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European Union energy security: the challenges of liberalisation in a risk-prone international environment Society

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Abstract-- The liberalisation and integration of European energy markets in a single one are going on. However, the energy environment of the European Union as well as its own internal situation have undergone profound changes. Thus, energy security issue of member states is discussed. This security concerns gas market, where suppliers' contracts and relations have been signed to secure the system, and today electricity markets because of the use of natural gas as an input of power generation. These two markets comply with security concerns, as investments in peak power plants, in transmissions assets, diversification of suppliers, negotiation of contracts with different durations. Actors of energy markets have to manage the security concerns to supply socially and economically essential commodities. In this article, we address two main topics. The first is related to gas and electricity transmission, access and investment in huge transnational gas pipelines and electricity interconnectors. The second concerns the upstream structure of the gas and electricity value chains, namely the problem of investing in peak electricity generation and relations with gas suppliers outside the EU.

Index Terms-- Energy security, investments, long term contracts, networks, regulation, risk, suppliers.

I. INTRODUCTION

Since the introduction of the first directive in 1998 opening up Europe's energy markets to competition, the energy environment of the EU as well as its own internal situation have changed dramatically. On the one hand, tension on the energy markets has brought questions of energy security to the fore. Compared with the 1980s, the 2000s saw considerable price volatility on international hydrocarbon markets. This was due in no small part to pressure on existing production capacity, compounded by the risk of conflicts over access to hydrocarbon resources. A situation of excess electricity capacity in the EU has given way to growing tensions in the electricity generation sector with gas and electricity increasingly linked as gas is used to generate electricity. In the long term, EU energy dependence on outside suppliers will grow. In terms of transmission, the EU's strategy of

diversification of gas supply sources will require the construction of LNG capacity or long distance gas pipelines. In the electricity generation sectors, safety margins are shrinking. Furthermore, the growing focus on environmental concerns means that environmental protection is now an important part of energy policy. EU energy policy today must therefore take into account three particular types of constraints – climate-related constraints, energy security constraints and competitiveness. For the most part, the question of competitiveness should be covered by the liberalisation directives. However, the divisions brought about by energy security and climate constraints are serious enough for questions to be asked as to whether the rules and institutions that underpin them are able to satisfactorily address these issues [1].

Generally speaking, the coherence among the three pillars around which European energy policy is built - competitiveness, security of supply and sustainability – is increasingly being called into question [2]. A big question that remains is whether the incentives and economic rules and institutions associated with the network industry liberalisation paradigm can alone guarantee the energy security of the European Union. This question takes on even greater importance in light of the liberalisation directives which have cast considerable doubt on some of the mechanisms on which EU energy security was founded, both from an organisational and contractual point of view.

The aim of this article is to examine the main challenges of energy security with respect to gas and electricity and to look at what has been done so far in response to these challenges. It was decided to deal with both types of energy in the same article since gas and electricity issues are increasingly linked. Also, they were not treated separately when the market liberalisation rules were developed. Nevertheless, liberalisation cannot really be applied to the entire gas chain (unlike electricity) since a sizeable and growing proportion of supplies is not concerned by these new rules. This creates new problems of supply security. With respect to natural gas, this article focuses more specifically on relations between the EU and its suppliers in a liberalised context.

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II. ENERGY SECURITY AND THE EU ELECTRICITY SECTOR

A. *Energy security: the stakes*

Energy security, whether it be for the short term or the long term, takes various forms and can be ensured by various mechanisms, both market-based and regulatory [3]. However, there are differing notions regarding energy security and how it should be approached. According to some authors, there are four main aspects to energy security, namely energy availability, accessibility, affordability and social acceptability [4]. The IEA considers explicitly that: “Energy security is defined in terms of the physical availability of supplies to satisfy demand at a given price”. It is therefore important to guard against risks using a cost efficient approach. Energy security comes at a cost and it is not a question of achieving it at any cost. Since the central notion in these approaches is the relative scarcity of energy, the question of price volatility takes on particular importance.

From a European perspective, energy security is most often discussed in terms of security of supply, in other words with reference to the avoidance of sudden changes in the physical availability of energy relative to demand [6]. It is therefore a question of guarding against such changes. Energy security involves developing strategies to reduce, or protect against, risks stemming from insufficient production capacity, imported energy and also, in the case of network industries, from transmission infrastructures (and thus transit problems). The main concern here is the risk of interruption of supplies and, more particularly, whether the energy is available in sufficient quantities to meet demand.

Energy security is a concern in both the gas and electricity sectors, especially as they become increasingly interdependent with the rise in bundled energy offers and the use of gas to generate electricity. In fact, given current environmental constraints and the need for high profitability and rapid returns on investment an attractive investment option would seem to be natural gas combined-cycle plants, which are less costly in terms of investment and which emit lower levels of greenhouse gases. Electric power generation forecasts and estimated future needs for peak capacity strengthen this interdependency between gas and electricity (by 2030, about 30% of electric power generated in the European Union will be gas-fired, [7]). This competitive context will pose new problems for the electricity sector, namely securing gas supplies to minimise risks related to price fluctuations and supply.

The third European directives propose a new series of measures to promote competition and create a single European energy market. More specifically, this directive consolidates the independence and powers of regulators when it comes to monitoring competition in the gas and electricity markets [8]. It also changes the way in which TSOs are structured, with a move towards Independent System Operators - ISO, or Independent Transmission System Operators - ITSO [9]. This organisational change is intended to enhance competition in

electricity and gas markets by giving greater independence to TSOs and promoting European energy market integration by facilitating their coordination [10], [11], investment in systems [12], [13] and the use of transmission capacities and interconnection capacities [14]. However, two problems would seem to remain, and these are essentially linked to the intrinsic characteristics of the gas and electricity markets and their complexity. The first is related to gas and electricity transmission, access and investment in huge transnational gas pipelines and electricity interconnectors. The second concerns the upstream structure of the gas and electricity value chains, namely the problem of investing in peak electricity generation and relations with gas suppliers outside the EU.

Below we present and analyse these two issues related to transmission and the upstream energy sector.

B. *Development of interconnectors*

Lack of investment in interconnectors can most often be attributed to the lack of incentives and clear visibility that might elicit commitments from public and private sector investors to develop such infrastructure. In fact, waiting games could appear because of market players’ risk aversion. This strategy is not necessarily harmful in terms of optimality since it provides time to better assess needs and so invest in large-scale infrastructures that are more efficient and economically viable [15]. It appears, however, that increased risks (regulation, demand uncertainty) and the lack of price signals that are sufficiently stable for the long term are the cause of lack of incentives to invest. In fact, the intrinsic characteristics of network industries and the complex organisation of the electricity and gas markets affect price signals, which may be manipulated [16], [17] may be affected by information asymmetry [18] or quite simply might reflect tense situations. The problem of price signals is made even more complex by the fact that electricity and gas are commodities that fall into the category of public utilities (or a universal service). The authorities are therefore quite likely to put in place price caps for end users, or may even regulate tariffs.

Three approaches to investment in interconnectors are generally identified:

- The planned approach where the aim is to build an efficient system with, for example, the introduction of a cost-plus pricing system and on condition that the investment is used to prevent the Averch-Johnson effect [19];
- The incentive approach with regulation through price caps and where the system operator invests with the aim of making a profit. The maximum tariff permitted by incentive regulations is applied to ensure a certain level of revenue;
- The merchant approach where the operator invests in the system and interconnectors [12], [20], [10].

Under a planned approach the TSO (or regulator) is entrusted with planning the development of transmission systems and more specifically interconnectors. TSOs are assumed to maximise public welfare. They take into

consideration system safety/security and constantly arbitrate between costs related to externalities and investment costs in relation to infrastructure use. If the TSO does not put the public interest first, conflicts of interest can arise between the TSO's personal interests and the duties expected of a TSO. The security of the energy systems is then compromised [11]. To avoid such problems the TSO obtains rates of return from these investments that are sufficiently high to enable the markets or certain consumption zones to be decompartmentalized. This provides additional revenues, improving profitability prospects and acting as an incentive to investment. Price regulation mechanisms determined by regulators for interconnectors as well as exemption procedures applicable to certain investments make regulation a more attractive incentive.

Exemption provides an additional incentive to encourage investment and reduce the impact of free-riding [3]¹. However, the optimality of the associated systems (merchant investment) is not guaranteed as far as public welfare is concerned, with private profit taking precedence over social benefit [21]. With the need to recover fixed costs, it may be necessary for players to seek market power, but market power inevitably leads to underinvestment [15]. It would therefore seem that the public authority has a vital role in planning such merchant investment if public welfare is to be maximised. Merchant lines are seen by some authors [22] as complementary to a planned approach, rather than as a substitute.

Interconnector development could be boosted if there were better control over the use of revenues resulting from auctions for use of existing interconnectors. The European Commission sector inquiry [23] cast doubts on how these revenues are used, in particular the amounts reinvested to deal with congestion, which generally represents only a small proportion of the income. The way in which congestion revenues are used has a big impact on the development of future networks [24]. However, any attempt to reduce excessive congestion would be inefficient since reducing congestion is far more costly than simply managing it [15]. The investment thus undertaken would be that with a marginal construction cost lower than the price differential between two nodes connected by a congested line [12] or lower than the costs related to an auction.

According to certain theoretical studies [25], the benefits of interconnectors must be balanced against the benefits in social welfare, that is to say the extent of the consumer surplus compared with the profits made by operators. Without such weighting, the impacts of the interconnector on surpluses and profits will balance out. If the social welfare function is weighted, the effect of an interconnector is no longer necessarily positive and inevitably leads to loss of social welfare for a country that is not compensated by the gains in

social welfare of another. Incentives to invest in interconnectors can be affected by this irrespective of the way in which TSOs are organised. Ownership unbundling alone will not necessarily guarantee that investments will be made [26]. It therefore needs to be accompanied by the right incentives to invest [21]. Furthermore, short-term signals given by the grid (congestion) are generally not sufficient to prompt investments whose costs might not be entirely covered. Grid access fees might prove necessary to alleviate the risk aversion of investors and the increasing economies of scale of installations [10], [11]. Investment in interconnections and market coupling make the system safer and improve the use of capacity.

In light of these arguments, it is easier to understand the view of Steven Stoft [15] whereby optimal investment in transmission infrastructure:

- Should not eliminate all congestion.
- Should not minimise short-term costs to consumers.
- Should minimise the total cost of transmission and the total production cost.

C. Investment in peak-load capacity

Since the electricity markets were opened up to competition safety margins have been shrinking [7], putting pressure on the balance between supply and demand and highlighting the need for investment in peak-load plants. Price signals on open markets or applied to consumers are the first triggers for such investment.

Investment in peak-load infrastructure is also considerably affected by problems of free-riding. The energy security provided by peak devices can be analysed using public goods theory. A firm investing in a peak load unit contributes to the safety of the system and to security of supply but has to bear the cost of this security alone, along with the risk of the so-called missing money problem.

Recurrent tensions indicate that, given the risks involved, classic funding methods, namely those depending solely on market operation and prices, may no longer be effective and something more than price signals alone is needed to stimulate investment [27], [28]. Incentives could be introduced either through rules (guaranteed purchase tariffs or contracts between producers and network operators) or through market mechanisms with the development of capacity markets. In fact, a competitive market should send the right price signals to trigger investment. In the electricity market, with its special characteristics (inelastic demand, price volatility, etc.), this price function is modified and investment is much more risky than in other industries. In addition to these uncertainties there are others relating to regulation and the power of public authorities who, with the public interest at heart and because electricity is a basic necessity, can set price caps for consumers.

The literature [29] suggests that, in the absence of market uncertainties, a price cap in the end-user market can result in

¹ However, the problem of free-riding is not eliminated since a new line takes pressure off the system for everyone and, in the event of congestion, can suffer from prevailing underinvestment. But, exemption nevertheless gives the investor rights to operate the new line, which alleviates the impact of the physical characteristics of the system and thus restores a certain incentive.

substantial investment. Operators who are unable to raise prices can increase their revenues by expanding capacity and therefore the volume of sales. Prices would of course have to be at the level of the price cap and demand sufficiently inelastic for the new capacity to be used. In the presence of uncertainties, a high price cap encourages firms to underinvest and exercise market power in order to raise prices to the maximum authorised level. On the other hand, a price cap that is too low can lead to waiting games because of the uncertainty regarding payment for capacity. In a market characterised by uncertainty and regulated by price caps, underinvestment dominates, enabling operators to capture positive rents.

Risk-averse investors will thus be reluctant to put their money into developing facilities which may not be profitable. The creation of incentives, or at least solutions to change the way the risks are perceived, is therefore a necessary step towards keeping tensions at bay [30].

III. PROBLEMS OF MANAGING EU GAS SUPPLY SECURITY: TOWARDS A EUROPEAN GAS MODEL?

One of the striking aspects of European gas market liberalisation and the goal of a single natural gas market is the EU's growing dependence on suppliers from outside the EU. While most of the problems discussed in relation to the electricity sector also apply to the natural gas industry, there are still some fundamental differences. The security stakes in a liberalised gas market are different, since rules apply only to the EU. The debate is thus structured around two main questions.

The first concerns Europe's strategy to diversify its supply sources given that at present it is faced with an oligopoly of suppliers composed of Algeria, Norway and Russia. This is of vital importance in terms of not only competition policy but also Europe's gas security concerns. More specifically, the question of transit and more generally of the long-distance transmission infrastructures that will be required pose particular problems in the context of liberalisation.

The second question focuses more on the EU's traditional suppliers and the way in which gas companies are adapting to the new institutional environment. This is a particularly important point given that the EU is often their principal - even their only - export market. The process of EU gas industry liberalisation and the creation of a single gas market is likely to have a profound effect on the contractual relations established between EU states and their main historic suppliers, namely Algeria and Russia. The question of long-term contracts is the subject of ongoing debate in the EU. Some observers believe that even if long-term contracts can effectively cover the energy security risks, they still inhibit competition [31]. On the other hand, references [32], [33] put forward economic arguments in favour of maintaining long-term contracts. The former authors justify maintaining such contracts when there is a risk in the sector of strategic behaviour from players, or of specific investment choices,

while noting that the simultaneous presence in a market of long-term and short-term contracts does not necessarily result in inefficiency. Carlton maintains that long-term contracts have a significant advantage over short-term contracts and spot markets in that they reduce operating costs in an economy characterised by transaction costs and uncertainty. He also underlines that reduced cash-flow variability represents a gain in efficiency and security.

Aside from these theoretical issues, a closer analysis should be made of the strategies brought about by the economic incentives stemming from rules generated by the gas directives and the third energy package. The organisational and institutional changes (especially contractual) in the EU gas markets prompt us to examine the coherence (or lack of it) between the rules and standards decreed by the European Commission in the context of market opening and integration with the rules and standards of its main external suppliers. One of the challenges for the EU is to determine the conditions in which competitive wholesale gas markets can develop alongside the long-term contracts that contribute to the EU's gas supply security [34].

A. Diversification of EU gas supply sources in a liberalised context: the question of long-distance pipelines

Europe's strategy to diversify its gas supply sources in a context of gas industry liberalisation is seen as a key factor in its aim to secure the future of its energy supplies. Building transnational long-distance pipelines in this type of institutional environment is one of the major challenges. From this point of view, construction of the Nabucco pipeline to carry gas from the Caspian to Europe - and more generally opening up a fourth supply corridor - has become a top priority for the EU.

However, some of the rules promoted by the EU as part of its gas industry reform process raise doubts concerning the economic incentives that they might produce. Rules on ownership unbundling and third-party access to networks could cast doubts on the profitability, feasibility and hence the credibility of transnational gas pipeline projects. Gas companies in Europe and in producing states might be inclined to delay or change their investment choices or decisions with respect to renewing or increasing transmission capacity [35]. It is very difficult to imagine that these companies would commit themselves to investing substantial sums of money in long-distance gas pipelines unless they had the assurance of reserved transmission capacity in the pipelines that are built. A short-term capacity allocation system might seem to be an important element considering what is at stake in terms of competition. But the fact remains that long-term capacity reservation is undoubtedly an essential factor where investment in long-distance infrastructure is concerned. It is a vital aspect of security of supply [36]. These problems are most likely what led to the Commission's exemption decision regarding the Nabucco project.

The problem of “mismatch” between long-term supply contracts and shorter-term contracts on transmission capacity reservation is also a huge problem, creating a particular risk in relation to the reliability of supply of an EU gas supplier [36], [37]. It is on this issue that the EU and Russia clashed during talks on the Energy Charter Transit Protocol. The question of harmonising the duration of supply contracts and transit contracts prompted Russia to propose a special mechanism, the Right of First Refusal. Under the provisions of this mechanism a supplier with a long-term contract would have priority for transmission capacity reservation. The EU opposed this mechanism on the grounds that it was incompatible with its competition rules [38].

B. The changing contractual relations between the EU and its incumbent suppliers: energy security stakes

Long-term take-or-pay contracts (and their different clauses) concluded with suppliers outside the EU have played a key role in supply security, providing stability and also ensuring the strong presence of natural gas in Europe’s energy balance. The gas directives and the third energy package have an important impact on these long-standing contractual relations. They imply changes in contract terms which, on the one hand, might increase risks along the entire gas chain - resulting in uncertainties – and, on the other hand, might change the distribution of volume risk and price risk between importer and exporter. This would lead to changes in how the rent is shared out between producer countries and consumer countries. It is important that we fully comprehend the strategies being implemented by gas companies exporting to the EU in response to these changes, strategies that could lead to changes in the terms and conditions of supply agreements. The question is whether these new contractual relations will provide a satisfactory response to the EU’s concerns over gas supply security.

The idea behind TOP contracts is that with their price indexation clauses, flexibility clauses, clauses on minimum take-off volumes, and so on, they enable risks related to price and volume to be shared between producer and consumer along the entire gas chain. These contracts represent security [39]. It is thanks to this type of contract that stable mature gas supply systems can be developed in that they ensure that substantial investment can be made in production and transmission, in particular export pipelines. The producer effectively is provided with a guarantee that what is produced will be purchased. These contracts also eliminate a certain number of externalities (problem of free riding, hold-up and double marginalization, [40]). In a similar vein, indexation of natural gas prices to competing energy sources in end-uses provides a mechanism for consumers to protect themselves against price risks [41].

It is in the context of the principles of competition (anti-trust laws) promoted by the EU through its liberalisation policies that long-term contracts have come into the spotlight [42], [36]. The UE authorities see such contracts as major barriers

to the entry of potential new players and as a hindrance to the development of the liquidity needed in markets [43]. TOP clauses in long-term contracts can lead to inefficiency because of their inflexibility. Relaxation of the requirements in these clauses would give operators greater flexibility [44], [45]. Long-term contracts also lead to market fragmentation, which is counter to the development of a single gas market, the second objective of the EU’s energy policy [40]. A subject of controversy and debate, the liberalisation process has thus far not led to the elimination of these types of contracts, but certain clauses deemed incompatible with the Commission’s competition policy and the flexibility required by the single gas market have been amended and in some cases removed.

The final destination and territorial restriction clauses and the use restriction clause are among those that have been removed. Since they act as barriers to the entry of new players and lead to market partitioning they have been removed on the grounds that they inhibit competition [46]². From a producer’s point of view, they could however be seen as instruments to help reduce market risks [37]). Other contract provisions such as profit-sharing clauses are considered to have similar effects in that they make resale economically less attractive or even unfeasible [47]. Such mechanisms are not allowed in natural gas contracts. However, their role in LNG contracts is still being debated.

Other clauses deemed contestable will probably be examined with a view to negotiating amendments. These include clauses concerning contract duration, the price-indexation formula, and flexibility regarding minimum and maximum amounts that the contracted purchaser must take. Gas prices practised in the EU are currently determined in one of two ways, either in the context of long-term contracts or on spot markets. The question of indexing gas prices in long-term contracts to those of oil has become a particularly thorny one given what is happening to prices on spot markets. In fact, while oil-indexed TOP contract prices have remained in line with the price of oil and petroleum products, natural gas and LNG prices on the open markets have plummeted as a result of the oversupply of gas. This has led to a significant drop in spot market prices and a considerable disparity between these prices and those in long-term contracts. Consequently some European gas companies asked suppliers (Algeria, Norway and Russia) to change the indexation formula used in their TOP contracts under the provisions of the price review or price re-opener clauses. These two mechanisms, introduced in certain contracts in the 1980s, allow for adjustments to be made to the price formula used in long-term contracts. They

² Use restriction clauses that also create barriers to market entry have been removed from long-term contracts, in particular, contracts concluded by Gazprom and Sonatrach with certain European companies. Negotiations were held between the EU and Sonatrach to consider replacing the final destination clause by alternative mechanisms such as profit-sharing clauses. The EU rejected this solution [39]. In the same time, Gazprom succeeded in having the consent clause removed from its long-term contracts with ENI. This provision obliged Gazprom to obtain ENI’s consent when selling gas to other customers in Italy.

are important factors in the principle of risk sharing between importer and exporter [49].

Some changes are being made to the price indexation formulas in certain existing contracts (including those with Norway and Russia), with spot prices being introduced into the formulas, along with the price of electricity and coal, which can be substituted for gas in electricity generation. But the debate between those for and against oil indexation of prices continues [50]-[52], [41]. The reliability of prices obtained from spot markets, given the relatively small volume of trade, is one of the main drawbacks to their being used in long-term contract indexation formulas [49]. The problem remains as to what reliable alternatives to oil-indexation might be used.

More generally, for some authors, bringing greater flexibility to contracts in the presence of spot markets that are for the main part still insufficiently “liquid” opens the way for spot price manipulation and coordinated agreements among producers to determine prices. In particular, it might be in the interests of producers to turn toward spot markets and short-term contracts to the detriment of long-term contracts in order to maximise the trade-off between price and volume. If they assume that there will be slow growth in gas production and exports, they would be able to force spot prices up, a strategy that would be impossible to implement in a context of traditional TOP contracts [53]. By indexing prices in TOP contracts to oil products, the producer prevents players from trying to influence prices and removes any incentive to do so.

The challenges being made to this type of contract or certain clauses such as the price indexation clause and the final destination clause³ are a source of considerable tension between the EU and its suppliers, particularly Russia. In the long term, this is creating major uncertainties regarding the investment strategies of producing countries. Russia is the perfect example. This country has continually reiterated its preference for long-term TOP contracts, which it needs in particular to finance development of the Yamal gas fields. The main reason why such a commitment is needed is the scale of the investment required.

Also, apart from a few minor concessions in relation to the price indexation formula that it has granted to some of its customers (E.ON for example), Gazprom has stated its firm intention to defend oil-linked pricing, aligning itself in this respect with Algeria. This represents a fundamental departure from Gazprom’s former strategy, since it had always preferring to maintain its market share in terms of volume. In the absence of firm commitments from its European customers, the company could delay any decisions regarding investment in the renewal of deposits in Western Siberia, Yamburg and Urengoy, which have reached maturity. Similarly, Gazprom could look to diversifying its export markets by turning to

Asia. In the short to medium term, this would have little impact on Europe’s gas supplies given the current surplus of LNG and the lack of infrastructure that would limit the possibilities of exporting to Asia. But in the longer term, Russia’s capacity to export to Europe will remain a key supply variable and thus a vital factor in Europe’s gas supply security [54]⁴.

Given the difficult relations between the EU and its suppliers on this question, the EU seems to be taking a middle road, preferring to limit transmission capacity reservation in long-term contracts as a way of spurring competition and protecting against the risk of foreclosure. However, if this trend continues, the problem of contractual mismatch between long-term supply contracts and shorter-term capacity reservation contracts in the EU will remain unsolved [36].

C. Reaction of suppliers: implications for competition

Europe’s traditional suppliers are developing ways to adapt to EU gas market liberalisation. In some cases, the EU has felt that the strategies used have in some ways distorted competition and threatened the Union’s energy security.

The classic response of a supplier faced with the realities of a liberalised market might be to secure a presence downstream in Europe and so preserve its market shares while capturing downstream the revenues lost upstream as a result of increased competition. Such strategies are likely to distort competition and give a competitive advantage to the gas producers. In fact, if the EU’s suppliers have direct access to end-consumers this will give them the opportunity to develop foreclosure strategies and also to raise the supply costs of their rivals downstream. Concerning Russia, Gazprom’s aim is clearly to gain footholds in the downstream market in Europe, even though this has been relatively limited. The policy implemented by Gazprom since the end of the 1980s to acquire assets abroad (in countries to which it exports) illustrates this aim, the company’s ultimate goal being to gain as much access as possible to the end-user market. The sectors targeted are transmission, marketing, trading and power.

So far the EU’s response to the strategies of Gazprom and other companies to acquire assets downstream has been to introduce rules on ownership unbundling and the creation of independent TSOs, as well as to develop the principle of reciprocity as discussed in the Third Energy Package [56]. The third country clause, also known as the “anti-Gazprom clause” opens the way for discrimination against foreign investors. Under the provisions of this clause, companies held by shareholders outside the EU must demonstrate that they do not pose a threat to the EU’s energy security if they wish to operate in the Union. Gazprom believes that these new rules

³ From this point of view, some authors have pointed out that the removal of this clause in the absence in the EU of provisions for completely liberalised third-party access to pipelines gave importers an unfair advantage over exporters [55].

⁴ Their studies show that constraints on exports from Russia and the Middle East would lead to significantly higher prices after 2020.

are a serious barrier to its investment in the European energy sector and stand in the way of its internationalisation goals⁵.

D. EU strategy to secure its energy supplies called into doubt by changes in institutional environment of its main suppliers

Europe's gas supply and the security of this supply are more generally being jeopardised by the institutional and organisational changes taking place in the countries from which it imports most of its gas (Russia, Algeria) as well as in countries that are potential suppliers (Kazakhstan, Turkmenistan). The organisational structure of gas industries in these countries corresponds less and less to the vertically deintegrated competition-based model promoted by the EU. This means that liberalisation cannot concern the entire gas chain, as it might in the case of the electricity market. Furthermore, the unwillingness of some countries to commit to multilateral investment treaties rules out a certain number of strategies that might be used by European companies to secure their supplies.

The EU has chosen to manage trading relations with its main gas suppliers principally by diffusing its *acquis communautaires* on matters relating to energy market regulation [57]. Extending market rules and standards on liberalisation and privatisation within an international system dominated by multilateralism is the main mechanism used by the EU to secure its energy supplies [58], [59]. This approach, backed by the Energy Charter Treaty, is at the core of the EU's strategy to secure the future of its gas supplies. In particular, it implicitly opens up the possibility for its gas companies to access producers' hydrocarbon resources. The Energy Charter thus guarantees investments in the upstream oil and gas sectors for international oil companies [60]. The principle of state sovereignty over natural resources is not compromised, but the Treaty establishes a series of rules on trade, transit and investment, the aim of which is to liberalise energy investment and energy flows (inclusion of certain WTO clauses such as the most favoured nation clause and the national treatment clause, [38]). These rules provide guarantees for international investors and ensure a principle of non-discrimination.

Diffusing the *acquis communautaires* by means of the Energy Charter Transit Protocol⁶ is also a way of helping to secure the EU's energy supply by promoting competition. The protocol could provide a legal framework for opening Gazprom's gas pipelines to external suppliers. If Gazprom were to offer full third-party access to its pipeline network⁷,

with freedom of transit as the basic principle, companies would be able to ship gas from Central Asia to Europe, creating a wider choice of suppliers on the European market.

Because some countries (Russia, Algeria and even Norway) have still refused to sign the Energy Charter Treaty, it is not possible as things stand for the EU to use this "institutional" method of ensuring the security of its gas supplies. Today the EU is trying to find ways of overcoming these "institutional differences". One particular proposal is to define a common policy with regard to energy supplies that gives appropriate consideration to external dimensions [61].

IV. CONCLUSION

European gas and electricity markets face to challenges in the upstream and in developments of networks. In the electricity industry, regulatory rules, merchant mechanisms (merchant lines or capacity markets) could improve investments and price signals to restore incentives to risk-averse investors.

In gas markets, the EU's growing dependency on external suppliers to meet its natural gas needs undoubtedly calls for dialogue between producers and consumers that goes beyond simple market rules and extending the 'rule of law' to countries outside the EU. The challenges for the EU is to determine the conditions in which competitive wholesale gas markets can develop alongside the long-term contracts that contribute to the EU's gas supply security.

V. REFERENCES

- [1] Helm, D., 2007. The New Energy Paradigm. Oxford University Press.
- [2] Glachant, J.M., 2009. Towards a Smart European Energy Policy. EU Energy Policy Blog, 16 mars. <http://www.energypolicyblog.com/?p=592>
- [3] Glachant, J.M., Lévêque, F., Ranci, P., 2008. Some Guideposts on the Road to Formulating a Coherent Policy on EU Energy Security of Supply. The Electricity Journal 21 (10), 14-18.
- [4] Kruyt, B., Van Vuuren, D., de Vries, H., Groenbergh, H. (2009). Indicators for energy security. Energy Policy, 37, pp: 2166-2181.
- [5] IEA (2001). Towards a Sustainable Energy Future. International Energy Agency, Paris
- [6] Winzer, C. (2011). Conceptualizing Energy Security. EPRG Working Paper 1123, University of Cambridge, 36 p.
- [7] European Commission, 2008. European Energy and Transport: Trends to 2030 – update 2007, DG Energy and Transport, 8 April.
- [8] Armstrong M., Sappington D.E.M. (2006). Regulation, Competition, and Liberalization. Journal of Economic Literature, vol.44, n°2 (June 2006), pp 325-366.
- [9] Pollitt, M., 2008. The arguments for and against ownership unbundling of energy transmission networks. Energy Policy 36 (2), 704-713.
- [10] Hogan, W., Rosellon, J., Vogelsang, I., 2010. Toward a combined merchant regulatory mechanism for electricity transmission expansion. Journal of Regulatory Economics 38, 113-143.
- [11] Rioux, V., Glachant, J.M., Perez, Y., Dessante, P., 2008. Diversity of design of TSOs. Energy Policy 36 (9), 3323-3332.
- [12] Joskow, P.L., Tirole, J., 2005. Merchant transmission investment. Journal of Industrial Economics, 53, 233-264.
- [13] Buchan, D., 2007. Crusading against vertical integration. Oxford Energy Comment, September.
- [14] Steiner, F., 2001. Regulation, industry structure and performance in the electricity supply industry. OECD Economic Studies 32, 143-182.

⁵ Mr. Putin warns EU energy laws hurt business. EurActiv, December 2010.

⁶ The Energy Charter Transit Protocol (2000) specifies conditions of access to pipelines. It defines principles for determining transit tariffs, available capacity and unauthorised taking of energy products during transit.

⁷ The protocol does not however set forth rules regarding third-party access.

- [15] Stoft, S., 2006. Problem of transmission investment in a deregulated power market, in: Lévêque, F. (Ed.), *Competitive electricity markets and sustainability*. E. Edgar.
- [16] Smeers, Y., 2009. How well can one measure market power in restructured electricity systems?, in: Glachant, J.M., Lévêque, F. (Eds.), *Electricity Reform in Europe : Towards a single energy market*. E. Elgar, pp. 207-268.
- [17] Crampes, C., Creti, A., 2005. Capacity Competition in Electricity Markets. *Economia delle fonti di energia e dell'ambiente* 2, 59-83.
- [18] Lofaro, A., 2002. On the efficiency of Bertrand and Cournot competition under incomplete information. *European Journal of Political Economy* 18 (3), 561-578.
- [19] Green R., 2007. US Regulation and Competition Policy among the Energy Utilities, December, RePec Working Paper.
- [20] Kristiansen T., Rosellón J., 2006, A merchant mechanism for electricity transmission Expansion, *Journal of Regulatory Economics*, n° 29, pp. 167-193.
- [21] Léautier, T.O., Thelen, V., 2007. Optimal expansion of the power transmission grid : why not ? IDEI, Toulouse, working paper.
- [22] Joskow, P.L., 2006. Patterns of transmission investments, in: Lévêque, F. (Ed.), *Competitive electricity markets and sustainability*. E. Edgar.
- [23] European Commission, 2007. DG Competition report on energy sector inquiry. 10 January.
- [24] Glachant, J.M., Pignon, V., 2005. Nordic congestion's arrangement as a model for Europe? Physical constraints vs. economic incentives. *Utilities Policy*, 13 (2), 153-162.
- [25] Percebois, J., 2008a. Electricity liberalization in the European Union : Balancing benefits and risks. *Energy Journal* 29 (1), 1-19.
- [26] Fiocco R. (2011). The design of ownership structure in a vertically related market with unknown upstream cost. Summer CCRP Workshop, IFP School, July, 2011.
- [27] Finon, D., Pignon, V., 2008a. Capacity mechanisms in imperfect electricity markets. *Utilities Policy* 16 (3), 141-142.
- [28] Finon, D., Pignon, V., 2008b. Electricity and long-term capacity adequacy: The quest for regulatory mechanism compatible with electricity market. *Utilities Policy* 16 (3), 143-158.
- [29] Roques F., Savva N., 2006. Price Cap Regulation and Investment Incentives under Demand Uncertainty. University of Cambridge, Electricity Policy Research Group, EPRG 0616.
- [30] Finon, D., Perez, Y., 2008. Investment risk allocation in restructured electricity markets : The needs of vertical arrangements. Larsen, Fontenay-aux-Roses, working paper 12.
- [31] Aghion, P., Bolton, P. (1987). Contracts as a Barrier to Entry. *American Economic Review*, n°77, pp 388-405.
- [32] Hubbard, G., Weiner, R. (1991). Efficient Contracting and Market Power Evidence from the U.S. Natural Gas Industry. *Journal of Law and Economics*, vol. 34, Issue 1, april, pp 25-65.
- [33] Carlton, D. (1979). Contracts, Price Rigidity, and Market Equilibrium. *The Journal of Political Economy*, vol. 87, n°5, pp 1034-1062.
- [34] Rioux, V. (2009) The Design of The Internal Energy Market In Relation To Energy Supply Security And Climate Change EU Working Papers 37 (Robert Schuman Centre For Advances Studies).
- [35] Dorigoni, S., Pontoni, F. (2008); Ownership Separation of the Gas Transportation Network: Theory and Practice. Working paper n° 9 IEFÉ, Bococoni, March.
- [36] Talus, K. (2011). Long-term natural gas contract and antitrust law in the European Union and the United States. *Journal of World Energy Law and Business*, 4(3), pp. 260-315.
- [37] Konoplyanik, A. (2005). Russian Gas to Europe: From long term contracts, on border trade and destination clauses to...?. *Journal of Energy & Natural Resources Law*, Vol 23, n° 3, pp. 282-307.
- [38] Haghghi, S. (2007). *Energy Security: The external Legal Relations of the European Union with Major Oil- and Gas-Supplying Countries*. Hart, Oxford.
- [39] Boussena, S. (1999). *New European Gas Market: Gas Strategies of Other Present and Potential Suppliers*, The 1999 International Conference: The role of Russian and CIS Countries in Deregulated Energy Markets (The Moscow International Energy Club and the Centre de Géopolitique des Matières Premières-Université Paris Dauphine), Paris, 6-7 December.
- [40] Talus, K. (2007). Long term agreements and security of supply-between law and politics. *E.L. Review*, August, pp. 535-547.
- [41] Konoplyanik, A. (2010). Evolution of Gas Pricing in Continental Europe: Modernization of Indexation Formulas Versus Gas to Gas Competition. Centre for Energy, Petroleum & Mineral Law & Policy, Working Research paper Series n) 2010/01, 31 p.
- [42] Glachant, J.M., de Hauteclocque, A. (2009). Long-term contracts in European Competition Policy: Fuzzy not Crazy. EU Working paper 6, European University Institute, San Domenico di Fiesole.
- [43] Percebois, J., (2008b). The supply of natural gas in the European Union - Strategic issues. *OPEC Energy review* XXXII (1), pp. 33-53.
- [44] Haurie, A., Legrand, J., Smeers Y., Zaccour, G. (1987). A stochastic dynamic Nash-Cournot Model for The European Gas Market. rapports de recherche H.E.C, octobre.
- [45] Crocker K.J., Masten S.E., 1985, "Efficient Adaptation in Long-term Contracts: Take-or-Pay Provisions for Natural Gas", *American Economic Review*, 75, 1083-1093.
- [46] Nyssens, H., Cultreta C., Schnichels, D. (2004). The territorial restrictions case in the gas sector: a state of play. *Competition Policy Newsletter*, n° 1, pp. 48-51.
- [47] Nyssens, H., Osborne, L., (2005). Profit splitting mechanism in a liberalised gas market: the devil lies in the detail. *Competition Policy Newsletter*, n° 1, spring, pp. 25-29.
- [48] Wäktare, E. (2007). Territorial restrictions and profit sharing mechanisms in the gas sector: the Algerian case. *Competition Policy Newsletter*, n° 3, pp. 19-21.
- [49] Frisch, M. (2010). Current European Gas Pricing Problems : Solutions Based on Price Review and Price Re-Opener provisions. *International Energy Law and Policy Research Paper Series*, Working research paper, 2010/03, 19p.
- [50] Stern, J. (2009). Continental European Long-Term Gas Contracts: is a transition away from oil product-linked pricing inevitable and imminent?. *OIEC, NG* 34, September.
- [51] Stern, J., Rogers, H. (2011). The Transition to Hub-Based Gas Pricing in Continental Europe. *The Oxford Institute For Energy Studies*, NG 49, march, 41 p.
- [52] Maisonnier, G (2006). The ties between natural gas and oil prices. *IAEE Newsletter*, third quarter, pp. 26-29.
- [53] Boussena, S., Locatelli, C. (2011). Energy institutional and organisational changes in EU and Russia : Revisiting gas relations. *EDDEN-CNRS*, Working paper.
- [54] Aune, F., Einar, K., Sagen, E. (2008). Globalisation of natural gas markets –effects on prices and trade patterns. *Discussion papers*, n° 559, Statistics Norway, Research Department, octobre, 18 p.
- [55] Frisch, M. (2003). The forced removal of destination clauses : European gas security of supply implications. *Eurasian Natural Gas : Opportunities and Risks*. Conference organised by the energy Charter Secretariat 12-13 November 2003.
- [56] Willems, A., Sul, J., Benizri, Y. (2010). Unbundling as a Defence Mechanism Against Russia: Is the EU Missing the Point?, in: Talus, K., Fratini, P. (Eds). *EU-Russia Energy Relations*. OGEL collection, Euroconfidential, Brussels, pp. 227-244.
- [57] Mc Gowan, F. (2007). Can the European Union's Market Liberalism Ensure Security in a Time of "Economic Nationalism? *Journal of Contemporary European Research* 4 (2), pp. 90-106.
- [58] Belyi, A., (2009). Reciprocity as a factor of the energy investment regimes in the EU-Russia energy relations. *Journal of World Energy Law & Business* 2 (2), pp. 117-127.
- [59] Correljé, A., Van der Linde, C. (2006). Energy supply security and geopolitics: An European perspective. *Energy Policy*, 34, pp. 52-543.
- [60] Wälde, T. (2008). Renegotiating acquired rights in the oil and gas industries: Industry and political cycles meet the rule of law. *Journal of World Energy Law & Business* 1 (1), pp. 55-97.
- [61] European Commission, 2011. On security of energy supply and international cooperation-"The EU Energy Policy: Engaging with Partners beyond Our Borders. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM (2011) 539 final, Brussels.