

23<sup>rd</sup> REFORM Group Meeting, Salzburg

# Infrastructural fossil gas lock-in: LNG infrastructure expansion plans in Germany

Isabell Braunger



# Agenda

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- 1) **The context of fossil gas in Germany**
  - 1.1) **Climate impacts of fossil gas**
  - 1.2) **Fossil gas consumption in compliance with the Paris Agreement**
  - 1.3) **The role of fossil gas in Germany**
  - 1.4) **LNG in Germany**
  - 1.5) **LNG in the EU**
  - 1.6) **Lock-in of fossil gas**
- 2) **Research Question(s)**
- 3) **Methodological approach**
- 4) **Preliminary results**
  - 4.1.) **Main drivers**
  - 4.2.) **Main Barriers**
  - 4.3.) **Challenges**
- 5) **Conclusion**

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## 1) The context of fossil gas in Germany

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1.6) Lock-in of fossil gas

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# Fossil Gas has strong climate impacts

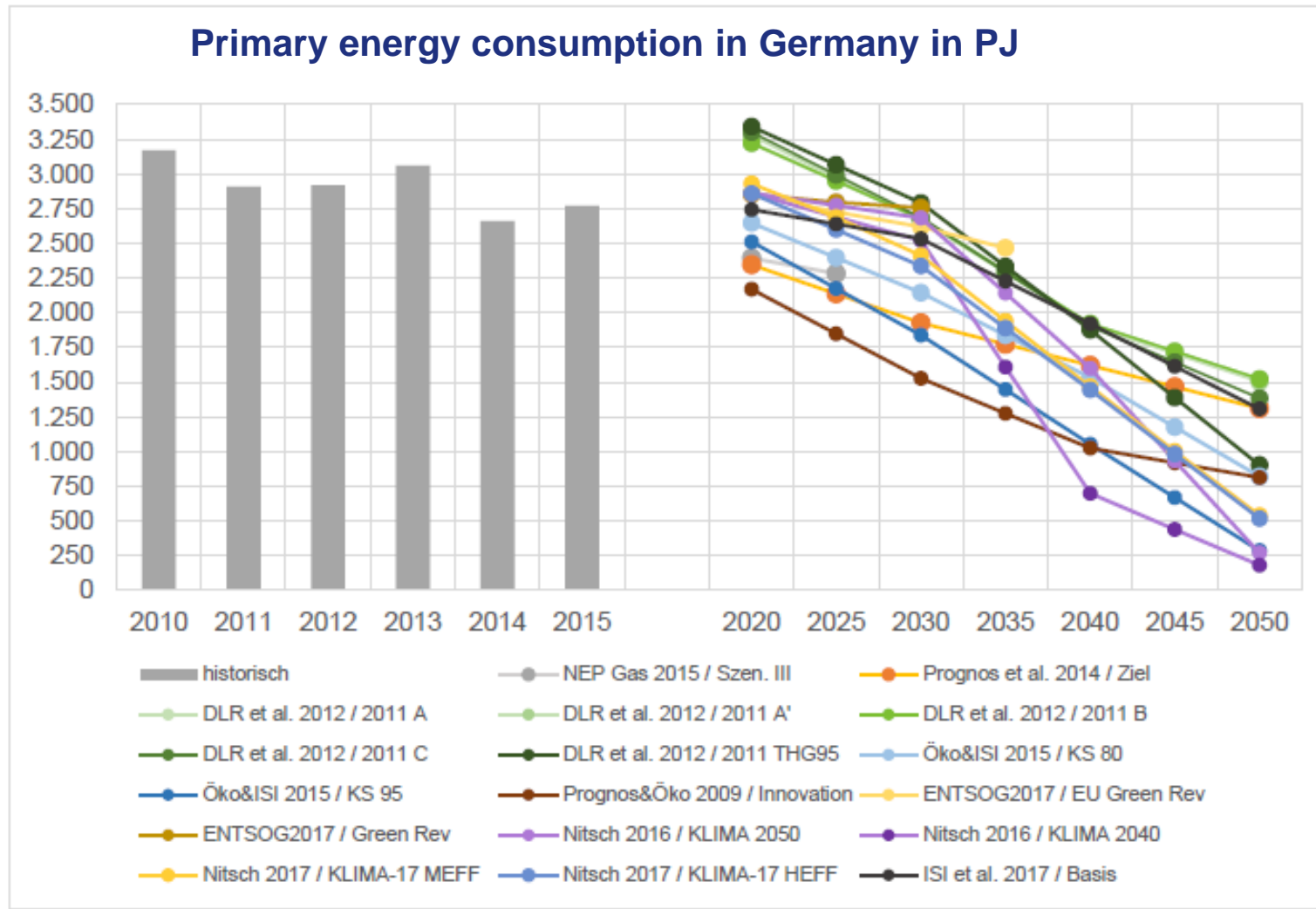
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- Fossil gas consists largely of methane (short lived ghg)
  - Within 20 years global warming potential of methane is 86 times higher than that of CO<sub>2</sub> and 34 times higher over a period of 100 years (IPCC 2014)
- Fossil gas is particularly harmful to the climate when it escapes unburned into the atmosphere
- Emissions occur at each segment of gas development
- In the USA measured leakage rates are about 60% higher than inventory estimates (Alvarez et al. 2018).
- Leakages occur in both the unconventional and conventional production of fossil gas (Cremonese and Gusev 2016)
- Leakage rates higher than ~ 2.7 % of the total gas burned, level the advantages of fossil gas over coal (EDF 2013)
- No independent measurements in the EU and Germany
- No reliable emission rates of Russian gas (Cremonese and Gusev 2016)



High methane losses a realistic conclusion (Cremonese and Gusev 2016)

# Development of Gas Consumption in Germany in Compliance with the Paris Agreement



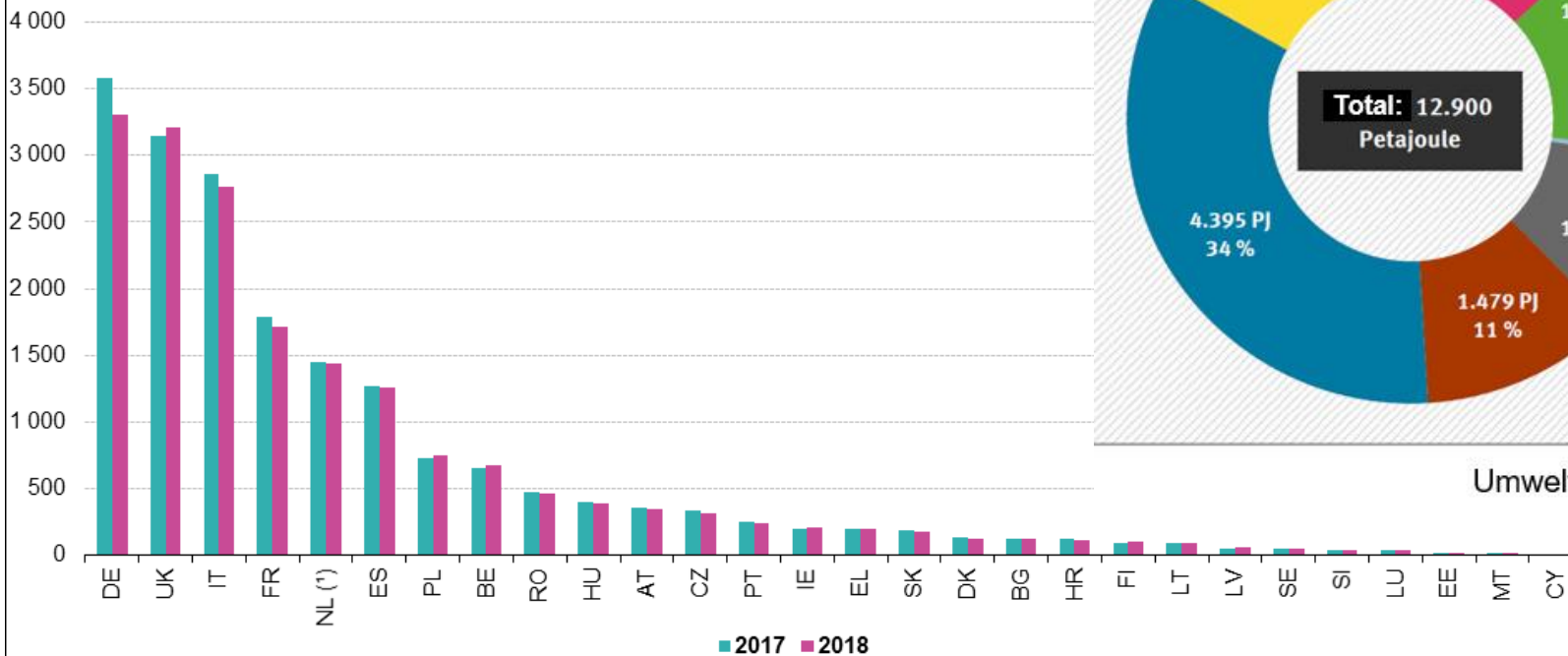
Source: (Kochems, Hermann, and Müller-Kirchenbauer 2018)

# Fossil Gas in Germany

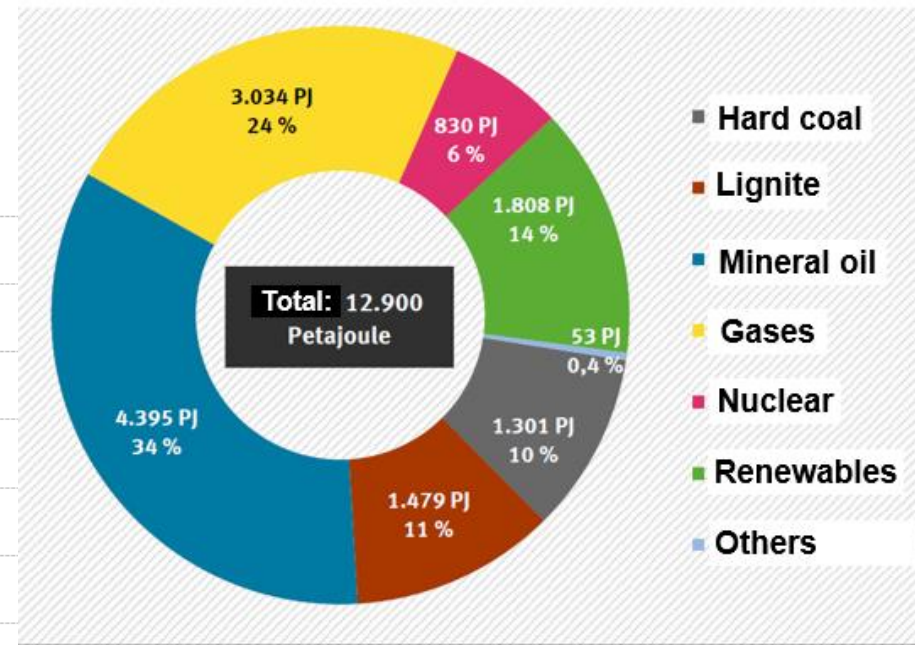
## Germany is the biggest fossil gas consumer and distributor in the EU

Primary energy consumption by energy source in 2018

**Gross inland consumption of natural gas, by country, 2017-2018**  
(thousand terajoules (Gross Calorific Value))



(\*) Provisional data for 2017 and 2018  
Source: Eurostat (online data code: nrg\_103m)



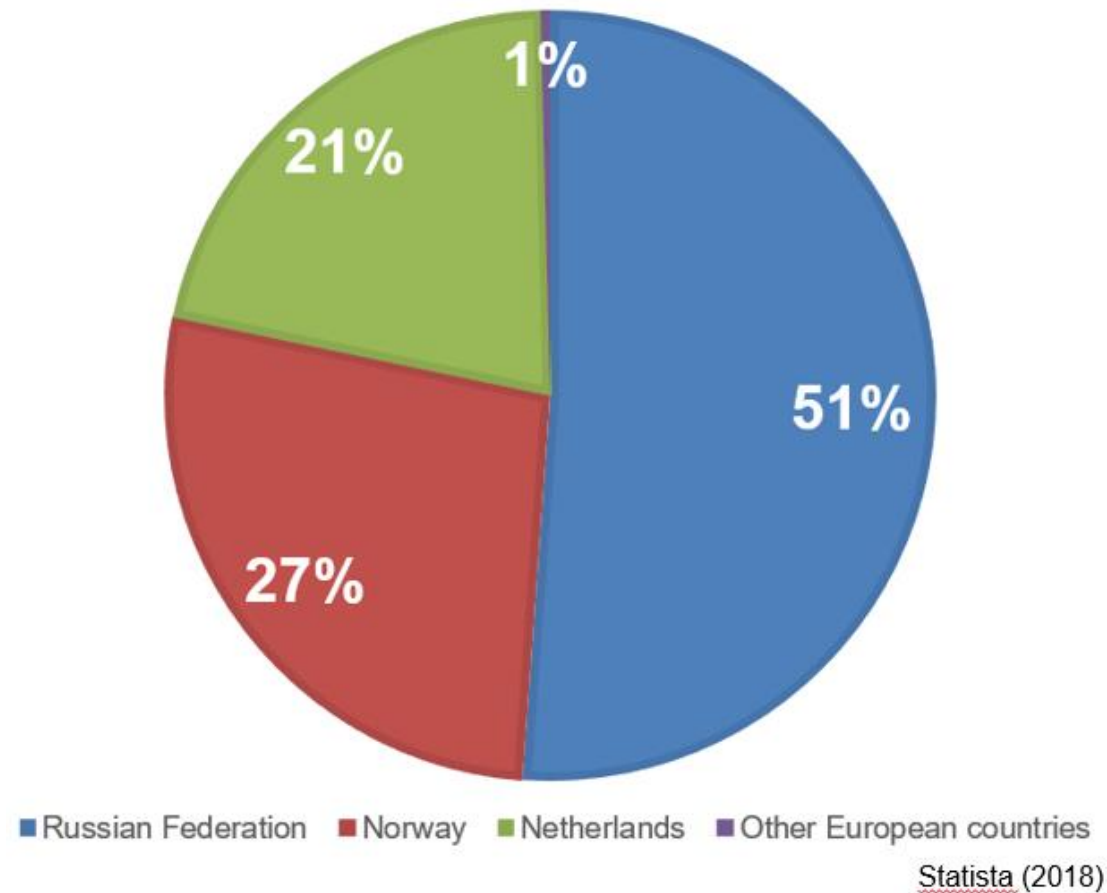
Umweltbundesamt (2019) [modified]

# Fossil Gas in Germany

- ✓ Well-developed fossil gas infrastructure
- ✓ Well connected to the European gas grid
- ✓ 46% of the fossil gas volume was exported to European countries in 2015
- ✓ Largest underground fossil gas storage volumes in the European Union
- ✓ Fourth largest storage capacity in the world
- ✓ No LNG terminal

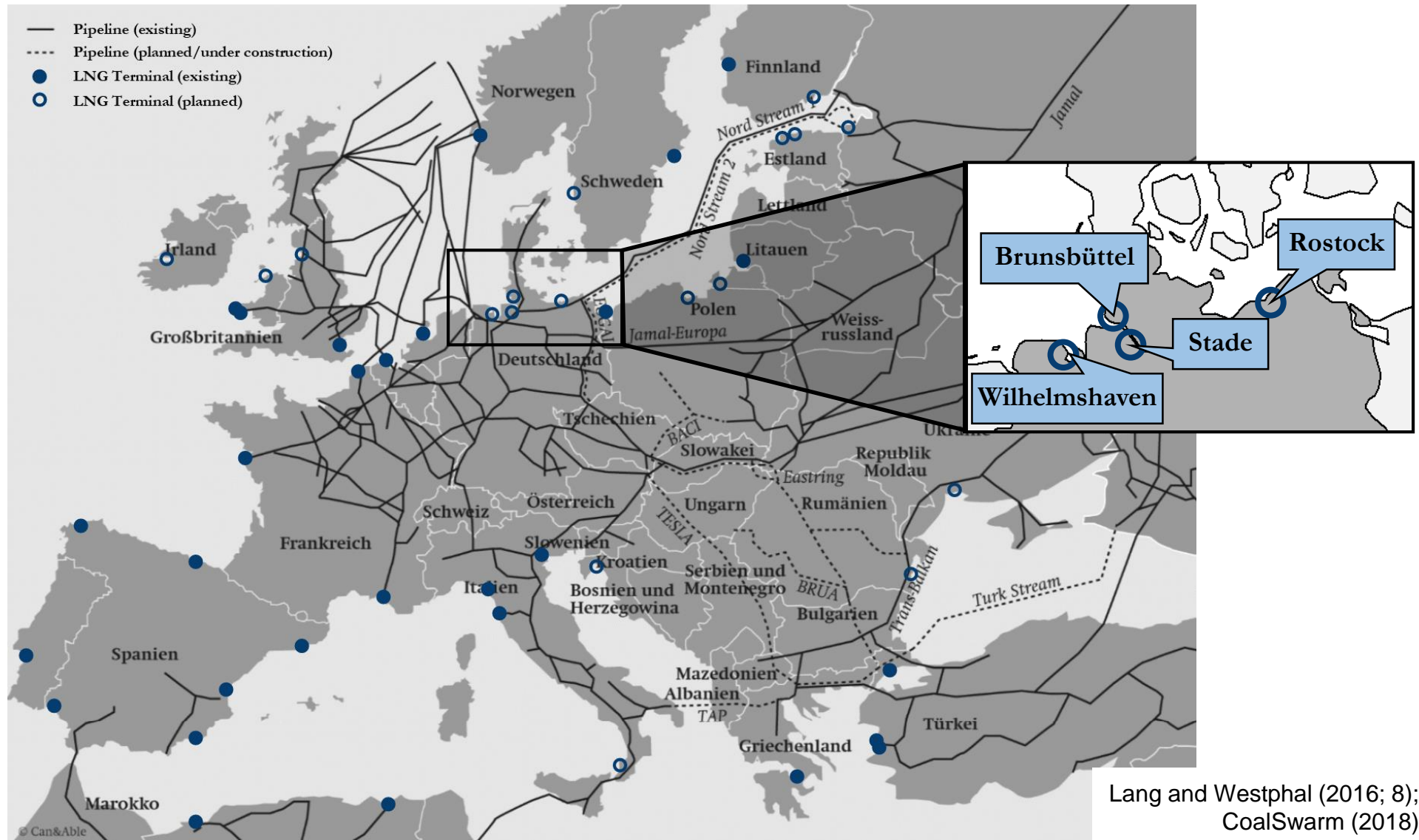
Sources: (Kochems, Hermann, and Müller-Kirchenbauer 2018)

Distribution of supplier countries in 2017





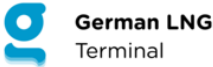









# LNG in Germany



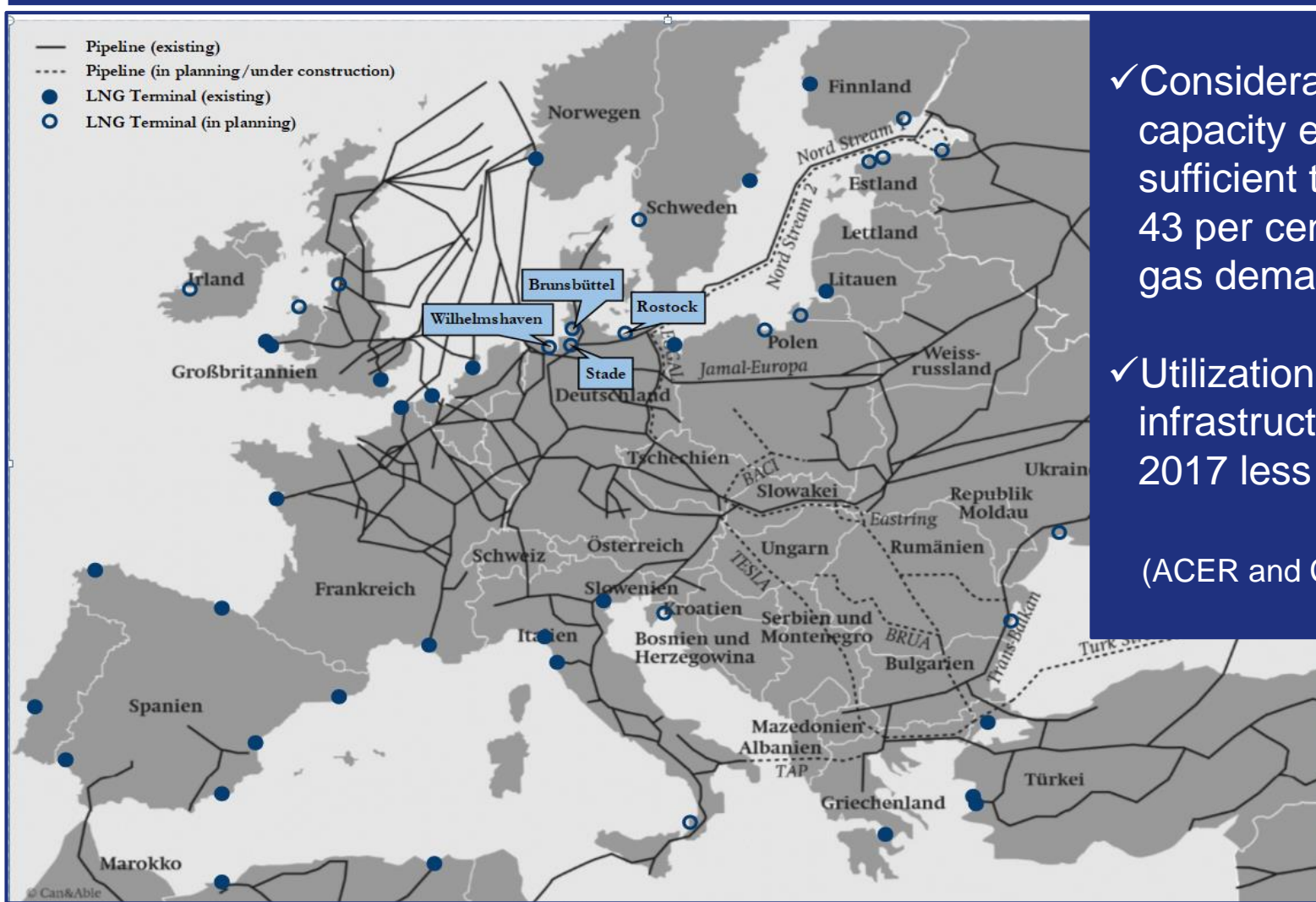


# LNG in Germany

	Wilhelmshaven	Brunsbüttel	Stade
<i>Operators/ Investors</i>	 	   	   
<i>Storage capacity</i>	263,000 cm	480,000 cm	Unknown
<i>Annual capacity</i>	10 bcm	8 bcm	4-12 bcm
<i>Connection to grid</i>	Yes	Yes	Yes
<i>Construction costs</i>	~ €1.5 billion (shore-side terminal) ~ €130 million (FSRU)	€500 million (investment volume)	€400-500 million (first stage)

Source: Ostseezeitung (2019); energate messenger (2018)

# LNG in Europe



✓ Considerable LNG import capacity exist in the EU – sufficient to cover around 43 per cent of its current gas demand

✓ Utilization rate of LNG infrastructure in the EU in 2017 less than 25%

(ACER and CEER 2018)

Source: Own graph based on Lang and Westphal 2016 and [https://greeninfo-network.github.io/fossil\\_tracker/](https://greeninfo-network.github.io/fossil_tracker/)

# Lock-In of fossil gas: LNG terminals are a pure fossil project

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- Hydrogen cannot be imported with the planned terminals
- Import of synthetic methane is possible but is not part of the business concept of the terminals
- It is also not yet foreseeable whether and from where synthetic methane will be imported
- The approval of the terminals is so far not linked to a time limit for the import of fossil gas

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# Research Question(s)

## LNG Terminal Investments in Germany in the context of Climate Change Protection – A Stakeholder Analysis

Introducing the LNG context in Germany, relating to climate impacts and market situation

Main research question:

Why do LNG terminal get proposed in Germany in times of alleged increasing climate protection ambition and why do these proposals by private investors receive political (and financial) support?

- Who are the stakeholders of an LNG Terminal in Germany?
- Who is a marginalised/invisible stakeholder?
- What stakeholder networks exist?
- What interests in the terminals exist?
- Who is affected, in what way?

- **CONTEXT:**
  - *Climate effect natural gas and climate protection commitments GER/EU*
  - *Power of actors*

Conclusion:

Results used to derive policy recommendations

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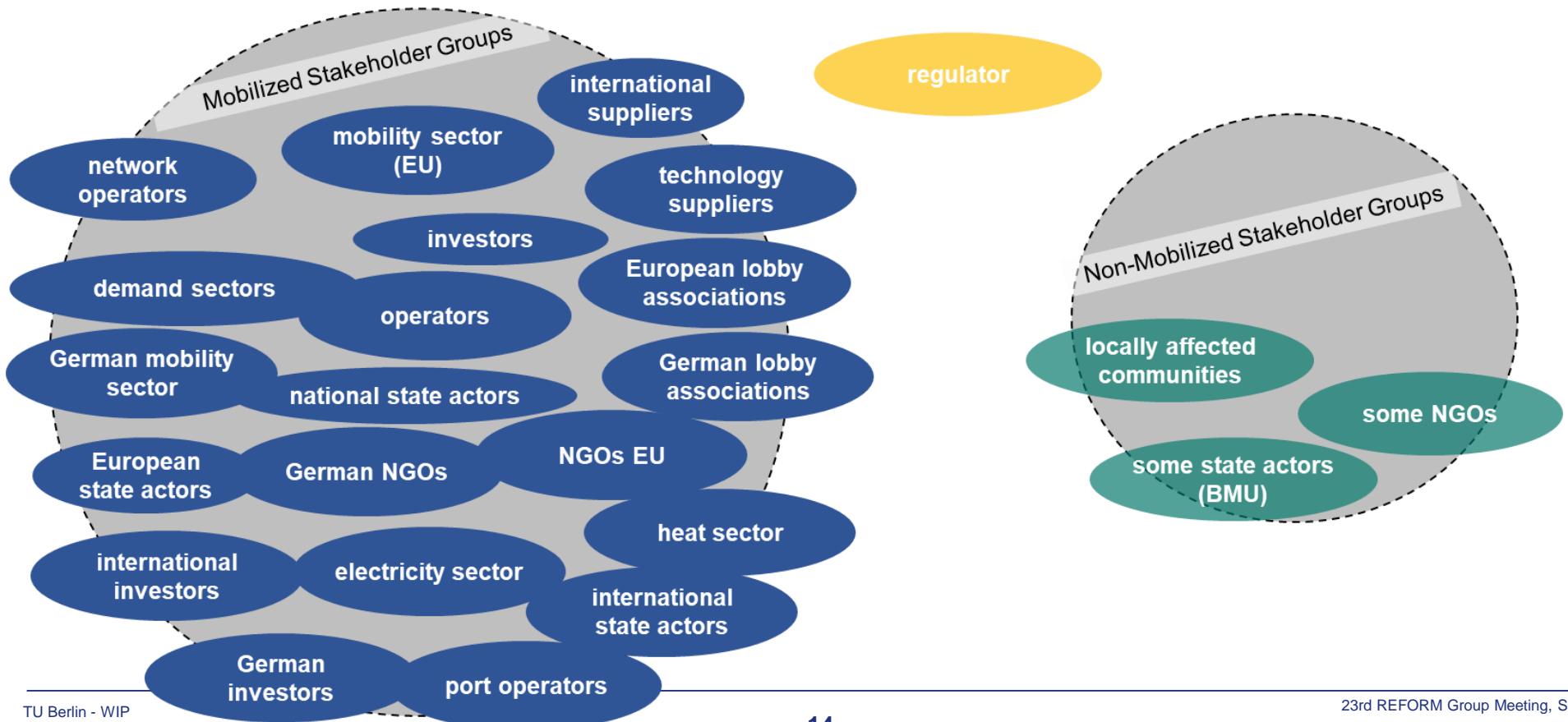
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# Methodological approach

## 1. Identification of all actors and aggregation in stakeholder groups:

- Comprehensive desk study (due to limited scientific literature we considered grey literature)
- Aggregation of single actors in stakeholder groups
- First draft of a stakeholder identification matrix with mobilized and non-mobilized stakeholders
- Supplementation of the raw version of the matrix by various experts





# Methodological approach

## 2. Evaluation of the stakeholders in terms of their position, the strength of their interest in the project and their influence by different experts

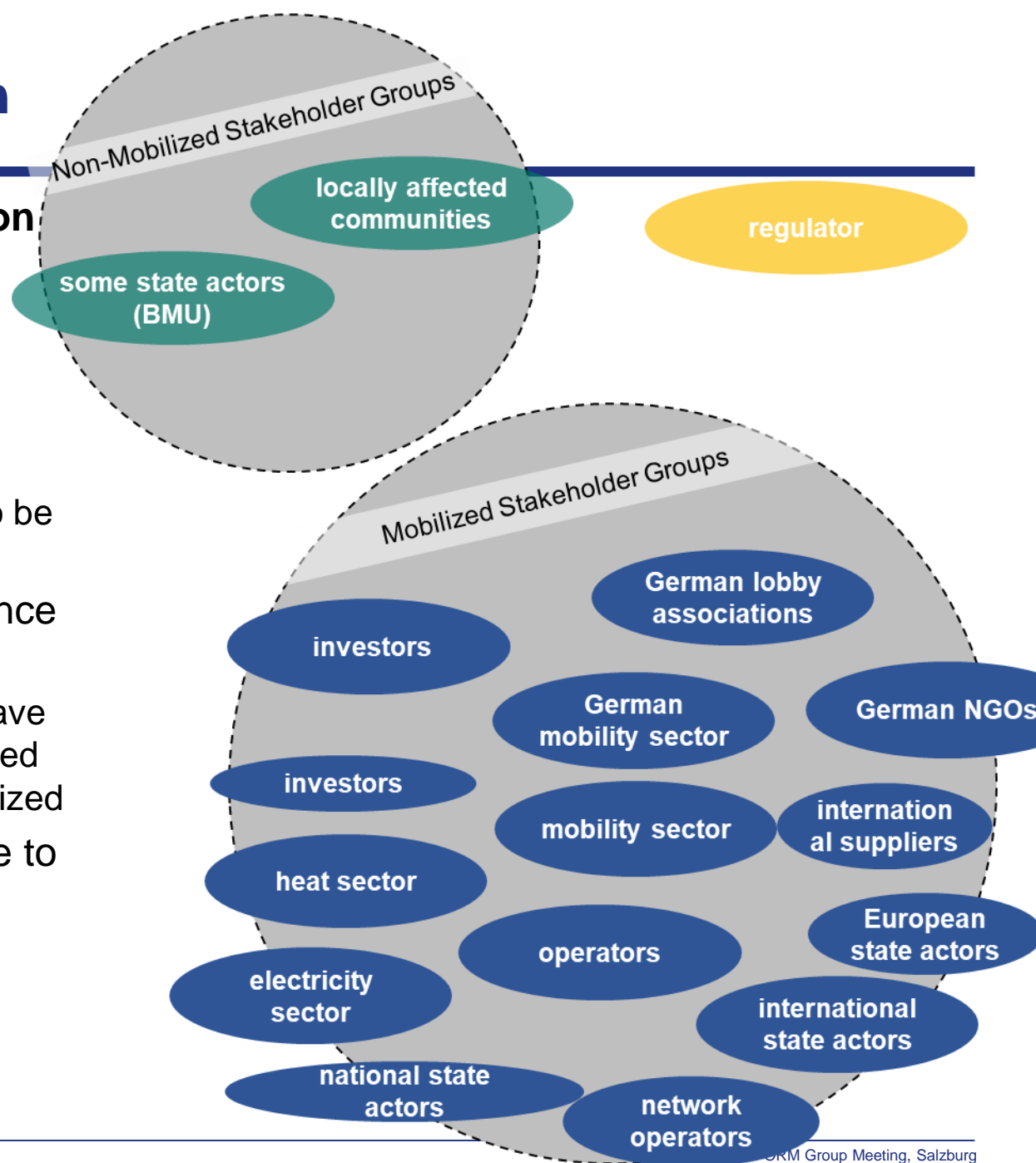
- Position (opposed, supportive, non-mobilized)
- Strength of their interest in the project (high, medium, low)
- Influence/power (high, medium, low)

Stakeholders		expert 1	expert 2	expert 3	expert 4			expert 1	expert 2	expert 3	expert 4
	3										
		interest (high, medium, low)						influence/ power (high, medium, low)			
	involvement in the issue					matches	no information				
NGOs dt (e.g.)	more involved in the coal issue in Germany	?	?	high	?	3	3	?	?	medium	?
NABU	active at the local level, maritime transport sector,	medium	high	high	high	1	0	low	medium	medium	medium
Food and Water	very active on national and global level in the gas issue	medium	medium	high	high	2	0	low	medium	low	medium
DUH (German environmental aid)	organization of gas stakeholder meeting of scientists, industry representatives, regulators, ngos, municipal utility companies, consultancies and network operators, written objection of the terminal, legal study of security issues of the terminal in brunsbüttel, campaign against the terminals	medium	high	high	high	1	0	low	medium	low	medium
local community		?	?	medium-low	medium	2	2	?	?	low	low
Bürgerinitiativen	gas drilling more of an issue,	high	high	high	?	3	1	low	low	low	?

# Methodological approach

## 3. Evaluation of the second version of the matrix

- Actors with only moderate or low interest were excluded
  - with some exceptions: local communities, opposed actors, non mobilized actors with the potential to be mobilized, German net regulator
- Actors with low or medium influence were excluded
  - exception: actors about whom we have too little information and non-mobilized actors with the potential to get mobilized
- Fusion of stakeholder groups due to their similar interests and actors
- Result: 17 stakeholder groups remain in the matrix**



# Methodological approach

## 4. In-dept analysis of the remaining stakeholder groups

- Further desk study
- 14 Semi-structured interviews with experts and stakeholders
- Analysis of the Interviews according to Glaser and Laudel

Conducted interviews (14)	Outstanding interviews
Energy Expert, Expert LNG	Ministry of Transport
NGO, Citizens initiative	State Government Lower-Saxony
Bündnis 90/Die Grünen, Local politician (Brunsbüttel)	State Government Schleswig-Holstein
Ministry of environment, Ministry of economy	
Advocacy Group Gas Industry, Advocacy Group Municipal Utilities	
Energy Utility	
Transmission Grid Operator	
Expert Transport (excluded)	
Industrial Gas Consumer	

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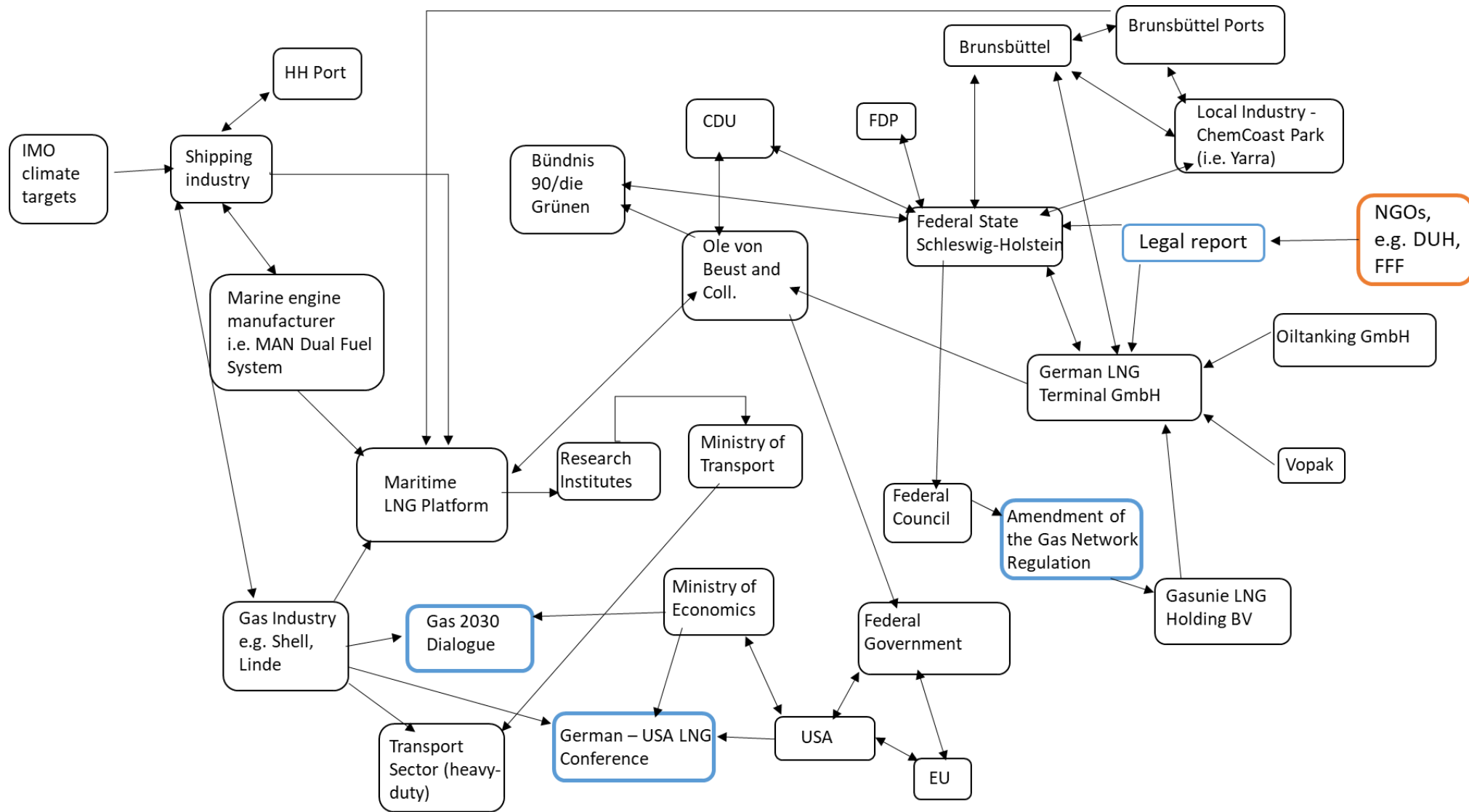
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# Preliminary results: Actor Network for Brunsbüttel



# Preliminary Results: Main Drivers

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- Gas traders hope for better access to the gas market
- Changes in the LNG market
  - Improvement of prices in the EU compared to the Asian market, more supply on the market, continuously increase of supply as fracking will become cheaper
- Northern Germany is strategically located (well connected to the pipeline network)
- Some of the stakeholders expect a positive effect on gas prices in Germany
  - improved negotiating position on pipeline prices,
-  Other stakeholders already regard this price effect as given by the neighbouring terminals
- Some of the stakeholders see an increase in demand for LNG
  - for shipping or heavy duty traffic
- others consider a general increase in gas demand possible
  - in electricity production
- Economic pressure from the USA
  - USA has developed from a fossil gas importer to a fossil gas exporter
- Local policy makers welcome investment in structurally weak regions
- The municipalities hope for positive effects on the local economy and tax revenues

# Preliminary Results: Main Drivers

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- Industry as well as the local community hope for an improvement of infrastructural connections (rail, road, gas network)
- ➔ Political support e.g. through rapid amendment of the Gas Grid Access Regulation, financial support by the federal states
- Some stakeholders want to improve the security of supply in Germany by building the terminals.
- ↔ Some of the stakeholders do not see the construction of the terminals as the right way to improve supply security  
2012 it was found that digitalizing communication in case of an interruption would contribute more to security of supply than the construction of a terminal
- ↔ Handling of the terminals not large enough
- ↔ Security of supply was already sufficiently high.



# Preliminary Results: Main Barriers

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- The financing of the connection lines was considered a major barrier.  
Previously, the connection of storage facilities, terminals and gas-fired power plants was regarded as private pipelines that had to be paid for by the investors themselves. In 2019 the amendment to the Gas Grid Access Regulation was passed within a short period of time. Since then, the connecting pipelines for terminals have had to be realised by the gas grid operators and the costs are passed on to the gas customers. This removed a major barrier to the construction of the terminals.
- High price difference to Pipeline Gas  
Germany has very good import capacities via pipeline and is very well connected to the European gas network.
- Currently the economic viability is not given but could come in the future
- The investments and the risk are high, therefore a large part of the capacities must be sold in advance.  
At present the expression of interest procedures are still ongoing and it seems unlikely that the terminals will be built unless a large part of the capacities can be assigned through long-term contracts in advance
- Very large companies are active in the LNG market, compared to relatively small German energy companies.
- Utilization of European terminals is still low on average

# Preliminary Results: Main Barriers

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- Potential resistance from local civil society against the connection lines
- Approval process of the Terminals

In Wilhelmshaven there is a permit for the landside terminal but not for the planned FSRU. In Brunsbüttel there is a legal report from the DUH (a German NGO) which disputes the approval capability of an LNG terminal in the immediate vicinity of a hazardous incident operation (toxic waste incineration plant) and an interim storage facility for radioactive waste. (Ziehm 2019)

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- Numerous actors currently have an interest in the realization of the terminals for very different reasons and form a complex network
  - Climate protection plays no role in the implementation of the projects
  - This interaction of different actors and their interests creates a window of opportunity that makes the realization of LNG terminals in Germany more probable at the current time than in the past
  - An actual realization of the terminals depends on many factors (sufficient market interest, fulfilment of approval requirements, social acceptance, etc.)
  - Security of supply in Germany is guaranteed even without the terminals
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- ➡ The planned LNG terminals are purely fossil projects
  - ➡ Investment in fossil infrastructure projects jeopardizes the achievement of the German climate protection goals, especially if promises for subsidies are made

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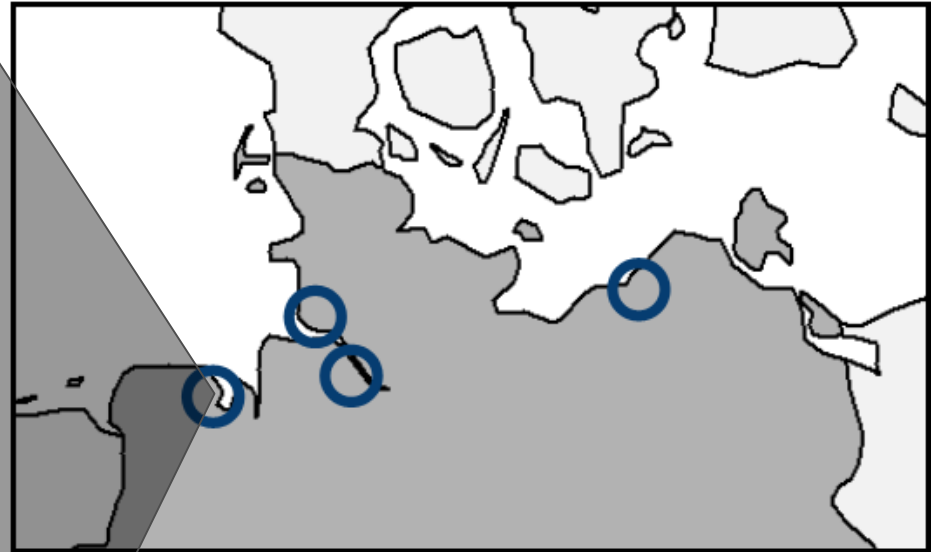
# Back-Up

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# Wilhelmshaven

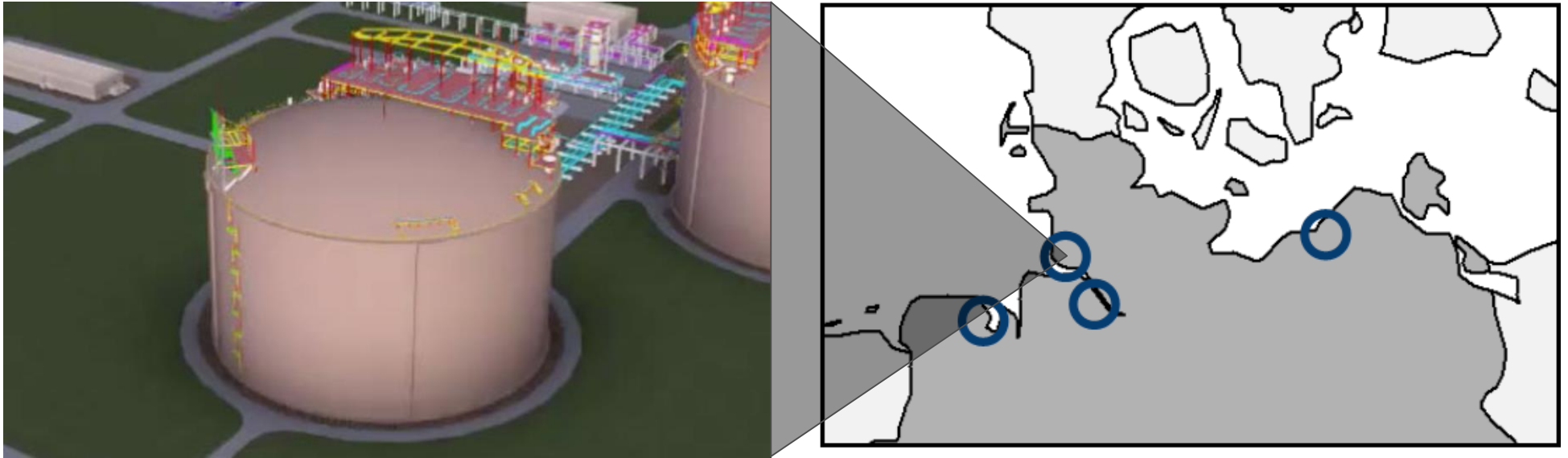


LNG Terminal Wilhelmshaven (2018)



Mitsui O.S.K. Lines

# Brunsbüttel



German LNG Terminal (2019)



**German LNG**  
Terminal

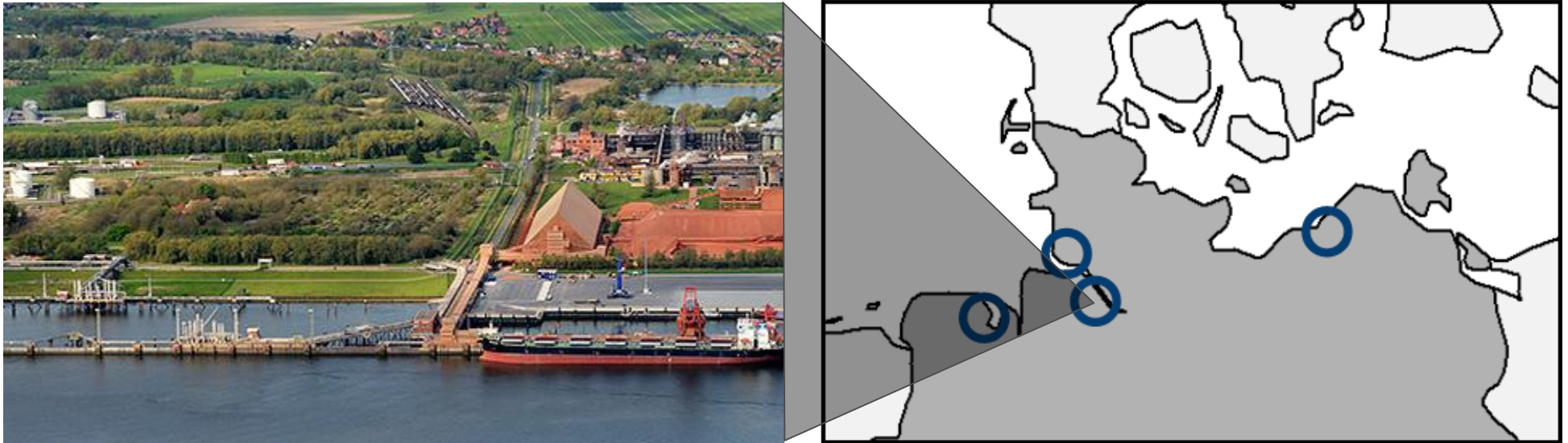
gasumte  
crossing borders in energy

**Oil**tanking



**Vopak**

# Stade



Seaports of Niedersachsen (n.d.)



中国港湾工程有限责任公司  
China Harbour Engineering Company Ltd.

