Preface

This volume offers a comprehensive insight into the grand challenge of our time: climate change and how this challenge is addressed with regard to the transport sector. It is intended for all who are interested in sustainability related to transport law, policy, business and the circular economy (CE). The book is an indispensable resource for transport lawyers, industry professionals, politicians and decision makers as well as for teachers and students in all fields of transport, as it can also be used as a text-book for introducing the field.

The future challenges in global trade development and transport are to a certain extent contradictory. On the one hand, the global economy is based on a functional and efficient transport system; on the other, transport is one of the worst polluters of the modern world. Between 2013 and 2030, global trade in goods is expected to double in volume (measured in value).¹ Transport is responsible for 23 per cent of greenhouse gas (GHG) emissions in the European Union (EU), being the second biggest emissions sector after the energy sector, industry being the third.² The fact that the transport sector remains outside the EU Emission Trading Scheme (ETS) is an indication of the special nature of the sector. Moreover, despite different EU transport policies and action plans on greening transport, the transport sector has not shown the same decline in emissions as other sectors. On the contrary, whereas transport accounted for 15 per cent of total emissions in 1990, by 2000 that figure had risen to 20 per cent.³

In 2011, a Commission White Paper set the goal of facilitating a competitive transport system, increasing mobility and supporting growth (that is increased transport) while simultaneously reaching a target of 60 per cent emissions reductions by 2050.⁴ These numbers demonstrate both how important more

¹ For example, as estimated in PricewaterhouseCoopers, ‘Global Economy Watch’ (October 2014) <<https://www.pwc.com/gx/en/issues/economy/global-economy-watch/assets/pdfs/global-economy-watch-october-2014.pdf>> accessed 16 October 2018.

² Commission, ‘A European Strategy for Low-Emission Mobility’ (Communication) COM(2016) 501 final, ANNEX I: Historical developments in transport activity, energy use and emissions, 89–90.

³ Ibid.

⁴ More precisely, the 60 per cent target for 2050 is in reference to emissions in 1990, see Commission, ‘Roadmap to a Single European Transport Area – Towards

*sustainable development*⁵ would be for the transport sector and that actions thus far seem to have been neither sufficient nor successful in cutting overall emissions.⁶ In other words, a behavioural change in the transport sector is essential. The contributions in this volume take at face value the assumption that clean energy and digital innovations will bring about a change in the right direction. However, clean energy and technological development are not enough. In light of past performance and estimated development, the target of a 60 per cent reduction in CO₂ emissions by 2050 will not be reached without further *behavioural change* in the transport sector. This interdisciplinary volume examines how such a behavioural shift within the transport industry can be achieved by various organizational and legal means, focusing primarily on the European Union and its specific policies related to greening transport.

The great global challenge to which the above-mentioned transport-emission-reduction targets relate is global sustainability, that is, *economic, social and environmental progress while staying within ecological planetary boundaries*.⁷ One recent solution proffered to the dilemma of maintaining competitiveness while respecting planetary boundaries is the idea of

a Competitive and Resource Efficient Transport System' (White Paper) COM (2011) 144 final, 3.

⁵ The term has its origins in the UN's 1987 'Brundtland Report' (*Our Common Future: Report of the World Commission on Environment and Development*), point 27: 'Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.' In the era of the Anthropocene (see, for example, Will Steffen and others, 'The Anthropocene: From Global Change to Planetary Stewardship' (2011) 40(7) *Ambio* 739) sustainable development can be defined as 'development that meets the needs of the present while safeguarding Earth's life-support system, on which the welfare of current and future generations depends', David Griggs and others, 'Comment: Sustainable Development Goals for People and Planet' (2013) 495 *Nature* 305, 306.

⁶ The paradox regarding the greening of the transport market was the central question of a recent international seminar, Sustainable and Efficient Transport Systems, that took place at the University of Helsinki in April 2017. The organizers of the seminar – an interdisciplinary research group for Sustainable Business and Law (InterTran), University of Helsinki and Aalto University School of Business, in collaboration with the research group for Sustainable Market Actors (the SMART project) at the University of Oslo – are interested in various incentives to push or nudge the industry towards making environmentally friendly decisions.

⁷ On planetary boundaries see Johan Rockström and others, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity' (2009) 14(2) *Ecology and Society* 32. See also European Commission's European Political Strategy Centre (EPSC), 'Sustainability Now! A European Vision for Sustainability' (2016) *EPSC Strategic Note* 18, and Art. 3(3) TEU.

turning the EU market into a circular rather than linear economy.⁸ The origins of the CE as an idea and an academic concept, while hard to trace, extend to the 1970s, pre-dating the industrial manufacturing models of off-shoring and global supply chains. It is an antonym for the concept of 'linear economy' and linguistically, and at a general level, builds on the idea of a closed loop.⁹ By contrast, the linear economy is characterized by having an open loop or no loop at all.¹⁰ Beyond the conceptual history of the CE, which does not specifically engage with transport, there are political reasons, such as the leverage exerted by the transport industry, for transport not being integrated into the CE approach. Moreover, a further reason, so we argue, is simply path dependence. Both national and European politicians are far more familiar with a sectorial approach to society than with the integrated approach required for a paradigm shift towards living within planetary boundaries.

This is where our interdisciplinary approach to the transport sector makes a contribution, by relating transport to environmental concepts more broadly. For many disciplines – including law – the CE and planetary boundaries appear to be novel contexts or ideas, while for example in logistics and supply chain management, the ideas of reverse logistics and closed-loop supply chains have already been present for several decades.¹¹ However, the transport sector and related policies seem to have been practically sidelined in the integration of sectors of economic activity into the CE project. Hence, adopting an interdisciplinary approach, this volume examines the extent to which sustainable development in the freight transport sector could benefit the CE project. The aim is to bridge the gap between the CE and transport in both the literature and policy while including all transportation modes (road, rail, maritime, inland waterway, and air transport, as well as their multimodal combinations). Even though the role of freight transport has been neglected in the CE and mobility approaches and constraints exist to direct political action on mobility, this

⁸ Commission, 'Closing the loop – An EU action plan for the circular economy' (Communication) COM(2015) 614 final.

⁹ Ibid., 2. The closed loop is defined as a circular economy where 'the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised'.

¹⁰ Alan Murray, Keith Skene and Kathryn Haynes, 'The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context' (2017) 140(3) *Journal of Business Ethics* 369.

¹¹ See, e.g., Vaidyanathan Jayaraman and Yadong Luo, 'Creating Competitive Advantages Through New Value Creation: A Reverse Logistics Perspective' (2007) 21(2) *Academy of Management Perspectives* 56; V. Daniel, R. Guide, Jr. and Luk N. Van Wassenhove, 'OR FORUM — The Evolution of Closed-Loop Supply Chain Research' (2009) 57(1) *Operations Research* 10.

volume argues that emissions could also be lowered through various indirect measures.

A variety of reasons exist for the less than optimal results in greening transport. Based on the 2014 figures of the Eurostat *Labour Force Survey*, the European Commission estimates that the entire transport industry (freight and passenger services and manufacturing) employs over 15 million people, which amounts to 7 per cent of total employment in the EU.¹² The transport industry is not only an influential economic and political force in itself, but the services it provides are also considered essential for a competitive EU economy. The Commission calls mobility ‘an indispensable driver for the global competitiveness of the wider economy’,¹³ and thus the means for reducing emissions do not include decreasing mobility; on the contrary, increasing mobility is an expected and accepted vision of the future.

Looking at transport policies generally, Gössling and Cohen (2014) identify what they call the ‘implementation gap’, that is, the gap between scientific knowledge and its implementation into policy.¹⁴ Although they focus on the (political) taboos against addressing such gaps in passenger transportation, some probably apply by analogy to freight transport as well: for example, retaining speed-limit-free driving for cars in Germany is analogous to ensuring that shipping contracts do not promote slow steaming. Other features of passenger transportation that are also applicable to freight transport include the fact that transport emission mitigation strategies projected into the future tend to rely on technological solutions yet to be developed; that energy is lightly taxed and transport industry heavily subsidized; and that the industry effectively lobbies transport policies.¹⁵ (Political) unwillingness to implement policy changes in turn means that, for example, in designing global value chains, the cheap price of (maritime) shipping not only allows companies to prioritize many other economic factors above transport but, in fact, also means that global value chain decisions are not motivated by higher or lower transport costs and emissions at all.¹⁶ With regard to including the price of emissions in transport costs, or increasing the price of transport by raising taxes, the idea is

¹² COM(2016) 501 final (n 2) 11.

¹³ Commission, ‘Europe on the move: An agenda for a socially fair transition towards clean, competitive and connected mobility for all’ (Communication) COM(2017) 283 final, 2.

¹⁴ Stefan Gössling and Scott Cohen, ‘Why Sustainable Transport Policies Will Fail: EU Climate Policy in the Light of Transport Taboos’ (2014) 39 *Journal of Transport Geography* 197.

¹⁵ *Ibid.*, 200. Consider, for example, how the low or non-existent carbon taxes on old-fashioned ships’ bunker fuels skew the price of freight transport.

¹⁶ Dan Danielsen and others, ‘The Role of Law in Global Value Chains: A Research Manifesto’ (2016) 4(1) *London Review of International Law* 57.

often flagged that actions – albeit environmentally friendly ones – that increase the prices of cheap products or cheap alternatives are especially costly to the less well off in society, who earn less and hence suffer relatively more from a price hike. After all, much of what is transported are goods ultimately sold on the EU market.

SUSTAINABLE MOBILITY: A PARADIGM SHIFT

Sirpa Pietikäinen, the European Parliament's Rapporteur MEP for the 'Report on resource efficiency: moving towards a circular economy' (adopted in July 2015), states in the Foreword to this volume that 'Europe stands at a crossroads where it has the chance to invest in the future by turning to more sustainable production and consumption patterns through resource efficiency and reducing energy consumption.' She nevertheless underlines the necessity of a mindset change, together with circularity and digitalization, for achieving the desired change. Pietikäinen claims that '[t]he huge costs of the second option [of clinging to current disruptive patterns and unsustainable ways] can already be seen, and there is no question that these costs will become unbearable' if we do not 'change the whole system'.

THE TARGET OF SUSTAINABLE TRANSPORT AND THE NEED FOR SOCIAL ENGINEERING

The actions proposed by Commission policy instruments have been deemed necessary in order for the EU to reach its agreed climate targets while generally remaining competitive. As to the global goals, in this volume's first chapter, 'Responding to the grand challenge of our time', the leader of the SMART project, Prof. Beate Sjøfjell of the University of Oslo, raises a fundamental question for all research today: how can social progress be achieved for all while remaining within the planetary boundaries? Sjøfjell's chapter emphasizes the importance of the role of market actors (businesses, investors, consumers and the public sector in its many roles) and describes how multifaceted a sustainability question this really is and how it affects different legal issues. At a general EU level, the Commission has introduced two separate low-carbon economy plans, that is, the CE plan and the plan on a competitive and resource efficient transport system.¹⁷ These Commission documents form the starting point for discussing sustainable transport in the EU. The plan for an EU Circular Economy aims to transform the current linear economy into a sustainable circular economy. This means, in a nutshell, that 'the value of

¹⁷ COM(2015) 614 final (n 8) and COM(2017) 283 final (n 13).

products, materials and resources is maintained in the economy for as long as possible, and the generation of waste is minimised'.¹⁸ However, in the CE context, GHG emissions are not, as such, considered 'waste', and they are reduced only indirectly, by way of reducing the need for energy. Consequently, the only emissions mentioned by the Commission under this policy are those from the energy sector (a sector included in the European Emissions Trading Scheme, unlike transport). Thus, the Commission fails entirely to address the impact of the circular economy project on transport volumes.

The commission's second plan, its vision and strategy for a competitive and sustainable transport system, appears, *inter alia*, in the 2011 White Paper on a 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system'.¹⁹ Here, the goal is to facilitate growth in transport while simultaneously reaching a 60 per cent emissions reduction target.²⁰ A list of initiatives deemed necessary to reach this political target is presented by the Commission.²¹ A selection of initiatives in shipping is outlined by Prof. Erik Røsæg in Chapter 2: 'Measures for the sustainable shipping of goods'. Røsæg's chapter points out that law could enable social engineering, and could shape a greener society in respect of transport. A closer analysis reveals, however, that law developed over centuries does not always cope well with environmental challenges. New approaches are hence necessary. Viewed from a historical perspective, the 'Single European Transport Area' programme transformed the EU's Common Transport Policy into a Single Transport Area where economic objectives need to be balanced with environmental and social objectives in the modern world. In Chapter 3, 'The Single European Transport Area and sustainability of the transport industry', Prof. Rosa Greaves examines this transition, which serves as a platform for further discussion.

THE CIRCULAR ECONOMY AND DIGITALIZATION – TRANSPORT IN A GREEN MARKET

Most recently, the Commission's drive towards sustainable mobility has clearly emphasized passenger transport. This area of mobility is expected to change through a growth in the sharing economy, the perception of transport as a service bought on a needs basis, better infrastructure, and technical progress

¹⁸ COM(2015) 614 final (n 8), 2.

¹⁹ COM(2011) 144 final (n 4).

²⁰ *Ibid.*, 3. The 60 per cent target is set for 2050 and with reference to the emissions in 1990.

²¹ *Ibid.*, Annex I 18-30.

with zero-emission vehicles.²² However, when it comes to freight transport, a significant part of total freight transport volumes is accounted for by the global supply chains of transnational corporations, which data from 2013 suggest represent 80 per cent of total world trade.²³ Consequently, although passenger and freight transport policies may at times align, the current trend of perceiving mobility more and more as services is not the optimal mindset for reducing freight transport emissions. This is especially true if approached from the perspective of the consumer or end-user, as end-products, raw materials, or semi-finished products are transported around the world ultimately in order to offer goods to consumers. Nevertheless, freight transport has traditionally been considered a service disconnected from these goods – transport emissions for example are not necessarily included in ecological footprints of products – or just not considered at all.

By contrast, as stated above, the part that transport plays in (global) supply chains has long been clear and central for logistics (the science of analysing the flows of objects in networks). However, in some disciplines, when studying or assessing the sustainability of supply chains, product-related sustainability has received more attention than transport-related sustainability. Moreover, other disciplines, such as law, tend to approach trade and transport in isolation from each other. A change of mindset towards more sustainable freight transport requires an integrated interdisciplinary approach – such as the one adopted in this volume – where transport is considered more broadly as an integral part of product supply chains and end-products. While the key actors who can immediately affect the sustainability of supply chains are the supply chain members themselves, the incentives for a change of behaviour are both internal and external to the supply chain. These incentives can come from manifold directions and involve market-led or regulatory action and the use of various sized tools, as the chapters of this volume will show. Nevertheless, the overall question is how to integrate sustainable transport into supply chains as well as how to make sustainability visible throughout the supply chain and to the end-users. Chapter 4, ‘Organization boundaries: How to integrate transport operations in circular economy thinking. The timber case study’, by Prof. María Jesús Muñoz-Torres, Prof. María Ángeles Fernández-Izquierdo, Prof. Juana María Rivera-Lirio, Dr. Idoya Ferrero-Ferrero, Dr. Elena Escrig-Olmedo and José Vicente Gisbert-Navarro, discusses precisely this question: the impact of integrating freight transport processes into a life-cycle analysis with other

²² COM(2017) 283 final (n 13) 18.

²³ United Nations Conference on Trade Development (UNCTAD), *World Investment Report 2013* (UN Publications 2013), x.

system processes (for example extraction of resources, manufacturing process or retail).

A systemic approach to rethinking transport is also present in the Commission's initiative on the physical Internet. The 'physical Internet' is a new concept aimed at building industry-wide standardized service architecture with separate logistics layers. The idea is based on the structure of the digital Internet, where heterogeneous digital networks, technologies and manufacturers have developed into a unified, standardized network of networks. The aim of the physical Internet is to standardize containers, interfaces and protocols to reform currently fragmented and heterogeneous logistics networks into a resource-efficient and environmentally sustainable system. This new technical innovation should enable new business models in which green transport plays an important role. The promises and challenges of the approach are discussed by Dr. Mervi Rajahonka, Dr. Anu Bask, Dr. Sadaat Ali Yawar and Dr. Markku Tinnilä in Chapter 5, 'The physical Internet as enabler of new business models enhancing greener transports and the circular economy.'

The Commission emphasizes the role of private industrial and economic actors in the 'systemic change' of transitioning to a circular economy, stating, for example, that 'market-driven initiatives can be a fast way to deliver tangible results'.²⁴ However, concrete ways to boost such initiatives (beyond the public commitment of private actors) or encourage private financing for circular-economy-oriented businesses are missing from the toolbox – actions delivered by the Commission include (proposals for) legislating, standard setting and several sources of public funding (the EU's cohesion funds; Horizon 2020; LIFE).²⁵ A growing concern in the transition to the circular economy is how to lead investors towards green investments. This is discussed by Prof. Jukka Mähönen in Chapter 6, 'Financing sustainable market actors in the circular economy'. Observing the heterogeneity of different kinds of investors, Mähönen emphasizes the necessity of analysing the role of drivers and various obstacles in creating sustainable value.

Another important economic tool is the European Emissions Trading Scheme (EU ETS). The EU ETS is an economic instrument with centralized regulatory authority and an EU-level emissions cap. In Chapter 7, 'Suitability of and regulatory barriers to the European emissions trading scheme regulating GHG emissions from transport', Emilie Ylihjeljo analyses the possibilities for

²⁴ COM(2015) 614 final (n 8), 13, 18.

²⁵ Commission, 'Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Circular Economy Action Plan' (Commission Report) COM(2017) 33 final, 11–12.

expanding the EU ETS to the road traffic sector, focusing particularly on the consequences the electrification of cars will have for the issue.

INFORMATION AS A DRIVER FOR GREEN BEHAVIOUR

In addition to external economic incentives for businesses to change their behaviour, behavioural and other market-led incentives have the potential to change the freight transport industry internally, from within. This volume explores the idea of employing tools from behavioural sciences, through legislative means if need be. One prominent avenue considered here is called ‘nudging’.²⁶ According to Richard Thaler and Cass Sunstein, who coined the term in 2008, nudges are increasingly popular behavioural-science-based, choice-preserving, low-cost tools that are ‘understood as interventions that maintain people’s freedom of choice, and uses of choice architecture, understood as the background conditions for people’s choices’.²⁷ Although criticized for exploiting human biases and for being patronizing and anti-liberal, nudging works through giving information, introducing a choice and relying on human inertia, the power of suggestion and the fact that humans are born procrastinators.²⁸ The different levels of nudging can be briefly presented with the following examples. First, it may be sufficient to make the presentation of *information* on transport-related GHG emissions mandatory both to end-users (businesses and consumers) and to actors throughout the supply chain (first-degree nudging, that is, labelling). This information could even enable the use of nudging by *default*, where, for example, a website would only present buyer options below a given limit for GHG emissions, though the possibility of opting out of this restriction would exist (second-degree nudging, that is, defaults). Here, the website might also issue a *warning* when the selection is increased to include more polluting alternatives, such as the text ‘warning: highly unsustainable product’, or a visualization of an exploding planet earth (third-degree nudging, that is, warnings).²⁹

²⁶ Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (New Haven, CT: Yale University Press, 2008).

²⁷ Cass R. Sunstein, *The Ethics of Influence: Government in the Age of Behavioral Science* (Cambridge: Cambridge University Press, 2016) 5.

²⁸ For a short list of what qualifies as a nudge, see Cass R. Sunstein: ‘Nudges do not Undermine Human Agency’ (2015) 38(3) *Journal of Consumer Policy* 207.

²⁹ Taxonomy of different degrees of nudging from Anne-Lise Sibony and Alberto Alemanno, ‘The Emergence of Behavioural Policy-Making: A European Perspective’ in Anne-Lise Sibony and Alberto Alemanno (eds) *Nudge and the Law: A European Perspective* (Oxford: Hart Publishing 2015), 1–28, following R. Baldwin, ‘From

In Chapter 8, ‘A sustainable behavioural change in the transport industry – the role of emission information’, Prof. Ellen Eftestøl-Wilhelmsson discusses whether and how *information* related to emissions from the carriage of cargo could *be used to trigger* environmentally friendly decisions and the use of transport alternatives with the lowest emissions. The chapter concludes that the contractual framework surrounding the transport industry could be utilized to couple emissions information with market actors and hence nudge a behavioural change in the transport industry. There are, however, several parties involved in international transport and thus various alternative answers to the question posed by Dr. Jaakko Salminen in Chapter 9, ‘Sustainability in contractually organized supply chains: Coordinating transport’. Dr. Salminen explores how sustainability in global value chains could be governed through contracts, focusing primarily on the role of *global lead firms*. The chapter explores the trifecta of private governance, private law and transnational regulation, which together can work as drivers for sustainability.

Through the corporate or contract governance of their supply chains, companies themselves can apply softer or harder forms of nudging to their sub-contractors, or they can set strict contractual limits on which raw materials, parts or modes of transport would be acceptable for them to integrate into their products. A recent nudge by the EU legislator relates to corporate governance in that sustainable corporate policy choices can be highlighted as key points – one such specific point is environmental impacts from transportation³⁰ – in companies’ non-financial corporate social responsibility reports.³¹ In addition to nudging firms to think about sustainability and adding transparency to their actions, this reporting responsibility may produce information about companies which can be compared by investors, consumers and the firms themselves and used when buying and selling products and/or services. Such nudges are especially relevant in areas lacking standards or where, for instance, reliable emission measurement and comparison are not yet feasible. In addition to the problem of agreeing on a common methodology to attain comparable figures and the potential costs of implementing it, such systems are inevitably vulner-

Regulation to Behaviour Change: Giving Nudge the Third Degree’, (2014) 77(6) *Modern Law Review* 831.

³⁰ Commission, ‘Guidelines on non-financial reporting (methodology for reporting non-financial information)’ (Communication) C/2017/4234 OJ C 215, 5.7.2017.

³¹ Starting from the 2017 financial year or during the 2017 calendar year, Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups [2014] OJ L 330/1 requires large companies to disclose in a yearly report their development, performance and position, and the impact of their activity in several fields, for example, environmental (greenhouse gas emissions, transport) as well as social and employee issues.

able to fraud *à la* ‘dieselgate’ unless subject to verification and sufficiently monitored. However, setting up intricate forms of compliance checks may be considered costly, uncondusive to efficiency and welfare gains and an overall hindrance to free and fair trade. In addition to these systems’ vulnerability to manipulation, this is one more reason to lean on nudging – which involves a mindset or attitude change – while waiting for the required technological breakthroughs. On this note, Chapter 10, ‘The way of business contracts: How to promote (transport) sustainability and incentivize the green economy via Contract Management’, by Suvi Hirvonen-Ere, studies the impact *contract management* could have on the process of highlighting sustainability in the relevant contractual framework.

Consumers form a large part of the market-driven incentive for a greener transport market in both passenger and freight transport and for a greener market in general. Consumer behaviour can be nudged through information, even in the form of legal obligations placed on producers to disclose information, which in turn can provide producers with market-driven incentives to change their behaviour. Regarding the emissions caused by manufacturing products in global supply chains (including freight transport), consumers are particularly reliant on the GHG information provided by producers. Creating market demand for green freight transport could, as the Commission outlines, precipitate its supply. However, when it comes to protecting and informing consumers, the Commission has not been wholly successful in adapting the legislative framework to support a CE. Overall, it is unclear whether current regulatory choices adequately reflect the broader systemic challenge and change of mindset described above. Chapter 11 on ‘Product information on freight emissions for consumers – changing the market towards sustainability?’ by Dr. Suvi Sankari, examines one key prong of the CE: helping consumers choose sustainable products and services. A case study on clothing manufacturing and retail is presented as an example of the absence of adequate and reliable consumer information, or producer information duties, on transport-related emissions within the global value chains that produce garments sold in the EU internal market. The example is used to question the potential of voluntary (international) standards and indirectly or directly related EU law to support more sustainable choices by consumers.

GREEN FREIGHT – SOLUTIONS AND OBSTACLES

Road transport is the most polluting mode of transport. Moreover, in terms of inland freight, it is the most popular, accounting for 72 per cent of all such

transport in 2015.³² In greening road transport, much remains to be done as, for example, only 1 per cent of road transport activity falls under cabotage.³³ Thus Part IV explores more practical ways of greening freight transport. It focuses partly on the road sector, as this is the transport sector with the largest potential for improvement, and partly on how new business models can enhance greening transport. Additionally, shortcomings in current environmental liability systems related to oil pollution from shipping are also discussed.

Technological development is an important asset in the transition to a more sustainable transport market. ‘Road-trains’, composed of several full-trailer trucks and formed by a practice called platooning, could bring an important efficiency gain to road transport, as they enable estimated fuel savings of 20 per cent, as outlined in Chapter 12, ‘Towards a model for sustainable platooning cooperation in road transport’, by Prof. Wouter Verheyen. Verheyen discusses the legal and contractual framework required for sustainable platooning networks, including provisions on: (1) the design of a framework for sustainable cooperation; and (2) the design of standard liability rules for individual cases of platooning. This example shows that there is room for practical proposals for new legislation that allows for greener transport to develop. Finally, all legislation aimed at environmental protection must conform to a certain standard. Unfortunately, deficiencies in the current legal system are apparent. An example of one such shortcoming is provided by Prof. Andrea La Mattina in Chapter 13, ‘Who pays for oil pollution at sea? Some remarks on the interplay between certainty of the law and unpredictability.’

The chapters combine to make a compelling case for the hypothesis, shared by the contributors, that the current non-integrated EU approach to transport is ineffective and cannot foster the kind of paradigm shift required for decreasing transport emissions, much less respect planetary boundaries. Moreover, the volume provides both theoretical and practical tools to facilitate this paradigm shift and bridge the ‘implementation gap’ (transforming scientific knowledge into policy). Mitigating emissions requires the integration of sustainable transport into general sustainability policies, such as the CE, and also into global supply chains.

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³² European Commission DG for Mobility and Transport, ‘An Overview of the EU Road Transport Market in 2015’ 6.

³³ Michelle Egan, *Single Markets Economic Integration in Europe and the United States* (Oxford: Oxford University Press, 2015) 184.

and Assistant Editor Amber Watts. We thank the Finnish Academy and the EU for financing parts of the research. Moreover, indispensable to the process of completing the volume has been our research assistant, Maximilian Huemer, whom we wish to thank for his hard and excellent work.

Last but not least, we thank Sirpa Pietikäinen MEP, who delivered a keynote address at the international ‘Sustainable and Efficient Transport Systems – The Role of Transport in the Transformation to a Circular Economy’ conference held at the University of Helsinki and organized by the Interdisciplinary Transport Research Group for sustainable business and law (InterTran), the University of Helsinki and Aalto University School of Business in collaboration with the research group for Sustainable Market Actors (SMART) at the University of Oslo. The keynote is published as an extended Foreword to the volume. It substantively outlines the challenge posed by climate change and the paradigm shift in sustainable mobility necessary to face that challenge successfully.