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Making territory through infrastructure: The governance of natural gas transit in Europe

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ABSTRACT

Recent political and military events in Ukraine have brought into sharp focus concerns over the security of European gas supplies from Russia. At the same time, the creation of an infrastructural and political 'energy union' has become a key stated priority for the governing bodies of the European Union. Both contingencies have highlighted the 28-nation bloc's dependence on energy sources well beyond its state boundaries, underpinned by the existence of a transnational network for the transport and distribution of natural gas. We develop a theoretical framework predicated upon assemblage and governance approaches to explore the regulatory practices and spatial features associated with this hitherto largely unexplored infrastructural realm. Qualitative evidence from interviews, policy documents and media reports is interrogated interpretively and with the aid of social network analysis techniques. The paper reveals the existence of a socio-technical assemblage for the transmission of natural gas across national boundaries emerging as a result of the erosion of decision-making power away from established state actors, and the rise of new institutional orders. While undermining the organizational arrangements that have traditionally dominated the European gas sector, these contingencies also challenge existing understandings of transnational energy governance as they apply to overland gas transit.

1. Introduction

As evidenced by concerns over European gas supply as a result of the crisis in Ukraine (Goldthau and Boersma, 2014; Pirani et al., 2014), the policy challenges surrounding the transit of gas across national boundaries regularly attract high-profile political and media attention. In part, this can be attributed to the complex and contested nature of the relationships among infrastructure investment, low-carbon transition and energy security at the global scale. Social scientists are becoming increasingly involved in attempts to shed further light on the internal workings of transnational energy circulations, using an ever-expanding array of theoretical and methodological tools. Many discussions on the topic focus on the rising number of policy actors and geometries seen during the last decades, and the changing role of the state as a provider, regulator and owner of networked infrastructures. This has been accompanied by a broader effort to interrogate the organizational and material aspects of socio-technical transitions, predicated by an understanding of governance systems as 'complex and historically rooted "arenas" coevolving with the energy issues they address' (Cherp et al., 2011, p. 75).

The European gas sector provides particularly fertile ground for such investigations, as a result of its economic and spatial idiosyncrasies. The European Union (hereafter EU) has been undertaking far-reaching processes of economic and regulatory liberalization aimed at creating common gas and electricity markets. More recently, this has been supplemented by efforts to create an 'energy union', which involves, among other goals, ensuring the security of supply and moving towards a low-carbon economy. Such initiatives have been unfolding against the systemic transformation of state and corporate structures responsible for the production, transmission, distribution and consumption of natural gas, spanning a wide range of geographical realms. They have been embedded in the specific material character of Europe's energy demand, resource endowment and geographical configuration, whereby a large volume of the continent's natural gas needs have to be met via overland gas pipelines.

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The circulations of power and political agency that are associated with the emergent geopolitical and economic reality created by gas sector restructuring in the European Union are poorly understood, especially when placed within the context of the wider movement towards a low-carbon economy and society (Bridge et al., 2013; Kama, 2014; Schmidt-Felzmann, 2011; Shaffer, 2013). Adding a further layer of complexity is the on-going global erosion of traditional state power, both towards transnational organizations and in the direction of regional and local actors. A burgeoning body of academic literature on the meanings and practices of 'territory' has emphasized the extensive spatial and political implications of the weakening of traditional forms of state authority (Agnew, 2005; Brenner, 2004; Newman, 2013). Some of the key contributions to this field have focused on the increasingly fluid and networked nature of territory, which can be organized around forces other than the state. Painter (2010, p. 1090) in particular, has opened the space for understanding territory as the outcome of 'networked socio-technical practices' and 'a product of relational networks'. This kind of thinking has prompted Sassen (2013, p. 38) to claim that some of the critical components of current territorial authority are 'no longer national in the strict sense of the term' as they function in a larger operational space that involves new dynamics of debordering outside traditional state boundaries. Elsewhere, the heuristic of 'geopolitical economy' has been put forward as an entry point for challenging state-centric understandings of the spatial implications of transnational power relations, market transformation and capital flows (Desai, 2013; Le Billon, 2004; Sparke, 1998).

The now widely accepted notion that territory can be understood as a 'political technology' (Elden, 2010) is mirrored in studies of large socio-technical systems, where a multiplicity of theoretical perspectives have foregrounded the diverse agencies involved in the construction and functioning of infrastructure networks (Anderson et al., 2012; Bailey and Maresh, 2009; Furlong, 2011). Yet thinking on energy infrastructures and territory rarely communicate (although see Barry, 2013; Bridge et al., 2013); and when it comes to territorially bounded systems such as the European gas sector, these bodies of work have seldom entered into a dialog with the expanding body of literature on Europeanization as a multi-scalar territorial and ecological project (Bialasiewicz et al., 2005; Jensen and Richardson, 2003; Moisio et al., 2013).

In light of these lacunae and the policy context detailed above, this paper focuses on the manner in which the transport of natural gas across and within national boundaries allows for the rise of a specific territorial assemblage beyond the traditional boundaries of the nation state. The paper has three aims. First, we wish to uncover how regulatory practices in this domain have been historically embedded in the material geography of the European gas sector, otherwise constituted by the hybrid landscape of state authorities, corporate actors and transnational organizations (van der Vleuten et al., 2013; Yafimava, 2011). Second, and drawing upon insights from network governance (Bulkeley, 2005) and critical geopolitics (Dalby, 2010), we are interested in interrogating the political and state structures that allow for the emergence of a specific form of energy governance in the case of overland gas transit. Third, the paper examines the spatial configurations that reflect the 'making of territory' (Keating, 2013) via socio-technical assemblages. All three aims hinge upon a conceptual approach that emphasizes the complex spatial and political processes behind energy policy-making, so as to move beyond one-dimensional analyses solely dedicated to markets or 'the state' as relevant actors (Bradshaw et al., 2014).

In addition to a survey of the academic literature, the evidence presented in the paper is based on semi-structured 'expert' interviews with key informants[1] combined with a review of secondary documents, and social network analyses of contractual links between state and corporate actors in the European gas sector derived from officially published reports. Given the methodological advantages and shortcomings of social network analyses in the context of energy circulations (Allen, 2011; De Graaff, 2012; Marres and Rogers, 2008) these explorations serve to supplement the triangulation of evidence rather than provide a central heuristic tool. The paper commences with a theoretical interrogation of the relationship between energy governance and territory, aimed at highlighting the multiple existing and possible intersections of the two frameworks as well as the need to move beyond the 'states vs. markets' debate in energy governance. This is followed by an examination of the spatial and temporal underpinnings of natural gas development in Europe. The paper then examines the production of a specific pan-European natural gas transit assemblage thanks to (i) the emergence of new regulatory and governance mechanisms (ii) spatial connections that allow for the rise of transnational governance networks of gas. The conclusion of the paper points to the manner in which a new set of organizational and territorial relations are altering the circulation of natural gas across the European geopolitical and economic space, while challenging dominant understandings of energy governance as they apply to this sector.

2. The energy governance – territory nexus: disjointed, polysemic, multi-scalar

Understanding the relationship between governance theories and energy studies within in territorial and infrastructural contexts that exceed the boundaries of the traditional nation state is complicated by the absence of a commonly accepted definition of the 'governance' concept. In part, this can be attributed to the theoretical pliancy of the term, which has been used to designate both the nature and typology of governing actors, as well as the roles and tasks that they undertake (Coutard, 2002). While some scholars think of governance as the purposeful activities of social, political or administrative bodies to 'guide, steer, control or manage societies with authority' (Seppo, 2004, p. 21) others emphasize the importance of political work within the established 'choice of rules' (Buchanan, 1975) such as advocacy activities, lobbying and clientelism. Overall, the ascendancy of the governance heuristic reflects the perceived increased role of civil society in influencing and shaping relations of power, as well as the dwindling monopoly of nation state governments in this domain. Also of relevance here is the role of globalization processes, and changes in management practice and theoretical knowledge brought about by the broader conceptual movement towards a relational notion of government.

The multiple political and material dimensions of energy flows in society have regularly attracted the interest of governance researchers (Kerebel and Keppler, 2009 provide an analysis of this relationship in the European context; for a review of the strategic rules surrounding oil governance see Mommer, 2000). One of the key advantages of governance frameworks in this context lies, as noted by Coutard (2002) in its 'polysemic' nature with respect to analyses of large technical systems, including energy: both broad-level political and economic issues can be covered within the same framework, in addition to more specific questions

[1] Including 9 interviews with decision makers in various EU institutions and national governments, 4 interviews with company representatives, and 2 interviews with third sector organizations. The interviews lasted between 1 and 2 h. Interviewees were selected so as to ensure the widest possible representation among relevant decision-making bodies, and were approached initially via email. The professional affiliation and personal identities of the interviewees are not disclosed in this paper for ethical purposes, and most of them have not been directly cited in the paper due to constraints on space.

surrounding decentralized forms of infrastructure provision. Further supporting the wide functionality of the concept is its ability to encompass 'the interactions between (the various forms and levels of) governance of technological systems and societal governance patterns' (Coutard, 2002, p. 2). At the same time, the governance register has allowed for notions of self-organization and fragmented control to become incorporated in a networked understanding of the rise of 'multi-actor system builders' (ibid). Governance paradigms have also been applied to the elucidation of the multi-level 'system of continuous negotiation among nested governments at several territorial tiers – supranational, national, regional and local' (Hooghe and Marks, 2003, p. 234) operating within the context of the European Union. Here, it is important to emphasize that governance also has a reflective component, since 'thinking and acting with respect to an object of steering also affects the subject and its ability to steer' (Voss and Kemp, 2006, p. 2).

Network, multi-level, multi-scalar and reflexive governance approaches have offered an elucidation of energy-related questions in a wide range of thematic areas, including low-carbon transition, cities and climate change (Anguelovski and Carmin, 2011; Bulkeley and Castán Broto, 2013). Of crucial importance in the governance of energy circulations are the inter-related questions of supply, transit and demand in the context of the relationship between security, scarcity and geopolitics. Debates over the security of energy supply have mostly centred on oil and gas; some of the work in this vein has emphasized that governments contribute to the failures of market approaches by interfering in the market operations in the name of national security (Dubash and Florini, 2011). The energy policies of India, China and Russia have come under particular academic and practitioner scrutiny (Daojiong, 2006; Dubash, 2011; Kong, 2011; Locatelli, 2006; Phillips and Newell, 2013; Zhao, 2013). It has been argued, for example, that Russia's rich resource endowment has been instrumentalized by the state for the purpose of fostering nationalism (Bremmer and Johnston, 2009; Domjan and Stone, 2010), while creating a particular identity around the 'hydrocarbon superpower' narrative (Bouzarovski and Bassin, 2011). Russia's ability to exercise political influence in neighboring countries using its oil and gas exports (Balzer, 2005; Feklyunina, 2012; Högselius, 2012; O'Lear, 2004) has been frequently invoked in the context of discussions centring on the complex web of multi-lateral agreements and institutional arrangements supporting the European Union's own energy security-related policies (Belyi, 2003; Laurila, 2003; Leonard and Popescu, 2007). The link between state sovereignty, identity and energy has also been explored with relation to nuclear power (Hecht, 2012, 1998; Jasanoff and Kim, 2009; Jones et al., 2013).

In this context, it is important to emphasize the close relationship between the governance of global economic dynamics, on the one hand, and the political and organizational aspects of infrastructure operation in the energy sector, on the other. As demonstrated by the example of the WTO (Higgott and Erman, 2010), any top-down attempts to strengthen the political and economic underpinnings of global energy circulations inextricably raise issues of legitimacy, accountability and transparency. Thus, practices of co-ordination and steering across different institutions are inextricably linked to the political affiliations and motivations that inform both individual and collective action in the energy domain (Goldthau and Witte, 2009). But contemporary interpretations of the driving forces, relations and practices of power in the governance of energy circulations display a distinct lack of coherence. In part, this has been attributed to conceptualization of energy governance in relation to separate energy sources (oil, gas, coal, nuclear, renewables), socio-economic implications (industrialization, productivity, efficiency, health, education, as well as persistent local and global externalities) and scientific disciplines (international relations, political science, institutional economics). Despite the deep systemic interdependencies created by energy flows – as the lifeblood of the global economy – and the multi-faceted nature of energy operations, policy activities remain divided across different 'arenas' (Cherp et al., 2011). It has been emphasized that policies in this domain need to move beyond the traditional remit of the nation state in order to simultaneously tackle geopolitical issues revolving around the security of supply, transit and demand, environmental externalities, economic development policies including investment, as well as resource management issues (ibid).

In addition to the sectoral fragmentation of relevant policies and the undue primacy of the nation state, the relationship between energy formations and governance concepts is further complicated by the lack of a consensus over the institutional and political approaches that accompany – in both positive and normative terms – ongoing economic and infrastructural transformations of the global energy system. The main cleavage exists between approaches that give centrality to security and geopolitical dimensions, on the one hand, versus those that prioritize market relations and co-operation, on the other. Further complicating these challenges is the continued domination of state power in some resource sectors – a role that often becomes intertwined with the expansion of nationalism and rentierism (Basedau and Lay, 2009; Okruhlik, 1999; Ross, 2012) – and geographic variations in the ability of supra-national institutions to enforce coherent policies spanning multiple sectors of the economy. Nevertheless, there is a growing realization within the literature that traditional forms of government are insufficient to address the complex systemic issues associated with the emergence of new global hydrocarbon markets, the convergence of energy security and climate change, and the end of the era of 'easy oil'.

The operation of transnational gas infrastructures in Europe opens a unique window into the conceptual underpinnings of the energy-governance-territory nexus. As highlighted in the introduction above, the development of energy policies within the European Union provides powerful insights into the spatial embeddedness and articulation of large socio-technical systems. Research focusing on this relationship has highlighted the ability of energy infrastructures to project relations of power across entire cities, regions and countries (Hughes, 1993; Marvin, 2012; Nye, 1999). At the same time, geographers have made the point that territorialities operating at different scales and material sites constitute an innate feature of energy systems (Bridge et al., 2013). The more general literature on the subject has emphasized that territory and territoriality *per se* are predicated upon the 'mobilization of a whole series of governmental technologies' (Painter, 2010, p. 1105) which create 'political machines' (Barry, 2001) by combining technical devices with institutionalized practices of measurement and control (Elden, 2013; Murphy, 2013). Of no less importance in this context is the proposition that regions are not physically bounded entities, but rather exist at the intersection of multiple economic and political networks (Allen and Cochrane, 2007; Goodwin, 2012; Jessop, 2000).

Assemblage thinking is allowing for an interpretation of the construction of space via the lens of more-than-human political ecologies (Dittmer, 2013), where the agentic capabilities of infrastructural systems are articulated via their material properties (Barry, 2001; Bennett, 2009; Meehan et al., 2013). Building on Deleuze and Guattari (1988) and DeLanda (2006) has offered a comprehensive operationalization of assemblage theories, by highlighting that such formations emerge out of the synergistic relationships among elements that can themselves exist as separate entities. He has explored the processes that (de)stabilize assemblages via the expression of language, practices of coding, and the embedding of spatial formations via processes of

(de)territorialization. The ability of assemblage thinking to integrate the inherently dynamic and multi-faceted nature of energy systems has meant that such approaches have also served as a basis for the study of low-carbon 'experiments' and transitions in urban areas (Bulkeley et al., 2014; Rohracher and Späth, 2014; Rutherford and Coutard, 2014). More broadly, the agentic capacities involved in the functioning of electricity grids have also been studied with the aid of assemblage approaches (Bennett, 2005) as have the driving forces of energy poverty (Harrison and Popke, 2011).

Intersections of governance and territory in the case of energy flows reveal a intricate and precarious socio-technical landscape, in which spatial formations, development paths and trade links underpin the relations between major corporate and market actors. It is a constellation in which the unfolding of transnational networks and practices of political power across space directly shapes the course of market transactions and investment decisions. But the governance mechanisms that underpin the creation and performance of territorial relations remain unclear, despite the widespread recognition that assemblages perform political work. The functioning of the governance-territory nexus is particularly unknown in the case of gas transit infrastructures, which encompass hybrid networks that can span multiple geographic realms (Bouzarovski, 2009, 2010; Johnson and Derrick, 2012).

3. Building the assemblage: spatial and temporal underpinnings of natural gas expansion in Europe

The territorial implications of European gas governance are contingent upon the historical development of infrastructures for the production and transmission of this fuel, and the resulting spatial distribution of its accompanying distribution activities. While the evolution of gas in Europe in many ways follows the 'three eras' described by Evans and Farina (2013) – involving its initial existence as a manufactured gas product, onto conventional and unconventional systems of provision – there are a number of important spatial and technical specificities that have served as drivers of the landscape that exists today.

Historically, the development of gas networks in the European continent is rooted in the 'town gas' systems that were installed in most major cities throughout the nineteenth and early twentieth centuries. Produced from coking coal, gas in these socio-technical systems was initially used for lighting, with heat and power uses following much later. The European gas network developed in an incremental and slow pace throughout the first half of the twentieth century, although the focus of production shifted from manufactured onto natural gas. This was mainly due to the use of domestic reserves and the realization that this fuel often provided a more secure, flexible, reliable and more environmentally friendly source of energy than either imported oil or coal. States like Italy, France and Austria – which saw significant gas finds both before and after World War 2 – were at the forefront of such dynamics. Alongside Romania and Galicia (a region shared between Poland and Ukraine) these countries were the only parts of Europe that saw the development of regional-level natural gas transmission networks based on indigenous production (van der Vleuten et al., 2013). Yet the resources available for the supply of their gas systems 'were too limited for natural gas to become anything more than a complementary energy source with dubious long-term prospects' (Högselius, 2012, p. 28).

It was only in early 1960s, thanks to the discovery of the Groningen supergiant field in northeastern Netherlands that major political and economic actors started to think of Europe as resting on 'nearly limitless gas riches in its own ground' (ibid: 29). The construction of a pipeline from the Netherlands into the West German industrial core in 1963 marked the beginnings of a Europe-wide transmission system. It was followed by a rapid process of gas supply expansion, whereby investment decisions and technological advancements enabled the industry to grow well beyond earlier expectations: gas production in the European Union increased from 102 billion cubic meters (bcm) to 197 bcm between 1970 and 1980 (Stevens, 2010). At the same time, locally-based gas enterprises were gradually consolidated and augmented into municipal, regional and national companies responsible for the construction and operation of high pressure transmission networks, and the conversion of former low pressure town gas networks into distribution systems from natural gas (Stern, 2013).

The realization that Europe's growing gas demand could not be met through domestic sources alone helped fuel the growth of trade relations with neighboring regions. First among these was Algeria, where a supergiant gas field was discovered already in 1956. This country's foundation as an independent nation, as well as its geographical and economic proximity to (then) growing Southern European markets meant that it became an important supplier of natural gas to countries such as France, Italy, Spain and the United Kingdom (UK). The inclusion of the UK in the group of initial Algerian markets is not accidental: Algerian gas was initially supplied to European states in the form of Liquefied Natural Gas (LNG), a technology that the UK had already utilized in prior trade relations with the US. But various political, economic and infrastructural obstacles meant that North African resources started to play a significant role in Europe's gas supply only in the late 1970s, thanks to the construction of a submarine pipeline to Italy. This supply route saw further expansion in the 1990s and 2000s (Cronshaw et al., 2008).

The early 1960s were also marked by the beginning of the construction of arguably Europe's most significant natural gas supply corridor: the extensive network of import links with the former Soviet space. The expansion of Soviet networks was seen as a major development opportunity by Austrian, Italian and German gas companies; it resulted in an agreement that allowed Austria to connect to the Czechoslovak grid in 1968, in a deal that marked the first gas transmission agreement between Western and Eastern Europe. Another significant endeavor was the construction of the dedicated 'Yamal' export pipeline, which commenced its operations in 1984. It led to the doubling of Soviet gas exports to Western Europe, despite attracting significant opposition in the United States.

The oil crises of the 1970s provided a major impetus towards the rise of natural gas demand in Europe. Major gas finds in the British, Danish, Dutch and Norwegian sectors of the North Sea aided the development of a dense transmission grid in Northwestern Europe. The rapid growth of this system contributed to the creation of a distinctive supply regime, which van der Vleuten et al. (2013) term 'North Sea Europe'. Other than declining indigenous UK and Dutch supplies, and the key role of Norway, one of the main features of this 'meso-region' is the rising role of LNG and the lack of an integrated grid among the Nordic countries, with the exception of a single 30-in. pipeline between Sweden and Denmark (see Fig. 1). Finland's isolation from its Western neighbors is a case in point – in European Union terms it represents a 'gas island' with only a single pipeline connection to Russia. As a result, van der Vleuten et al. (2013) group this country alongside the entirety of Eastern and Central Europe (including much of Germany, Austria and Northeast Italy) and Greece in a second gas region, termed 'Eurasia'. In addition to being highly reliant on Russia for its gas supplies – dependency ratios reach 100% in the case of several Central and Southeastern European countries – this realm is also characterized by the presence of a second set of gas

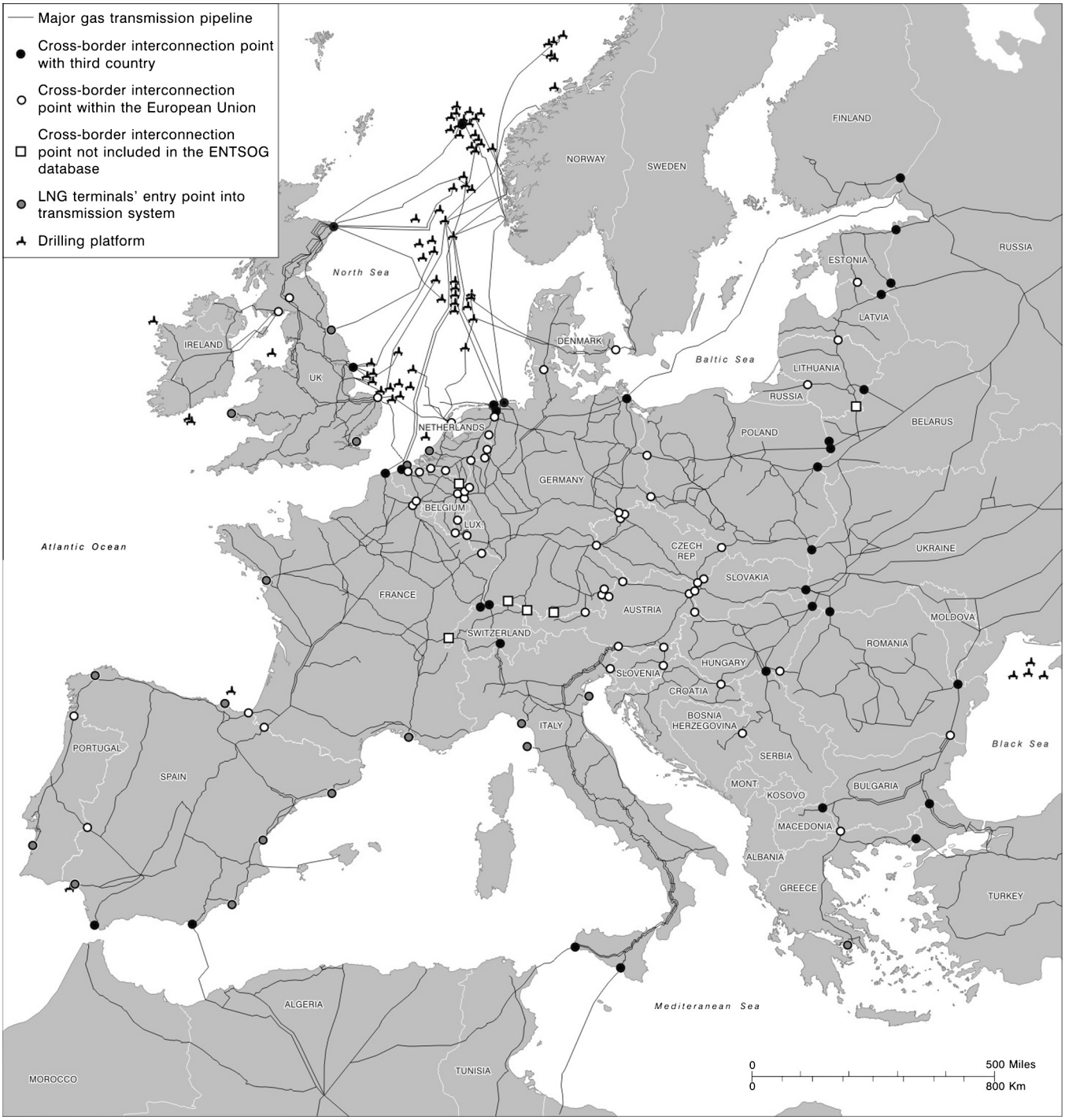

Fig. 1. Salient geographical features of the European gas sector. *Source*: ENTSOG.

islands, as the three Baltic republics remain separated from the rest of the European Union's gas grid (Fig. 1).

The same authors identify a third macro-gas region in Europe: titled 'Eurafrica', it includes the south of France, the Iberian Peninsula, and much of Italy. Alongside North African gas – and associated concerns over stability and competitiveness – LNG plays an important role in shaping supply mix of this part of Europe; a total of 11 major LNG terminals can be found on the coasts of Italy, Spain, Portugal and Southern France (Fig. 1). While emphasizing that the boundaries between 'Eurafrica', 'Eurasia' and 'North Sea Europe' are approximate and fluid, van der Vleuten et al. (2013) add that they do not coincide with national borders: the territories of major economies such as Germany, France and Italy all belong to at least two regions. Moreover, the resource base of the European gas sector extends well into Siberia and Africa, thus creating an array of economic, political and infrastructural interdependencies across a vast set of geographical realms. The resulting 'hidden integration' of Europe (Aalto and Korkmaz Temel, 2014; Misa and Schot, 2005) reveals the existence of a transnational socio-technical assemblage that does not easily conform to preconceived historical and political cleavages. As argued by van der Vleuten et al. (2013, p. 56), the complex political map of gas transmission in Europe points

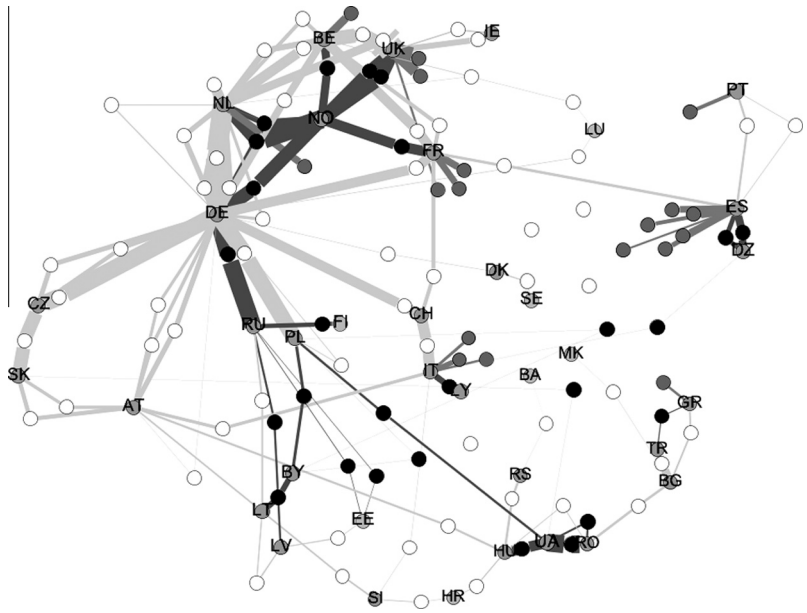

Fig. 2. A network map of capacities and connections at cross-border gas transmission points in the EU and associated countries (cross-border points within the EU are marked by white circles). Black circles represent non-EU import border points, and dark grey circles indicate LNG terminals. Darker lines indicate connections between EU countries and non-EU gas transmission border points or LNG terminals. *Source*: ENTSOG.

to 'the overwhelming extent to which factors such as geographical and cultural proximity, epistemic communities of trust, and economic rationalities could be transformed by actors into convincing arguments for building dependency-generating pipelines' that transgressed major geopolitical and physical barriers (also see Bouzarovski and Konieczny, 2010).

The interconnectedness of the European energy landscape and its resource dependency on neighboring geographical realms become all the more visible when the European gas network is represented via a topological map that shows the connections between different national transmission systems and the total capacities at cross border points (Fig. 2). The post-communist countries of Eastern and Central Europe (ECE) are particularly distinctive in this regard – their systems are independently linked with the Russian grid via hub and spoke configuration. Under communism, this infrastructural legacy was contingent upon a complex network of bilateral trading relationships. Economic activities followed the 'gas for manufactured goods' principle, which meant that heavy industry was developed based on Soviet oil and gas exchanged via barter (Cronshaw et al., 2008). Similar to other energy resources, gas 'was considered as a central tool of the socialist economic policy, and was sold for a symbolic price' (ibid: 18) across ECE.

The specificities of the post-Soviet socio-technical assemblage have traditionally been a major cause of concern in Western Europe, especially when placed in the context of broader geopolitical relations in the Eurasian and North Atlantic realms (Adamson, 1985; Stern, 1982). In the early 1980s, for example, the West German government set a 30% limit for Soviet gas supplies to the country (Cronshaw et al., 2008). The growing gas dependency of Western European states on Russian and other foreign imports gave rise, inter alia, to the emergence of a 'scarcity mentality' (Stern, 2013) whereby gas was seen as a 'premium fuel' reserved for high added value residential and commercial energy services, instead of being burned in industrial boilers and power stations. A depletion policy-based model of upstream gas governance thus came to dominate European gas markets for several decades, but was then abandoned by the UK in the early 1990s following privatization. The 'scarcity' and 'depletion' approaches were reflected in a range of regulatory decisions (particularly around licensing and pricing), while affecting the use of gas for power generation purposes. They slowed down the expansion of gas across Europe, while preventing trans-national market integration. However, anxieties over the security of supply have continued to persist among experts and the general public alike (European Commission, 2014a). This is despite the fact that the dissolution of the Soviet Union was not associated with major supply interruptions, other than the consequences of the Russia-Ukraine gas crises during the winters of 2006 and 2009, and concerns over the military conflict in 2014 and 2015.

4. Governing the assemblage: EU policies and the 'common energy market'

While the recent establishment of the 'Energy Union' offers a high profile demonstration of the regulatory and policy architecture involved in governing the European gas sector, it should be noted that most of the elements of this framework have already been in place for at least a decade. EU governance in the natural gas domain has involved three principal approaches: the community model (compliance and rule-based multilateralism), the partnership model (intergovernmentalism) and bilateral diplomacy (Padgett, 2011). In the intergovernmental gas governance domain, these strategies have involved limiting the scope of EU competences via, in particular, opt-outs and arrangements that have allowed certain member states to pursue closer integration, while implementing gradual liberalization and multiple models of compliance (Andersen and Sitter, 2015). At the same time, the EU has promoted consensual decision-making with the aid of organizations such as the Agency for the Cooperation of Energy Regulators (ACER), established in 2011 and replacing the European Regulators' Group for Electricity and Gas. There has also been efforts to shape the power, preferences and strategies of the European Commission in domains such as decision-maker appointments and consultations on policy initiatives, while allowing for the parallel operation of state authority in particular energy policy realms. The latter have included the ability to determine the composition of energy supply, the extraction of natural resources, and the nature of new infrastructure investment.

The presence of a shared understanding behind the employment of intergovernmental policy tools in the gas transmission domain was also confirmed by two of our interviewees in the European Commission. Their statements highlighted the stabilization of the overland gas transit assemblage via a set of shared interests and beliefs, which are not always expressed in official documents and regulatory acts. It was underlined that:

> In most cases there is a common denominator between member states ... [A] very important basis for our policy is the development of the internal market for gas and electricity. It has led to creating competencies at EU level and some common standards which have to be implemented by EU member states. For the large supplier countries it is a very important basis for developing a policy. A second [key] basis is the security of supply, where all or most member states have a common interest in terms of gas. There is an obligation in the EU treaty to co-operate on security of supply aspects ... the Commission acts as a facilitator in this regard.
>
> [(Personal communication, 2012)]

Indeed, the suggestion that gas security in Europe cannot be guaranteed by national-level policies was present in the statements of most of the decision-makers interviewed for the purposes of this study. Some of them recognized the existence of the 'meso-regions' suggested by (van der Vleuten et al., 2013), while pointing out the significant infrastructure growth prospects in Southeastern Europe in particular. This is further confirmed by a policy document developed at the request of the European Parliament's Committee on Industry, Research and Energy (Bjørnmose et al., 2009). It identifies four clear overland gas import corridors into the EU: northeastern (from Russia, supplying approximately 23% of consumption), northwestern (from Norway, accounting for ca. 18% of consumption), southwestern (via the Mediterranean, responsible for 10% of consumption) and southeastern (from Turkey and the Black sea). The report sees the latter pathway (elsewhere this has been described as the 'Southern' corridor) as offering the most significant opportunities for diversifying Europe's gas supply prospects and opening new markets.[2] One of our interviewees, however, questioned the extent to which a corridor deriving gas from Azerbaijan, Central Asia or the Middle East and using Turkey as a transit hub would necessarily bring greater levels of energy security to the EU itself – especially given Russia's increasing interest in this corridor.

The EU's increased involvement in transnational gas governance has been underpinned by a series of specific policy measures aimed at, in effect, establishing a common code for the functioning of the gas transmission assemblage. These have mainly been contingent upon the liberalization of the gas sector and the creation of a 'common energy market' via an incremental process that has been underway during the past two decades (for a further discussion see Maltby, 2013). In an effort largely led by the European Commission, a series of directives were implemented during the 1990s and 2000s, allowing for the separation and 'ownership unbundling' of trading, transportation and distribution activities, as well as the creation of independent regulatory bodies. The provisions of the Third Energy Package, adopted in 2009, have been of particular importance in this context. They involve two directives and three regulations for the 'common internal markets' in electricity and gas. Overall, the declared objective of these legislative acts is to provide for 'competitive and integrated energy markets' that allow 'European consumers to choose between different suppliers and all suppliers, irrespective of their size, to access the market' (European Commission, 2014b).

[2] Our use of the terms 'state' and 'market' is broad and comprises a combination of formal institutional structures, forms of socio-political organization and relations of power, along the work of authors such as Strange (1998).

The Third Energy Package has allowed for the emergence of a distinctive set of steering practices, rules and regulations for the at the scale of the EU. This governance framework functions across a number of spheres, from the development and implementation of official policy documents, to the day-to-day operation of material infrastructures such as pipelines, pumping stations and storage facilities. It has been underpinned by the formulation of, principally, five types of technical and regulatory instruments: (i) codes for the balancing of transmission networks; (ii) capacity allocation mechanisms; (iii) congestion management procedures; (iv) interoperability rules; and (v) framework guidelines for tariffs. Institutionally, such measures have been articulated via the European Network of Transmission System Operators for Gas (ENTSOG) and ACER, in addition to associated bodies with a more general remit, such as the Energy Community. The arrangements developed by these bodies extend over and above the activities of national regulators and utility companies. While a detailed discussion of such technical and regulatory frameworks would exceed the aims and scope of this paper, it is worth pointing out that they constitute the grain that allows for the functioning of the European natural gas transmission network. They are, in effect, the codes and convention that have allowed for consolidating the gas transmission assemblage (DeLanda, 2006).

Evidence from our background interviews indicated that the ownership unbundling process constitutes the central cog in the wheel that drives the establishment of a distinct European gas transmission landscape. Three aspects are of particular importance in this context: (i) the creation of a regime in which transmission sector operators (TSOs) are lifted out of national decision-making spheres by becoming regulated monopolies that are not always owned by the state (Stern, 2013); (ii) the establishment of formally independent regulatory bodies that can act as unitary players in building linkages across national boundaries; and (iii) the removal of pipeline ownership from vertically integrated energy companies, thus allowing for the entrance of transnational corporate actors into the transmission sector. As a result of such processes, the overland transport of gas in Europe has become a material and institutional nexus for the interaction among private enterprise and the state at multiple scales of activity.

The European Union's activities in drafting the Third Energy Package have been accompanied by a wider framework of policies in the energy security domain. This is leading to the emergence of a multi-lateral energy governance regime, involving a pan-European energy policy that conveys normative principles, fosters energy liberalization and provides for reciprocity with key strategic political and energy partners (Westphal, 2006). But our interviews indicated that market-based governance is projected by the EU onto the international arena despite the fact that member states are internally divided on liberalization reforms, and levels of success in implementing the Third Energy Package have been varied (Boussena and Locatelli, 2013). When combined with the lack of physical interconnections as a result of the historical legacies highlighted in Section 2, this situation limits the EU's ability to formulate an unified response to external energy challenges. Thus, the wider geopolitical and material context of EU energy policy is a constant destabilizing force for the gas transmission assemblage: it offers alternative modes for the organization of its constituent parts while undermining the effectiveness of the political and institutional consensus that drives its functioning.

5. Territorializing the assemblage: new spatial formations in the gas transit landscape

The operation of the gas transmission assemblage via the governance practices described above is starting to affect the material

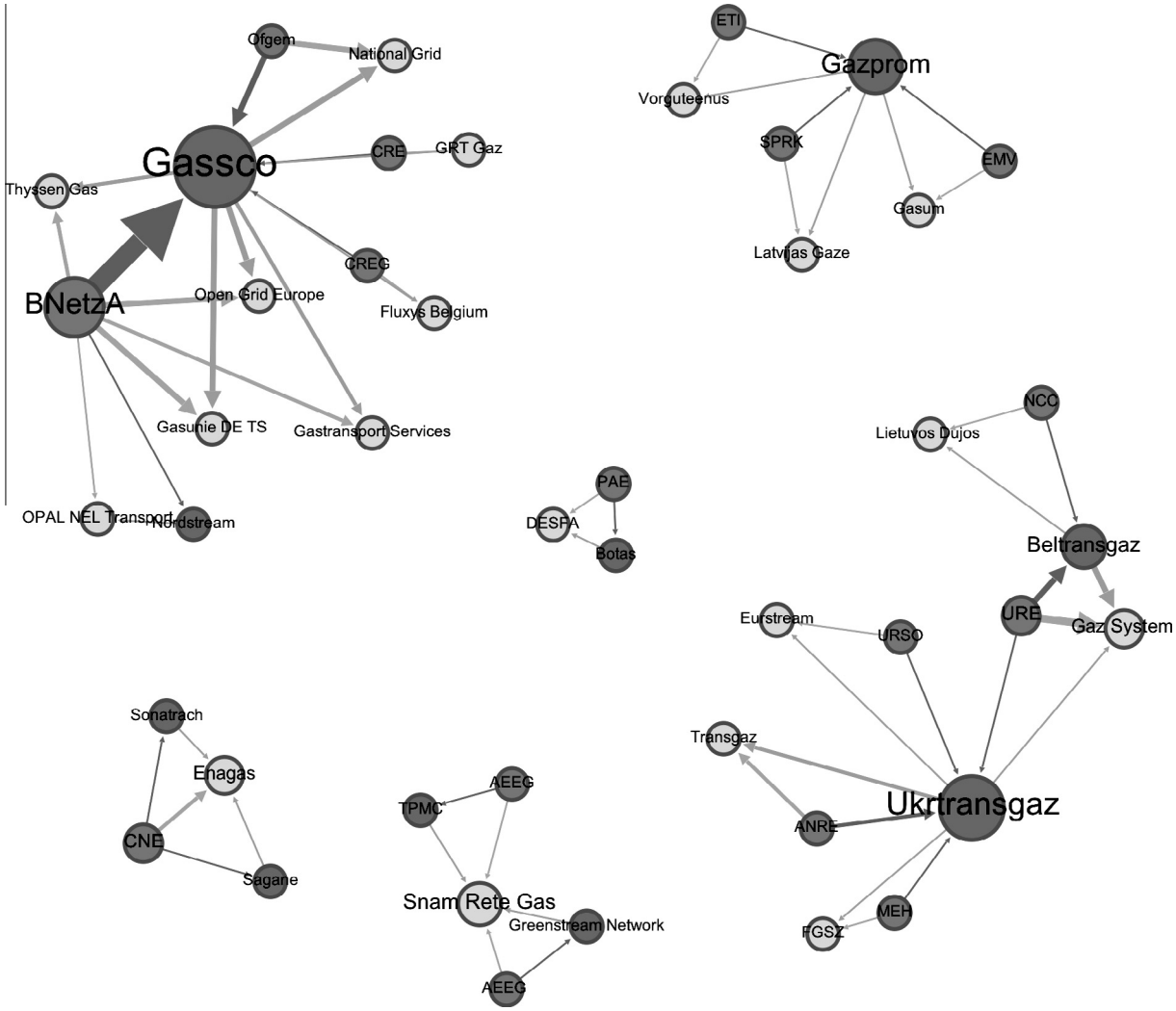

Fig. 3. Relations among gas TSOs and state regulators at the entry points of natural gas pipelines into the EU. Line thickness indicates number of connections. Exporters are marked in medium grey, importers in light grey, regulators in dark grey. Circle size indicates number of institutional connections at the cross-border transmission points.

geography of the European energy sector. Existing physical structures and socio-technical legacies have combined with the establishment of new codes and regulatory arrangements to create an emergent set of spatial distribution patterns and territorializations of gas transmission activities. Thus, an analysis of the institutional links between energy regulators and TSOs at the import entry points of natural gas in the European Union highlighted the existence of five separate spatially-embedded transnational clusters (Fig. 3). The largest three of these centre on the Norwegian (Gassco), Russian (Gazprom) and Ukrainian (Ukrtranzgas) TSOs, with the German regulator (BNetzA) playing an important role in the former due to, in part, the physical centrality of the German gas network in Western Europe. This emergent web of institutional affiliations and links challenges the traditional division of the European gas sector into three meso-regions (described in Section 3) while indicating the infrastructural difficulties associated with building a materially integrated gas market in the EU (Fig. 3).

Also contributing to the spatial and territorial distribution of gas transmission activities has been the decline of oil-indexed long-term contracts (LTCs) – traditionally the main method of supplying gas to European markets. The decrease of oil-indexation and LTCs is not only the result of the liberalization and integration of gas markets; the 'virtual elimination of oil products from many stationary energy sectors in these markets' (Stern and Rogers, 2011, p. 2) has also played a key role, in addition to the changing risk ownership structure in the gas value chain, in 'which back-to-back selling at oil-linked prices is difficult' (DNV KEMA Energy and Sustainability, 2013, p. 23). Such developments have precipitated the rise of wholesale gas spot and forward markets, creating a situation whereby midstream importing and wholesale companies have been 'squeezed between gas bought upstream at oil-linked prices and gas sold downstream based on wholesale market prices' (ibid).

One of the consequences of the decline of LTCs has been the rise of a network of 'gas hubs', along the lines of the North American market model. This process commenced in the UK, with the establishment of the 'National Balancing Point' (NBP) as a virtual location where shippers can nominate their buys and sells, and where the National Grid can equalize the system on a daily basis (Heather, 2010). Although the NBP is still the dominant hub in the European network – and has international significance as the provider of benchmark pricing – its preeminence is increasingly challenged by the Dutch Title Transfer Facility (TTF), which functions on a similar basis. Also of importance are the Zeebrugge hub (ZTP) in Belgium and the Central European Gas Hub (CEGH) in Austria. Unlike NCG and TTF, these hubs are nested in particular geographical locations, where large flows of gas enter the two

countries' territories (although CEGH involves six tradeable locations). They thus serve as transportation entry points for large quantities of gas to, respectively, neighboring Western and Central European countries (Heather, 2012). Yet the advantages of geography have also constrained the growth of the two hubs, as they remain dependent on the physical volumes of gas transiting through them. Also of note is the Gaspool physical hub in Germany, as well as a number of smaller virtual hubs: NetConnect Germany (NCG), the three Points d'Echange de Gaz (PGZ) in France, Italy's Punto di Scambio Virtuale (PSV), as well as the emergent hubs in Spain, Ireland, Hungary, Poland, and the Czech Republic. It should be noted that despite not being materially manifested in a given place, all of the hubs are associated with distinctive geographical territories, which are not necessarily conterminous with the borders of nation states (see Fig. 4).

Gas hubs are playing an increasing role as an instrument for the exchange of natural gas in European markets. In the first half of 2013, three of the continental hubs – TTF, Gaspool, and NCG – saw double-digit growth in traded volumes (27%, 23%, 22%, respectively) relative to the first half of 2012. The physically volume of gas within all EU hubs rose by 5% across the board, with Zeebrugge, Gaspool and NCG seeing the largest expansions, at 48%, 14% and 13%, respectively (Market Observatory for Energy, 2013). The success of the gas hub model, with its associated increase in levels of energy independence, market integration and prices, have prompted countries across Europe – and especially those in the East – to ponder the development of their own systems of this kind. One of our corporate interviewees, however was skeptical about their future development:

> 'Establishing a gas hub is a complex infrastructural and financial undertaking. In Europe, most gas hubs developed to meet balancing need . . . only after a certain degree of liquidity and price reliability were they able to offer an additional pathway for gas supply as an alternative to long term contracts and oil indexation. The biggest problem in Eastern Europe is that you need a large market to sell the gas to, a variety of commercial players, and preferably a connection to an LNG terminals rather than just pipelines'.
>
> [(Personal communication, 2013)]

Overall, the restructuring of the European gas markets has added a new layer of complexity and diversity to an already multi-faceted transmission landscape. The organizational richness of this assemblage becomes even more evident when contractual relationships among transmission system operators at cross-border trading points are analyzed using network mapping techniques (Fig. 5). In addition to the dense institutional linkages surrounding the two major mid-stream exporters to the EU (the Russian Gazprom and Norwegian Gassco), the map also reveals the existence of a weaker set of relations in the Mediterranean, focused on the imports of Algerian gas. The existence of 'gas islands' in Eastern Europe is also highlighted in the form of

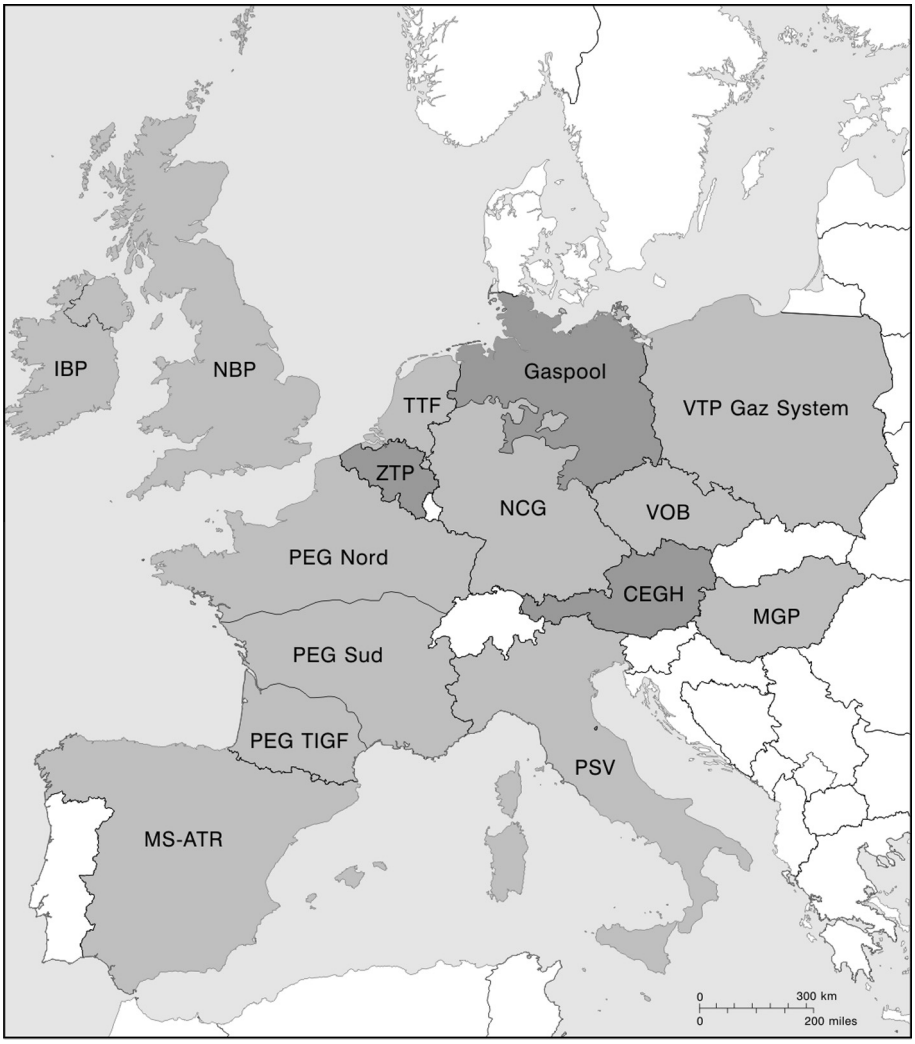

Fig. 4. Territories covered by the various European hubs. *Source*: ENTSOG and Heather (2012).

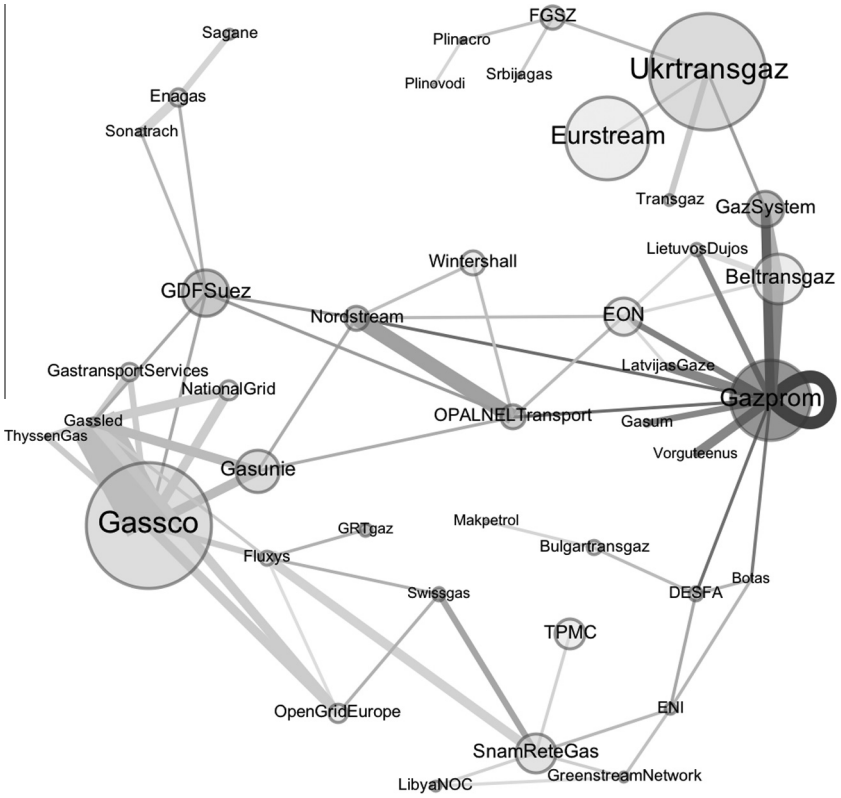

Fig. 5. Relations among gas TSOs at the entry and exit points of natural gas in the EU. Line thickness indicates number of connections. Shading indicates level of diffusion (more diffuse networks are darker). Circle size indicates cross-border transmission capacity associated with the given company. *Source*: ENTSOG.

unconnected branches from the Gazprom network, particularly in the Balkans and the Baltic States. Also evident is the crucial role of the Nord Stream pipeline in helping bridge the transmission gap between the Gazprom and Gassco systems. Arguably, this link plays one of the most important roles towards the creation of a unified European network.

The network analyses also highlight the key role that a limited set of companies – GDF Suez, Gasunie, EON, Wintershall, Fluxys and OpenGridEurope – play in facilitating transmission connections across the continent. This reflects findings by Stern (2013), who identifies these stakeholders, in addition to RWE, Enel, Endesa, Iberdrola and Vattenfall as being the main owners of a variety of gas assets across a number of European countries, thanks to a number of relatively recent mergers and acquisitions. It is worth noting that the foundation of most of these corporate entities lies in the electricity sector, which allows them to dominate the utility landscape as a whole. Thus, while the territorialization of the gas transmission assemblage has yet to produce spatial patterns of activity that would radically transform the existing geographies of gas circulation in Europe, there are indications that a new set of economic relations and interdependencies is creating a landscape in which traditional actors – state actors and regulated monopolies within national boundaries – are taking a back seat in favor of legally 'unbundled' transmission owners dominated by transnational companies.

6. Conclusion

This paper has focused on the governance practices and networks that accompany the emergence of a large scale infrastructure system for the overland transmission of natural gas in Europe. We have argued that this process has involved the stabilization of a specific socio-technical assemblage encompassing variety of institutional actors and material sites. Going back to our first aim (regarding the historical embeddedness of gas networks in the European energy landscape), we can conclude that this was an incremental 'process through which larger entities emerged from the assembly of smaller ones' (DeLanda, 2006, p. 18). Moreover, the assemblage transmits relations of political power, while acting as a conduit for the articulation of economic links and interdependencies. Its features are aligned with the dynamic understanding of territory advanced by authors like Paasi (2003), who emphasize the amalgamation of land, power and functionality in the emergence of these formations. The fact that the European gas network involves a range of material, performative and symbolic dimensions also implies that it serves a particular territorial role *vis-à-vis* the political articulation of EU energy security, integration and neighborhood policies.

In terms of the second aim of the paper (on the 'coding' of the assemblage via practices of gas governance), there is evidence to suggest that the effective functioning of this system has required the enrolment of a variety of human and non-human actants. Large transnational corporations are becoming increasingly important here, often overtaking and replacing the actions of the nation state. This is facilitated by the gradual emergence of a common EU energy market, which is otherwise supported via a wide range of formal and informal steering mechanisms. The declining importance of long-term contracts and oil indexation both underpin and express such dynamics. Overall – and in response to the third aim of the paper – it can be concluded that their territorial operation favors the growing emphasis on market mechanisms within the literature on energy governance, as opposed to the more traditional focus on state policy and geopolitical relations. It also highlights the need for a more inclusive understanding of the spatial contingencies that allow such processes to occur, as well as the manner in which background policies and actions at the

transnational scale shape the development of large scale infrastructure systems.

The territorial architecture that is being produced by the socio-technical system for European gas transmission has several distinctive features, whose further exploration may benefit wider understandings of the role of infrastructure in producing such systems. There are important synergies here with research on infrastructure more generally (Star, 1999). The gas transmission system, for example, has increased incrementally from the bottom up – largely through private sector investment – while including a variety of spatial formations with their own geographies. The presence of isolates, hubs and highly interconnected spaces points to the emergence of a specific new landscape of geographical inclusion and exclusion. In addition to being spatially diffuse, the physical boundaries of this space are highly interconnected with neighboring spaces, while being materially embedded in wider socio-technical systems for the provision of energy. They are increasingly run in a manner that extends beyond the traditional domains of governance, involving transnational actors that do not easily lend themselves to conventional accountability mechanisms. As such, they offer fertile ground for expanding the theoretical lens of energy governance into examinations of the socio-technical assemblages associated with non-state actors.

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