Small-scale LNG: A Case of EU Multi-level Governance Success?

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6

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6.1. INTRODUCTION

This chapter analyses the complex dynamics behind the governance of small-scale LNG to see whether the theoretical expectations reflect reality and give MLG a further theoretical boost. By identifying the challenges of governance and how power links into its dynamics, I demonstrate that MLG can be improved upon. While there are multiple options to make transport more sustainable, this chapter focuses on just one of these options: using liquefied gas as a fuel. Liquefied Natural Gas (LNG) is natural gas that has been converted to liquid. In order to liquefy natural gas, the gas must be cooled to about -162°C. Because LNG has a lower volume than compressed natural gas, liquefying the gas makes its transport over long distances more cost-efficient. Although LNG is mostly converted back to compressed natural gas after transport (large-scale LNG), an increasing number of vehicles and vessels have now started to use LNG as a source of fuel (small-scale LNG). Risks associated with LNG are high flammability after conversion to its gaseous state (when certain conditions are met), freezing, and asphyxia. Therefore, LNG is subjected to strict regulation. In contrast to CCS, not much academic work could be found on small-scale LNG during the data collection process (chiefly February through September 2015). This chapter therefore is the first to offer a thorough case study, applying MLG to it and showing what small-scale LNG means for a port.

This chapter is comprised of two distinct parts: a discussion of the (international) small-scale LNG context (§6.2) and the application of Piattoni's theory to the case. Within Energy Port

the small-scale LNG case is part of the LNG hub. While the science behind using LNG has been developing for decades, the use of LNG as a relatively clean fuel is still considered an emerging technology. Section §6.3 dives into the governance of small-scale LNG in Rotterdam, guiding the reader through how multi-level governance works in this case and making extensive use of interview data to show its mechanics. Section §6.4 discusses the consequences of this case for the Port of Rotterdam and the role its authority can play. Section §6.5 discusses the theoretical and empirical conclusions for the governance of EU energy and climate policy based on this case.

6.2. LNG: WHAT, WHY AND WHEN?

LNG 'simply' is natural gas in its liquid phase. Natural gas is one of the most important commodities on the planet and accounts for roughly a quarter of the world's energy demand (IGU, 2015b:6). At the same time, the global energy sector is the number one contributor to GHG emissions and is in second place[196] when it comes to methane emissions. In 2010, more than two-thirds of the world's GHG emissions came from the energy sector. If climate change is to be tackled effectively, the energy sector needs to change. Even so, the projections are that global energy consumption will increase in the future and that fossil fuels will play a major part in this consumption (IEA, 2013:15).

Not all fossil fuels are equally polluting. For instance, switching from coal to natural gas is often mentioned as a way to at least *improve* the emissions situation. Burning gas leads to lower emissions than burning coal; on average, natural gas is twice as clean as coal, although the increased methane emissions associated with the production and distribution of natural gas decrease the relative cleanliness of gas (*ibid.*:28). Still, gas has become more popular in recent years and the possibility to easily transport it in liquid form has sped the market along. LNG can be an important step towards a cleaner use of what essentially still is a fossil fuel.

Because there is potential in LNG, the trade has increased to levels that warrant close study[197]. The share of LNG has grown faster than any other source of gas; in 1990 the share of LNG in the global gas supply was only 4% and the projections for LNG only show growth in the near future (IGU, 2015b:6). In the EU, LNG imports peaked in 2011 and then dropped by 50% in 2014. The somewhat dramatic drop in imports may be partially explained by competition from the shale gas boom in the US, increasing US domestic gas consumption and decreasing US demand for coal. Coal was then 'dumped' on the European markets for a very low price.

196 Agriculture is the world's largest source of methane emissions.

197 In 2014, global LNG trade reached 241 million tonnes, which constitutes about 10% of the global gas supply.

Power plants operate in a merit order with the cheapest power plant being turned on first. Thus, when coal prices in Europe plummeted, coal consumption in the EU rose as coal-fired power plants were favoured over gas-fired power plants[198]. The worsening economic situation and the uptake of renewable energy also led to a declining demand for natural gas (PwC, 2013:34). In addition, the 2011 Fukushima nuclear disaster caused a rise in the demand for LNG in Japan, bumping up its prices in the Asian region. LNG transports were therefore rerouted to Asia where a higher price was paid for the commodity, causing the demand for gas in the EU to decline further (IGU, 2015b:12-15). So, how and why did small-scale LNG develop in times of decreasing LNG demand in Europe? To answer that question, it is imperative to first consider the potential costs and benefits of small-scale LNG (summarised in table 6.1).

Table 6.1. Small-scale LNG is promising but will not save the world

Pros	Cons
Benefits climate	System-wide change needed (different engines, refueling hoses, bunker points, regulation, training, etc.)
Benefits local air quality	Expensive
Single fuel engines very clean	Dual fuel engines have methane slip
New market opportunities for shipping sector and fuel production industry	Still a fossil fuel (unless bio-LNG)
Best option for newly built vessels	Retrofitting a ship takes it out of service

Source: author's own composition based on sources cited in this section.

In its 2013 special report, the International Energy Agency shows where several major policies overlap with climate change mitigation. Three policies are considered: energy security, environment, and economic/social development (IEA, 2013:20). Interestingly, transport is not mentioned as a separate policy field. In the case of LNG, transport policy can prove to be a powerful policy area to help combat climate change. The use of LNG as fuel has benefits for both air quality and the climate. According to the European Commission "the EU population will benefit from reduced emissions of substances that are harmful to human health, in particular NOx and PM" (European Commission, 2013i:24). This benefit to local air quality is such that both port cities and cities along the European riverbanks will probably benefit the most from the improved air quality. In the Rotterdam region, 40% of the particulate matter (PM) emissions is due to the transport sector alone (shipping: 22% and road: 18%). Another 41% comes from the industry in the region (MSR, 2010a). The concentration of PM in the Rotterdam region is the root cause of 200-300 hospitalisations per year, with most people suffering from lung diseases and heart conditions (MSR, 2010b).

198 Also based on interview 3.

The Netherlands wants to meet the EU's required emissions reduction norms. In 2012, The Netherlands still emitted 93% of the GHG emissions emitted in 1990. In comparison, the EU-28 average was 82%. Note that this low decrease in emissions does not necessarily mean total Dutch GHG emissions are high, it merely means that the reduction of emissions is not proceeding as quickly as in the rest of the EU. For the EU as a whole, in 2011 10% of GHG emissions came from commercial transport. The acidifying gases (SO_2, NOx, NH_3) that were released in the same year had a transport share of 14% (Eurostat, 2014:150-160). The emissions problem is therefore twofold: it is bad for human health and it is bad for the climate and the environment. Greening the fleet can contribute to improving this situation, and LNG could have a part to play in the solution. On the other hand, the Commission also states that "[t]here may be marginal environmental effects, both positive (reduced CO_2 and PM emissions) and negative (increased methane emissions)" (European Commission, 2013i:24). The EC is thus also looking at the negative climate effects of using LNG as fuel, as there is a significant methane slip if the ship uses a dual fuel engine and does not possess extra treatment facilities[199]. Dedicated LNG engines are more environmentally-friendly, but this benefit comes at the cost of being unable to handle changes in power demand well due to their relatively low capacity. However, increased use of LNG may have a positive effect on the market opportunities for the shipping sector and the fuel production industry (*ibid.*:24).

The downsides of LNG are the associated costs with the switch and the necessity for what is basically a system-wide change: for LNG to be a competitor fuel, LNG infrastructure will have to be built across Europe. The *Clean Power for Transport* Directive (see section 6.1.3) goes a long way towards demanding the construction of such infrastructure, but a change in laws, regulations and even the mindset of shipping companies is also paramount to ensuring the development of the small-scale LNG market. As of yet there is no standardisation of LNG equipment, which makes the costs of retrofitting a ship to accommodate the new fuel very high. Furthermore, retrofitting operations take a ship out of service for a limited amount of time, resulting in a loss of potential income for the shipper (*ibid.*:24). Analyses performed by — among others — the EC, have also shown that the adoption of LNG is most beneficial for newly built vessels which are either large or have to perform heavy-duty tasks (*ibid.*:25; Panteia, 2013)[200]. LNG is therefore not the best option for 'everyone'. Other challenges for LNG development will be discussed in section 6.4, but for now it is important to know that the small-scale LNG transition is mainly driven forward by environmental concerns and at the same time slowed down by financial and regulatory challenges. For The Netherlands specifically, small-scale LNG demand rose to counter decreasing large-scale LNG demand.

199 A methane catalyst would help solve the problem, but requiring its use would increase the prices of LNG engines; a prospect which grates engine manufacturers.

200 Also backed by interviews 1, 5, 12 and 16.

Figure 6.1 illustrates the key events marking the rise of small-scale LNG in Europe. Major tipping points for Rotterdam are the construction of GATE and the *Argonon*, the adoption of *Clean Power for Transport*, and subsequent legalisation of overall LNG operations in the Rotterdam port area. Note that the upswings of LNG seem to happen right after peaks in oil price, and the downswings happen after drops in the oil price.

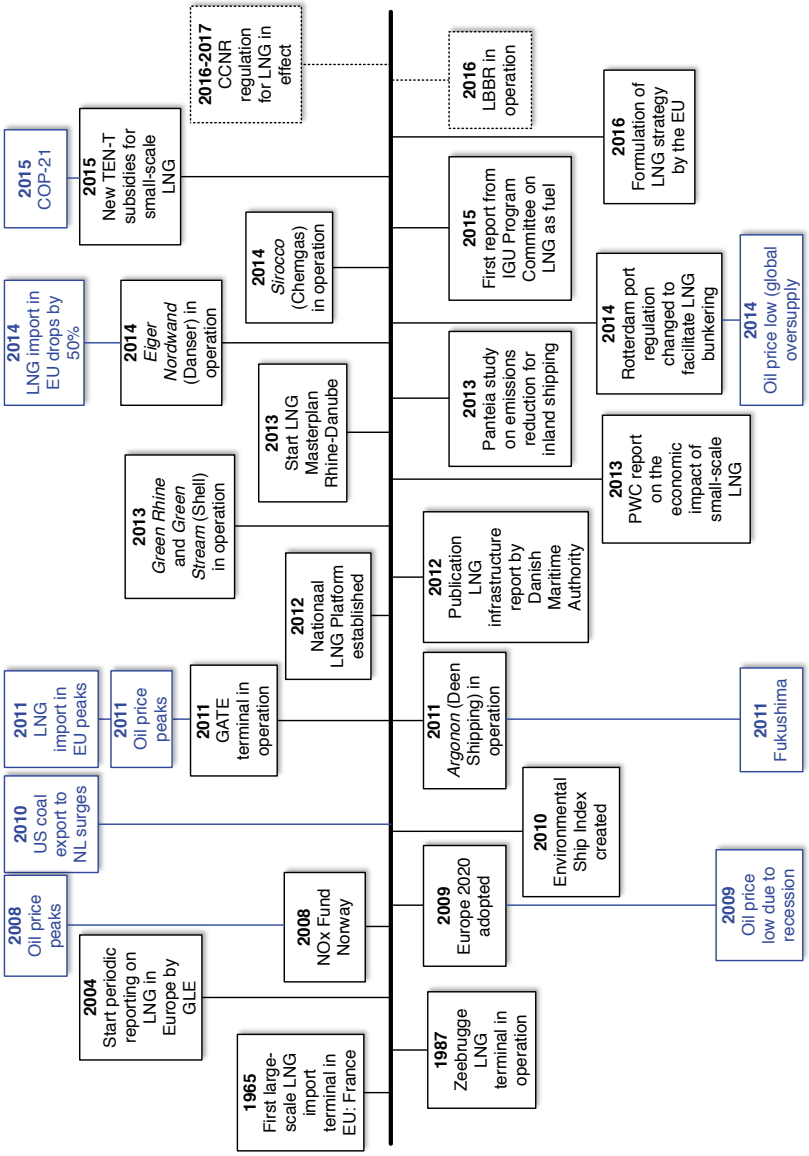

Figure 6.1. Timeline of small-scale LNG in Europe and major global (oil-related) events
Source: author's own reconstruction.

6.2.1. Historical Context and Recent Developments

6.2.1.1. 1965 - 2000: Large-scale (conventional) LNG

The act of liquefying natural gas is not a new development. Natural gas often is freed during the process of oil drilling and used to be considered a byproduct. Without the necessary pipelines from the well to a market demanding gas, there would be no use for the gas and it would therefore be flared. However, as energy markets started to change due to new technologies and the exploration of new — often remote — gas fields, companies started to liquefy both the gas-byproduct from oil drilling and the gas from gas wells for overseas transport to LNG import terminals. Suddenly gas could be transported across the globe by ship and re-gasified once transferred to a terminal, increasing the world's potential gas supply. The origin of LNG thus is that it is a solution to a transport problem: while ways of transporting gas over long distances were absent, there was no LNG. Especially in European countries such as Spain (as early as 1969), Italy, France (as early as 1965) and the UK, LNG was imported and then injected into the gas grid once returned to its gaseous state (IGU, 2015b:79-81). The mostly South-European LNG terminals[201] and the large energy companies together are at the head of half a century of experience in transporting and storing LNG in large tanks. Engie (formerly GDF Suez) is an example of a big energy company with 50 years of experience with LNG. Shell also has about 50 years of experience with the transport of LNG in seagoing vessels. These two companies are major players in the European LNG sector. Northern Europe followed its southern neighbours with the construction of an LNG import terminal in Zeebrugge (Belgium) in 1987. The main use of LNG in these years was re-gasification and injection into national gas grids, which is also referred to as the conventional — large-scale — use of LNG. The Netherlands did not need LNG because it was extracting gas from the country's own gas reserves and using its pipeline system to transport it. The government did consider constructing an LNG terminal in the 1970s (interestingly, Eemshaven in the north was preferred over the Port of Rotterdam), but public concerns about safety and the onset of risk calculations in spatial planning of industrial and energy activity took the upper hand (Oostendorp, Zwaard, Van Gulijk, Lemkowitz & Swuste, 2013:75-80).

6.2.1.2. 2000 - 2010: From large-scale to small-scale LNG

Small-scale LNG essentially means using LNG in transport (as fuel) instead of on the energy market (as an energy carrier), as previously intended. Small-scale LNG can be used for road transport, maritime transport, short-sea, inland shipping, and break bulk[202]. For inland

201 The LNG experience started in Southern Europe because of LNG imports from Algeria.

202 Break bulk entails sending small ships filled with LNG to supply the resource to a small terminal or end user.

shipping, switching over to LNG became a chicken-and-egg challenge: the infrastructure was not being built due to low use of LNG as fuel, but shippers were also hesitant to adopt LNG because of the lack of infrastructure (cf. Danish Maritime Authority, 2012:15; PwC, 2013:25; IGU, 2015a:63; Innovation Norway, 2015[203]). The first European country that made the move from large-scale to small-scale LNG was Norway[204], due to its multitude of off-shore drilling platforms, a lack of pipelines, and largely due to the 2008 NOx Fund[205]. Since LNG can contribute strongly to the reduction of NOx emissions, using it as a fuel was an easy match for Norway and subsequently kickstarted the development of small-scale LNG in other parts of Europe. Many Norwegian companies are involved in the LNG sector and have conquered a leading position in LNG distribution; Gasnor (nowadays a sister company of Shell) provides LNG bunkering at ferry berths, Wärtsilä builds LNG engines, Statoil is a large LNG distributor, and DNV GL holds a lot of LNG expertise and technical know-how. The Norwegian experience with small-scale LNG started to trickle down to the rest of Northern Europe through partnerships (for example, Shell - Gasnor and Cofely's involvement in Norway's small-scale LNG sector) and data collection and reporting by Gas LNG Europe (GLE)[206]. GLE started reporting on the status of LNG in Europe in 2004, focusing on the conventional use of LNG with attention for the small-scale terminals proliferating in Norway. The possibility to use LNG as fuel reached Deen Shipping when in 2006 the company began to think about ways to make ships cleaner and thereby meet longer term emission standards. Eventually this led to the construction of the *Argonon*, which is the first new-built tanker ship sailing on dual fuel in European waters[207].

In 2008, at the start of the economic crisis which would later cause EU gas demand to decrease, 55 of the world's key ports agreed to put more effort into reducing GHG emissions and cemented their commitment in an initiative called the World Ports Climate Initiative (WPCI, 2008). The oil price was high, making LNG an attractive alternative. One of the WPCI's key projects is the Environmental Ship Index (ESI), which came to life in 2010. ESI offers tools to evaluate the environmental performance of maritime — or seagoing — ships by looking at their NOx, SOx, PM and GHG emissions. Ports can then offer financial rewards to ships meeting current IMO emission standards (WPCI, 2010:1-4). The Port of Rotterdam,

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203 Innovation Norway gave a presentation about the potential for LNG in India in which the chicken-and-egg problem is mentioned (slide 19).

204 Note that Norway is not a member of the European Union.

205 The NOx Fund is an environmental agreement between the Norwegian government and 15 organisations in which it is possible to pay a participant fee instead of having to pay NOx taxes. The government then offers financial support for projects that contribute to NOx reduction (nortrade.com, 2011). In Norway, the first LNG-powered ferry was built in 2000, followed by dual-fuel supply vessels and more ferries between 2003 and 2010

206 Now part of a larger umbrella organisation Gas Infrastructure Europe (GIE).

207 The *MTS Argonon* was christened in November 2011.

for example, rewards clean ships (such as LNG ships) by reducing their seaport dues[208]. While ESI focuses on seagoing ships and not inland ships, it does promote the uptake of LNG in the maritime sector and could indirectly influence the uptake in the inland shipping sector as well.

6.2.1.3. 2010 - Today: Small-scale LNG in the EU on the rise

Small-scale LNG took flight in the EU since 2010. In The Netherlands, change occurred when the lifespan of the country's own Slochteren gas started to shorten. The endangered competitive position of the Dutch gas market was reason enough to reconsider LNG, which led to the construction of the Gateway to Europe (GATE) terminal by Vopak and GasUnie. This terminal would import LNG and use it in the conventional way; re-gasify it and send it onward as simple gas. Because of the previously mentioned risks associated with LNG, GATE had to be located in a separate dock (in Dutch: *insteekhaven).* GATE was under construction when European LNG imports were rising and the oil price was high. However, Slochteren gas made a transition and was suddenly cheaper when hauled out of Qatar. Furthermore, the free market dynamics favoured Slochteren gas and the Japanese nuclear situation also had an effect on the energy sector as a whole, with LNG being rerouted to Asia to fill the energy gaps created by the nuclear failure. Fukushima also sparked the German *Energiewende* and the resulting rise in renewable energy reduced EU gas demand further, right after the import of LNG peaked in 2011. GATE, which entered into operation in that year, now faced an economic problem as it was not being used enough to be economically viable. As stated earlier in this chapter, LNG imports in the EU peaked in 2011 and then dropped dramatically in the next few years, while the oil price went down as well (making conventional oil-based fuels more attractive again). When LNG ships finally began docking at GATE since mid-2013, this increase in activity still was not enough to make GATE profitable. The response was to look for alternative solutions, which is how the use of LNG on a small scale was introduced as an extra goal for GATE. The terminal has been expanded to accommodate space for liquid break-bulk terminal operations (LBBR) which have officially commenced in 2016. Small-scale LNG in The Netherlands thus was meant to offset the effect of the maturing Dutch gas market. The Dutch government became a staunch supporter of LNG in order to kickstart the process of legislative adjustment at the international level to enable the use of LNG as fuel.

Policy-making needs expert knowledge. In 2012, the Danish Maritime Authority published an influential (and EU-funded) report on the future possibilities for the use of LNG as a fuel in shipping, including recommendations regarding infrastructure development and ways

208 For more information see [https://www.portofrotterdam.com/en/shipping/port-dues/discounts-on-port-dues/esi-discount].

to get the LNG to the end user[209]. Among the contributors to the report are the Port of Rotterdam, Zeebrugge, Gasnor, MAN, and even Gazprom. The Dutch National LNG Platform was established in the same year with the goal to speed up the Dutch uptake of small-scale LNG in the road transport and shipping sectors[210]. The Danish report served as a baseline for EU thinking about small-scale LNG, which led to several developments in the next year. The *Clean Power for Transport* Directive was adopted in 2013 and includes LNG — to a large extent due to the strong Dutch advocacy for it — as an option to make transport more sustainable[211]. A largely technology neutral approach was chosen to ensure support in the Council, since some MS have better access to certain technologies and fuel types than others. The Directive was generally well-received among the EU countries (Council of the European Union, 2013:8). Another study on the climate contribution of LNG as fuel was published by Panteia, which also served as input for EU policy. It compares different ways to reduce emissions from inland shipping from an environmental, social and economic perspective. Both retrofits and new-built ships are considered. The study concludes that LNG is a good option for inland shipping but that more R&D is required to solve the methane slip problem. The difficulty with financing is also discussed and the report mentions that there is no clear delineation of tasks between multiple governmental levels, which makes the creation of a good funding landscape difficult (Panteia, 2013:109-120). This last conclusion is practically problematic, but academically interesting where MLG is considered.

The year 2013 also saw Shell revealing its two newly built LNG tankers: *Greenstream* and *Greenrhine*, and the Port of Rotterdam receiving EU funding for a major European LNG project called 'LNG Masterplan'. The nature of the project is such that if it ends up being successful, the infrastructure and ships resulting from it would cover Europe's main arteries: the Rhine and the Danube. LNG dispersal on Europe's main arteries could have a significant impact on the small-scale LNG business as a whole. The new LNG ships coupled with the LNG project meant the PoR had to introduce a change to its port regulation to allow for LNG bunkering. As of 2014, LNG bunkering is officially mandated in the port. That year also saw the birth of two additional LNG ships in The Netherlands: the *Sirocco* (Chemgas) and the *Eiger Nordwand* (Danser). Additionally, more LNG projects were approved under the CEF Program, including

209 The report looks at the demand and supply of LNG in Europe, the available infrastructure, oil price relations, technical and safety aspects, and regulatory concerns. It concludes that LNG must be treated as a 'dangerous good' which requires proper personnel training, safety measures and a coordinated permit process (Danish Maritime Authority, 2012:13-14).

210 In The Netherlands, PwC published a report on the economic impact of small-scale LNG in The Netherlands, concluding that the use of LNG in the transport sector can lead to about €2.7 billion worth of economic growth and 8000 extra FTE by 2030. Investments into LNG infrastructure, bio-LNG, a pricing mechanism that is beneficial in comparison to oil, and a good business case for end users will be necessary (PwC, 2013:4-49).

211 For more information see chapter 4, section 4.3.2.

projects in the Rotterdam area. Shell has committed to chartering thirty LNG ships for a longer term and is thereby trying to push the market forward. Engie announced plans to realise about the same amount of ships. The reason these companies are committing now is because the Central Commission for Navigation of the Rhine (CCNR) — responsible for regulation covering Rhine navigation[212] — has made regulations to facilitate the use of LNG as fuel on the Rhine[213] and because they have an interest in the development of this market. CCNR has five members (Germany, Belgium, France, The Netherlands, and Switzerland) and also fosters an observer's agreement with the EU. For a while, letting a ship filled with LNG sail down the Rhine was prohibited by the CCNR. The new rules entered into force in 2016-2017. In the meantime, national regulatory bodies in combination with the CCNR were tasked with giving legal exemptions to allow for the use of LNG as fuel (European Commission, 2013i:10). Small-scale LNG is thus beginning to become institutionalised in the EU and international organisations such as CCNR and IGU. At the same time, the EU is giving a lot of attention to the strategic importance of large-scale LNG by formulating an LNG Strategy, which was published in the first quarter of 2016.

6.2.1.4. Facts and market developments

This section discusses how the small-scale market is embedded in the global LNG market, as the developments on the global gas markets have a significant impact on the attractiveness of LNG fuel for the private sector. Small-scale LNG developed in times of decreasing EU gas demand and in part to offset that trend and to take action against climate change. What is the situation now? The map in figure 6.2 shows the LNG landscape in and around Europe in late 2015. As becomes clear, LNG is not (yet) readily available throughout the EU. LNG is mainly imported in the southern and western parts of the EU. South-Europe was frontrunner in this development due to the availability of Algerian LNG as early as during the 1960s. In countries such as Spain and Portugal the contribution of LNG to their gas supply has even been nearly 50% (IGU, 2015b:13). The construction of LNG terminals spread to other key seaports on the continent and LNG is now also available in, for example, the UK, The Netherlands, Belgium and Greece. Central and Eastern Europe have been heavily dependent on Russian gas, which is imported through the extensive pipeline system running from Russia to large parts of Europe. It is therefore no surprise that these countries have not yet secured access to LNG. However, terminals are now planned or even under construction in Finland, Lithuania[214], Poland, Estonia and Latvia. In addition, Ukraine and Turkey are planning to build LNG import terminals as well. Among LNG exporting countries around the EU are Norway,

212 Other rivers are regulated by similar commissions, such as the Danube Commission for the Danube river.

213 Adjustments to the ADN will follow as well.

214 The Lithuanian terminal is actually a floating terminal and entered into operation in late 2014.

Russia, Algeria, Egypt and Libya. As stated in the introduction of this chapter, however, the use of LNG makes it easy to import it from all parts of the world. Other notable LNG exporters, then, are Qatar, Malaysia, Australia, Nigeria and Indonesia. US export of LNG started in 2014 and is on the rise as well (IGU, 2015b:9).

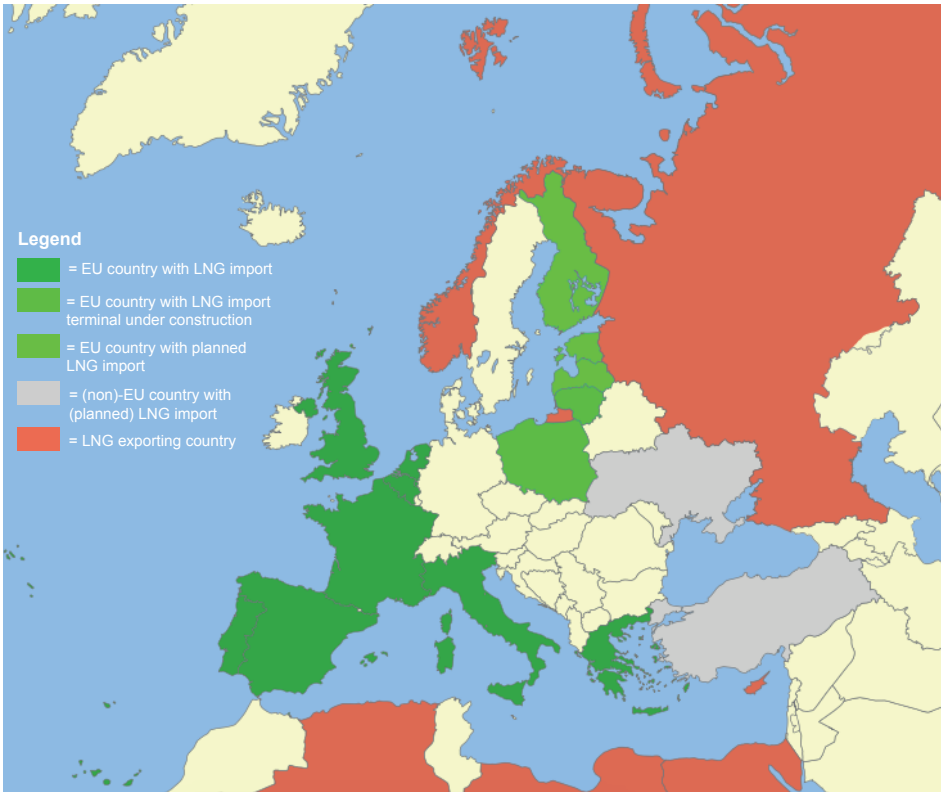

Figure 6.2. LNG not available in all European countries
Source: IGU, 2015b.

The global LNG market is not an integrated market. Broadly speaking, there are two 'basins': the Asian-Pacific Basin and the Atlantic Basin[215]. Both basins have their own pricing mechanisms, but are also interconnected due to the strategic positioning of Qatar on the border of both markets. Since the Fukushima disaster a lot of the LNG from Qatar re-routed to the Asian market. However, three developments will most likely introduce lower demand and/or higher price competition in the Asian LNG market: Japan is reintroducing nuclear

215 These two basins came into being due to the two geographic bottlenecks existing in maritime transport: the Suez Canal and the Panama Canal. According to a respondent (interview 3) the prices to go through either of the canals vary between 0.5 million and 1 million euros per ship. Traversing both canals is very expensive so there must be a good price-related reason for a company to use them.

energy into its energy mix, the Chinese economy is stagnating and Australia is investing a lot into the construction of new LNG export terminals. With its new terminals, Australia will be able to supply the bulk of the demand in the Asian-Pacific Basin, which could lead to a rerouting of LNG exports from Qatar to the European market. Analysis of these market forces suggests that it is quite likely that the LNG price in the EU will go down, making LNG imports attractive. Especially from the point of view of securing independence from Russian gas, the EU may stimulate LNG imports from other parts of the world. The European LNG market is also dependent on the price of oil[216]. According to PwC, the LNG pricing mechanism used in Europe has come under pressure because "high oil-linked gas prices no longer reflected gas supply-demand fundamentals. This has led to moving away from oil-linked prices to more hub-based prices" (PwC, 2013:34), such as what is used in the US. Still, a low oil price makes it more attractive for ship owners to continue to use oil-based fuels instead of making the switch to LNG. Longer term projections of global oil and gas prices, however, expect oil prices to increase again and gas prices to decrease, making LNG more attractive in the near future (*ibid.*:37-39). The global demand for LNG has grown 7% per year on average since 2000 and the current investments into LNG throughout the world do not suggest a stagnation in the near future. The end of the economic crisis may also make life better for shipping companies and increase their investment possibilities (IGU, 2015b:12).

6.2.2. Policy Context

Any case study in this field should consider the political and legislative context it operates in. Chapter 4 discussed the relevant policies at length. This section acts as a brief summary and foregrounds key policies, goals and tools. The 2001 White Paper on Transport placed heavy emphasis on stimulating the modal split through the EU's Marco Polo Program. According to the EU,

> "The biggest missing link is the lack of a close connection between sea, inland waterways and rail. For centuries sea and river dominated goods transport in Europe. […] Nowadays, despite a slight revival, water transport is the poor relation even though it is a mode which is not expensive and does less damage to the environment than road transport" (European Commission, 2001a:41).

The inland shipping sector was seen as quite clean in the early 2000s, yet transport as a whole had already been identified as a major source of GHG emissions. The 2001 White Paper

216 In North America the price of LNG is set at liquid trading hubs, whereas Europe and Asia tend to prefer oil-linked pricing (IGU, 2015b)

mentioned natural gas (preferably bio-gas) as a potential fuel in the medium and long term (European Commission, 2001a:86). That medium term arrived in the 2011 White Paper on Transport, which has a much more urgent tone when it comes to GHG emissions. A strong emphasis was placed on investing into R&D for alternative fuels (European Commission, 2011c:24). Several years later, the use of LNG as fuel has become part of a larger EU strategy to transition towards more sustainable fuels for transport. Table 6.2 shows which level of government employs which types of policies aimed at the shipping sector.

Table 6.2. Shipping-related policy competencies are spread over hierarchical levels

Government level	Competency
EU	Standards, maritime policy, inland shipping policy, innovation policy
National government	Fiscal policy, innovation policy
Local government	Contextual policy, innovation policy

Source: *Brandstofvisie*, Ministerie I&M, 2014a.[217]

MLG contends that the multi-level context asks for coordination between levels and policies. While all policies identified in table 6.3 have an impact on the LNG hub in Rotterdam, it is clear that they differ in scope. The goals set and tools used at the European level tend to be more all-encompassing (for example, developing alternative fuels for transport) while goals and tools at decentralised levels of government tend to be more concrete (for example, the fund for NOx-free ships). At the same time, it appears that the more binding and strategic policy goals are set at higher levels of government and that the decentralised levels then have the freedom to act within these goals.

6.3. BEHIND THE SCENES: THE GOVERNANCE OF SMALL-SCALE LNG

The first part of this chapter focused on the context of the LNG case. The next part delves into the application of MLG to the case in an effort to reach behind the scenes. This section thus introduces the empirical data collected through the nineteen interviews conducted with experts, desk research and observations made at the Port of Rotterdam Authority. Before delving into this data, a few words on the focus of this case. This case study deliberately focuses only on inland shipping — and not on maritime shipping — to offer a precise analysis of the governance mechanisms of small-scale LNG to help this field develop.

217 Shipping policy for seafaring ships is also made on the international level by the IMO, while inland shipping policy is also part of the daily work of the CCR. With 'contextual policy', the *Brandstofvisie* document refers to, as examples, parking privileges and emission-free zones.

Table 6.3. LNG policy context: a patchwork of policies at all levels of government

Level of government	Main policies	Goals	Policy instruments
EU	1. Clean Power for Transport 2. Europe 2020 3. 2030 Energy & Climate Framework 4. Energy Roadmap 2050 5. NAIADES 6. National Emission Ceilings Directive 7. Air Quality Directive 8. Non-Road Mobile Machinery Directive	• Development of alternative fuels for (commercial) transport • 80% reduction of CO_2 by 2050 • Majority of energy is renewable • 30% energy efficiency • Reduction of GHG emissions • Improving air quality • Cleaner ship engines	• Mix of soft and hard targets. Emission performance of ship engines is a regulation, which does not allow any deviation. On the other hand, renewable energy has no hard target and its implementation possibilities vary per country • Financing/subsidies through CEF or EIB
Dutch national government	1. Energieakkoord 2. Brandstofvisie 3. Werkprogramma Zeehavens	• 60% GHG emissions reduction from transport by 2050 • 80-95% reduction of CO_2 by 2050 • 16% renewable energy in 2023 • Level playing field for ports and supporting sustainable initiatives	• Green Deals (= cooperation with private sector) • Mix of hard and soft targets. The emissions reduction targets are compulsory but the support for sustainable initiatives in ports is a policy commitment • Financial incentives
Province of South Holland	1. Visie Ruimte & Mobiliteit	• All public transport fossil fuel-free by 2035 • Fostering connections between industries and strengthening clusters	• Financial incentives through the EFRO program (indirect EU subsidy) • Granting of permits • Approving use of land
City of Rotterdam	1. Stadsvisie Rotterdam 2. Programma Duurzaam	• Cleanest port city in the world by 2030 • Cleaner transport	• Financial incentives (fe., for NOx-free ships) • Mostly informal: networking and expertise sharing

Source: desk research and interviews.

The European mainland can be divided into seven basins, also called 'corridors': Rhine-Danube, Azov-Black-Caspian seas, Baltic area, Czech-Slovak centred network, Rhône-Saône basin, Seine-Oise basin, and the coastal routes connecting to inland waterways. The largest corridor, Rhine-Danube (47,6% of the total), is of critical importance to The Netherlands. In 2010, nearly 7000 inland vessels were operational on the Rhine river alone, totalling a capacity of 108,550,000 tonnes (UNECE, 2011:10-15). An average inland vessel with a 2000 tonnes capacity roughly equals 80 trucks, or 50 railway cars, allowing for an enormous carrying capacity per transport unit (Naiades, n.d.). About 84% of the Rhine fleet dates from before 1990 (some 600 vessels date from before 1930), indicating the long lifespan of inland vessels (UNECE, 2011:15).

The Netherlands, especially Rotterdam, is a good subject for the study of inland shipping due to the exceptionally large contribution inland shipping makes to the Dutch transport sector. The Netherlands also has the largest inland shipping sector in Europe. The table below compares the Dutch modal split to the EU-28 average and several other countries.

Table 6.4 shows that the Dutch inland shipping sector is much larger than it is in other parts of the EU. Several states have next to no inland shipping sector, which can be explained by their geographic location and the absence of large rivers flowing through them. Other countries with a considerable inland shipping sector are Belgium, Romania, Bulgaria, and Denmark. Ports and companies located in the first three countries are also part of the LNG Masterplan yet only the Netherlands has built several inland LNG ships, marking its importance as a case.

Table 6.4. Modal split in the EU varies strongly per country (in percentages)

Country	Road (%)	Rail (%)	Inland waterways (%)
The Netherlands	56,2	5,1	38,7
Belgium	58,3	17,5	24,3
Romania	53,3	24,2	22,5
Bulgaria	74,7	8,9	16,4
Denmark	64,6	23,1	12,3
Poland	81,9	18	0
Italy	85,9	14	0,1
France	80,6	15,2	4,2
United Kingdom	87,7	12,1	0,1
EU-28	***75,1***	***18,2***	***6,7***

Source: Eurostat, 2014:132. Data is from 2012.

It is worth noting that the inland shipping market for LNG has experienced a lift from mid-2015 due to the improving economic climate and aggressive pushes onto the market coming from Shell and Engie[218]. Of the 44 LNG as fuel or bunkering projects listed in the database of the Observatory of European Inland Navigation (OEIN), 30 were still ongoing or being planned. Twenty of those are (partly) Dutch projects (OEIN, 12 October 2015). The maritime LNG business case still looks more promising, not least because of the explicit regulation of sulphur emissions in the Sulphur Emission Control Areas (SECAs). Small-scale LNG essentially lengthens LNG's value chain by adding new end users and applications. Figures 6.3 and 6.4 illustrate this extension from the moment LNG is imported. For the Port of Rotterdam, the significant value of small-scale LNG begins with the reloading activity, which constitutes any activity that does not re-gasify the LNG for injection into the gas grid.

218 Referring back to the ±30 LNG ships each company will be putting on the market in the coming years.

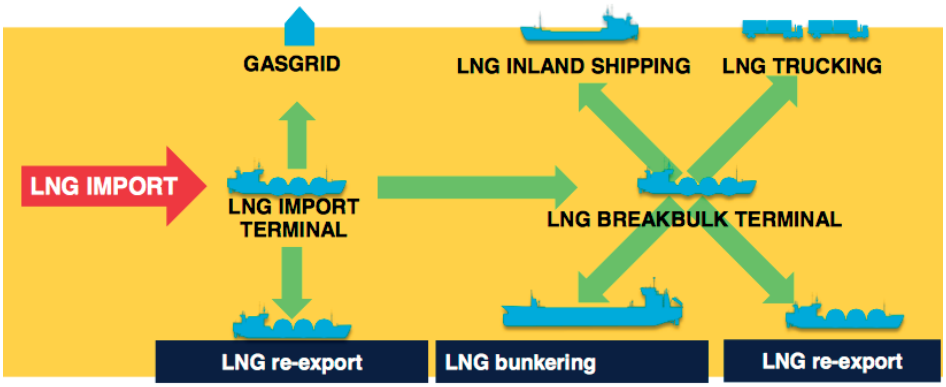

Figure 6.3. LNG applications as gas, fuel and export material
Source: Port of Rotterdam (presentation).

Figure 6.4 shows how small-scale LNG potentially increases the size of Rotterdam's LNG hub. The reloading of LNG for small-scale operations adds a whole chain of activities that can be performed in the port and therefore generate income for a port authority.

Focusing only on the Rotterdam region means this case study is not telling the whole small-scale LNG story, but it does have the benefit of being able to dive deeply into the details and dynamics of the case. As the next part of this chapter will show, such detail proves highly enriching for the study of multi-level governance.

6.3.1. The 'Small-Scale LNG Network'

Who is actually involved in small-scale LNG in the Rotterdam area? This question is an important one to answer if the impact of this case on European energy policy is to be considered. Figure 6.5 shows the involved actors in the multi-level context[219]. While this study cannot examine every possible actor involved in small-scale LNG, it has gone beyond past previous studies in providing depth to what motivates actors within this field. The efforts of other EU member states, who also have to implement *Clean Power for Transport,* cannot be discussed within the scope of this dissertation, but the fact that several Eastern European countries have begun constructing LNG terminals and LNG-fuelled ships is a testament to the further rise of LNG in the EU. Ports in other European member states influence the development of LNG in Rotterdam, as it is no use developing a new type of fuel if the ships using that fuel cannot refuel in any other ports than Rotterdam. For purposes of manageability they

219 A more detailed overview can be found in annex VI.

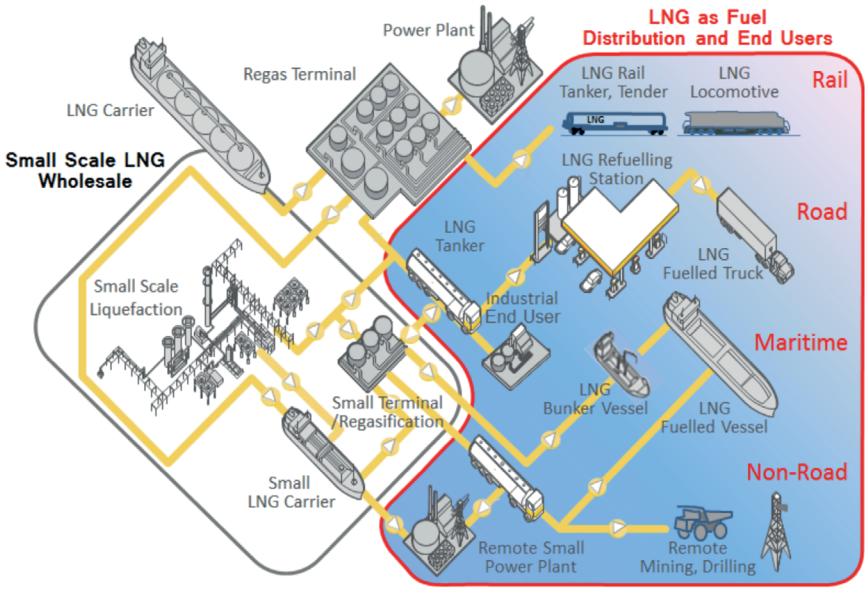

Figure 6.4. Small-scale and LNG fuel value chain extends port operations
Source: IGU, 2015a:11.

will not be considered specifically, but may be referred to when relevant. The international LNG producers and exporters will also be left out of the analysis, since the small-scale use of LNG comprises only 1-2% of total LNG import[220]. The international LNG producers are thus not highly relevant in this case, though the global market developments are (see §6.3.2.1). The remaining actors will be discussed where relevant. Lastly, companies such as Shell — now called 'local' because they have an office in Rotterdam — operate on all levels and can therefore be placed in multiple categories. One actor that is not mentioned in the figure is the IMO. The International Maritime Organization does not concern itself with inland shipping, which is why it was left out of the figure. However, it is important to note that any emission standards or other LNG-related requirements set by the IMO for the global maritime sector may have an influence on the prospects of LNG fuels in the European inland shipping sector. Where that is the case, the IMO will be mentioned in the analysis.

Not all of the actors shown in figure 6.5 are part of the LNG core network. Throughout this chapter it will become clear that there are many crucial actors at local level, but that they are dependent on the regulatory authority of the Dutch government, the European

220 Based on interview 3.

Commission, and international bodies. Unsurprisingly, while there are multiple Commission DGs involved in the LNG dossier, DG MOVE is the most connected. The other three DGs (CLIMA, ENV and ENER) are important due to their respective areas of competence, but within the theme of sustainable transport it is mainly DG MOVE that coordinates and devises policy. Furthermore, interviews with representatives from the other DGs revealed that areas of competence appear to be strictly divided between DGs, with one DG being unwilling to say much about another DG's area of competence. In one of the interviews, when asked to reflect on the link alternative fuels policy creates between energy policy, transport policy and climate policy, a respondent replied by saying: "*my unit does not look at this*"[221]. This reply is very illustrative of the attitude DGs have towards each other's policy area and begs

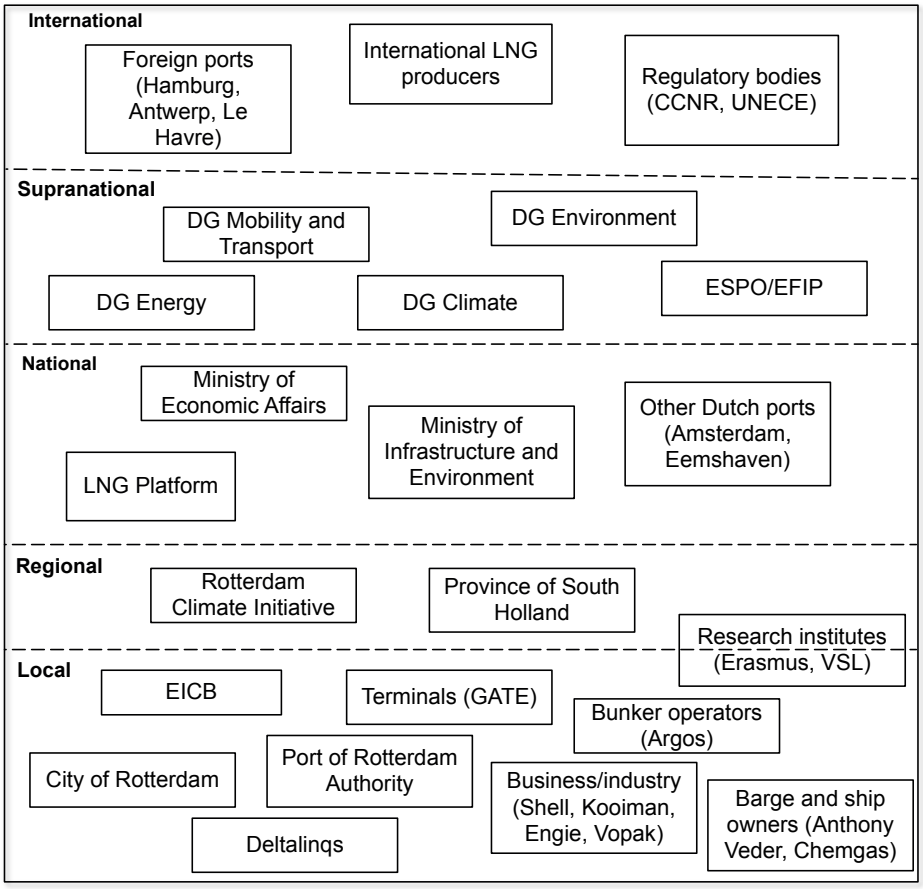

Figure 6.5. Rotterdam's small-scale LNG network in multi-level perspective
Source: author's own compilation based on fieldwork.

221 Interview 15.

the question whether policy integration has a chance of succeeding, since it has not before (Geerlings & Stead, 2003:189-195).

A surprising finding is that, in the PoR's small-scale LNG ego network, DG ENV falls out of the picture. It has a role to play through the Commission's inter-service consultation procedure and devises contingent policies which impact small-scale LNG, but has no direct connection to the PoR in this matter. Regarding betweenness centrality two actors stand out on the high side: the PoR and the Ministry of I&M. That the PoR has a high betweenness centrality (19.78) makes sense due to the local focus of the network (small-scale LNG development in *Rotterdam*) and its role as port authority. The Ministry's high betweenness centrality (14.36) indicates it is potentially powerful, yet the question is whether it uses its power to advance or block the interests of others. As the qualitative analysis will show, I&M has chosen a degree of passivity in the LNG case after an initial period of high activity. Actors with the lowest betweenness centrality — potentially low influence — are bunker operators and research institutes (0.94). These actors will likely not make or break the case.

Figure 6.6 provides justification for leaving foreign ports and international LNG producers out of the analysis unless relevant on a micro-level. Another actor that does not meet the set degree requirements but will be mentioned often in this chapter is GATE. Along with the other purely private sector parties (energy companies, barge and ship owners, bunker operators) GATE is mostly concerned with its business case. However, companies are tied to the public sector or umbrella organisations to regulate this new market by helping to provide, for example, regulations for standardisation of equipment. In the end, these activities help their business case as well but are also meant to provide collective goods.

6.3.2. Governance at EU Level — the Domestic - International Dimension

Chapter four and section 6.2.2 provided a comprehensive overview of the LNG policy context as it currently is in place. MLG hypothesises a shift from domestic to international coordination spurred by the necessity for supranational coordination due to *international interdependencies* (the first key concept) which cannot be ignored. The second concept is the *level at which policy coordination mostly occurs*. I expect the PoR to use its various ties to respond to policies. As this chapter will show, the consequences of increased EU and international legislation are indeed that strategic decisions are taken at those levels while the national government retains competency for practical issues. The PoR moves freely within this arena, though international focus on IWT is limited. The national government is far from obsolete, but is pushed into a different role than it used to have.

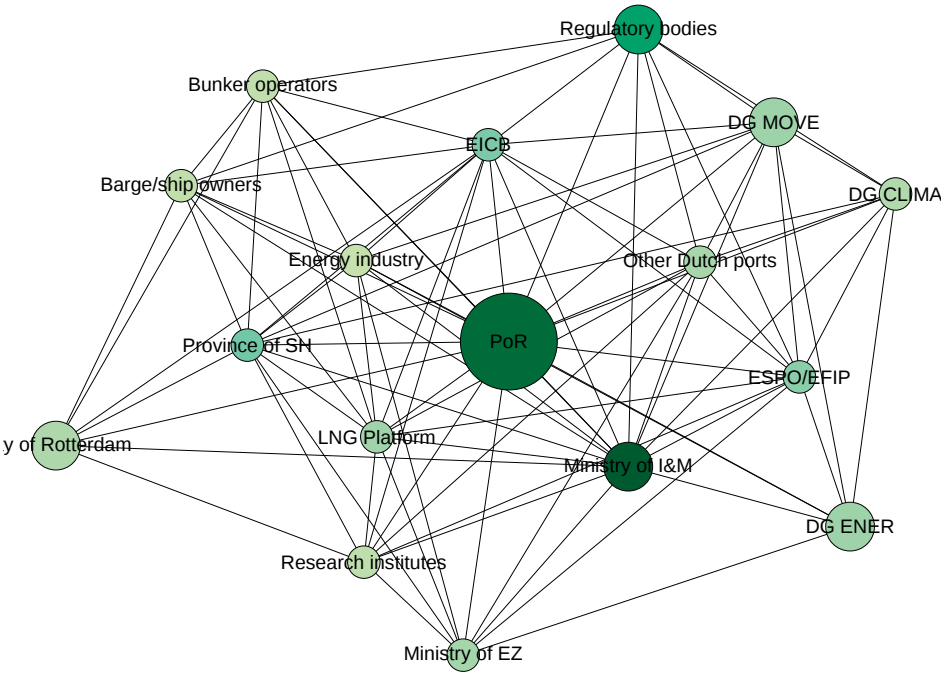

Figure 6.6. Small-scale LNG ego network for Port of Rotterdam Authority
Source: author's own composition based on fieldwork. The darker the node, the higher its degree. Minimum set edges per node is 9 (maximum is 20). The average degree is 10.8, the density is 0.568 and the modularity is 0.148, so there are no analytically meaningful communities in this network. Used software: Gephi (ver. 0.9.2).

6.3.2.1. International interdependencies as key manifestation of MLG

Mutual interdependencies drive the multi-level governance of EU energy and climate policy, which is why investigating how they work is important. At EU level, inland shipping has not been a main priority. The *Clean Power for Transport* Directive went through the legislative process quite easily, even though it was watered down in negotiations. Piattoni (2010) identifies two mechanisms structuring international interdependencies: the inclusion of sub-national authorities in European policy-making and the interdependencies created by business and civil society operating across national boundaries. Both mechanisms are discussed below. In addition, the CCS case found another mechanism affecting the level at which policy coordination occurs: nation states creating interdependencies of their own volition. This case adds a fourth factor: the influence of global market dynamics.

First, even though a member state can decide on its energy mix, the Commission makes an effort to play a coordinating role in setting up a European LNG strategy. As port areas are very important in global energy flows (Meyer, Nillesen & Zonneveld, 2012:80), the EC

welcomes the input of port authorities and decentralised governments, which the PoR readily provides. Regarding cities, my interviews did not reveal a large emphasis on their inclusion in the European process of policy-making for alternative fuels for inland shipping, even though the sector is partly covered by projects running under the Covenant of Mayors[222]. Save for a recognition of the impact local government action can have, no Commission official indicated that including cities and regions in this policy area is of paramount importance[223]. On the other hand, research has also shown that to "seize and make use of these political, informational, and administrative resources required spontaneous initiatives on the part of regional leaders" (Smyrl, 1997:298) and that at times regions get captured by the national government acting as a gatekeeper to the EU (*ibid.*:305). In the case of small-scale LNG, stimulating the use of LNG as a fuel is part of the ESI initiative set up under the WPCI (see section 6.1.2.2). Port authorities are, in large parts of the world, still part of local governmental authorities, and their initiative to cooperate in making ports more sustainable is a good example of decentralised authorities working together in a cross-border context. The ESI program is supported by sea-ports umbrella organisation ESPO, thus also by the PoR, and complies with EU directives regarding emission norms. It also fits within EU ambitions to make reporting of ship emissions mandatory[224]. Both initiatives, however, focus on maritime transport and not on inland shipping. While it is a recent addition to the EU's climate worries, attention to reducing emissions from inland shipping still is not copious. In fact, during one interview with a Commission official the following statement was made:

> *"If you disregard fuels for international flights and international marine transport, then 95% is cars, so road transport. And all the rest is marginal. If you want to devise a policy that is relevant for the current emissions in transport […] what are you looking for? Are you looking at this tiny little sector or are you looking at the 95%?"*[225]

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222 The Covenant of Mayors is an EU-supported initiative stimulating cooperation between local and regional authorities in the EU in the area of sustainable energy. For more information see [http://www.conventiondesmaires.eu/about/covenant-of-mayors_en.html]. An example of an initiative covering small-scale LNG is the Baltic Energy Forum. Furthermore, the Province of South Holland is asking for EU attention for cleaner inland shipping through the CLINSH Project (DG ENV).

223 In the broader sense of the potential impact of city-wide policies for climate change adaptation and mitigation, however, scholarly research has shown that cities have a significant role to play in combating climate change due to their ability to mobilise local action (Betsill & Bulkeley, 2006:141-143). This role has been recognised by the EU in an initiative called 'LA21', which promotes the articulation of local agendas and cooperation between cities, both nationally and internationally. The Dutch *Brandstofvisie* (Ministerie I&M, 2014a) also explicitly recognises complexity due to globalisation, multiple levels of policy-making, the economy, and various other factors.

224 Regulation 2015/757.

225 Interview 2.

This attitude, while on the extreme side, is very telling of the general attitude policy-makers seem to have towards the inland shipping sector. Because it traditionally is not the most polluting sector, and because it is relatively small, they prefer to focus on other sectors and therefore often overlook the inland shipping sector[226]. Contrary to MLG's thesis, in small-scale LNG policy-making subnational authorities mostly play a symbolic role.

The interdependencies created by civil society (such as NGO activity) and business are the second factor mentioned by Piattoni. The activities of NGOs award low priority to inland shipping, mostly focusing around advocating cleaner road transport and aviation, with maritime transport being a secondary concern. Even European NGOs such as Transport & Environment and the Climate Action Network Europe focus more on maritime transport than on the inland waterways of Europe[227]. None of the people interviewed mentioned NGO activity as being crucial in advocating sustainable inland shipping in the EU, which appears to confirm the low policy priority of the sector. As such, NGOs also do not spur supranational coordination in this case.

In keeping with Piattoni's line of inquiry, one must ask whether business creates the interdependencies at an international level? Not for small-scale LNG for inland shipping. Cross-border networks are present of necessity through the nature of the energy and shipping business; shipping is international and many companies are multinationals operating in more than one country. They are often represented in umbrella organisations at EU-level (for example the European Community Shipowners' Associations, ECSA) through their own national association. Furthermore, ports themselves are part of various formal cross-border networks (for example ESPO and the European Federation of Inland Ports, EFIP) and informal networks. None of these cross-border networks are new or appear to be sticklers for sustainability. While sustainability is acknowledged to be important, economic viability and ensuring a level playing-field seem to be the top priorities of these networks[228]. According to EFIP,

> "EFIP supports policies aimed at further reducing emissions from inland waterway transport. At the same time, the relatively bleak economic situation of the sector should be taken into account. Stricter emission standards therefore need to be

226 The EC was even criticised for this omission in the consultation round for the mid-term review of the 2011 White Paper on Transport (European Commission, 2015e:10). A city such as Rotterdam, with a port heavily dependent on IWT, does focus on inland shipping emissions through its *Programma Duurzaam* and *RAP/RAL*.

227 See their aims, goals and projects on their websites at [http://www.transportenvironment.org/] and [http://www.caneurope.org].

228 See, for example, ESPO's and EFIP's yearly reports. There is some focus on sustainability in general, but it is clearly not their main concern.

accompanied by meaningful financial support measures, in particular for the retro-fitting of the existing fleet" (EFIP, 2014:23).

Arguably the most prominent example of business activity, although initiated by the EC, is the European Sustainable Shipping Forum (ESSF); an expert group under DG MOVE[229]. It is mostly made up of MS authorities, companies, and business associations and has a subgroup on LNG in which the PoR is active. The ESSF is meant to assist in policy formulation and implementation and functions as a platform for the exchange of views on sustainable shipping. It relies heavily on the expertise brought in by non-state actors. Again, maritime LNG receives more attention than IWT.

As the above analyses have indicated, Piattoni's two factors indicating growing interdependencies at the international level do not resonate strongly in the small-scale LNG case, mostly because the focus on inland shipping is limited. My interviews show two other important factors: nation state activity and global market dynamics. My network analysis deliberately left out the IMO — a UN subsidiary — since the IMO focuses on maritime transport rather than on inland waterways. The IMO, however, does have an influence in this case. An employee representing the Dutch government at the CCNR explained:

> *"Member States refer to IMO-norms when it comes to engines. Engines for inland waterway vessels have the same bandwidth as engines for sea-faring vessels. Many engine manufacturers thus sell both types of engines, not in the least because the inland shipping sector is relatively small; fewer than 200 engines sold per year in Europe. For them it is very annoying if inland shipping norms are different from maritime emission norms. The norm that holds for maritime transport, IMO Tier 4, therefore is often used as starting point in the discussions concerning emission norms for inland shipping. Some small tweaks can then still be made, such as regarding PM or methane slip, and it does allow engine manufacturers to sell the exact same engine for both maritime and inland transport, with small adjustments."*[230]

Since all EU member states are IMO members, agreements made in the IMO are automatically relevant for the EU as a whole. In the interest of a level playing-field, the shipping sector and national authorities prefer to let IMO negotiate and try to come to legislation and emission

229 Registry number E02869. See [http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2869] for more information.

230 Interview 12.

standards so that the rules apply to as large a group as possible. Thus, nation states willingly maintain the interdependencies that necessitate supra- or international coordination, at the same time knowing that the established channels like the IMO are slow due to specific catering to the interests of the shipping sector, the difficulty of finding consensus between so many participants, and their view that other transport modes should also decarbonise (Oberthür, 2003:195-199)[231]. When it comes to pure CO_2-reductions, the shipping sector is very divided. As a result, the international shipping community has not been able to set a CO_2-reduction target[232], although the IMO does have an energy efficiency design index. Since the engines used by inland shipping are often adjusted maritime engines, an LNG push in the maritime sector could be a catalyst for the transition in the inland shipping sector.

Rivers do not heed national borders. The Netherlands thinks it can be an LNG hub because of the strong positions of the ports of Rotterdam and Amsterdam[233]. At the same time, *Brandstofvisie* acknowledges that the bulk of Dutch policy in this regard follows the European *Clean Power for Transport* Directive (Ministerie I&M, 2014a:6-38) and is therefore adaptive rather than pioneering. National governments hardly have a choice but to cooperate when inland waterway transport is concerned. According to a Dutch policy officer:

> *"the national government is […] more and more dependent on international bodies"*[234].

These 'international bodies' are mostly existing bodies. The CCNR coordinates cooperation for the Rhine river. However, the CCNR's policy cycle is shorter than the EU's, which leads the EU to struggle to keep up with new rules adopted by CCNR. The EU can influence[235]

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231 From a cynical point of view, that may also be a reason why national authorities prefer international standard setting over national standard setting; if no standards are agreed upon, countries will not have to act.

232 Some other agreements are in place as well. The MARPOL (short for Marine Pollution) Protocol is a UN document prescribing limits to pollution coming from sea-faring ships. A result of this protocol are the Emission Control Areas (ECAs), which limit certain emissions (mostly sulphur oxides) in defined areas such as the North Sea and the Baltic Sea. Currently the Mediterranean Sea is not included in the ECAs, but there are plans to do so on the short term. The ECAs are not popular amongst all companies. The short-sea sector was especially against setting more stringent emission norms. The Dutch government was a strong proponent, as was the European Commission. The PoR took up a position favourable to the ECAs because of the construction of Maasvlakte 2, which requires ships to have low emissions due to the potential impact on the environment. Based on respondents 3, 10, 11, 12, 13, 14 and 17.

233 Another way of looking at the possible interest of The Netherlands in LNG is when considering the switch Shell has been making from being an oil company to being a gas company with significant stakes in the production, trading and use of LNG.

234 Interview 13.

235 See the 'Administrative arrangement concerning a framework for cooperation between The Secretariat of the Central Commission for the Navigation of the Rhine and The Directorate-General for Mobility and Transport of the

decision-making in CCNR and usually adopts agreements made by it as EU law (CCNR, 6 April 2015)[236]. However, with the EU delaying transposition and the CCNR left without one of its main policy instruments, the development of new emission norms for inland shipping has come to a standstill over the last few years. When it comes to the safety of LNG, the ADN Safety Committee (under UN ECE), tasked with the safety check for LNG ships, is also an important party due to legislation concerning the transport of high-risk substances. CESNI, a newly founded EU entity, allows EU-wide membership and is responsible for the drafting of technical and crew requirements for the inland shipping sector. The standards developed by CESNI automatically become part of the EU's and CCNR's legislation (Council of the European Union, 2015)[237], so national governments cannot ignore them. CESNI is the best example of nation states willingly creating *new* international interdependencies, which lead to supranational coordination.

Box 6.1. Choosing LNG for different reasons

The choice for LNG - the political narrative

The Netherlands traditionally is a gas country with excellent gas infrastructure. As the only net gas producing country in the EU, The Netherlands has significant interest in maintaining the status quo for natural gas. With Slochteren gas decreasing in quantity and production, the government needed a viable substitution for its natural gas supply, preferably independent from Russian gas. Importing LNG from production facilities spread across the globe was an attractive alternative. The Dutch government therefore became a staunch supporter of the construction of the GATE terminal, meant to secure the nation's gas grid. Small-scale LNG is a non-issue compared to the importance of national energy security, though gains saliency when GATE struggles to be competitive.

The choice for LNG - the industrial narrative

Exogenous effects such as the Fukushima disaster and a low oil price cause a dramatic drop in LNG imports in the EU, right after the GATE terminal enters into operation. The sparse LNG ships docking at GATE can provide natural gas to the Dutch gas grid, but GATE's business case is in jeopardy. To safeguard GATE's profitability, Gasunie and Vopak explore their options and arrive at the great potential for the use of LNG as fuel; small-scale LNG. They begin talks with the Port of Rotterdam Authority to explore possibilities for using LNG as fuel in the port. The LNG Masterplan and the construction of the liquid breakbulk facility commence shortly afterwards, giving GATE value beyond its role in national energy security, yet securing it at the same time. Market possibilities drive decision-making regarding LNG.

European Commission', signed in Brussels on 22 May 2013.

236 EU members — such as The Netherlands — are not allowed to agree to change emission norms in another international body (eg., CCNR) without consulting the EU first. It is expected that the CCNR will fully regulate the use of LNG as fuel by 2017. The consequence of this regulation is that the Dutch government should not have to keep reviewing every single LNG ship prior to approval by classification bodies.

237 Based on interview 12.

The fourth, perhaps strongest, important factor in this case concerns global market dynamics. The LNG market is globalising, which in turn creates new interdependencies. The EU imports most of its gas, and with the increased use of LNG the potential sources of gas have diversified. In the first section of this chapter it was mentioned that the use of LNG as fuel flows from the large-scale use of LNG to supply national gas grids. To that end, The Netherlands built the GATE terminal (see also box 6.1). Small-scale LNG developed because the large-scale market did not provide enough business prospects, which was an important driver of the thought processes regarding possible alternative uses of LNG. Currently, LNG terminals are being built all over the world. These market dynamics regulate the interdependencies between countries in terms of their energy policies and therefore also impact the options the EU has to make its transport cleaner. If the amount of LNG being pushed onto the market increases, thus decreasing its price even further in comparison to oil, it will become a more interesting fuel for inland shipping. As an expert put it:

> *"LNG could take up a large share of the fuels mix in the inland shipping sector. Europe is investing heavily in LNG, also outside of its application in inland shipping, which will cause supply to rise further and further, and therefore also the supply of LNG as fuel. The price difference between oil and LNG will probably only increase, which will make the switch to LNG financially interesting."*

The choices made by the EU in terms of its energy policy and energy mix may therefore also impact the development of LNG as fuel. These choices are at least partially dependent on the global energy market[238]. Likewise, small-scale LNG developments in other EU countries could impact the Rotterdam case as well. A market-building project such as the LNG Masterplan creates interdependencies at the European level due to the connection between the Rhine and Danube rivers and European coordination of the project. Efforts to introduce LNG as fuel for shipping have thus been made in Romania and Bulgaria, albeit with little success so far[239]. With growing availability of LNG in those parts of Europe the situation may change. Global market dynamics thus influence choices made by countries individually, but also as part of, the EU. This finding adds more nuance to MLG's domestic - international dimension.

238 Based on interviews 3, 6, 7 and 15.

239 In fall 2015, twenty implementation projects for small-scale LNG outside of The Netherlands were planned or on-going, the bulk of which were meant for German waterways, one in France, and two in the Danube-Main corridor (OIEN, 12 October 2015).

6.3.2.2. EU policy coordination leaves room for national diversity

My interviews confirmed that international coordination is necessary simply because a fuel can only be used if refuelling points at certain intervals are available. The Commission seems to be managing to make a measure of coordination happen where previously there was none. Whether this coordination will continue in the future is questionable, as box 6.2 illustrates.

Box 6.2. Narratives of EU policy coordination

EU policy coordination - the political narrative
The European Commission knows all too well it is difficult to agree on anything with 28 member states. When deciding on an attempt to coordinate national fuel policies in order to reduce emissions from transport and reduce oil-dependence, the Commission immediately decided to opt for a Directive, called Clean Power for Transport, instead of a Regulation, allowing national governments to retain control over the implementation. Such a construction, resulting in a measure of EU policy coordination, was deemed favourable over having no EU-wide alternative fuels strategy at all. Private parties are encouraged to invest in alternative fuels. The Commission watches developments across the EU closely to judge whether it can try to coordinate even further in the future.

EU policy coordination - the industrial narrative
Inland waterway transport often crosses borders. Even though rivers are coordinated by special river committees, national laws govern the berthing of ships and the handling of (dangerous) cargo. When laws and regulations differ across countries, shipping companies are left with a difficult choice: either comply with the strictest of standards, or change their operations. Since Directives leave a lot of room for national governments to diverge in their implementation of the goals, whilst transposition of a Directive is ongoing it is uncertain for the private sector what the variation across nations will be. It is also unclear whether ships will even be able to refuel at the needed intervals. Investing into long-range LNG powered ships becomes too risky and is therefore placed on the back-burner until policies are sorted out.

Originally the EC also wanted to use *CPfT* to dictate how many refuelling points each MS had to construct[240]. Even though The Netherlands responded favourably to the directive, its Parliament was concerned with the appropriateness of the EC deciding upon the amount of refuelling points needed, arguing that infrastructure is a matter of national competence. EU member states wanted more control and delayed the directive's timeline by five years. By 2015 the Dutch government was cautiously backing away from supporting LNG because of the methane slip associated with combustion of gas and a discussion surrounding potential lock-in of LNG, which the government fears could be harmful to development of hybrid and electric techniques. The environmentally oriented side of the Dutch government prefers

240 This information can be found in the Dutch parliamentary procedures, #21501-33 410 and #21501-33 457 at [https://zoek.officielebekendmakingen.nl].

transport to become electrified, which coincides with the positions of DG ENV and DG CLIMA[241]. One striking finding is the Commission's 2014 communication regarding GHG reduction targets for transport beyond 2020, in which the EC announces that:

> "The Commission does not think it appropriate to establish new targets for renewable energy or the greenhouse gas intensity of fuels used in the transport sector or any other sub-sector after 2020" (European Commission, 2014d:6).

The question why the EC chooses not to establish targets beyond 2020 was posed during an interview with a representative from the European Commission. The main reason behind this decision is that efforts to reach GHG reduction targets from transport have, thus far, been challenging and that the costs for mitigation from transport are too high. For now the EC prefers to mitigate climate change through cheaper means by using the ETS system[242]. Another directive such as *Clean Power for Transport* might thus not be proposed any time soon.

6.3.2.3. Soft coordination: implementation through TEN-T funds

Supranational coordination often takes on a *soft* nature, with funding instruments taking up a large portion of it (cf. Eberlein & Kerwer, 2004; Citi & Rhodes, 2007; Stephenson, 2013). This case confirms this claim. The Commission seeks to stimulate LNG development with "targeted, limited public financial support" and a "harmonised framework for rules and procedures" (European Commission, 2013f:3). Existing rules need to be scrutinised, and, where necessary, adapted to fit LNG. Pioneer projects are meant to shape the EU LNG framework and to enable learning through best practices (*ibid.*:3-5). The current TEN-T Regulation[243] focuses on removing bottlenecks, building missing cross-border connections and promoting modal integration and interoperability. Additional goals are to promote clean fuel, other innovative transport solutions and to integrate urban areas into TEN-T. To accomplish its goals, the Regulation divides the EU into nine corridors, three of which include

241 Based on interviews 2, 5, 8, 9, 10, 12, and 13.

242 Based on interview 2.

243 Regulation 1315/2013, amended in 2014. The TEN-T network and its link to the EU's alternative fuel strategy goes back to the origins of EU transport policy in the Treaty of Rome (1957) and the resulting extremely slow cross-border infrastructure development. The situation started to change when the Treaty of Maastricht (1992) obliged the EC and EP to make Trans-European Network (TEN) guidelines. For transport, the first TEN-T guidelines were made in 1996, then revised in 2004 and 2013 (Fraunhofer ISI, 2015:17). See annex VII for a comprehensive overview of the TEN-T corridors.

Rotterdam and are therefore important to The Netherlands[244]. The effect of soft coordination, as shown in this study, through funding is that cross-border networks between companies are built which obtain EU funding and liaise with EU officials. A good example is the LNG Masterplan, supported by key public and private actors from the Rhine-Danube corridor.

Box 6.3. Funding narratives

Funding - the political narrative

The EU has multiple funding mechanisms the private sector can call upon to implement new technologies and new fuels. These funding mechanisms rely heavily on the construction of infrastructure to aid the deployment of ships sailing on alternative fuels. National governments therefore decide not to subsidise deployment in their own country too heavily, since EU funding is available and they do not want other member states to receive more financial support than they do. When private sector parties talk to national governments about their LNG plans, the national government tells them to apply for EU funding. Initiatives are supported by the national government as well, but this support never covers the requested financial support.

Funding - the industrial narrative

Obtaining EU subsidies is a tedious process involving much bureaucracy and a very low chance of success. The EU's method of spreading out subsidies over all regions as evenly as possible, to maximise economic gain, makes clustering of projects in a small region impossible. Smaller companies often lack the needed manpower to manage an EU-funded project, leading them to not try to get EU funding in the first place. Landing EU projects becomes the prerogative of large companies and actors such as port authorities. Since national funding is mostly absent, a small company will not invest in small-scale LNG unless it wants to be a pioneer and is financially able to do so.

National governments liaise with the Innovation & Networks Executive Agency (INEA) in implementing TEN-T. They need to make sure that their seaports have alternative fuels available, and that they support on-shore activities and intermodal connections. Inland ports are expected to adhere to navigability and inter-modality requirements. INEA also manages the funding instruments belonging to TEN-T: the Connecting Europe Facility (CEF)[245], by far

244 Note that these corridors are not the same as the IWT corridors on p.13 of this chapter. The Port of Rotterdam is part of the Rhine - Alpine, North Sea - Mediterranean, and North Sea - Baltic corridors running from north to south and west to east. A closer look at the work plans of each of these three corridors reveals an interesting finding: since most bottlenecks are identified in areas of the corridor *other than* Rotterdam, most of the activity (and funding) is geared towards improving those areas. The exception is the North Sea - Baltic corridor, which stresses that it depends on ports on both ends of the corridor for its success, but even so attention is then focused on the Port of Amsterdam. The sea lock at the Port of Amsterdam is identified as a bottleneck for further development. For the PoR, this focus is unfortunate since they would prefer to get (more) funding instead.

245 Regulation 1316/2013. The current CEF Programme runs from 2014 to 2020 and contains 22,4 billion euros, of which 87% has been awarded between 2014-2015. According to INEA, 42% of the funding goes to the private sector, 41% to the public sector, 16% to member states and 1% to 'other'. By far most of the funding goes to rail projects. The 3 corridors the Port of Rotterdam is part of receive less money as compared to other corridors. For alternative fuel supply points, 79% of funding goes to electricity projects, 10% to LNG, 10% to CNG and 1% to hydrogen (INEA, 2016). Nearly 90% of that funding went to cross-border infrastructure projects and 1,5%

the main funding instrument, and the relevant parts of Horizon 2020. National governments can submit projects for funding under these programmes, as well as under the Cohesion Fund and the European Regional Development Fund (EFRO)[246]. Clearly, the promise of massive EU funding incentivises cross-border cooperation for companies and governmental authorities alike. At the same time managing EU projects is a tiresome task (see box 6.3). My observations at and conversations with people from the PoR show that another EU-funded project is not likely to take place anytime soon with the same team of people[247].

6.3.2.4. The absence of coordinated policy

Having a directive in place does not imply EU-wide policy coordination. Policy documents often refer to the 'appropriate' level to tackle an issue, which can indicate policy coordination as I have operationalised it. Where the EU sees ensuring that there is an EU-wide network of LNG refuelling points as a supranational task, its member states and the private sector see standard-setting for the shipping sector as something the IMO and CCNR need to do. The EU is willing to provide the necessary regulation and limited funding, but is otherwise letting member states decide on their own how to meet the requirements of the *Clean Power for Transport* Directive. Consequently, the Dutch government is taking up that task, but also playing the ball back into the EU's court where financial incentives, the methane leakage, and ETS problems are concerned. *Brandstofvisie* has a clear message for the European level. It advocates placing CO_2-reductions and the methane slip on the EU agenda, as well as the creation of financial incentives by governments to stimulate LNG development and bunkering (Ministerie of I&M, 2014a:iii). Additionally, ETS problems are mentioned as a factor that hampers investments in clean technology (*ibid.*:32). Going even further down the hierarchical ladder, local governments are asked by the *Energieakkoord* to consider climate and sustainability in their spatial policies in the future. Furthermore, the City of Rotterdam had to make changes to its port bye-law to accommodate for small-scale LNG. The municipality is also financially stimulating clean ships in order to help The Netherlands meet the EU's air quality standards. Cross-referencing in policy documents emanating from several governmental levels clearly is very common, especially when governments want another level to carry out a task. The private sector, on the other hand, calls on these governments to solve the legal issues surrounding Rhine navigation and to financially support business

went to deploying sustainable and efficient transport (INEA, 2016:10-14). It should be clear that this funding instrument is not meant for actual vehicle deployment. A single LNG ship will most likely not receive funding under CEF.

246 The first Dutch LNG ship, *Argonon*, was partly funded by EFRO funds.

247 Most of their complaints were about the amount of bureaucracy involved with an EU project, which takes up much of their time while they prefer to spend it doing business development.

cases which would otherwise not be sufficiently promising. They want governments to act as facilitators.

Concluding this section, the bulk of the 'policy weight' seems to lie at a higher level than the national one[248], which supports MLG's notion of a shift from the domestic to the international and indicates a move towards potential harmonisation of transport policies through directives such as *Clean Power for Transport*. The setting of emission norms may theoretically become the sole prerogative of international organisations, supported by the EU. In practice, failure to coordinate effectively in the past has led to today's uncoordinated LNG policy[249]. When asked about who actually makes LNG policy, representatives from the Dutch government evasively said that 'everyone does a little bit'. In November 2014, the Dutch cabinet[250] noted that LNG could be one of the focal points in the Dutch CEF strategy and that *the international nature of transport requires international coordination*. Continuing the discussion on how to further stimulate the development of low- and zero-emission fuels at EU level therefore remains a priority for the government[251]. The possibility of funding serves as an instrument of implementation through soft coordination, with EU bodies presiding over the decision which projects fit within EU priorities, and which do not. The result is that the EU provides a long-term vision for its members to implement as they choose. The PoR responds by mobilising its network to make use of the EU's soft coordination tools and attract funding for the port.

6.3.3. Governance at National Level — the Centre - Periphery Dimension

According to Piattoni (2010:86), states are not unitary actors, but are comprised of multiple levels of hierarchy which are territorially distinctive. Decentralised authorities are thought to be better equipped to organise administrative, economic and social efficiency than national authorities, although the question is whether they will be able to make proper use of the tools at hand (Smyrl, 1997:298). My analysis of the domestic - international dimension showed that sub-national authorities have not been important in European small-scale LNG policy-making. In light of the criticism directed at MLG regarding its overstatement of the

248 In the interviews, most of the statements regarding policy output are related to EU policy and international agreements made in bodies such as IMO and CCNR. There are significantly fewer statements mentioning the Dutch policy output and hardly any mentions of the decentralised authorities.

249 Before the EU's LNG strategy (COM(2016) 49 final) was published in 2016 (2016c in bibliography), there was no LNG policy document. This strategy comprises the role of LNG in the EU's energy policy as a whole, which is of strategic importance to the EU. Also based on field work report C and interviews 6 and 15.

250 See Dutch parliamentary proceedings, #21501-33 512.

251 See Dutch parliamentary proceedings, #21501-33 578.

power of sub-national mobilisation (Jeffery, 2000:8; Jordan, 2001:201) it is important to analyse if the pull exerted by decentralised governments is reflected in the centre - periphery dimension consisting of two key concepts: the *level at which the domestic coordination of activities* takes place and the *level of empowerment of local actors*. Can the PoR use its resources effectively to stimulate regional activity?

6.3.3.1. How decentralised authorities matter

In attempting to coordinate the uptake of alternative fuels in transport, the EC invariably added IWT to its target groups even though not much energy is spent on the sector. At the national level, inland shipping receives more attention[252]. As discussed previously in this chapter, the slow uptake of LNG import through the GATE terminal led to a re-evaluation of possible uses of LNG[253]. The initial focus of the government lay with short-sea and inland shipping[254]. The Dutch focus on inland shipping does not fit with the EU's focus, but its ambitions — and reservations — regarding LNG as fuel resemble those of the Commission. At the city level, these reservations do not seem as strong. LNG came up in Rotterdam in 2009-2010, when the port bye-law (in Dutch: *Havenbeheersverordening*) was changed to accommodate the construction of the GATE terminal. While the safety of using LNG as fuel was a concern, the city was willing to be convinced of the fuel's safety through pilot projects[255]. Because the city wants to be the cleanest port city in the world, — a goal still remaining in its most recent *Programma Duurzaam 2015-2018* — it saw the LNG terminal and its possible applications as contributors to this goal, especially in terms of air quality benefits (Gemeente Rotterdam, 2011:18)[256]. Over time, the city accommodated developments within the port by adjusting the port bye-law so as to legalise all activities related to small-scale LNG and allowing the Port of Rotterdam Authority to incorporate plans to be an LNG hub into its long-term strategy (*Havenvisie 2030*)[257]. The most recent policy documents

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252 When the Dutch government considered building an LNG import terminal in the northern part of the country in the 1970s, safety concerns and public opposition halted the project. Had the Dutch not reconsidered the construction of an LNG terminal in the mid-2000s, perhaps LNG as fuel option would not have developed so quickly in The Netherlands.

253 The Dutch also advocated for the use of LNG as fuel at an informal Transport Council in Antwerp in September 2010, and reaffirmed the importance of hubs to distribute LNG as fuel.

254 See Dutch parliamentary proceedings, #21501-33 290, #21501-33 292 and #21501-33 383 at [https://zoek.officielebekendmakingen.nl].

255 See the Replijst Commissie Economie en Haven for 2011 and 2012 in the online Rotterdam city archives.

256 The city (and PoR) has also argued that not all planned shore-power installations can be placed due to other circumstances, therefore proposing to use LNG as fuel could offset potential negative air quality consequences of having fewer shore-power installations than originally envisaged.

257 The city also mentioned the LNG Platform's plans to realise 50 inland ships, 50 maritime ships and 500 trucks by 2015 (Gemeente Rotterdam, 2013:92). This ambition has not been reached. In mid-2016 there were 350 LNG

(for example the *Stedelijke agenda haven 2016*, the city's vision on the synergy between the city and the port) still support small-scale LNG as a contributor to national sustainable goals. Rotterdam has stimulated clean shipping with investments of up to 5 million euros in 2013 and 2014. Part of the reason to do so is to allow The Netherlands to meet the EU's air quality requirements. Furthermore, subsidies are available for the development of NOx-free ships (rotterdam.nl, 2 February 2015).

The relative ease with which the port and business could introduce small-scale LNG leads to the conclusion that it has not been a contentious issue. The local government cooperated with business, demonstrating economic and social efficiency as expected by MLG, and went unimpeded by the national government[258]. Especially the PoR emerged as a strong peripheral actor which was able to provide manpower, discounts for clean ships and land allotment for the purposes of developing small-scale LNG. Higher levels of government may provide a long-term vision, but decentralised authorities matter when it comes to achieving this vision.

Box 6.4. When narratives match — the case of Albert Heijn's LNG trucks

LNG trucks - the political narrative

Cities often have strict rules for the allowed restocking hours of retail stores, especially when these stores are located in highly populated downtown areas. Trucks are traditionally noisy, so restocking at night is not an option because it disturbs citizens' night rest. Supply hours therefore are scheduled during daytime, often leading to traffic congestions and air pollution through idling engines. When supermarket chain Albert Heijn comes with the proposal to do a pilot with LNG-fuelled trucks, several city governments decide to allow it. The pilots result in empirical evidence showing the trucks are silent and better for air quality than diesel fuelled trucks, so city governments permanently extend supply hours for LNG trucks to include evening hours and the early morning. City councils are satisfied because they can protect their citizens while reducing traffic congestion and cater to local retail.

LNG trucks - the industrial narrative

When a truck with fresh supplies is stuck in a traffic congestion, a store may not be restocked in time and the extra time needed to resupply costs money. It would be much more efficient to be allowed to resupply at night, but that is prohibited in most cities. Hearing of the potential of LNG-fuelled trucks, Albert Heijn decides to invest money in the acquisition of such trucks in order to be allowed extended supply hours. The supermarket chain convinces several city governments to allow a pilot, showcasing the delivery trucks' silence and reduced emissions. The pilots lead to permanently extended supply hours, allowing Albert Heijn to restock its stores outside of rush hours for more efficient operations, a green image and happy customers. The pilot also catalyses the small-scale LNG sector.

trucks and 6 operational LNG ships, with 35 ships pending construction (LNG Platform, n.d.).

258 The growing use of LNG as fuel has recently begun to worry the Veiligheidsregio Rotterdam-Rijnmond (an organisation assessing threats in the greater Rotterdam region) as a higher amount of LNG vehicles on the road and the waters could lead to incidents with the substance, and, according to VRR, it should therefore be well-known how to deal with any incidents that come up (VRR, 2016:61).

Developing LNG infrastructure and pilot-testing the ships has a geographical component that necessitates local action and support from relevant local authorities. A good example is the introduction of LNG trucks (see box 6.4). If the participating cities had been unwilling to change the restocking hours for supermarkets on the condition that relatively quiet trucks were used, Albert Heijn may not have invested in switching over to LNG fuel. But it is not just about the municipalities. According to a safety expert from the private sector:

> *"The fire department also has to know how to deal with an LNG-related incident. […] The department can only give a positive recommendation [for projects] when they know how to respond to LNG incidents"*[259].

The first LNG ship sets an entire local chain into motion, which is based on the competence delegated by the national government. In addition, small-scale LNG touches upon territorial policies such as infrastructure policy and environmental policy, which are fundamentally local in nature and therefore not easily relocated to a different hierarchical level (Piattoni, 2010:250). Because of the territorial distinctiveness within decentralised states such as The Netherlands, the preferences of local governments (and business and society!) matter.

6.3.3.2. The limits of local empowerment

Unfortunately, the inland shipping sector is not as straightforward an example of empowerment of local authorities as was the case in the example of Albert Heijn's trucks. Betsill and Bulkeley discuss the role of cities in climate change mitigation and claim that

> "it is increasingly clear that nation-states will be unable to meet their international commitments for addressing climate change without more explicit engagement with subnational action. GHG emissions originate from processes that are embedded in specific places, and it is often argued that the local is the most appropriate political jurisdiction for bringing about necessary reductions in these emissions" (Betsill & Bulkeley, 2006:141).

Betsill and Bulkeley effectively reiterate the efficiency of local governments, though box 6.5 shows that problems arise when the local and national level are not sufficiently aligned. The competence of a city such as Rotterdam in efforts to make urban mobility more sustainable is straightforward. Rotterdam can, for example, choose to only use e-transport or stimulate the use of bicycles instead of cars. But it cannot do so alone. In the city's *Programma Duurzaam*,

259 Interview 8.

Box 6.5. When the local and national levels are not mutually reinforcing

Local or national? - the political narrative

Cities are very concerned about air quality, since it directly impacts the health of their citizens. Using LNG as fuel is good for air quality, making it an interesting alternative for conventional fuels. Aiding in the deployment of small-scale LNG, however, is difficult for local governments. The city of Rotterdam has a limited budget and since ships do not stay in Rotterdam for very long, it is difficult to legitimise spending financial resources on incentivising the use of LNG as a fuel. Instead, the city government makes sure manpower is put on small-scale LNG so that companies who do want to invest can apply for permits and prove compliance with safety regulations. The national government, in turn, is more concerned with the climate, more precisely, with CO^2 emissions, than with air quality. LNG scores mediocrely on the climate scale. Fearing a technological lock-in and favouring the promise of electric vehicles, the national government chooses to not support LNG financially too much either. It does make sure that a government representative is present during relevant CCNR, ADN and IMO meetings to obtain favourable regulatory conditions.

Local or national? - the industrial narrative

The private sector is called upon by the European Commission and the national government to deploy LNG fuelled vehicles and ships. Lacking enough support from both the local government and the national government, and knowing that heavy-duty transport will not be electrified in the near feature, the transport sector defaults back to oil-based fuels, especially during times when the oil price is low. Regulatory uncertainty does not help investment decisions into LNG either because it is difficult to convince shareholders that investments into small-scale LNG will repay themselves in the long run. Who should champion LNG?

the role of the Rotterdam Port Authority and Deltalinqs are explicitly mentioned as being of crucial importance in making the city more sustainable. My observations in the field have confirmed that the PoR's activity was hugely important during the launch of small-scale LNG, providing much needed support to shipping companies through mutual business development and the provision of facilitating incentives.

As the Albert Heijn example shows, local entrepreneurship is not lacking, yet at the same time the city admits it only has a limited budget and that it can mostly play a facilitating role in providing expertise, bringing people together and conducting exploratory research (Gemeente Rotterdam, 2015:63-68). Practically speaking, local coordination of activities is the most logical course of action. That does not mean that the coordinative activities are actually performed by a governmental authority or that central government is not needed at all. With an international transport mode such as inland shipping, the power of the city is not so easily established. Rotterdam will not go too far in its support of small-scale LNG for inland shipping due to limited resources and because ships only spend several hours in the city before they sail elsewhere[260]. Coordination between governmental authorities is needed in order to align territorial preferences.

260 Based on interviews 5 and 9.

This study shows that local, business-driven processes such as the development of small-scale LNG eventually interact with and can be captured by a higher level of governance. In fact, the international nature of transport requires coordination on an international level. The coordination of legal exemptions has an international nature through negotiations between representatives from national ministries[261]. Furthermore, the source of funding is of crucial importance since the actor who finances projects also gets to lay down the rules. The development of LNG infrastructure is done locally or regionally (with some financial support from the territorial authorities), but in the case of Rotterdam the bulk of the financing comes from the EU. Since there is no point in establishing LNG infrastructure in just one port, initiatives for small-scale LNG often have a cross-border nature and are therefore eligible for EU funding under the CEF programme. Therefore, since the EU is funding many small-scale LNG projects, the Commission gets to make demands and coordinate the aggregated efforts across all of the EU. To conclude, it appears that an EU centre provides vision and funding opportunities to cover the necessary expensive investments, enabling the periphery to efficiently oversee the practical implementation of this long-term vision. Local actors can exert influence by marshalling local and regional forces, yet only within the confines of frameworks established by higher authorities. Remaining national competencies suggest that the boundaries of the centre and the periphery are being stretched. EU funding also places the private sector in direct contact with Commission officials[262], thereby defying hierarchy by bypassing the national government in the development the small-scale LNG market. This finding fits with MLG's expectations.

6.3.4. Coordination with Third Parties — the State - Society Dimension

Piattoni (2010) identifies a state-society shift in which *cross-linkages between the public and private sector* with joint goal-setting and a *blurring of state and society* comprise key elements of multi-level governance. This section will argue that especially the concept of cross-linkages between public and private actors, measured by resource flows and joint-goal setting, is crucial in the small-scale LNG case, and that the PoR acts as an intermediary.

261 Based on field work report B. Exemptions for Netherlands-based ships are officially given by the Inspectie Leefomgeving en Transport (ILT), yet only after prior approval by the countries represented in the CCNR.

262 There are project controllers who are responsible for monitoring progress. During an informal conversation with an EU insider, however, it was suggested that the amount of projects being monitored by EC officials is so large that the Commission is unable to manage them well. The Commission is considering a move towards co-financing, in part to make project management more manageable. Based on field work report K.

6.3.4.1. Resource dependency guiding state - society interactions

The various policy areas of energy, climate and transport policy are connected to each other in the LNG case, which allows for a variety of actors to be involved to various extents. Interconnectedness shows itself both in the connections between hierarchical levels of government and between the public and private sector, which results in different actors being 'responsible' for different parts of developing the small-scale LNG market, leading to a dense resource flow between actors, and efforts to coordinate objectives and activities (Börzel, 1998:259), as visible in table 6.5.

Table 6.5. Resource flows guide cross-linkages between public and private actors

Resource	Summary	Direction of flow
Knowledge	Mostly embedded in the private sector due to experience with LNG and transport, shared with public sector through platforms, networks and meetings	Private —> public
Policy-making capacity	Public sector prerogative, sets the framework in which the private sector operates	Public —> private
Personnel	Overlap in international organisations and relatively low FTE capacity in public sector	None
Capital	Investment capacity lies with both public and private sector (and banks!), with a general belief that the private sector should do the bulk of the investments	Public —> private (+ private sector's own investment capacity)

Source: fieldwork and interviews.

The government acts as a facilitator and an activator (Kohler-Koch, 1999:23-24), bringing public and private parties together, stimulating private sector efforts and fostering cooperation between both sectors. For example, the private sector played a large part in the formulation of the Dutch *Brandstofvisie* and *Energieakkoord*, indicating the importance the Dutch government attributed to the opinion of private sector. Without private sector action, none of the sustainable goals can be attained. The interdependencies go deeper when one considers how LNG as a fuel for shipping develops into a new market; new engines need to be constructed by engine-building companies, significant investments need to be made by shipowners to retrofit existing ships or to build new ships, new infrastructure that allows ships to refuel wherever they go is needed across inland ports and seaports, new safety procedures have to be established, personnel needs to be trained, the environmental impact of using LNG as a fuel needs to be analysed, and so on. In general, many respondents indicate that the public and private sector *need* each other to transition to a more sustainable

economy and that joint goal-setting is necessary to ensure cooperation[263]. One interviewee aptly put it as follows:

> *"Broad support is necessary: cooperation between the public and the private sector and the inclusion of relevant agencies for implementation and control."*[264]

The experiences of private sector actors with LNG are crucial input for policy-makers, as information is needed on, for example, technical possibilities and actual emissions. Business cases are made by the private sector based on these experiences and on projections concerning initial and operational costs. In the case of the PoR, its corporatisation in 2004 left it in charge of its own port policy. The city of Rotterdam thus lost employees with extensive knowledge of port operations, which they are only now compensating for. The Dutch Ministry of Infrastructure and Environment has relatively few people working on LNG and port-related issues and therefore also lacks expertise. The same goes for the European Commission where civil servants have expertise in the area they work on but do not want to engage in cross-sectoral discussions, perhaps in fear of encroaching on the territory of another DG. In general, the interviews show that the public sector actors mostly lack the detailed knowledge necessary to make policy related to the use of LNG[265]. As policy-makers prefer to be on the safe side — it is no use enforcing a norm that is not technically feasible — they need precise information in order to devise policy. Or, as one respondent put it:

> *"It is important to be on the safe side when legislating because the shipping sector needs to be able to meet the norms."*[266]

As such, there is a *crucial* knowledge flow from the private to the public sector regarding technical feasibility which serves as input for policy-making.

Capital is hugely important yet also the most fuzzy of the resources. Both the public and private sector have investment capacity, albeit to a different extent and guided by different motivations. Many interviewees have touched upon the question 'who pays for sustainability?'. The answer is not clear-cut. In part, the private sector depends on governmental

263 As indicated by interviews 2, 3, 5, 7, 8, 9, 10, 13. Of course, such statements are also politically correct, yet that does not take away from what happens in practice.

264 Interview 9.

265 Indicated by interviews 9, 13, 14 and 16. The development is of a highly technical nature, with even information regarding the exact emissions of LNG engines still missing in mid-2015, two years after the LNG Masterplan started. A project to measure emissions was in preparation in late 2015.

266 Interview 14.

authorities for funding due to the high amount of investments necessary to transition to LNG fuel and the uncertainty surrounding long-term policy goals. Securing funding from the government is therefore a proxy for government support of LNG; the importance of which should not be underestimated in a sector that is dealing with severe economic and financial problems. However, the consensus seems to be that the larger part of investments should come from the private sector[267], preferably with some support from a public authority and with a large role for banks. One private sector respondent stated:

> *"If a government wants something, it will have to shape the framework within which that specific development can take place. That the government then does not invest all by itself is understandable. That's up to the private sector. They can complain […] but in the end they have to execute it. […] It does help if such plans can be made [by the public and private sector] together."*[268]

Conversely, private sector actors have also indicated that the market will provide whatever is needed if the government presents clear policy choices. Especially larger companies do not need to rely on public finances to invest in sustainability. Still, with new developments such as the use of LNG as fuel, a measure of public sector support is helpful. The Dutch government has been withdrawing from financial involvement, fittingly described by one interviewee as:

> *"at the Ministry of Infrastructure and Environment, the possibilities are as good as dried up."*[269]

Resource interdependencies create a necessity for cooperation between the public and private sector at multiple governmental levels (Börzel, 1998:259; Hueglin, 1999:249), even for a small part of the transition to come about. A certain measure of joint target-setting, as has been done in, for example, the Dutch *Brandstofvisie*, is therefore inevitable yet not without its own problems. When new ships for some reason do not get a legal exemption from CCNR, or their request is delayed, ship owners are likely to hold off investments into LNG due to the uncertainty of the regulatory outcome. Absent a political decision to actively invest in clean fuel deployment, the private sector has little choice but to look elsewhere or abstain from investing altogether (see box 6.6). Mutual interdependencies can thus also delay progress.

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267 Indicated by interviews 1, 3, 4, 11 and 17. Some of them are representatives of private sector actors.

268 Interview 3.

269 Interview 5.

Box 6.6. Narratives of deployment; when worlds collide

Deployment strategy - the political narrative
LNG as fuel might be a fairly new market in the transport sector, but it is not a case of a technology that has recently been developed and is in need of demonstration and upscaling. Rather, using LNG as fuel can be done with existing technologies. It is therefore not allowed by European state aid rules to directly subsidise the construction of new LNG-fuelled ships. It is also politically contentious to do so because of the methane slip associated with (dual-fuel) engines and the fear of a technology lock-in, possibly delaying the more preferable switch to electric vehicles. But if technology is market ready, transport companies can meet NRMM standards better using LNG, and gas is cheap, why is the market not investing?

Deployment strategy - the industrial narrative
Ships have a long lifespan and are not often replaced by new ships. The inland shipping sector is in heavy weather, with many ships forced into receivership. It is clear to private companies that the Dutch government supports LNG half-heartedly: EU-funded projects are supported, but the government prefers electric vehicles even though they are not available for heavy-duty transport. Facing regulatory uncertainty with no early prospect of resolution, it is safest to resort to a well-known fuel. Why would a company invest in LNG if there is no certainty it is viable in the longer run?

6.3.4.2. Cooperation, though not much blurring of state and society

MLG theorists often speak about a blurring of state and society; a situation in which the public and private sector perform activities or tasks traditionally associated with the opposing sector[270]. Whilst there are not many examples of Piattoni's interpretation of blurring of state and society, the clearest example is the policy document made under the LNG Masterplan — fed by the pilot projects — which should serve as input for LNG related policy at EU level. The safety program set up under the auspices of the LNG Platform is based on questions asked by the public sector to which the private sector did not have an immediate answer. As the program continues and the private sector gathers the necessary data, this information will be used by the national government to devise LNG safety policy[271]. The private sector here acts as an advisor to policy-makers.

A second example is provided by the Rotterdam region. In the words of a representative from the energy business:

270 Please note that Piattoni's is a very far-reaching interpretation of blurring of state and society. It is an extreme version of the cross-linkages between the public and private sector, which is the more traditional interpretation of blurring.

271 Based on interview 8.

> *"Rotterdam is good at this. It was never that clear to me, but I'm starting to realise that more and more. What happens is the following: we, as the small-scale LNG industry, come together and make a plan. Of course you have to make sure whatever you do is within the boundaries of competition laws, but if you are transparent and invite everyone to join in, that's alright. So we say that we see this small-scale LNG market as an interesting development. LNG as transport fuel. These are the reasons why, and we want to do it this and that way. We are willing to invest this much into it. And then you go to the government and tell them 'we as an industry want to do this, and what we need of you is a change in this regulation, that regulation, some support for that, and information regarding this and that'. And then it is up to the government to see whether, given available alternatives in the market, they find it an interesting market and if they want to support and facilitate it. And that makes it possible to create the framework together. […] This happens quite often in the port of Rotterdam, and it's nice because otherwise these developments are impossible to launch."*[272]

This quote is not only a good example of public and private parties can cooperate at the local level and blur the boundaries between state and society, but it also nicely illustrates how Type II, bottom-up, networked forms of MLG eventually need Type I — a governmental authority — to make decisions, change regulations and support developments (Smith, 2007:6278).

The PoR itself has been a major driver in small-scale LNG development. One respondent from the private sector indicated that their company could have had a much harder time within the port without the support of the port authority. If small-scale LNG had not been one of the PoR's top priorities, the authority could have thrown up many obstacles preventing investment. On the other hand, this power implies that the PoR can also make things happen faster if an initiative is in their line of thinking. To that end the PoR employs many resources to find out what the businesses in the port want, which is valuable information for governmental authorities. The PoR's ability to act in the general interest and cooperate with companies is a good example of blurring of state and society. Yet a single port authority can only do so much. If small-scale LNG development is not on the list of priorities of other ports, transport companies or governmental authorities, its power to develop small-scale

272 Interview 3.

LNG into successful business will be very limited[273]. So even though the PoR may be a powerful supporter, if its network does not cooperate it will have to change its goals. As one respondent from the energy business put it:

> *"The Port of Rotterdam Authority does not determine everything. Nobody can, in this case. This market can only flourish if everyone does it together."*[274]

What the PoR can do, then, is act as a facilitator and catalyst. To support business activities on its land, the PoR can organise its public affairs such that it can gain political support for policies stimulating small-scale LNG development. It can also make sure that the infrastructure is there when private parties need it. As a semi-governmental organisation it can liaise with governments and it has the capacity to coordinate a large project such as the LNG Masterplan, thereby benefiting all other parties participating in the project. The PoR is a powerful initiator *provided* there is a secured following.

Furthermore, according to the six interviewees, contractors — i.e., the companies that want goods to be shipped, by law called 'consignors' — have to step up. They can request their transport loads to be fulfilled using LNG as fuel. According to some respondents this would be the best way to ensure more investments into LNG ships. If nobody cares which type of fuel is used or how clean a ship is, there is little reason to invest heavily in a clean, but expensive, ship. Consignors are thus *expected* to act in the interest of the many instead of the few, yet this actual championship of public goals by consignors is hardly happening. An expert from a knowledge institute put it as follows:

> *"The role of the private sector lies with those who stand to benefit from further development of LNG: engine manufacturers, suppliers of cryogenic technologies, and the LNG-suppliers themselves. They can all benefit from cleaner inland shipping because it increases their market share potential. They can therefore do something to stimulate this. The signal from the sector itself is that they, in general, want to be greener, but something needs to be done about their risk coverage. […]. There may be other parties who find a green image important. […]. Most likely are the LNG suppliers themselves: they can stimulate their market share at the same time and can thus create a win/win situation."*

273 Based on interviews 3, 5, 11 and field work reports C and F.

274 Interview 3.

The example of Albert Heijn's LNG trucks has been discussed earlier, and it shows how a potential win/win situation can get both private and public authorities to cooperate together. Obviously Albert Heijn stood to gain from this fuel switch, but the company did have to increase its investments into its logistical operations[275].

The other way around, governments at times act more like private actors when they attempt to lobby other governments. While Dutch ministries used to give subsidies and other financial incentives to the private sector, the preferred course of action is now to try to secure EU funding first[276]. To that end, private parties are required to obtain support from ministries in their European applications. Effectively, this development places the national government more in the shoes of a private party than of a public authority. The Dutch Ministry of Infrastructure and Environment helped secure funding for several TEN-T projects by drawing attention to them at the European level[277]. Since the Dutch national government is withdrawing from funding activities, it is expected that lobbying for money by the government will only increase in the near future. Experience with the LNG case shows that it is likely that such lobbying will be the result of a national public-private coalition bridging the divide between state and society.

To conclude, in response to Tortola's (2017:241-242) challenge to show that there is a natural connection between state and society, the small-scale LNG case depicts a situation in which regulation is lacking and much of the needed expertise lies with ports and businesses, rendering their inclusion in policy processes natural to provide good policies. There is a shift from state-oriented, top-down steering to heavy involvement of societal actors in policy-making in "more horizontally organized, relatively fragmented systems of *governance*" (Eikenberry, 2007:193 [italics in original]). However, also befitting MLG's claims, the nation state remains important, especially to spur an essentially technical development along. A high-level employee at the Rotterdam Port Authority formulated this as follows:

> *"Less is done from the viewpoint of the government trying to make changes and devising the needed regulations for that. Instead, the developments are bottom-up and the government then participates*

275 Example based on interview 9. The call for contractors to request LNG shipping is based on interviews 1, 5, 9, 13 and 16. One respondent also stated that the PoR could switch over to LNG for its own ships, thereby sending a strong message to others. According to an employee of the Port Authority, some ships would be eligible to make the switch to LNG fuel, but most of the PoR's fleet is too small to accommodate the necessary machinery. Still, the 'walk the talk' argument is convincing.

276 Part of this development is caused by the European state aid rules, which place restrictions on funding of projects that are not part of pre-commercial activities such as R&D.

277 Based on interviews 6, 12 and 13.

to facilitate these developments, sometimes through regulations. This is significantly different from the model that was used before. There still are departments with a top-down way of doing things, but changes are happening."

Participation of both the public and private sector is crucial to develop small-scale LNG, though Piattoni's far-reaching blurring of state and society is barely present.

6.3.5. Discussion of the Three Theoretical Dimensions

The three shifts identified in MLG theory are a domestic - international shift, a centre - periphery shift and a state - society shift. These shifts are also connected to each other through the dynamics that occur within them. MLG focuses on contestation along these three dimensions, since it does not assume that there is complete coherence between them (Piattoni, 2010:87-88). The three shifts, along with areas where they clash, will be discussed now (see also table 6.6).

The importance of the EU as a level of policy-making is especially clear in the small-scale LNG case due to the international nature of transport, emissions, and energy flows. Regulation at the EU level[278] (or higher) is deemed necessary not just by the EU but also by national authorities and the private sector, albeit for different reasons. The EU wants to legislate in order to expand its competencies while national authorities and the private sector — illustrating the domestic - international shift — create interdependencies to ensure a level playing-field. Private sector and societal actors do not only cooperate with the national government, but are also connected to these higher levels of governance. The resource flows are crucial here. Because the EU has become the main funder of projects related to small-scale LNG, it is connected to local and regional businesses and also gets to lay down demands. Still, contrary to the MLG framework, widespread influence of NGOs or business actors was not found in this case, largely due to the low priority attributed to greening the inland shipping sector. However, there is definitely a shift from the domestic to the

278 The EU itself, however, is internally divided concerning the answer to the climate change mitigation question. For the EU, LNG is just one of potential possibilities to make transport more sustainable. DG CLIMA and DG ENV are strong proponents of fully electric transport, although that future still seems far away. Furthermore, DG CLIMA's focus on CO_2 is getting a lot more attention at the domestic, EU and international level than DG ENV's (and cities'!) focus on the environment and air quality. Polluting ships in a large port such as the Port of Rotterdam have a significant impact on the local air quality in the city of Rotterdam. It would stand to reason that initiatives focused on improving this situation — such as the use of LNG as a fuel for inland (and maritime) shipping — would garner much support from DG ENV. Strangely enough, there are hardly any connections between PoR officials and DG ENV.

Table 6.6. Results of LNG case per key concept of MLG

Dimension of MLG	Key concepts	Results of LNG case
Domestic - international dimension	Interdependencies at international level	1. Hardly new cross-border networks created (examples are ESSF and CESNI) 2. Representation in international organisation or associations mostly along traditional lines
	Policy coordination at the X level of government	1. EU attempts to coordinate policy and offers soft coordination through funding 2. National policy documents do refer to the necessity for EU decisions due to international nature of IWT
Centre - periphery dimension	Coordination of activities	Local projects across the EU are coupled into EU-funded projects, Rotterdam facilitates LNG uptake where it can
	Local empowerment	1. Many attempts at local coordination 2. PoR perceived as important locally and is empowered alongside other local actors but interdependencies are high
State - society dimension	Cross-linkages between public and private actors	1. Many resource flows between public and private actors, capital and policy-making capacity are crucial 2. Joint goal/target setting present
	Blurring of state and society	1. PoR can spur blurring and the LNG Masterplan provides input for policy-makers 2. Dutch government supports Dutch projects at EU-level. Otherwise not much blurring

Source: author's own composition based on case study.

international, albeit mainly through different factors than identified by Piattoni. EU member states themselves willingly maintain existing international interdependencies, and global market dynamics create new interdependencies. The Dutch government is even compelled to push for international regulation by actors such as the Port of Rotterdam Authority. The insistence on a level playing-field necessitates international action, yet at the same time ensures slow progress towards sustainability. It is therefore also an excuse for the national government to not have to coordinate (or fund) at all, which probably meets the preferences of a department with a low budget to spare, such as the Ministry of Infrastructure and Environment. Even if driven by a different set of factors than identified by Piattoni, the result of the domestic - international shift remains the same; the high-impact strategic decisions seem to be taken at EU (or higher) level, while practical decisions (such as levying taxes per fuel type) are made nationally. A local voice in policy-making is missing.

At the same time, this shift clashes with the state - society shift due to the centrality of governments in international decision-making. The nation state remains important — hierarchy persists — but decentralised levels of government do have powers of their own and their

preferences do not always line up with those of the national government. In fact, one could argue that the distinctiveness of local governments is another feature of the persistence of hierarchy, driven by the political belief that representative democracy is important and that accountability is better organised in a rule-based hierarchy (Lynn Jr., 2011:231-233). When taking the other two shifts into consideration, an interesting picture appears in the centre-periphery shift. One important peripheral actor, the PoR, is not part of representative democracy but can efficiently act as the linking-pin between governmental authorities and the private sector. As discussed above, the inclusion of society (in a broad sense) in state affairs speeds the governance process along, and much of the policy output stems from the EU and international level. The coordination of activities is mostly organised locally. Whilst the city of Rotterdam is not being heard in LNG policy-making, the absence of strong central steering — a lot of the transition to cleaner fuels is done through soft coordination — empowers local coalitions; the periphery. The interconnections and interdependencies necessitate high-level international coordination (often top-down) coupled with domestic practical implementation, testing and experimentation in a more networked fashion[279]. The national government is seemingly undergoing a change from setting the long-term visionary goals to taking care of practical issues based on EU policy. It therefore more and more acts like a decentralised authority than a national government.

6.3.6. Secondary Findings; the Role of Power and Uncertainty

Even though no interview question explicitly probed the issue of power, respondents often touched upon it in their answers. In fact, power relations seem of much higher importance in this case than initially assumed in the conceptual framework. When it comes to distribution of power, the international dependencies created by national governments also have their downside for governmental authorities. One such example is the revision of NRMM. As discussed previously, the methane slip of LNG engines is harmful to the climate. Without going too much into the technical details here, it is important to note that NRMM does not include a specific methane emissions norm, but implicitly covers it through a more general hydrocarbons emissions (HC emissions)[280] norm. The proposed norm by the EC was 6 gr/kWh. While fairly strict, during negotiations it appeared that this norm would be supported by member states and large parts of the private sector affected by the regulation. The Dutch government, however, proposed to change the norm to 3 gr/kWh[281], claiming the necessity

279 Based on interviews 3, 5, 9, 11 and 13.

280 Methane (CH_4) is a hydrocarbon.

281 This norm would only apply to new ships and thus not to retrofits. Existing and upcoming retrofits would therefore be safe not complying to the 3 gr/kWh norm.

for such a strong norm if LNG as fuel is to be used without a negative impact on the climate. The environmental department of the Ministry of I&M submitted the amendment, but insiders have claimed this went without support from the transport department. Support was also lacking at EU level[282]. Member states were hesitant to adopt a more stringent norm, probably due to the resistance from the private sector[283]. DG MOVE could not support the amendment without convincing proof that 3 gr/kWh was actually possible for ship engines. The Dutch proposal was outvoted[284]. While the Dutch government definitely has a say in the negotiations, in the end it is dependent on the greater consensus within the EP and the Council[285].

On the other hand, the national government maintains a powerful position as well. There are several reasons. First, energy policy is still an area in which EU member states retain competency, especially where their national energy mix is considered[286]. Even though the EU is trying to insert a measure of coordination between the national energy policies, bilateral activity remains prevalent. Second, it was mentioned earlier that the national government must lend political support to TEN-T projects. Without the signature of the national government, a project cannot be submitted to the Commission for funding. While it is in the interest of a national government to support as many projects as possible (otherwise the funds will go to another country), this competency disables the possibility to completely defy the existing hierarchy. Third, even though EU decision-making is based on consensus between 28 countries, this still means that the Dutch government has a vote in the policy-making process. Its policy priorities are therefore one of the determinants of the policies resulting from negotiations. Fourth, even in an area where the EU does have clearer competence, such as transport, MS retain some autonomy. Clean fuels for transport, to name an example, are governed by an EU Directive. Directives give MS leeway in the way they are transposed. The EU imposes the final goals, not the way in which these goals are reached. National governments can still be powerful in the implementation process. Multi-level governance

282 Although nobody stated it explicitly during the interviews, the prevailing feeling (which was quite clear during participant observation) that was communicated indicated a lack of trust in the national government, especially the Ministry of I&M. This lack of trust lives both in local authorities and in the private sector and is mainly due to the formal and distanced attitude of I&M and its internal conflict between the environmental department and the transport department. After openly supporting LNG as fuel for transport, the Dutch proposal to amend methane emissions in the NRMM regulation took both the PoR and the private sector off guard. Some actors took the government's action as an affront and saw it as an attempt to block further small-scale LNG development.

283 PoR was strongly against the 3 gr/kWh norm, so were other port authorities.

284 Example based on interviews 3, 5, 7, 8, 9, 12, 13, 14 and 16 and field work reports A and J.

285 The same applies within the CCNR, IMO, CESNI, and the ADN Safety Committee.

286 Art. 4 TFEU. Officially energy policy is a shared competence. See chapter 4, section 4.2.2.2. for more information.

does not disable the nation state; its governance capacity is stretched out over multiple levels of government and between multiple actors.

Power (im)balance is important within EU institutions as well. The Dutch 3 gr/kWh proposal was not adopted due to the lack of political support in other countries. Internal conflict within the Ministry of I&M[287] most likely also did not help the government in backing the proposal unilaterally. At the EU level, DGs often are at odds with each other (Aspinwall, 1999:127) and when push comes to shove, oftentimes energy policy (and economic gain) wins out on environmental and climate considerations. Even with the apparent fusion of DG ENER and DG CLIMA under one Commissioner it is not a given that both policy fields will be given equal importance. Energy security is of strategic and economic importance and is likely to continue to be treated with privilege. While both the 2011 White Paper on Transport (European Commission, 2011c:5) and the White Paper on Governance (European Commission, 2001b:28-32) mention policy integration as important, one insider in European diplomacy described reality as follows:

> *"At the end of the day, energy policy determines what will happen, and climate ambitions — if necessary — will be wiped from the table".*[288]

The integration of environmental issues into other areas of European policy-making thus still has a long way to go. The top-down way in which the Commission operates leaves little room for DGs such as CLIMA and ENV to upload their agendas effectively[289].

Between DG CLIMA and DG ENV there are power imbalances as well. DG CLIMA's focus on CO_2 is getting a lot more attention at the domestic, EU and international level than DG ENV's focus on the environment and air quality. Emissions other than CO_2 are usually translated into CO_2-equivalents. International climate negotiations also often focus on CO_2, placing this greenhouse gas in the area of high politics, i.e., the Hobbesian elements in politics that touch upon matters which are very contentious and deemed essential to the survival of the state. This contrasts with low politics, referring to more technical responses to concerns that do not endanger the nation state (Hix, 2006). As stated before, GHG emissions have

287 Interviews 3 and 9.

288 Field work report K.

289 With the advent of the Juncker Commission the DGs have handed in part of their power and have to fold to the political priorities established by Juncker and his VPs. In addition, the inter-service consultation is led by officials from the Secretariat-General, which places the real administrative power in their hands and not in the hands of individual DG officials. Still, the new VP structure introduced by Juncker could lead to more policy integration at the high, political level within the Commission. Based on field work reports J and K.

a global effect whereas air quality has a highly local impact. Reducing the local emissions impacting air quality therefore remains in the area of low politics. It is an area in which the local level is potentially empowered, most apparently through its regulating powers as attributed by DG ENV's Air Quality Directive[290].

While not part of the MLG framework, uncertainty drives much of what happens between the public and private sector. McKibbin and Wilcoxen (2002:115) claim that "uncertainty is the single most important attribute of climate change as a public problem". Cooperation between the state and society in a broad sense may be needed to break through this uncertainty. From a private sector perspective, investing into sustainable initiatives does not help short-term gain. From a public sector perspective, investing into sustainability is too expensive without support from the private sector. Parties involved in the development of LNG as fuel are fully aware that the real gain will come after several years, and that this market needs full support to develop first. This is also the reason why governments and companies want more stringent emission norms; the incentives created by firm emission caps should cause a further push toward cleaner transport. Paradoxically, these emission caps are very difficult to establish due to resistance from the shipping sector, mainly at the IMO. Table 6.7 summarises the most important uncertainties for small-scale LNG development, which often came up as shining examples in the narrative boxes.

Table 6.7. What prevents small-scale LNG development?

Politics/policy	Finance	Technology
Unclear long-term policy priorities, also regarding emission norms	Small-scale LNG (and retrofit) is expensive	Long lifespan of ships, slow turnaround
Geopolitical situation (energy independence?)	Inland shipping sector under heavy weather	Methane slip and actual emissions of LNG engines still unclear
Mindsets of shippers and consignors	Unclear LNG price development (in relation to other fuels)	Infrastructure lacking (also for large-scale LNG)
Intra-governmental competition	Financial tools do not always match the needs of the market	

Source: interviews, each hurdle has been mentioned by at least four people and is commonly found in evaluative documents. Hurdles range from most to least mentioned.

The public sector is cautious to formulate specific targets for sustainability because the rate at which cleaner technology becomes available is unpredictable. On the other hand, business seems to have trouble understanding the nature of governmental planning. While governments usually make financial plans of up to four years, a viable business case in this sector requires a certain financial stability of between five to ten years. When governments cannot give the private sector such assurances, the private sector becomes cautious to

290 Based on interviews 1, 3 and 10.

invest in expensive technologies. The public and private sector thus at times have difficulty understanding each other's language. Forcedly incentivising the market to provide a product can become very expensive, as became blatantly obvious when the Dutch government tried to stimulate the acquisition of electric vehicles through subsidies (Rengers & Schoorl, 2014)[291]. Coupled with the inherent uncertainty surrounding climate change as a public problem (McKibbin & Wilcoxen, 2002:115), the uncertainty of future policy choices in this domain (also mediated by power relations) and the uncertainty of the rate at which technological progress will occur are very important factors in the governance of small-scale LNG.

6.4. CONSEQUENCES FOR THE PORT OF ROTTERDAM

Ports can play an instrumental role in the transition towards sustainable transport and energy. Not only are they the obvious place for large concentrations of transport activities, they are also very important in global energy flows (Meyer, Nillesen & Zonneveld, 2012:80). Therefore, they are the prime suspect, so to speak, to watch when assuring the sustainability, competitiveness and security of European energy (and therefore also transport). Growing strategic importance of LNG as a large-scale energy carrier may push other LNG developments forward, although that is not certain because EU LNG import terminals already have overcapacity. Therefore an increase in LNG imports would not necessarily impact — positively or negatively — small-scale LNG developments. A promising possibility would be to tie small-scale LNG into the larger LNG strategy of the EU. Doing so would require cooperation between DGs and a more comprehensive policy framework than is currently available. Not only is it uncertain whether member states would allow that, but it is equally uncertain whether the individual DGs are willing to encroach on each other's territories. The efforts of the current Juncker Commission to mainstream Energy Union plans and climate plans into all of the EU's policy-making could mark the change needed to get to this comprehensive framework. The recent Energy Union plans look promising; transport, energy and climate are explicitly considered together in the Commission document and it is acknowledged that the climate objectives regarding decarbonisation of the economy will have to be expressed in concrete actions targeted at the transport and energy sectors (European Commission, 2015b). A link to ports, however, is still missing.

The potential importance of ports is especially relevant when the largest European port is considered. The Port of Rotterdam houses some of the world's largest energy companies and is a major transport hub through which many different transport companies traverse on a daily basis. A third of all energy brought into the port is processed within the port area,

291 Interview 9.

fuelling the cluster and producing energy carriers. Two thirds of the energy is transported further inland or exported[292]. A major consequence for the PoR is therefore that political choices made by governments impact its operations due to the direct impact of these choices on the private sector present in or making use of the port. Of course, this is not news to the port. But, as discussed in the three shifts in multi-level governance, governance is dynamic and relationships change. Especially before corporatisation of the PoR, the local and national governmental authorities were of paramount importance to the Rotterdam Port Authority. Now, the EU (especially DG ENER, DG MOVE and DG CLIMA) is becoming more and more important, even if there is no formal ports policy (yet). As an entity devising its own long-term strategies and goals, the PoR will have to deal with the shift from domestic longer term visions to strategies formulated at the European level. At the same time, the distance to that level is larger than the distance to the national level, even physically. The PoR also has to contend with many other players for EU attention. It remains to be seen whether the Port Authority is fully equipped to deal with this new reality. Its potential strength as a regional aggregator of interests may be an important catalyst for its public affairs management.

There is another reason why the EU is of increasing importance to the PoR. The Port of Rotterdam can afford to have a long-term strategy including investments that are potentially risky, or that will pay off five, ten, or even twenty years from now. This ability fits its role as infrastructure provider facilitating necessary provisions for companies. However, many of the businesses in the port cannot afford to invest in long-term payoffs due to them simply being too small to have sufficient financial stability for the future. Since strategic decisions of the PoR also rely on the information they receive from the private sector, it is difficult for the PoR to devise strategies based on the uncertainty of long-term private sector investment. With the uncertainty surrounding the national government's real (and realistic) priorities added to the mix, strategic planning for the PoR may become very difficult. One thing the PoR could, but will not, do is make a clear choice against another type of fuel (oil, for example) since that would harm its business. If other actors from the public or private sector make these choices, the port will follow to accommodate their wishes. The Port Authority is in danger of supporting everything (and therefore choosing nothing) in fear of missing out on an opportunity. Lastly, global uncertainty due to economic crises does not help either. While the above affects the EU as well, it is better able to provide more longer term financial stability and security than the national government, if only by virtue of EU decision-making being slow. The EU may therefore be better able to provide a guiding light for the port.

292 Port of Rotterdam Authority, internal presentation (2017). Total energy flowing in to the port on a yearly basis is 7620PJ.

The somewhat ambiguous status of the Port of Rotterdam Authority may prove challenging in the EU. Many European ports are still in the hands of governmental authorities, which makes it easy for the EU to know who to address if ports are considered. In its actions towards governmental authorities the PoR can either be advocating its own interests (mostly focused on ensuring a level-playing field) or as the aggregator of port-related company interests. It should be clear which position the authority is taking in each situation. Furthermore, in the LNG case both the local and international network seem quite small; PoR officials know people in certain positions at the EC and vice versa. Still, the Commission often prefers to speak with governmental authorities instead of actors such as the PoR. The corporatisation of the PoR means that they can operate relatively independently from the Dutch national government, although they are obliged to report to the Dutch government and the city of Rotterdam due to their status as shareholders. However, with the port authority being in charge of its own port policy and being able to define its own future, there is not much standing in its way when moving towards the EC rather than the Dutch ministries. In doing so, it can behave both as a public and as a private party. During a conversation with an employee of the PoR, it was stated that depending on the subject, the PoR alternates their statement whether they are a public or private sector actor in EU questionnaires. This ambiguity may therefore not work in their favour at the EU level where there is no full understanding of the exact status of the PoR. The implications are that if the Commission continues to prefer contact with a governmental authority over direct contact with a port authority, maintaining good relations with the Dutch government will be a must for the PoR.

During the interviews a question was asked regarding respondents' opinions on what the role of a port authority is in stimulating the transition towards more sustainable energy and transport. The overall opinion of what PoR is doing is favourable, though respondents do indicate that it could be more open in its goals and information sharing with other parties such as other ports. The leadership role PoR has taken up, however, is judged very positively. It is clear that the EC watches Rotterdam closely and that there are informal ties between the two actors. However, the bureaucratised way in which the EC operates does not make it easy for the PoR to pursue its goals at the EU level. As policy officers often are responsible for only a small part of an issue, the PoR inevitably has to deal with multiple officials. The PoR will also have to contend with the fact that outside The Netherlands there are more big players vying for access to the European Commission.

6.5. CONCLUSIONS

The application of MLG to this case addressed Jordan's (2001:201-204) criticism that MLG ignores the external level of the EU. Piattoni's factors covering the domestic - international

shift were supplemented with two other factors: nation states willingly maintaining international dependencies, and the influence of global market dynamics. Coupled with Piattoni's factors, this case study is able to add to the continuously evolving MLG framework. The shift from centre to periphery actually revealed the formation of a new centre at the EU level, with an enlarged periphery consisting of domestic actors. It also partly confirmed earlier criticism of MLG regarding its overstatement of the influence of sub-national authorities. Even though the preferences and actions of decentralised authorities matter, and regions are *potentially* empowered, they do not overshadow the national government but rather build up to intergovernmental coordination in international institutions and the EU. Power relations were found to be more important than previously expected, which reflects a shortcoming of MLG as described by Jachtenfuchs (2001:258). This shortcoming will be addressed more fully in the last two chapters of this dissertation.

Multi-level governance as a theory is able to identify the dynamics occurring between actors and the challenges related to EU policy-making. It does, however, not predict *what* will happen, only *that* changes will occur (see table 6.8). The shift from state to society shows that the inclusion of business and civil society helps governments govern more effectively

Table 6.8. Small-scale LNG conclusions per theoretical expectation

Theoretical expectation	Conclusions for small-scale LNG case
Actors create interdependencies between business, civil society, and government on an international level, which necessitates policy coordination at not only the national level but also the supranational level *-> The PoR is one of many actors active at international level because the policy solutions the PoR needs cannot be provided at national level alone*	Shift from the domestic to the international, with governmental authorities retaining their decision-making competencies and voting powers in international bodies (strengthening vertical governance). At the same time, mutual interdependencies are created by actors such as the PoR, and by societal actors in a broad sense, but mostly due to nation state actions and global market developments (exogenous effects).
Regional coordination in territorial matters is more efficient than national coordination, which leads to the strengthening of local policy actors *-> PoR is empowered due to being able to employ its resources effectively when stimulating activities in Rotterdam*	Boundaries of centre and periphery are being stretched through the empowered activity of peripheral actors such as the Port of Rotterdam Authority, acting in coordination with the local private sector and implicitly backed by the passivity of the Dutch national government.
Cross-linkages between private and public actors lead to private parties assuming public responsibilities and public parties acting like private groups *-> PoR develops economic activity in cooperation with the private sector and advocates its interests at EU level alongside Dutch governmental actors to obtain favourable policy conditions*	Shift from the state to society due to the critical nature of resource flows, resulting in more horizontal governance, where the public and private sector jointly agree on sustainable goals and organise their implementation. The PoR moves between the public and private in an effort to maximise regional benefits.

Source: author's own composition based on case study.

through mutual resource dependencies. In turn, the private sector is heavily dependent on policy initiatives such as *Clean Power for Transport*. The shift from the domestic to the international illustrates how interdependencies are created at the international level, which necessitates international coordination. Yet supranational governance is not necessarily the most effective form of governance. When appropriate regulation at the international level is lacking, as for example with the legality of sailing down the Rhine in an LNG fuelled vessel, action from national governments is necessary. Or, in other words, the domestic level steps in when the international level fails — a stark contrast to the CCS case — provided that such action is within the interests of the nation state. The growing patchwork of EU policies regarding emission ceilings, transport policy, energy policy and climate policy suggests that EU policy output will continue to expand in the future. However, lingering uncertainties impede governance when actors do not know what the future will bring. These uncertainties go past practical regulation and are especially prevalent in the governance of climate change, as technologies and insights evolve and much is dependent on the mindset of policy-makers and entrepreneurs alike. Multi-level governance can help uncover these uncertainties.

The nation state remains at the heart of the governance of small-scale LNG, although its position is not one of an autonomous, directive authority. The national government retains competence in the area of energy policy and has room for manoeuvring when implementing EU transport Directives. However, the cross-border nature of IWT and required system changes for LNG implementation necessitate EU-wide coordination and provide powerful incentives for regional authorities to step into the arena. Crucial, then, is the fit between domestic initiatives and long-term European goals. Ensuring this fit will require cooperation at multiple governmental levels, with a strong role for the private sector due to the expertise and investment capacity of the sector. The value of MLG as a theory therefore is in showing that the authority of a national government can be stretched across multiple levels, yet paradoxically remain intact as well. The complex dynamics between the actors in multi-level governance strengthen mutual dependencies.

What is the 'engine' that seems to be at work in this case? EU member states requested the EU to formulate an alternative fuels strategy due to the cross-border nature of transport. Supranational coordination was desired. The Commission took up this task and defined the *Clean Power for Transport* Directive. Alongside the Directive came EU funding for alternative fuels infrastructure, pilot ships and efforts to standardise training and safety procedures. As national governments began transposing the *CPfT*, their own uncertainty regarding desirable alternative fuels for the future and discussions regarding lock-ins delayed implementation. Still, the Dutch government enabled small-scale LNG demonstration through a Green Deal which stimulated local activity in the Port of Rotterdam and the municipality. Especially the PoR can incentivise the use of LNG through discounts and infrastructure adjustments.

Large companies such as Shell and Engie can afford to invest in LNG (bunker) ships and infrastructure, but smaller shipping companies face larger financial insecurities. Explosive growth in the usage of LNG as fuel is therefore unlikely in the current situation. The lessons learned in the demonstration projects and infrastructure adjustments can be used in the revision of the alternative fuels strategy at EU level. The LNG 'engine' is running slowly, but whether it achieves further harmonisation and large-scale implementation is yet to be seen. However, the first results are promising.

The importance of power is a secondary finding of this case study. The European Commission can only do so much until it hits the wall of national interests and political pressures. Whichever (geo-)political direction the EU and its members choose with respect to energy policy *will* impact transport. Especially in countries where large-scale LNG infrastructure is lacking, EU emphasis on the importance of LNG for environmental purposes may help in its introduction as a fuel (Arteconi & Polonara, 2013:511). Due to the connection between transport and energy policy, changes in the transport regime will, in turn, also change European energy policy. This case study has shown multiple examples of power relations impacting the outcomes of governance, not in the least because of the tensions between climate considerations and economic gain. The next chapter will discuss whether the multi-level governance framework adequately considers the role of power in governance.