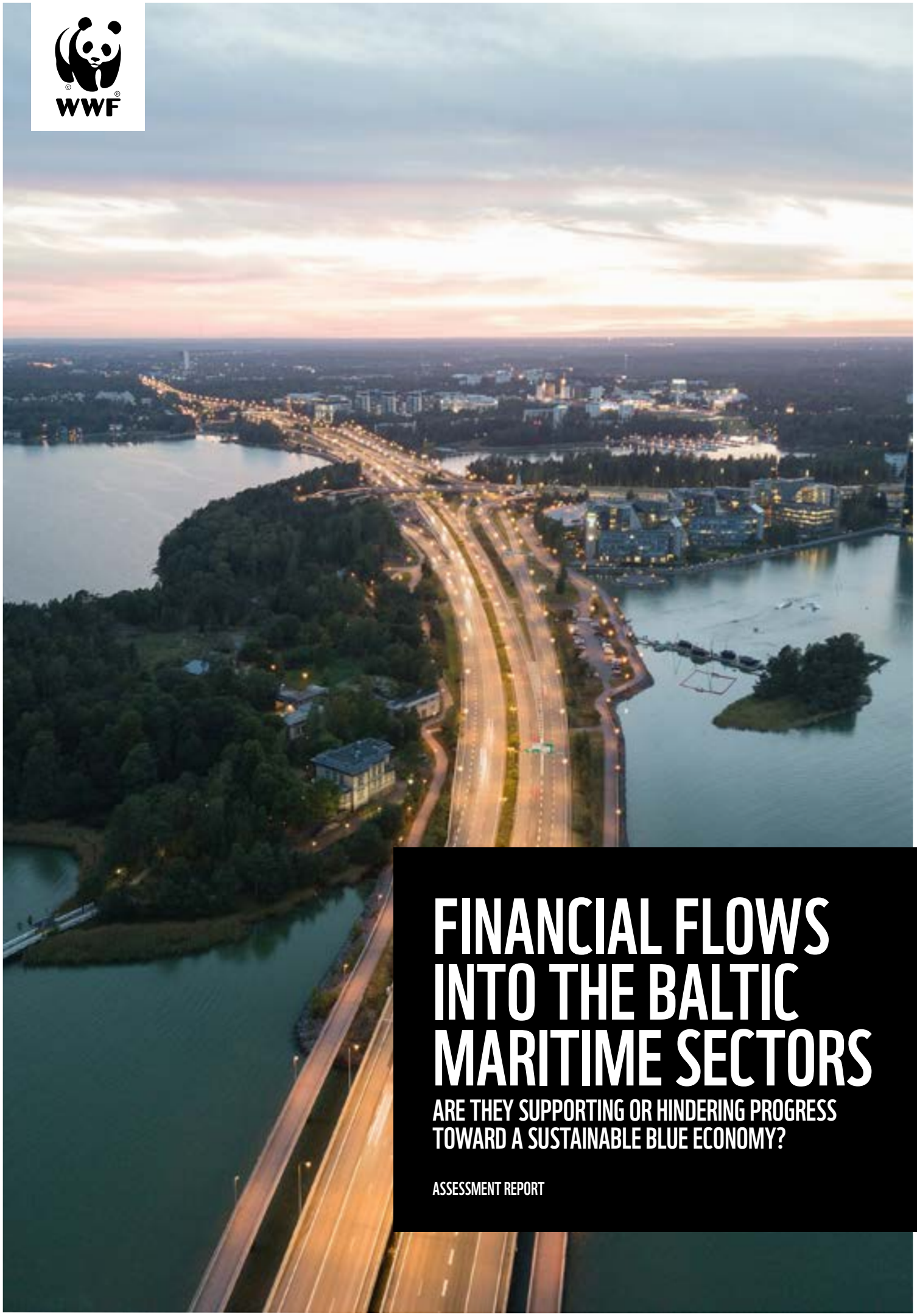


FINANCIAL FLOWS INTO THE BALTIC MARITIME SECTORS

ARE THEY SUPPORTING OR HINDERING PROGRESS TOWARD A SUSTAINABLE BLUE ECONOMY?

ASSESSMENT REPORT

EXECUTIVE SUMMARY

A healthy ocean provides blue natural capital which our economy, our societies and our future are dependent upon. The goods and services that flow from a healthy ocean including ocean-based climate mitigation, adaptation and resilience solutions are worth at least US$2.5 trillion each year globally, and the overall value of the ocean as an asset is 10 times that.[1] Yet, the ocean continues to be under-appreciated and overexploited as a resource.

The estimated total turnover of the Baltic Sea Economy is in the region of EUR€1.17 trillion per year, with an estimated Gross Value Added (GVA) of approximately EUR€263.5 billion (refer to Annexes 5 and 7 to see how the figures were derived). That is one and a half times the GVA of the entire agricultural sector within the EU. The average annual financial stock—the combined value of equity and debt—in Baltic maritime sectors is estimated to be EUR€780 billion. Annual financial flows—the additional streams of finance that move into the stock pools—are estimated at EUR€36 billion.[2]

In its current state, the Baltic Sea Economy is some distance from becoming a Sustainable Blue Economy (SBE). An economy that would not only ensure thriving nature, but also the perpetual availability of resources and other ecosystem services (i.e., regulation and maintenance services, supporting services, cultural services, etc.). Economic policy reforms are needed to incentivise a shift in financing away from harmful activities and toward sustainable ones. Well-targeted sustainable finance can accelerate the transition to a SBE by flowing into companies and sectors that have overall positive environmental and social impacts on the Baltic Sea region, or at least the will to transition in the direction of that ambition. A key function for the finance sector should be to engage with portfolio companies to substantially improve their standards and practices; moving investments and lending away from unsustainable activities.

1 Reviving the Ocean Economy | WWF (panda.org)
2 For methodology of how figures were calculated see Annex 7 Methodology

The report

This report aims to help chart a sustainable development trajectory for the Baltic Sea based on a mapping of the financial flows into the Baltic maritime sectors and an assessment of whether these flows support or hinder the delivery of a SBE.

The report provides both an overview of the "state-of-play" and a glimpse into the future that can be employed to:

- encourage financial institutions and other key stakeholders to pursue a more resilient investment strategy in the region, and
- influence industry sectors to proactively engage in restoring, protecting and sustainably managing the natural capital of the Baltic Sea.

The objective of this report is not to capture all financing activities affecting the Baltic seascape, but to evaluate the environmental and social impacts of 16 economic sectors for which sufficient information was available during the research period. Several sectors with significant secondary effects on marine ecosystems, such as Agriculture and Forestry, were excluded due to difficulties attributing specific shares of financial flows that result in marine impacts.

The research for this report was conducted from May to August 2020 based on available data from 2016 to 2018 primarily. Initial findings were first presented at a side event at the HELCOM Intersessional Heads of Delegation Meeting in Lübeck on 20 October 2021 and during the online World Water Week on 25 August 2022.

While the intention with this report is to provide a comprehensive overview of the Baltic seascape's economic sectors and financial flows, the report and appendices are structured to also allow the reader to approach from an interest in a specific economic sector or financial instrument to gain access to a significant level of detail.

Context

The Baltic Sea is a unique marine habitat, being one of the largest areas of brackish water on the planet. It is a semi-land-locked marginal sea with a large catchment area in northern Europe where salinity is driven by freshwater supply due to river runoff, net precipitation and the exchange with saline water from the North Sea. The Baltic Sea connects and provides resources and livelihoods to more than 85 million people, of whom 15 million live on the coast in diverse political, social and economic circumstances. Consequently, it is subject to extremely high impacts from human activities. This has led to the ongoing degradation of the Baltic seascape, including eutrophication, pollution from hazardous substances and marine litter, underwater noise, the establishment of non-indigenous species, over-exploitation of species by fishing, and the destruction and disturbance of the seabed.

The Baltic Sea Economy

The estimated total turnover of the Baltic Sea Economy is EUR€1.17 trillion per year, with an estimated GVA of approximately EUR€263.5 billion. The average annual growth in the Baltic Sea Economy is estimated at 6.5% (2016-2018). Growth has been driven largely by an increased turnover from non-living resource-related activities. The extraction and renewable energy generation sectors have seen the highest per-sector growth rates at 10.1% and 8.4%, respectively. Of notable concern is the fossil fuel sector. While small in terms of total turnover, it had an average year-on-year growth of 33% from 2016 to 2018. If sustained into future years, such a precipitous growth trend in this sector would certainly prove an obstacle for the transition to a SBE.

Financial stock and flows in the Baltic Sea Economy

The average annual financial stock—the combined value of equity and debt—in Baltic maritime sectors is estimated at EUR€780 billion between 2018 and 2020; with equity accounting for 73% of the total. Annual financial flows—the additional streams of finance that move into the stock pools—are estimated at EUR€36 billion.

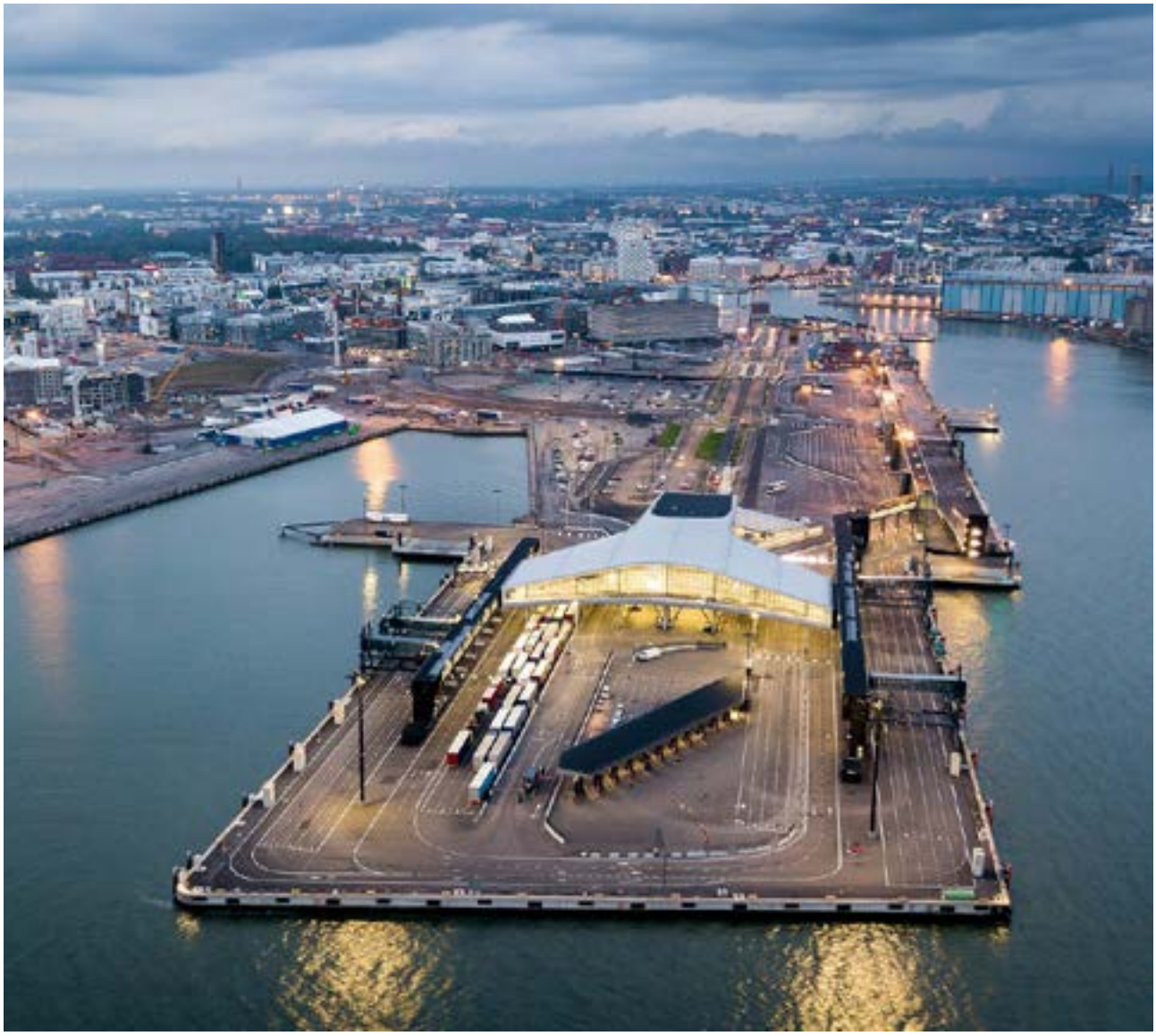
On balance, most of the current finance was shown to flow into activities that hinder the attainment of a SBE. Nearly 79% of the total debt in the Baltic seascape is within ocean service sectors that were assessed as having a negative environmental and social impact. Regarding equity, 53% of the value is held in sectors with negative environmental and social assessment scores. This is primarily due to the high value of equity in marine biotechnology and bioprospecting—sectors with fewer negative environmental and social assessment scores.

Flow and sector analysis highlights

Analysis of key Financial Institutions (FIs) and the types of financial instruments used by different economic sectors has provided greater clarity on influential levers for accelerating the transition to a SBE in the Baltic.

Analysis of financial transactions of the top five companies in each economic sector (275 companies across 55 sectors in total) shows that bank and institutional loans are the most prominent debt instruments by far. The trade and extraction sectors source approximately 67% and 68% of their debt from bank and institutional loans. Banks and institutional lenders clearly have a significant influence on companies and sectors' capital allocation and, as such, can enable exposed activities with best environmental, social and governance (ESG) integration criteria to receive loans, versus those that cause environmental harm.

The second most prominent debt instrument is capital lease obligations. The seafood sector is the largest user of this instrument, holding 36% of the total value of all capital lease obligations. It is very likely that these companies use this debt instrument to finance a mix of assets, such as equipment and premises. Asset owners



typically control the terms of capital leases, potentially giving them control over selecting lease recipients, or even attaching sustainability conditions to the use of assets.

Traditional investment managers have diverse, multi-billion Euro holdings in extraction, trade, seafood and renewable energy generation. They account for 46% of all shareholdings in the Baltic Sea Economy and can be considered key stakeholders in the sustainability of the Baltic seascape. Venture capital/private equity firms with more than a 5% company stake own a further 25% of all shareholdings.

The extraction sectors present a specific challenge for the development of a Baltic SBE. It is the largest of all in terms of turnover (refer to Figure 3), commands the largest share of financial stocks (especially in Russia, see Annex 8) and flows, ranks worst in terms of environmental and social impact, and employs 23% of the entire Baltic Sea Economy workforce. There is a considerable difference between tapering down activities in fossil fuels (as is rhetorically called for in many Baltic nations) and the 33% year-on-year growth seen in that sector between 2016 and 2018.

By contrast, the current scale of the marine circular economy in the Baltic does not appear to be at all matched to the value of goods flowing through the current "take-make-waste" system. Although circular activities can and do take place in many sectors, the only defined economic sector that is dedicated to circular resource use is the "Resource and material recovery" sub-sector. This sector generates approximately EUR€9 billion, a mere 3% of the EUR€286.4 billion generated by all extraction sectors.

Renewable energy generation is the second largest economic sector by turnover. The rise of renewables as the lead profit-generating economic sector is cause for hope and a potential source of examples for other sectors. The highly intentional coordination of resources and creation of support mechanisms for renewable energy demonstrate that relatively short-term change is possible. The next challenge for renewables is reducing or eliminating their negative environmental impacts associated with infrastructure placement and noise pollution. Investment is needed to support technological solutions to address these, as well as effective maritime spatial planning and stakeholder engagement processes, to ensure that they are located in appropriate areas to avoid known impacts.

In the endeavour to accelerate, implement and sustain adaptation in human systems and ecosystems, the presence of enabling conditions is of vital importance. These conditions include political commitment and follow-through, institutional frameworks, policies and instruments with clear goals and priorities, as well

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as enhanced knowledge on impacts and solutions, mobilization of and access to adequate financial resources, monitoring and evaluation, and inclusive governance processes. Many efforts such as the EU Taxonomy for Sustainable Activities and the EU Corporate Sustainability Reporting Directive, also called the NFRD, have made strides in linking finance and business practices to environmental and social outcomes. There are also voluntary reporting efforts such as the Taskforce on Climate-related Financial Disclosures (TCFD)[3] and the Taskforce on Nature-related Financial Disclosures (TNFD) that deliver a risk management and disclosure framework for organizations to report and act on climate and nature-related risks.

Finance actors can influence sectors to adopt and implement best practice measures that support nature and promote sustainability. For example, changing fishing practices to become more sustainable will come at a cost, but the long-term risks and losses associated with business as usual (BAU) practices are well reported and will be significantly higher.[4,5] By contrast, it is difficult to envisage how companies with a primary focus on fossil fuel extraction could ever be aligned with a SBE or the achievement of the EU Green Deal and the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement targets; hence finance should be directed away from them. The current view of Finance Institutions and others is that selling off carbon-emitting assets does not necessarily lead to reductions in emissions or, as here, fossil fuel production. Owners and funders need to ensure a meaningful transition of and for these companies which, in some cases, may include early decommissioning retirement of fossil fuel dependent assets.

3 https://www.fsb-tcfd.org/
4 Value at Risk (panda.org)
5 The Sunken Billions (researchgate.net)

Implications

In general, new debt accounting for 93% of all flows stands out as an influential investment mechanism for the Baltic Sea Economy.

Bank and institutional loan providers are the largest debt issuers among public companies, making them key to potentially influencing new and established debt, as well as phasing out existing debt and saying no to new potential debt that is not in line with a SBE.

Traditional institutional investors, such as asset owners and asset managers, are the largest holders of public companies, making their influence over equity across a range of economic sectors an important locus of leverage.

Public companies, being beholden to their shareholders, are required to justify their financing activities. In certain sectors, where social and environmental harms are apparent, shareholder advocacy is likely to be one of the most straightforward opportunities for change.

Private companies, because of their internal control of equity, are harder to influence depending on the nature of the owner structure. With institutional investors as shareholders, a similar stewardship approach as above is possible and relevant. For the companies with less public owners, the concept of a social license to operate could become important. If influence through governance measures or finance fails, then it may fall to customers and clients to call for sustainable transitions.

Looking ahead

Governments, industry and financial actors are in a position to steer future investments and lending away from current harmful BAU practices and toward nature and climate positive outcomes. Key guidelines, guardrails and accountability frameworks relevant to the ocean context are coming on stream and are applicable to support current and future decision-making in the Baltic Sea region:

1. Adopting and implementing the Sustainable Blue Economy Finance Principles[6] and associated guidance provided by United Nations Environment Programme Finance Initiative (UNEP FI) can help positively transform the way in which ocean assets are used and managed, ensuring that investment decisions deliver long-term value without having a negative impact on marine ecosystems or on efforts to reduce carbon emissions.
2. The newly established Taskforce for Nature-related Disclosures (TNFD) is also set to offer a critical accountability framework which, hand-in-hand with the Task Force on Climate-related Financial Disclosure (TCFD), will assure that future investments take account of their impacts.
3. In addition, the EU taxonomy, a classification system with "do no significant harm" (DNSH) criteria for biodiversity and climate[7], will help shift investments toward sustainable economic activities. As such, it can support the delivery of the EU Environmental and Biodiversity Directives and the HELCOM Baltic Sea Action Plan by creating and establishing a list of sustainable economic activities and highlighting those that are not considered to contribute to a SBE. It could also play an important role in helping the EU scale up sustainable investment and implement the EU Green Deal, but only if it does not allow greenwashing of fossil gas and nuclear energy.
4. The marine-related financial risk assessments of BAU pathways to both society and business are becoming increasingly clear as developed by WWF, Fish Tracker, ORRAA[8], etc.[9]

Not all of these emerging blue finance frameworks and processes are currently mandatory. If we are to meet the targets laid out in the UNFCCC, Convention on Biological Diversity (CBD) and UN SDGs, while delivering on ambitions for a SBE, it is critical that the finance and investment sectors take leadership and redirect finance toward sustainable development pathways that will build environmental, social and economic resilience and secure the needs of present and future generations across the Baltic Sea region.

Likewise, governments must create the enabling conditions through supporting measures, setting common standards, regulation, carbon pricing and a clear net zero transition roadmap. Currently, there is a lack of government action on carbon and legal frameworks, yet we need both to happen at once. Governments must shoulder more of the solutions and take action now, or risk having a very difficult and costly transition in the future—or, in the worst-case scenario, risk being too late to make the transition achievable at all.

6 The Principles – United Nations Environment – Finance Initiative (unepfi.org)

7 In addition to climate and biodiversity, the EU taxonomy has specific "do no significant harm" (DNSH) objectives for the sustainable use and protection of water and marine resources and the prevention of pollution, both of which are related to marine ecosystem direct impacts (as well as the transition to a circular economy).

8 Homepage - ORRAA (oceanriskalliance.org)

9 Value at Risk (panda.org)

AUTHORS: Valerie de Liedekerke and 3Keel

Editorial and Production Team: Hannah Griffiths-Berggren, Lisa Baumgartel, Valerie de Liedekerke and Brandline.

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Holger Apel, Managing Director Global Head Maritime Industries, KfW IPEX-Bank GmbH

Daniela Cedola, Partner, Advisory Government and Public Services, PwC Luxembourg

Klaas de Vos, Ocean Fox Advisory

Magnus Emfel, Chief Economist, WWF SE

Bernhard Friess, Former Director Maritime Policy & Blue Economy, DG MARE

François Gardin, Nature-related finance expert, Polygones E.R.I. SRL

Mariusz Grendowicz, Executive Partner/CEO, ACP Credit

Louise Heaps, Lead, Sustainable Blue Economy (Global), WWF

Marc Klaus, Independent Consultant, Stockholm, SE

Mirosław Proppé, CEO, WWF PL

Mauro Randone, Regional Manager, WWF Mediterranean Marine Initiative
Angela Schultz-Zehden, Managing Director, SUBMARINER Network

Claus Schultze, Senior Policy Officer, DG MARE

Ottilia Thoreson, Marine and Coastal Development Specialist, Sida

Heidi Tuhkanen, Senior Expert, Stockholm Environment Institute Tallinn Centre

Olivier Vardakoulias, Economist, Finance and Subsidies Coordinator, Climate Action Network (CAN) Europe

Emilie Westholm, Head of Responsible Investment and Corporate Governance, Folksam

CONTENTS

1/ INTRODUCTION

THE PRINCIPLES OF A SUSTAINABLE BLUE ECONOMY

Key ocean assets worldwide are estimated to have an overall economic value of more than US$24 trillion, and two-thirds of the ocean's base economic value is produced by assets that rely on healthy ocean conditions.[10] Unfortunately, the health of the marine environment and hence, its ability to generate benefits for society and nature is currently under pressure due to human economic activities. These pressures include overfishing, climate change, nutrient discharge, underwater noise pollution and near-ubiquitous plastic waste, among other things. To ensure that the marine environment can continue to provide for societal needs and thrive in its own right, the notion of a Sustainable Blue Economy (SBE) has been developed (See box, "What is a Sustainable Blue Economy?")

This report maps the financial flows directed into 16 maritime sectors of the Baltic Sea (refer to Table 1: "Framework used to define the boundaries of the Baltic maritime economy") and assesses whether these flows support or hinder a SBE. Financial flows into Russian maritime sectors were mapped separately following a different methodology (please refer to Annex 8 for the Russian case study). The objective of this report is to establish a broad basis for ongoing efforts to ensure that financing contributes to the reversal of environmental damage and supports the attainment of a SBE in the Baltic Sea.

The following sections will assess the overall size of the maritime and supporting economic sectors in the Baltic Sea and evaluate both the financial stocks of these sectors and the finances flowing into them. Additionally, the key financial instruments and actors will be identified and the environmental and social impacts of the economic sectors will be evaluated. Finally, there will be a reflection on whether or not future economic opportunities in the Baltic Sea are likely to be consistent with a SBE.[11]

WHAT IS A SUSTAINABLE BLUE ECONOMY?

The concept of a Sustainable Blue Economy is based on a series of principles, summarized here:[11]

A Sustainable Blue Economy is a marine-based economy that:

1. Provides social and economic benefits for current and future generations.
2. Restores, protects and maintains the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems.
3. Is based on clean technologies, renewable energy, and circular material flows.

A Sustainable Blue Economy is governed by public and private processes that are:

1. Inclusive—a Sustainable Blue Economy is based on active and effective stakeholder engagement and participation.
2. Well-informed, precautionary and adaptive.
3. Accountable and transparent.
4. Holistic, cross-sectoral and long-term.
5. Innovative and proactive.

A Sustainable Blue Economy requires that public and private actors:

1. Set clear, measurable, and internally consistent environmental goals and targets.
2. Assess and communicate their performance on these goals and targets.
3. Create a level economic and legislative playing field.
4. Plan, manage and effectively govern the use of marine space and resources.
5. Adopt standards, guidelines and best practices—or, if lacking, develop and apply them.
6. Recognize that the maritime and land-based economies are interlinked.
7. Actively cooperate.

10 reviving_ocean_economy_report_hi_res.pdf (panda.org)

11 WWF (2015) Principles for a Sustainable Blue Economy. https://www.wwfbaltic.org/report/principles-for-a-sustainable-blue-economy/

THE CURRENT STATE OF THE BALTIC SEA

A unique and fragile sea

The Baltic is the youngest sea on the planet, having emerged toward the end of the last ice age, approximately 10,000-15,000 years ago. Special hydrographical and climatic conditions make it a vulnerable and fragile marine environment. Over one-third of its 420,000 km² extent is less than 30 metres in depth. It has a narrow connection to the North Sea, which means that it takes approximately 30 years for the Baltic Sea waters to be fully exchanged, with marine waters entering predominantly during winter storms.[12] These inflow events bring water of higher salinity. Meanwhile, freshwater reaches the Baltic Sea from numerous rivers, corresponding to about one-fortieth of the total water volume per year.[13] The low influx of saline water and a large freshwater catchment makes the Baltic Sea one of the planet's largest bodies of brackish water.[14] The Baltic Sea is rather shallow compared to oceans (i.e., 54 metres on average), and is stratified due to thermoclines and has large and growing hypoxic/anoxic areas (aka dead zones).

The number of species in the Baltic Sea is low compared to most other seas due to the low salinity. Nonetheless, variations in salinity and the variability of habitats in the Baltic Sea result in it containing a greater variety of plant and animal life than might otherwise be expected.[15] It is home to about 2,700 macroscopic species and innumerable smaller microscopic species. Many species are under threat: 4% of the 1,750 species evaluated according to the International Union of Conservation of Nature (IUCN) criteria were determined to be threatened, with three regarded as already extinct.[16]

Economic activities that impact the Baltic Sea

Nine countries surround the Baltic Sea: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden. Only four of these countries— Denmark, Germany, Russia and Sweden—have coastal regions bordering other seascapes, meaning that the Baltic Sea is critical to the marine-based economies of the region.

Over the past 100 years, the Baltic Sea has degraded quite dramatically. Eighty-five million people inhabit the drainage area of the Baltic Sea, and the intense marine and land-based activities driven by humans exert a wide variety of pressures on the Sea. These human pressures include overfishing, pollution and now, increasingly, the effects of climate change which are altering the ecological balance and depleting renewable resources beyond safe biological limits.

Economic activities that affect the Baltic Sea include the use of non-living resources, living resources, and maritime-based commerce.

Non-living resources. Activities utilising non-living resources in the Baltic include fossil fuels, the extraction of sand and gravel, and the generation of offshore renewable energy. Each of these activities is enabled by a wide range of support activities including the building of infrastructure, transportation, electric power transmission, the processing and manufacture of materials, infrastructure maintenance, and research and development – all of which can impact the Baltic seascape.

Living resources. Activities utilising living resources within the Baltic include wild capture fisheries and mariculture. These sectors are supported by fish processing, distribution and retail activities.

Maritime-based commerce. Maritime-based commerce in the Baltic includes sea and coastal freight shipping, tourism activities and all the activities that enable them; i.e., port infrastructure, shipbuilding and repair, water treatment and supply, waste collection and treatment, food service activities and retail.

To read a full list of the economic sectors present in the Baltic seascape, which were included in this study, see Annex 1.

12 Stigebrandt, A. (2001). Physical oceanography of the Baltic Sea. In: Wulff, F.V., L.A. Rahm, & P.A. Larsson (Eds.) Systems Analysis of the Baltic Sea. Springer Berlin Heidelberg. https://link.springer.com/chapter/10.1007/978-3-662-04453-7_2

13 Bergström, S., H. Alexandersson, B. Carlsson, W. Josefsson, K.-G. Karlsson & G. Westring, G (2001). Climate and hydrology of the Baltic Basin. In: Wulff, F.V., Rahm, L.A. & Larsson, P. A (Eds.) Systems Analysis of the Baltic Sea. Springer Berlin Heidelberg. https://link.springer.com/chapter/10.1007/978-3-662-04453-7_3

14 HELCOM (2018). State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155. https://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-3/helcom-2018-state-of-the

15 HELCOM (2018). Op cit.

16 HELCOM (2007). HELCOM lists of threatened and/or declining species and biotopes/habitats in the Baltic Sea area. Balt Sea Environment Proceedings. 113. https://www.helcom.fi/wp-content/uploads/2019/08/BSEP113.pdf

Threats and pressures jeopardizing future sea use

The Baltic Sea's vast array of ecosystem goods and services are provided by nature for free. Unfortunately, many of the pressures exerted on the Baltic Sea by economic activities are depleting renewable resources beyond safe biological limits— putting both the marine ecosystem and future economic activity in jeopardy. Some of these pressures are listed below. They are not presented in a sequence that attempts to rank the severity of their respective impact on the marine ecosystem - as it is their collective and cumulative impact that ultimately determines the health of the Baltic Sea.

WHAT IS AN ECOSYSTEM?

An ecosystem or biome describes a single environment and every living (biotic) organism and non-living (abiotic) factor that is contained within it or characterizes it. An ecosystem embodies every aspect of a single habitat, including all interactions between its different elements[17]

Eutrophication is the increase in the supply of organic matter through nutrient enrichment, caused by the excessive availability of nitrogen and phosphorus. This results in significant changes to species composition and ecosystem functioning. Inputs of nitrogen and phosphorus into the Baltic Sea increased dramatically between 1950 and the late 1980s and, although inputs have declined somewhat since then, they are still sufficiently high to cause damage to the ecology of the sea.[18] Around 70% of the input of nitrogen and phosphorus into the Baltic is riverine (largely from agricultural run-off and wastewater treatment facilities); but other sectors, such as shipping, road transportation, energy production, and agriculture also contribute atmospheric inputs.[19]

Hazardous man-made chemicals and heavy metals present another problematic land-based threat. They flow into the Baltic from wastewater treatment plants, leach from household materials and from waste deposits, and are introduced via atmospheric deposition from industrial plants and the burning of fossil fuels. Some of these substances are so persistent they remain in the habitat and accumulate in food chains.

Marine litter such as lost fishing gear or packaging material causes harm to humans and animals when they ingest it or become entangled in it. Microplastics are of particular concern because of their longevity and ubiquity.[20]

Underwater noise pollution is caused by offshore wind turbines, shipping and boating (continuous sound) and piling, as well as underwater explosions or airgun signals used in seismic surveying (impulse sound).[21] Sound waves propagate over long distances in water and may disrupt the behaviour, communication and orientation of animals and scare them away from areas that are important for their feeding or reproduction.

Over-fishing and species displacement are also putting the marine ecosystem and future sea-use at stake. Commercial fisheries target a small number of species, affecting their abundance: cod, herring and sprat represent about 95% of the total biomass caught. The species composition of the Baltic is further affected by the introduction of non-indigenous species. Around 140 non-indigenous species have been recorded in the Baltic Sea.

© Metta Wiese / WWF-Sweden

17 Ecosystem - Definition, Examples and Types | Biology Dictionary

18 Andersen, J. H., J. Carstensen, D.J Conley, K. Dromph, V. Fleming-Lehtinen, B.G. Gustafsson, A.B. Josefson, A. Norkko, A. Villnäs, & C. Murray (2017): Long- term temporal and spatial trends in eutrophication status of the Baltic Sea. Biological Reviews, 92: 135-149. https://researchportal.helsinki.fi/en/publications/long-term-temporal-and-spatial-trends-in-eutrophication-status-of

19 HELCOM (2018). State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155 https://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-3/helcom-2018-state-of-the

20 Xiao Zhi Lim (2021). Microplastics are everywhere — but are they harmful? Nature 593, 22-25. doi: https://doi.org/10.1038/d41586-021-01143-3

21 HELCOM (2018). State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155 https://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-3/helcom-2018-state-of-the

Of these, there were 12 new introductions between 2011 and 2016. Non-indigenous species can displace existing species, bring disease and affect ecosystem functions. Aquaculture and shipping are considered to be the main sectors responsible for the inadvertent introduction of non-indigenous species into the Baltic Sea.[22]

Seabed disruption is prevalent in the Baltic Sea—40% of the Baltic seabed has been disturbed by maritime activities[23], covering a total area of 180,000 km^2. The sub-basins with the highest proportions of disturbed seabed are in the southern Baltic Sea, in the Kattegat and the Bornholm Basin, where 80-100% of the seafloor is considered disturbed. Activities that inflict permanent changes or temporary disruptions to the seabed include the extraction of seabed sand and gravel, modification of the seabed for installations, maintenance of open waterways by dredging, and bottom trawling.[24]

Anthropogenic climate change presents a final major pressure on the health of Baltic marine ecosystems. The average surface water temperature in parts of the Baltic has increased by more than two degrees since the 1990s.[25] Climate change is forecasted to alter rates of freshwater inflow from the surrounding basin, among other marine ecosystem impacts. Current and expected impacts of climate change in the Baltic Sea are described through 34 parameters grouped into physiochemical parameters that are directly affected by climate change (referred to as "direct parameters"), as well as ecosystem and human use parameters that are indirectly affected ("indirect parameters").[26]

STEERING TOWARD A SUSTAINABLE BLUE ECONOMY

The role of policy

In response to pressures on the Baltic's marine ecosystem caused by human activities and climatic changes, several policies have been enacted to curb or reverse harmful impacts to nature and people.

The Sustainable Development Goal (SDG) number 14 ("Life below water") commits all United Nations Member States to conserving and sustainably using the oceans, sea and marine resources for sustainable development.[27] The SDGs are interconnected[28], and the intricate relationship between the sea, coast and land in the Baltic means that the fulfillment of other SDGs is also highly relevant to a SBE, including SDG 7 ("Attainable and clean energy"), SDG 8 ("Decent work and economic growth") and SDG 13 ("Climate action").

In line with the SDGs—and in recognition that the climate crisis and environmental degradation represent an existential threat—the European Commission has initiated the European Green Deal. A set of policy initiatives developed with the overarching aims of making Europe climate neutral by 2050, decoupling economic growth from resource use, and ensuring that no person or place is left behind in terms of being able to enjoy the economic benefits of the transformation.[29] Although the scope of the EU Green Deal is wider than the Baltic Sea (and is not relevant to Russia, one of the main Baltic Sea economies), it nevertheless provides a policy framework and instruments for bringing about the transformation of the marine-based economy toward the principles of a SBE.

When it comes to supporting the health of the Baltic Sea, the interdependencies of the coastal countries – and the need for the shared action that entails—are formally recognized by the Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention). Established because of the Convention, the Baltic Marine Environment Protection Commission—also known as the Helsinki Commission (HELCOM)—is a regional intergovernmental organization for environmental policymaking. In addition to activities such as monitoring the health and biodiversity of the sea[30], HELCOM can be considered a critical organization for translating the broad goals of the SDGs and other high-level policy frameworks into the reality of a SBE in the Baltic seascape. However, HELCOM has limited funding and enforcement capabilities, which emphasizes the importance of other mechanisms, such as sustainable finance, to invest in a SBE.

22 Galil, B.S. A. Marchini, A. Occhipinti-Ambrogi, D. Minchin, A. Narščius, H. Ojaveer & S. Olenin (2014). International arrivals: widespread bioinvasions in European Seas. Ethology Ecology and Evolution 26: 152– 171. https://www.tandfonline.com/doi/pdf/10.1080/03949370.2014.897651?needAccess=true&cookieSet=1

23 de Liedekerke, V., Thoreson, O., Owen, S. & Berggren, H.G (2020). A sea under pressure: Bottom trawling impacts in the Baltic - Baltic WWF (wwfbaltic.org)

24 HELCOM (2018). State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155 https://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-3/helcom-2018-state-of-the

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The role of finance

Finance has and continues to play a key role in enabling current economic activities within the Baltic Sea to develop. Equally, finance can be a vital force when it comes to supporting the development of a SBE and maximizing the opportunities of it; as well as supporting the policy goals of the EU and HELCOM, while avoiding the risks associated with ongoing "business as usual" (BAU) practices. For this to occur, finance must be directed toward activities that minimize damage to the ocean and maximize social equity and environmental sustainability. Principles have been developed by the United Nations Environment Programme Finance Initiative (UNEP-FI) to support the role of finance (i.e., banks, insurers and investors) in supporting the transition to a SBE.[31] Another key function for the finance sector must be to engage with portfolio companies and credit holders to substantially improve their standards and practices, as well as to move investments and lending away from unsustainable activities and promote investments and lending in more sustainable and transformative activities.

Some investments in a SBE are likely to generate competitive market returns and thus be able to attract private finance, whereas other investments can generate positive but below market returns and may require some form of public or philanthropic co-financing. To finance activities that maintain or restore certain ecosystem functions, but do not generate a market return, public and/or philanthropic investment is required.[32] However, there is little evidence that most financing of marine and associated companies is done with a sustainable seascape context or goal in mind, notwithstanding important finance initiatives such as the Nordic-Baltic Blue Bond.[33]

31 https://www.unepfi.org/blue-finance/the-principles/

32 Sumaila, U.R., Walsh, M., Hoareau, K. et al. Financing a sustainable ocean economy. Nat Commun 12, 3259 (2021). https://doi.org/10.1038/s41467-021-23168-y https://www.nib.int/releases/nib-launches-five-year-sek-1-5-billion-nordic-baltic-blue-bond, https://doi.org/10.1038/s41467-021-23168-y

33 NIB (2020). NIB launches five-year SEK 1.5 billion Nordic–Baltic Blue Bond. https://www.nib.int/who_we_are/news_and_media/news_press_releases/3583/nib_launches_five-year_sek_1_5_billion_nordic-baltic_blue_bond

2/ METHODOLOGY

The analysis methodology for this report was designed with the joint aims of (1) capturing a quantitative overview of financial activities in the maritime sectors of the Baltic Sea basin, and (2) assessing the environmental and social impact of financial flows moving to, from and between entities in the Baltic Blue Economy. To that end, 10 steps comprising data collection, analysis and contextualization were undertaken as follows.

Research methodology steps

1) Define sector and sub-sector classifications
2) Delineate sector and sub-sector sizes and boundaries
3) Quantify the relative portion of the regional economy pertaining to Baltic coastal geographies
4) Identify data sources to be used in capturing financial flows
5) Quantify aggregate macro financial flows across relevant sectors
6) Cross-check sectoral investment with bank lending and debt data to validate aggregate metrics
7) Identify a core list of key companies from each sub-sector as a sample for detailed analysis
8) Estimate the fraction of the maritime economy represented by the list of key companies
9) Identify and analyze financial flows involving key companies
10) Assess the environmental and social impact resulting from said flows

Due to the disparate and often private nature of financial data, a number of proxies and assumptions were used to approximate a landscape view of financial flows in the Baltic Blue Economy. Including the fact that economic activities are often lumped together under one European Nomenclature of Economic Activities (NACE) system, whether they are land or sea based. The full 10-step methodology can be found in Annex 5. Table 1 describes the ocean activities, ocean sectors and 16 economic sectors covered within the scope of this research.

TABLE 1

Framework used to define the boundaries of the Baltic maritime economy. Shipping falls under Trade.

TABLE 1/ Framework used to define the boundaries of the Baltic maritime economy. Shipping falls under Trade.

ACTIVITY: LIVING RESOURCES	ACTIVITY: NON-LIVING RESOURCES	ACTIVITY: MARITIME-BASED COMMERCE
OCEAN SECTOR: Seafood	**OCEAN SECTOR:** Extraction	**OCEAN SECTOR:** Trade
• Fisheries • Aquaculture • Distribution of fish products • Processing of fish products • Other seafood-related activities	• Fossil fuels • Mining & dredging • Manufacturing activities • Distribution activities • Support activities	• Transport & infrastructure • Port infrastructure & services
OCEAN SECTOR: Marine biotechnology & bioprospecting	**OCEAN SECTOR:** Renewable energy Generation	**OCEAN SECTOR:** Tourism & recreation
• Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	• Offshore wind	• Tourism • Coastal development

3/ ANALYSIS

3.1 OCEAN SECTOR SIZE AND TRENDS IN THE BALTIC SEASCAPE

Turnover and GVA

The total turnover of the Baltic Sea Economy, calculated as an average of the three most recent years for which data is available (2016-2018), is approximately EUR€1.17 trillion (Table 2); equivalent to approximately three and a half times the 2020 turnover of the e-commerce company Amazon.com, Inc.[34] Gross value added (GVA) of the same sectors during the same period is EUR€263.5 billion, compared to EUR€177.0 billion GVA for the entire EU agricultural sector in 2020.[35] For those familiar with the EU *Blue Economy Report*, please note that their estimate of the Baltic GVA is approximately EUR€34 billion.[36] The EU's GVA estimate differs from ours for two reasons. Firstly, this analysis includes significantly more NACE codes related to maritime sub-sectors. Secondly, the Blue Economy Report utilizes conversion factors to reduce the sizes of certain NACE codes to reflect a maritime-only fraction of GVA in sub-sectors where non-maritime activities may occur.[37]

Our analysis does not employ a similar apportioning because financial stocks and flows are analyzed at the company level, where companies receive known quantities of debt and equity but allocate an unknown share of those resources to their maritime segments. Assessing finances at this level mirrors how companies generally engage with the financial sector, which allows for a more coherent assignment of priorities for actions needed to support the transition to a sustainable Baltic Sea Economy.

TABLE 2

Gross turnover and gross value added of the Baltic Sea Economy, in millions of euros. Data from Eurostat and Blue Indicator Dashboard.

TABLE 2/ Gross turnover and gross value added of the Baltic Sea Economy, in millions of euros.

DATA FROM EUROSTAT AND BLUE INDICATOR DASHBOARD.

MILLION EURO

YEAR	GROSS TURNOVER	GROSS VALUE ADDED
2016	1,096,812	244,734
2017	1,169,754	260,813
2018	1,244,233	284,788
AVERAGE	1,170,266	263,445

Grouping structural business statistics by NACE codes allows for a more detailed characterization of the financial status of the various ocean activities, ocean sectors and economic sectors that comprise the Baltic Sea Economy. As Figure 1 illustrates, ocean activities involving non-living resources dominate revenue generation and account for 47%, or EUR€550.5 billion, of total turnover. Living resources and Maritime-based commerce are responsible for 28% and 25% of total turnover respectively.

34 The Wall Street Journal (2021). Amazon.com Inc. https://www.wsj.com/market-data/quotes/AMZN/financials/annual/income-statement

35 Eurostat (2021). Performance of the agricultural sector. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Performance_of_the_agricultural_sector#Value_of_agricultural_output

36 European Commission (2021). The EU Blue Economy Report. https://oceans-and-fisheries.ec.europa.eu/system/files/2021-05/the-eu-blue-economy-report-2021_en.pdf

37 European Commission (2021). The EU Blue Economy Report: Annex II (Methodological Framework for the Established Sectors). https://blueindicators.ec.europa.eu/sites/default/files/annex_ii_methodological_framework.pdf

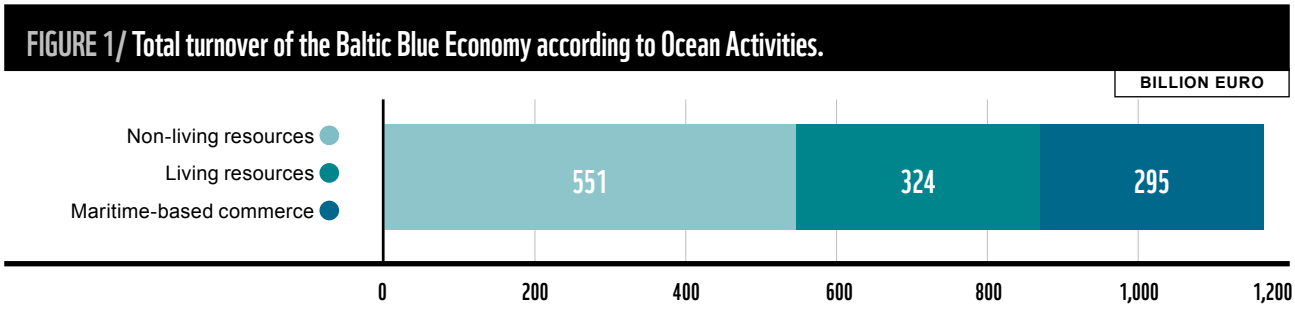


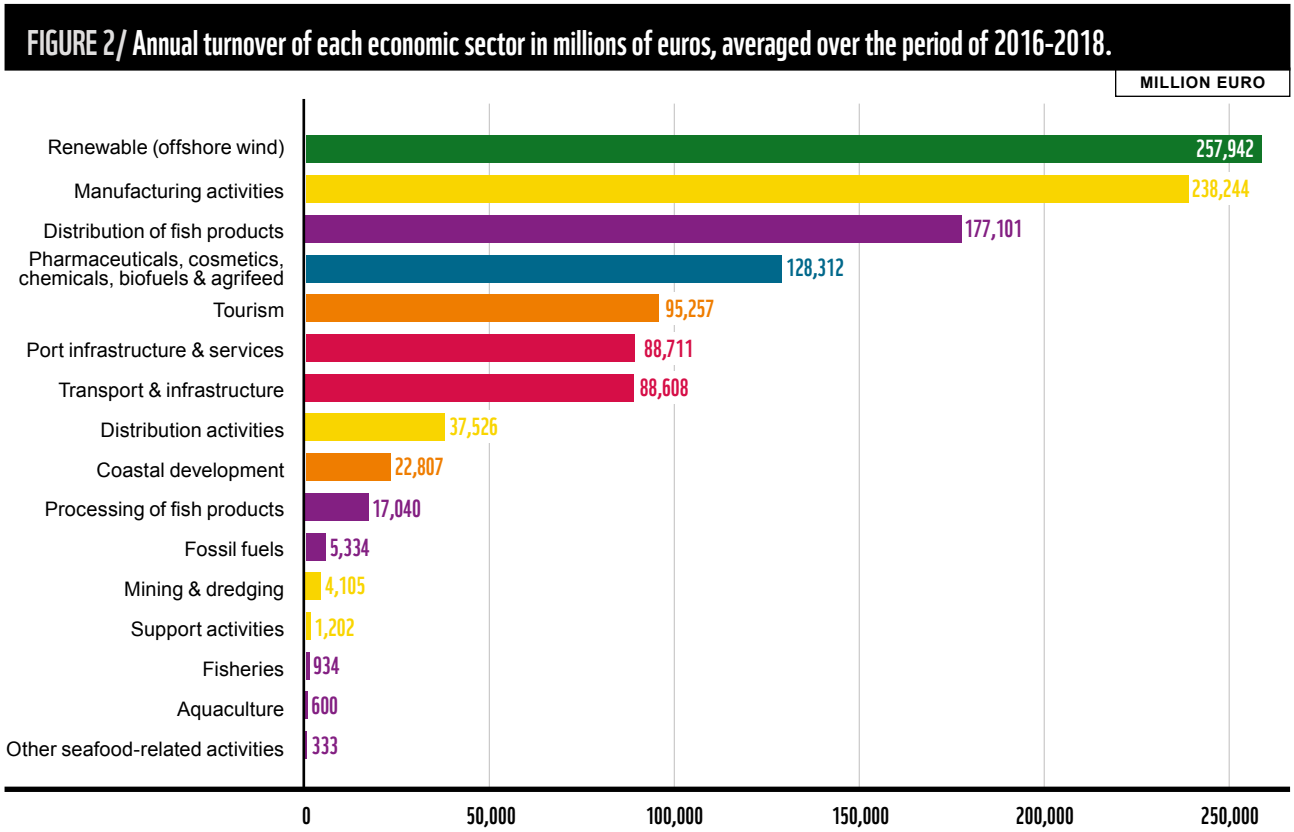
FIGURE 1

Total turnover of the Baltic Sea Economy according to ocean activities.

Renewable power generation from offshore wind is the single largest sector in the Baltic Sea Economy by revenue, accounting for approximately EUR€258 billion annually on average for the period from 2016 to 2018 (Figure 2). Extraction, the other major component of the non-living resources ocean activity category presented above, contains sectors like manufacturing, fossil fuels, energy distribution activities and mining and dredging. Of these non-living resource sectors, manufacturing activities account for the bulk of turnover at EUR€238 billion annually on average for the period between 2016 and 2018. Together, these activities, which include, for example, the processing of refined petroleum products and the creation of basic building materials from clay, plaster, lime, etc., generate 83% of all revenue from all extraction-based economic sectors (or roughly 20% of turnover across all maritime sectors). Fossil fuels, a sector of particular interest considering its outsized potential to generate further harmful environmental impact, generated approximately EUR€5.3 billion in turnover annually.

FIGURE 2

Annual turnover of each (maritime) economic sector in millions of euros, average over the period of 2016-2018.



"The precise relationship between material extraction, consumption and reuse in the Baltic region is a theme ripe for future study. It appears to indicate a current structural shortfall in the Baltic seascape economy, but it also represents an opportunity..."

The relative pre-eminence of extraction-based sectors suggests that the Baltic Sea Economy is likely dependent, to a significant extent, on non-renewable raw material inputs—whether those inputs are extracted directly from the Baltic region or imported. Raw materials from the extraction sector are used as the basis for manufactured goods, construction materials, energy carriers and numerous other essential and non-essential goods. On the other hand, the fraction of the Baltic Sea Economy concerned with material recovery and recycling (NACE E383 within transport and infrastructure) generates approximately EUR€9.0 billion, compared to EUR€286.4 billion generated by all extractive sectors. In other words, the scale of revenue generated by the economic sector most directly concerned with material circularity is far overshadowed by the sector involved in extracting, importing and processing material inputs. The precise relationship between material extraction, consumption and reuse in the Baltic region is a theme ripe for future study. It appears to indicate a current structural shortfall in the Baltic seascape economy, but it also represents an opportunity: reducing wastage of raw materials through increased circularity can help reduce the rates of environmentally damaging primary extraction.

The majority of the EUR€324.3 billion generated by living resources is from the distribution of fish products and activities driven by the pharmaceutical and chemical industries. Fish product distributors include large food companies with major retail components that also include the processing of fish such as Norwegian salmon which in Poland represents approximately EUR€1 billion. While the distribution of fish products accounts for a considerable fraction of turnover, other sub-sectors within seafood play a lesser role. Fisheries and aquaculture production under NACE code A03, for example, factor negligibly into the overall size of the Baltic Sea Economy. Despite this, these activities have meaningful and visible impacts on the Baltic Sea basin.[38,39] The impacts—both positive, with regard to the livelihoods and cultural traditions the sectors sustain, and negative, considering the habitat degradation and marine pollution they can cause—are enmeshed in an ongoing dialogue about the appropriate role of sustainable commercial fishing and mariculture.

"Fisheries and aquaculture production, for example, factor negligibly into the overall size of the Baltic Sea Economy. Despite this, these activities have meaningful and visible impacts on the Baltic Sea basin."

The rise of renewable energy generation (through offshore installations), as both a significant enabler of a sustainable energy transition and a revenue-generating activity, also indicates a concerted effort by countries to subsidize and create supportive infrastructure for green power in the Baltic Sea basin. Despite the existence of considerable untapped fossil fuel resources in the Baltic Sea basin[40], renewable energy generation is responsible for almost 50 times the revenue of the fossil fuel sector.

Trends in turnover

The Baltic Sea Economy saw average annual growth of 6.5% between 2016 and 2018. Growth was largely driven by increased turnover from non-living resource-related activities (Figure 3). Extraction and Renewable energy generation saw the highest per-sector growth rates at 10.1% and 8.4%, respectively. Tourism and recreation also saw 7.5% annual growth.

38 WWF (2020). Stop Ghost Gear: The Most Deadly Form of Marine Plastic Debris. https://www.worldwildlife.org/publications/stop-ghost-gear-the-most-deadly-form-of-marine-plastic-debris

39 HELCOM (n.d.) Bycatch. https://helcom.fi/action-areas/fisheries/ecosystem-effects-of-fisheries/bycatch/

40 E.g., by one study's estimation, 434 billion cubic metres of shale gas resources in the Lower Silurian formation of the Baltic Basin bordering Poland [Topor et al. (2017). Multi-variable constraints of gas exploration potential in the Lower Silurian shale of the Baltic Basin. International Journal of Coal Geology. http://dx.doi.org/10.1016/j.coal.2017.05.001

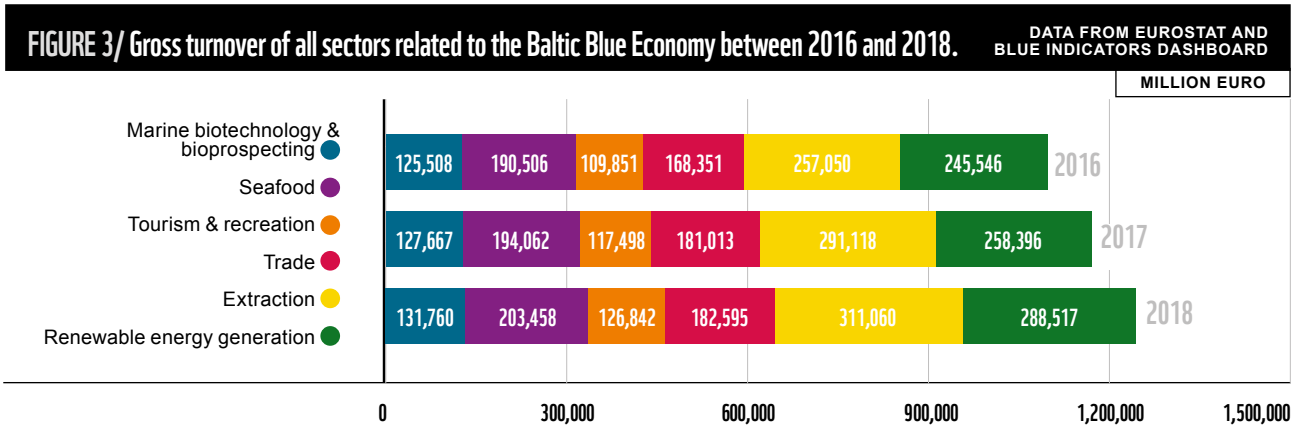


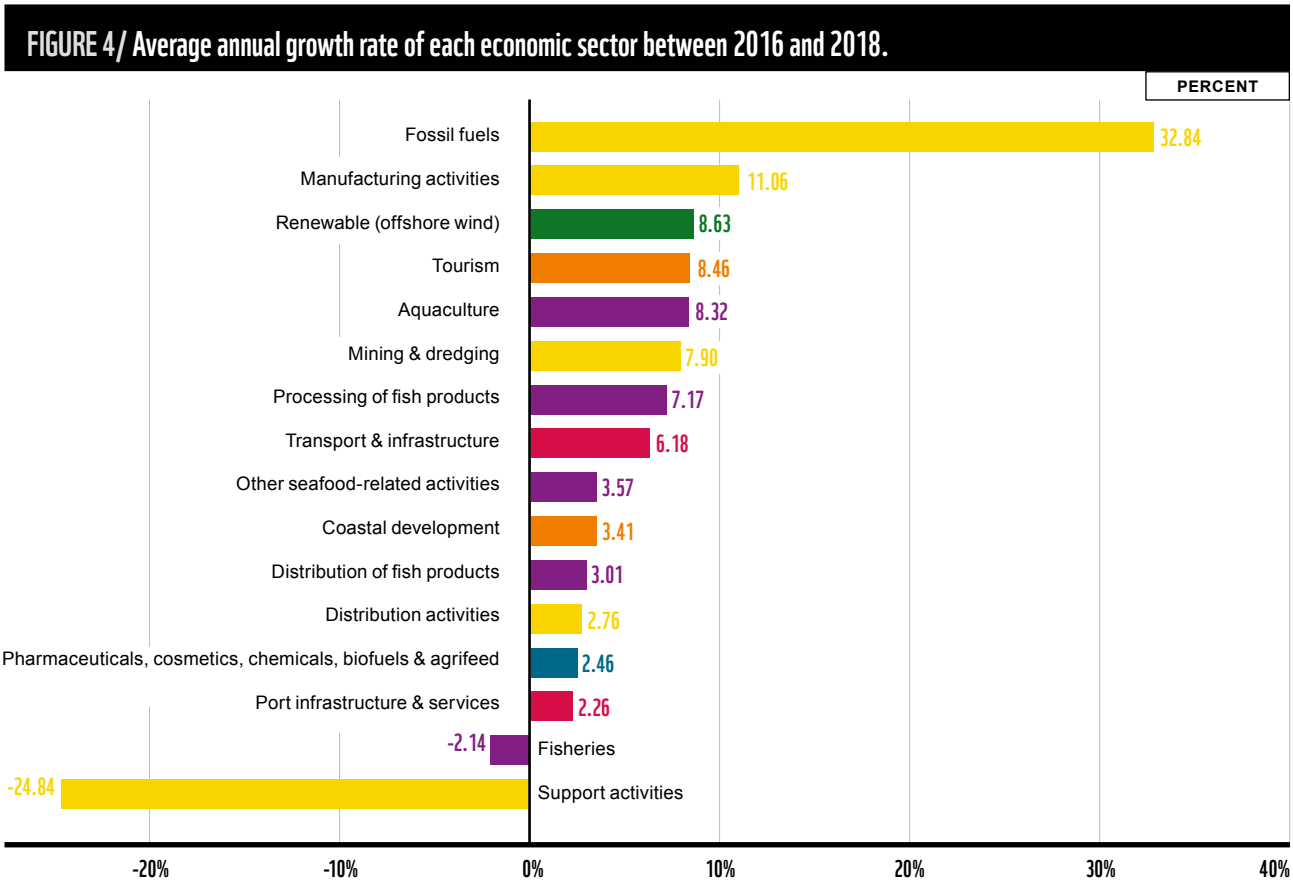
FIGURE 3

Gross turnover of all sectors related to the Baltic Sea Economy between 2016 and 2018. Data from Eurostat and Blue Indicators Dashboard.

In a further layer of detail (see Figure 4), the sub-sectoral trends reveal that most sectors have grown modestly over the 2016-2018 period (between 2 and 11% per year). The two largest sectors by turnover, manufacturing, and renewables, exhibited the second and third highest growth rates (11.1 and 8.6%, respectively). Both extraction support activities and fisheries contracted a 25% decline in the case of support activities, and a 2% decline in the case of fisheries. By contrast, fossil fuel turnover grew by 33% on average between 2016 and 2018. If sustained into future years, this trend could prove an obstacle to the transition to a SBE and to reaching the EU net zero target by 2050. This growth has occurred even though additional investment in the fossil fuel sector significantly increases the risk of stranded assets.

FIGURE 4

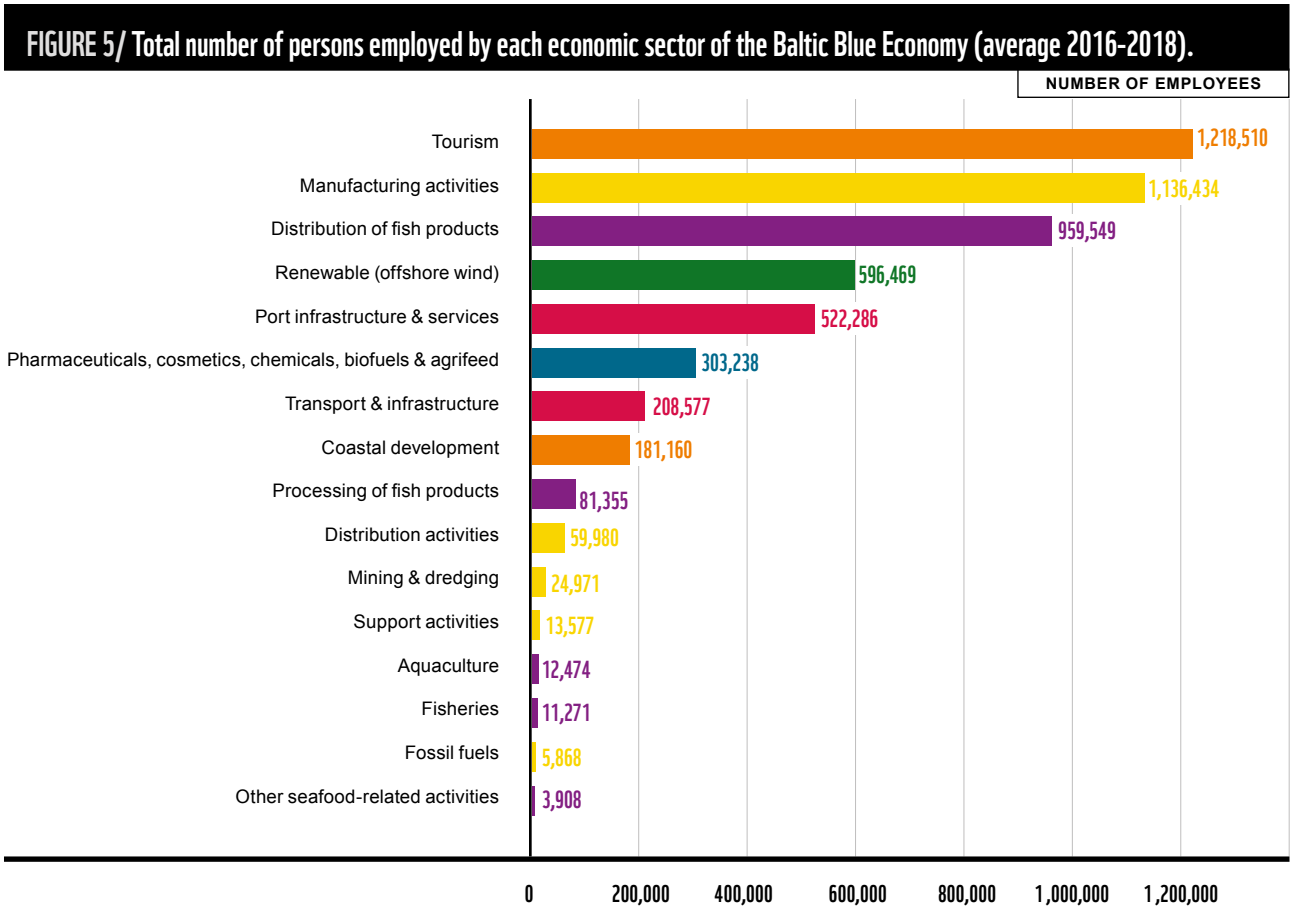
Average annual growth rate of each (maritime) economic sector between 2016 and 2018.



Employment trends

The Baltic Sea Economy employed an average of 5.4 million people per year between 2016 and 2018, equivalent to 2.4% of all employees within the EU27.[41] Looking at Figure 5, the largest sectors by employment are tourism (1.2 million), manufacturing activities (1.1 million) and fish product distribution (956 thousand). Most sectors have grown in terms of employment, although at generally lower rates compared to turnover growth. Support activities for extraction saw a steep drop in employment between 2017 and 2018 when the sector went from nearly 19,000 persons employed to less than 4,000. The cause of this loss of employment is unknown. Fisheries also saw a reduction in employment over the 2016 to 2018 period, shrinking by 5%. It should be noted that Eurostat employment data is extrapolated from a number of assumptions and is thus subject to a degree of uncertainty.

FIGURE 5
Total number of persons employed by each (maritime) economic sector of the Baltic Sea Economy (average 2016-2018).



3.2 AGGREGATE FINANCIAL FLOWS INTO THE BALTIC SEASCAPE

Aggregate financial stocks and flows offer a detailed view of the allocation of debt and equity across sectors, as well as insight into how debt and capital flows move and influence segments of the Baltic Sea Economy. In this study, they are modelled from ratio analysis averaged over the period of 2018-2020 and Eurostat macroeconomic data. See Annex 3 for a national breakdown of financial stocks and flows, and Annex 4 for the calculated ranges of stocks and flows.

41 Statista (2021). Number of employees in the European Union (EU27) and United Kingdom from 1st quarter 2005 to 3rd quarter 2020. https://www.statista.com/statistics/570993/employees-in-europe/

Aggregate financial stocks

The range of calculated values was used to assemble a model of debt and equity as they are held within and flow through the Baltic Sea economy. Figure 6 demonstrates how financial stocks are distributed within all six ocean sectors for all companies as an aggregate, as well as how they are split between public and private companies. The allocations of both debt and equity amount to a snapshot of the capital structure of the entire Baltic Sea Economy and the sectors that comprise it. While financial flows change from year to year, Figure 6 effectively represents the pattern by which companies (and groupings of companies) have organized their financing habits—retaining a considerable amount of debt and equity as it suits their particular operational needs.

FIGURE 6/ Financial stocks by sector.

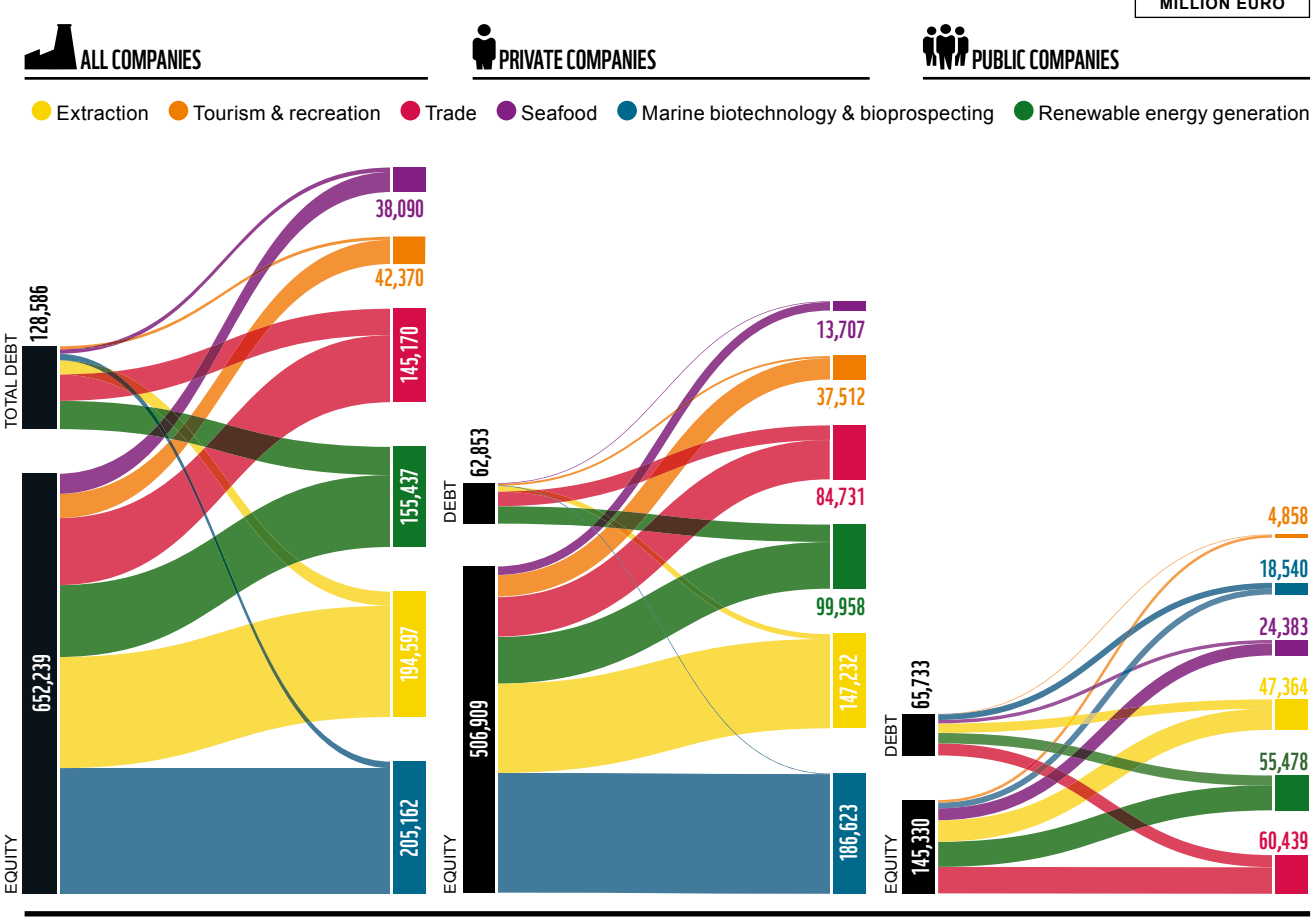


FIGURE 6/ Financial stocks by sector. The model of financial stocks is derived from aggregate ratio analysis (2018-2020). The leftmost diagram represents all companies, the middle diagram represents only private companies and the rightmost diagram represents only public companies.

"The equity of private companies represents the most meaningful financial stock currently supporting the Baltic Sea Economy."

The model of aggregate financial stocks also reveals that equity dominates the overall capital structure of the Baltic Sea Economy at approximately five times the volume of total debt (EUR€128.6 billion). Private companies hold approximately three times the volume of total debt and equity compared to public companies (Figure 7). The equity of private companies represents the most meaningful financial stock currently supporting the Baltic Sea Economy.

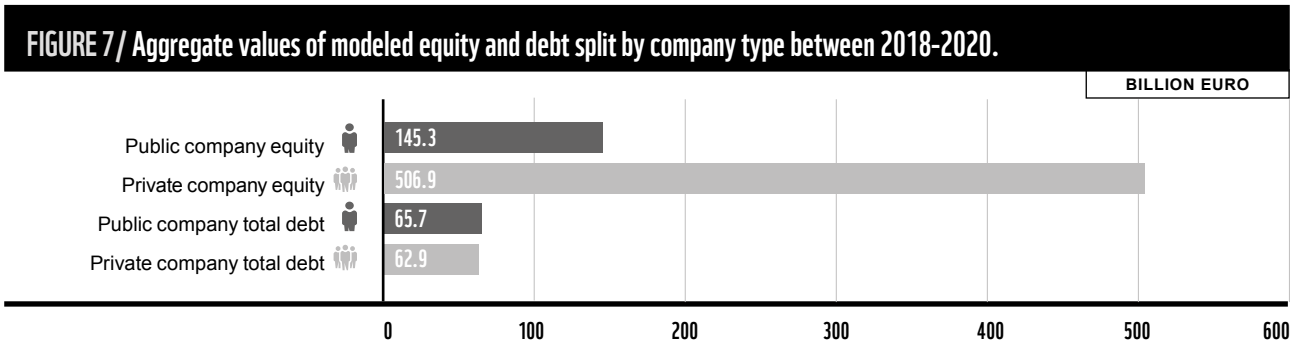


FIGURE 7

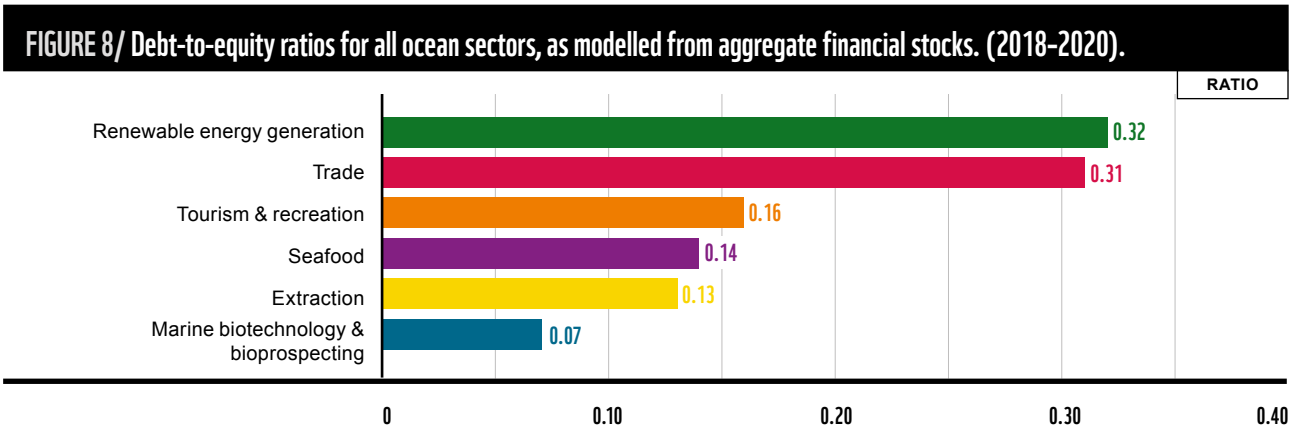
Aggregate values of modeled equity and debt split by company type between 2018 and 2020.

This model portrays one side of the full view of financial stocks in the Baltic Sea Economy – the recipient company side. Companies engage in financing activities by issuing new debt or shareholders' funds (which are captured as financial flows), but innumerable entities exist on the other side of those transactions. The linkages between debt and equity holders and the overall financial stocks and flows are explored in more detail for public companies in the following section ("Aggregate financial flows"). The same analysis is not possible for private companies due to the lack of detailed cash flow data. Instead, transactions between private companies and investors are analyzed in detail.

The larger financial stock of the two, by a significant margin, is equity. That is, all of a company's assets minus its liabilities, and that part of a company's assets that are owned by shareholders rather than lenders. Out of the total stocks for all companies, equity accounts for 84%. Debt is apparently much less common on the balance sheet of companies in the Baltic Sea Economy, accounting for only 16% of total financial stocks. The overall debt-to-equity ratio of the Baltic Sea Economy indicated by this model is approximately 0.2 (or 20%). This ratio indicates that the leverage, meaning the reliance on debt or borrowed funds to finance activities, of the Baltic Sea Economy is low. Low leverage suggests that, as a whole, the maritime economy of the region is not over-accumulating debt and, as such, is in sound financial shape in that regard. However, looking at only public companies' overall debt-to-equity ratio of the Baltic Sea Economy indicated by this model is 45%. Higher risk activities, such as biotech-related activities, are typically financed with equity. On the other hand, renewable energy generation (mainly offshore wind farms), an infrastructural activity with substantially lower risk, tends to be financed with debt (see Figure 8).

FIGURE 8

Debt-to-equity ratios for all ocean sectors, as modelled from aggregate financial stocks (2018-2020). Lower ratios indicate greater use of equity financing and lesser use of debt.



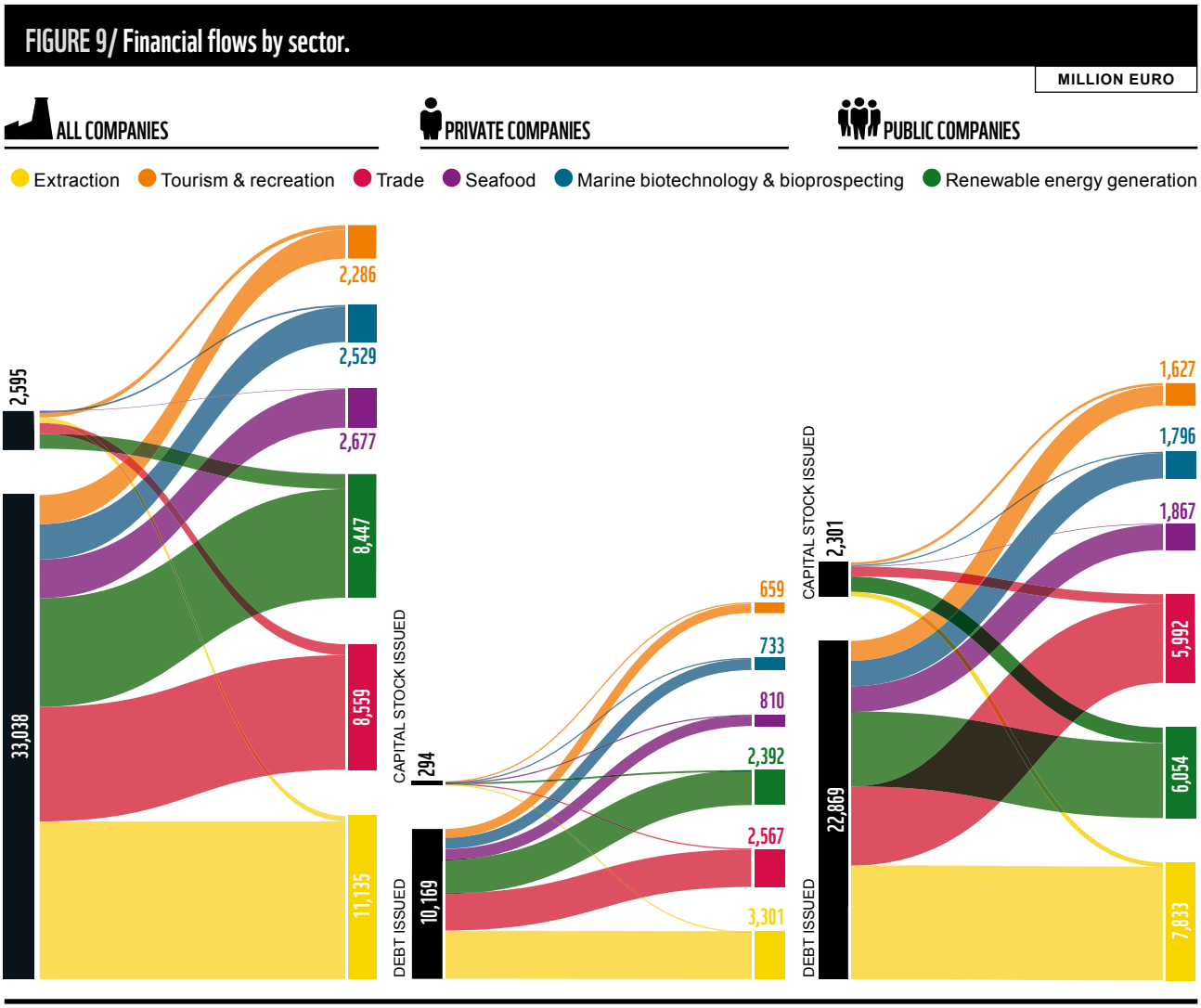
The allocation of financial stocks differs somewhat between public and private companies. A notable difference is that, while marine biotechnology and bioprospecting account for the largest share of stocks for private companies, it accounts for one of the lowest shares of stocks for public companies. In conclusion, high-risk activities (e.g. biotech start-ups) are typically carried on by VC-type funds, explaining why there is such a high dominance of private companies' equity in the biotech sector. Once these companies succeed, they are often bought by larger, mainly public, companies. This suggests that while the number of private companies in the Baltic Blue Economy is generally higher than the number of public companies, the proportion is especially skewed in the case of certain sectors such as biotech.

Aggregate financial flows

FIGURE 9

Financial flows by sector. Model of financial flows derived from aggregate ratio analysis between 2018 and 2020. The leftmost diagram represents all companies, the middle diagram represents private companies and the rightmost diagram represents public companies.[42]

While assessment of the distribution of financial stocks reveals how debt and equity have accumulated over time, financial flows reveal the investment activities driving the Baltic Sea Economy from year to year. Figure 9 illustrates how financial flows, either in the form of equity (also called "capital stock") or debt issued, move into each ocean sector. The flows pictured represent approximate annual additions to the pools of total debt and total equity that comprise the previously discussed financial stocks.



42 It should be noted that the flows portrayed here are strictly inflows (which accumulate on top of stocks). Outflows are not captured in this model. Outflows would include mechanisms like debt repayment and reductions of shareholders' funds caused by devaluation, bankruptcy or equity buy-back.

"…fossil fuel capital investments are primarily financed by bank debts or bonds."

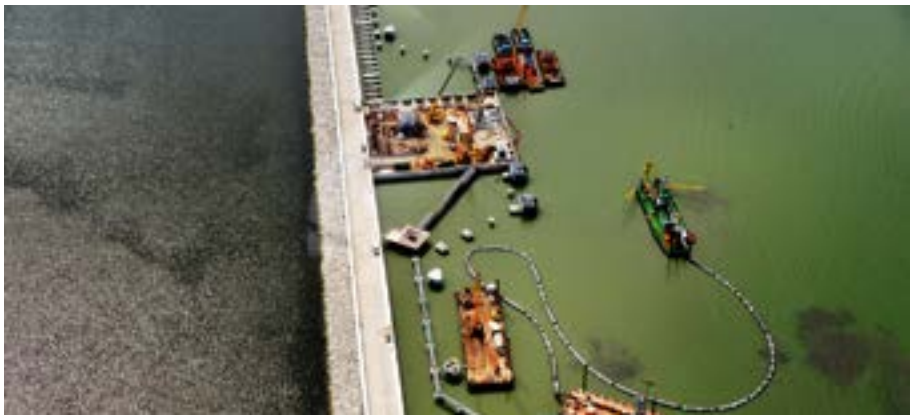
"Debt stands out as the key investment mechanism by which the Baltic Sea Economy can be influenced."

The most apparent insight from the model of financial flows is the preponderance of new debt over new capital stock during the period of record low interest rates which stimulated companies, particularly public ones, to issue masses of fresh debt. This is the case for investment in Europe in general and is not unique to the SBE or Baltics due to the overall structure of EU Finance; unlike in the US, for example, where equity plays a much larger role. However, the debt-equity split is not representative of future years, particularly bearing in mind substantial interest rate increases carried out by central banks over the past few months.

For all companies, new debt accounts for €33 billion, or 93% of all flows. As such, debt stands out as the key investment mechanism by which the Baltic Sea Economy can be influenced. The sector that issues the greatest amount of debt is extraction, followed by trade and renewable energy. The institutions holding that debt have significant influence over the financial well-being of these sectors. For example, fossil fuel capital investments are primarily financed by bank debts or bonds.[43] Banks that implement restrictive policies for financing fossil fuel companies (e.g., BNP Paribas) can significantly shrink the available universe of finance at the disposal of these companies. Some of the tools at the disposal of banks motivated to align financing with sustainability objectives include green financing frameworks, non-financial disclosure protocols and financial instruments (e.g., bonds) whose proceeds are restricted to activities that benefit society and the environment. The next section ("Major companies in each sub sector") provides a detailed analysis of debt mechanisms employed by public companies within the Baltic Sea Economy.

"Public companies apparently engage in financing activities more frequently and/or at larger scales than private companies."

The second observation that the model yields concerns the relative shares of financial flows issued by public and private companies. Private companies–although they account for 77% of the total number of companies and 46% of revenue in the sample group analyzed–are responsible for only 30% of financial flows in the model. Apparently, public companies engage in financing activities more frequently and/or at larger scales than private companies. This is fortunate since private companies are typically more difficult to influence financially (in part due to the opacity of their ownership structures and financial situations). Public companies, being beholden to their shareholders, are required to justify their financing activities, including how much and what kind of debt is sourced, meaning they could be more susceptible to the influence of activism and public pressure aligned with the transition to a sustainable Baltic Sea Economy. Even if there are many private companies in this analysis, it is relevant to note the presence of State Owned Enterprises as some of the largest companies – as they can also set direction and lead the way toward implementing and supporting a SBE.



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43 Beyene et al. (2020). Fuelling fossil fuel: Bond to bank substitution in the transition to a low-carbon economy. UN Principles for Responsible Investment. https://www.unpri.org/pri-blog/fuelling-fossil-fuel-bond-to-bank-substitution-in-the-transition-to-a-low-carbon-economy/5712.article

3.3 MAJOR COMPANIES IN EACH SUB-SECTOR

Unlike the model of aggregate stocks and flows in the previous section (refer to Section 3.2), the figures presented here are based on reported data rather than being extrapolated from ratio analysis. While this data is not scaled up to represent the entire Baltic Sea Economy, it is accorded more certainty: company statistics are sourced directly from financial databases (Step 6, Section 2).

All company statistics were averaged over the previous three years (i.e., 2018, 2019 and 2020) to partially account for disruptions and significant year-to-year changes in revenue, financial stocks or financial flows caused by the Covid-19 pandemic. Since companies were selected based on revenue to maximize the coverage of financing activities, small and medium-sized enterprises are represented only to a limited extent.[44]

Largest companies by revenue

The majority of companies in the final list are private: 77% compared to 23% public. However, public companies earned, on average, nearly four times the revenue (EUR€3.6 billion) of private companies (EUR€924 million). The combined effect of higher average revenue for public companies and the significantly higher number of private companies means that the overall split of revenue between the two company types is relatively even: EUR€232.4 billion (54%) from public companies, and EUR€196.0 billion (46%) from private companies.

Table 3 contains a list of the 20 largest companies by revenue from the sample group. Of the top 20 companies, six belong to the ocean sector of extraction, six belong to renewable energy generation, four belong to trade, two belong to seafood and two belong to marine biotechnology and bioprospecting. The tourism and recreation ocean sector is not represented within the top 20 companies. Eleven of the top 20 are public, which is generally consistent with the observation that public companies generate higher average revenue. Altogether, these companies are responsible for 54% of the total revenue of all companies in the sample group. In addition, they are responsible for 56% of the total debt and 61% of the total equity held as stocks by companies within the sample group.

These top 20 companies (as a subset of the larger sample group of 278) represent key players in the Baltic Sea Economy. Financing activities undertaken by these companies, especially in high-impact sectors, have outsized effects on the Baltic Sea basin. These companies issued an average of EUR€9.4 billion in new debt and EUR€155 million in new equity annually from 2018 to 2020. Capital expenditure data (available for the majority of companies) indicates that this group is responsible for EUR€8.1 billion annually in spending on facilities, equipment and other assets. In addition, the companies for which data is present (14 out of 20) hold a combined EUR€13.8 billion in bank debt.

As an example of the influence these companies hold, A.P. Møller - Mærsk A/S, a maritime transport and logistics company, took on an average of EUR€1.3 billion of new debt each year over the past three years. In all likelihood, a sizable fraction of these funds was put toward the company's average annual capital expenditure budget of EUR€1.9 billion. The kinds of activities the company funds with that budget—hypothetically, decarbonising logistics (as the company says is one of its sustainability priorities[45]) versus building additional fossil fuel-powered vessels—affects the outlook of a sustainable Baltic Sea Economy.

44 The methods by which SMEs engage in financing activities also tend to differ from larger companies. In general, equity financing is more limited and debt financing is often procured through banks and other traditional lending institutions.

45 A.P. Møller - Mærsk A/S (2020). Sustainability Report. https://www.maersk.com/about/sustainability/reports

TABLE 3/ Top 20 companies from the sample group ranked according to a three-year revenue average.

MILLION EURO

COMPANY	COMPANY TYPE	OCEAN SECTOR	REVENUE
A.P. Møller - Mærsk A/S	Public	Trade	34,986
Novo Nordisk A/S	Public	Marine biotechnology & bioprospecting	16,354
Vattenfall AB	Private	Renewable energy generation	15,896
Fortum Oyj	Public	Renewable energy generation	14,682
Skanska AB	Public	Trade	14,578
Vestas Wind Systems A/S	Public	Renewable energy generation	14,404
ICA Gruppen AB	Public	Seafood	12,083
Neste Oyj	Private	Extraction	11,491
DSV Panalpina A/S	Private	Trade	11,093
Kesko Oyj	Public	Seafood	10,564
Centrica Energy Trading A/S	Private	Renewable energy generation	10,010
Danske Commodities A/S	Private	Renewable energy generation	10,008
Sandvik SRP AB	Private	Extraction	9,992
Atlas Copco AB	Public	Trade	9,618
Preem AB	Private	Extraction	8,244
AstraZeneca AB	Private	Marine biotechnology & bioprospecting	7,960
SSAB AB	Public	Extraction	7,381
Grupa LOTOS S.A.	Public	Extraction	6,662
Outokumpu Oyj	Public	Extraction	6,612
Peab AB	Public	Renewable energy generation	5,645

TABLE 3

The top 20 companies from the sample group of companies used for analysis, ranked according to a three-year revenue average between 2018 and 2020. Several of the top 20 companies listed as "private" are, in fact, wholly or majority state-owned enterprises, (e.g., Vattenfall (Sweden), Fortum (Finland) and Danske Commodities (ultimate owner is the Norwegian company Equinor, where the Norwegian state is the majority shareholder)) while ICA Gruppen was delisted in 2022.

Public company detail: share of debt split by debt instrument

Cashflow data from public companies offers a deeper look into the mechanisms employed to build the stocks and enable the flows that power the Baltic Sea Economy. Detailed attribution of company debt to specific debt mechanisms was built from the subset of public companies within the sample group. Figure 10 displays each ocean sector's share of debt split according to the debt instrument used to issue it. The total debt held by all public companies which was analyzed amounts to EUR€32.4 billion. The renewable energy generation sector holds the largest fraction of debt (EUR€11.1 billion), followed by extraction (EUR€8.8 billion) and trade (EUR€6.6 billion).

Bank and institutional loans

Bank and institutional loans are, by far, the most prominent debt instruments in the Baltic. All sectors rely on these lenders, at least to a degree (although, in tourism and recreation the value is negligible). Extraction and trade are particularly reliant on this debt instrument. The extraction sector sources approximately 68% of its debt (ca EUR€5.9 billion) from bank and institutional loans alone. The trade sector sources a similar 67% of all debt (ca EUR€4.4 billion) from this instrument. This suggests that interventions at the lender level have the potential to shift the Baltic Sea Economy at scale. If banks and institutional lenders could be motivated to change what activities they are willing to finance, and implement higher standards and requirements within already existing contracts, then the sectors dependent on their credit would be compelled to (at least partially) shift in accordance.

"...interventions at the lender level have the potential to shift the Baltic Sea Economy at scale. If banks and institutional lenders could be motivated to change what activities they are willing to finance, then the sectors dependent on their credit would be compelled to (at least partially) shift in accordance."

FIGURE 10/ Sectoral debt by debt instrument.

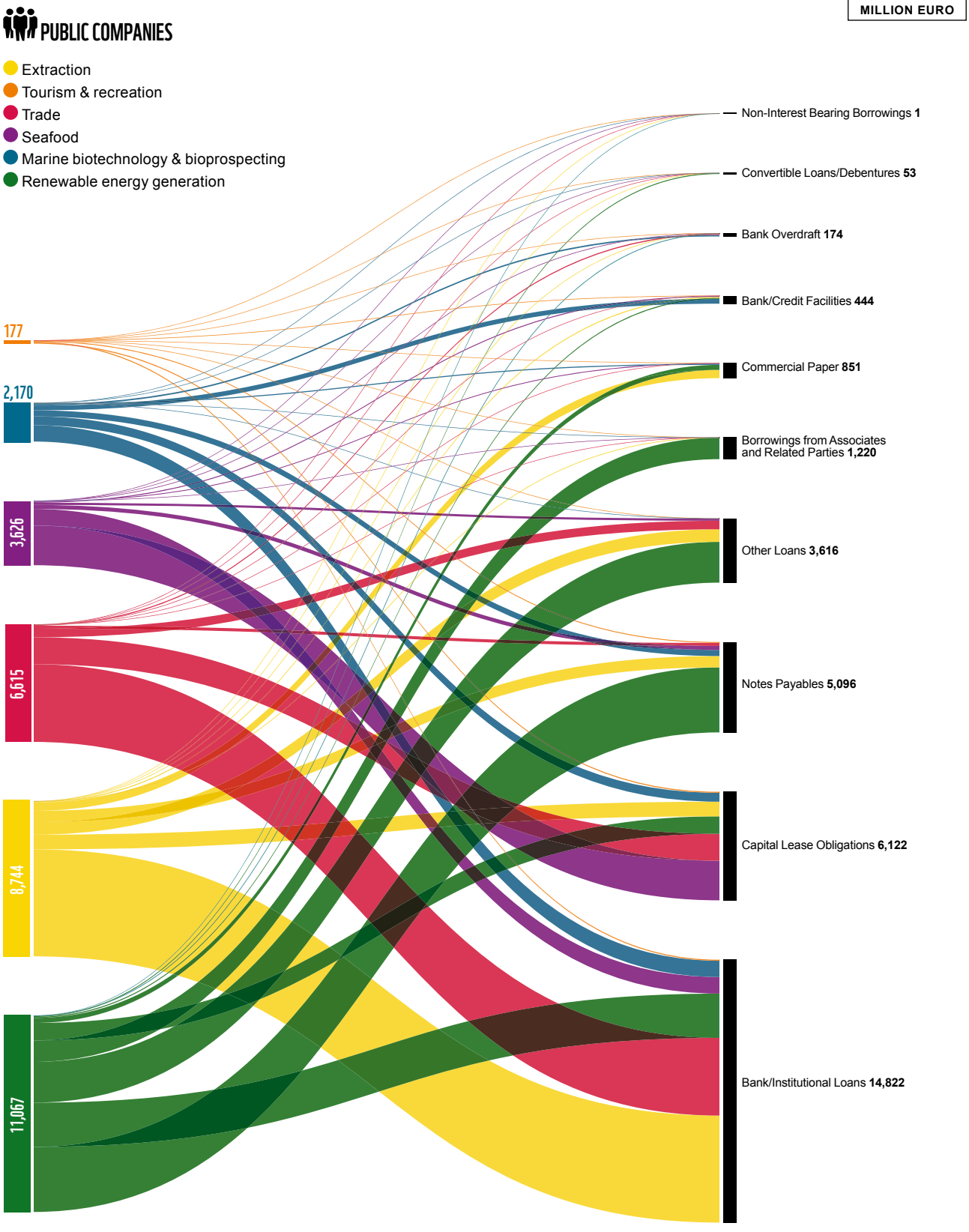


FIGURE 10/ Sectoral debt by debt instrument. Distribution of debt across each ocean sector, organized by debt mechanism between 2018 and 2020. All data from the subset of public companies within the sample group. See Annex 6 for a disaggregated version of this figure.

Capital lease obligations

The second most prominent debt instrument is capital lease obligations. These debts represent leases of assets that are recorded as though a company owns the asset for the purposes of accounting. Leases can be issued for equipment, machinery, properties and other physical assets. The seafood sector is the largest user of capital lease obligations, holding 36% (or EUR€2.2 billion) of the total value of this debt instrument. Within seafood, the fish product distribution sector relies most heavily on capital lease obligations (fisheries and aquaculture account for a small fraction of the total). It is very likely that these companies use this debt instrument to finance a mix of assets that include equipment and premises. Asset owners typically control the terms of capital leases, giving them significant control over selecting lease recipients, or even potentially attaching conditions to the use of assets. In fish product distribution, this could equate to establishing requirements that companies adhere to certain sourcing protocols (sustainable catch standards, for example) or that they make commitments to improve the sustainability of their operations.

Notes payable

The third largest share of debt is sourced from notes payable. These debts are similar to loans, in that repayment terms (including interest rates) are agreed upon by the lender and recipient, but potentially offer greater flexibility than bank or institutional loans. The renewable energy generation sector is particularly reliant on notes payable—33% of all debt financing (ca EUR€1,6 billion) comes from this instrument (followed by bank/institutional loans at 23% and "other" loans at 21%). Very little public information is available on the possible terms and uses of proceeds from notes payable in the renewable energy sector. This instrument may be attractive to the renewable energy generation sector for a number of reasons: more attractive terms than bank loans, higher risk appetite of lenders, better understanding by lenders of industry specifics, to name a few. Since notes payable are flexible (potentially even one-off) debt instruments, it may be challenging to exert a sustainable influence over this mechanism at large. However, amenable note holders could be petitioned to attach social and environmental criteria to the terms of notes—for example, offering more attractive interest rates for higher demonstrable sustainability at the project level or outright denying financing to companies or projects that fail to meet a minimum threshold for social and environmental performance.

"Clearly, investors of all classes see biotechnology and bioprospecting as a lucrative holding. Marine biotechnology and bioprospecting accounts for 53% of all capital stock across public companies."

Public company detail: share of equity split by owner class

Aside from detailed debt structure information, cashflow data from public companies offers insights into the variety of actors invested in listed equity across the Baltic Sea Economy. Figure 11 shows the degree to which various owner classes are invested in each ocean sector. The considerable variety of owner classes is evident from first glance. The plethora of shareholders (and investment strategies) speaks to the need for tailored interventions.

FIGURE 11/ Sectoral capital stock by owner class.

MILLION EURO

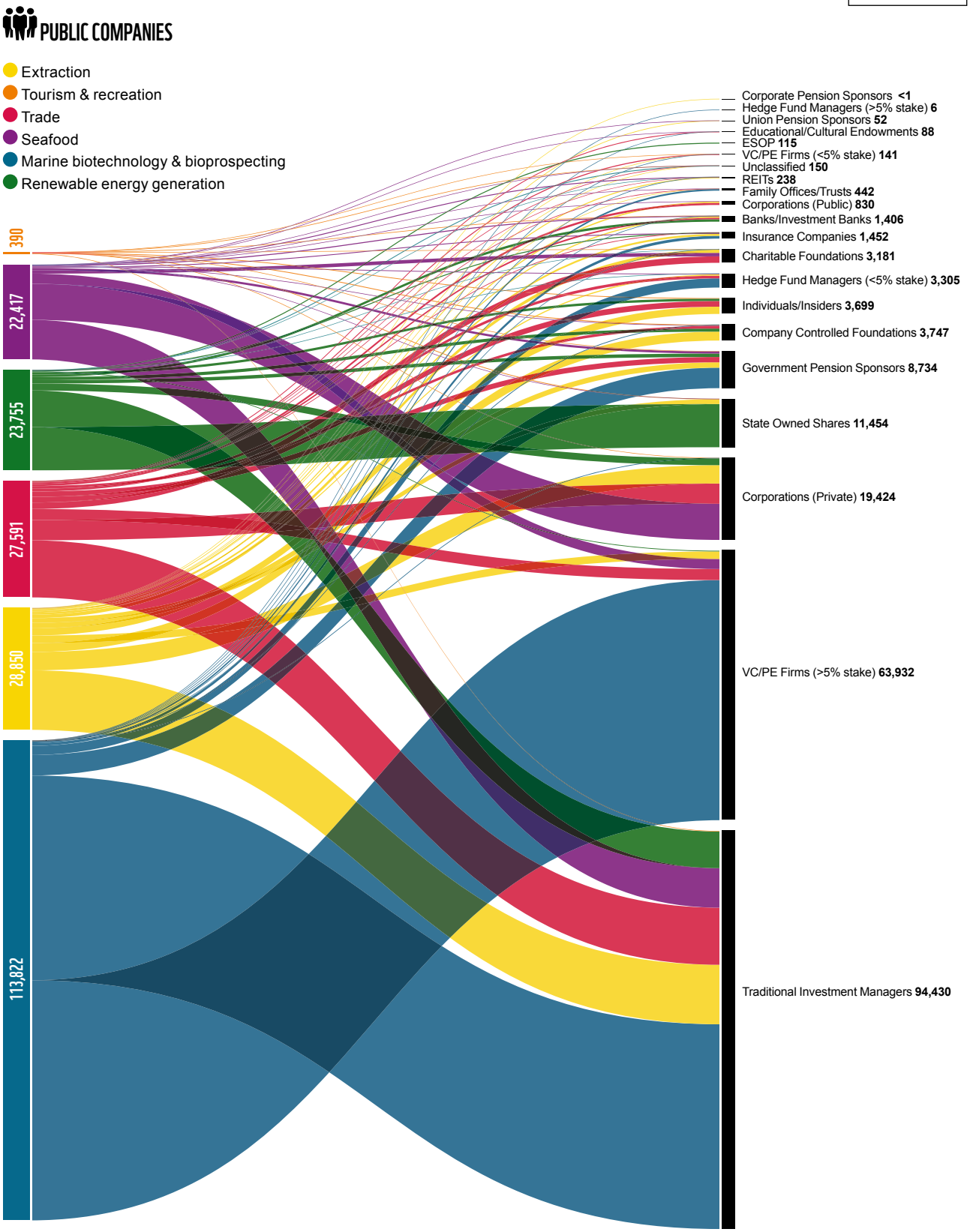


FIGURE 11/ Sectoral capital stock by owner class. Share of equity owned by various owner classes across ocean sectors between 2018 and 2020. All data from the subset of public companies within the sample group. See Annex 6 for a disaggregated version of this figure.

Investment managers are motivated to maximize returns by holding shares in companies and industries with high-profit potential and tolerable risks. Clearly, investors of all classes see biotechnology and bioprospecting as a lucrative holding. Marine biotechnology and bioprospecting accounts for 53% of all capital stock across public companies. The primary investors in this sector are traditional investment managers and venture capital/private equity firms with more than a 5% company stake. Marine biotechnology and bioprospecting accounts for 89% of the EUR€63.9 billion held by VC/PE firms and 51% of the EUR€94.4 billion held by traditional investment managers.

"Even in the absence of external pressures, investors are increasingly recognizing the major risks posed by a portfolio exposed to the physical impacts of climate change, as well as to looming transitions that have the potential to strand assets and make entire business models obsolete."

While a majority of the value held by traditional investment managers is in marine biotechnology and bioprospecting companies, this owner class also has diverse holdings in all other sectors. Traditional investment managers have additional multi-billion holdings in extraction, trade, seafood and renewable energy generation. As the dominant owner class, traditional asset managers (meaning institutional investors, both asset owners and asset managers) act as a key interface between social and environmental impacts and company-level activities. There are two primary reasons for this: first, traditional investment managers operate at the discretion of their clients, meaning they are likely to be responsive to shifting priorities (such as demand for environmental, social and governance offerings); second, mechanisms like shareholder voting and the threat of divestment have direct financial effects on companies operating counter to investor wishes. Depending on social pressures, traditional investment managers could be motivated to meaningfully shift the way equity is employed in pursuit of a sustainable Baltic Sea Economy. Other investors, especially those with avowed commitments to non-financial impact (e.g., educational endowments and charitable foundations) are also likely to be receptive to maximizing the social and environmental benefits attached to their investments. Even in the absence of external pressures, investors are increasingly recognizing the major risks posed by a portfolio exposed to the physical impacts of climate change, as well as to looming transitions that have the potential to strand assets and make entire business models obsolete.[46]

Private company detail: share of transactions split by deal type

Although private companies do not typically disclose detailed cash flow data, supplementary analysis of the transactions that involve private companies offers some insights into the mechanisms by which value changes hands. Figure 12 shows how each ocean sector participates in the numerous types of transactions that occurred among private companies in the Baltic Sea Economy between 2014 and 2021.

Mergers and acquisitions is by far the most common and most highly valued type of transaction that has recently been occurring in the Baltic Sea Economy. Mergers and acquisitions can refer to purchases of entire companies (or subsidiaries), or to the selective acquisition of individual assets owned by other companies. Transactions involving the marine biotechnology and bioprospecting sector account for the largest per-sector share of value. Of those transactions, 97% of value changed hands through mergers and acquisitions. This indicates that acquisitions are a key part of the growth strategy for companies involved in pharmaceutical research, manufacturing and distribution.

46 See for example Kahn et al., 2019. Long-Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis. https://www.frbsf.org/economic-research/events/2019/november/economics-of-climate-change/files/Paper-2-2019-11-8-Pesaran-9AM-2nd-paper.pdf

FIGURE 12/ Sectoral share of private company transactions - by aggregate transaction value.

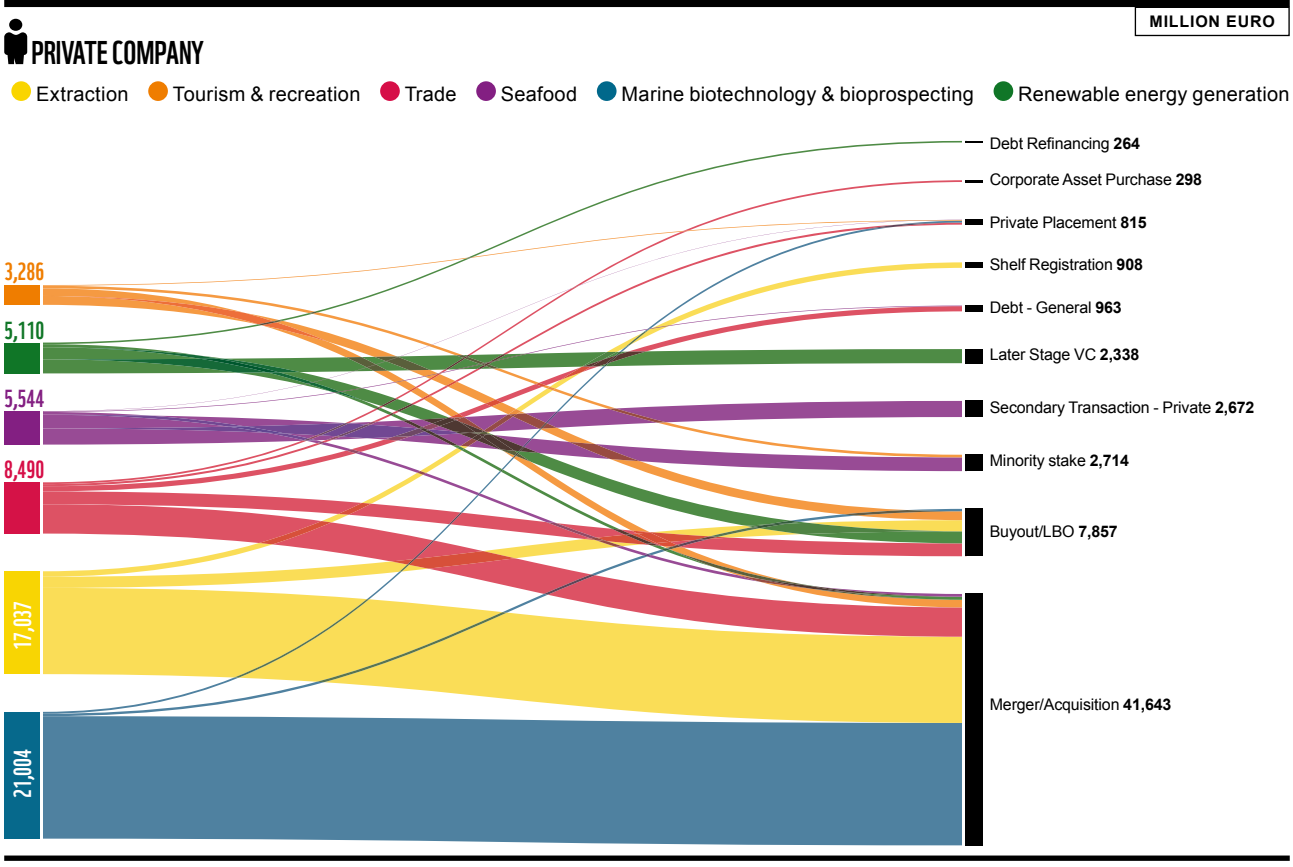


FIGURE 12

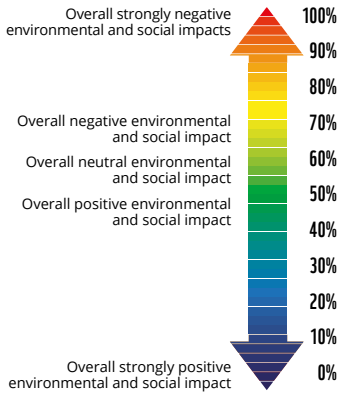
Sectoral share of private company transactions - by aggregate transaction value. Aggregate value of each transaction type, split by ocean sectors 2014-2021. All data from Capital IQ, Zephyr, and PitchBook.

Six of the 10 largest transactions, amounting to EUR€16.0 billion, involve companies in the Extraction sector. Two of the 10 largest transactions, amounting to EUR€18.0 billion, involve companies in the biotechnology and bioprospecting sector. The remaining two of the 10 largest transactions, amounting to EUR€4.9 billion, involve companies in the trade sector.

Individual transactions among or involving private companies are likely the most challenging component of the financial system for outside parties to influence directly. In order to address private companies, one would have to trace VC/PE owners, and subsequently, through them, trace back to the institutional investors with the largest limited partners positions in these funds. The capital in these funds is very often from institutional investors (asset owners, asset managers) and the way these investors set up standards and requirements for the VC/PE funds can contribute a lot to improving the sustainability levels of the investments. Traditionally, institutional investors have focused on their holdings in public companies where the ultimate exclusion threat is always present, but the potential and responsibility of the holdings in the private space have been increasingly growing. In particular, the work put in before an investment is made is important here; investment agreements should include clear sustainability requirements since the possibility to exclude them is very limited once the investment has been made. Raising the importance of environmental, social and governance (ESG) issues among owners of private companies (i.e., among PE, VC, players, etc.) can help steer private companies toward stronger due diligence processes before or while considering potential transactions. Private companies will also be exposed to both the physical and transition risks associated with the continuation of unsustainable business practices. Transactions that align with the transition to a sustainable Baltic Sea Economy can be framed not just as the right thing to do, but also as best practice for increasing the reliance of individual firms and sectors.

3.4 ENVIRONMENTAL AND SOCIAL PERFORMANCE

KEY TO TABLE 4



Environmental and social impact assessment

The methodology used to conduct the assessment of the sectoral environmental and social performance of maritime-related sectors can be found in Annex 7, Step 10. The assessment of the sectoral environmental and social performance of maritime-related sectors in the Baltic is provided in Table 4. The table is organized in descending order from negative to overall positive impact. The scoring reflects the overall impact and risks that each sector poses (see Annex 2 for scores and scoring criteria). However, an individual company may have higher or lower performance than the sectoral average, depending upon its specific practices and the natural resources being used/harvested.

TABLE 4/ Environmental and social assessment of Baltic economic sectors.

OCEAN SECTOR	DESCRIPTION	% SCORE
Extraction	Mining & dredging	95%
Extraction	Operation of gravel and sand pits; mining of clays and Kaolin	95%
Extraction	Extraction of crude petroleum and natural gas	94%
Seafood	Marine fisheries	89%
Extraction	Support activities and Manufacturing activities	88%
Trade	Construction of water projects	85%
Extraction	Transport via pipeline	84%
Trade	Port infrastructure & services	82%
Trade	Sea and coastal freight water transport	82%
Seafood	Freshwater aquaculture	80%
Trade	Sea and coastal passenger water transport	78%
Trade	Transport and infrastructure (manufacturing, shipbuilding and repair)	78%
Seafood	Marine aquaculture	77%
Tourism & recreation	Tourism	75%
Trade	Water collection, treatment and supply	74%
Tourism & recreation	Fishing practiced for sport or recreation and related services	73%
Tourism & recreation	Sewerage	71%
Tourism & recreation	Waste collection, treatment and disposal	70%
Renewable energy generation	Electric power generation, transmission and distribution	67%
Seafood	Distribution & Processing of Fish Products and Other seafood-related activities	60%
Marine biotechnology & bioprospecting	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	50%
Extraction	Extraction of salt	Insufficient data
Tourism & recreation	Remediation activities and other waste management services	Insufficient data

TABLE 4/ Environmental and social assessment of the Baltic economic sectors.

The extraction sector—which includes mining and dredging, the operation of gravel pits, and the extraction of oil and gas— received the worst environmental and social assessment score of all the sectors. This sector scored poorly for its impact on marine biodiversity[47], ecosystem and ecosystem services[48], coastal and marine habitats[49], animal welfare[50], GHG emissions, and displacement of other livelihoods.[51]

"The only sector that is assessed as having an overall positive environmental and social impact is marine biotechnology and bioprospecting. This is due to the potential positive effects—if developed sustainably—of activities such as producing seaweed that also help mitigate marine eutrophication, protect and restore marine habitats while capturing CO_2, and the potential of these activities to help diversify local economies."

Significantly negative environmental and social impacts were also displayed by a range of different sectors. These sectors include marine fisheries, support services for extraction, construction or water projects, pipeline transportation of oil and gas, and marine freight transport. They scored on the negative side of the spectrum, to a greater or lesser degree, for most of the environmental impact categories.

The only sector that is assessed as having an overall positive environmental and social impact is marine biotechnology and bioprospecting (when looking at NACE M72 & M74 codes in terms of experimental research for biotechnology). This is due to the potential positive effects—if developed sustainably—of activities such as producing seaweed that also help mitigate marine eutrophication[52], protect and restore marine habitats[53] while capturing CO_2[54], and the potential of these activities to help diversify local economies. A number of other sectors show a mixture of positive and negative environmental and social impacts. For example, renewable energy generation is rated as having negative impacts on biodiversity (e.g., the impact of wind turbines on migratory bats[55] and birds[56]) and seabed habitats[57], causing localized but permanent loss of these habitats, yet has comparatively low greenhouse gas (GHG) emissions[58] and some positive social dimensions.[59] Of note, the scientific findings on the renewable energy sector's positive impacts on biodiversity are still being collected.

Environmental and social performance vs financial flows

Comparing the environmental and social assessment scores versus the financial flows into economic sectors provides insight into the degree to which financial flows are supporting or hindering a Baltic SBE. To allow for greater comparability, financial data has been aggregated at the level of the ocean sector, using the average environmental and social assessment score for each ocean sector.

47 Helle, I., Jolma, A., and Venesjärvi, R. (2016). Species and habitats in danger: estimating the relative risk posed by oil spills in the northern Baltic Sea. Ecosphere 7(5):e01344. 10.1002/ecs2.1344 https://esajournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/ecs2.1344

48 HELCOM (2018). HELCOM Maritime Assessment 2018: Maritime activities in the Baltic Sea. Baltic sea Environment Proceedings no.152. Helsinki Commission, Helsinki, Finland. https://docslib.org/doc/11802643/helcom-assessment-on-maritime-activities-in-the-baltic-sea-2018

49 HELCOM (2018). State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155. https://www.eea.europa.eu/data-and-maps/indicators/chlorophyll-in-transitional-coastal-and-3/helcom-2018-state-of-the

50 HELCOM (2020). Baltic Marine Environment Protection Commission, Heads of Delegation. Online meeting, 7-8 December 2020

51 Bertram, C., Ahtiainen, H., Meyerhoff, J., Pakalniete, K., Pouta, E., and Rehdanz, K. (2020) Contingent Behavior and Asymmetric Preferences for Baltic Sea Coastal Recreation. Environmental and Resource Economics 75: 49–78. https://link.springer.com/content/pdf/10.1007/s10640-019-00388-x.pdf

52 Kulikowski, T. (n.d.). Development of a European seaweed strategy: Baltic Sea Status. National Marine Fisheries Research Institute. https://www.submariner-network.eu/images/grass/Development_of_EU_Seaweed_strategy.pdf

53 Weinberger, F., Paalme, T., and Wikström, S.A. (2020). Seaweed resources of the Baltic Sea, Kattegat and German and Danish North Sea coasts. Botanica Marina, vol. 63, no. 1, pp. 61-72. https://doi.org/10.1515/bot-2019-0019

54 Krause-Jensen, D., Duarte, C., Frigstad, H. (2018). Marine forests - Nature's own carbon capture and storage. ScienceNordic. https://sciencenordic.com/climate-change-climate-solutions-denmark/marine-forests---natures-own-carbon-capture-and-storage/1458305

55 Simon P. Gaultier, Anna S. Blomberg, Asko Ijäs, Ville Vasko, Eero J. Vesterinen, Jon E. Brommer, and Thomas M. Lilley (2020). Bats and Wind Farms: The Role and Importance of the Baltic Sea Countries in the European Context of Power Transition and Biodiversity Conservation. Environmental Science & Technology 54 (17), 10385-10398. DOI: 10.1021/acs.est.0c00070. https://pubs.acs.org/doi/10.1021/acs.est.0c00070

56 Piggott. A., Vulcano, A., & Mitchell, D. (2021). Impact of offshore wind development on seabirds in the North Sea and Baltic Sea: Identification of data sources and at-risk species. Birdlife International. https://www.birdlife.org/wp-content/uploads/2021/09/birdlife_offshore_summary_report_digital-compressed.pdf

57 HELCOM (2018). HELCOM Maritime Assessment 2018: Maritime activities in the Baltic Sea. Baltic sea Environment Proceedings no.152. Helsinki Commission, Helsinki, Finland. https://docslib.org/doc/11802643/helcom-assessment-on-maritime-activities-in-the-baltic-sea-2018

58 WindEurope (2019). Boosting offshore wind energy in the Baltic Sea. https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Boosting-offshore-wind.pdf

59 WindEurope (2019). Op cit.

"Nearly four-fifths (79%) of the total debt is within ocean service sectors that were assessed as having an overall negative environmental and social impact."

Based on aggregate financial flows (Section 3), nearly four-fifths (79%) of the total debt is within ocean service sectors that were assessed as having an overall negative environmental and social impact (i.e., impact score >60%, Table 4). Just 6% of the total debt resides in sectors with a neutral or positive impact (score ≤60%). This reflects the high levels of total debt in the extraction, marine trade and renewables sectors (Figure 13). Sectors with negative environmental and social assessment scores also dominate the value of equity (53%). However, the high value of equity in marine biotechnology and bioprospecting—which has the potential for more positive environmental impacts compared to many other sectors—means that the distribution of equity is more balanced between environmental and social impacts (Figure 13).

FIGURE 13/ Average environmental and social score against proportion of total debt and proportion of total stocks for ocean service sectors in the Baltic.

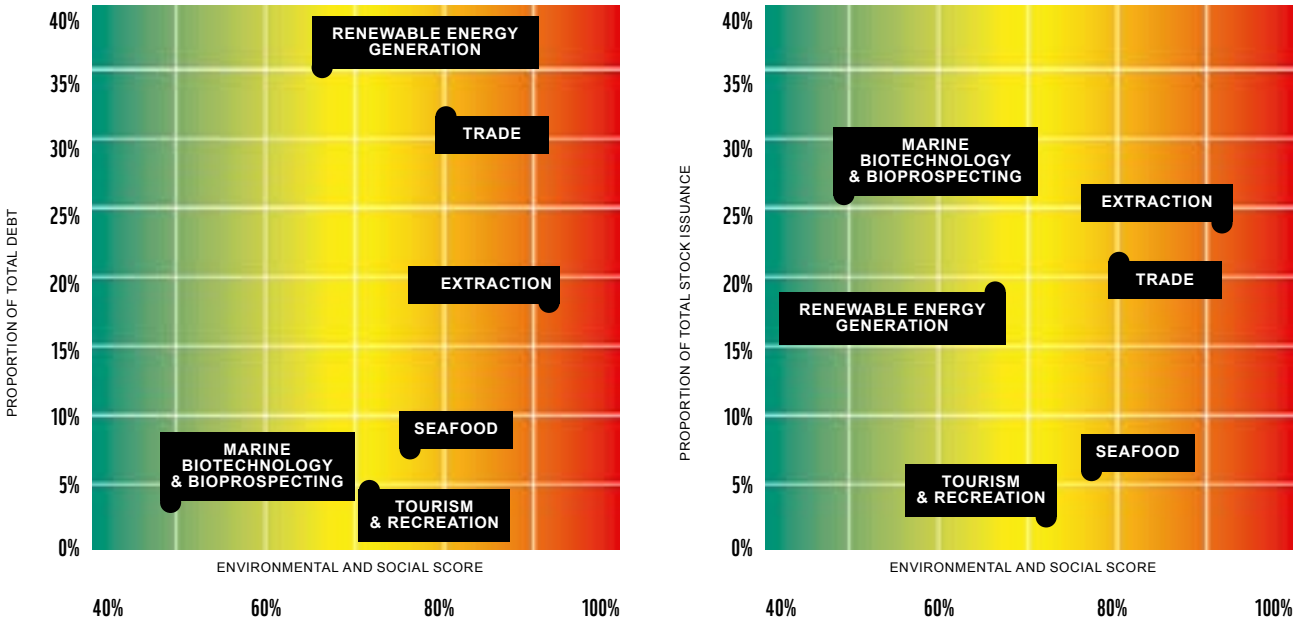


FIGURE 13

Average environmental and social score against proportion of total debt (left), and proportion of total stock issuance (right) for ocean service sectors in the Baltic (financial estimates 2018-2020). Sectors with environmental and social scores above 60% are considered to have an overall negative impact.

An assessment of the average financial flows of top companies (see Section 3.3) yields similar results, with 74% of average debt issuance received by companies in ocean service sectors that were assessed as having overall negative environmental and social impact (i.e., impact score >60%). Eleven per cent of the average debt and stock issuance flows into sectors with a neutral or positive environmental and social assessment score. The dominance of strongly negative environmental and social scores in debt issuance is driven by the extraction industries (fossil fuels, mining and dredging, and transportation by pipeline (Figure 14)).

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FIGURE 14/ Average environmental and social score against average debt issuance and stock issuance for ocean service sectors in the Baltic.

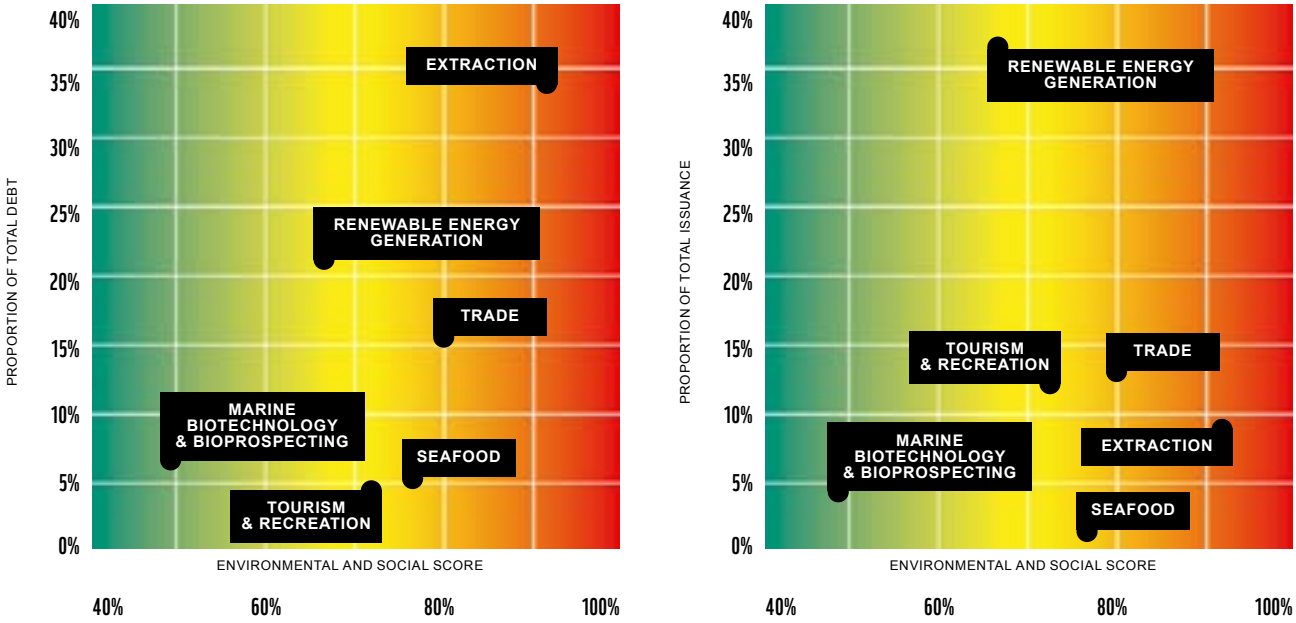

FIGURE 14

Average environmental and social score against average debt issuance (left) and stock issuance (right) for ocean service sectors in the Baltic. Sectors with environmental and social scores above 60% are considered to have an overall negative impact.

The average value of equity in companies within sectors with negative environmental and social assessment scores is less dominant (33%) than debt. However, the total value of equity in sectors for which there was sufficient data to conduct an environmental and social assessment was less than half the total value of equity in all the companies assessed. The largest share of average debt was in renewables (Figure 14), a sector assessed as having only mildly negative impacts overall, with positive scores for some impact areas. However, the Russia-Ukraine conflict could possibly lead to an unpredictable demand for fossil fuels requiring greater debt financing.

Interactions between sectors and sustainable practices

Marine-based economic sectors do not act—or have impacts—in isolation. Any set of sectors can have a synergistic or, more commonly, antagonistic relationship in a given space; involving, for instance, their use of natural capital, impacts on touristic value and effects on the operations of other sectors.[60] For example, there is an antagonistic relationship between the extraction of crude petroleum and the fishing industry due to seismic surveys that disturb, kill or injure marine life, cause contamination through toxic drilling, mud and cuttings, and oil spills that affect the very fish populations the fishing industry relies upon. Synergistic relationships between sectors exist, such as multi-use off-shore platforms that provide opportunities for renewable energy and aquaculture.[61] The synergistic and antagonistic relationship between sectors has been modelled in part using a systems modelling approach in the Value at Risk in the *Blue Economy*[62] and *Navigating Ocean Risk*[63] reports. A full analysis of the environmental and social interactions of marine sectors[64] is beyond the scope of this report.

60 Beatrice Crona et al. (2021). Sharing the seas: a review and analysis of ocean sector interactions. Environmental Research Letters, 16, 063005. https://iopscience.iop.org/article/10.1088/1748-9326/ac02ed

61 Wever L, Krause G and Buck B H 2015 Lessons from stakeholder dialogues on marine aquaculture in offshore wind farms: perceived potentials, constraints and research gaps Marine Policy 51, 251–9. https://www.sciencedirect.com/science/article/abs/pii/S0308597X14002310?via%3Dihub

62 Value at Risk in the Blue Economy (metabolic.nl)

63 Navigating Ocean Risk - Value at Risk in the Global Blue Economy - Baltic WWF (wwfbaltic.org)

64 Beatrice Crona et al. (2021). Sharing the seas: a review and analysis of ocean sector interactions. Environmental Research Letters, 16, 063005. https://iopscience.iop.org/article/10.1088/1748-9326/ac02ed

However, it is partly accommodated through the scoring of livelihoods and economic opportunities' impact areas (Annex 2a). For example, renewable energy generation scored "neutral" (Annex 2b) for the livelihoods impact area due to its antagonistic impact on tourism[65] and fisheries and shipping[66], while it had a positive impact on energy price volatility[67], and sustainable development.[68]

Insights into the ways that sectors interact also point to a broader truth: many sectors can reduce their environmental and social impact if the authorities that regulate them, the institutions that finance them, and the actors who operate in the sector behave differently. Perhaps the clearest example of this is the fisheries sector; the Baltic Sea has a poor record of overfishing[69], by-catch[70] (both affecting the marine biodiversity impact area); bottom trawling[71] (affecting marine habitats), lost fishing gear (affecting animal welfare)[72], etc. As for offshore wind energy generation, such facilities must be carefully considered and, especially, designed to not only meet energy demands but also societal demands (i.e., less-disturbing design) and be placed away from biodiversity-sensitive areas. Sectors based on ecosystem services may therefore have the opportunity to align themselves with a SBE. Whether the extraction sectors will be able to do this is less apparent, as they are in direct opposition to principles two and three of a SBE.[73]

"Insights into the ways that sectors interact also point to a broader truth: many sectors can reduce their environmental and social impact if the authorities that regulate them, the institutions that finance them, and the actors who operate in the sector behave differently."

3.5 HORIZON SCANNING

If the industrial landscape of the Baltic Sea Economy is to evolve in accordance with the vision for a secure and sustainable future, it will have to undergo substantial changes. Some sectors within the Blue Economy are at the forefront of change, while others risk being outpaced by the social, economic and legislative demands for sustainable shifts. Laggards are far more likely to face financial losses arising from transition risks (e.g., stranded assets).[74] On top of that, those who fail to halt harmful activities within a timeframe that gives society the best chance of avoiding the worst consequences of the climate and biodiversity crises increase the physical risks associated with climate change and environmental damages for all actors in the Baltic Sea Economy.

"Some sectors within the Blue Economy are at the forefront of change, while others risk being outpaced by the social, economic and legislative demands for sustainable shifts."

Recent trends in Baltic economic sectors

As described in Section 3, recent trends in economic sectors provide a contradictory picture with respect to the prospects of a Baltic SBE, indicating rapid growth in both renewable energy generation and activities related to fossil fuel extraction. The lack of an explicit economic signal toward sustainable activities suggests that the functioning of the Baltic Sea ecosystem will continue to be threatened.

65 Palkeinen, A. (2012). Boat Tourists' Perception of Environmental Problems: A Case Study in Estonian, Finnish and Swedish Archipelago. Thesis for a Bachelor of Natural Resources, NOVIA University of Applied Sciences. https://www.theseus.fi/bitstream/handle/10024/53523/Anne_Palkeinen.pdf?sequence=1

66 HELCOM (2020). Baltic Marine Environment Protection Commission, Heads of Delegation. Online meeting, 7-8 December 2020

67 Reve (2018). How to exploit offshore wind energy potential in Baltic Sea. https://www.evwind.es/2019/11/28/how-to-exploit-offshore-wind-energy-potential-in-baltic-sea/72092

68 Reuters Events: Renewables (October 7, 2020). UK to build 1 GW floating wind by 2030; Europe backs Baltic offshore wind push. https://www.reutersevents.com/renewables/wind/uk-build-1-gw-floating-wind-2030-europe-backs-baltic-offshore-wind-push

69 HELCOM (2018). HELCOM Maritime Assessment 2018: Maritime activities in the Baltic Sea. Baltic sea Environment Proceedings no.152. Helsinki Commission, Helsinki, Finland. https://docslib.org/doc/11802643/helcom-assessment-on-maritime-activities-in-the-baltic-sea-2018

70 Littfass, D. (2019). Bye-bye bycatch: HELCOM and OSPAR are pooling efforts to deal with incidental catch of species. https://helcom.fi/bye-bye-bycatch-helcom-and-ospar-are-pooling-efforts-to-deal-with-incidental-catch-of-species/

71 WWF (n.d.). Bottom trawling impacts in the Baltic Sea. https://www.wwfbaltic.org/our-vision-for-the-baltic-sea/supporting-sustainable-fisheries/bottom-trawling-impacts/

72 HELCOM (2018). HELCOM Maritime Assessment 2018: Maritime activities in the Baltic Sea. Baltic sea Environment Proceedings no.152. Helsinki Commission, Helsinki, Finland. https://docslib.org/doc/11802643/helcom-assessment-on-maritime-activities-in-the-baltic-sea-2018

73 The Sustainable Blue Economy Finance Principles | WWF

74 For more information refer to Navigating Ocean Risk - Value at Risk in the Global Blue Economy - Baltic WWF (wwfbaltic.org)

"Recent trends in economic sectors provide a contradictory picture with respect to the prospects of a Baltic Sustainable Blue Economy, indicating rapid growth in both renewable energy generation and activities related to fossil fuel extraction."

Two recent initiatives, the Nordic Baltic Blue Bond[75] and the BlueInvest Fund[76] offer opportunities to achieve greater alignment of finance with the Baltic SBE, as well as to finance projects that support adaptation to the effects of climate change and more extreme weather in the future.[77] The size of these funds (EUR€1.47 billion and EUR€75 million, respectively) is equivalent to just 0.3% of the estimated average annual financial stock of Baltic maritime sectors. While these (and similar) initiatives are encouraging, it highlights the need for sustainable blue finance initiatives to be supported through the mainstreaming of sustainability considerations in the decision-making processes of financial institutions.

Outlook compared to the EU Blue Economy

The EU *Blue Economy Report* identified the following sectors as emerging, innovative and likely to bring about sustainable change: marine renewable energy, blue biotechnology, marine minerals, desalination, maritime defence, research and development, education, and infrastructure and maritime works.[78] Each of these sectors represents considerable potential for positive growth along both economic and sustainability dimensions.

A key difference relates to the EU Blue Economy's assessment of marine minerals as a contributor to growth and a sustainable transition.[79] The analysis performed in this study of the Baltic Sea Economy links marine mining and dredging to significant social and environmental harm (Table 4). Identifying alternative sources of these materials, developing appropriate demand reduction measures, creating circular economies and funding the development of alternatives would be preferred recommendations. These recommendations align with the EU policy objectives on the circular economy, as in the Circular Economy Action Plan adopted March 2020.[80]

Maritime spatial planning

Spatial planning can integrate the sometimes disparate components of marine ecologies, economies and surrounding societies. A maritime spatial planning approach is currently being applied to the Baltic Sea to address transborder issues, develop coherent data platforms and implement continuous improvement plans. Under the EU Directive for Maritime Spatial Plans (MSPs), European nations were asked to deliver MSPs in March 2021. Key frameworks at play in maritime spatial planning for the Baltic Sea include national-level MSP legislation for countries surrounding the Baltic[81], HELCOM's updated Baltic Sea Action Plan (in October 2021)[82] and Visions and Strategies Around the Baltic Sea's (VASAB) Long-Term Perspective for the Territorial Development of the Baltic Sea Region.[83] MSPs identify areas for all marine economic activities, including those with harmful environmental impacts on the Baltic seascape (e.g., extractives), and more environmentally benign ones (e.g., renewable energy generation).

75 NIB (2020). NIB launches five-year SEK 1.5 billion Nordic–Baltic Blue Bond. https://www.nib.int/who_we_are/news_and_media/news_press_releases/3583/nib_launches_five-year_sek_1_5_billion_nordic-baltic_blue_bond

76 European Investment Fund (202). European Commission and European Investment Fund launch €75 million BlueInvest Fund. https://www.eif.org/what_we_do/equity/news/2020/blueinvest-fund-efsi.htm

77 For example, the Nordic-Baltic Blue Bond supported Nya Slussen redevelopment project https://www.nib.int/releases/nib-finances-the-nya-slussen-project-in-stockholm-sweden

78 European Commission (2021). The EU Blue Economy Report. https://ec.europa.eu/oceans-and-fisheries/system/files/2021-05/the-eu-blue-economy-report-2021_en.pdf

79 Ibid.

80 European Commission (2020). Circular economy action plan. https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

81 European MSP Platform (2021). Baltic Sea. https://www.msp-platform.eu/sea-basins/baltic-sea-0

82 Helsinki Commission (2021). Baltic Sea Action Plan. https://helcom.fi/baltic-sea-action-plan/

83 Visions and Strategies Around the Baltic Sea (2009). Long-Term Perspective for the Territorial Development of the Baltic Sea Region. https://vasab.org/wp-content/uploads/2018/06/vasab_ltp_final-2.pdf

"More commitment and greater effort are needed to strengthen their national plans with regard to the inclusion of nature and Good Ocean Governance"

The Baltic is the first regional sea with established maritime spatial plans from all Member States. While the WWF assessment of the Baltic MSPs[84] recognizes the good first steps the Baltic countries have taken in planning and establishing institutional structures for further developments in maritime management, more commitment and greater effort are needed to strengthen their national plans with regard to the inclusion of nature and Good Ocean Governance. One shortcoming in the MSPs of three countries was the lack of definitions of SBE objectives and finance principles, while a further three countries partially fulfilled the criteria. This could lead to the assumption that MSPs are based on an economic growth model that does not take into account planetary boundaries and potentially negative feedback loops from environmental overuse and habitat destruction.

Baltic Member State stakeholders must adopt SBE principles and implement a SBE, while financiers should adopt the UNEP FI SBE finance principles. Baltic European MSPs must align with EU policies that seek a sustainable and secure future for all, such as the EU Biodiversity Strategy, European Green Deal, Common Fisheries Policy and Marine Strategy Framework Directive. When harmoniously applied and successfully enforced, government policies can support a SBE and safeguard the well-being of Baltic wildlife and people.

84 https://wwwwwfbalticorg.cdn.triggerfish.cloud/uploads/2022/03/assessment-report-msp-01mar2022_final.pdf

4/ KEY INSIGHTS

The premise of wielding financial resources to drive the transition to new, more sustainable economic and social systems is not a new one. Whether government-backed, led by the private sector, or developed through grassroots efforts, countless initiatives are seeking to financially reward economic activities that benefit the environment and penalize those that cause harm. The strength of these initiatives is bolstered substantially when the interventions are based on critical assessments of key leverage points—opportunities for maximizing impacts—which are identified through the careful study of context and relationships.

This first analysis of the core elements of finance in the Baltic Sea Economy suggests that leverage points abound. The deep (potentially intractable) links between unsustainable sectors and their financial backers point to numerous avenues of potential influence. This study could ideally serve as a springboard for further ideas to precisely target the actors within and components of the Baltic Sea Economy's financial system that could be primed for a shift away from an untenable business-as-usual. Unfortunately, this study was not able to review the innovation landscape, or do an in depth analysis of Venture Capitalists and Private Equity's role in supporting a SBE. A lot of the change toward a SBE will be driven by different types of innovation and some understanding of how this segment is contributing, and the avenues for larger contribution would be relevant to research and gain insight from. This is a gap we have identified in this study due to a lack of time and resources. However we acknowledge the European Commission's actions to accelerate this type of innovation via the BlueInvest platform.[85]

This report aims to lay the groundwork for the numerous potential action points that have made themselves evident following the analysis and interpretation of the data. To that end, key insights have been drawn from elsewhere in the report and expanded upon here.

INSIGHT 1/ The biggest obstacle to a Baltic SBE is likely to be the financial intertwining of the regional economy with its worst offending ocean sector.

The segment of the Baltic Sea Economy involved in harvesting and processing raw materials—many of them from non-renewable sources—is the largest of all in terms of turnover. It also commands the largest share of financial stocks (especially in Russia (see Annex 8)) and flows, and ranks worst in terms of environmental and social impact. While this interplay of financial dominance and negative impact means that the biggest sustainability gains are likely to be seen in the extraction sector, identifying ways to achieve those wins remains a major challenge. Supplanting demand for goods and materials from unsustainable sources seems to require either finding new, sustainable sources of materials or reducing aggregate demand. Yet wind turbines and solar cell technology require long supply chains and some of their components rely on critical materials that are either mined or refined in China, thereby raising concerns about their future availability.

The circular economy undoubtedly has a role to play in sourcing recycled and reused materials. However, the current scale of the marine circular economy in the Baltic does not appear to match the value of goods flowing through the current "take-make-waste" system: resource and material recovery sub-sectors generate approximately EUR€9.0 billion, compared to EUR€286.4 billion generated by all extraction sectors. Clearly, a marine circular economy capitalizing on only 3% of material extracted is insufficient.

Further, the extraction sectors employ 1.2 million people, or 23% of the entire Baltic Sea Economy workforce. In keeping with the principle of a just transition for all, considerations must be made for the retraining of this workforce. The good news is that many technologies used in the offshore wind industry represent innovations that have stemmed from the offshore fossil fuel industry. Foundations are fabricated in the same yards that build oil rigs and the different floating foundations proposed for offshore wind originate from deep-water drilling. Construction know-how in the open ocean requires a highly skilled crew. The renewable energy sector currently needs more skilled labourers, of which the oil and gas workforce has the transferable skills needed. More must be done by governments and industry to ensure a just transition[86] that leaves no worker behind as we shift to a net zero (low carbon) future.

85 Maritime Forum (europa.eu)

86 WWF's online "Build your own scorecard" tool allows anyone to take a draft or final Territorial Just Transition Plan, check its quality and potential to deliver a just transition, and see how others are doing in comparison (https://just-transitions-plan.wwf.eu/en/intro).

INSIGHT 2/ The rise of renewables in the Baltic as the lead profit-generating economic sector is cause for hope and a potential source of examples for other sectors.

Renewable energy generation by offshore wind installations is the second largest economic sector by turnover (the first being manufacturing and the third being the distribution of fish products) in the Baltic. The highly intentional coordination of resources and creation of support mechanisms for renewable energy demonstrates that relatively short-term change is possible.

The next challenge for renewables is reducing or eliminating some of their negative environmental impacts and finding synergies with environmental organizations and government institutions to help restore and conserve nature. Offshore renewable infrastructure is still infrastructure. It needs to be subject to a circularity concept, best-practice planning and design, and requires rigorous evaluation using both environmental impact assessments (EIA) and strategic environmental assessments (SEA).[87] When developing offshore renewable projects, it is therefore crucial to adopt an ecosystem-based approach, use marine space judiciously (both nationally and regionally) and support ocean resilience by staying within ecosystem boundaries. Robust MSPs that consider species migration and dispersal routes will be a key element in meeting this challenge, alongside measures to minimize and redress the environmental impact of construction, maintenance and phasing out activities.

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UNEP FI SUSTAINABLE BLUE FINANCE RESOURCES[88]

UNEP FI has designed guidance for banks, insurers and investors on how to avoid and mitigate environmental and social risks and impacts. The resources also highlight opportunities when providing capital to companies or projects within the blue economy. Their Turning the Tide[89] report offers guidance and a set of recommendations including a roadmap with a detailed breakdown of which client activities to seek out as best practice, which activities to challenge, and which activities to avoid completely due to their damaging nature.[90] In addition, the EU Taxonomy, a mandatory disclosure mechanism, has 'do no significant harm' (DNSH) screening criteria for wind power that can help guide investors. Under the Recovery and Resilience Facility (RRF) regulation, Member States need to put forward coherent packages of measures, including both reforms and investments (in accordance with Article 14(1) of the RRF Regulation). The DNSH assessment needs to be carried out not only for investments, but also for reforms. Reforms in some sectors, including industry, transport and energy, while having the potential to significantly contribute to the green transition, can also entail a risk of significant harm to a number of environmental objectives, depending on how they are designed.[91]

87 wwf_epo_position_paper_offshore_renewable_energy_and_nature.pdf (panda.org)
88 Sustainable Blue Finance – United Nations Environment – Finance Initiative (unepfi.org)
89 Turning the Tide: How to Finance a Sustainable Ocean Recovery – United Nations Environment – Finance Initiative (unepfi.org)
90 https://www.unepfi.org/publications/turning-the-tide/
91 https://ec.europa.eu/info/sites/default/files/c2021_1054_en.pdf

INSIGHT 3/ The growth trend in fossil fuels in the Baltic is a cause for concern for the future of a SBE.

There is considerable dissonance between the tapering down of fossil fuel activities in Baltic nations and the 33% year-on-year growth seen between 2016 and 2018. This sectoral activity is not conducive to developing a healthy and sustainable blue economy in which both nature and people thrive and, therefore, has no part to play in a Baltic SBE.

Through the 2015 Paris Agreement, world governments have committed to curbing global temperature rise to well below 2°C above pre-industrial levels, limiting warming to 1.5°C. In 2018, the Intergovernmental Panel on Climate Change (IPCC) warned that, to avoid the catastrophic impacts of climate change, global warming must not exceed 1.5°C. GHG emissions must be halved by 2030 and drop to net zero by 2050. Doing so will not only benefit the stability of natural ecosystems, but it will also provide great benefits for people such as clean air and water, better health and green jobs.[92] In addition, finance actors should follow the EU Taxonomy guidelines which set out four overarching conditions that an economic activity must meet in order to qualify as environmentally sustainable. The UNEP FI has created a briefing paper discussing the potential risks associated with the exploration and production of offshore petroleum resources (oil and gas), and how financial institutions should engage with and respond to this sector.[93]

> “There is considerable dissonance between the tapering down of fossil fuel activities in Baltic nations and the 33% year-on-year growth seen between 2016 and 2018.”

WWF'S OIL & GAS POLICY[94]

The most apparent insight from the model of financial flows is the preponderance of new debt over new capital stock in this sector. WWF Oil & Gas Policy Recommendations are as follows:

- A.1. There should be no exploration for new oil and gas resources.
- A.2. There should be no new investment in the development of oil and gas reserves beyond that which had already been sanctioned by January of 2020.
- A.3. Oil and gas fields currently under production need to be subject to considerations of shorter life spans to make sure the world is aligned with the 1.5°C threshold.
- A.4. There should be no new infrastructure for production, refining and transport and use of oil and gas (including power plants) that produce emissions exceeding the carbon budget aligned with the 1.5°C threshold.
- A.5. Existing power stations with the largest climate impact need to be phased-out first, regardless of the duration of licences and economic life span of the installation.
- A.6. High- and upper-middle income countries need to end oil and gas production by 2040 at the latest, while low-income countries should end production by 2050.[95] Phase out may need to be sooner, depending on the remaining space in the carbon budget.
- A.7. Existing oil and gas operations in areas of high biodiversity importance (e.g. protected areas, key biodiversity areas, Arctic marine and intact forest landscapes) need to be shut down first.
- A.8. Decommissioning of production facilities need to restore the original ecosystem functions of the area.

92 Nature Hires: How nature-based solutions can power a green jobs recovery | WWF (panda.org)

93 https://www.unepfi.org/wordpress/wp-content/uploads/2022/04/Harmful-Marine-Extra-ctives_Offshore-Oil-Gas.pdf

94 wwf_policy_position___the_transition_away_from_oil___gas.pdf (panda.org)

95 Asset Owner Guide To Oil & Gas Producers | WWF

COMBATING CARBON LEAKAGE WITH CBAM

The EU Carbon Border Adjustment Mechanism (CBAM)[96] could combat "carbon leakage"—referring to relocation of fossil fuel extraction to countries with looser climate regulation (e.g., Russia) —by gradually putting a price on imports of certain goods from these regions starting in 2023 and becoming fully functioning by 2026. However, WWF finds it concerning that the Commission wants CBAM sectors to receive free Emissions Trading System (ETS) permits to pollute until 2035.

WWF asks for CBAM revenues to go to developing countries as international climate finance, and for no export rebates as these are incompatible with WTO rules. All ETS revenues must be spent on genuine climate action. Furthermore, Member States should be required to set national climate-neutrality targets.

INSIGHT 4/ Debt, over equity, stands out as the key investment mechanism by which the Baltic Sea Economy might be influenced: for all companies, new debt accounts for EUR€33 billion, or 93% of all flows.

In the "race-to-zero" to reduce carbon emissions and reverse nature loss, debt capital markets must rapidly shift to becoming "zero carbon and nature positive debt capital markets."[97] Lenders have significant control over the terms of debt—especially in the case of flexible instruments like notes payable. These terms can be directly tied to sustainable outcomes by attaching stipulations for minimum sustainability performance of a qualified borrower, or by stipulating that proceeds cannot be used for unsustainable activities.

Another advantage of debt is that it has sway over virtually all companies. In particular, debt through bank loans could be a key leverage point for companies including SMEs to scale up their activities. Lending institutions could have a critical impact on the real economy especially in the Extraction and Trade sectors. Private company equity, in contrast, is only accessible to a slim fraction of investors. Instruments, including blue/green bonds, have a clear role to play in promoting finance for a Baltic SBE, alongside the need to make it harder (or more costly) to raise finance for unsustainable activities.

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FIVE RAPID CHANGE LEVERS

In WWF's report *Can Debt Capital Markets Save the Plant?* five rapid change levers have been identified:[98]

- Ambition must increase, with impact as the primary focus;
- Investors must rapidly shift their capital out of unsustainable entities and into green opportunities;
- Governments, financial regulators, supervisors and central banks must step up;
- Definitions and metrics must continue their journey to define a common language of sustainable finance;
- Transparency, confidence and integrity are critical for systemic change.

96 Carbon Border Adjustment Mechanism (europa.eu)

97 https://wwfint.awsassets.panda.org/downloads/wwf_report_can_dcm_save_the_planet__final_2021_09_27_.pdf

98 https://wwfint.awsassets.panda.org/downloads/wwf_report_can_dcm_save_the_planet__final_2021_09_27_.pdf

INSIGHT 5/ Bank and institutional lenders are the largest debt providers among public companies in the Baltic, making them a key party to influence for their control over new and established debt.[99]

Although traditional banks may be hesitant to attach sustainability conditions to credit, innovative lenders such as development finance institutions (e.g., the European Bank for Reconstruction and Development (EBRD)), and institutional asset owners who often think long-term and give sustainability guidelines to asset managers and the financial sector, could pave the way— especially amid robust evidence that such debts don't necessarily detract from a lender's bottom line.

Lending to carbon-intensive sectors shows limited signs of declining in the Baltic. Currently, no European bank meets regulator expectations on climate and environmental risk management, including making little progress in stress testing and review of Pillar 2 requirements (capital held in reserve to cover climate-related risks).[100] In March 2022, ECB stress-tested Eurozone banks for the first time on their ability to withstand climate-related risks based on scenarios produced by the Central Banks and Supervisors Network for Greening the Financial System. The results were poor, which is very concerning considering stricter disclosure regulation is on the way and time is running out. Roughly 75% of the banks did not disclose whether climate and environmental risks have a material impact on their risk profile, while almost 60% did not describe how transition risk or physical risk could affect their strategy.[101]

The banking industry should implement sweeping changes to address not only ocean health, but climate and biodiversity in general. For instance, credit institutions could commit to achieving net zero operational emissions and reducing financed emissions by at least half. They should also phase out finance for activities that lead to outsized environmental damages, such as the extraction of coal, oil and gas[102,103,104,105] especially in, or near to, protected areas. Current evidence suggests that many banks fail to employ the mechanisms necessary to achieve their public environmental commitments, at least in the fossil fuels sector.[106]

INSIGHT 6/ Traditional institutional investors are the largest holders of public companies in the Baltic, making them a key party to influence for their control over equity.

In the Baltic, traditional institutional investors such as asset owners and asset managers, hold over EUR€94 million euros in public companies especially in the Marine biotechnology and bioprospecting sector. In Sweden, the largest institutional investors such as pension funds, insurance companies and banks represent 20% of the capital on the Stockholm Stock Exchange. Such investors have made initial commitments to accelerate the uptake of Environmental and Social Governance (ESG) investment opportunities.

There is an opportunity to highlight the importance of ingraining long-termism in institutional investors practices, and the rising importance of Sustainable Finance Disclosure Regulation (SFDR)[107] and frameworks such as the Taskforce on Nature-related Financial Disclosures (TNFD) and Science Based Targets Network (SBTN).[108] New investor initiatives have developed such as the Finance for Biodiversity Pledge.[109] At COP26, the U.S. Treasury Secretary Janet Yellen[110] underlined that attacking the climate crisis requires concerted action from governments and the private sector alike. The Glasgow Financial Alliance for Net Zero[111] (GFANZ) —which includes banks, insurers, and asset managers—announced about USD$130 trillion in commitments to reach net zero carbon emissions by 2050, which appears sufficient to close the gap. The asset manager portion of the alliance, called the Net Zero Asset Managers initiative[112] (NZAMI), has 220 signatories with USD$57 trillion in managed assets.[113] While momentum around ESG investing is generally high, equity offerings specific to the Baltic SBE could help capitalize on investor appetite for demonstrable, local non-financial impact. Further, more general insights on how finance actors could be influenced can be found in Annex 10.

99 In addition, although cashflow data is not available for most private companies, it is likely that banks and institutional lenders are also responsible for the majority of debt among private companies.
100 2022 climate risk stress test (europa.eu)
101 New ECB Report Finds European Banks are Failing to Adequately Disclose Climate Risk - Structured Finance Association
102 Recommended Exclusions for Financing a Sustainable Blue Economy – United Nations Environment – Finance Initiative (unepfi.org)
103 https://www.unepfi.org/publications/harmful-marine-extractives-deep-sea-mining/
104 https://www.unepfi.org/publications/harmful-marine-extractives-offshore-oil-gas/
105 https://www.unepfi.org/publications/harmful-marine-extractives-dredging/
106 Ward Warmerdam, W. , Termorshuizen, D., & Beenes, M. (2021). Banking on thin ice. BankTrack, Profundo, Fair Finance Guide Norway (Etisk Bankguide), Fair Finance Guide Sweden (Sveriges Konsumenter), Oxfam IBIS (Denmark) and ActionAid Denmark. https://fairfinanceguide.se/media/60041/banking-on-thin-ice.pdf
107 SFDR is a European regulation introduced to improve transparency in the market for sustainable investment products, to prevent greenwashing and to increase transparency around sustainability claims made by financial market participants.
108 Science Based Targets Network
109 Finance for Biodiversity Pledge – Reverse nature loss in this decade
110 https://home.treasury.gov/news/press-releases/jy0457
111 https://www.gfanzero.com/press/amount-of-finance-committed-to-achieving-1-5c-now-at-scale-needed-to-deliver-the-transition/
112 https://www.netzeroassetmanagers.org/
113 https://www.morningstar.com/articles/1066190/the-esg-advisor-asset-managers-are-making-net-zero-carbon-commitments

5/ FACTORS IMPACTING CHANGE

In the endeavour to accelerate, implement and sustain adaptation in human systems and ecosystems, the presence of enabling conditions is of vital importance. These conditions include political commitment and follow-through, institutional frameworks, policies and instruments with clear goals and priorities, as well as enhanced knowledge on impacts and solutions, mobilization of and access to adequate financial resources, monitoring and evaluation, and inclusive governance processes.

Yet the existence of such enabling conditions is regularly called into question by a number of foreseeable and unforeseeable factors. Fast evolving changes in technology, the growing nature of systemic risks, the impact of the pandemic and war on access to finance, and the increasingly complex linkages in the financial system play pivotal roles in our future.

In the context of Covid-19 and Russia's invasion of Ukraine, for instance, governments around the world are forced to rethink their domestic priorities, national security interests and global commitments. This includes efforts focused on a comprehensive "global reset" of the international economic system that created such dramatic vulnerabilities to the pandemic, and on ensuring a "green recovery." Much of this work is focused on policy-level innovations so that the global economy is re-established on a more sustainable footing, as well as the related organizational and technological innovations that might support these broader changes in societal and economic life.

The challenge facing the Baltic will be to not move too fast just for the sake of engagement with all stakeholders. As we work to realize a Baltic SBE, interventions will be needed to look at processes and paradigms, using a systems-based and transformational lens. Improved decision-making would be supported by stronger and more coherent governance mechanisms and robust scientific data that can take a big picture view of the current regional sector-wide multi-use of the Baltic sea; and identify potential gaps and areas in need of more evidence or collaboration.

GOVERNANCE

The importance of adequate regulation to ensure that a company's profits do not come at the expense of people and the planet cannot be stressed enough. The clearest path to an overarching system that financially penalizes unsustainable activities, or rewards sustainable ones, is through legislation.Whether governments, societies and business communities of the Baltic Sea Economy (at large or as individual countries) are ready and willing to make that kind of move is a pertinent question.

It is noteworthy that the vast majority of economic instruments used by governments to incentivize the sustainable use and conservation of biodiversity and ecosystem services are aimed at terrestrial sectors rather than ocean activities. The only exception is tradable permits, which are more common for ocean sectors than terrestrial due to the preponderance of quotas in the marine fishing sector.[114] Biodiversity-relevant economic instruments such as preferential interest rates, taxes, fees/charges, sanctions, tradable permits, payments for ecosystem services schemes, and environmentally-motivated subsidies, provide signals to both producers and consumers to behave in a more sustainable way. Yet, terrestrial economic instruments are falling short in delivering desired results downstream in terms of safeguarding water in the landscape, hence financiers could lend support by also stipulating adoption of best measures. For example when speaking about agriculture the impact of its runoff on marine ecosystems needs to be part of the discussion.

Economic instruments should be utilized more in the marine context to provide continuous incentives to achieve environmental objectives in a more cost-effective manner. They could be used to mobilize finance and/or generate revenue to support marine protected area management, marine restoration, and monitoring and evaluation. In addition, data collected from using economic instruments could be used to monitor progress toward the proposed Target 18 of the post-2020 Global Biodiversity Framework[115] (on incentives) and Target 19 (on resource mobilization), and could be used to monitor progress toward Sustainable Development Goal (SDG) Target 15.a. on biodiversity finance.

114 OECD (2021). Tracking Economic Instruments and Finance for Biodiversity: 2021. Available at https://www.oecd.org/environment/resources/biodiversity/tracking-economic-instruments-and-finance-for-biodiversity-2021.pdf

115 https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf

> **“...the vast majority of economic instruments used by governments to incentivize the sustainable use and conservation of biodiversity and ecosystem services are aimed at terrestrial sectors rather than ocean activities.”**

THE EUROPEAN GREEN DEAL

The overarching aim of the European Green Deal is for the European Union to become the world’s first “climate-neutral bloc” by 2050. Another policy mechanism available are the more recent EU Missions for example the Restore our Ocean and Waters.[116]

The goals of the European Green Deal extend to many different sectors, including finance (see Figure 15), construction, biodiversity, energy, transport and food. It is a package of measures ranging from ambitious cuts in greenhouse gas emissions, to investing in cutting-edge research and innovation, to preserving Europe’s natural environment.

Europe’s transition to a sustainable economy means significant investment efforts across all sectors for the EU to reach the goals set out in the deal: it is estimated that approximately EUR€260 billion a year is going to be required by 2030 in investments.[117] The success of the European Green Deal Investment Plan will depend on the engagement of all actors and that SBE actions be incentivized on a permanent basis and not only through investment support. We need continuous incentives for the goods and services so that investments come naturally.

FINANCE

Broadly speaking, five categories of possible economic actions are the most obvious: financial sector engagement[118], education & knowledge sharing across financial actors on the linkage/issues/impacts, the current and future barriers (e.g. market, regulatory, technology, etc.) to SBE investing, as well as incentives and penalties– and it is worth noting the differences in scale that these two latter types of mechanisms represent.

Incentives

Financial incentives, such as more attractive financing terms for switching to sustainable practices, can encourage companies toward changes that they might otherwise be hesitant to make (especially when costs are the obstacle).

Financial incentives would likely result in change, with companies selectively changing practices as they see alignment between financial needs, customer demands and operational constraints. This could be achieved through a range of interventions, including preferential interest rates, credit risk assessments, internal shadow pricing, limited permits, environment-related financial disclosure[119], guidance on finance for a SBE[120], among others.

Penalties

The notion of blocking “unhealthy” companies’ access to finance is already entrenched in the financial world. What if the criteria for denying access to finance extended to non-financial components of a company’s influence—to not only how a company is likely to contribute to the economy, but also to the longevity of healthy social and environmental systems?

Financial penalties, such as divestment from unsustainable activities or blocking finance entirely if minimum sustainability criteria aren’t met, make it more difficult for companies to operate if they are unwilling or unable to keep pace with society’s demands for a more sustainable future. They would likely result in a more stepwise change, with whole sectors being compelled to eliminate their most harmful practices to ensure continued access to their financial lifeblood.

116 Restore our Ocean and Waters (europa.eu)

117 “Financing the green transition: The European Green Deal Investment Plan and Just Transition Mechanism”. Accessed 28 March 2022. https://ec.europa.eu/regional_policy/en/newsroom/news/2020/01/14-01-2020-financing-the-green-transition-the-european-green-deal-investment-plan-and-just-transition-mechanism

118 The Future of Investor Engagement: A Call for Systematic Stewardship to Address Systemic Climate Risk – United Nations Environment – Finance Initiative (unepfi.org)

119 For example, the Task Force on Climate-related Financial Disclosures (TCFD). TCFD (2017). Recommendations of the Task Force on Climate-related Financial Disclosures. https://assets.bbhub.io/company/sites/60/2020/10/FINAL-2017-TCFD-Report-11052018.pdf

120 For example, United Nations Sustainable Blue Finance Initiative https://www.unepfi.org/blue-finance/

Empirical research points to the relevance of engagement as a key point for the financial sector to generate impact. WWF advocates for the finance sector to engage with the companies they allocate capital to in order to bring about positive change.

Financial Regulation

Many central banks accept that preventing the build-up of risks from climate change falls within their mandates which has stretched them to consider other environmental risks, such as those from biodiversity loss. Beyond regulatory and legal obligations, central banks and financial supervisors are facing growing scrutiny from civil society on the issue. For example, WWF's Greening Financial Regulation Initiative (GFRI), has created a framework for assessing how much climate-related and environmental risks are being considered by banking regulators, supervisors and central banks. The details of the framework can be found in the WWF's recent Sustainable Financial Regulations and Central Bank Activities (SUSREG) report[121], which covers the major elements of prudential supervision, monetary policy and other measures that are critical to directing financial flows toward more sustainable activities. Hopefully, Baltic national central banks will use the SUSREG tracker to establish a baseline by which year-on-year improvements can be gauged. SUSREG Tracker provides a roadmap for central banks, financial supervisors and policymakers to enhance the financial sector's stability and resilience to growing climate-related and environmental and social risks, while enabling the mobilization of capital for the transition to a low-carbon, resilient and sustainable economy. WWF intends to use the SUSREG Tracker[122] and forthcoming annual reports to evidence progress made on climate-related and environmental risks and other fronts, to facilitate the sharing of best practices among central banks, regulators and supervisors – promoting a much-needed strengthening and convergence of practices.[123]

Linking business practices to environmental outcomes

Many efforts such as the EU Taxonomy for Sustainable Activities and the EU Corporate Sustainability Reporting Directive, also called the NFRD, have made strides in linking business practices to environmental and social outcomes. There are also voluntary reporting efforts, such as the Taskforce on Climate-related Financial Disclosures (TCFD)[124] and the Taskforce on Nature-related Financial Disclosures (TNFD) that deliver a risk management and disclosure framework for organizations to report and act on climate and nature-related risks. These efforts, while noteworthy need to be tested in terms of effecting a green transition, The Science Based Target Initiative (SBTi) encourages companies from all sectors and of all company sizes to commit to set science-based targets that result in emissions reduction in line with the SBTi's criteria. Despite these great efforts, a huge number of activities that externalize damage to both natural and social systems are still permitted. Indicating a need for education and knowledge sharing across financial actors on these linkages, issues and/or impacts.

121 WWF-Introducing-SUSREG-April-2021.pdf
122 SUSREG Tracker
123 wwf_report_nature_s_next_stewards_14_july_2021.pdf (panda.org)
124 https://www.fsb-tcfd.org/

LEADING FINANCIAL INITIATIVES

The first beta version of the **TNFD framework**[125] marks an important step by the market to tackle the risk of nature loss and incorporate nature-related risk and opportunity analysis into the heart of corporate and financial decision-making. The TNFD defines nature-related risks as the potential threats posed to an organization linked to its and other organizations' dependencies on nature and nature impacts. These can derive from physical, transition and systemic risks. TNFD is modelled on the TCFD four pillars of Governance, Strategy, Risk Management and Metrics and Targets. Unlike the TCFD—which is designed for a global context—the TNFD framework will be dependent on location based considerations.

The TNFD will also pursue engagement with the International Sustainability Standards Board (ISSB) to ensure alignment with the corporate sustainability disclosure standards. The TNFD LEAP approach is practical guidance on nature-related risk and opportunity analysis for companies and financial institutions to incorporate into their enterprise risk and portfolio management processes. The framework will be voluntary for market adoption and it will be up to individual regulators to decide how it should be applied and enforced. However, the TNFD expects organizations to disclose the full set of material risks and opportunities related to the impacts and dependencies of their operations and their upstream and downstream value chains.

Another important endeavour is the **Science Based Target Initiative**[126], where ambitious corporate climate action leads the way to a zero-carbon economy, boosts innovation and drives sustainable growth by setting ambitious, science-based emissions reduction targets. Science-based targets show organizations how much and how quickly they need to reduce their GHG emissions to prevent the worst effects of climate change.

There is also the **Net Zero Asset Managers initiative**, made up of an international group of asset managers committed to supporting the goal of net zero greenhouse gas emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5 degrees Celsius; and to supporting investing aligned with net zero emissions by 2050 or sooner.

As well as the UN convened **Net Zero Asset Owner Alliance**[127] whose members commit to transitioning their investment portfolios to net-zero GHG emissions by 2050 consistent with a maximum temperature rise of 1.5C degrees above pre-industrial temperatures, taking into account the best available scientific knowledge including the findings of the IPCC, and regularly reporting on progress, including establishing intermediate targets every five years in line with Paris Agreement Article 4.9. The Commitment is made in the expectation that governments will follow through on their own commitments to ensure the objectives of the Paris Agreement are met.

Additionally, there is the **Sustainable Blue Economy Finance Initiative**[128], with 78 members (almost 50 financial actors representing a total asset size of 11 trillion USD), working toward implementing the Sustainable Blue Economy Finance Principles, supporting the alignment of capital flows and business practices with SDG 14 - Life Below Water.

Disclosure is not enough, markets must price climate and environmental risk.

Financial markets, including credit ratings, are often focused on short-term economic concerns, and therefore underweight longer-term issues, including environmental and social risks as well as investment in resilience and sustainability. Credit rating agencies (CRAs) provide information to investors and financial markets to help them price risk and thus oftentimes negatively impact the cost of public investments aimed at delivering sustainable development.

Credit rating assessments must be continually reviewed in order to adapt to changes in ways that strengthen the quality of ratings and encourage investment in sustainable development. CRA's current "long-term" rating is meant to cover three to five years for non-investment-grade issuers and up to 10 years for investment-grade issuers. Yet the increasing frequency and magnitude of climate and other shocks have highlighted the impact of longer-term factors on a country's debt sustainability. Amid an increased recognition of the physical and transition risks arising from climate change, CRAs are already integrating climate and other ESG risks into their ratings.

125 https://tnfd.global/

126 https://sciencebasedtargets.org/

127 https://www.unepfi.org/net-zero-alliance/

128 Sustainable Blue Finance – United Nations Environment – Finance Initiative (unepfi.org)

However, CRAs must continue to adapt to fast-evolving changes in technology and the growth of global systemic risks in ways that strengthen the quality of ratings and encourage investment in sustainable development over a long-term horizon. Long-term pension fund investors and insurers could encourage the development of long-term ratings. The Global Investors for Sustainable Development (GISD) alliance could help support such a move. This too would encourage governments to invest in resilience and sustainability and would match the investment horizon of long-term investors, reducing the risk of sharp selloffs of sustainable development debt after a rating downgrade, for example, resulting in a country having to turn toward funding infrastructure projects with fewer environmental safeguards.

Nature loss represents a significant risk to corporate and financial stability. More and more risk management tools are being created (e.g., WWF's Biodiversity Risk Tool, Water Filter Risk Tool, and Navigating Ocean Risk). These and others should be deployed to capture longer-term risks that can help steer portfolio alignment approaches, as well as monitor banks' strategic positioning against science-based transition pathways, also in accordance with a Paris-compatible trajectory. The urgency of these exponentially increasing risks may not be clear in the short-term evaluations generally considered by the financial sector. This is because these risks are rarely, if ever, priced into the value of assets. This is either because they are not seen at all (given that holistic environmental risk assessment is not part of the status quo) or because they are interpreted incorrectly.

To fully integrate ocean-related risks into decision-making, investors need to better understand the short, medium and longer-term risks associated with business-as-usual. The model described in the *Navigating Ocean Risk*[129] report can be used to calculate how risk develops over time with the implementation of different types of intervention: it serves as both a means of engagement and a tool for scenario-building. This will enable financiers to manage these risks and support a shift in financial flows, directing investment away from potential stranded assets and negative environmental impacts, and toward nature-positive outcomes. Using such a model provides a pathway for individual asset and portfolio managers to identify where exposure within an unsustainably managed blue economy may arise. Double materiality and better accounting for long-term adverse impacts (i.e., in addition to financial materiality) should be made, and how this can be better integrated into the sustainability objectives of the financial institutions should be assessed.

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NAVIGATING OCEAN RISK

The Navigating Ocean Risk[130] **analysis found that 66% of globally listed companies have some dependency on the blue economy—with different sectors having varying exposure to environmental, climate, physical and transition risks. The study found that key marine sectors globally stand to lose up to US$8.4 trillion over the next 15 years without immediate action to safeguard ocean resources and align financial portfolios with the Paris Agreement's target to keep a rise in global temperatures within 1.5C. Under a Sustainable Development scenario for almost all sectors the absolute risk to assets and revenues is reduced, where the impact of pollution and resource extraction on the ocean is managed and carbon emissions are kept under control, amounting to US$5.1 trillion in savings.**

129 https://value-at-risk.panda.org/#intro

130 https://value-at-risk.panda.org/#intro

THE PANDEMIC

The Covid-19 outbreak and related restrictions revealed the fragility of the global economy, sparking fears of impending economic crisis and recession. The pandemic led to vast economic disruption across the globe, ensuing the collapse of industry activity and market confidence.[131] The duration of lockdowns and comparable measures directly influenced GDP growth rates. When the world went into lockdown, scientists had an unprecedented opportunity to study how human activity interacts with natural Earth system processes at regional and global scales.

Impact on GHG emission levels

The IPCC emphatically states that GHGs produced by human activities are the direct cause of an increase in global temperature. Among the anthropogenically emitted greenhouse gases (namely CO_2, CH_4, N_2O, and F-gases), CO_2 has been the main contributor, accounting for almost three-quarters of all GHG emissions in 2017.[132] The resulting limitations on travel (by air, road and water) due to the pandemic and other economic sectors by countries around the globe drastically decreased air pollution and greenhouse gas emissions within just a few weeks. However, surprisingly, while carbon dioxide (CO_2) emissions fell by 5.4% in 2020, the amount of CO_2 in the atmosphere continued to grow at about the same rate as in preceding years.[133] Researchers identified several reasons for this result. One being the ocean didn't absorb as much CO_2 from the atmosphere as it has in recent years—probably in an unexpectedly rapid response to the reduced pressure of CO_2 in the air at the ocean's surface.[134] It was possibly also due to the strong climate-oceans nexus where—in addition to the climate pressure on the state of oceans (e.g. warming and acidification)—certain harmful blue economy activities such as extractives (including bottom trawling, dredging) causing physical disturbance of seabeds and coastal areas, etc. can lead to significant and possibly underestimated source of GHG emissions in areas where the carbon sequestration potential could be very high if left undisturbed.

In addition, by reducing nitrogen oxide (NOx) emissions—as beneficial as that was in cleaning up air pollution—the pandemic also limited the atmosphere's ability to cleanse itself of another important greenhouse gas: methane. Methane grew by 0.3% in the past year—a faster rate than at any other time in the last decade. With less NOx, there was less hydroxyl radical to scrub methane away, so it stayed in the atmosphere longer. Notably, emissions returned to near-pre-pandemic levels by the latter part of 2020, despite reduced activity in many sectors of the economy.[135]

Finding solutions to the climate crisis is an emergency. According to the IPCC report, Climate Change 2022: Impacts Adaptation and Vulnerability[136], we are not prepared for more global warming. We need more investment in adaptation. There is a rapidly narrowing window of opportunity to enable climate-resilient development. Looking at the environmental results of the pandemic will be paramount in teaching us what a lower-emissions future might look like and how the world might get there. The trajectory of financing and reconstructing the economy should be thoughtful with a focus on green sustainable technologies. This is a critical decade for action. Governments around the world should not overreact and avoid shortcuts to grow the economy quickly in order to bounce back fast. Instead, they should capitalize on this opportunity to devise pathways for an environmentally-friendly and sustainable transition to a green economy. More importantly, new policies should be framed in a manner to endure any future crises. Some solutions exist for a safer future, but it is clear that this future will not come into existence without rapid, deep and sustained emission cuts and enablers such as finance.

A catalyst for innovation

Within a very short time span after the initial outbreak of the pandemic in early 2020, there was an innovation supernova – especially in the Baltic, as it is one of the most digitally advanced regions – which will continue to impact businesses for years to come. While strict policy responses to Covid-19 were necessary, firms will inevitably be impacted by it, sustaining both short-term effects and less-expected long-term consequences.[137] Due to these circumstances, firms in industries with fast-changing technologies that invest in research and development activities in response to emerging global risks will be better positioned to promote not only their near-term survival, but also their future innovative performance to stay competitive. It would be of interest to investigate how technological innovation and support for innovation positively impact change.

131 https://www.nature.com/articles/s41598-021-97461-7.pdf
132 https://www.climatewatchdata.org/ghg-emissions?amp%3Bend_year=2017&amp%3Bstart_year=1990&breakBy=gas&end_year=2018&start_year=1990
133 https://climate.nasa.gov/news/3129/emission-reductions-from-pandemic-had-unexpected-effects-on-atmosphere/
134 https://climate.nasa.gov/news/3129/emission-reductions-from-pandemic-had-unexpected-effects-on-atmosphere/
135 https://climate.nasa.gov/news/3129/emission-reductions-from-pandemic-had-unexpected-effects-on-atmosphere/
136 Climate Change 2022: Impacts, Adaptation and Vulnerability | Climate Change 2022: Impacts, Adaptation and Vulnerability (ipcc.ch)
137 https://www.pnas.org/doi/10.1073/pnas.2006991117

During the first waves of the pandemic in the Baltic, society mobilized for cooperation and implemented digital education projects, with great examples of effective public-private partnerships involving government officials, private companies, start-ups, and non-governmental organizations—all co-creating in an agile and proactive mode.[138] Although numerous incubators, accelerators and hubs are popping up to support ocean ventures (e.g., Blue Climate Initiative and BlueInvest), we need more. More insight regarding the innovation landscape and VCs/PEs supporting role is needed. A lot of the change toward a SBE will be driven by different types of innovation and some understanding of how this segment is contributing, and the avenues for larger contribution, would be relevant to investigate in depth.

It is clear that the urgency of the pandemic has been a catalyst for creative and novel approaches, driving decision makers to act fast and decisively. At the same time, urgency can mean that policymakers choose to make decisions without engaging in sufficient consultation with relevant stakeholders.[139] All stakeholders should continue to press for reform of outdated legislation that constrains our own ability to innovate, in order to give us more flexibility to adapt our regulatory approach to a changing world. This is the best way to put effective regulation in place that protects the public through effective safeguards but also fosters safe innovation.

Finance aided by science, technology, and innovation (STI) plays a critical role in building a more resilient, sustainable and inclusive future. The Covid-19 pandemic and its effects on socio-economic activities may result in lasting changes for STI. It may also affect the purpose, design and execution of STI policies. Public funding for STI could be under pressure in the years to come because of increased levels of public debt across the world, which could reduce funding for public universities and research institutions.[140] The Covid-19 pandemic (and to a certain extent, the Russian-Ukrainian war) threatens to cause long-term damage to innovation systems at a time when science and innovation are most needed to deal with the climate emergency, meet the Sustainable Development Goals, and accelerate the digital transformation.

The finance sector should seek to balance "innovation for development" portfolios with more emphasis on forward-looking anticipatory innovation and bottom-up adaptive innovation. Yet, the experience of the 2008-09 global financial crisis showed that maintaining research and development funding levels was a challenge for many countries, damaging their capacity to innovate including through the brain drain of researchers.[141] Finance must invest in more strategic and focused collaboration, especially with local and national actors, ensuring and sustaining a focus on leaving no one behind. Creation of and collaboration in innovation investments must be joined up and expanded. Investing in more strategic and focused collaboration, especially with local and national actors is paramount.[142] Many sustainable blue economy actions need de-risking ("risk money"[143]) and far more venture capital.

Russia-Ukraine conflict

Russia's invasion of Ukraine has not only caused a humanitarian disaster by killing thousands, displacing millions, wrecking cities, harming the environment and bringing war to Europe, but it has also accelerated the move away from dependency on oil and gas from Russia to renewable energy sources closer to home and pushed more transport from land to sea.[144] It has also led to an increased demand for weapons and a shift of attention away from global climate concerns and toward national security interests.

Although it is still too early to draw conclusions on how the Russia-Ukraine conflict will impact the Baltic, there are clearly some areas where the war could have an impact, e.g., naval exercises, security interests/military installations being given precedence over environmental protection, fertiliser transport/production, increased air and water pollution, large migration footprint and general "co-operation" is at risk of eroding between "east-west" blocs of the past.

Consequences for energy prices

Russia is the third-largest oil producer and second-largest exporter as well as Europe's largest natural gas provider, currently supplying 35% of Europe's demand.[145] The Russian invasion of Ukraine is having an impact on global oil prices, and is subsequently raising the prices of petrol, diesel and LPG cylinders. The war is also predicted to have a significant impact on the continuing shortage of semiconductors and chips, and other rare earth

138 https://www.baltictimes.com/pandemic_accelerated_innovations_in_education_in_the_baltics/
139 https://www.oecd.org/coronavirus/policy-responses/innovation-development-and-covid-19-challenges-opportunities-and-ways-forward-0c976158/
140 https://www.oecd.org/coronavirus/policy-responses/how-will-covid-19-reshape-science-technology-and-innovation-2332334d/
141 https://www.oecd.org/coronavirus/policy-responses/how-will-covid-19-reshape-science-technology-and-innovation-2332334d/
142 https://www.oecd.org/coronavirus/policy-responses/innovation-development-and-covid-19-challenges-opportunities-and-ways-forward-0c976158/
143 Risk money needed to cover risk management (the process of identification, analysis, and acceptance or mitigation of uncertainty in investment decisions.)
144 Comment made at the Nordic Maritime (April) 2022: Green Transition to a Sustainable Ocean Economy Conference in Singapore.
145 https://www.linkedin.com/pulse/russia-ukraine-war-financial-impacts-simsree-finance-forum/

metals given that Russia is one of the largest producers of rare earth metals like palladium, an essential metal for semiconductors while Ukraine is one of the biggest producers and exporters of neon gas which is used in the manufacturing of semiconductors.[146]

So far, the war has resulted in pushing land transport out to sea and changing the flow of gas markets–meaning Norway is supplying Europe more and Russia is shipping supplies to South East Asia–while energy bills, food prices, and the cost of basic commodities across the world increase. All this combined, economists predict global stagflation—a combination of recession and inflation. In the mid-term or long-term, the war will have effects on equity and welfare as governments will be forced to look into increasing their spending on defence budgets and cutting back on social and environmental spending. The war is creating two cold war-like blocs (US and allies, and China and allies) which could hamper the decades-old trend of increased globalization in the free flow of goods and human capital. This environment of volatility and uncertainty will also hurt investor sentiments and restrict cash flow into markets. Indirectly, high levels of military spending divert resources away from solving environmental problems and away from sustainable development. International tensions stoked by high levels of military spending also reduce opportunities for international cooperation on global environmental threats, such as the climate emergency.

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Added impacts to the climate crisis

High-intensity conflicts require and consume vast quantities of fuel, leading to massive CO_2 emissions and contributing to climate change. Environmental damage and degradation can also stem from resource extraction used to finance conflicts. The use of explosive weapons in urban areas creates vast quantities of debris and rubble, which can cause air and soil pollution. Pollution can also be caused by damage to environmentally sensitive infrastructure such as water treatment plants. The loss of energy supplies can have reverberating effects that are detrimental to the environment, shutting down treatment plants or pumping systems, often leading to the use of more polluting fuels from domestic generators. Human displacement spurred by war can have large environmental footprints; already 3.6 million Ukrainians have migrated to neighbouring countries, and an estimated 6.5 million people are thought to be displaced inside the war-torn country itself.[147] These large-scale pollution incidents can lead to transboundary environmental and global climate impacts from air pollution or water pollution, through the contamination of rivers, aquifers and, ultimately, the sea.

The Russian-Ukrainian war has pushed Europe to move away from its dependency on Russian oil and gas and toward investing big in greener energy sources. Time will tell whether this will decrease the 33% year-on-year growth in fossil fuels seen in the Baltic or increase as markets shift toward supplying China and other countries. Russia has big plans to expand its agricultural production, which will also require energy. How will the boom in investments in offshore renewable energy impact a Baltic SBE? How will shifting fossil fuel markets impact the Baltic Sea Economy? Measured action and transboundary cooperation, planning and investments will need to be coherent, joined up and not lead to proliferation and duplication—especially in the refitting of ports and growing renewable energy sector across the Baltic basin.

146 https://www.linkedin.com/pulse/russia-ukraine-war-financial-impacts-simsree-finance-forum/
147 https://www.bbc.com/news/world-60555472

6/ RECOMMENDATIONS

Shifting the Baltic Seascape toward a more sustainable trajectory requires a bigger vision.

The purpose of this report has been to share heretofore unresearched data and provide a unique overview of the financial flows in order to encourage financial institutions and other key stakeholders to pursue a more resilient investment strategy and influence industry sectors to proactively engage in restoring, protecting and sustainably managing the ocean's natural capital toward delivering a sustainable development trajectory for the Baltic Sea. However, looking toward the future from the global perspective, an even bigger ambitious vision is needed.

While the global race to net zero is gathering pace, backed by established international targets and national, sector-level strategies, policies, and processes – the world lacks an equivalent coherent policy framework for nature. As a result, nature risks are being overlooked in the net zero transition and concern is growing that too much focus on climate change "quick fixes" will make the nature crisis worse. Both the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) warned that "the world will fail unless climate and nature crises are tackled together." In other words, the transition must be both net zero AND nature positive[148], or it will be neither (refer to Annex 9 Roadmap to read more about a nature positive global economy).

Financiers must get involved in how to assess "sustainability" (foster more life cycle assessments, etc.); disincentivize production of waste (companies made responsible for the waste they produce); focus more on regional / local production (which can be better controlled) in light of impacts of COVID and Ukrainian crisis. Unless more is done prudential risks will increase ultimately having disastrous consequences on the Baltic economy and all economies.

The inability to manage climate and environmental risks poses a serious prudential risk to the stability of euro area banks and the banking sector as a whole.

Banks need to do more to protect themselves–let alone clients, firms and markets–from biodiversity and climate risks. Few banks have taken any steps to adjust their business model and strategic planning.

The EU's Prudential Regulation Framework[149] must be amended to incorporate climate risks. The Regulation on prudential requirements for credit institutions requires certain banks to disclose ESG risks as of 28 June 2022. Current divergent disclosure standards and market-based practices make it very difficult to compare different financial products, create an uneven playing field for such products and for distribution channels, and erect additional barriers within the internal market. Although the EU regulation on sustainability-related disclosure in the financial services sector[150] is a step in the right direction, it is not enough. More needs to be done. The European Commission must push for a legally binding requirement for banks to develop, implement and disclose their transition plans. The lack of harmonized rules relating to transparency makes it difficult for end investors to effectively compare different financial products in different Member States with respect to their environmental, social and governance risks and sustainable investment objectives.

In the framework of the European Green Deal[151], the Commission announced a renewed sustainable finance strategy (Figure 15) which aims to provide the policy tools to ensure that the financial system genuinely supports the transition of businesses toward sustainability in a context of recovery from the impact of the Covid-19 outbreak. The renewed strategy will contribute to the objectives of the European Green Deal investment plan, in particular to creating an enabling framework for private investors and the public sector to facilitate sustainable investments. While the EU's plans are commendable, more transparency and disclosure are needed, as well as measures to stop the EU Taxonomy greenwashing.

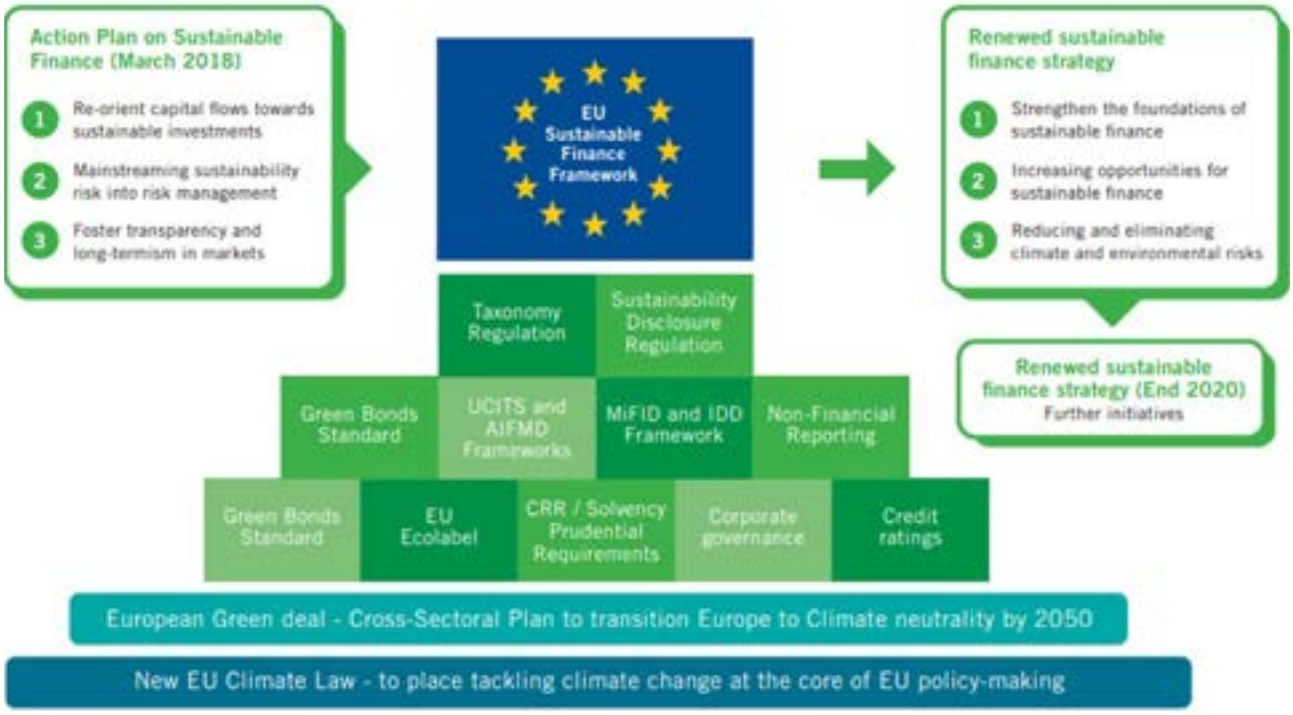
148 'Nature-positive' is broadly accepted to mean a scenario in which nature loss is reversed, i.e., nature is enhanced or improved, rather than further depleted.

149 https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-supervision-and-risk-management/managing-risks-banks-and-financial-institutions/prudential-rules-investment-firms_en

150 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019R2088&from=EN

151 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

FIGURE 15/ EU SUSTAINABLE FINANCE FRAMEWORK[152]



Credit: Irish Funds

All finance actors need to urgently set ambitious and concrete goals and timelines to mitigate their exposure to current and future climate and environment risks, as well as support policy by rapidly shifting their capital out of unsustainable entities and into green opportunities. All stakeholders have an important role to play in supporting a fair, just and equitable green economic transition.

WWF's recommendations

In the mission to shift the Baltic seascape economy from its untenable state of business-as-usual toward a SBE, which allows ecosystems and economies to thrive in the long-term, research has demonstrated that the following overarching courses of action are needed:

- Move finance away from sectors and activities that are incompatible with a SBE, including fossil fuels and seabed mining.[153,154]
- Set concentration limits on lending to or investment in certain sectors known to cause significant harm to social and environmental criteria.
- Urge the finance sector to engage more with industry prior to capital allocation.
- Seek out where SBE FP indicators denote current best practices on a particular issue and where financing is encouraged.
- Make finance more readily available for actors that are willing and able to make their activities more sustainable, for example, shifting fisheries away from bottom trawling and reducing bycatch[155] through investments in gear changes.
- Increase finance for activities that are compatible with a SBE, including circular economy, and research and development focused on sustainable alternatives to damaging business-as-usual practices.

Here follows WWF's specific set of recommendations, per financial sector actor, for achieving these aims.

Recommendations per stakeholder

For policymakers:

- Introduce policies and regulations that disincentivize and explicitly make unsustainable practices less profitable and illegal, focusing on those sectors that currently command the greatest financial resources and are responsible for the most significant social and environmental damages.

152 Sustainable Finance Regulation | Irish Funds Industry Association | International Investments
153 https://www.unepfi.org/wordpress/wp-content/uploads/2022/04/Harmful-Marine-Extra-ctives_Offshore-Oil-Gas.pdf
154 Recommended Exclusions for Financing a Sustainable Blue Economy – United Nations Environment – Finance Initiative (unepfi.org)
155 Investing in sustainable seafood: Why it matters and what can be done – United Nations Environment – Finance Initiative (unepfi.org)

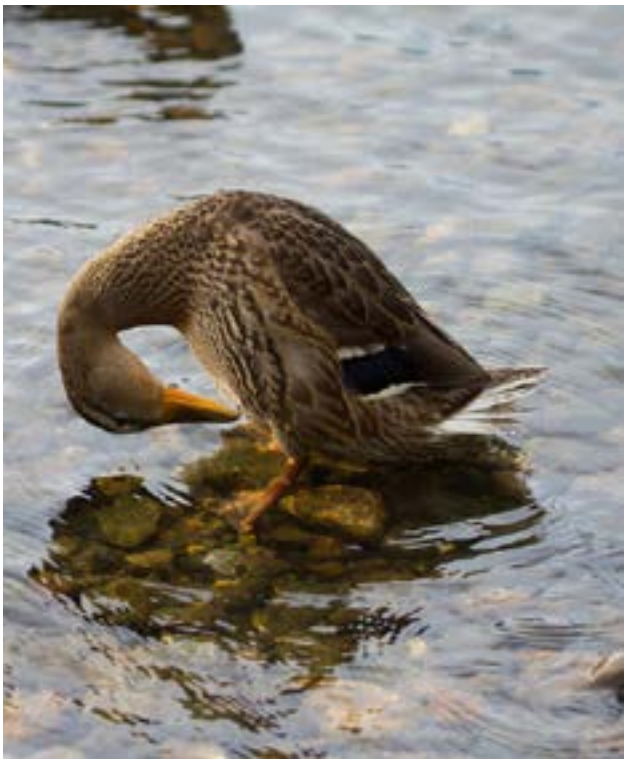
- Introduce incentives and finance to shift sectors toward more sustainable practices aligned with a SBE, including circular economy approaches and research and development.
- Support nature-positive economic policies and investment decisions at the national level, as well as help address international ocean governance issues required to deliver a SBE (e.g., protection and management of global commons) and assess sustainability by fostering more life cycle assessments.
- Commit to and finance a transition that is both net zero AND nature positive (see Annex 9 Roadmap for a nature positive global economy).
- In such cases where the policymaker is also a shareholder, e.g., state-owned enterprises, governments should lead by example by committing to and implementing principles of finance that will lead to a SBE.
- Disincentivize harmful industry practices and production (e.g., production of waste) companies must be made accountable for the waste they produce both in the short and long-term.
- Provide investors with a clearer picture of where and how debt capital markets significantly harm global environmental objectives and, in turn, the risks of harmful BAU practices to capital markets.[156]

For debt providers:

- Implement UNEP FI's Sustainable Blue Finance Principles and associated guidance in their entirety.
- Engage in the creation of a credible and robust TNFD that includes ocean-specific metrics.
- At minimum, publish credible strategies and frameworks for addressing biodiversity (including ocean health) and climate that align with the Principles and emerging TNFD. Assess and report entire portfolios transparently against robust environmental and social metrics, with a particular focus on activities that lead to environmental harm (including greenhouse gas emissions).
- Reduce and cease lending to those sectors that are incompatible with a SBE, especially fossil fuels.[157]
- Seek and pilot risk-based models and approaches to inform decisions toward sustainable development pathways.[158]
- Promote greater awareness, transparency and better standards among investees/loan recipients about marine ecosystems' risks and impacts.
- Develop new financial products (e.g., sustainable ocean bonds aligned to the Sustainable Blue Economy Finance Principles) to facilitate the shift toward more sustainable practices.
- Proactively influence the enabling environment to further de-risk investments.[159]

For shareholders:

- Use shareholder advocacy: alerting companies to the issue, entering dialogue, supporting change and voting to shift companies toward sustainable practices and boards that are aligned with science-based sustainability goals and key performance indicators.
- Make equity offerings specific to the Baltic Sea Sustainable Blue Economy in order to capitalize on investor appetite for demonstrable, local non-financial impact.
- Develop and implement a public commitment to divest from those sectors that are incompatible with a SBE, i.e., fossil fuels.
- Focus on opportunities for sustainable investments related to the mitigation of key ocean pressures, the protection and restoration of marine ecosystems.



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156 https://wwfint.awsassets.panda.org/downloads/wwf_report_can_dcm_save_the_planet__final_2021_09_27_.pdf
157 Recommended Exclusions for Financing a Sustainable Blue Economy – United Nations Environment – Finance Initiative (unepfi.org)
158 BlueEconomy_SummaryReport_v06_MSG_compressed.pdf (panda.org), p43
159 BlueEconomy_SummaryReport_v06_MSG_compressed.pdf (panda.org), p43

7/ ANNEXES

ANNEX 1/ FULL LIST OF SUB-SECTORS EQUATED TO THE BALTIC SEA ECONOMY

This list of sub-sectors includes corresponding NACE codes. Sub-sectors are also correlated to the appropriate ocean activity, ocean sector, and economic sector.

Ocean activity	Ocean sector	Economic sector	NACE code	Description	NACE level
Living resources	Seafood	Fisheries	A031	Fishing	Level 2
Living resources	Seafood	Aquaculture	A032	Aquaculture	Level 2
Living resources	Seafood	Distribution of fish products	G4638	Wholesale of other food, including fish, crustaceans and molluscs	Level 4
Living resources	Seafood	Distribution of fish products	G4621	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	Level 4
Living resources	Seafood	Distribution of fish products	G4723	Retail sale of fish, crustaceans and molluscs in specialised stores	Level 4
Living resources	Seafood	Distribution of fish products	G4711	Retail sale in non specialised stores with food, beverages or tobacco predominating	Level 4
Living resources	Seafood	Processing of fish products	C102	Processing and preserving of fish, crustaceans and molluscs	Level 3
Living resources	Seafood	Processing of fish products	C1041	Manufacture of oils and fats	Level 4
Living resources	Seafood	Processing of fish products	C1085	Manufacture of prepared meals and dishes	Level 4
Living resources	Seafood	Processing of fish products	C1089	Manufacture of other food products n.e.c.	Level 4
Living resources	Seafood	Other seafood-related activities	C1394	Manufacture of cordage, rope, twine and netting	Level 4
Living resources	Seafood	Other seafood-related activities	O8424	Public order and safety activities	Level 4
Living resources	Marine biotechnology & bioprospecting	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	Level 2
Living resources	Marine biotechnology & bioprospecting	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	G4646	Wholesale of pharmaceutical goods	Level 4
Living resources	Marine biotechnology & bioprospecting	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	M721	Research and experimental development on natural sciences and engineering	Level 3
Non-living resources	Extraction	Fossil fuels	B06	Extraction of crude petroleum and natural gas	Level 2
Non-living resources	Extraction	Mining & dredging	B07	Mining of metal ores	Level 2
Non-living resources	Extraction	Mining & dredging	B0812	Operation of gravel and sand pits; mining of clays and kaolin	Level 3
Non-living resources	Extraction	Mining & dredging	B0893	Extraction of salt	Level 3
Non-living resources	Extraction	Mining & dredging	B0899	Other mining and quarrying n.e.c.	Level 3
Non-living resources	Extraction	Support activities	B09	Mining support service activities	Level 2
Non-living resources	Extraction	Manufacturing activities	C192	Manufacture of refined petroleum products	Level 3

Ocean activity	Ocean sector	Economic sector	NACE code	Description	NACE level
Non-living resources	Extraction	Manufacturing activities	C235	Manufacture of cement, lime and plaster	Level 3
Non-living resources	Extraction	Manufacturing activities	C236	Manufacture of articles of concrete, cement and plaster	Level 3
Non-living resources	Extraction	Manufacturing activities	C2399	Manufacture of other non metallic mineral products n.e.c.	Level 4
Non-living resources	Extraction	Manufacturing activities	C24	Manufacture of basic metals	Level 2
Non-living resources	Extraction	Manufacturing activities	C25	Manufacture of fabricated metal products, except machinery and equipment	Level 2
Non-living resources	Extraction	Manufacturing activities	D352	Manufacture of gas; distribution of gaseous fuels through mains	Level 3
Non-living resources	Extraction	Distribution activities	G4663	Wholesale of mining, construction and civil engineering machinery	Level 4
Non-living resources	Extraction	Distribution activities	G4672	Wholesale of metals and metal ores	Level 4
Non-living resources	Extraction	Distribution activities	H495	Transport via pipeline	Level 3
Non-living resources	Renewable energy generation	Renewables (offshore wind)	C2712	Manufacture of electricity distribution and control apparatus	Level 4
Non-living resources	Renewable energy generation	Renewables (offshore wind)	D351	Electric power generation, transmission and distribution	Level 3
Non-living resources	Renewable energy generation	Renewables (offshore wind)	F4222	Construction of utility projects for electricity and telecommunications	Level 4
Non-living resources	Renewable energy generation	Renewables (offshore wind)	F4321	Electrical installation	Level 4
Maritime-based commerce	Trade	Transport & infrastructure	H502	Sea and coastal freight water transport	Level 3
Maritime-based commerce	Trade	Transport & infrastructure	H501	Sea and coastal passenger water transport	Level 3
Maritime-based commerce	Trade	Transport & infrastructure	C2811	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	Level 4
Maritime-based commerce	Trade	Transport & infrastructure	E383	Materials recovery	Level 3
Maritime-based commerce	Trade	Transport & infrastructure	C3311	Repair of fabricated metal products	Level 4
Maritime-based commerce	Trade	Transport & infrastructure	C3315	Repair and maintenance of ships and boats	Level 4
Maritime-based commerce	Trade	Transport & infrastructure	C301	Building of ships and boats	Level 3
Maritime-based commerce	Trade	Port infrastructure & services	H5222	Service activities incidental to water transportation	Level 4
Maritime-based commerce	Trade	Port infrastructure & services	H5229	Other transportation support activities	Level 4
Maritime-based commerce	Trade	Port infrastructure & services	H5221	Service activities incidental to land transportation	Level 4

Ocean activity	Ocean sector	Economic sector	NACE code	Description	NACE level
Maritime-based commerce	Trade	Port infrastructure & services	N7734	Renting and leasing of water transport equipment	Level 4
Maritime-based commerce	Trade	Port infrastructure & services	E36	Water collection, treatment and supply	Level 2
Maritime-based commerce	Trade	Port infrastructure & services	H5224	Cargo handling	Level 4
Maritime-based commerce	Trade	Port infrastructure & services	H521	Warehousing and storage	Level 3
Maritime-based commerce	Trade	Port infrastructure & services	F4291	Construction of water projects	Level 4
Maritime-based commerce	Tourism & recreation	Tourism	G473	Retail sale of automotive fuel in specialised stores	Level 3
Maritime-based commerce	Tourism & recreation	Tourism	I56	Food and beverage service activities	Level 2
Maritime-based commerce	Tourism & recreation	Tourism	N791	Travel agency and tour operator activities	Level 3
Maritime-based commerce	Tourism & recreation	Tourism	N799	Other reservation service and related activities	Level 3
Maritime-based commerce	Tourism & recreation	Tourism	R9319	Other sports activities	Level 4
Maritime-based commerce	Tourism & recreation	Coastal development	E37	Sewerage	Level 2
Maritime-based commerce	Tourism & recreation	Coastal development	E39	Remediation activities and other waste management services	Level 2
Maritime-based commerce	Tourism & recreation	Coastal development	E381	Waste collection	Level 3
Maritime-based commerce	Tourism & recreation	Coastal development	E382	Waste treatment and disposal	Level 3

ANNEX 2A/ FULL LIST OF ENVIRONMENTAL AND SOCIAL INDICATORS

Based on UNEP FI 2021.

Impact categories	Environmental impacts	Description	Examples	Indicators
Marine biodiversity	Loss or reduction in marine biodiversity, including loss of endangered, threatened and protected species.	Loss or reduction of populations of a given species, or of a species as a whole, due to human impact. This includes endangered, threatened and protected (ETP) species as defined by the IUCN Red List of Threatened Species and protections under applicable jurisdictions. Treatment process and management of ballast water (threat of introduction of non-native species).	This may result from direct overexploitation such as overfishing, or indirectly as a consequence of other impacts, such as the destruction of habitat or changes to biological and chemical cycles on which species may depend.	Activity includes unsustainable harvesting of marine species. Activity results in incidental death of marine species, potentially including rare, threatened or endangered species.
Ecosystem and ecosystem services	Loss of ecosystem resilience and provision of ecosystem services.	Loss or reduction in the ability of an ecosystem to provide specific benefits. These benefits (termed ecosystem services) include provisioning services such as oxygen production and carbon sequestration, and regulating services for the climate and against disease outbreaks.	A particularly prominent ecosystem service is climate resilience (e.g. through coastal flood defence), where a loss of resilience has significant bearing on the ability to adapt to the impacts of climate change.	Activity reduces ecosystem resilience through shift in species distribution and abundance. Activity reduces ecosystem resilience by directly impairing ecosystem services.
Coastal and marine habitats	Loss or degradation of coastal and marine habitats.	Changes to the physical environment on which life depends.	This may result from temporary disturbance to the seabed as a result of dredging or trawling, or from more permanent change as a result of construction work (e.g. for offshore wind farms).	Activity results in direct physical destruction or degradation of habitat – coastal. Activity results in direct physical destruction or degradation of habitat - marine.
Animal welfare	Reduction in animal welfare.	The consequences of human activity on the health of individual animals, both wild and farmed. It complements the impact on biodiversity, which looks at impacts on groups of animals and species. These impacts are closely linked and often appear together.	Reduction in animal welfare includes sources of stress for many organisms, typically as a result of pollution. This includes noise pollution from shipping, which notably impacts the welfare of marine mammals.	Activity causes physical pollution (e.g., plastics). Activity causes chemical pollution (water or airborne). Activity causes noise pollution.
GHG emissions	Increased GHG concentrations.	The role of greenhouse gas (GHG) emissions in contributing to climate change. While human activity affects the climate in many ways, as well as the capacity to offer resilience or adapt to climate change, this impact covers the output of greenhouse gas emissions into the atmosphere itself, raising concentrations that result in a changed climate.	This results from a broad range of human activity, including emissions from vessels.	Greenhouse gas emissions.
Marine cycles	Changes to marine biological, chemical and geological cycles.	The consequences of changes to biogeochemistry – natural processes within the ocean such as the water, carbon and nitrogen cycles – that play a role in regulating the planet. While dependent on water chemistry, marine life also plays a role in these cycles. As such, this is closely linked to loss of ecosystem services, though the consequences are somewhat different, focusing specifically on these global processes of chemical regulation.	This may result from specific pollutants that affect marine biogeochemistry (e.g. soot or sulphur dioxides emitted by vessels into the water).	Activity causes nutrient overload (e.g., nutrient discharge). Activity causes indirect nutrient overloads (e.g., atmospheric nitrogen).

Impact categories	Social impacts	Description	Examples	Indicators
Human rights	Violation of human rights, including rights of indigenous communities.	The violation of any human right, including the rights of indigenous communities, in the process of developing or financing a given sector. This includes both specific and clear examples of human rights violations as well as more systemic human rights violations such as the impact of inequality of opportunities between social groups and genders.	An example of violation of human rights includes modern slavery in fishing or shipping.	Records of human rights violations.
Livelihoods	Reduction or loss of access to sustainable and inclusive livelihoods.	The consequences of development on an individual or community's ability to attain and maintain livelihoods.	This impact may cover the consequences of commercial overfishing on a coastal community's ability to fish for the same species.	Records of use rights violations or displacement of livelihoods.
Health and security	Increased likelihood of injury, disease or loss of life.	The consequence of an activity on the short- and long-term physical health of an individual or community as a result of development.	This may include the higher likelihood of injury as a result of unsafe dive tourism practices, or the increased probability of fatal injury in unsafe construction of a merchant vessel.	Incidents of significant threats to human health.
Economic productivity	Economic damage and loss of productivity.	While all of these impacts ultimately lead to some form of economic damage and loss of productivity, this impact specifically examines the direct, proximate consequences of a given pressure on the economic output and productivity of an individual or an enterprise.	This may include economic damages and losses as a result of illegal fishing or disease outbreak in aquaculture.	Economic loss to other sectors. Significance of sector as an economic driver.
Equality of opportunities	Inequality of opportunities on the basis of age, sex, disability, race, ethnicity, origin, religion or economic or other status.	Instances where the development of a sector reinforces or establishes inequality of opportunities within and between communities and between individuals. This is closely linked to the impact of human rights violations.	This may include gender imbalances in corporations across Blue Eonomy sectors, or racial discrimination in employment. It may also include unequal distribution of costs or benefits associated with a development, such as a tourism development benefiting non-indigenous, wealthy communities at the cost of marginalised and disadvantaged coastal communities.	Reported widespread inequalities.

ANNEX 2A/ United Nations Environment Programme Finance Initiative (2021). Turning the Tide: How to finance a sustainable ocean recovery – A practical guide for financial institutions. Geneva.

ANNEX 2B/ ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SCORING

Impact assessment final score sheet.

TYPES OF IMPACTS

TYPE OF ACTIVITY	OCEAN SERVICE	ECONOMIC SECTOR/INDUSTRY	DESCRIPTION	NACE CODE
Living resources	Seafood	Fisheries	Marine fisheries	A03.10
Living resources	Seafood	Aquaculture	Marine aquaculture	A03.20
Living resources	Seafood	Aquaculture	Freshwater aquaculture	A03.22
Living resources	Seafood	Distribution of fish products	Distribution of fish products, Processing of Fish Products and Other seafood-related activities	Various
Living resources	Marine biotechnology & bioprospecting*	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	Various
Non-living resources	Extraction	Fossil fuels	Extraction of crude petroleum and natural gas	B06.10
Non-living resources	Extraction	Mining & dredging	Mining & dredging	Various
Non-living resources	Extraction	Mining & dredging	Operation of gravel and sand pits; mining of clays and Kaolin	B08.12
Non-living resources	Extraction	Support activities	Support activities and Manufacturing activities	Various
Non-living resources	Extraction	Support activities	Transport via pipeline	G49.50
Non-living resources	Renewable energy generation	Renewables (offshore wind)	Electric power generation, transmission and distribution	Various
Maritime-based commerce	Trade	Transport and infrastructure	Sea and coastal freight water transport	H50.20
Maritime-based commerce	Trade	Transport and infrastructure	Sea and coastal passenger water transport	H50.10
Maritime-based commerce	Trade	Transport and infrastructure	Transport and infrastructure (manufacturing, shipbuilding and repair)	Various
Maritime-based commerce	Trade	Transport and infrastructure	Port infrastructure & services	H52.22
Maritime-based commerce	Trade	Transport and infrastructure	Water collection, treatment and supply	E36.00
Maritime-based commerce	Trade	Transport and infrastructure	Construction of water projects	F42.91
Maritime-based commerce	Tourism & recreation	Tourism	Tourism	Various
Maritime-based commerce	Tourism & recreation	Tourism	Fishing practiced for sport or recreation and related services – operation of sport fishing preserves	R93.19
Maritime-based commerce	Tourism & recreation	Coastal development	Sewerage	E37.00
Maritime-based commerce	Tourism & recreation	Coastal development	Waste collection, treatment and disposal	E38.1; E38.20

*Marine biotechnology & bioprospecting (seagrasses, kelp, algae)

Scoring system used to evaluate sectors against each of the UNEP FI impact areas.

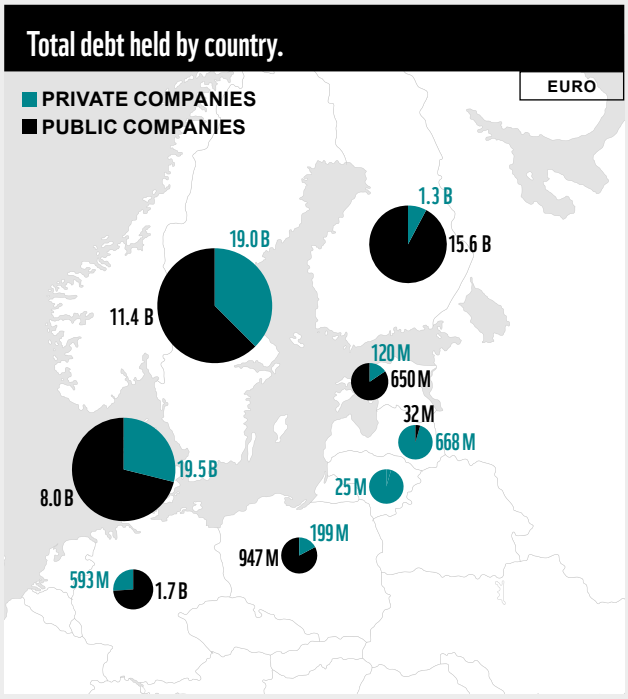
IMPACT RATING	N/A	1	2	3	4	5
	N/A or no data	Strong positive	Weak positive	Neutral (or mixed positive and negative)	Weak negative	Strong negative

ANNEX 3/ NATIONAL BREAKDOWN OF FINANCIAL STOCKS AND FLOWS

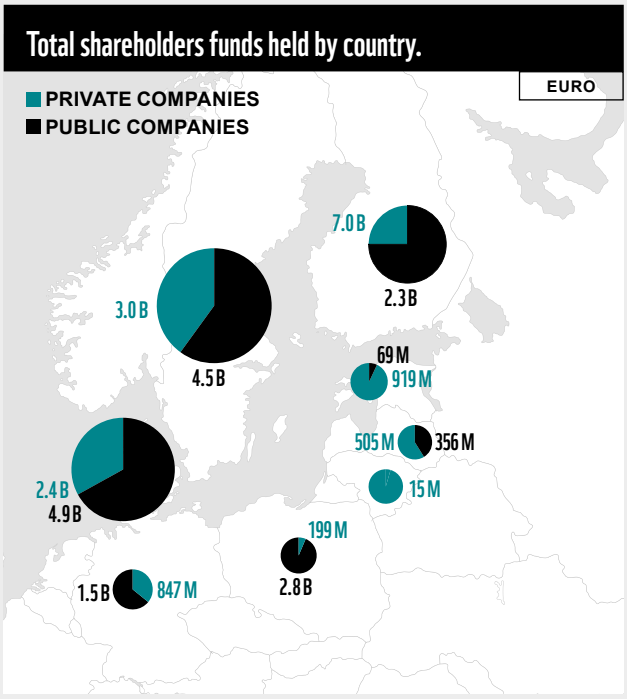
All data relates to the sample group of companies used for analysis.

COMPANIES: Private company Public company

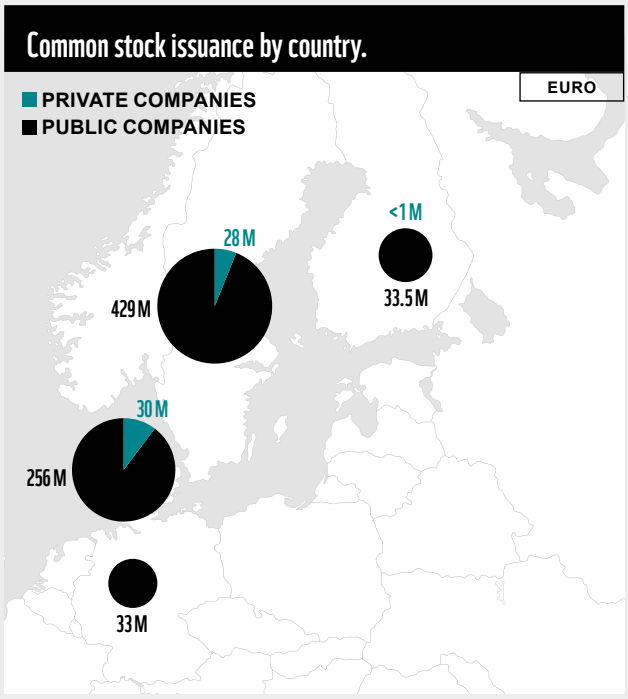
Total debt held by country.



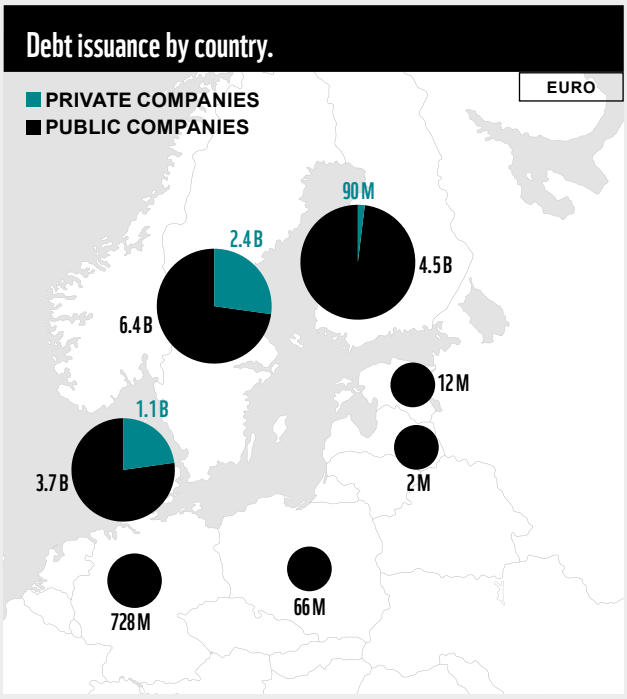
Total shareholders funds held by country.

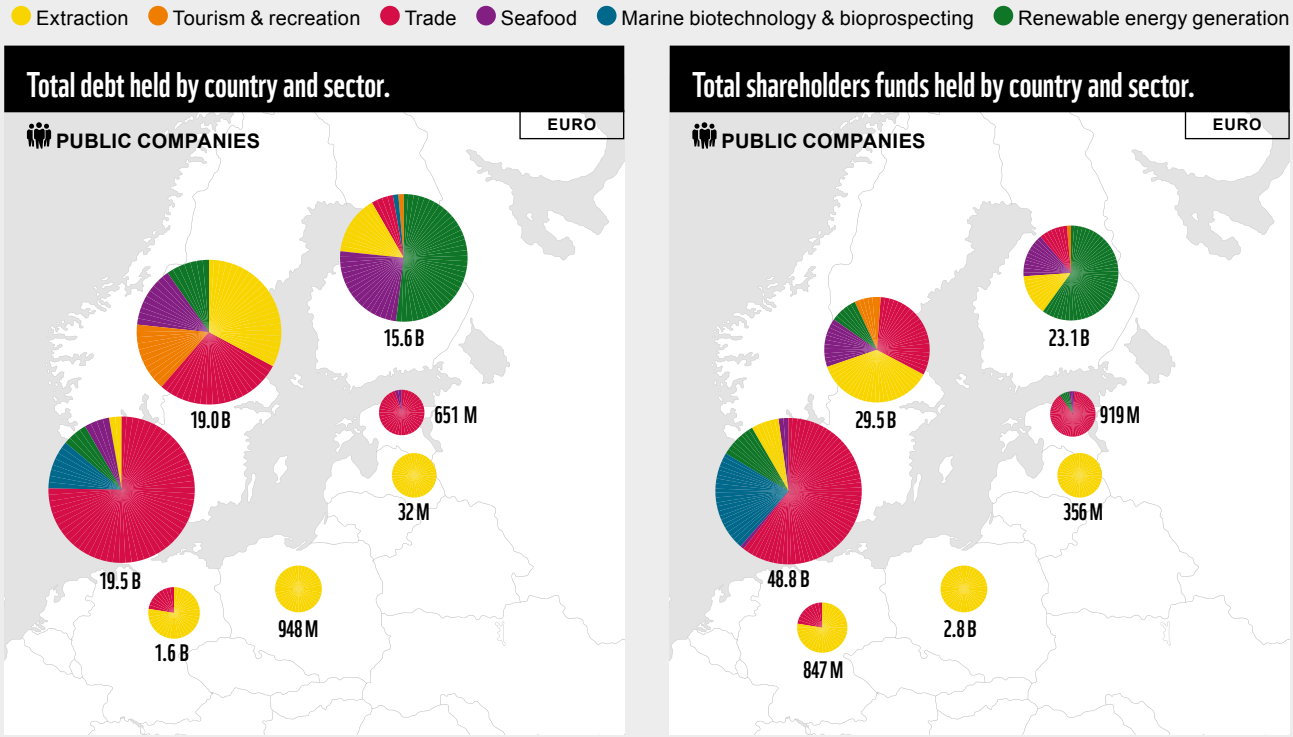


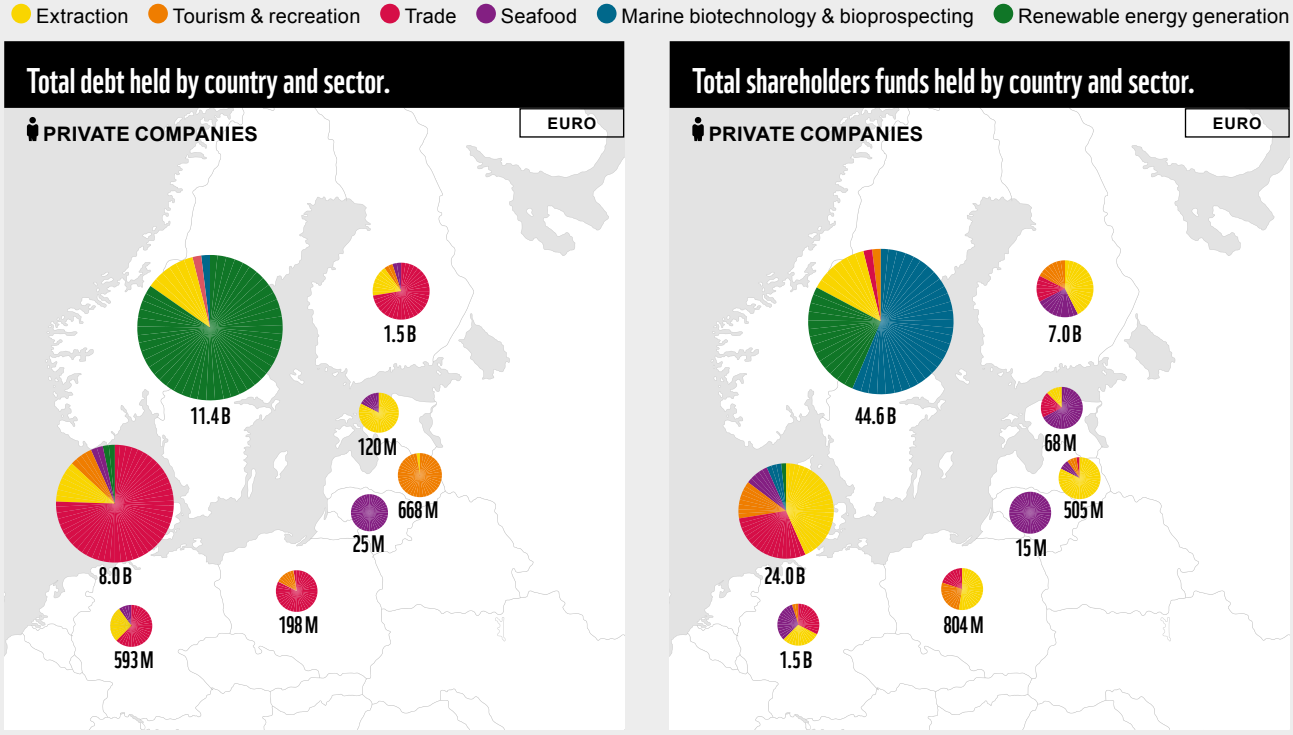
Common stock issuance by country.

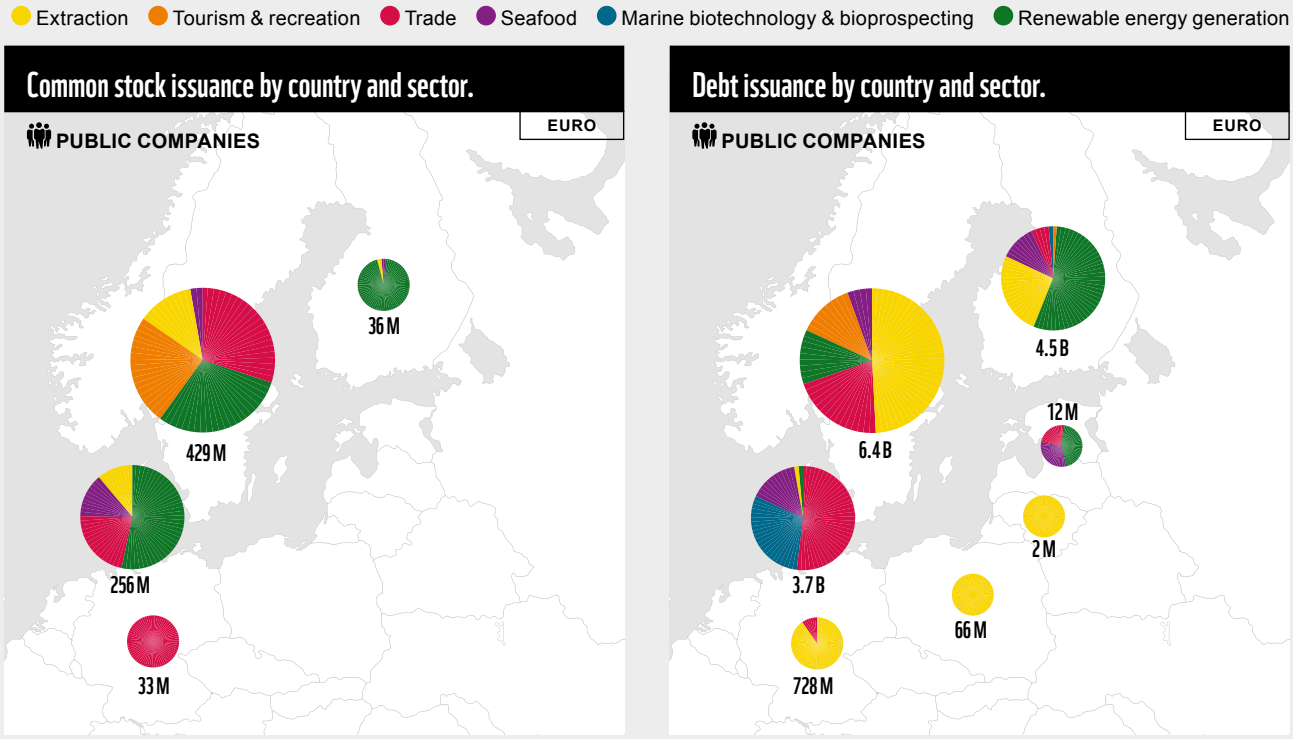


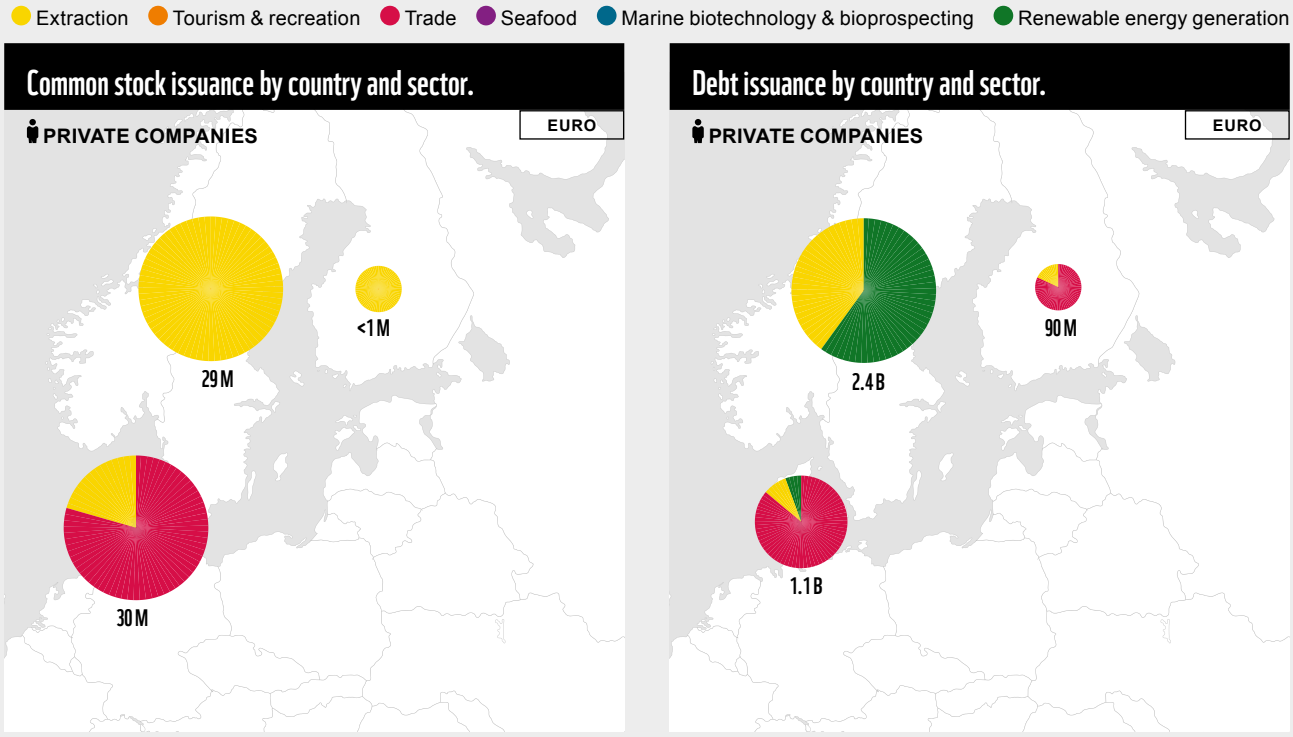
Debt issuance by country.




Extraction
Tourism & recreation
Trade
Seafood
Marine biotechnology & bioprospecting
Renewable energy generation
Total debt held by country and sector.
EURO
PUBLIC COMPANIES
15.6 B
19.0 B
651 M
32 M
19.5 B
1.6 B
948 M
Total shareholders funds held by country and sector.
EURO
PUBLIC COMPANIES
23.1 B
29.5 B
919 M
356 M
48.8 B
847 M
2.8 B


Extraction
Tourism & recreation
Trade
Seafood
Marine biotechnology & bioprospecting
Renewable energy generation
Total debt held by country and sector.
EURO
PRIVATE COMPANIES
1.5 B
11.4 B
120 M
668 M
25 M
8.0 B
198 M
593 M
Total shareholders funds held by country and sector.
EURO
PRIVATE COMPANIES
7.0 B
44.6 B
68 M
505 M
15 M
24.0 B
804 M
1.5 B


Extraction
Tourism & recreation
Trade
Seafood
Marine biotechnology & bioprospecting
Renewable energy generation
Common stock issuance by country and sector.
PUBLIC COMPANIES
EURO
36 M
429 M
256 M
33 M
Debt issuance by country and sector.
PUBLIC COMPANIES
EURO
4.5 B
6.4 B
12 M
2 M
3.7 B
66 M
728 M


Extraction
Tourism & recreation
Trade
Seafood
Marine biotechnology & bioprospecting
Renewable energy generation
Common stock issuance by country and sector.
PRIVATE COMPANIES
EURO
29 M
<1 M
30 M
Debt issuance by country and sector.
PRIVATE COMPANIES
EURO
90 M
2.4 B
1.1 B

ANNEX 4/ EXAMPLE CALCULATION OF AGGREGATE FINANCIAL STOCKS AND FLOWS

The sample companies comprising the final dataset were used to calculate key financial ratios. The ratio used in this example calculation of the aggregate shareholders' funds (financial stock) was shareholders' funds to revenue.

$$\text{Shareholders' funds: revenue} = \frac{\text{Shareholders' funds}}{\text{Revenue}}$$

The average values of revenue from that dataset were divided by average values of shareholders' funds to arrive at an average shareholders' funds to revenue ratio of 54.7% for private companies and 59.5% for public companies.

Then, the ratios were multiplied by the known total revenue of the Baltic Blue Economy (see Step 2 of the Methodology) and the average fraction of the dataset made up of public or private companies. The result is the aggregate volume of shareholders' funds held by each company type across the included sectors. An example calculation for private companies is presented below:

$$\text{Aggregate shareholders' funds} = \frac{\text{Shareholders' funds}}{\text{Revenue}} \times \text{Total revenue X\% private companies}$$

Aggregate shareholders' funds = 54.7% x 1,170 billion EUR x 15.7% = 110 billion EUR

ANNEX 5/ CALCULATED RANGES OF AGGREGATE FINANCIAL STOCKS AND FLOWS

Estimates of total debt and total shareholders' funds (Table 5a), along with debt issuance and shareholders' funds issuance (Table 5b) are derived from the ratio analysis described in Step 5 of the methodology. The following ranges of values have been calculated from multiple groupings of company data divided on lines of data quality – bolded 'estimate' values reflect the values used wherever quantifications or visualisations involving aggregate stocks and flows are presented.

TABLE 5A/ Calculated aggregate financial stocks held by entities within the Baltic Sea Economy.

MILLION EURO

	TOTAL DEBT	TOTAL SHAREHOLDERS' FUNDS
PRIVATE COMPANY		
Min	60,026	275,954
Max	206,065	729,586
ESTIMATE	**62,853**	**506,909**
PUBLIC COMPANY		
Min	6,312	112,796
Max	117,783	200,480
ESTIMATE	**65,733**	**145,330**
AGGREGATE (ALL COMPANIES)		
Min	66,338	388,750
Max	323,848	930,067
ESTIMATE	**128,586**	**652,239**

TABLE 5B/ Calculated aggregate financial flows issued by entities within the Baltic Sea Economy.

MILLION EURO

	DEBT ISSUANCE	SHAREHOLDERS' FUNDS ISSUANCE
PRIVATE COMPANY		
Min	4,714	253
Max	15,624	335
ESTIMATE	**10,169**	**294**
PUBLIC COMPANY		
Min	15,619	893
Max	27,426	4,708
ESTIMATE	**22,869**	**2,301**
AGGREGATE (ALL COMPANIES)		
Min	20,333	1,147
Max	43,050	5,043
ESTIMATE	**33,038**	**2,595**

ANNEX 6/ FIGURE 10 AND 11 ADDITIONAL DETAIL

FIGURE 10A/ Value of debt by instruments. Public companies in maritime-based commerce.

MILLION EURO

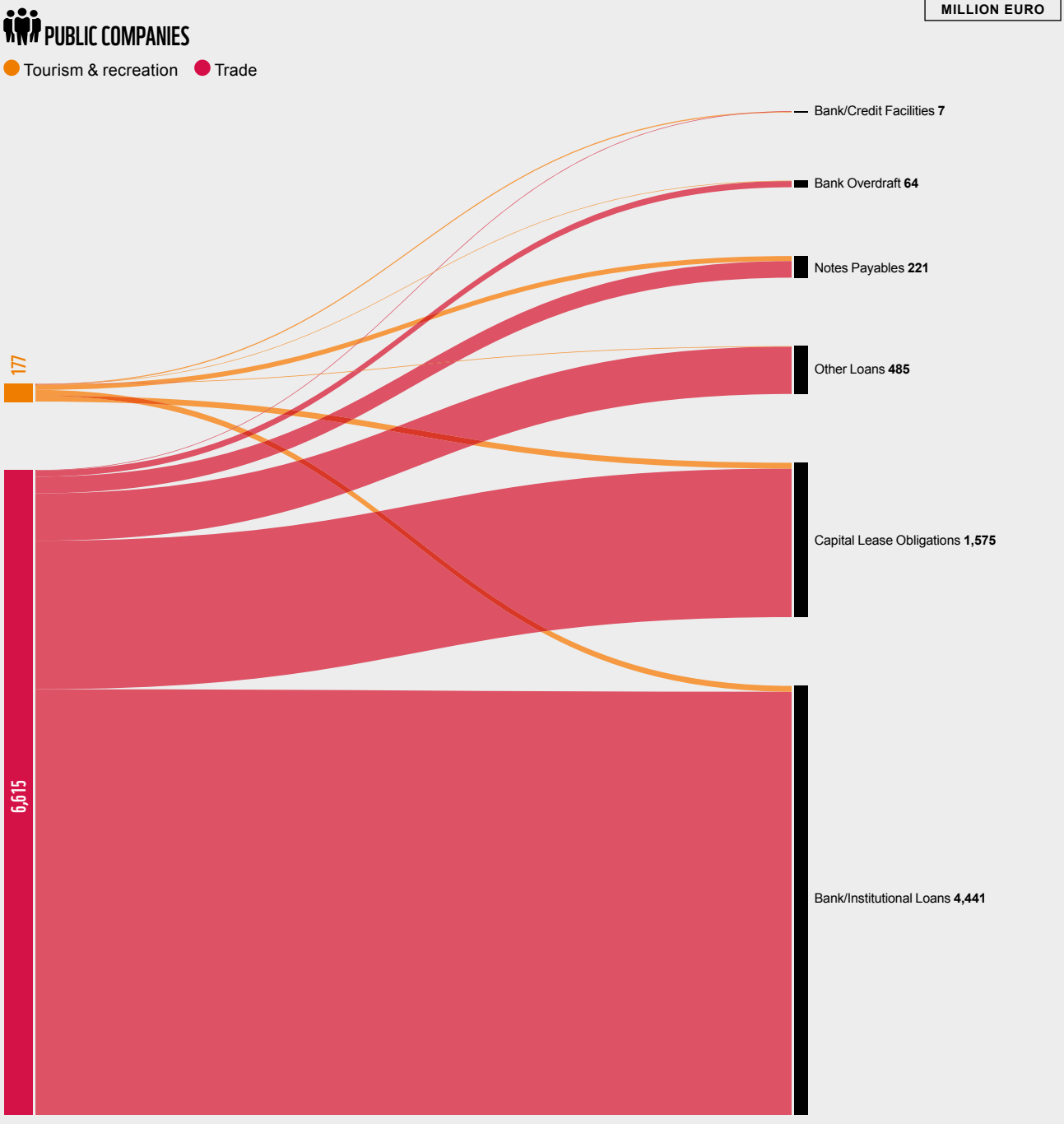


FIGURE 10A/ Value of debt by debt instruments. Public companies in maritime-based commerce. Total value of debt held by public companies within the two maritime-based commerce sectors (Tourism & recreation and Trade) across all debt instruments.

FIGURE 10B/ Value of debt by instruments. Public companies in living resources.

MILLION EURO

PUBLIC COMPANIES

Seafood Marine biotechnology & bioprospecting

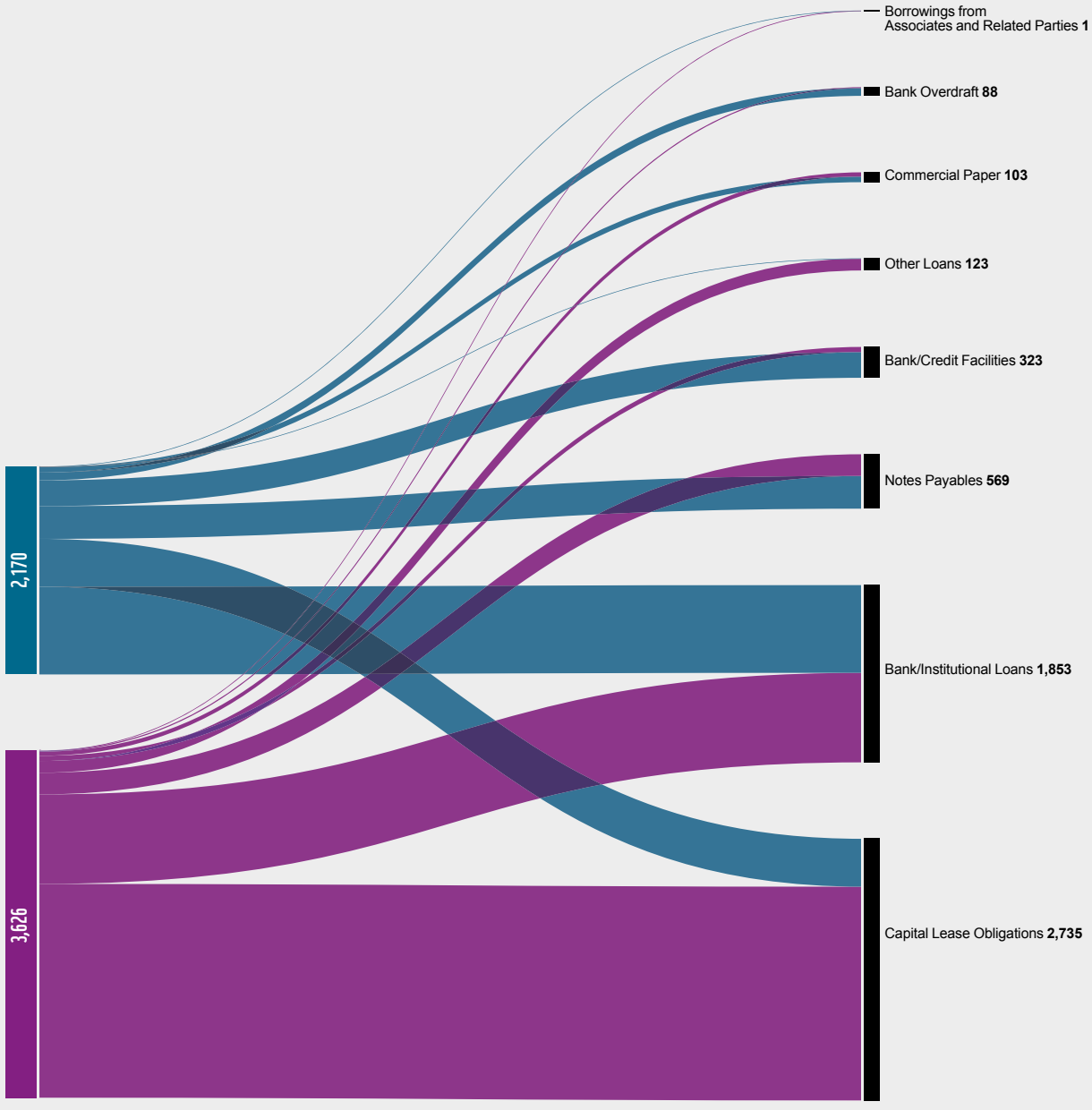


FIGURE 10B/ Value of debt by debt instruments. Public companies in living resources. Total value debt held by public companies within the two living resources sectors (Marine biotechnology & bioprospecting and Seafood) across all debt instruments.

FIGURE 10C/ Value of debt by instruments. Public companies in non-living resources.

MILLION EURO

PUBLIC COMPANIES

Extraction Renewable energy generation

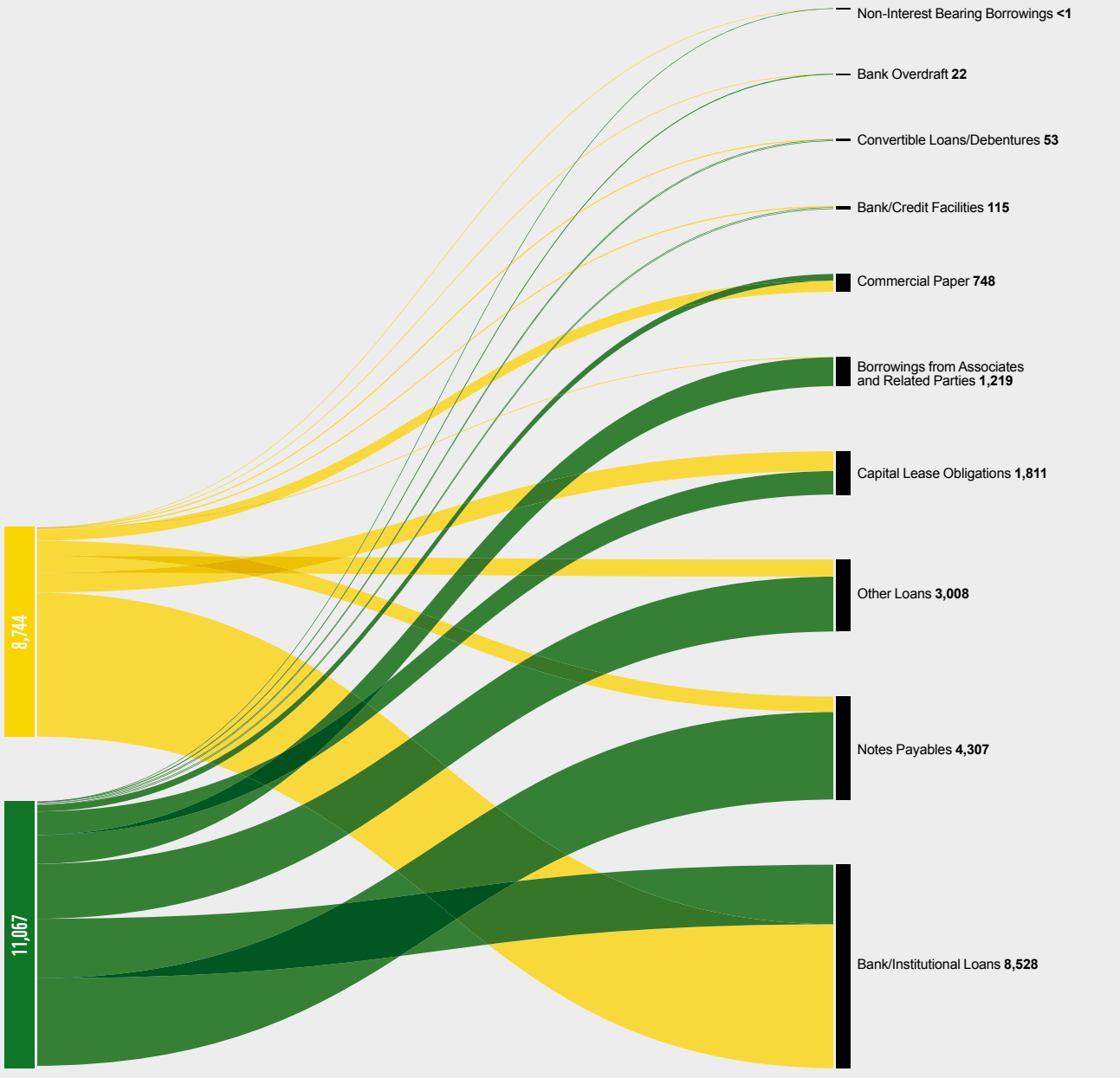


FIGURE 10C/ Value of debt instruments. Public companies in non-living resources. Total value of debt held by public companies within the two non-living resources sectors (Extraction and Renewable energy generation) across all debt instruments.

FIGURE 11A/ Sectoral capital stock by owner class. Public companies in maritime-based commerce.

MILLION EURO

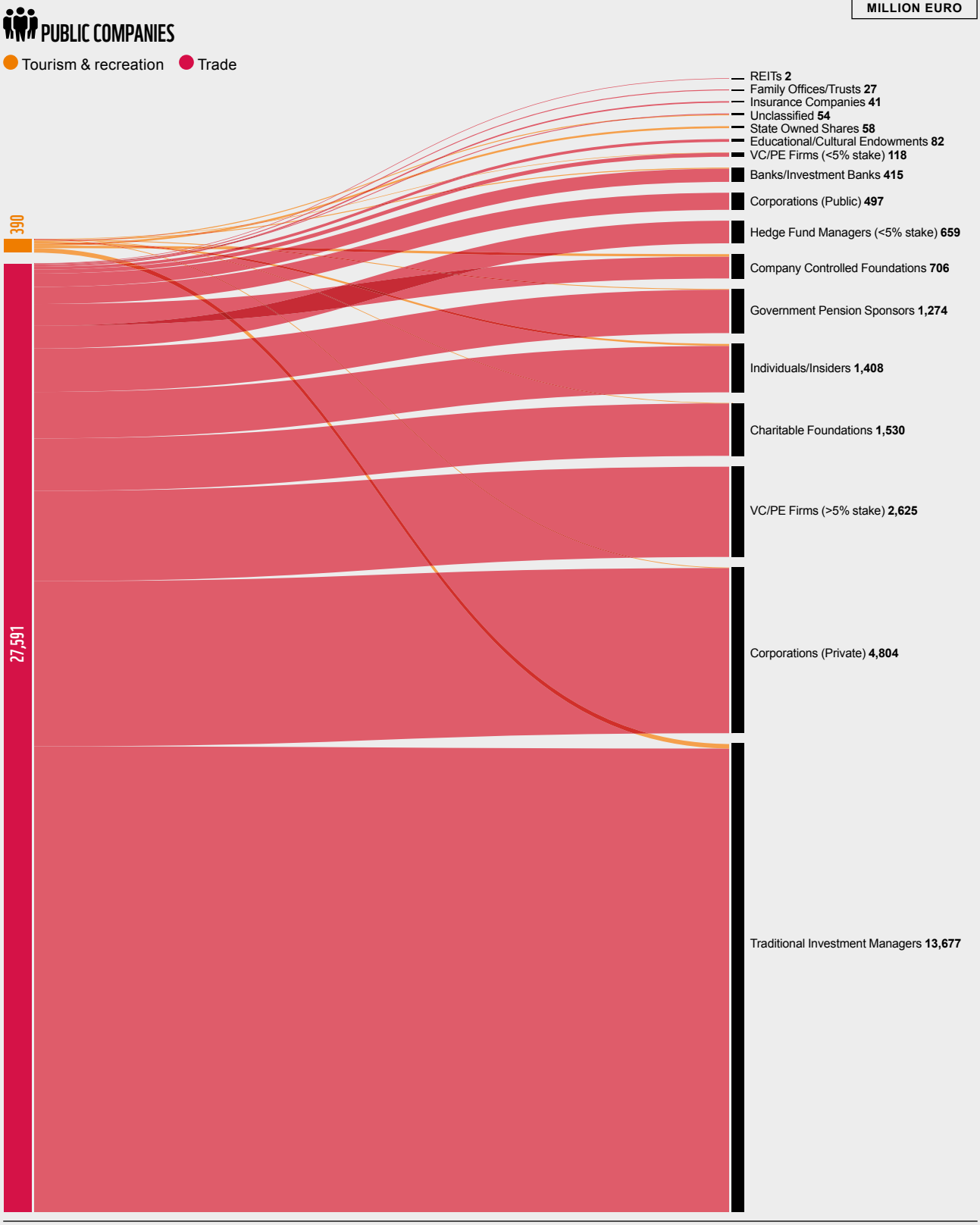


FIGURE 11A/ Sectoral capital stock by owner class. Public companies in maritime based companies. Total value of equity within the two maritime-based commerce sectors (Tourism & recreation and Trade) held by all owner classes.

FIGURE 11B/ Sectoral capital stock by owner class. Public companies in living resources.

MILLION EURO

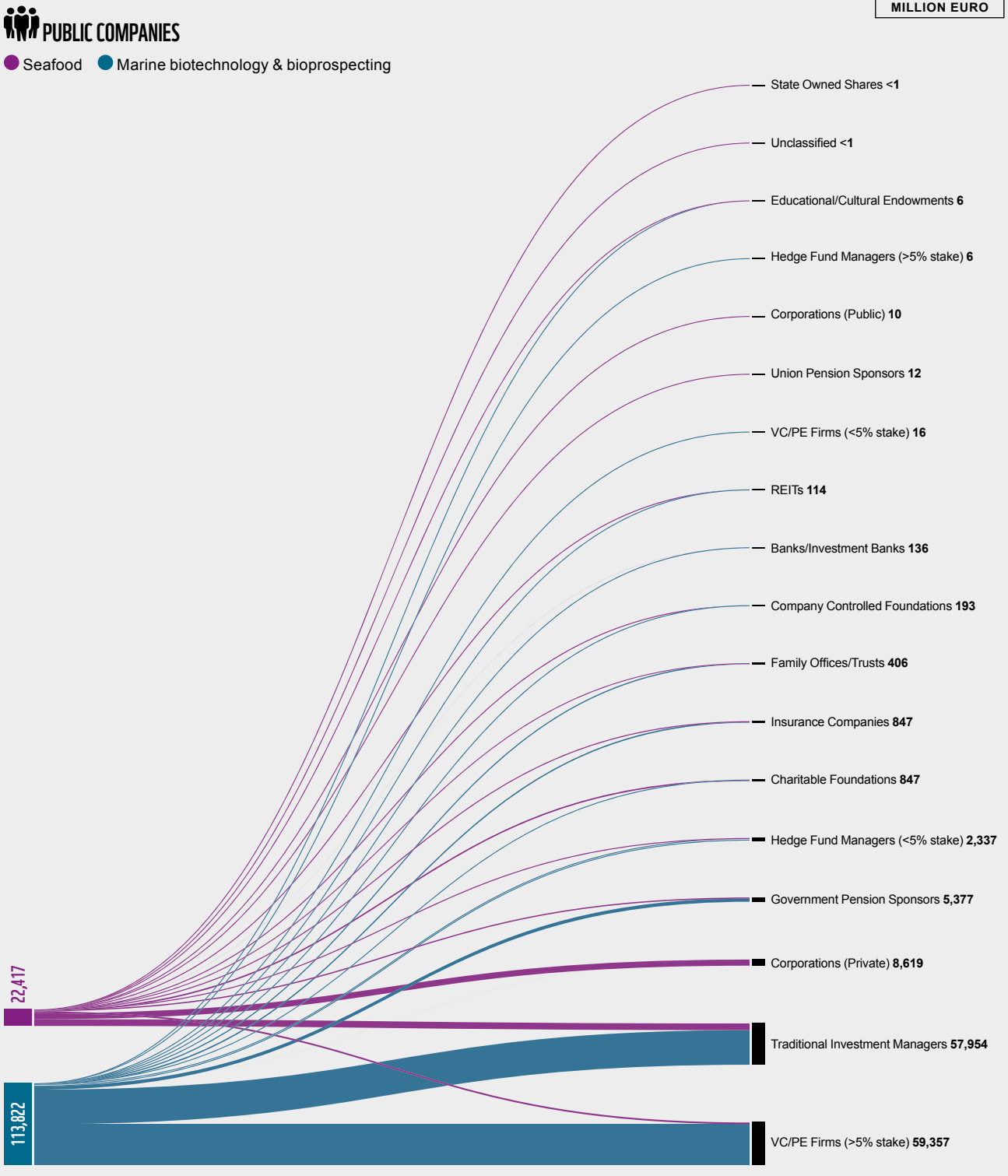


FIGURE 11B/ Sectoral capital stock by owner class. Public companies in living resources. Total value of equity within the two living resources sectors (Marine biotechnology & bioprospecting and Seafood) held by all owner classes.

FIGURE 11C/ Sectoral capital stock by owner class. Public companies in non-living resources.

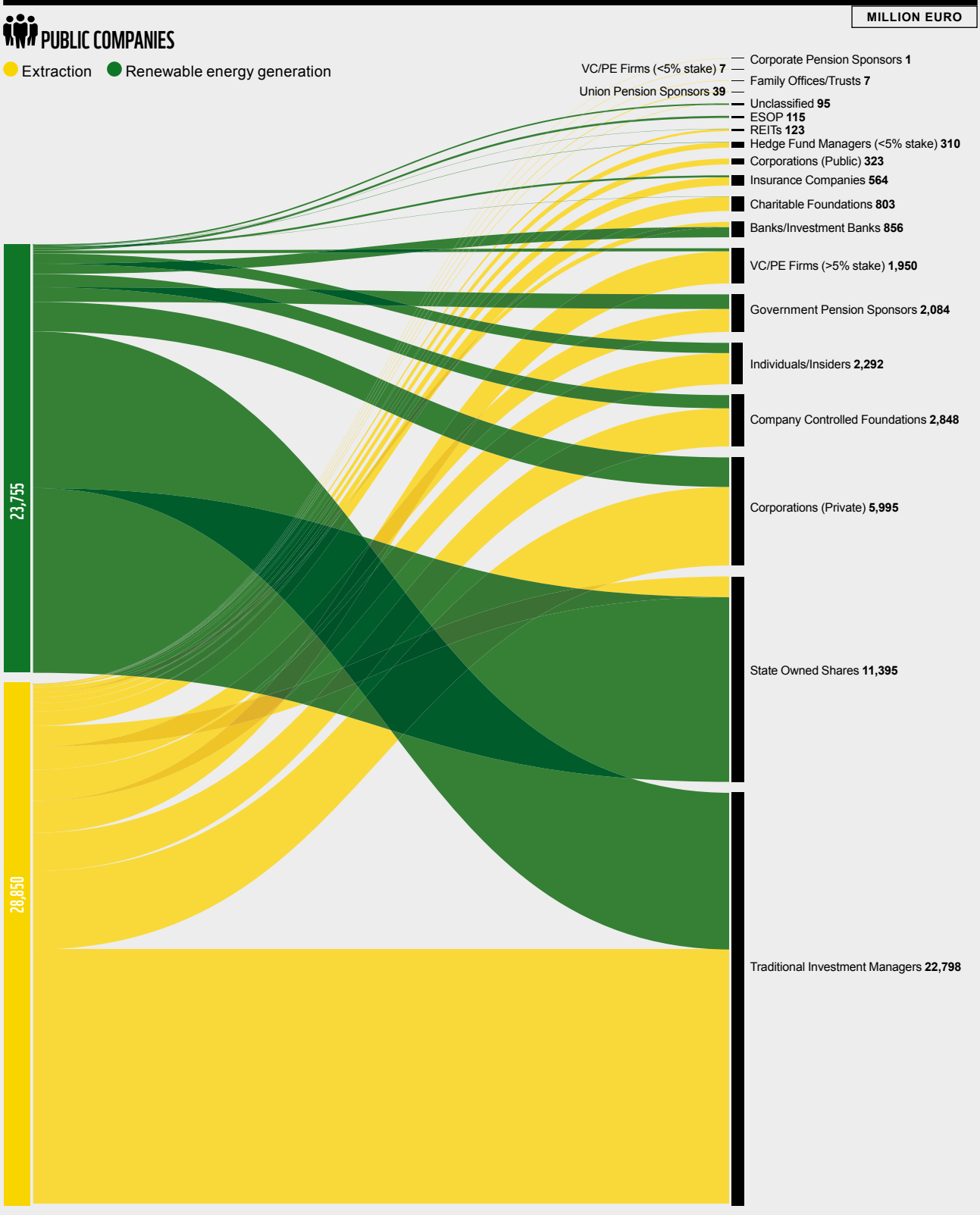


FIGURE 11C/ Sectoral capital stock by owner class. Public companies in non-living resources. Total value of equity within the two non-living resources sectors (Extraction and Renewable energy generation) held by all owner classes.

ANNEX 7/ METHODOLOGY

10-STEP METHODOLOGY

STEP 1: Define sector and sub-sector classifications

To ensure uniformity and comparability, a set of sectors and sub-sectors were demarcated and equated to the Baltic maritime economy. The specific industries identified fall within the following hierarchy that relates sectoral activities to broader impacts on the Baltic seascape and its social envelope: Ocean activity -> ocean sector -> economic sector -> specific sub-sector (refer to Table 1 below for a description of the ocean activities, ocean sectors and 16 economic sectors within the scope of this research).

TABLE 1/ Framework used to define the boundaries of the Baltic maritime economy.

ACTIVITY: LIVING RESOURCES	ACTIVITY: NON-LIVING RESOURCES	ACTIVITY: MARITIME-BASED COMMERCE
OCEAN SECTOR: Seafood	**OCEAN SECTOR:** Extraction	**OCEAN SECTOR:** Trade
• Fisheries • Aquaculture • Distribution of fish products • Processing of fish products • Other seafood-related activities	• Fossil fuels • Mining & dredging • Manufacturing activities • Distribution activities • Support activities	• Transport & infrastructure • Port infrastructure & services
OCEAN SECTOR: Marine biotechnology & bioprospecting	**OCEAN SECTOR:** Renewable energy Generation	**OCEAN SECTOR:** Tourism & recreation
• Pharmaceuticals, cosmetics, chemicals, biofuels & agrifeed	• Offshore wind	• Tourism • Coastal development

TABLE 1/ Framework used to define the boundaries of the Baltic maritime economy.

The European Nomenclature of Economic Activities (NACE) system was applied to define the specific sub-sectors used for data collection and analysis. As the official European industry classification standard, NACE references allow for straightforward comparison across databases and sources of industry and financial statistics. *The EU Blue Economy Report*[160] relies on a similar classification of maritime sectors in its statistical methodology.[161] *The Blue Economy* Report serves as the baseline for information on the scope and size of the maritime economy across the EU, and it is used as a source of economic data. It is likely that employing NACE codes did, to some extent, narrow the scope of included companies—for example, by potentially omitting emerging sectors or companies whose activities are not well captured by a single code. However, we tried to account for this by completing a separate horizon scanning in the Baltic.

The final list of NACE codes used in analysis was assembled based on comparison with the *Blue Economy* Report's methodology, as well as through expert consultation on the economic activities that have a meaningful impact on the Baltic seascape. See Annex 1 for the full list of sub-sectors (with NACE codes) included

160 European Commission (2021). The EU Blue Economy Report. 2021. Publications Office of the European Union. Luxembourg. https://maritime-spatial-planning.ec.europa.eu/practices/eu-blue-economy-report-2021

161 European Commission (2021). The EU Blue Economy Report: Annex II (Methodological Framework for the Established Sectors). https://blueindicators.ec.europa.eu/sites/default/files/annex_ii_methodological_framework.pdf

in the analysis. Some sectors with significant secondary effects on marine ecosystems, such as Agriculture and Forestry, were excluded due to difficulties attributing specific shares of financial flows that result in marine impacts. We recognize this as a gap in our results and note the importance of including these impacts in future financial flow assessments.

STEP 2: Delineate sector and sub-sector size and boundary

To determine the size of the relevant sectors and groupings of sub-sectors, four indicators were used:[162]

1. Number of enterprises
2. Turnover
3. Value added at factor cost
4. Persons employed

Robust data on all four indicators was available from the Eurostat European Statistical Dashboard, Structural Business Statistics[163] for the majority of sectors and sub-sectors (NACE codes beginning with B through N). Data from the *Blue Economy Report*'s Blue Indicators Dashboard[164] was used to supplement data gaps in the Eurostat database related to the Fisheries and Aquaculture sectors (NACE codes beginning with A).

Data was not available for two specific sub-sectors: "Public order and Safety activities" (NACE O8424) and "Other sports activities" (NACE R9319). A later assessment of these sub-sectors indicated that their contribution to the financial flows of the maritime economy is negligible; for this reason, they have been excluded from the macro level analysis of aggregate financial statistics.

STEP 3: Quantify the portion of the regional economy pertaining to Baltic coastal geographies

Two key considerations were applied to set boundaries around the Baltic maritime economy: relevant economic contributors must reside within specific geographical bounds, and they must engage in activities that have a direct impact on the Baltic Sea basin.

The scope of analysis included all countries whose borders overlap the Baltic Sea: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. Please note that quantifications and insights for Russia are presented separately, as significant differences in data availability and integrity for this non-EU state required additional assumptions.

Economic activities of interest within these countries were restricted to those occurring in coastal regions. The European Nomenclature of Territorial Units for Statistics (NUTS) system was used to identify and isolate the appropriate areas within each country. The Eurostat "Coastal, Islands and Outermost Regions" list of coastal NUTS3 codes[165] was used in combination with a correspondence table of NUTS3 codes and postal codes[166] to create a filter in data collection that ensured selected commercial entities reside within the appropriate geographic region. This report's geographical boundary differs slightly from that used in official European Statistical digests by also including the coastal areas of Denmark and Sweden at the "mouth" of the Baltic.

In the case of countries bordering multiple sea basins, it was necessary to develop weighting factors to avoid over attributing economic activities to the Baltic Sea. For instance, assuming the Baltic Sea is responsible for 100% of maritime GVA in Denmark would erroneously claim significant economic activities occurring in the North Sea. These weighting factors were developed by comparing the share of GVA attributable to Baltic-specific NUTS codes to the total coastal GVA of a nation. The resulting factors were applied to national macroeconomic data to calculate the specific fraction of an economic indicator that is attributable to the Baltic seascape (as opposed to the aggregate of all marine-related activity). Data used in generating the weighting factors was obtained from Eurostat, Regional Economic Accounts.[167]

The second consideration for quantifying the fraction of economic activities relevant to the Baltic maritime economy is that activities must have a direct impact on the Baltic Sea. The primary method for apportioning maritime-specific financial data was through the selection of companies whose activities were directly tied to the relevant NACE codes (Step 1). Companies were added to the sample group used for analysis if at least one segment contributes to a relevant NACE code. This differs somewhat

162 Definitions for these economic indicators are provided by Eurostat: https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL_GLOSSARY&StrNom=CODED2&StrLanguageCode=EN
163 Eurostat (2021). Structural Business Statistics. https://ec.europa.eu/eurostat/web/structural-business-statistics/overview
164 European Commission (2021). Blue Indicators Dashboard. https://blueindicators.ec.europa.eu/access-online-dashboard
165 Eurostat (2021). Methodology: Coastal, Islands and Outermost Regions. https://ec.europa.eu/eurostat/web/coastal-island-outermost-regions/methodology
166 European Commission – TERCET (2021). Correspondence Tables. https://gisco-services.ec.europa.eu/tercet/flat-files
167 Eurostat (2021). Regional Economic Accounts – Coastal, Island and Outermost Regions. https://ec.europa.eu/eurostat/web/coastal-island-outermost-regions/data/database

from the Blue Economy Report methodology, in which certain NACE codes are subdivided into maritime and non-maritime fractions.[168] This means, for example, that the manufacturing sector described in this analysis does not include all manufacturing activities from every related NACE code. Rather, NACE codes associated with manufacturing that are likely to influence the marine or coastal environment were assembled and used as a proxy for the maritime-specific manufacturing sector. See Annex 1 for the full list of NACE codes used.

Companies were designated as geographically relevant if they were domiciled in one of the countries bordering the Baltic Sea. For companies solely operating in the Baltic region, this involved a straightforward mapping of headquarters. For companies operating in multiple geographies – multinational corporations, for example – operating subsidiaries domiciled in the Baltic region were included in data collection. This means it is likely that an unknown number of companies headquartered outside of the Baltic region but operating within its borders have been excluded.

STEP 4: Identify data sources to be used in capturing financial flows

Data used for both the selection of top companies and the analysis of those companies' financial features was obtained from several financial databases:

1. Capital IQ: public company records, private company records and transaction records;
2. Orbis Europe: public company records and private company records;
3. PitchBook: public company records, private company records and transaction records;
4. Zephyr: transaction records.

See Step 2 for the sources of macroeconomic and structural business statistics used there and in Step 5. Other relevant data used for cross-checking and validating the aggregate analysis was obtained from Statista.[169]

Note that private companies are not required to disclose the same level of financial information that publicly listed companies are. As a result, entries in financial databases for private companies typically contain figures from the balance sheet (whether derived from analysis or disclosed) but not the cash flow statement. To cover the data gap relating to private company debt and equity issuance, additional screens for private company transactions were performed. The Capital IQ, PitchBook and Zephyr databases were used to capture data for all listed transactions between private companies occurring within the relevant NACE codes and NUTS regions over the period of 2014-2021. The final list of transactions was used to supplement analysis of the financial flows to private companies.

STEP 5: Quantify aggregate macro financial flows across relevant sectors

Financing activities were analyzed using a "stock and flow" perspective. Stocks refer to the aggregate financial resource pools of total debt and total equity (equal to shareholders' funds minus the sum of common equity and minority interest) at the disposal of companies within the boundaries of analysis.[170] These stocks represent a snapshot of the capital structure of the Blue Economy. Assessing the capital structure of the maritime economy at different levels yields insights into the state of play and adds significant context to the analysis of financial flows. Given the data at hand, it was possible to examine the capital structure of the whole maritime economy as an aggregate, the capital structure of each ocean sector and (in many cases) the capital structure of companies within individual NACE codes.

Flows comprise the issuance of new debt and new equity – additional streams of finance that move into the stock pools from beyond the boundaries of the system. New debt adds to existing total debt whereas shareholders' funds, whether in the form of common equity or minority interest, adds to existing equity. Analyzing flows offers insights into the sources and destinations of investment in the Baltic Sea Economy, and thus allows for identification of leverage points to shift investments toward a SBE.

Aggregate stock and flow figures for the Baltic Sea Economy were derived through ratio analysis. Key financial ratios were calculated from the sample group of companies and then applied to macroeconomic data to arrive at aggregate figures specific to the Baltic Sea Economy (see Annex 4 for an example). For financial stocks, the ratios used were debt-to-revenue and equity-to-revenue. For financial flows, the ratios used were debt issuance-to-revenue and equity issuance-to-revenue.

From these ratios and the known turnover of the Baltic Sea Economy (from Step 2), it was possible to derive a high-level view of debt and equity held by different company

168 European Commission (2021). The EU Blue Economy Report: Annex II (Methodological Framework for the Established Sectors). https://blueindicators.ec.europa.eu/sites/default/files/annex_ii_methodological_framework.pdf

169 Statista (2021). Outstanding value of loans to non-financial corporations in the euro area. https://www.statista.com/statistics/1238066/value-business-loans-in-the-euro-area/

170 Note that the term 'stocks' does not refer in this analysis to shares of a company traded on an exchange or stock market.

types and sectors, as well as the general trends related to financial flows at the sector level. Since the calculated ratios differed significantly between public and private companies, results are generally presented separately for each company type.

STEP 6: Cross-check sectoral investment with bank lending to validate aggregate metrics

To verify that the range of figures calculated in Step 5 represent an accurate estimate of stocks and flows in the Baltic Sea Economy, a cross-check of a key calculation was conducted using entirely separate data. Total debt was selected as the point for triangulation.

Assessment of annual bank reports failed to identify a significant fraction of debts that would be present in the dataset used for analysis, and so an alternative method was devised by identifying outstanding business bank loan data obtained from Statista. This was normalized to be consistent with the Baltic-specific maritime sectors.[171] Normalized figures were then combined with national investment data[172] to scale the calculated value of total bank loans up to total debt (covering all debt instruments, including but not limited to bank loans). This calculation assumes that company investment is proportional to loans received (i.e., over time, money spent is equivalent to money received through financing). The result of this cross-check calculation fell within the range of estimates derived from Step 5, indicating that the methodology for estimating aggregate financial stocks and flows is consistent and robust. Stakeholder consultations were also conducted at this stage to seek expert opinions on the volumes and types of debts making their way through the Baltic Sea Economy.

STEP 7: Identify a list of companies from each sub-sector as a sample for detailed analysis

Financial databases were used to build a list of key companies that includes up to five companies from each NACE code identified from Step 1. The Capital IQ, Orbis Europe and PitchBook databases were all used to screen for and capture data relating to all companies operating within the relevant NACE codes and NUTS3 regions. Essential figures from company balance sheets (total debt and total equity) and cash flow statements (new debt issuance and new equity issuance) were included in the screening criteria. The resulting screens were cleaned for comparability and then sorted according to revenue per NACE code. Up to five of the largest companies by revenue were selected from each NACE code and used for detailed analysis.

STEP 8: Estimate the fraction of the maritime economy represented by the key companies

The total revenue of companies from the sample group was compared to the total revenue of the Baltic Sea Economy derived in Step 2. This comparison served to determine what level of coverage the sample group of companies represents relative to the total size of the Baltic Sea Economy. The companies represented a combined 37% of the total turnover of the Baltic-specific maritime economy. The subset of public companies (whose financial data is generally of a higher quality than private companies') from the sample group represented a combined 13% of the Baltic-specific maritime economy.

STEP 9: Identify and analyze financial flows involving key companies

Public companies

The sectoral shares of total stocks were calculated for each sector using financial data from the list of key companies. The per-sector aggregates of total debt and total equity were divided by the overall values of total debt and total equity, respectively, to arrive at percentage-based shares of debt and equity for each sector. The sectoral shares of total flows were calculated similarly, dividing the per-sector shares of new debt issued and new equity issued by the respective totals of new debt and new equity.

Using the more detailed cash flow and public ownership data available for most public companies, it was possible to map an additional level of detail onto both categories of financial stocks. In the case of total debt, it was possible to break down the per-sector shares of total debt by debt instrument (e.g., bank loan, notes payable, private equity, etc.). In the case of total equity, it was possible to break down the per-sector shares of total equity by owner class (e.g., traditional investment manager, private trust, high-net-worth individual, etc.).

171 Normalization required extrapolating total outstanding business loan figures from the five countries for which Statista data was available through ratio analysis. The known quantity of total turnover for the Baltic Sea Economy was used in combination with the ratio of business loans to Baltic-specific maritime revenue for the five countries to scale up the total outstanding business loans for all countries.

172 Publications Office of the European Union (2021). Gross fixed capital formation at current prices. https://data.europa.eu/data/datasets/ophsxuwjdtqpjxb8pnld8w?locale=en

Private companies

Calculations of the share of financial stocks and flows for private companies were performed with the same method used for public companies. However, private companies lacked sufficient cash flow or ownership data for mapping individual debt instruments or owner classes to different sectors. In lieu of this, supplemental analysis was conducted using private company transaction data.

STEP 10: Assess the environmental and social impact resulting from said flows

Following the financial analysis of the seascape, we then turned to assessing the extent to which the current flows impact the environment and society and support or hinder the attainment of a SBE within the Baltic seascape.

Environmental and social criteria

There are numerous frameworks for assessing environmental and social impacts. However, the specific needs of this research are (a) that the analytical framework is familiar to financial institutions; (b) that it can be applied at a sector (and sub-sector) level; and (c) that it is aligned with the principles of a SBE. For these reasons, we based our analysis on the environmental and social impact framework developed by the UN Environment Programme's SBE Finance Initiative (UNEP FI SBE)[173] (Annex 2). Specific sub-indicators were developed for impact categories that cover a range of impacts to allow a more sector-specific evaluation.

ectors evaluated

The sectors evaluated included all those used in the financial analyses (Annex 1). However, many sub-sectors themselves have minimal environmental impact but are part of the "financial ecosystem" that drives activities which have a direct impact on the Baltic seascape. This could lead to erroneous results, whereby a "supporting" sub-sector (e.g., tour operators) for other activities (e.g., tourist water transport) could, itself, appear to be environmentally or socially neutral, whereas, in reality, it creates demand for the activities that may have a negative social and environmental impact. Where this occurred, economic sub-sectors were grouped for the analysis to better reflect the impact of the whole economic sector (Table 1).

Evaluation and scoring

An extensive review of the scientific and "grey" literature was conducted on the actual and potential environmental and social impacts of each sector. Baltic-specific information was prioritized, however, in some instances, more general literature on a sector's impacts on marine environments had to be used. The environmental and social impact of each sector was scored on a scale of 1 to 5 (one (1) being a strongly positive impact on the Baltic seascape, five (5) strongly negative; Annex 2b). Where evidence was missing, the impact was excluded from further analysis. The scores for each sector were totaled and converted into a percentage, with each impact area receiving equal weighting. Scores of 100% imply a strongly negative impact, 60% neutral (or a balance of positive and negative), and less than 50% imply an overall positive impact (although the impact for some individual criteria may have been negative).

Evaluation of UNEP FI impact areas

Refer back to Annex 2.

173 United Nations Environment Programme Finance Initiative (2021). Turning the Tide: How to finance a sustainable ocean recovery A practical guide for financial institutions. Geneva. https://www.unepfi.org/publications/turning-the-tide/

ANNEX 8/ RUSSIAN CASE STUDY

Quantifications and insights for Russia have been presented separately, since significant differences in data availability and integrity for this non-EU state required additional assumptions.

FIGURE 16/ Map of Russian administrative areas bordering the Baltic Sea.

FIGURE 16/ The Russian administrative areas neighbouring the Baltic Sea are Leningrad Oblast, Saint Petersburg and Kaliningrad Oblast.

Russia's Baltic Sea Economy

The Russian administrative areas neighbouring the Baltic Sea are Leningrad Oblast, Saint Petersburg and Kaliningrad Oblast (Figure 16).[174]

Comparable turnover, GVA and employment statistics specific to Baltic coastal areas were not accessible for Russia. Data limitations for Russia also extend to poor coverage in financial databases for companies within relevant NACE codes. Consequently, a basic estimate of the turnover of Russia's Baltic Sea Economy was derived from the country's overall Gross domestic product (GDP) (Table 6). The ratio of maritime turnover to national GDP was calculated for all European countries within the boundaries of analysis. This ratio was then applied to Russia's GDP to provide a rough estimate of the fraction of the national economy related activities in the Baltic Sea Basin.[175] While the ratio of GDP to turnover does not yield an estimation that is as accurate as the Eurostat data used for EU countries, a preliminary triangulation using total revenue across all Russian sample companies suggests that the estimate is within the right order of magnitude. The sum of turnover for all companies within the Russian sample group is EUR€98.3 billion. Given the lack of coverage of Russian companies within the financial databases, it is likely that a significant number of companies were omitted from the sample group.

TABLE 6/ Russian GDP from 2016-2018 and the estimated fraction of the national economy attributed to the Baltic Sea basin.

MILLION EURO

YEAR	GDP	MARITIME TURNOVER
2016	1,502,102	367,449
2017	1,851,999	461,154
2018	1,949,799	504,842
AVERAGE	1,767,967	444,428

TABLE 6/ Russian GDP from 2016-2018 and the estimated fraction of the national economy attributed to the Baltic Sea basin.

174 Helsinki Commission – Baltic Marine Environment Protection Commission (2021). Helcom Map and Data Service. https://maps.helcom.fi/website/mapservice/index.html

175 The World Bank (2021). GDP – Russian Federation. https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=RU

The above estimate assumes that Russia's Baltic Sea Economy has grown in step with the overall economy. Russia's GDP grew at an average annual rate of 1.61% between 2016 and 2018.[176]

Unfortunately, a statistical analysis of other features of the Russian Baltic Sea Economy at the level of individual NACE codes was not possible considering data gaps. As a result, the trends observed in European nations are not directly comparable to the circumstances in Russia. This means that the trends observed in the EU countries do not necessarily account for the linkages between those countries and Russia. Potential pressures exerted by Russia on the EU Baltic Sea Economy are captured to the extent that they influence indicators like turnover, GVA and employment. However, it was not possible to illuminate nuances such as inter-sectoral relationships or international supply and demand drivers.

Russian aggregate financial stocks

Aggregate stocks were calculated for Russia using the country's estimated Baltic Sea Economy turnover (derived from GDP) and the separate sample group of Russian companies operating in relevant NACE codes and geographies (Figure 17). Insufficient data availability from cash flow statements prohibited a reasonable estimation of financial flows.

FIGURE 17/ Financial stocks by sector.

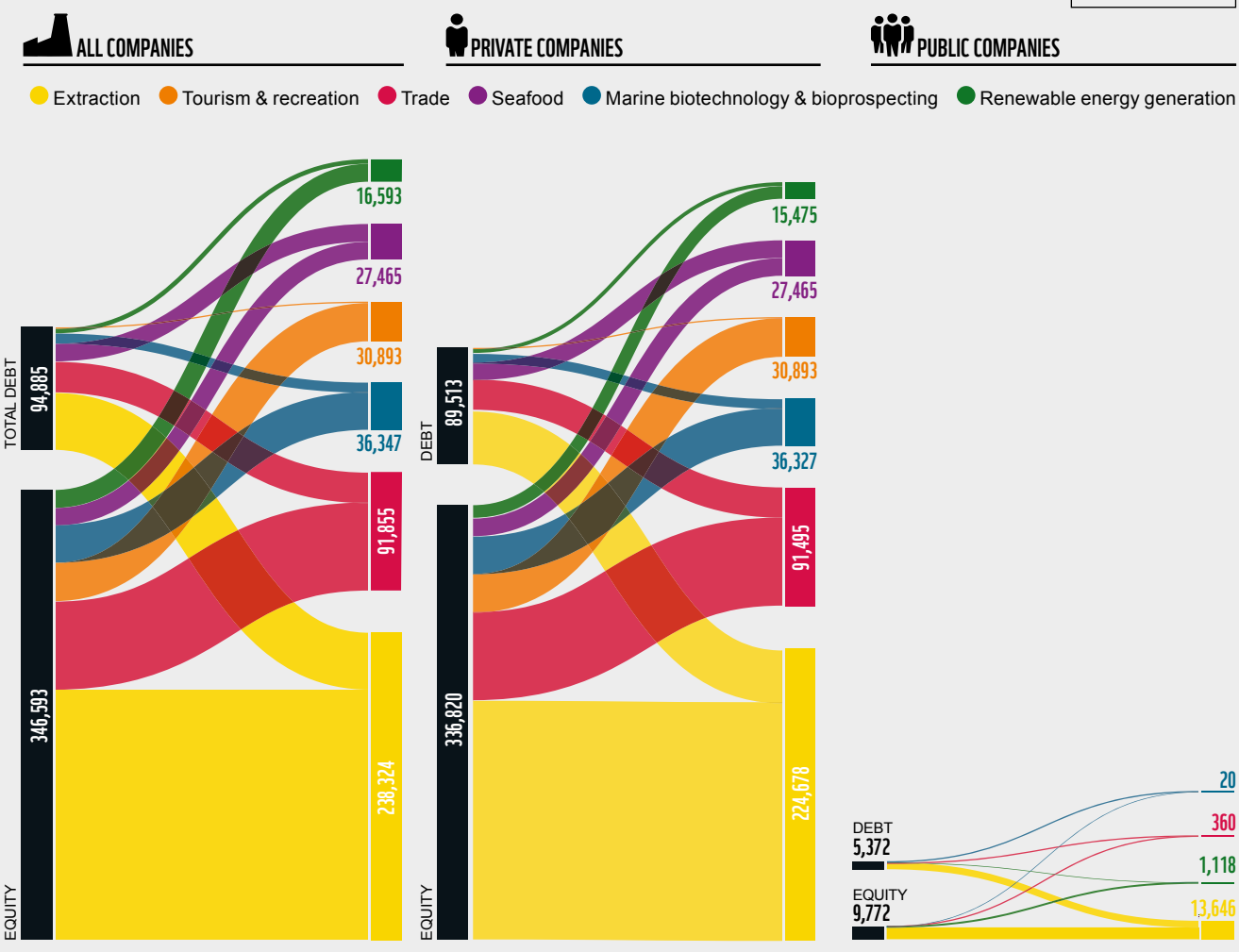


FIGURE 17/ Financial stocks by sector. Model of Russian financial stocks derived from aggregate ratio analysis between 2018 and 2020. Leftmost diagram represents all companies, middle diagram represents only private companies and rightmost diagram represents only public companies.

176 The World Bank (2021). GDP growth – Russian Federation. https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=RU

Note that the total sample size of companies used to calculate fractions of stocks held and flows issued across different sectors was considerably smaller for Russia than for the European Baltic countries included in this study. For this reason, these results are presented with the caveat that significant stocks and flows may have been omitted. In addition, 97% of the Russian companies analyzed were private. The lack of robust data that is typically available for public companies adds an additional degree of uncertainty to the results for Russia.

The view of aggregate stocks in the Russian Baltic Sea Economy reveals many of the same trends that exist in Russia as the other countries bordering the Baltic Sea. Total equity dominates debt as a fraction of total financial stocks. Additionally, extractive industries and trade similarly occupy two of the top three spots in both Russia and EU countries bordering the Baltic. Extraction particularly dominates in Russia, accounting for 55% of all financial stocks within private companies and 88% in public companies (Figure 18). In contrast, financial stocks in the Renewable energy generation sector are comparatively small, EUR€16.6 billion in Russia compared to EUR€155.4 billion in all Baltic EU countries. Within extraction, the Fossil fuel and Manufacturing sectors combined account for 64% of all equity and 75% of all debt. As this data is averaged over the period of 2018-2020; it appears that Russia has been slow to transition toward a SBE.

FIGURE 18/ Fractions of total debt and total equity held by each Russian economic sector between 2018 and 2020.

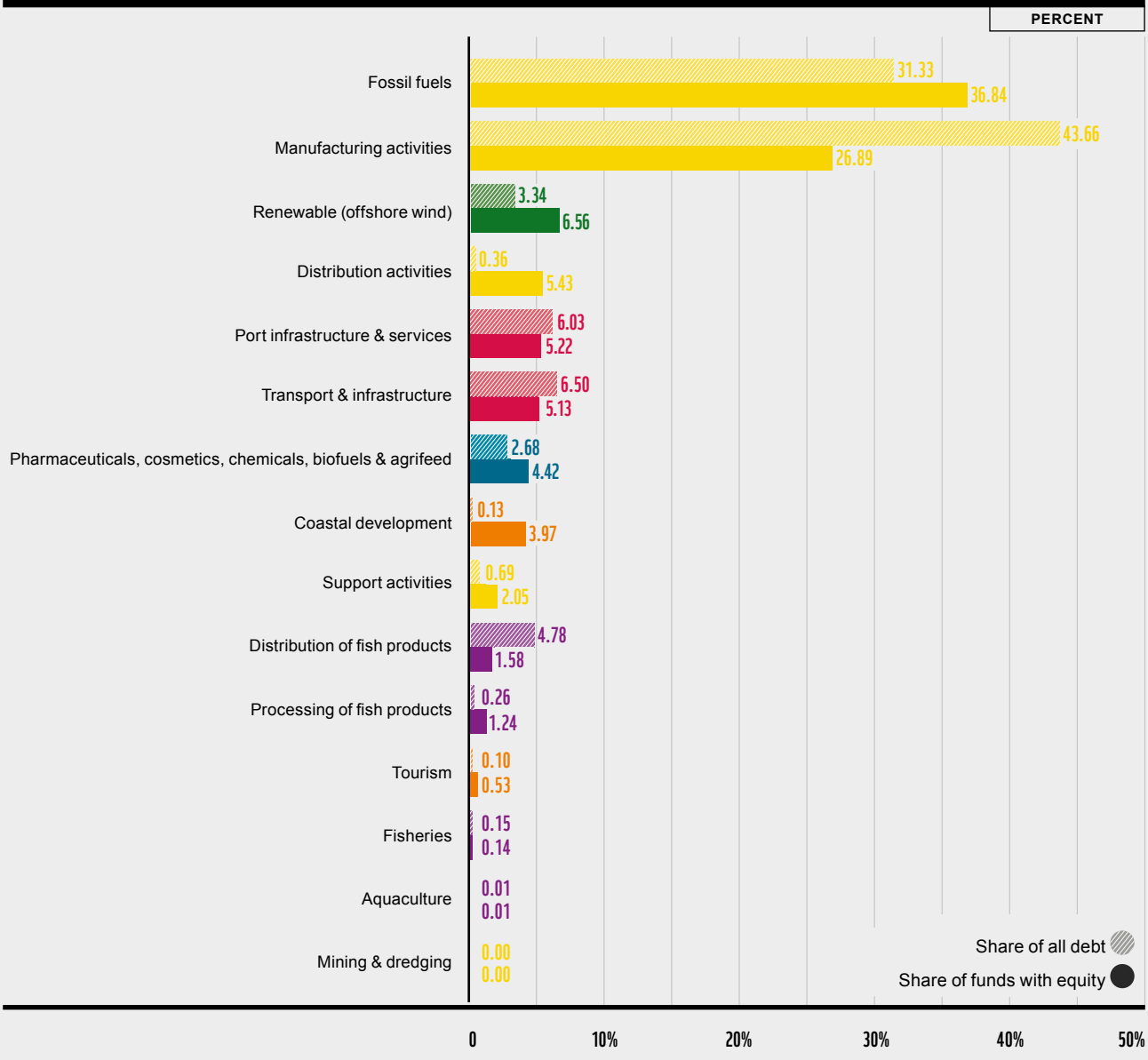


FIGURE 18/ Fractions of total debt and total equity held by each Russian (maritime) economic sector between 2018 and 2020.

> It appears that Russia has been slow to transition toward a Sustainable Blue Economy."

Top Russian companies

Lacking sufficient data from public companies, it was not possible to analyze either the structure of debt held by Russian companies, nor the makeup of shareholders classes with public ownership in Russian companies. Table 7 lists the 20 largest Russian companies by revenue from the relevant NACE codes and geographies—companies that are likely to be key players in the Russian Baltic Sea Economy.

TABLE 7/ The top 20 Russian companies from the sample group of companies used for analysis, ranked according to a 3-year average of revenue.

MILLION EURO

COMPANY	COMPANY TYPE	OCEAN SECTOR	REVENUE
Public Joint Stock Company Gazprom Neft	Public	Extraction	29,696
En+ Group International Public Joint-Stock Company	Public	Extraction	9,904
Limited Liability Company Lenta, Llc Lenta	Private	Seafood	5,693
Limited Liability Company Novatek-Ust'-Luga	Private	Extraction	2,561
O`Key, Limited Liability Company	Private	Seafood	1,911
Joint Stock Company Saint-Petersburg Sale Company	Public	Renewable energy generation	1,795
Public Joint Stock Company Lsr Group	Public	Extraction	1,581
Limited Liability Company Gazprom Pererabotka	Private	Extraction	1,513
Limited Liability Company Transoil	Private	Trade	1,359
Public Joint Stock Company Territorial Generating Company No 1	Public	Renewable energy generation	1,180
Public Joint-Stock Company Lenenergo	Public	Renewable energy generation	1,044
Limited Liability Company Gazprom Neft Shelf	Private	Extraction	1,031
Lukoil-Severo-Zapadnefteprodukt	Private	Tourism & recreation	1,021
Limited Liability Company Gazprom Transgaz Saint-Petersburg	Private	Extraction	1,021
Baltika Breweries	Public	Seafood	970
Joint Stock Company United Shipbuilding Corporation	Private	Trade	779
Joint Stock Company Central Design Bureau for Marine Engineering Rubin	Private	Marine biotechnology & bioprospecting	720
Interregional Distributive Grid Company of North-West Public Joint Stock Company	Public	Renewable energy generation	693
Llc Kinef	Private	Extraction	681

TABLE 7/ The top 20 Russian companies from the sample group of companies used for analysis, ranked according to a 3-year average of revenue.

In the absence of more structural insights into the mechanisms underpinning debt and equity in the Russian Baltic Sea Economy, the most direct path to increased sustainability may be petitioning these individual companies. Eight of the top 20 companies (Table 7) belong to the extraction sector. These companies in particular are likely to be linked to more direct and sizable impacts on the Baltic Sea basin and its social envelope. Given those impacts, and the fact that the extraction sector controls 55% of all financial stocks, these companies represent an entry point for efforts to create a sustainable Russian Baltic Sea economy.

The total revenue of the top 20 Russian companies amounts to EUR€65.2 billion, compared to EUR€238.3 billion for the top 20 EU companies. Although substantially lower than the EU total, this sum of money—and the unknown quantity of financial stocks and flows attached to it—likely exerts significant pressures on the Baltic Sea Economy. Without the ability to track financial stocks or flows to sectors and origins, it is difficult to say what degree of impact Russia has on the financial makeup of the Baltic Sea Economy.

> In the absence of more structural insights into the mechanisms underpinning debt and equity in the Russian Baltic Sea Economy, the most direct path to increased sustainability may be petitioning these individual companies."

ANNEX 9/ ROADMAP TO A NATURE POSITIVE GLOBAL ECONOMY

Governments around the world have been making commitments to become nature positive by 2030[177], and more than 700 businesses have called for nations to reverse nature loss as soon as possible.[178]

Acting on these commitments will require strong political will, combined with real accountability and appropriate legal, economic, and financial tools and incentives.

FIGURE 19/ WWF and Capitals Coalition; adapted from the Dasgupta Review.

The Dasgupta Review[179] proposed options for change, yet there is still a lack of clarity on how to put these reforms into action. Currently, many components of the economic system disincentivize investment in the sustainable management of nature. Many of these components stem from the international economic and financial architecture.[180]

That means that even if national governments want to promote a nature positive economy,[181] they will be hampered by the current rules of the game created by existing global institutional mechanisms.

Going forward, we need all these international mechanisms to be aligned in promoting net zero, nature positive outcomes. That is why WWF, UNEP-WCMC and others are calling for the development of a "roadmap to a nature positive global economy"[182] (Figure 19).

A basis for building political support and catalyzing change

The purpose of the roadmap is to build consensus on both the global reforms needed to promote a nature positive economy, and the roles different actors will play in implementing them.

The ultimate end-goal is to help catalyze concrete action from the international and national players who can help implement the economic and financial system and architectural reforms that are necessary in order to incentivize and mainstream rapid nature positive reforms by governments, central banks and financial supervisors, financial institutions, and the private sector.

177 https://www.leaderspledgefornature.org

178 https://www.businessfornature.org/call-to-action

179 Final Report - The Economics of Biodiversity: The Dasgupta Review - GOV.UK (www.gov.uk) (starting on p487)

180 The Dasgupta Review argued that a plan equivalent in scale and ambition to the 2nd World War Marshall Plan is needed. https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review

181 "A nature-positive economy is one in which businesses, governments and others, take action at scale to reduce and remove the drivers and pressures fuelling the degradation of nature, and work to actively impr ove the state of nature and the ecosystem services it provides. Nature-Positive Hub | Cambridge Institute for Sustainability Leadership"

182 A 'nature positive economy' is an economy that achieves a nature-positive outcome.

ANNEX 10/ ADDITIONAL INSIGHTS ON HOW TO BRING ABOUT CHANGE AMONGST FINANCIAL ACTORS

(Continued from page 43)

INSIGHT 7/ Private companies, due to their internal control of shareholders' funds, are harder to influence through finance in general.

Once momentum around a sustainable Baltic Sea Economy builds, private companies may be the ones to move faster and more meaningfully. The innovation and agility many private companies display are well suited to the substantial changes that will be required to finance and create a new SBE in the Baltic. On the other hand, blocs of private companies in sectors resistant to change could be an obstacle. In this case, the concept of "a social license to operate" could become important. If influence through finance fails, it may fall to customers and clients to call for sustainable transitions.

However, industry cannot address the global crisis on their own. Leading businesses are calling on governments to work together to adopt policies to reverse nature loss in this decade (Business for Nature[183]). In parallel, guidelines for corporate non-financial reporting have been set by the European Commission to help companies disclose high-quality, relevant, useful, consistent and more comparable non-financial information in a way that fosters resilient and sustainable growth and employment, and provides transparency to stakeholders. Such non-binding guidelines are proposed under the EU Non-Financial Reporting Directive (NFRD) soon to be the Corporate Sustainability Reporting Directive (CSRD).[184] Yet, the EU NFRD urgently needs to be clarified to establish sufficient legal requirements for corporate sustainability reporting.

Companies have taken a very flexible approach to NFRD implementation, largely ignoring the legislation's objective and guidelines. Company reports lack strategic and comparable information on salient sustainability issues that would allow financial institutions and other stakeholders to understand the development, performance, position and impact of company activities on sustainability issues. In the 2019 Alliance for Corporate Transparency report[185], only 20-30% of companies disclosed specific information about their policies and risks in the four main Directive areas.

Robust corporate science based targets[186] already exist and should be used. In order to develop a more granular and standardized corporate reporting framework, the NFRD should build on the forthcoming delegated acts developed by the European Commission for the Taxonomy Regulation for environmental issues; the Implementing Technical Standard currently developed by European Bank Authority for the Capital Requirements Regulation; the Regulatory Technical Standards currently developed jointly by the three European Supervisory Authorities (ESAs) for the Disclosure Regulation; and the Commission for the Benchmark Regulation.

STANDARDIZING SUSTAINABILITY DISCLOSURE FOR COMPANIES

The Alliance for Corporate Transparency provides evidence for the discussion on the standardization of sustainability disclosure and guidance to companies and regulators. In their 2019 Alliance for Corporate Transparency report[187], they encourage companies to disclose non-financial matters including human rights issues and taxonomy related categories and consistencies with taxonomy related disclosure. Reports should also include measurable, science based and time-bound targets, and measurable and concretely trackable transition pathways related to set targets; forward-looking scenario analyses on, e.g., climate mitigation; sustainability matters with Board level accountability; and full remuneration of executive directors based on the implementation of sustainability strategy and targets. Furthermore, companies should disclose annual progress against sustainability targets and whether strategy targets are being achieved in the mid and long-term.

183 https://www.businessfornature.org/
184 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017XC0705(01)&from=EN and Corporate sustainability reporting | European Commission (europa.eu)
185 https://www.sustentia.com/wp-content/uploads/2020/07/2019-Research-Report-Alliance-for-Corporate-Transparency_compressed.pdf
186 https://sciencebasedtargets.org/
187 https://www.sustentia.com/wp-content/uploads/2020/07/2019-Research-Report-Alliance-for-Corporate-Transparency_compressed.pdf

INSIGHT 8/ Public companies, being beholden to their shareholders, are required to justify their financing activities.

To make it more difficult for companies to finance unsustainable operations, shareholders must oppose funding those operations. Or companies should let their owners decide on the climate/ESG strategy at the Annual General Meeting. In certain sectors where social and environmental harms are apparent, shareholder dialogue and activism are likely to be the most straightforward avenues for change. For example, the Farm Animal Investment Risk and Return (FAIRR) Initiative, whose members command USD$40 trillion in assets under management, leverage shareholder voting power and relational influence to shift public companies away from harmful practices in animal agriculture, including aquaculture.[188] Collective calls for change can be costly and damaging to a company's reputation when significant fractions of shareholders are the ones requesting action and can bring into question the company's social license to operate.

Governments too should build public awareness and transparency on company practices. Regulatory shaming is inherently efficient. It can achieve regulatory goals in a quicker, simpler, and less expensive fashion than other enforcement tools. It can also encourage citizens to play an active role in regulatory processes; advancing and building cooperation, democratic values, and trust between the government and its citizens. Regulatory shaming is founded on corporate sensitivity to reputational gains and losses, as alluded to above. Regulatory shaming can serve worthy social and economic goals in the hands of administrative agencies seeking to promote responsible conduct by business entities.[189]

INSIGHT 9/ Across sectors and financial mechanisms, high return on effort will arise from a combination of the magnitude of investment shifted and the net negative impact of the sector (or sub-sector) in question.

In other words, focus should be placed on the sectors that are in command of the greatest financial resources and are responsible for the most significant social and environmental damages. These sectors, especially extraction sectors, will account for the lion's share of harm reduction. In effect, areas where the obstacles to creating financial pathways for sustainable change are greatest will also be responsible for the most return on effort. So, just because opposition is fierce, it does not mean that stepwise change is not imminent.

188 FAIRR Initiative (2019). Shallow Returns? ESG Risks and Opportunities in Aquaculture. https://www.fairr.org/article/shallow-returns-esg-issues-in-aquaculture/
189 https://law.lclark.edu/live/files/28501-49-2yadinpdf

ACRONYMS

BAU Business As Usual

CBAM Carbon Border Adjustment Mechanism

CBD Convention on Biological Diversity

CSRD Corporate Sustainability Reporting Directive

CO_2 Carbon Dioxide

CRA Credit Rating Agency

DG MARE DIRECTORATE-GENERAL Maritime Affairs and Fisheries

DNSH Do No Significant Harm

FAIRR Farm Animal Investment Risk and Return

EBRD European Bank for Reconstruction and Development

ECB European Central Bank

EIA Environmental Impact Assessment

ESA European Supervisory Authority

ESG Environment, Social and Governance

ETS Emissions Trading System

EU European Union

EUR Euro

GDP Gross Domestic Product

GFANZ Glasgow Financial Alliance for Net Zero

GFRI Greening Financial Regulation Initiative

GHG Green House Gas

GISD Global Investors for Sustainable Development

GVA Gross Value Added

HELCOM Helsinki Commission

IPBES Intergovernmental Platform on Biodiversity and Ecosystem Services

IPCC Intergovernmental Panel on Climate Change

IPEX International Project and Export

KfW Kreditanstalt für Wiederaufbau

MSP Maritime Spatial Plan

NACE Nomenclature of Economic Activities

NFRD Non-Financial Reporting Directive

NOx Nitrogen Oxide

NUTS Nomenclature of Territorial Units for Statistics

NZAMI Net Zero Asset Managers Initiative

ORRAA Ocean Risk and Resilience Action Alliance

PE Private Equity

RRF Recovery and Resilience Facility

SBE Sustainable Blue Economy

SBTi Science Based Target initiative

SDG Sustainable Development Goal

SEA Strategic Environmental Assessment

SFDR Sustainable Finance Disclosure Regulation

STI Science, Technology, and Innovation

SUSREG Sustainable Financial Regulations and Central Bank Activities

TCFD Task Force on Climate-Related Financial Disclosures

TNFD Task Force on Nature-Related Financial Disclosures

UN United Nations

UNEP FI United Nations Environment Programme Finance Initiative

UNEP WCMC United Nations Environment Programme Environment Programme World Conservation Monitoring Centre

USD United States Dollar

VASAB Visions and Strategies Around the Baltic Sea

VC Venture Capital

WTO World Trade Organization

WWF World Wide Fund for Nature

OUR MISSION IS TO STOP DEGRADATION OF THE PLANET'S NATURAL ENVIRONMENT AND TO BUILD A FUTURE IN WHICH HUMANS LIVE IN HARMONY WITH NATURE.

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together possible™

panda.org

WWF, 28 rue Mauverney, 1196 Gland, Switzerland. Tel. +41 22 364 9111
CH-550.0.128.920-7

For contact details and further information, please visit our international website at wwf.panda.org