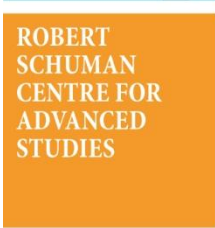




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Understanding institutional change: the development of institutions for the regulation of natural gas transportation systems in the US and the EU

Aad Correljé, Martijn Groenleer and Jasper Veldman

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Abstract

This paper compares the development of the institutions for regulation of the natural gas transportation systems in the United States and the European Union. Given the fact that these systems are technically similar, it addresses the question why regulatory institutions in the US and the EU have developed in such different ways. To explore institutional change and the differences thereof (in terms of for instance the role of federal and supranational actors, coordination between public and private actors and co-existence of different executive orders), we adopt a historical and dynamic approach in which institutional outcomes are explained not only by the structural conditions but also by the behaviour of the different actors involved. Our exploration is based on a systematic search of the literature on the US and EU regulation of the natural gas transportation systems since their early beginnings. The paper serves as a prelude to more in-depth research on the development of regulatory institutions in the gas sector and notably the political struggles involved in that development.

Keywords

European Union, history, institutional change, natural gas, politics, regulation, United States.

I. Introduction: The puzzle of change in regulatory institutions*

Federal regulation of the natural gas market in the United States (US) has evolved into a strong system that is often used by economists as an example of how gas market regulation should work. The Federal Energy Regulatory Commission (FERC) and its predecessor have, over time, regulated transactions from the wellhead to the pipeline entry and exit points. *Interstate* gas transportation is now essentially regulated at the federal level, while the public utilities commissions of the individual states are responsible for *intrastate* gas transport. Both the FERC and public utilities commissions are independent from federal and state executive authority.

By contrast, supranational European Union (EU) regulation of gas markets is usually depicted as relatively weak. Only recently has an Agency for the Cooperation of Energy Regulators (ACER), a ‘FERC-lite’ one might say (Court 2012), been established. In its current *de jure* institutional setup, the agency’s competences and capacity remain limited. The agency is highly dependent on national regulatory agencies (NRAs), which differ in terms of their institutional features. Some national regulators are not entirely independent from national executive authority. Member states’ politicians still often defend their national energy champions, interfering with decisions of national regulators.

Given the fact that transportation systems (i.e. pipelines) for natural gas are more or less physically alike, this raises the puzzle why the institutions for regulation of the US and EU gas transportation systems has developed in such different ways. In order to address this puzzle, we pose the following questions:

- How have the US and EU gas markets developed over time?
- What regulatory institutions have emerged?
- What technological and economic factors have driven the development of regulation in both polities?
- What actors have been involved in the regulation of the US and EU gas markets?
- How have these actors behaved over time?

Analysing institutional change in these regulatory systems is enormously complex and would entail a well-developed theoretical framework and in-depth qualitative as well as quantitative study. Our aim in this paper is relatively modest. We seek to explore, in a preliminary fashion, the *history* of the gas markets in the US and the EU and mainly the *politics* involved in the development of the *institutions* to regulate these markets over time. In order to explore change in regulation and the differences between the US and the EU, we adopt a historical yet dynamic approach in which institutional outcomes are driven not only by structural conditions, but also by the actions of a multitude of different actors. Our ultimate aim is not to assess the differences between the US and the EU on the basis of a full-blown comparison, which would simply be impossible given the many differences, but to understand the recent and on-going development of regulatory institutions in the EU by contrasting it with processes of centre formation, administrative coordination and the co-existence of executive orders in the US.

We argue that the regulation, de-regulation and re-regulation of an industry and the institutions developed for that purpose not only shape its organization in the economic sense, as a market, hoping to improve its performance (see Scherer 1980). By (re-)determining patterns of ownership and control over the several types of assets involved, including the gas molecules as such, regulation of the gas market also influences the nature and strength of the interests of the private parties involved in the

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different parts of the industry and its end-users. In turn, these private parties and customers have an influence on regulatory change and on the actual process of day-to-day regulation by public authorities (see also Helm 2006; Spiller 2009). Processes of economic restructuring are thus being shaped by the (re)distribution of interests among all actors involved, at both state and national levels and federal and Union levels.

We proceed as follows. Section 2 outlines our theoretical and methodological approach. Section 3 provides an overview of the development of the US and EU regulatory systems over time. In section 4, we analyse this development along the lines of the concepts put forward in section 2. Section 5 concludes this paper with tentative answers to the questions formulated above and some directions for further research.

II. Theoretical and methodological approach: history, institutions and politics

A. Incremental change

Our research question is in essence a question of how to account for (variation in) institutional change. To study such change, we adopt a perspective which holds that periods of apparent institutional stability are characterized by gradual change over time, i.e. that change is incremental. Indeed, when zooming in on what at first sight seems to be a ‘punctuation’ (Krasner 1988; Baumgartner and Jones 2009), it often appears that institutional change is driven by slow but steady developments beneath the surface (Thelen 2003; see also Correljé 2005). Certainly, exogenous shocks such as technological innovations or economic crises often prompt change, but usually such shocks themselves and the reactions to these shocks are highly related to endogenous factors and therefore not so exogenous at all (Thelen 1999; Boin and ‘t Hart 2000). Their impact is often generated ‘from the inside’, through the deliberate interventions of actors or the unintended consequences of their actions.

B. Injecting agency: layering and displacement

We make use of ‘path dependence’ and ‘institutional stickiness’ arguments from the historical institutionalist literature (Mahoney 2000; North 1990; Pierson 2000a; 2000b) that may help us to explain why institutions persist, even if there is a functional need to adapt or reverse them. But we complement these arguments with the notion of on-going political contestation over institutional outcomes to help us explaining transformation in regulation (cf. Groenleer 2011; Levi-Faur 2011).

Structural conditions are important to take into account when it comes to understanding why initial choices are often self-reinforcing, but we argue that an account of institutional change is incomplete if it does not include the ‘politics’ of institutional change by considering the actors involved and their behaviour. While actors at a given moment in time are limited in their options due to historical trajectories (they are ‘locked-in’), institutions are not just constraints but are also strategic resources for actors, providing opportunities for change. We thus highlight “the processes through which institutional arrangements are renegotiated periodically in ways that alter their form and functions” (Thelen 2003: 213; cf. Knight 1992).

The concepts of ‘layering’ and ‘displacement’, taken from the historical-institutionalist literature, are particularly useful to analyse contestation over institutional outcomes. *Layering* refers to the process by which actors attach new elements to existing institutions, which thus gradually change in status and structure (Schickler 2001; Mahoney and Thelen 2010). These new elements do not replace what is already there, but they are added to it, leading to incremental change. *Displacement* refers to a situation in which “new models emerge and diffuse which call into question existing, previously taken-for-granted organisational forms and practices” (Streeck and Thelen 2005: 19). Displacement differs from the punctuated equilibrium model in that the new institution is introduced in competition

with the existing institution rather than immediately displacing it. It also differs from layering because under displacement the new institution eventually supplants the old.

We thus first of all propose that the process of restructuring in both the US and the EU is one of incremental yet transformative change which leads to an increased role of the ‘centre’, i.e. the federal or Union level. Change is not necessarily efficient, however, and outcomes may not serve the original purpose of institutions (March and Olsen 1989). We subsequently put forward that the differences between the US and the EU result from the mode of incremental change. In the US, changes seem to have occurred through displacement of existing institutions, whereas in the EU the phenomenon of layering appears to be dominant and European and national orders co-exist. Finally, we suggest that the differences in incremental change are not only determined by structural factors, but also the result of actor behaviour. Actors’ preferences are not necessarily fixed and their interests may change over time, in relation to those of others, generating cooperation as well as conflict (March and Olsen 1989).

C. Juxtaposing the US and the EU: structured, focused comparison

Our approach is comparative, juxtaposing the development of regulatory institutions in the US and in the EU. In both the US and the EU we have seen extensive restructuring of the gas markets. Both systems have moved from local to state and federal or Union-wide regulation, and from regulation to de-regulation and re-regulation. However, the regulatory institutions that have emerged in the US as a result of the process of restructuring differ significantly from those that have emerged in the EU, at least until now.

One might argue that the regulatory systems in the US and the EU are too different to be compared (see Correljé and De Vries 2008). Indeed, there are several structural differences in relation to their political systems and gas markets that make comparison difficult. First, the US as a political system came into being more than 200 years ago, whereas the EU just ‘celebrated’ its 60th birthday. The US thus simply has a much longer history than the EU, which could explain for the observed differences. The US also is a federal system, whereas the EU is a hybrid somewhere in between an international organization and a federal state. This not only means that the US and EU systems are composed of different actors, but also that these actors play different roles, which almost inevitably leads to differences. Moreover, the starting points of the US and EU systems are different, with private actors traditionally playing a much more important role in the US than in the EU, especially where it concerns the energy sector.

Second, in terms of the ‘co-evolution’ of technology and institutions, the US regulatory system, because of its earlier point of departure, has been affected by technological innovations in the past that have not influenced the EU regulatory system, because such a system was simply lacking at that time. It is likely that individual EU countries have responded differently to technological changes and this will also be reflected in the regulatory institutions built at the EU level. In addition, the US only depends for a small percentage of its gas consumption on imported gas, which comes almost entirely from Canada; this percentage is likely to decrease as a result of the shale gas revolution. The EU, in contrast, is highly dependent on imported gas, by pipes from Norway, Russia, Algeria and Libya, and by LNG from a range of other countries; this dependence will only increase after countries such as the Netherlands run out of domestic supplies. Differences in the level of dependence on gas producing countries are likely to affect the regulation of the gas markets in both systems.

Given these differences, it would indeed be surprising if we would find that similar regulatory institutions have emerged in both systems. Indeed, we do not believe that a full-blown comparison of the US and EU systems will yield much insight in the development of their regulatory institutions. So we acknowledge the abovementioned differences and focus our comparison only on those aspects of the cases that we believe are relevant to our research objectives. This method of structured, focused comparison (George and Bennett 2005) means zooming in on the development of a number of key

institutional aspects of the regulation of the gas industry, including issues of ownership and control over the assets, ways of public intervention and regulation, and patterns of market governance.

In order to take the first steps in tracing the development of both regulatory systems, we undertook an electronic search to identify all articles, books, book chapters and research reports on the regulation of the US and EU natural gas markets, notably their gas transportation systems, starting at the beginning of the 20th century until now. We are still in the process of digesting all this literature and the paper is therefore based on the (limited amount of) articles, books, chapters and reports that we could review so far.

III. The development of institutions for the regulation of gas transportation systems in the US and the EU

A. The US: the path to competition

1. The rise of federal regulation

The gas industry in the US started as small scale municipal businesses. Technological advances soon made it possible to build pipelines between municipalities. As pipelines were thought of as ‘natural monopolies’, state public utility commissions were created to regulate the rates of pipeline companies and make sure they would not abuse their market power. A regulatory gap arose when pipelines crossed state borders; such interstate pipelines were beyond the power of state level regulators. By 1906, Congress aimed for federal regulation of oil and gas interstate pipelines by means of ensuring ‘common carriage’, which would make it obligatory for pipeline companies to transport the oil and the gas of others for a fee. At least partly as a result of the efforts of Senator Joseph Foraker to shield gas pipelines from competition, interstate gas pipelines remained unregulated private carriers. Pipeline companies continued to be vertically integrated with gas producers (i.e. ‘upstream’) or with local distribution companies serving their customers (i.e. ‘downstream’) (Makholm 2007; 2012; cf. Troxel 1936; 1937a; 1937b).

Almost thirty years later, in 1935, the first step was made toward the regulation of interstate gas pipelines. The Federal Trade Commission (FTC) showed that a great part of the gas production, interstate transport and local distribution was controlled by only a few vertically integrated holding companies. To keep them from abusing their market power, Congress passed the Public Utility Holding Company Act, which enabled the Securities and Exchange Commission (SEC) to separate the gas pipelines from the gas distributors and thus break the vertical integration (Makholm 2007: 19; 2012: 99-103). As a result, two groups of actors were created: on the supply side the pipeline companies and on the demand side the local distribution companies (LDCs).

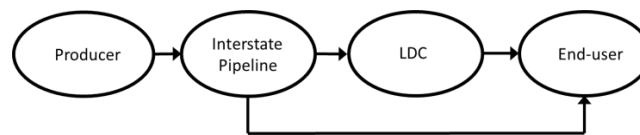
Three years later, in 1938, the Natural Gas Act (NGA) was enacted, which allowed the regulation of *interstate* gas pipelines by the Federal Power Commission (FPC), created in 1920. Regulation involved rates for the pipeline tariffs to protect consumers, in combination with the licensing of new pipeline capacity, to shield the pipelines from competition. Pipelines were not forced to interconnect. This combination had emerged as a compromise outcome between the pipeline owners and the LDCs, the latter acting on behalf of local governments and consumers (Makholm 2012: 122-129).

Since the NGA, federal and state regulation are supposed to form a comprehensive regulatory scheme ensuring that there are no regulatory gaps. The FPC’s (and later FERC’s) jurisdiction complements that of state commissions, that are responsible for *intrastate* regulation, and that, already in 1889, created the National Association of Regulatory Utility Commissioners (NARUC) to represent their interests. Whereas on paper the distinction between federal and state authority is clear, in practice distinctions have often involved “a power struggle between [the federal regulatory commission] and

state regulatory commissions, each seeking to preserve or to expand its jurisdictional territory” (McGrew 2009: 125).

In the ensuing period, two events further shaped the regulation of gas pipelines. The Hope Decision (1944) provided protection to the pipeline owners, in the sense that the value of their assets would not be jeopardized by regulatory decisions, such as unreasonably low tariffs. The Administrative Procedures Act (1946) provided even more certainty in the tariff setting procedures (Makholm 2006: 14-18; 2012: 129-132). Therewith an ‘iron triangle’ between the pipeline companies, the distributors and the regulatory agency was established, providing the stable market conditions (or at least the anticipation thereof) required to attract the funding for (permitted) long-distance pipelines (see Sanders 1981).

Figure 1. US industry structure prior to unbundling (Source: NGSA)



This was not the case, however, in respect of the commodity (gas) transactions. Throughout the 1940s, two problems were prevalent. First, the concern that producers would sell their gas at excessive prices to their affiliated pipelines and, second, that regional depletion would provide producers with market power in selling as yet un-contracted volumes of gas. The regulated pipeline companies sold the gas to the distributors, just passing on their purchasing costs. Over time, doubts arose as regards the role of the pipeline companies in efficiently purchasing on behalf of their “captive customers” (Makholm 2006: 24-26; 2012: 132-138).

The 1954 decision of the Supreme Court in *Phillips Petroleum Co. v. Wisconsin* determined that gas producers should sell gas to interstate pipelines at regulated prices (Baker and Illig 1954: 376-377; McGrew 2009: 62). Initially, the FPC sought to regulate wellhead prices on the basis of individual fields. This proved a mission impossible, however (MacAvoy 2000: 12-16). Thereupon, in 1960, it was decided to divide the US into 23 areas and to determine a price for each area. In 1974 the FPC was forced to change its ratemaking approach into a nationwide interstate gas price, as it was impossible to react promptly and responsively to changing market conditions (Breautigam and Hubbard 1986: 141-146).

In the meantime, new market conditions had arisen. Due to the oil crises the demand for gas increased, which led to a higher gas price on the *intrastate* market. The FPC did not allow the regulated price of gas on the *interstate* market to follow this pattern, however. Because of the higher intrastate gas prices, most producers started to sell their gas on these markets. Hence, largely as a result of FPC regulation (Breyer and MacAvoy 1973; MacAvoy 2000) less gas became available on the interstate market. This induced shortages in those states that had no gas production and were dependent on the ‘import’ of gas from the interstate market and, thus, tensions arose. An additional problem that emerged from the relatively low interstate price of gas was the fact that it decreased the incentive to search and develop new gas reserves, above what was required to serve the intrastate markets (Breautigam and Hubbard 1986: 141-146).

2. Phased de- and re-regulation

The difficulties of price regulation, the shortages of gas and the absence of incentives to search for new gas reserves led Congress in 1978 to pass the National Gas Policy Act (NGPA), eliminating the dual markets for natural gas and providing for the deregulation of gas prices. The NGPA gave the Federal Energy Regulatory Commission (FERC), replacing the FPC, control over interstate transport. FERC started the phased deregulation of the gas market, which solved the problems with the shortages

and the exploration for new gas reserves but subsequently led to another problem (Breautigam and Hubbard 1986: 151-165).

During the 1974-1978 period, at the time of the shortages, interstate pipeline companies had signed long-term 'take-or-pay' contracts (meaning that the buyer is obliged to pay unconditional of whether the purchased gas is taken) with the gas producers (Hubbard and Weiner 1986). The pipelines signed those contracts in the expectation of growing gas demand and rising prices. But around 1980 the price of oil and gas started dropping sharply (Leitzinger and Collette 2002: 84). Industrial customers and electricity companies, began switching to other, cheaper, fuels. The interstate pipeline companies had contracted gas, but they did not manage to sell it at profitable prices. They could refuse to take the gas from the producers, but they would have to pay anyhow. To prevent the bankruptcy of the pipeline companies, in 1983, FERC allowed industrial users to buy gas directly, without a long-term contract, from producers, while pipelines were given permission to transport this gas. This option was not open to LDCs supplying residential customers, however. Therefore, in 1985, the approach was invalidated by the US Court of Appeal for the District of Columbia (DC) because it was considered discriminatory (Breautigam and Hubbard 1986: 158-165; Bernhardt 1988: 763).

By 1984, FERC Order No. 380 released the LDCs from their minimum bill obligation. This allowed LDCs to purchase gas on the developing energy spot market as well. Yet, for these purchases, they experienced problems in contracting – particularly – firm transport capacity with the pipelines, which only offered interruptible contracts, outside the heating and storage injection season (Leitzinger and Collette 2002: 87). Moreover, the pipelines remained tied to long-term take-or-pay contracts with producers, which covered their initial commitments to LDCs. This intensified the take-or-pay crisis for the pipelines.

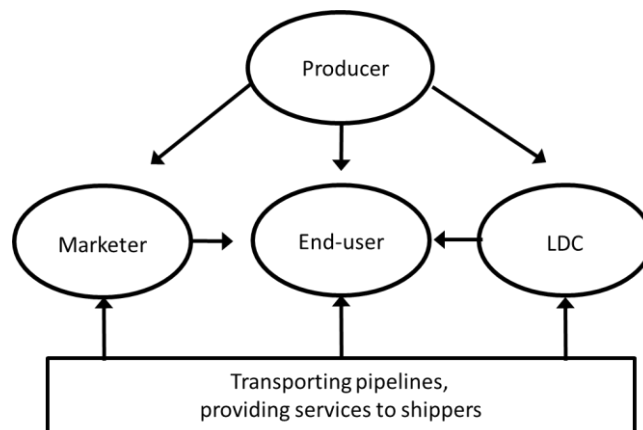
Thereupon, in 1985, FERC announced Order No. 436 which introduced voluntary open access for the interstate gas pipelines. Pipeline companies could choose to be only a transporter of the gas, while discarding their merchant role, or to remain regulated. This enabled LDCs and large end-users to bypass the pipelines and to purchase natural gas directly from producers. Another important provision was that new pipeline investments in capacity would be allowed by FERC, if the pipeline company assumed the risk for the project, instead of having it passed on to the customers.

Initially, most of the pipeline companies refused the common carriage, but within a year most of them had opted for open access (Bernhardt 1988: 764). Leitzinger and Collette (2002: 87) argue that this was the consequence of a vicious circle, in which: "(1) customers sought open access transportation to move cheap gas spot supplies; (2) that movement displaced pipelines' contracted gas; (3) the resulting decline in 'takes' of contract gas on the part of the pipelines caused producers to offer more volume in the spot market; (4) the increased spot volume lowered the price, increasing the incentive to use spot gas; which (5) caused more customers to seek open-access transportation, etc." As a consequence, a huge amount of contracted – but not taken – gas developed; on the one hand, as a liability to the pipelines but, on the other, reducing the cash flow of the producers. This spurred negotiations among the firms to mutually absorb part of the stranded cost, thereby, eventually reducing end-consumer prices.

As a result of FERC Order No. 436, an increasing number of unregulated gas marketing affiliates appeared in the market selling gas on a spot market basis, forcing un-competitive merchant pipelines out of business. Initially, the transport of this gas was made difficult, because the pipelines tended to give their affiliate suppliers a preferential treatment in getting access to their systems. This made FERC issue Order No. 497, requiring a separation of the pipelines and the trading business. The DC court overturned Order No. 436, as this order left the burden of absorbing the stranded cost of long-term contracts to the pipeline companies and producers. The new FERC Order No. 500 also involved the end-users in sharing the burden in several alternative ways. Subsequently, the Wellhead Decontrol Act of 1989 deregulated the wholesale price of natural gas in all interstate transactions, further promoting competition in the wholesale natural gas market.

Nevertheless, by 1992, FERC decided that voluntary common carriage continued to be problematic, as firm peak day supply remained under control of the pipelines. So, to their disadvantage, independent shippers had to use interruptible transport contracts. FERC thus introduced Order No. 636, which required pipeline companies to fully unbundle gas trading from pipeline operation activities, and to set up separate transportation and trading affiliates (Chermak 1998: 209). This attracted many new companies into marketing and promoted fierce competition. It also dealt with the issue of the stranded cost caused by the full unbundling. Order No. 636 significantly reformed interstate pipeline transportation. It allowed resale of transportation contracts by shippers, inducing a secondary transportation market, where shippers can purchase pipeline capacity from other shippers that have temporarily or permanently spare capacity. This fostered an efficient allocation of transportation contracts among shippers and high utilization of natural gas pipelines.

Figure 2. US industry structure after unbundling (Source: NGS)



A subsequent series of measures, such as FERC Order No. 637 (2000) was designed to promote transparency and flexibility in trading practices. It facilitated short-term capacity resale, shippers' choice in delivery locations on interstate pipeline systems, and the standardization of contracts and pipeline system operation. Further rules guided the development of a short-term transportation market where capacity and interruptible contracts can be traded among pipeline companies and shippers (see for instance Petrash 2007). Natural gas regulation through the FERC has thus matured and today "unbundled, non-discriminatory transportation is clearly the norm in the industry" (McGrew 2009: 68).

B. The EU: from multiple national markets to a single European market?

1. Public-private coordination at the national level

The natural gas pipeline network in continental Europe was developed in the 1960s, after the discovery of the Groningen Gas field in the Netherlands. Pipelines were built to supply Belgium, France, Germany and later also Italy with gas (see Correljé et al. 2003). During the 1970s, Norway and the Soviet Union appeared as new suppliers, attracted by the high revenues on gas sales in Europe and the growth in gas demand, particularly after the oil crises in the 1970s.

Diversification was stimulated by the strong inclination to diminish the dependence on expensive OPEC-oil, plus the explicit refusal of the Netherlands government to enlarge the volumes contracted for export after 1973. Following the first oil shock, it decided to reserve Dutch gas to Dutch consumers – instead of satisfying the growing demand for gas in the neighbouring countries. Subsequently, around 1979/80, the Netherlands started a series of negotiations with importing countries to increase the border prices for Dutch gas. As a consequence, the importing countries'

wholesale/transmission companies turned to alternative suppliers like Norway, and also to the Soviet Union and Algeria. These new suppliers took advantage of the fact that a national and a local gas infrastructure had already been put in place. On this basis they were able to gradually expand their sales and to construct new pipeline systems connecting newly developed gas production areas in the North Sea, in Russia and in Algeria to the main consumption areas in Western Europe.

These developments took place within a managed market, in which no ‘free’ volumes of gas could be offered to ‘free’ customers; there was no gas-to-gas competition. The near watertight system of contracts and the controlled construction of transmission and distribution capacity - taking account of the volumes that could be sold at premium prices to specific categories of consumers - secured a virtually riskless expansion of the supply system and the gradual growth of markets. This without jeopardizing the other national and industrial interests involved, such as state revenues, the oil and the coal industry, and nuclear power generation.

Upstream, generally, the gas resources were explored and produced by joint ventures of the international oil companies and/or the state-owned companies of the countries with gas resources. These producers coordinated their production with the (semi) state-owned wholesale single-buyers, which sold the gas to transmission and trading companies taking care of the international transport of the gas throughout Europe, via the national high-pressure transport systems. Generally, these were controlled by joint ventures with producers. The transmission/wholesale companies supplied the large industrial customers and the municipally, or regionally, owned local distribution companies (LDCs) operating the low-pressure networks, through which the gas was sold and transported to the small domestic users and businesses.

Figure 3. European industry structure prior to unbundling



Trade between the several parties in the gas chain was arranged through privately arranged medium to long-term contracts. By means of concessions, public ownership, indicative planning, cost-plus pricing (i.e. first calculating the costs, then adding a proportion of it as markup) and contracted prices, the producers, pipeline-owners and distributors were able to coordinate investments, purchase and sales volumes of gas, and prices. Through these contractual provisions, the risk involved in the funding of the expensive upstream production and transport facilities was reduced. This facilitated investment in the expansion of the system, as long as gas could be produced and transported at such a cost that the end-use price allowed for a certain profit. Upstream competition existed essentially between the supplying countries, before new long-term supply settlements and pipelines were contracted. The only downstream competition to gas emerged from the threat that consumers would switch to other energy sources, of which oil was the most relevant. Yet, as the end-use gas prices were linked to local prices for substitutable oil products, the added-value to the end-user was in the technical and other advantages of easily controllable gas firing, and avoiding the storage of dirty coal and oil products (Peebles 1980; Correljé *et al.* 2003; Davis 1984; Estrada *et al.* 1995).

The continental European gas industry was thus characterized by a highly integrated and (inter)nationally coordinated structure, in which the firms in the mid-stream industry enjoyed exclusive rights to supply their customers, the large industry and LDCs, and to import and export gas. In exchange for this exclusivity, the companies were entrusted with various public service obligations and duties – to ensure secure and reliable supply at ‘acceptable’ cost to the various categories of users. The LDCs had to guarantee connection of consumers, when such a connection was economically ‘justified’. End-use prices were subject to a limited degree of public control, through municipal ownership of the LDCs and ministerial oversight. The gas transport companies were able to pass on the costs of new pipeline investments directly to their customers, who had no alternative but to accept

the tariffs as a given. Furthermore these tariffs were ‘bundled’ – a consumer paid a combined tariff for transportation and distribution and the fuel component, established every six months.

Yet, in some parts of the European gas market, developments took place which illustrate that the market was not as rigidly locked as is often believed. An example is the German company Wingas, a subsidiary of the chemicals giant BASF. In 1989 it announced the construction of the Midal pipeline, from the place where Norwegian gas enters Europe, Emden, to its main plant Ludwigshafen. This was a response to its traditional gas supplier Ruhrgas, which was not prepared to lower the price for gas delivered to BASF. Thereupon, BASF engaged in international gas trading through its subsidiary Wingas, initially a small gas production company. The accession of Wingas as an ‘independent’ outsider – and joint venture with Gazprom (35%) - to the traditional network of transmission companies sowed the seeds for gas-to-gas competition and triggered a wave of pipeline construction to Russia, by Wingas, and to Norway, by Ruhrgas (see Stern 1998).

Another major development was the construction of the Interconnector between the United Kingdom (UK) and the continent. In the 1980s, the UK started the public finance driven privatization of its utilities, including gas, which was followed by market restructuring (Mabro et al. 1999; Newbery 2001). In 1992, the UK Department of Energy brought together a number of energy companies to study a cross-channel natural gas connection. Several energy companies eventually made long-term capacity commitments, allowing the construction of the Interconnector between 1996 and 1998. A considerable portion of its capacity was open for short-term and spot-market deals, however. In the context of excess supply and a competitive market in the UK, it provided a powerful potential to disrupt the hitherto controlled Western European market.

In this context, the two traditional suppliers, Netherlands and Norway, were also gradually adjusting their strategy to a more competitive context. Notwithstanding the fact that the Netherlands’ government had been among the most staunch defenders of the controlled market, it declared by the end of 1995 that it would not resist a liberalisation of the gas market anymore. By and large this meant that Gasunie would seek its future strategy in the provision of additional flexibility and storage capacity and in a major role as a gas trader, without making much larger volumes of gas available for the export, however. As has become clear in retrospective, this certainly has facilitated the development of a ‘free’ gas market in North-western Europe.

The other traditional supplier, Norway, also took a more liberal position. While maintaining the status quo as much as possible, it took advantage of the new situation by offering gas to Central European countries, while bringing about a potential increase in supply capacity through the optimization of existing systems for export to the UK and Central Europe.

Large industrial consumers have played an important role in national developments. If they believed that cheaper gas could be purchased, either from abroad or from alternative national suppliers, or that their competitors abroad would receive lower cost gas, they took action in pressing their traditional suppliers and persuading their national governments and regulators to take steps towards enacting and enforcing EU level regulation.

2. Deregulation of national markets through regulation of the European market

The European Union developed out of the European Coal and Steel Community (enacted 23 July 1952), the European Atomic Energy Community (Euratom, enacted 1 January 1958) and the European Economic Community (EC Treaty, in its original version, the Treaty of Rome, enacted 1 January 1958). The Treaty of Rome established a customs union of the member states and defined ‘four economic freedoms’, i.e. free movement of goods, people (labour), services and capital. Despite the fact that two of these three communities dealt with energy, the European Community (EC) has been notoriously weak in respect of its grip on energy sector developments. It never managed to establish a common energy policy, because the member states’ governments were not prepared to cede any

sovereignty over energy issues to the Community's institutions. Moreover, their energy policy objectives and solutions in times of crisis were rather diverging, depending on the specific circumstances in their national energy sectors (see Jensen 1967; Lucas 1977; 1985; Weyman Jones 1986).

Reflecting this legacy from the past, the Single European Market did not provide for any special treatment of energy and energy resources with respect to the four economic freedoms (Art. 85 EC Treaty), which in principle also extended to the energy industry. Member states' had given extensive concessionary monopoly rights to (public) utilities in network industries (telecommunications, electricity, gas), however. Such exemptions from competition were allowed, as long as they fulfilled public service obligations.

By 1988, the European Commission determined that it should actively extend its free market initiative towards the energy sector and published a working document titled 'The Internal Energy Market' (CEC 1988) aiming at a restructuring of the energy markets. The initiative was supported by the energy intensive industry and the power sector; both large gas consumers that saw the advantages of liberalization (see Stern 1998: 60-68). Yet, the initiative also met strong resistance. Most of the actors in the upstream and midstream industry, often in public ownership, were against liberalization, as it would affect profitability (Stern 1990: 72-75; Correljé et al. 2003; Haaland Matlary 1997: 79-103). Another impediment to liberalization was that many member states feared that they would lose their grip on energy policy and stressed their public service obligations. Nevertheless, in the beginning of the 1990s, the Price Transparency Directive (90/377/EEC) and the Gas Transit Directive (91/296/EEC) saw the light. These had little effect, however, and in the view of the Commission further legislative action was necessary.

With the first Gas Directive of 1998 (98/30/EC) the European Union sought to open up the midstream market, by providing regulated or negotiated third party access (TPA) to the national transmission and regional distribution networks, via a step-by-step introduction of free choice of suppliers to large, medium and small scale customers. Separate accounts for generation, transmission, distribution and any other activities were required, but explicit unbundling was not.

In June 2003, the second Gas Directive (2003/55/EC) was adopted. To reduce the leeway in national implementation, this new directive was more explicit and more stringent in a number of aspects. The 'Common Carrier' approach, called Regulated TPA, became mandatory, meaning that approved and published tariffs would apply to transmission, distribution and LNG operators, as well as to balancing services. Full market opening was required. Furthermore, transmission and distribution system operators had to be unbundled, legally and in terms of management. A genuinely new element was the creation of national energy regulators, or national regulatory authorities (NRAs). Their main roles included approving and controlling tariffs (or methodologies), ensuring non-discriminatory network access and effective unbundling (CEC 2005).

In the meantime, concerns about the security of supply had reached the policy agenda. In 2004, a directive aimed at establishing a common framework within which member states can define security-of-supply policies that are transparent, solidarity-based, non-discriminatory and consistent with the requirements of a single market in gas was adopted (CEC 2004). In the second part of the decade, disputes between Russia and Ukraine caused supply problems, particularly in Central and South Eastern countries, providing a further impetus to realise the internal energy market and to expand the transmission infrastructure.

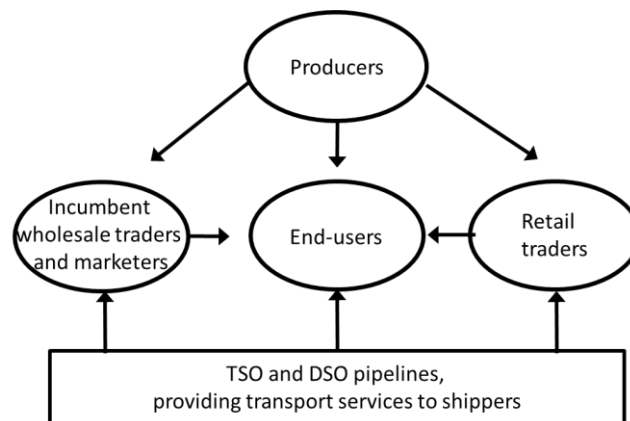
Moreover, responding to concerns, particularly voiced by large consumers and new entrants in the trading segment, about the lack of development of wholesale gas and electricity markets and the limited choice for consumers, the Commission's Directorate-General Competition launched an inquiry to assess the wholesale markets for gas and power, identifying issues that were still hampering the development of these markets (CEC 2006). The results of the inquiry showed that there were only a few global players active in the upstream gas chain. Due to infrastructure constraints, as was argued,

some regions in the EU continued to be dependent on a limited number of upstream producers for their gas. Nevertheless, the future development of new infrastructure and LNG sources were expected to provide new economically viable sources of gas to Europe, thus reducing the dependence on a few producers and therewith the upstream concentration in the gas supply chain.

The sector inquiry further found that, at the wholesale level of the gas supply chain, liberalization had not significantly changed the degree of market concentration in most national markets. Incumbents remained dominant by largely controlling gas imports and/or indigenous production. Neither had a liquid wholesale market emerged, while traded markets (gas hubs) represented only a minor part of gas supply. Incumbents rarely entered other national gas markets as competitors and available capacity on cross border import pipelines was limited. New entrants had to procure gas on the hardly developed wholesale markets, while despite third party access and legal/functional unbundling, they often lacked effective access to networks. This crucially affected the competitive conditions at the retail level.

In order to address such issues, a third Gas Directive (2009/73/EC) was approved in July 2009. An important objective of this directive was to introduce common rules for the transmission, distribution, supply and storage of natural gas. To take away the differences among them, member states were required to unbundle their transmission system and transmission system operators from trading parties. In addition, an Agency for the Cooperation of National Energy Regulators (ACER) was created. Before the creation of ACER, national regulators were supposed to cooperate with each other through ERGEG, an (in)formal advisory group established in 2003. However, EU legislation only provided for certain minimum competencies as regards the powers of the NRAs. This gave rise to a regulatory vacuum – especially in cross-border situations. While far from being a single EU energy regulator, ACER is supposed to fill this vacuum, helping to ensure the proper handling of cross-border cases. At the same time, measures were adopted to strengthen and guarantee the independence of NRAs.

Figure 4. European industry structure after unbundling



During the process of restructuring, both the activities of companies and those of governments were broken up, to create a competitive market and independent regulation thereof. As a result, a large number of new actors appeared on the scene, all establishing their own interest representation.

In the developing regulatory arena, the interests of (large) consumers and the newly established traders were mostly in line with the market-driven initiatives of the Commission; hence, they were well-represented in the political process. The main objective of this group of actors became to gain access to the market and the transport systems, at ‘level-playing field’ conditions, while creating the transparency required to trade in these markets at the lowest level of asset investments and transaction costs possible.

The interests of large consumers and traders were up against the interests of the upstream producing countries and, albeit to a lesser extent, the international oil and gas companies active in exploration and production. Whereas the former were not or hardly represented in the process, the latter group reacted by withdrawing from the mid/downstream activities, high into the upstream market and, thus, unaffected by the process of transmission restructuring. They were, however, affected by the discussion about long-term gas contracting. Whereas the EU and the (new) traders advocated gas-to-gas competition as the preferable trading device and tried to outlaw the traditional long-term contracts, the upstream suppliers and the mid-stream traders, initially defended the continuation of the long term contracts. Nevertheless, the growth in gas volumes traded on the spot-market, at increasingly lower prices after the economic crisis broke out in 2008 and the abundant supply of LNG following the US shale gas revolution, began to push the mid-stream traders towards the other camp. They could no longer compete with their oil-parity priced gas.

The unbundling of transport and sales in the national or regional wholesale and transmission companies and in the regional distribution companies, created the categories of the (incumbent) wholesale and retail trade companies and the transmission and the distribution system operators (TSOs and DSOs). The group of wholesale mid-stream traders could either win or lose in the new situation, depending on their strategy and market perspectives. Much of their strategy consisted of horizontal consolidation, taking over smaller colleagues and retail companies in other countries and integrating with the power sector, while trying to protect their home market. Therewith they took an ambiguous position in the process of restructuring.

In respect of the unbundled mid-stream transmission and distribution system operators (TSOs and DSO's), the situation did not change that radically, initially. As formerly supply-driven and cost-plus remunerated affiliates of the mid-stream traders and distribution companies, the TSOs, organized in the newly created European Network for Transmission System Operators for Gas (ENTSO-G), and the DSO's became 'regulation-driven' stand-alone infrastructure companies. The new element was that these networks now had to confront the efficiency drive of the new market paradigm and the regulatory scrutiny/opportunism. Hence, their main message was to underline their crucial role in providing security of supply and supporting an efficient development of the commodity market, by extending and interconnecting their networks, also internationally. Nevertheless, some of these system operators maintained fairly 'intimate' relations with their former trading partners.

Alongside, a new group appeared of independent operators of interconnectors and storage- and LNG re-gas facilities, often under the control of consortia of mid-stream and retail traders and/or transmission distribution operators. Their main objective became to keep their assets free from unpredictable regulation by means of exemptions, while contracting their capacity long term to third parties that either expected to profit from the interplay of opportunities and risks in the commodity market, or employ this capacity to move their supply flexibility downwards in the supply chain.

Even though we have witnessed significant change as compared to the situation before the first Gas Directive, there is still no single or common EU regulator like in the US. Cooperation among member states continues to be largely voluntary, incumbent pipeline suppliers still do not have to be fully transparent and thus are generally better informed than new entrants, and vertical integration is not forbidden. Pipeline owners are permitted to submit their operations to a TSO rather than to separate, as a result of which they can remain dominant.

IV. Understanding change in regulatory institutions

A. Incremental, yet transformative change

Our descriptive analysis, first of all, shows that institutional change in both the US and the EU system appears to be incremental, yet transformative.

Technological innovations and economic crises have undeniably had an effect on the regulation of the US and EU gas transportation systems. For instance, in the US, technological innovations made it possible to transport gas to other municipalities and even across state borders, which also increased the size of companies and necessitated some form of interstate regulation, initially through the FPC. In addition, due to the oil crises in the 1970s, the demand for gas increased. In the US, this led to shortages, which eventually spurred a process of deregulation by the FERC.

In the EU, exogenous factors, like the rise in world oil prices, driving up the coupled gas price, in combination with the endogenous growth in demand, brought about an extension of the supply base towards Norway, the Soviet Union and Algeria, rendering mere public-private coordination at the national level increasingly inadequate. The Single Market Initiative of 1986 subsequently triggered economic restructuring at the EU level, including the aim of realising an internal energy market, based on the international trade theory of comparative advantage. Accordingly, energy - including natural gas - would have to be produced, respectively, manufactured in those countries that were able to provide it at the lowest relative cost. Yet, the 2004 expansion of the EU towards Central and South East Europe, fully dependent on Russian gas, and the ensuing disputes between Russia and Ukraine following soon thereafter, raised concerns about security of supply and spurred further EU regulation.

Superficially looking at the development of both regulatory systems, it may appear that the periods in between such innovations and crises were characterized by relative stability. Regardless of the federal acts in response to functional pressures and exogenous shocks, not much seems to have happened in the US between 1935 and 1978. And whereas the three packages of EU legislation have followed each other relatively quickly, and change is more transformative, the period until 1998 seems to have been characterized by inertia.

However, by going back to look at what actually was happening it seems that these periods of apparent stability in between historic breaks have been characterized by gradual changes over time and the building up of pressures, eventually culminating into what appear to be historic breaks. In the US, federal regulation did not come about overnight; it proceeded through actions of the regulator, producers, pipeline companies, the distributors (and their constituencies) and the court. Furthermore, the 1978 National Gas Policy Act did not dismantle pre-existing regulatory institutions all at once; as it impacted upon the power positions of these actors, deregulation was a step-by-step process.

The incremental nature of change is also clearly reflected in the development of regulation at the EU level. First of all, liberalization of the gas market was preceded by new structures and arrangements over the 1980s, such as international gas trading with Norway and Russia by the BASF and Gazprom joint-venture Wingas and the UK privatization experience, including the Interconnector construction. The internal energy market project after the mid-1980s involved the energy intensive industry in the debate, increasingly engaging the electricity sector as a main supplier of power and as an important client of the gas industry. This stimulated a reconsideration of the prevailing structure of the EU gas sector. Thereafter, nonetheless, it took three legislative packages to restructure the European gas markets in such a way that gas now is traded on competitive market conditions in some parts of the EU. But the internal energy market is far from completed; an objective the Gas Target Model hopes to fulfil (Vazquez et al 2012). Whereas some formerly national transport companies, like Gasunie and Fluxys, have already become international players, the operation of national transportation systems in other member states must still be effectively unbundled from generation and distribution of gas.

Another good example of an emerging pressure upon the pre-existing system is the current debate, including arbitrage cases, between major gas suppliers, like Gazprom, Statoil and Gastera, and their main clients about the adjustment of long-term contracts to spot-market determined prices. This debate, at least in terms of the relevant, and eventually destabilizing, 'struggle' resembles the US debate on diverging gas prices for different customers, as a consequences of the existence of 'old' and 'new' contracts post-1980.

In order to understand the relative stability in the US and EU systems over time, arguments of institutional stickiness and path dependency provide a useful point of departure. In the US case, the role played by Senator Foraker in excluding interstate gas pipelines from federal TPA regulation has had a long-lasting effect on the regulation of the market, as it has avoided a lot of the problems that have occurred in the ‘common carrier’ regulation of oil pipelines and, at least for a long time, ensured investments in gas transportation infrastructure. It was difficult to reverse this initial decision, and therewith it strongly influenced the later developments in federal regulation. In the EU case, restructuring proved difficult because fundamental institutional change – the separation of the gas commodity from its transport, and the unbundling of vertically integrated companies – was unattractive, not only for the incumbent companies but also for those national governments being major shareholders. In addition, it was ineffective in their relationships with the main gas producing countries outside the EU jurisdiction, as a result of which incumbents and at least some national governments had an interest in maintaining the situation as it was.

Whereas historic breaks may to a certain extent explain the change that has taken place exogenously, in our descriptive analysis they served to emphasize the moments of political contestation over institutions. The negotiation of the US Natural Gas Act in 1938 is a clear example of how different interests all partially achieved their aims through Congressional ‘horse trading’. Whereas rate regulation of tariffs for transport to LDC’s was introduced to protect consumers, incumbent pipelines were shielded from competition by new pipelines through licensing of new pipeline capacity. In the EU, the creation of an EU regulator, ACER, in order to fill the regulatory vacuum in cross-border situations, supplanting ERGEG, was not at all a radical change from the past. Through the agency’s design NRA’s, even more independent than before, are closely involved in ACER’s work. Moreover, national TSOs established their own European network, ENTSO-G, continuing their dominant positions at the EU level.

Both in the US and the EU, the increased number of actors involved as a result of the processes of regulation, deregulation and re-regulation does not necessarily mean that the system becomes more efficient (as economists would expect), nor that it inevitably gets entrenched (as would follow from institutional stickiness and path dependence arguments), but that the chance of conflicts among those actors increases and that we see more political struggle, negotiation and compromise, through which change can and does occur.

Unlike in the world of technologies and markets, in the world of politics ‘winners’ do not necessarily take it all. Indeed, ‘losers’ reappear in a next round to challenge prevailing institutions. This has happened in both the US and the EU, but in a slightly different way, and this is where we may be able to find an answer to the question of how at least part of the variation in regulatory institutions currently in place can be explained. At each step in the restructuring, new actors are created which develop their own interests. And they, often supported (or blocked) by exogenous events, will argue, lobby, and fight each other, to have their preferred arrangements included in the regulation of the gas market.

B. Displacement, layering and compartmentalization

Given the characteristics of the US multi-level regulatory system, we expected that the dominant mode of incremental change in the US would be displacement and in our descriptive analysis we have indeed found instances thereof. For example, since 1935 vertical integration is prohibited. Until then holding companies could abuse their market power. The taken-for-granted form of vertical integration was called into question and subsequently replaced with the opposite form, separation of transport from distribution. Yet, since then new business models have emerged and diffused in close connection with technological and economic changes. So, displacement has often been a relatively swift process and there has not been much competition with pre-existing models.

Moreover, it is not entirely clear that the displacement mode really captures the dynamics that have occurred with regard to regulatory institutions in the US case. What appears to have taken place in the US could perhaps better be referred to as a process of *compartmentalization*. In this process, change occurs through a power struggle between a wide variety of actors, both public and private. As a result of this struggle regulatory institutions at the federal and/or state level over time become solely responsible for a particular regulatory activity. Subsequently, specific groups ‘of interest’ are juxtaposed and forced to reach a mutually acceptable outcome in each of the following stages of market development (see also Sanders 1981).

By contrast (albeit more slight than we expected), the dominant mode of incremental change in the EU has been layering. In essence, regulation of the gas market at the EU level in its current form can be seen as a process in which a new layer is attached to existing institutions. Regulatory institutions develop alongside existing institutions at the national level and the supranational level (notably the Commission) resulting in a multi-level or rather a multi-layered system of governance (Hooghe and Marks 2001; Egeberg and Curtin 2008; Eberlein 2008). They do not supplant what is already there, but supplement it. Layering takes place for the very reason that simply replacing existing institutions is often not only unfeasible (in terms of resources and expertise) but also unacceptable or even outright impossible (in terms of the sovereignty of external EU gas suppliers).

In both the US and EU systems, regulatory authority is dispersed across institutions at multiple levels. However, as our descriptive analysis has also shown, the relationship between US federal and state level actors differs significantly from the relationship between supranational EU institutions and the individual member states. In the US, a generally clear division of labour between the federal agency, FERC, and state agencies has developed over time, FERC being responsible for the regulation of *interstate* transport and trade, while state agencies being responsible for *intrastate* transport and trade (Court 2012). EU agencies such as ACER or networks such as ENTSO-G are not comparable to federal agencies in the sense that there is usually no such clear division of labour with national agencies. EU agencies, at least for the moment, are not superior to national agencies and they only have the powers expressly granted to them; the member states (or the Commission, when tasks have already been delegated to the EU level) retain all other powers (Groenleer 2011).

V. Conclusion: A partial solution to the puzzle

Our descriptive and exploratory analysis helps us first of all to avoid a simplistic functional perspective on institutional change. We have shown that change in both the US and the EU has not followed a functional logic only. Our analysis also takes us beyond emphasizing the importance of historic breaks, demonstrating the value of the incremental change model in terms of exploring change in regulatory institutions over time, and the different modes of incremental change, including displacement and layering. Moreover, we add a potential new mode of change, compartmentalization, which appears especially relevant for understanding the development of multi-level systems of (regulatory) governance.

Finally, we have shown that history, institutions and politics matter in conjunction, also in seemingly technical and economic areas such as gas market regulation, and that actors may play an important strategic role in the process of institutional change and the creation of markets through regulation. To further substantiate our argument, in-depth research needs to be done on a number of – what at first glance seem to be – historic breaks in US and EU regulation, zooming in on the actor constellations and behaviour.

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