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Network-led advocacy for a green shipping transformation: A case study of governance networks in the Norwegian maritime sector

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Abstract

Climate action has until recently been slow in the shipping industry. The sector is notoriously difficult to regulate by individual states, and international governance is moving slowly. In such a context, networks of actors can potentially contribute to a sustainability transition. In Norway, which is widely considered a leader in maritime environmental innovations, two networks have become prominent. This article studies how the cluster organization Norwegian Centre of Expertise Maritime CleanTech and the public–private partnership named the Green Shipping Programme have developed, gained influence in policymaking, and are now taking part in governing a transition toward low- and zero-emission shipping. I argue that these governance networks gained governance capacity because of how network organization allow for utilization of the resources of individual members. The resources of individual network members are "mixed and matched" through network activities. In particular, the combination of technical expertise, lobbying expertise, and relational capital is important when a network seeks to influence policy in sustainability transitions.

1. Introduction

Until recently, climate action has been long in coming in the international shipping sector. However, during the last two years, we have seen a reorientation toward sustainable shipping. In April 2018, the International Maritime Organization (IMO) agreed to reduce international shipping-related CO_2 emissions by at least 50% in 2050 compared to 2008 and phase out greenhouse gas emissions as soon as possible in this century (IMO 2018). To reach this goal will require a transformation entailing changes to institutions, markets, and technology. This necessarily requires actors to drive and steer the transition: We need effective governance. I argue that governance networks can contribute toward ensuring the sustainability transition. Networks are capable of tying together actors across sectors, tasks, and fields of expertise – actors who do not normally interact – to work for a common goal. In this article, I aim to develop a better understanding of how networks of actors participate in governance of sustainability transitions. I ask: *How can networks of actors engage in policymaking for a transformation to low- and zero-emission shipping?*

The Norwegian maritime sector, widely considered a leader in environmental innovations, is pushing for a transformation toward low- and zero-emission shipping by mobilizing in networks. Two governance networks have become central in governing the green shipping transition; the cluster organization Norwegian Centres of Expertise (NCE) Maritime CleanTech and the public–private partnership called the Green Shipping Programme. Membership in the networks includes private companies, business associations, research institutions, and public organizations. Although their main activities are focused on conducting pilot studies and promoting innovation, they are also actively engaging in policymaking. In this article, I map how these two networks have developed and analyze how they engage in policymaking. I show that the networks gain governance capacity by utilizing the

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resources of individual members. I argue that the dynamic of rearranging and matching resources of members in new ways is what equips governance networks to take part in governing sustainability transitions.

To shed light on such network dynamics, I employ the nodal governance framework as theorized by Burris *et al.* (2005) to analyze the empirical cases of the aforementioned green shipping networks. By focusing on how actors (nodes) contribute individually and link up in networks, one can understand how the networks build governance capacity. However, the nodal governance framework is weak on explaining how networks are capable of engaging in policymaking. To be able to explain this, I make use of the concept of access from literature on interest groups and advocacy coalitions. The article contributes to the development of the nodal governance framework by developing further the aspect of access to policymakers and by reflecting on the interplay of the contributions of network members.

2. Theoretical framework

2.1. Governance through networks

Governing through networks of actors is integral to the concept of governance (Rhodes 2007). In their seminal study of 13 business domains, Braithwaite and Drahos (2000) find that power is best understood as exercised through "webs of influence," and that webs of dialogue are usually preferred to webs of coercion. In webs of dialogue, actors develop their interests and practices through formal and informal deliberative interaction. Webs of dialogue are effective because interdependence among participants motivates agreement, participants commit normatively, and incompliance may provoke shaming.

I focus here on how two particular networks seek to take part in governing the green shipping transition. I analyze them as governance networks, defined as "sets of autonomous yet interdependent actors (individuals, groups, organizations) that have developed enduring relationships in governing specific public problems or policy programs" (Klijn & Koppenjan 2014, p. 61). Governance is in this study understood as "intentional activities designed to shape the flow of the events" (Wood & Shearing 2007, p. 6). A network is thus understood as an intentional way of organizing collective action. I follow Latour (2011) when he stated that "the notion of network is of use whenever action is to be redistributed." What is interesting for the purpose of this study is to understand how networks spark action. It is therefore not an analysis of network structure (as in social network analysis), but a qualitative analysis of how network as an organizational structure is exploited to engage in policymaking.

The two networks have in common that they are initiated by the industry, are highly formalized, and have both public and private members. In addition to their purposes to facilitate innovative new technical or operational solutions, they are both seeking to influence policy. They are not automatically integrated in public policymaking and must therefore be outspoken to make their voices heard; they have to advocate their views. This leaves the networks as hybrids between business coalitions and governance networks. Yet, as they both have received public funding from their establishment, and because they are both acknowledged as governance tools in the Government's action plan for green shipping (Ministry of Climate and Environment 2019), I find it appropriate to label them governance networks.

How networks can participate in complex polycentric governance can be studied through several network theory traditions: in particular, the nodal governance framework (e.g. Burris *et al.* 2005), the advocacy coalition framework (ACF) (e.g. Weible 2006), ecology of games theory (e.g. Lubell 2013; Berardo & Lubell 2019), and social network analysis (e.g. Lubell *et al.* 2014). For this study, the nodal governance framework has been chosen over the three other approaches because of its theoretical advantages and its appropriateness to understand the empirical object of study. Its strength lies in understanding the importance of the deliberate and directional action of individual members when networks are formed, grow, and gain power.

Social network analysis falls short when it comes to understanding how networks form and develop, as it only produces the picture of network properties at one point in time (Lubell 2013). The ACF (Sabatier 1998) and ecology of games theory (Lubell 2013; Berardo & Lubell 2019), on the contrary, seek to explain policy change over a long period of time – longer than the existence of the two case networks. The ecology of games theory takes a much broader perspective to policy change in time and scope than what I intend to do here. The ACF is designed for the study of policy processes lasting a decade or more (Sabatier 1998) and has focused more on mature coalitions. These two theories are not as explicit as the nodal governance framework about describing how networks

form and gain power. Since the case networks are very young, the nodal governance framework is more suited to understand how they, despite their youth, have been able to enter the stage of green shipping governance in Norway.

The nodal governance framework and the ACF share the aspiration to understand the influence on policymaking and have similarities in framework elements. A central hypothesis of the ACF is that holding similar policy beliefs is the glue of coalitions (Sabatier 1998; Henry *et al.* 2010). The ACF assumes that coalitions are formed for the purpose to influence policy. However, the case networks in this study are not mainly formed for this purpose. The nodal governance framework does not assume that normative beliefs are shared by all members and demands the examination of single members' additional motivations for being part of a network. Therefore, the framework can uncover how actors with diverging motivations and beliefs coexist in networks. The application of the framework has therefore yielded the insights about the advantages of networks' flexibility as described in Section 6 in this article.

Finally, the nodal governance framework feeds into the broader theoretical tradition of network governance (see e.g. Sørensen & Torfing 2005; Klijn 2008; Klijn & Koppenjan 2012; Rhodes 2012; Klijn & Koppenjan 2016), to which this study contributes. Nodal governance has become a popular framework in studies of policing and security governance (e.g. Wood & Dupont 2006; Nøkleberg 2016; Quéro & Dupont 2019), but has also been applied in environmental governance (e.g. Froestad *et al.* 2013; Ziervogel *et al.* 2017) and global water governance (Baumgartner & Pahl-Wostl 2013). As a theoretical framework, nodal governance is relatively young and should be tested and elaborated further.

2.2. The nodal governance framework

Essentially, nodal governance is "a description of how resources are mobilized and power exercised in a social system" (Burris 2004, p. 344). The framework's explanatory power lies in its focus on nodes (actors) in networks, and how they relate to each other. A nodal focus can better explain how networks govern because it focuses on action in networks (Burris *et al.* 2005). It is a network theory that sees networks as carriers of the members' efforts to make something happen (Jensen & Pettersen 2012). The framework has a polycentric view of governance (Holley & Shearing 2017), which comprises many actors on different levels and a plurality of steering mechanisms (Burris *et al.* 2005).

The nodes are actors in the networks, defined as "organizational centers in time and space from which the actions of governance flow" (Drahos 2004, p. 405). This includes very different kinds of actors, from individuals to large organizational entities, both public and private. The nodes may differ greatly from one another in character, resources, and possibilities to interact with other nodes. When a node is able to create an organizational structure that connects representatives from other organizations and networks and hence concentrates their resources and tools for a common purpose, this structure is called a superstructural node (Burris *et al.* 2005, p. 38; Drahos 2004). In a superstructural node, dispersed performance and decisionmaking are centered and strengthened in that node (Burris *et al.* 2005).

The framework posits that all nodes contain a set of essential characteristics: mentalities, technologies (methods of governance), resources, and some kind of institutional structure (Burris 2004; Burris *et al.* 2005). Mentalities are a node's way of thinking about what is to be governed (Burris 2004; Burris *et al.* 2005; Wood 2006) and how the node understands its role and purpose in the governance system (Martin 2012). Technologies are the methods, or tools, available to and used by nodes to exercise influence in the network (Burris *et al.* 2005). To avoid confusion of this characteristic with technological innovations, I will in the further call it *tools* (of influence).

Resources are what enables the node to apply tools (Martin 2012). Resources are understood as forms of capital (Burris *et al.* 2005; Dupont 2006). To understand the resources brought into NCE Maritime CleanTech and the Green Shipping Programme, I analyze three types of capital: economic capital, cultural capital, and relational capital. *Economic capital* is about access to funds that can be channeled into network activities and used to accumulate other forms of capital (Dupont 2006). *Cultural capital* consists of all kinds of knowledge and expertise that a node can mobilize. *Relational capital* is a function of social and political relations (as treated separately by Dupont 2004, 2006) that enable a node to interact with powerful actors and gain the ability to influence policy

(Dupont 2006). Relational capital derives from the proximity of relations to influential actors inside or outside the networks, be it politicians, bureaucrats, or companies.

To sum up, nodal governance focuses on the role of nodes in the process of tying together networks to concentrate power and capacity to govern (Drahos 2004). Strong nodes can tie together networks by enrolling other nodes into the network (Latour 1984; Braithwaite & Drahos 2000), where even weak interpersonal ties can be important for building a diverse network (Granovetter 1973). In a network, the capacity to govern is thus concentrated through the mobilization of several nodes' tools and resources. The nodal governance framework assumes that tools and resources are important for governance capacity but does not suggest how different kinds of tools and resources interact within networks to enhance governance capacity.

2.3. Network-led advocacy

Participation in governance of a green maritime transition is here operationalized as engagement in public policymaking. Burris *et al.* (2005) state in their article on nodal governance that "Access to nodes is a necessary condition for participation in governance […]" (p. 56). However, a fault of the framework is that it does not theorize clearly how actors and networks access policymakers (or other nodes) to participate in governance. To analyze this, I borrow the concepts of access and network-led advocacy from the advocacy and interest group literature.

Advocacy work is often done in coalitions (Heaney & Lorenz 2013). Literature on interest group coalitions establishes that there are benefits from forming coalitions: sharing of skills as well as resources (Nelson & Yackee 2012) such as money, information, and political contacts (Hula, cited in Mahoney 2007). Actors see joining a coalition as particularly beneficial if prominent actors are already members (Hojnacki 1997). One major advantage of uniting is that a coalition can convey a unison message to policymakers (Nelson & Yackee 2012).

Mosley and Jarpe's (2019) concept of "network-led advocacy" captures the act of advocacy work by networks: network-led advocacy occurs when a governance network tries to influence policy (Mosley & Jarpe 2019). Specific advocacy activities may be inter alia meetings with policymakers, participation in development or revision of regulations, participation in government-led commissions, committees or advisory groups, enlightenment of the general public and issuance of statements on issues, publication in the media, and dissemination of reports (Mosley & Jarpe 2019).

When a network engages in advocacy work, how can we know whether it is capable of influencing policy processes? In the interest group literature on influence, it is assumed that access to policymakers is a necessary condition for influence (Beyers 2002). Although actual influence is extremely difficult to measure, the advantage of studying access is that it is observable (Binderkrantz & Pedersen 2016). In line with this, the outcome in this study is measured as access rather than policy outcomes. The assumption is that interest groups with access are more likely to gain influence than groups without access (Binderkrantz & Pedersen 2016). Access is attained "when a group has entered a political arena (parliament, administration, or media) passing a threshold controlled by relevant gatekeepers (politicians, civil servants, or journalists)" (Binderkrantz & Pedersen 2016, p. 307). Following this definition, access will here be operationalized as direct contact with (meetings, seminars, etc.) policymakers (politicians and bureaucrats at the local, regional, and national levels) and op-eds in newspapers and mentions in news articles.

3. Data and methods

The study is a qualitative case study of how two governance networks engage in the governance of the transformation to low- and zero emission in Norway. NCE Maritime CleanTech and the Green Shipping Programme were chosen as units of study because they are very similar in structure and purpose, including the goal to influence policy. They are the only two formal networks in Norway with green shipping as a primary goal and that are uncommitted to a specific technology, and case selection therefore follows a "no selection at all" logic (Swanborn 2010). Despite some differences between the networks, such as number of participants, geographical location, and main way of seeking access, the outcome, access to media and policymakers, is quite similar for both. This has motivated the study of what the networks have in common that can explain the outcome.

The core data material for the study comprises semi-structured interviews and documents. From January to April 2019, I interviewed seven members of the Green Shipping Programme, six members of the NCE Maritime CleanTech, and one representative from the NCE Maritime CleanTech administration. The interviews were semi-structured with a set of questions asked to all informants. The questions concerned the member's role and participation in the network, the resources the member brings into the network, and how those resources are utilized. The selected informants were representatives of members who knew the network well because they took part in establishing the network and/or because they were of the most active members. Appendices I and II show the selection of members that were interviewed from each case network.

The selection of members was based partly on my request and partly at the discretion of the network administrations. One of the networks requested to select members to avoid research fatigue on members. This entails that the chosen members are not representative of all network members. However, I claim that the analysis of the characteristics of these members provide the basis for a valid understanding of the capacity of the network to engage in policymaking, because they are the members with the most experience from network activities and with the most knowledge about internal dynamics of the network.

I also make use of nine background interviews conducted in November 2017 through February 2018 with actors who participate in the discourse of greening the shipping sector (i.e. one public organization, environmental organizations, and industry associations). The interviews were conducted in the beginning of the study, with the purpose to get an overview of the status of the maritime sustainability transition, which actors are central and the role they play, and which social forces drive and block the transformation. A majority of these informants were in some way linked to NCE Maritime CleanTech and the Green Shipping Programme.

Where organizations are identified by name, the informants have consented to this. As the representative of one private company requested not to be identified by company name, I have chosen to remove the names of all private companies. Some informants may be indirectly identifiable, but all informants have consented to this.

The analyzed documents are media articles, newsletters, publicly available documents, and nonofficial documents about the networks from establishment to 1 January 2019. The media search was done in the newspaper database Atekst in January 2019 and includes all news articles in the Norwegian media that mention either of the networks. Documents about network activities include brochures, network web pages, official and internal reports, and minutes from member meetings.

4. Network activities and development

4.1. NCE Maritime CleanTech

Since 2011, NCE Maritime CleanTech has been a cluster under the publicly funded cluster program. It was not evident, as one might think now, that the cluster would center on developing green shipping technology. The present CEO wanted to see if there was an interest in environmental technology in the southwestern region of Norway. She found that there was a growing interest in environmental technology in the maritime industry. She discovered that the trio of Wärtsilä, Eidesvik shipping, and DNV GL were already working together to test new fuel cell technology on the offshore supply vessel Viking Lady. Building on that trio, she reached out to other maritime companies and started to form a cluster. When the cluster was launched in March 2011, eleven companies and one research institution were formally tied together in the pursuit of promoting environmental maritime technology. During the first four years, the network grew slowly (see Fig. 1) and was dominated by the 12 founding fathers. During the next four years, 2015–2019, the number of members nearly tripled. In the early years, the administration had to actively build the network, but now they experience that potential members are nominating themselves. In total (as of December 2018), the cluster has had 122 members of which 80% are private companies, 10% are research and education institutions, and 9% are public organizations. Only one of the members is a business association (see Fig. 2. Some members have left, which is why the numbers differ in Figures 1 and 2).

The first public organization joined in 2012; it was not until 2016 that other public organizations followed suit. Eight of 11 public organization members joined during 2017 and 2018. NCE Maritime CleanTech thus developed on a business-centered platform but has grown more diverse with time.

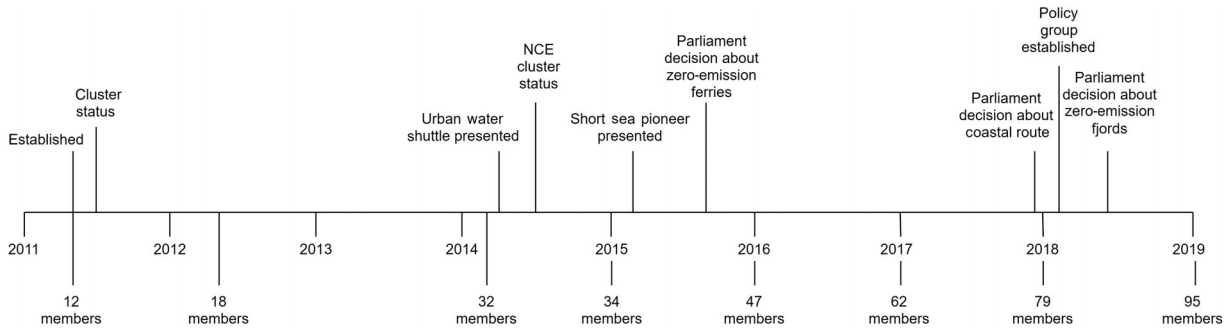

Figure 1 Timeline for NCE Maritime CleanTech.Sources: News articles and annual reports.

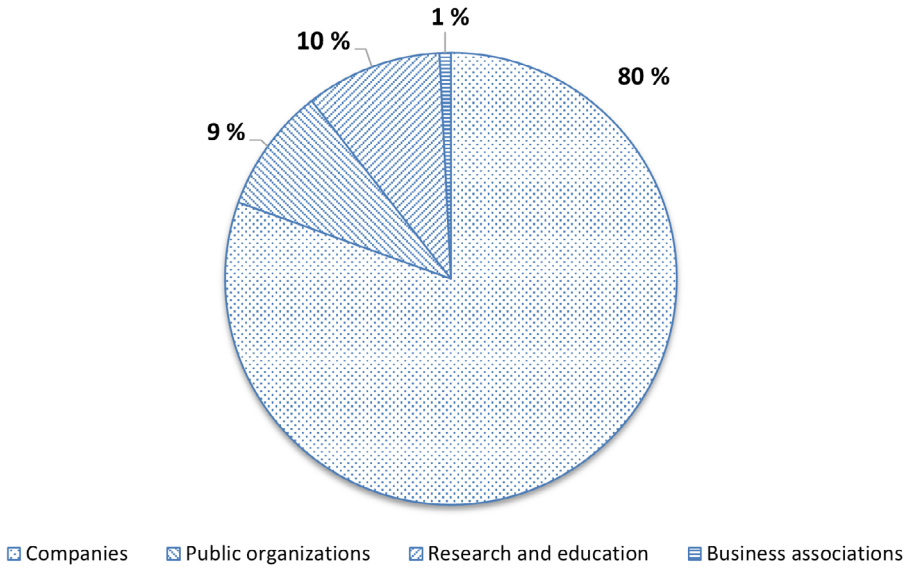

Figure 2 Distribution of types of members in NCE Maritime CleanTech.*N* = 122 members = total number of members 2011–2018.

The goal of NCE Maritime CleanTech is to "strengthen the cluster partners' competitiveness by developing and launching innovative solutions for energy-efficient and clean maritime activities" (NCE Maritime CleanTech 2018). A core activity for the cluster is to develop sustainable innovation projects. The "Urban Water Shuttle" (electric fast ferry concept) has earned the cluster international attention, and the concept is now being developed for the River Thames in London, Zenne Canal in Belgium, and Stavanger in Norway (NCE Maritime CleanTech 2019). Another key activity is to monitor decisionmaking processes of public authorities. Ever since its inception, NCE Maritime CleanTech has been calling for the public sector to take an active role as procurer and demand clean technology in public tenders within shipping services. They have reiterated this message in every round of decisionmaking for public tenders (see Fig. 2 for parliament decisions wherein NCE Maritime CleanTech has been lobbying). Their watchdog role became particularly prominent in the 2017–2018 tender process of the Norwegian coastal route for passengers and cargo (known as Hurtigruten), where NCE Maritime CleanTech teamed up with the environmental organization Zero and a fishing boat company to push for stricter emission requirements in the tender. They managed to get the tender back on the parliament's agenda, which resulted in an added bonus scheme for further emission reductions.

Table 1 summarizes the cluster's advocacy work. Although their main messages continue to revolve around public tenders, they also work with a range of other issues that they believe will enforce transformation. For example, together with Zero, the fishing boat company and allied politicians, they succeeded in getting the

Table 1 Network-led advocacy by NCE Maritime Clean Tech

Main messages	Issues	Tools for getting their messages through to policymakers
• The technology is ready. • The industry has developed the technology. It is now up to the public sector to create a market. • Norway can become a showcase for the world.	Main issues • Stricter emission reduction requirements in public tenders • Zero emission shipping in the fjords Other issues • Safeguarding of national industry • Economic incentives for maritime industry and shipowners • International fund for clean technology • Public sector lead in developing infrastructure for zero-emission shipping • Emission reduction requirements when issuing licenses for aquaculture, oil production and offshore wind industry	Main tools • Media coverage and op-eds • Show what is possible through pilot projects Other tools • Communicate state-of-the-art technology • Communicate industry needs to policymakers through presentations, meetings, and letters. • Direct input to politicians' policy formulation • Input in government meetings when invited • Nurturing of political contacts • Hosting seminars and workshops • Building network • Presentations at conferences

parliament to decide that by 2026, ferries and cruise ships have to operate with zero emissions in the Norwegian world heritage fjords (Zero 2018).

Over time, the cluster has woven a network of connections with politicians and bureaucrats, at both the local and national levels. The network administration is in regular contact with national-level politicians representing the west coast of Norway, as well as members of the Standing Committee on Energy and the Environment in the parliament. A number of the members have provided the cluster with political contacts. One example is the shipping company Eidesvik, which in its role as frontrunner had received political attention and could direct their political contact's attention to the cluster. Already in August 2012, the cluster was invited by the Norwegian Labour Party to provide input for the national transport plan. Politicians often participate in events organized by the cluster. For example, in the annual conference of 2018, politicians representing five Norwegian parties participated in a political debate. Less formally, when preparing their party platforms and parliamentary motions, political parties consult the cluster.

The cluster has received much media attention, and central individuals in the cluster have written op-eds. In total, NCE Maritime CleanTech is mentioned in 874 news articles: 401 mentions during the first five years. Political contacts, relations to bureaucrats, and media attention are the cluster's ways to access policymakers in order to deliver their messages.

4.2. The Green Shipping Programme

In January 2015 at the head offices of DNV GL in Norway, the Minister of Climate and Environment, the Minister of Trade, Industry and Fisheries, Equinor, the Norwegian Shipowners' Association, and 14 others signed a declaration of cooperation. They agreed to join forces to make Norwegian coastal shipping the world's most efficient and environmentally friendly; the Green Shipping Programme was established as a public–private partnership.

Much groundwork had been laid before the program was launched. The idea was conceived by the current program director from within DNV GL, a Norwegian quality assurance and risk management company with a long tradition as a classification company for shipping. He was backed by the CEO, and DNV GL financed a preproject to establish the program. The program director reached out to a civil servant in the Ministry of Climate and Environment. During the spring of 2014, they had informal communication about the idea, discussing the scope of the program and which actors to involve. The Ministry of Trade, Industry and Fisheries, industry organizations such as the Norwegian Coastal Shipowners, and the Norwegian Shipowners' Association were also recruited early on. Subsequently, DNV GL recruited Equinor, shipping companies, ports, and other industry actors.

The existing link between DNV GL and the Ministry of Climate and Environment was crucial in forming the network. Like NCE Maritime CleanTech, the Green Shipping Programme builds on prior relations. Already a decade ago, DNV GL started working on the application of battery power on ships and discovered an interest in batteries in the maritime industry. As a result, DNV GL established the Maritime Battery Forum in 2014. The key person behind the Maritime Battery Forum is the same individual who initiated the Green Shipping Programme. The new program built on both the already established Maritime Battery Forum and his personal network. He claims that "What Maritime Battery Forum did for me was […] that I got a nice infrastructure of [relations to] top executives and mid-level managers in the industry. This has been of great value to me and was important during the establishment [of the Green Shipping Programme]." The civil servant in the Ministry of Climate and Environment was also central in building the Maritime Battery Forum. Former relations and networks have hence been important for the start-up of both NCE Maritime CleanTech and the Green Shipping Programme.

At the beginning of 2019, the Green Shipping Programme had 50 members (see Fig. 3). The members represent the whole industry value chain plus public organizations, and this is the result of a conscious strategy. Of the 18 members that first signed the declaration of cooperation, there were 10 private companies, 3 public organizations, and 4 business organizations. From the start, the membership base has been more diverse than the first members of NCE Maritime CleanTech. In total (as of December 2018), the program has had 68 members (see

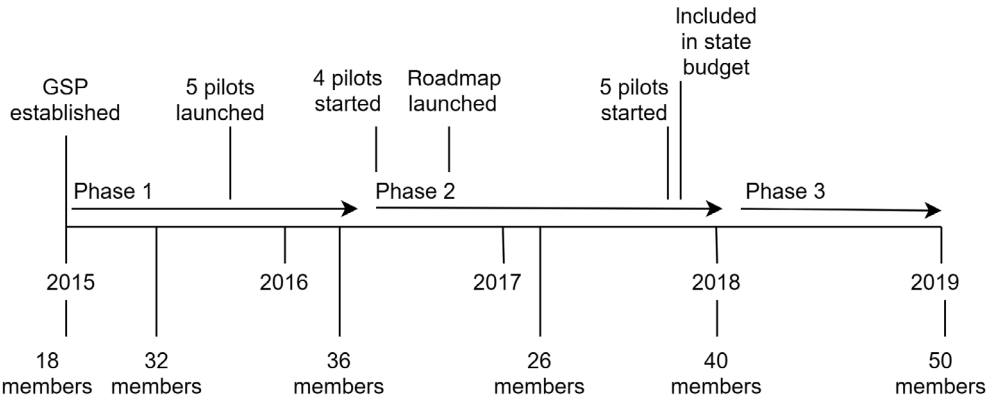

Figure 3 Timeline for the Green Shipping Programme.Sources: News articles, reports, and newsletters.

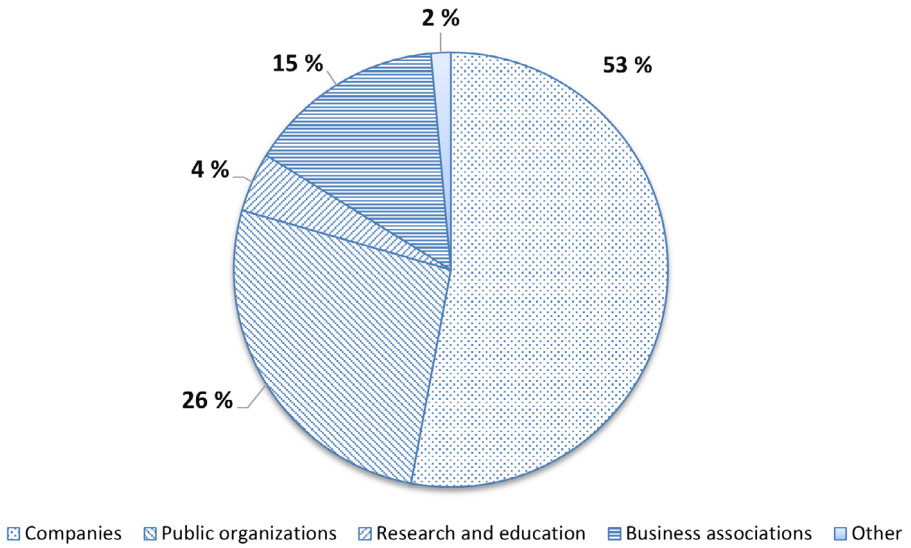

Figure 4 Distribution of types of members in the Green Shipping Programme.*N* = 68 members = total number of members 2015–2018.

Fig. 4), of which 53% are private companies, 4% are research and education institutions, 26% are public organizations, and 15% are business associations. (Bear in mind when the networks are contrasted, that NCE Maritime CleanTech has been a formal network for twice as many years as the Green Shipping Programme. The numbers are therefore not directly comparable.)

The vision of the program is to enable Norway to establish the world's most efficient and environmentally friendly coastal shipping. The envisioned results are cost-efficient emission reductions, economic growth, increased competitiveness, and job creation. The core activities are much the same as for NCE Maritime CleanTech. The Green Shipping Programme facilitates pilot projects which develop technical solutions on ships and projects that focus on identifying system barriers to transformation. Influencing policy is a second core activity. In 2016, the governmental expert committee on green competitiveness asked the network to produce a national roadmap for green shipping. The result was a "Navigational chart for green shipping" that set a goal of 40% reduction of greenhouse gas emissions in 2030 and a zero-emission target for 2050. The Green Shipping Programme has identified a range of barriers to a transition and have made these the core of their appeals to policymakers. They call for coordinated policies and incentives, "political push" and green markets. Table 2 summarizes the main messages, issues, and tools of the program's advocacy work.

The Green Shipping Programme has actively sought the attention of the media and has been mentioned in 221 new articles, which amounts to somewhat more than half the mentions NCE Maritime CleanTech got in their first 5 years. The Green Shipping Programme has focused on accessing policymakers. The program director has been participating in the Minister of Climate and Environment's advisory body and has been invited several times to provide input in formal meetings with ministries. The program's most important channels through which to access policymakers are through the bureaucracy. The program director confirms that they "cooperate very well with the bureaucracy." The fact that two ministries are members of the program is likely the reason for this "bureaucracy approach." However, the business associations also bring in other types of important relations to the network, which I will show in the next section.

4.3. Network characteristics and routes to influence

NCE Maritime CleanTech and the Green Shipping Programme have developed into highly formalized networks; they are purposefully established with a common goal and have their own resources (Musiolik & Markard 2011). They have formal membership agreements, a common vision, decisionmaking bodies, membership fees, and member meetings. Because they receive public funding, the network administrations must report on activities and budgets. They are also both brokered networks (Provan & Kenis 2008), as the network administrations are managing most networks activities and day-to-day operations. Even though both networks were initiated by the industry, they have developed in somewhat different manners. The Green Shipping Programme was started by a

Table 2 Network-led advocacy by the Green Shipping Programme

Main messages	Issues	Tools for getting their messages through to policymakers
• The technology is ready, but political push and green markets are lacking. • Transition requires investment and commitment from both the public sector and industry • Policy suffers from a lack of coordination. • The incentives are insufficient and inadequate because they do not address system barriers	Main issues • Lower electricity prices for shore power and charging • CO_2 fund Other issues • CO_2 tax-exemption for LNG • National plan for cleaner fuels • Job creation • More cargo on ships, less on roads	Main tools • Input in government meetings when invited • Meetings with policymakers • Studies and analyses Other tools • Media coverage and op-eds • Communicate industry needs to policymakers through presentations, meetings, and letters • Host seminars, workshops, and debates • Participate in the Minister of Climate and Environment's advisory body • Presentations at conferences • Show what is possible through pilot projects • Network building

large company (DNV GL) in collaboration with the Ministry of Climate and Environment. They chose a top-down approach for network building. NCE Maritime CleanTech, on the other hand, has pursued a bottom-up approach. They are more industry-heavy in terms of membership, and members from the public sector have joined only in recent years. These development paths are linked to somewhat different routes to influence. Both networks have relations to politicians and bureaucrats. However, the Green Shipping Programme has taken a "bureaucratic approach," while NCE Maritime CleanTech has moved through local politicians.

5. Node characteristics in advocacy work

The nodal governance framework (Burris *et al.* 2005) suggests that the characteristics of nodes are important for nodes' capacity to govern. Following this, I analyze the mentalities, resources, and tools of seven nodes in each case network. Appendices I and II provide the detailed analysis of each node's characteristics.

The *mentalities* of the members of NCE Maritime CleanTech and the Green Shipping Programme are multifaceted. The public organizations report that the main reason for joining a network is to implement public climate policy. Business actors are widely considered to be rational actors only concerned with maximizing profit (Downie 2018). However, in interviews, all the private companies and business associations report a dual motivation – on the one hand, a concern about climate change and the urgency of a transition; on the other hand, instrumental factors such as meeting potential clients, promoting their own products or (for business associations) attending to the needs of their members. For the companies (except one), a prerequisite goal of green shipping is that it must coincide with making a profit. This means that the informants do not subscribe to the notion that the responsibility of the company is only to maximize profit for shareholders (Friedman 1970). However, despite (varying degrees of) personal feelings of moral obligation, they acknowledge that they are constrained by the necessity of profitmaking (van Marrewijk 2003).

Cultural capital and *relational capital* are the *resources* that the informants point to as most significant for governance capacity. The broad picture is that business associations bring in lobbying experience; public organizations contribute with knowledge about and relations with the political and administrative system; and maritime sector companies bring in technological expertise related to the attainment of low- and zero-emission solutions. Adding to this, DNV GL and a few of the private companies in each network have knowledge about politics and relational capital that they have put to use in network-led advocacy work. For the Green Shipping Programme, the program would have been much weaker without DNV GL's close relationship with the ministries.

For NCE Martitime CleanTech, three private companies have been particularly important. One energy company brings in political skills and relations with environmental organizations and politicians. The political relations of a shipping company, resulting from their status as frontrunners, were a resource for NCE Maritime CleanTech in the early days of the network. Lastly, and very importantly for NCE Maritime CleanTech, is the fact that the CEO of the fishing boat manufacturer is an experienced "network builder" who provides a link to national politicians, other businesses, and influential environmental organizations.

Both networks demand an annual membership fee. In addition, members of the Green Shipping Programme contribute a given number of working hours. Although it is clear that some individuals invest much more time in network activities than others, when they were asked about *economic (capital)* contributions to the networks, the informants' responses did not indicate that economic capital was important for governance capacity. This supports Meckling's (2011) warning against viewing influence as flowing directly from financial resources.

When looking at the *tools* employed by individual actors, it becomes apparent that there is a large imbalance between the kinds of tools individual members have available and can use to reach their own and the network's goals. Tools are linked to resources. Business associations, which primarily contribute lobbying expertise as a resource, use tools like meetings with policymakers, op-eds, letters, and responses to hearings. Companies that lack such tools may engage in initiating and sustaining the network, for example, through board membership. Public organizations play an interesting role in the Green Shipping Programme when it comes to policymaking. The individuals who represent public organizations are bureaucrats. However, they are connected with politicians and therefore may function as gatekeepers for access to politicians. This is the case of the Ministry of Climate and Environment in the Green Shipping Programme, where the contact person in the ministry has the minister within reach. Even so, the gatekeeper role is limited to the domain of that particular public authority.

A large share of the tools of influence in use are in the hands of the network administrations. Both NCE Maritime CleanTech and the Green Shipping Programme have administrations for day-to-day management. One person is funded to manage the Green Shipping Programme and NCE Maritime CleanTech had seven employees in 2018. Several of the informants describe the role of the administrations as crucial. Both contribute by performing administrative tasks like planning and budgeting, recruitment, and attending to members, making meeting rooms available and hosting meetings and conferences for the members. They write op-eds, are media contacts, and meet with policymakers. The administration of the Green Shipping Programme, which is held by the DNV GL, is a critical factor in initiating pilot projects. The project leader comments: "People always have so much to do. […] You are in dialog with the industry all the time, and you see possibilities that they may themselves be the source of. If this is put on paper and is suggested to them, it is actually their own idea that we have put on paper.". He tells me that "Most often it is us who take the first steps. Then they come on board and can become pilot leaders." and "If you help people to calculate environmental gains, feasibility, and economy for green technologies for their own ships, then they get started. But if they are left alone, in many cases they are not capable of taking the first steps. So, we are actually helping them to take the first steps." The administrations have become superstructural nodes, as they are the command centers of the networks that "magnify or focus the power of individual nodes through creating nodal assemblages" (Burris *et al.* 2005, p. 43).

In terms of advocacy, the history and organization of the networks matter for the power balance within the network. DNV GL continues to hold a prime position in the network, as they hold the administrative function. They are contributing heavily, providing resources such as work hours, administration of partner meetings, facilitation of meeting premises, communication services, and web pages. They also set the agenda for and chair the partner meetings. Consequently, DNV GL is the most influential member when the Green Shipping Programme engages in governance and lobbying. Despite the large administration of NCE Maritime CleanTech, participation in advocacy is here slightly more dispersed among key members. This is ensured by the board, along with the establishment of a resource group for policy work. This group comprises members with high relational capital, which is used in the network's advocacy work.

6. Network dynamics in advocacy work

The members report many reasons why network organization may provide more leverage to influence the course of events. To begin with, the networks tie together actors who bring in various resources. The representative from DNV GL explains the value of including participants from the entire value chain in the Green Shipping Programme: *To have all private and public key competencies and functions around the table is producing large effectiveness in design, assessments and problem-solving. Results can be produced fast with good quality and everybody is learning in the process*.

Since the networks are open to many types of organizations, actors whose paths normally do not cross, now get a chance to meet, share experiences and collaborate. The constellations differ from established maritime sector supply networks. One example is that, as procurers of ferry services, the Norwegian Public Roads Administration is a member of the Green Shipping Programme. A representative from the Norwegian Shipowners' Association points to the value of broad membership:

> *…they [the Green Shipping Programme] build networks of actors that normally don't talk to each other. Not many of our members talk often to the Norwegian Public Roads Administration. This is an arena to do just that. You connect suppliers in a different manner than in a usual supply chain.*

A technology and service company representative in NCE Maritime CleanTech states similarly: *It gives us access to other* [kinds of] *meeting points than what is normally seen in our business*.

Based on this insight, we can identify one trait of networks as the ability to link together actors with different characteristics in new ways. Not only seems diversity to be important, but the constellation of actors is crucial. When NCE Maritime CleanTech seeks access to policymakers to advocate stricter emission reduction demands in public tenders, they draw on the political relations of members, the communication expertise of the administration, and the technical expertise of other members, and this enables them to communicate credibly that "the technology is ready." In network activities, the resources and tools of different members can be matched,

rearranged, and put together in new ways, which provides leverage to the networks to pursue their goals. Such network dynamics give *legitimacy* to the network, and as argued by several informants, being a member of a network gives legitimacy to the individual member in their pursuit to fulfill their goals in pilot projects and advocacy work. This is due to an assumed neutralization of individual interests, access to resources, and matching of resources. First, some informants expressed that policymakers are more likely to listen to a coalition of actors rather than individual businesses. The representative from the fishing boat manufacturer explains why they decided to join the network:

> *If I go to the Ministry of Fisheries and say that diesel tax [exemption] is bad, then I'm just a business actor. If I and my competitor […] create an association, and then go to the Ministry of Fisheries and say that subsidies are bad, then [they will say]: "We'll take a look at that". […] Being part of something bigger gives leverage. […] Numbers matter; size matters.*

The same person says: "[As a member of] Maritime CleanTech […] you are perceived as being more neutral than if you are talking only on your own behalf."

Both network administrations emphasize the importance of giving a unison message to policymakers, lending support to the uniformity hypothesis of Nelson and Yackee (2012). The CEO of NCE Maritime CleanTech asserts: "It is very effective when politicians get a unison message from the industry, that 'We can do this.' We manage to speak with one voice. The politicians are very concerned about that; otherwise they get confused."

Second, several of the informants who represent companies emphasize that the networks provide access to means by which to influence policy, something they are unable to do on their own because of lacking resources and experience. Conversely, members who have lobbying expertise, point to their dependence on the expertise of the technology companies: "We don't have expertise in battery technology or other [technologies], so we are ourselves dependent on these networks to be able to give substantial input to the authorities (Norwegian Shipowners' Association representative)." In the case networks, actors with such lobbying and technical expertise meet and collaborate.

Third, legitimacy derived from pilot projects and other network activities may provide leverage when lobbying:

> *One thing is to work politically, as we often do. We are in the Parliament […], but to have that platform, that arena where you can develop pilots […], I think that is important. It makes us more relevant when we lobby, […] because we can show that we take actual steps […]. It makes us more trustworthy when we lobby. (Norwegian Ports' Association representative)*

We have now seen that organizing in networks strengthens the legitimacy of the network and its members in advocacy work. The networks are dependent on being perceived as legitimate by policymakers to gain access. The quotes reported imply that organizing in networks gives leverage that individual businesses and even industry organizations on their own would not have. The network gives members a platform for advocacy work that some of them would not have had otherwise. Because advocacy is not the only purpose of the network, the network also attracts members whose main motivation is not the opportunity to lobby, and hence would not otherwise have sought other options like lobbying individually or ad hoc coalitions. The interview data revealed how another trait of networks, *flexibility*, supports the legitimacy of the networks. Because actors in governance networks are autonomous (Klijn & Koppenjan 2014), the goals of the network as a whole and the goals of individual members may deviate from one another. In the cases in this study, network organization overcomes such differences in a favorable manner in advocacy work. In some instances, the network administration can be more radical about environmental targets than individual members. For example, one energy company, although it was a member of NCE Maritime CleanTech, did not take part in advocating a ban on emissions in Norwegian world heritage fjords, because this issue conflicted with their business model. Nevertheless, they did not interfere by trying to prevent NCE Maritime CleanTech from advocating this issue. In other instances, individual members can go further, whereas the network administrations are constrained by norms or loyalty to their public sector funders. The Norwegian Shipowners' Association, which was among the first in the country to set an emission reduction target for shipping, notes:

An employee in NCE [Maritime CleanTech] or the Green Shipping Programme will have a different [weaker] opportunity to be tough in the media or when they go to the Parliament or the ministries and insist on their demands than us who are [financially] independent. It is this interaction that works well. We can bring out the best in each other. We can take on some roles, and others can take on other roles. They can host a conference, create an arena, and then we can give a sharper message. But in that case, we are in agreement about what we say.

One member of NCE Maritime CleanTech who is strongly committed to transforming the Norwegian maritime sector has been particularly outspoken about what he regards as too low environmental requirements in public tenders for shipping: "Sometimes I can say things that are not appropriate in an organization. Then I can be the guy with the big mouth, without anyone else getting hanged for it." This dynamic depends on very committed members and is probably rarer.

It may be viewed as paradoxical that the networks have public sector members, yet lobby to influence public policy. The networks do not acknowledge this as a problem. The issue is also avoided by the flexible nature of networks. When the Green Shipping Programme promoted an industry-managed CO_2-fund, this was negotiated with the Ministry of Climate and Environment outside of the scope of the program. The ministry simply did not take part in the program's discussions on the issue.

Flexibility supports legitimacy of a network since individual members may remain passive or step outside of the network when their vision is less ambitious or more radical than that of the network. Eventually, more radical policy suggestions can be put forward. The flexibility in mentalities documented here seems to be an advantage that such networks have over advocacy coalitions, where common policy beliefs is what makes actors stick together (Sabatier 1998).

7. Discussion

The narratives about NCE Maritime CleanTech and the Green Shipping Programme reveal that they have gained access to the media and policymakers. This access can be explained by (1) the relational capital of members and the networks' administrations, and (2) legitimacy gained from matching the various resources and tools of the members, (3) which is reinforced by the flexible nature of governance networks. I assume that access to media and policymakers increases the governance capacity of networks, and I claim that the governance capacity gained by the networks is a result of how organizing in networks allows for mobilization and exploitation of the resources of individual members.

The nodal governance framework enables an analysis of how individual nodes take part in governance through networks. The framework focuses on governance capacity as an effect of individual nodes' power to govern due to their characteristics. This study also shows how the governance capacity of networks increases because several nodes' characteristics are combined through network organization; the tools and resource of nodes are matched in new ways within the network, which provides legitimacy to the network and therefore access to policymaking. This argument is valid for both the "bureaucratic approach" used by the Green Shipping Programme and the "politician approach" used by NCE Maritime CleanTech.

The study endorses the nodal governance framework as a fruitful framework to better understand network governance. The article contributes to the development of the framework in two ways. First, the notion of access has so far been underdeveloped in nodal governance. For the purpose of explaining access to nodes in a policymaking position, the framework has not been adequate. I have therefore borrowed the concept of access from advocacy and interest group literature to amend this fault. This maneuver has yielded insight in how the internal dynamics of the networks is linked to the attainment of access to policymakers. Yet, I have not distinguished between different types of access strategies, such as insider and outsider strategies (Gais & Walker 1991). Different access strategies can give access to different categories of policymakers (Eising 2009). The access dimension may therefore be elaborated on in future research to see whether different access strategies are linked to different constellations of nodes and resources.

Second, the nodal governance framework suggests that tools and resources are important for governance capacity but is obscure on how these elements interact within networks to enhance governance capacity. The

superstructural nodes in the case networks are important for network building by enrolling the resources of other nodes, which is a core argument of the theory. However, they are dependent on expertise of other actors. We know that pooling of resources and presenting a unison message supports access in network-led advocacy (Nelson & Yackee 2012). This study shows the importance of including actors with a diversity of resources in governance networks. In particular, the combination of technical expertise, lobbying expertise, and relational capital has been shown to be decisive for the case networks to gain access to participate in governance. This is likely to be valid in for governance networks working for sustainability transitions in similar contexts, but remains untested.

This study is restricted to one sector in one country, and therefore the findings cannot be generalized to every kind of governance network. I propose that the findings can be relevant for governance networks working for sustainability transitions in similar contexts: First, transforming the maritime industry requires implementation of new technology as well as new policies and regulations. Policymakers often have limited insight into the technical challenges of transformations, which makes them more dependent on external technical expertise. Second, in Norway, the government and the shipping industry (at least a large part of it) share the goal of emission reduction, as it is seen by both to potentially boost Norwegian maritime industry. Trust is relatively high between Norwegian business leaders and policymakers (Gulbrandsen 2007). The findings may be valid for other industry sectors with these conditions, such as the offshore wind industry, aviation, and carbon capture and storage (CCS), in countries with a similar economy.

Some additional limitations are important to mention. The case networks are specific types of networks and are well-functioning. The study does not look at informal networks, dysfunctional networks, NGO- or public sector-led networks, or network promoting single technologies. Also, this article focuses on the driving forces of advocacy and members that contribute productively to network activities, and does not describe the mentalities and resources of passive members. One grave limitation is that the study does not include a contrasting case that can challenge the findings of the study. Future studies should therefore compare networks of different kinds and compositions.

8. Conclusions

Governance networks have the potential to contribute to sustainability transitions. By studying NCE Maritime CleanTech and the Green Shipping Programme as governance networks and how they work for a transition in the Norwegian maritime sector, I have shown that such networks are able to access policymakers and therefore have the potential to participate in governance of the ongoing transformation to low- and zero emission shipping.

I claim that the networks have gained governance capacity as a result of organizing in a network structure, which has enabled the mobilization and exploitation of the various resources of individual members. A nodal governance perspective allows for seeing how a governance network is built and gains strength. DNV GL has been a driving node in the Green Shipping Programme and has consciously built a network of actors to drive a green transformation. The initiator of NCE Maritime CleanTech built the network on local relations and common mentalities. Both networks have thus grown out of prior relations. The initiators have used previous relations and networks to enroll and activate other actors to work for a common goal.

The nodal governance framework explains outcomes primarily by how strong individual actors govern through networks by enrolling other actors and their resources. I argue that to explain the governance capacity of a network, we must also understand how the resources and tools of individual actors are matched in new ways within networks. Through network activities, mentalities, resources, and tools are "mixed and matched" in new ways. Matching of resources gives legitimacy to network-led advocacy and increases the chances of gaining access to policymakers. As the framework has previously been weak on the notion on access, I have borrowed the concept of access from advocacy and interest group literature and introduced it in the framework. The networks' legitimacy is also supported by the flexible nature of networks. When light is shed on these mechanisms, we gain a better understanding of the importance of networks in governing sustainability transitions. In particular, the combination of technical expertise, lobbying expertise, and relational capital proves to be important when

maritime governance networks seek to influence policies for a green shipping transformation. This is likely to be the case for similar governance networks that are pushing to implement sustainability transitions.

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Data Availability Statement
The data contain information about identifiable persons and are therefore not shared.

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APPENDIX

Characteristics of nodes in NCE Maritime CleanTech

Node	Mentalities and goals	Tools	Resources
NCE Maritime CleanTech (network administrator)	• "Strengthen the cluster partners' competitiveness by developing and launching innovative solutions for energy-efficient and clean maritime activities"	• Policy work group • Meetings with policymakers • Letters to policymakers • Op-eds • Conferences • Pilot projects • Agenda setter and leader of cluster activities • Planning and budgeting	• Project management expertise • Expertise in writing applications for funding • Communication expertise • Relations to decisionmakers: local and national politicians and the Norwegian Maritime Authorities • Relations with environmental organizations and other cluster organizations.
Technology and service company A	• Improve conditions for new technology • Global HQ: responsibility to develop technology for a more sustainable industry, and reduce own emissions	• Chairmanship of board • Central in establishment of cluster • Member of political resources group	• Leadership and strategy expertise • Technical expertise • Expertise in global markets and value chains • Global sales network
Shipping company	• Early mover in emission reducing technology on ships as part of strategy	• Board member • Central in establishment of cluster • Input to administration based on experiences • Meetings with policymakers	• Experience with new technologies • Show off successful cases • Database on fuel consumption on ships. • Relations to local and national politicians • Relations to oil companies
Propeller manufacturer	• A transition is urgent • Access to funding opportunities • Access to influence policy • Energy efficiency as part of strategy • Produces propellers that reduce fuel consumption	• Board member • Central in establishment of cluster • Input to administration	• Technical expertise
Technology and service company B	• Access to customers, partners, and funding opportunities • Aims to be a key player in clean maritime technology	• Contributed to the establishment of cluster	• Technical expertise
Energy company	• A change of the energy mix is necessary • Improve conditions for use of LNG as fuel • Reduce CO2 emissions from shipping, create growth, jobs, and new technology • Access to influence policy • Product: LNG • Planning production of biogas and hydrogen.	• Chairmanship of board • Leadership of political resource group • Meetings with policymakers	• Strategic expertise • Knowledge about politics • Expertise on gas and energy value chains • Relations to environmental organizations and key persons involved in green shipping
Fishing boat manufacturer	• CEO has a personal goal to reduce the world oil consumption by 1% • Wants access to influence policy • Produces electrical fishing boats	• Member of political resource group • Network builder • Presentations at seminars and conferences • Participates in debates • Meetings with national politicians	• Knowledge about political processes • Large network with relations with environmental organizations, national politicians, business leaders and journalists • Show off successful cases

Characteristics of nodes in the Green Shipping Programme

Node	Mentalities and goals	Tools	Resources
DNV GL (network administrator)	• Vision: Global impact for a safe and sustainable future • Reach national emission reduction goals	• Initiator of network • Project leader and administration • Initiates pilots • Meeting rooms • Material support • Agenda setter and leader of partner meetings • Writes meeting reports • Planning and budgeting • Meetings with policymakers	• Expertise in analysis, safety, technology, and regulations • Relations with ministries and the Norwegian Maritime Authority • Customers from the whole value chain. • Leader of precursory network
Ministry of Climate and Environment	• Implement governmental policy: Reduce emissions from domestic shipping by 50% by 2030	• State budget • Procurer of studies/reports	• Knowledge about departmental policy processes • Knowledge about IMO policy processes • Vast experience with policy work for green shipping • Large network
Norwegian Coastal Shipowners	• Transitions will and must happen • Attend to the needs of the members	• Meetings with policymakers • Data gathering from members • Recruits own members into the program	• Knowledge about coastal operation • Lobbying expertise • Relations to other networks, labor organizations, politicians, ministries, the Norwegian Maritime Authority, and the Norwegian Coastal Administration
Norwegian Shipowners' Association	• Attend to the needs of the members • Early mover on emission targets: Norwegian shipping shall become zero emission. • Global mentality	• Events • Meetings with policymakers • Letters to policymakers • Conferences • Show off cases • Network builder • Bring in members to participate in pilots	• Lobbying expertise • Knowledge about politics and policy processes • Can promote network goal to members • Member of the Norwegian delegation to IMO • Close relations with ministries
Technology and service company C	• Access to information about market developments to prepare for the future • Be a driving force for transformation • Global HQ: supports the Paris agreement and carbon pricing as a measure; own emission reduction goal; clean technology as important element in competition	• Participates in discussion groups for policy influence upon invitation	• Technical and cost expertise
Norwegian Ports' Association	• Transitions will happen, and ports will play a role in it • Attend to the needs of the members	• Member of program advisory board • Responds to hearings • Opinion pieces on own web pages	• Knowledge about ports • Lobbying expertise • Can recruit members • Can bring in expertise electricity companies • Relations to policymakers
Oslo municipality and Port of Oslo	• Implement municipal policy: reduce emissions from port activity by 50% by 2030 • Electrify ferry transportation and establish shore power • Participation in Green Shipping Programme is part of the port action plan	• Invites the industry to meetings • May use financial regulations • Express desired industry action	• Knowledge about municipal policy processes • Experiences from Port of Oslo • Access to bureaucracy and local politicians • Relations with county administrations