E. FUTURE TRENDS IN MARITIME TRANSPORT SUPPLY AND RELEVANT REQUIREMENTS

1. Supply of maritime cabotage services

Cabotage is defined as sea transport of passengers, goods and materials between two ports located in the same country, irrespective of the country in which the seagoing vessel is registered. Cabotage encompasses domestic shipping operations; these include domestic trade, as well as operations related to transhipment. Cabotage may involve tramp or liner operations and a variety of cargo-handling techniques.

In many countries, cabotage is limited to nationally flagged ships for various reasons, including the following: to promote shipping and national transport capacity, reduce the adverse impact of freight expenditures on the balance of payments, facilitate international trade in a predictable and stable environment and ensure strategic deliveries and shipments. The box below provides a summary of how these limitations are expressed in commitments contained in schedules derived from trade negotiations and agreements and in applied regimes. Commitments are usually worded in a manner that contains an overall prohibition to provide cabotage services, although in some conditions the provision of such services is allowed.

In practice, cabotage restrictions are not always rigidly applied in developing countries. Services are often operated by foreign companies, subject to complying with authorizations and other requirements and flagging in the country concerned. In some cases, this way of operating can cause serious disruptions in providing door-to-door services, suggesting that restrictions may be more burdensome than necessary to achieve an efficient maritime industry.

Different regimes for cabotage may have different implications for a country's shipping connectivity, as they may facilitate the combination of national, regional and intercontinental shipping services. This will be discussed in more detail in chapter 6.

Box 2.1. Cabotage in trade agreements: Scenarios, conditions and examples

Overall prohibition: Foreign services providers cannot provide cabotage services

- Cabotage is limited to nationally flagged vessels.
- Cabotage is open solely to national carriers.
- Vessels providing cabotage services must be owned by nationals or companies legally established in the country concerned and registered as shipowners in the national shipowners registry.
- National vessels that operate cabotage services must meet the following conditions: if the owners are natural persons, they must prove they have (local) nationality and domicile; if the owner is a company, it must provide evidence that half plus one of its shareholders are (local) nationals domiciled in the country, that at least 51 per cent of the registered voting shares are owned by nationals, that the company is controlled and managed by nationals and that it is up to date in meeting its social and tax obligations.

Exceptions: Cabotage services can be provided under certain conditions

Allowed for some (trading) partners; subject to reciprocity or in case of regional integration	Allowed for trading partners, in case of bilateral or multilateral agreements that grant cabotage rights to trading partners on a reciprocal basis, to encourage trade and promote regional economic integration
Allowed for some operations or under certain conditions (subject to authorizations and other requirements)	After undergoing registration, foreign shipping companies may transport self-owned or leased empty containers between certain designated coastal ports. National and foreign maritime (cabotage) transport companies must have authorization and an operating permit. These are granted for an indefinite term, provided that the company respects the conditions originally required for their granting. To obtain such a permit, foreign shipping companies must have a shipping agent in the country concerned. Cabotage may be allowed if reciprocal treatment is offered, if the activity is for the purpose of scientific research or environmental protection or if it is in the interest of the State concerned. Foreign ships may perform (cabotage) activities where a non-nationally registered duty-paid ship is available or suitable. There are no limits on the number of waivers for foreign ships to engage in cabotage. A waiver application for a temporary coasting trade licence involves a search for a (national) suitable ship and a labour market test if a company seeks to crew its vessels with foreigners.

Source: UNCTAD secretariat, based on information from the Integrated Trade Intelligence Portal Services database (World Trade Organization and World Bank).

2. Gender issues: Assessing gender aspects in shipping

In shipping, men make up the majority of the workforce. In 2015, out of the estimated 1,647,500 seafarers in marine operation roles employed in the global merchant fleet, about 16,500 seafarers, or 1 per cent, were women (Baltic and International Maritime Council, 2015). In particular, 0.4 per cent of ratings and rating trainees, 0.7 per cent of officers and 6.9 per cent of officer trainees were women. The latter number suggests a likely increase in the number of women seafarers.

A survey conducted in 2016 by the Maritime HR Association indicates that the share of women in global onshore maritime employment strongly depends on the level of hierarchy. The share is largest in administrative positions (74 per cent of the provided data) and balanced in junior positions (55 per cent). The share decreases with regard to senior positions: Women occupy 37 per cent of professional-level positions and 17 per cent of manager-level positions. At the director level, 12 per cent of positions are filled by women, compared with 9 per cent at the executive level.

Women were most likely to be found in corporate support roles such as in human resources and finance. They were least likely to hold positions in ship management (9 per cent) (HR Consulting, 2016). A similar trend can be seen in national shipowner associations. For example, the International Chamber of Shipping found that only 6 per cent of national board members were women, 30 per cent at director or policymaking level and 86 per cent at support level (Orsel and Vaughan, 2015).

Combined with other factors, the lack of women in senior positions translates into a gender pay gap. While no global data are available, in the United Kingdom, there is a national average gender pay gap of 19 per cent. In comparison, the difference between the mean hourly rate of men and women employees in the maritime sector is significantly higher and translates to 39 per cent across the 26,000 employees covered by a survey of the Maritime HR Association (HR Consulting, 2017). When comparing pay by gender within job levels, the pay gap was at 8 per cent at the junior or professional level, increasing with seniority (Spinnaker Global, 2017).

Another dimension to be considered in this area are health-related issues. Owing to concerns that medical handbooks aimed at women seafarers might not take a gendered approach to health or might be outdated, the International Maritime Health Association and its partners conducted a survey on the health and welfare needs of women seafarers. According to the survey, the main health challenges were joint and back pain (particularly on passenger ships in catering and room services, less so on cargo ships), stress, depression, anxiety, obesity and heavy or painful menstrual periods. Some 55 per cent of the respondents linked their health problems to working conditions. About 40 per cent did not have access to a sanitary bin and 17 per cent considered sexual harassment to be a current challenge. In an earlier pilot survey when the question was not restricted to current experiences, 50 per cent stated that sexual harassment was a problem (International Maritime Health Association et al., 2015).

Based on a shortage in the supply of officers and the need to guarantee equal opportunity for all genders, Governments and industry should take measures to facilitate the uptake of women in shipping, ensure equal pay and improve retention rates. It is expected that the estimated shortage of 16,500 officers in 2015 will grow to 147,500 by 2025 (Baltic and International Maritime Council, 2015). Public and private sector initiatives can include targeted recruitment, support for employees with caring responsibilities (such as work arrangements to switch between vessel-based and shore-based positions), unconscious bias awareness training, mentoring, internal networks, talent pipelines and consistency in salary decisions (HR Consulting, 2017). Given the scarce data available on the topic, further research should be conducted to tailor instruments to the needs as fittingly as possible (Women's International Shipping and Trading Association, 2015). Organizations working on the issue should exchange information and collaborate to use resources as effectively as possible and raise awareness in industry and politics.

To improve the working and living conditions of women aboard shipping vessels, simple and low-cost interventions can help substantially. The production and distribution of gender-specific information on the aforementioned health problems can support their mitigation. A diversity charter signed by shipping companies and seafarer organizations can support the change of corporate cultures. Prevention and investigation of cases of sexual harassment and bullying aboard should be standard policy. Solutions for the disposal of sanitary waste on all ships and availability of women-specific products in port shops and welfare centres should be ensured (ILO, 2016; International Maritime Health Association et al., 2015; Orsel and Vaughan, 2015). Furthermore, gender-blind measures such as rejoining and long-service incentives, an open-door policy in company culture, better accommodation aboard and facilitated communication between seafarers and their families can help improve retention rates (Women's International Shipping and Trading Association, 2015).

3. The future of liquefied natural gas fuel

Liquefied natural gas carriers are the vessel type with the highest growth rate in deadweight tonnage (table 2.1), and liquefied natural gas as shipping fuel is experiencing growth as well. This trend is developing in a context of tightening environmental policies. For example, at the seventieth session of the Marine Environment Protection Committee, IMO members decided in its resolution MEPC.280(70) of 28 October 2016 that a 0.5 per cent mass/mass limit on sulphur fuel content in global marine traffic would go into effect in 2020.

Since 2015, even stricter regulations have been in place in the emission control areas encompassing the North American coasts and the United States Caribbean: The sulphur fuel content is limited to 0.1 per cent; comparatively low limits apply as well for the emission of nitrogen oxides (NO_x) and fine particulate matter (United States Environmental Protection Agency, 2010). The 0.1 per cent sulphur cap also exists in the North Sea and Baltic Sea sulphur emission control areas, and their regulatory scope will be extended to nitrous oxides as of 2021, in line with the decision of the seventy-first session of the Marine Environment Protection Committee in July 2017 (Danish Maritime Authority, 2017). Also, greenhouse gas emission regulation is gaining support in the maritime sector: the Committee at its seventy-first session adopted a mandatory data collection system for fuel consumption of ships, which will provide the basis for the comprehensive IMO strategy on greenhouse gas emission reduction scheduled for adoption in 2018 (European Commission, 2016). Other steps are being taken in that direction; for example, the European Union announced that maritime transport would be included in the European Union Emission Trading System as of 2023 if the IMO has not implemented a greenhouse gas reduction scheme by 2021 (*Täglicher Hafenbericht*, 2017). National administrations and ports are offering additional incentives to reduce emissions (European Commission, 2017). An example is the Swedish system for fairway dues, which calculates the fee according to the sulphur content of the fuel used by ships calling in Swedish ports (Swedish Maritime Administration, 2010).

In this context, local emissions can be reduced by using liquefied natural gas as a fuel, or, alternatively, a combination of other measures. For example, low-sulphur oil-based fuels, catalysts, particulate filters, scrubbers or exhaust gas recycling can also be used to this end. Depending on the circumstances, liquefied natural gas can be the more cost-efficient option and potentially reduce greenhouse gas emissions as well, contingent on the applicable well-to-wake pathway (Bureau Veritas, 2017; European Union, 2016). In addition, factors such as new regulatory requirements, an increasingly buyer-dominated liquefied natural gas market (*Shipping and Finance*, 2016; Lloyd's List, 2017) and technological progress, the fleet of vessels capable of using liquefied natural gas as fuel has increased.

While the percentage of liquefied natural gas-capable[3] newbuildings (measured in gross tons) was relatively steady at about 2 per cent from 2002 to 2013, it rose to 5.8 per cent in 2014, 4.3 per cent in 2015 and 5.3 per cent in 2016. The trend becomes particularly evident when considering the order book. While a slight increase is expected in 2017 (to 5.7 per cent), 13.5 per cent of the gross tonnage currently on order for delivery in 2018 onwards are from liquefied natural gas-capable ships (table 2.11 and figure 2.8).

As of 1 January 2017, gross tonnage had been distributed over a total of 325 liquefied natural gas-capable vessels delivered. Of these, 229 were liquefied natural gas carriers, 46 were offshore service and other cargo vessels, 39 were passenger vessels and 11 were other types of vessel. There were 110 liquefied natural gas-capable ships on order. In the category of liquefied-natural-gas-ready vessels – ships that are prepared for future liquefied natural gas retrofit – an additional 1,467,805 gross tons were in the fleet, and 3,708,483 gross tons were on order.

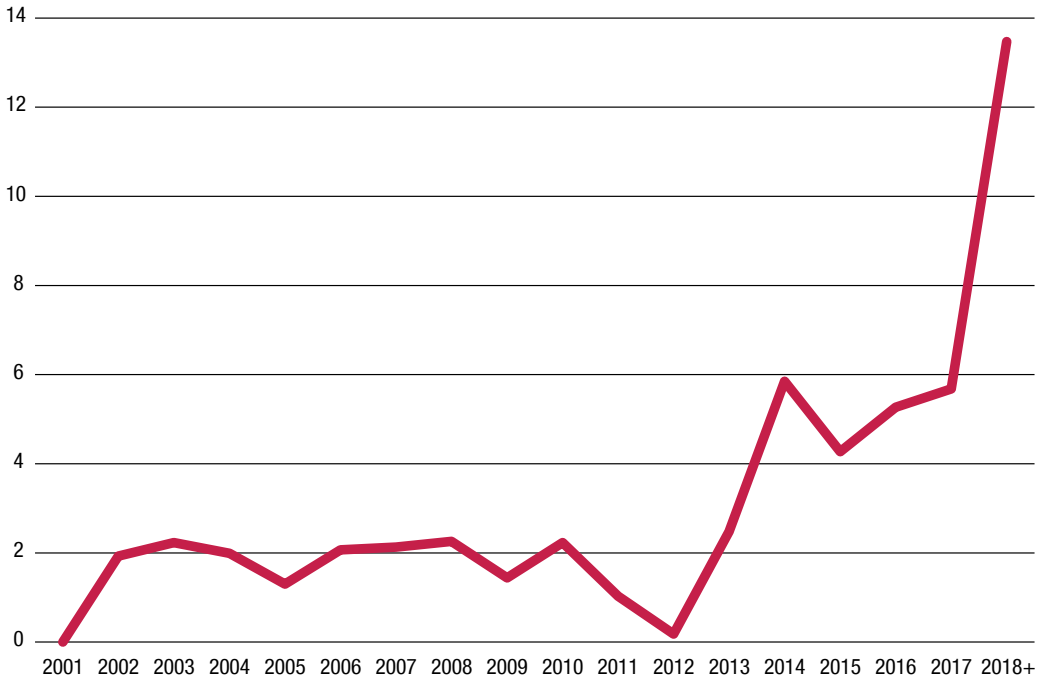
Table 2.11. Liquefied-natural-gas-capable newbuildings (Thousands of gross tons)

	Deliveries 2001–2016																Scheduled orderbook 2017–2018+	
Principal vessel type	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018+**
Oil tankers																	47	
Bulk carriers																		31
General cargo ships			131								4	3			23	30	57	
Container ships											11				34	34	17	149
Liquefied gas carriers		657	674	726	622	1 090	1 100	1 543	1 126	2 182	1 033	114	1 658	3 589	2 788	3 139	4 877	7 551
Chemical tankers						12	22									34	11	79
Offshore supply			10	94			87	6	6		5	31	5	120	19	9	18	169
Ferries and passenger ships						7	23		6	12	13	23	104	32	28	143	248	830
Other/not available																95	20	13
Subtotal built or on order		657	814	820	622	1 109	1 231	1 549	1 138	2 194	1 066	170	1 767	3 740	2 893	3 484	5 295	8 821
All other ships	31 267	33 412	35 662	40 395	47 059	52 454	56 623	67 060	77 878	96 298	102 684	96 444	69 414	60 178	64 862	62 598	87 936	56 669
Total gross tonnage built or on order	31 267	34 068	36 477	41 214	47 681	53 563	57 854	68 610	79 016	98 492	103 750	96 615	71 181	63 918	67 755	66 082	93 232	65 490
Share of liquefied natural gas-capable vessels (percentage)	0.00	1.93	2.23	1.99	1.30	2.07	2.13	2.26	1.44	2.23	1.03	0.18	2.48	5.85	4.27	5.27	5.68	13.47

Sources: UNCTAD secretariat calculations, based on data from Clarksons Research. Data on newbuildings are derived from the existing fleet and order book as of 1 January 2017.

Notes: Propelled seagoing vessels of 1,000 gross tons and above. For the period 2001–2016, information on the fuel type is not available for 6 per cent of the gross tonnage delivered. For 2017 and beyond, information on the fuel type is not available for 20 per cent of the gross tonnage on order.

Figure 2.8. Share of liquefied-natural-gas-capable newbuildings, as of 2001 (Percentage of gross tonnage)



Sources: UNCTAD secretariat calculations, based on data from Clarksons Research. Data on newbuildings are derived from the existing fleet and order book as of 1 January 2017.

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The routing possibilities for liquefied natural gas-powered vessels are limited by the relatively small number of ports providing liquefied natural gas bunkering facilities. However, this number is increasing, particularly along the main shipping lanes (European Union, 2016; DNV GL, 2014). Within the European Union, the Alternative Fuels Infrastructure Directive (2014/94/EU) requires all maritime ports of the core Trans-European Transport Network to provide liquefied natural gas bunkering until 2025 and all inland ports of the Network until 2030 (European Union, 2014).

From a government perspective, besides the environmental advantages, liquefied natural gas helps to broaden the fuel and energy supply and thus reduce oil dependency. Liquefied natural gas and oil exporters are mostly not congruent (International Energy Agency and Organization for Economic Cooperation and Development, 2016; International Gas Union, 2016), which allows for risk diversification. For countries with sustainably available biomass, replacing natural gas to the desired extent with domestic biomethane is an additional possibility – there is no blend wall as is the case with oil-based fuels.

In their approach to market development, Governments should introduce liquefied natural gas bunkering demand and infrastructure supply in a coordinated initiative to overcome the dilemma of one party's unwillingness to invest without an investment commitment from the other parties concerned. Coordination between industries can thus be an effective key to unlocking private sector investment, which is particularly relevant for developing countries, given the high upfront investment cost for liquefied natural gas infrastructure.

A further component of liquefied natural gas market development policy can be the linkage to port operations, hinterland road and inland waterway traffic, where vehicles could be operated using liquefied natural gas or compressed natural gas (German Energy Agency, 2014). To make the use of liquefied natural gas a success, high standards in bunkering and ship operations are required to avoid methane slip and ensure safety. The new mandatory IMO International Code of Safety for Ships using Gases or Other Low-flashpoint Fuels, commonly known as the IGF Code, came into force on 1 January 2017. It details the specific operational requirements for liquefied natural gas as a fuel to minimize risks to ships, crews and the environment. It is accompanied by training requirements for seafarers and the new ISO standard 20519 for the safe bunkering of liquefied natural gas-fuelled ships (IMO, 2017; ISO, 2017).

F. OUTLOOK AND POLICY CONSIDERATIONS

After years of oversupply, the lower growth rates of the world fleet and the declining order book suggest that demand and supply will be more balanced in the medium term. The composition of the fleet is adjusting, albeit slowly, to market demands with newbuildings and ship scrapping of different vessel types.

Given that different countries participate in different maritime sectors, policymakers need to identify their countries' possible niches. Earlier issues of the *Review of Maritime Transport* discussed this topic and options for policymakers in more detail (UNCTAD, 2011). The latest data presented in this 2017 edition of the Review confirm continued concentration and specialization. At times, policymakers will need to make choices between either protecting jobs in national shipping businesses or striving to increase trade competitiveness by improving connectivity and reducing trade costs, as the latter may imply opening up markets to foreign shipping service providers. As discussed above, one way to enhance efficiency may be to make maritime cabotage regimes more flexible.

To meet not only the requirements of importers and exporters, but also the demands and expectations of society and political commitments, maritime businesses should constantly revise and adjust their ways of doing business. Shipping – both onshore and offshore – is traditionally a male-dominated sector. By promoting the employment of women, maritime businesses may not only help to overcome shortages in labour supply, but may also contribute to achieving key Sustainable Development Goals.

Achieving environmental sustainability, including in maritime transport, is an imperative of the 2030 Agenda for Sustainable Development. An important development worth highlighting in this respect is the growing importance of liquefied natural gas as an alternative fossil fuel. In 2016, liquefied natural gas carriers and other gas carriers recorded the highest growth in deadweight tonnage, reflecting growing liquefied natural gas trade flows. Promoting liquefied natural gas-powered ships can reduce costs and promote clean energy, and hence address climate-related Goals.