LNG (Article 7); Distribution and Supply (Article 10); and Access to the System (Articles 14, 20). It is also implicit in the other principles identified above, since discrimination is incompatible with a competitive natural gas market, and creates barriers to interconnection and interoperability. The principle of non-discrimination affects many aspects of the Directive's implementation, and has special significance because of the structure of the natural gas industry in Europe.

[11] See Dorigoni S, Gullì F., 2002.

price based on its cost responsibility and it is, therefore, not discriminated as requested by the European Directive;

- X efficiency identifies the ability of companies to reduce their costs, given a certain technology and productive organisation. This goal may also be achieved through price-cap devices;
- Dynamic efficiency has been revaluated only in the last years. It refers to the ability of introducing innovations (of product, process, organisation, etc.) which represent new opportunities for remarkable reduction of costs able to increase companies' competitiveness. It differs from X efficiency since in the previous case cost reductions are introduced "under the same technology", while in the latter case efficiency gains arise from the introduction of innovations;
- Fairness is an extremely critical issue: it requires going beyond the mere verification of a correspondence between price and cost-responsibility of every single user which is already implicit in the concept of allocative efficiency. A price system can be considered as fair if it discriminates on the basis of the elasticity of demand. That is to say those consumers with rigid demand should pay less considering the fact that they are not able to change consumption patterns (fuel-switching) in order to minimise supply costs;
- Simplicity does not require particular consideration: tariffs should only be easily understandable, especially for those users' categories which have difficulties in finding information without high transaction costs;
- Full cost recovery means that the participation tie of the transport company has to be respected. In other words in case the transport service should not be supplied for non-sustainability the worst result under the allocative point of view would occur.

As it is possible to notice from the given explanations, every concept is different but fundamental in an open market environment.
Allocative efficiency is synonym of non-discrimination and, therefore, of competition: it ensures that all the involved subjects act on a level playing field.
X-efficiency and dynamic efficiency lead to cost reduction and the decrease in price for final consumers allows achieving one of the main goals of liberalisation. More particularly, dynamic efficiency is a very important issue with respect to security of supply (another target of the reform process) insofar as it implies the rationalisation of consumption by means of technological development.
Fairness is an issue related to certain categories of consumers rather than others. The fact that some users cannot benefit from inter-fuel competition implies their protection. Moreover, under a theoretical point of view, competition occurs both on the supply and the demand side: there has to be a plurality of suppliers, but also the traded product should have substitutes.
Simplicity means that market rules are transparent, being one of the main concern of the regulators, and full cost recovery is necessary in order to grant that the service is offered, and the way in which costs are recovered should

prevent the monopolist to earn extra-rents and to therefore be in a privileged position compared to other competitors.
Some of the above mentioned principles have also been explicitly recalled by several interlocutors involved in the liberalisation process.
The Brattle Group[12], which is a well-known Commission consultant, indicates the following targets tariff methodologies should enable to reach for the improvement of the reform process:

- Non-discrimination;
- Competition;
- Promotion of interconnection between member states.

The first principle is the condition for the others: discrimination is inconsistent with competition and brings about barriers to cross-border transactions. It is important to note here that non-discrimination in access charges means that every user should pay the cost generated by its use of the network. In other words non-discrimination is related to cost-reflectiveness and therefore to allocative efficiency. Promotion of interconnection depends also on the recovery, by the network owner, of the full cost it has incurred for managing the service, be it fixed or variable. That is why full cost recovery is one of the main principles a tariff mechanism should follow.
In the Bergognoux report[13] (2001) objectives that access charges should pursue are also mentioned as follows:

- Cost-reflectivity;
- Simplicity;
- Promotion of interconnection;
- Full cost recovery;
- Promotion of the creation of a secondary capacity market;
- Providing the market with correct signals on investments.

Since we have already talked about the first four criteria[14] let's focus the attention on the last two. The development of a liquid secondary market for capacity rights mainly depends upon the capacity allocation and conferment mechanism that does not constitute the object of our analysis.
As far as the matter of supplying the market with correct scarcity signals is concerned, it is once again necessary to refer to cost-reflectivity in the sense that insofar as access charges correspond to the actual costs generated on the system they are able to give proper market signals to the community of users

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[12] The Brattle Group, *Methodologies for establishing national and cross-border systems of pricing of access to the gas system in Europe*, London, 2000; The Brattle Group, C. Lapuerta, B. Moselle, *Convergence of non discriminatory tariffs and congestion management systems in the European Gas sector*, London, 2002, (pages 36-37).

[13] The report was commissioned for the French Commission de Regulation de l'Electricitè (CRE) and became a milestone in the energy industry liberalization process.

[14] Being the promotion of interconnection directly connected with the investments full recovery.

on the network. This leads us back to the concept of non-discrimination and allocative efficiency.
Last but not least, also the CEER[15] (6th Madrid Forum) has indicated the purposes access charges should achieve in this way:

- Cost-reflectiveness;
- Full cost recovery;
- Correct market signals;
- Simplicity/transparency;
- Competition.

At this point, we are allowed to consider the first list of tariff principles as exhaustive.
Given this, we will verify the way in which these principles are fulfilled by different tariff methodologies. In particular we will first consider the purpose of full cost recovery, which mostly depends on the way the Regulatory Asset Base (RAB) is calculated and then the other five criteria in a group, whose respect is connected with the structure of the access charge.

Table 3: Access charges for LNG terminals in Europe

	RAB calculation	***WACC***	***Tariff structure***
Belgium	Reconstruction costs	7,1%	Capacity/commodity
France	Revaluated historic costs	9,75% before 2004 11% after	Capacity/commodity
Italy	Revaluated historic costs	7,6%	Capacity/commodity
Spain	Revaluated historic costs	6,51%	Capacity/commodity
UK	EXEMPTION		

Source: National Regulatory Authorities.

As it is possible to see from table 1 the basic method of calculating the Regulatory Asset Base (RAB) is a cost-plus system in which all the costs reported in the balance sheet of the company are covered by the tariff. This methodology is mainly aimed at favouring all the necessary investments on the grid to the extent that every capital expenditure is included in the tariff setting, and at respecting the participation tie of the transport company. In this sense the principle of full cost recovery seems to be fully fulfilled here. The only exception is represented by Belgium where a reconstruction cost is recognised. Nevertheless the latter could be higher than historic costs considering the recent upward trend in the costs of rigasification plants.
The return on capital varies among the considered countries but if Belgium, France, Italy and Spain show a rate comprised between 6,51 and 7,6%, in

[15] Council of European Energy Regulators.

France the WACC (Weighted Average Cost of Capital) is equal to 9,75% for facilities entered into operation before year 2004 and to 11% thereafter. The aim of the regulator is clearly the one of boosting new investments considering the expected growth in natural gas demand.

4.1.1 Access charges and efficiency

As mentioned before it is possible to maintain that capacity allocation mechanisms are more concerned with competition at the regasification plant level than tariffs. But also the achievement of a non-discriminatory (among other goals) access by third parties could depend on tariff design.
More particularly the reference goes to one part tariffs versus non-linear tariffs.

Optimal pricing for access to essential facilities has received considerable attention in recent years both from economists and policy makers throughout the world[16]. This has focused mostly on network utilities. Recent interest has been triggered in part by the wave of privatisations of network utilities around the world and the international drive to open up network markets.

One of the most common access problem arises in networks where a service requires two legs, one a monopoly owned essential facility, and the other a potentially competitive segment. Suppliers other than the owner of the essential facility need to interconnect with the monopoly supplier and are generally expected to contribute to the cost of the essential facility. The appropriate structure of this access charge has been the focus of significant debate within the economic theory.
Complex theoretical contributions deliver one message: the access charge is often performing too many tasks.
Different goals and policy objectives lead to alternative ways of calculating optimal charges.
While it is true that theory is extremely useful to understand the mediating function of access prices, one main fundamental step should precede any access distortion: whenever possible, the use of access pricing as an instrument for the promotion of too many goals should be avoided and other instruments should be used.
Nevertheless if considering the sole goal of increasing competition or, at least, the latter as the main issue in our analysis, it is possible to maintain that the main feature a tariff structure should have in order to promote entry to the market is the one of being non-discriminatory.
This means that every operator should be charged the cost that its access brings about to the essential facility. In other words, access charges should be cost-reflective (which means allocative efficiency).
That is why we will consider this criterion as the most important one in evaluating the capacity of tariffs in ensuring the achievement of the

[16] See Kessides, 2004; Dorigoni, 2004; CEER, 2002; Crew, 2002; but also Katz, 1983; Schmalensee, 1981; Spence, 1977; Oi, 1971.

liberalisation targets, even though, as highlighted before, all the mentioned principles seem to be definitely correlated.
Other goals a tariff structure should achieve (as specified before) should be x-efficiency, in order to assure a decrease in the price of the service, dynamic efficiency, in order to grant technological development and also simplicity and fairness.
We will now test the attitude of different tariff types in pursuing the above mentioned goals.

Table 4: Possible tariff structures, efficiency and effectiveness

Type of tariff	***Allocative Efficiency*** ***non-discrimination***	***Productive Efficiency***	***Dynamic Efficiency***	***Fairness***	***Simplicity***
Monomial (Fixed price)	•	•	• •	•	• •
Monomial (Demand based)	• •	•	• •	• •	•
Binomial (Usage based)	• • •	• •	• •	• •	•
Monomial (Energy based)	•	• •	•	• • •	• •

• • • high; • • medium; • low.

Source: IEFE, 2006.

The frame which rises from the proposed considerations and that is summarised in table 4, is consistent with the initial assumptions. The number of goals pursued by the regulator and their eventual incompatibility make it hard for regulators to choose the optimum tariff structure: deciding to pursue a specific goal may signify giving up, at least partially, other objectives. In those cases, lacking a priority scale, it is reasonable to rely upon the theoretical consistency, eventually admitting a partial and limited shifting from it in order to be able to reconcile different goals. In particular, this means designing a polynomial tariff which represents the most balanced solution, leaving the definition of the relative weight of the different components to objective considerations about the nature of costs.

Table 5: Capacity/Commodity split in tariff determination in European countries

Country	***Capacity share***	***Commodity share***	***Efficiency gain factor***
Belgium	100%[17]	0%	No
France	80%	20%	No
Italy	80%	20%	1,5% of RAB
Spain	90%	10%	15% of the inflation rate
UK	n.a.	n.a.	n.a.

Source: IEFE's elaboration on national authorities' data, 2006.

Almost all the considered countries have adopted two-part tariffs in order to balance the targets described so far. Just in Belgium the tariff seems to be mainly concerned with fixed costs considering that no charge related to consumption has been introduced. In the UK tariff setting is free and for this reason, it has not been possible to infer at least the average split between commodity and capacity charge.
The weights that have been given to the different parts is slightly different but they seem to converge on the actual cost structure of the natural gas transportation highly dominated by the presence of fixed costs.
This fact is of paramount importance since cost-adherence enables the access charge to provide appropriate scarcity signals to network users and therefore, to arrange timely and proper investments if necessary.

The presented analysis has shown that all the considered countries have opted for non-linear tariffs that is for the tariff structure that better enables to achieve a good balance between the goals an access price should pursue. Under this point of view it is therefore possible to affirm that regulation regarding regasification terminals in Europe seems to help LNG in developing its potentialities in terms of competition (down the European border).

5. LNG and the diversification of the supply side (beyond the European border)

As mentioned in paragraph 2 many experts believe that an increased role of LNG in European imports would also lead to competition among producers.

The reasons on which this belief is based can be summarized as follows:

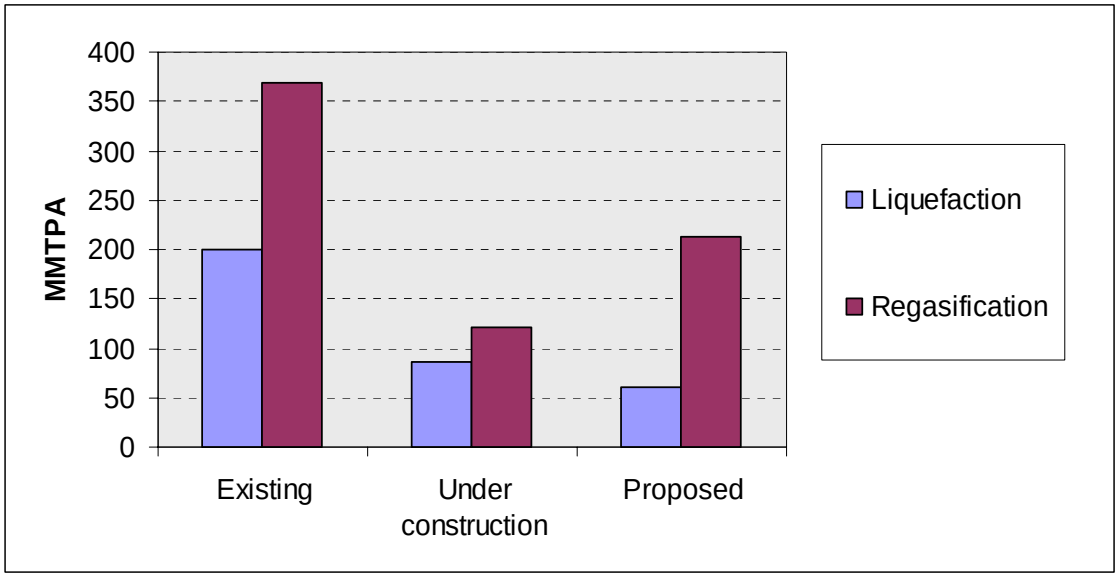
1. The LNG chain is more flexible (LNG infrastructures are less project-specific than pipelines) considering the fact that it allows a switch to a different seller according to the competitiveness among supplies. In fact, regasification plants can receive ships coming basically from any liquefaction plant;

17 Users pay a tariff related to the number of slots they nominate. A slot includes unloading, storage and regasification capacity for 10,35 days for a vessel with 140.000 m3 of capacity. So the Belgium tariffs may be considered 100% capacity-related.

2. The LNG chain allows the entrance on the market by new operators that would otherwise be unable to do so according to the absence of spare capacity on the existing pipelines, which remain throughout Europe under the national incumbents' control;
3. The possibility to enlarge the supply base (many stranded gas producing countries are economically reachable just by sea) and to switch to another seller would also reduce the exporter's contracting power balancing in this way the previously mentioned decrease in the importers' bargaining power;
4. The increase in spot sales and the decrease in contract duration showed by the LNG industry further add to flexibility and also a wider range of pricing mechanisms is emerging: suppliers are adopting different pricing policies according to the buyers' market. For instance, Qatar that sells in the four main LNG markets has pegged its LNG sales to crude oil prices in Japan, to Henry Hub spot prices in the US, to NBP spot prices in the UK, and to fuel oil prices in continental Europe.

In the past these considerations had been emphasized on the basis of the significant decrease in LNG costs brought about by technological improvements. Unfortunately this trend has been reversed due to the rise in the costs of row materials and in the oligopolistic structure of the constructors market (facing an increasing demand). Nevertheless the necessity for traditional pipe exporters like Russia to start the development of expensive frontier-fields in order to cover exports and internal demand could help LNG competitiveness (considering the whole value chain, that is including the price of gas) against imports by pipe.
Although these arguments sound attractive it is necessary to evaluate the market fundamentals before concluding on the role of LNG in introducing competition in the upper part of the natural gas chain.

Figure 6: Forecasted liquefaction and regasification capacity balance



Source: Authors' elaborations on Petroleum Economist and Wood Mackenzie data 2007.

As can be noticed from the previous figure the LNG market is characterized by an excess of regasification capacity over liquefaction capacity. The reasons for

the overbuild of regasification capacity are to be found in the fact that building a regasification terminal is often the only way to enter a national market, since it is not possible to get access to transit pipelines, and in the fact that regasification is the cheapest part of the chain. On the other side it is worth mentioning that in the last two years liquefaction costs have risen dramatically making the construction of “merchant” plants unthinkable.

According to authoritative sources the gap between liquefaction and rigasification capacity is going to slightly reduce if considering under construction projects and to significantly increase if taking into account all the proposed liquefaction and regasification terminals (time horizons respectively 2010 and 2015). This means we are going to face a seller’s market on the liquefaction side that would have different implications:

1. LNG will go to the highest value markets (for instance the Asiatic one that has no or little alternatives in terms of gas supply)
2. the forecasted increase in demand for LNG will give producers large scope for arbitrage
3. the exporters’ bargaining power will increase

Last but not least the possibility for Europe to receive LNG from different sources could be limited by the restrictive quality of European gas and by the difficulties relating to the scheduling of ships that could become harder the larger the number of regasification terminals independent users.

According to the above mentioned considerations it is possible to argue that it will be producers that will be able to choose the most attractive sellers rather than sellers being able to switch to the most convenient supply.
That being said, although an increased role of LNG in Europe would determine an increase in the number of importers, its influence on producers is very likely to be limited or even non-existent. According to the depicted scenario LNG will be directed towards the most attractive markets in terms of price and, should the planned regasification capacity be constructed, a competition among LNG importers is very likely to occur, strengthening the exporters’ position.

5. Conclusions

The analysis proposed within this article has shown that an increased role of LNG among European gas imports could lead to an increase in the number of importers fostering competition down the European border, and achieving one of the targets of the liberalisation process. In order to develop, this effect requires a well designed regulation. Access regulation plays in fact a key role for new entrants on the market in obtaining access to transport infrastructures on a non-discriminatory basis. The former basically consists in price (tariffs) and non-price (capacity allocation) regulation. The article is focused on access pricing models and provides, after a theoretical analysis of different tariffs methodologies, a cross section comparison among the tariff structure adopted in different European countries, highlighting the critical role of the regulator in

finding a proper balance among the several goals tariffs are aimed at pursuing and in promoting efficiency and competition.
In order to achieve a single and competitive European gas market it would be however necessary to have a diversified supply and producers competing among each other. Competition should, in other words, develop beyond the European border. Otherwise competition, (and supply fragmentation), down the European border would turn to an increase in the producers' bargaining power and in the transfer of the importers' part of the rent to the latter, reducing the scope for competition even down the European border.
Although LNG can be used to import stranded gas from new areas, adding in some way to supply diversification, the forecasted surplus of regasification capacity will lead to a seller's market context in which importers will engage in competition to grab supplies, and in which gas will flow towards the most valuable markets.

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