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URMAS REINSALU

Connecting
Europe – The
Three Seas
Initiative



JURIS PŪCE

Latvia is ready to
be part of climate
change solution



MATTI ANTTONEN

Northern
Dimension 2.0



ANNALEENA MÄKILÄ

Finnish ports
joining the digital
age





**BALTIC RIM
ECONOMIES**

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University of Turku
Turku School of Economics
Pan-European Institute
Rehtorinpellonkatu 3
FI-20500 TURKU, Finland
Tel. +358 29 450 5000

www.utu.fi/pei

bre@utu.fi

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URMAS REINSALU

Connecting Europe – the Three Seas Initiative

Expert article • 2545

In June 2020 Estonia will host the fifth Three Seas Initiative Summit in Tallinn, bringing together Heads of States and business communities from twelve member countries located between the Baltic, Adriatic and the Black Sea – Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Austria, Hungary, Slovenia, Croatia, Bulgaria and Romania; as well as representatives from partner countries, the United States of America, Germany and the European Commission.

As Europe and the world around it changes, **the Three Seas Initiative was born out of a practical need to boost connectivity and economic cooperation on the north-south axis of the European Union.** When looking at the map of the European Union in terms of infrastructure – roads, railways, airway connections, but also energy grids and telecommunication networks –, it's a dense web in the west but looks significantly sparser when you move to the Central and Eastern Europe. This disparity is not a question of mere inconvenience but one of economic competitiveness. When it comes to energy markets, it's also a question of geopolitical vulnerability. Completing that web of infrastructure connections is both the goal and challenge for the Three Seas Initiative – better infrastructure connections means stronger economies and a more cohesive and resilient European Union.

The first Presidential Summit of the Three Seas Initiative was held in Dubrovnik in 2016. Since then the summits have occurred annually and each summit has added substance to the initial idea. The Warsaw Summit in 2017, with the participation of President Trump, highlighted the strong support of the United States of America. **This is a hugely important new aspect in the transatlantic bond, and we cannot underestimate the value of such a partnership with the US in drawing investments and business interest in building up our regional infrastructure and energy security.**

In 2018 in Bucharest the member states agreed on a list of Priority Interconnection Projects, to map the needs of the region in transportation, energy and telecommunication sectors. **Bucharest also saw the first Three Seas' business forum aiming to facilitate direct contacts between business representatives of the region, and introducing new investment opportunities.** A project progress review was introduced by Slovenia at Ljubljana Summit in 2019. So far, many of the projects prioritized by the Three Seas Initiative have been developed and financed largely by the European Union. Maintaining the EU support to the Initiative remains a precondition in working towards the Initiative's goals.

Estonia is happy to take on the hosting of the fifth Three Seas Initiative Summit, together with the third Three Seas' business forum in June 2020. Our goal will be to consolidate and build on the impetus that the past summits have created. When we asked ourselves what focus Estonia can give to the Three Seas Initiative, the choice fell logically to our experience and know-how in digitalization and building up digital society. **Estonia truly believes that digital ties**

between countries – the digital single market, standardization and data sharing between countries across various platforms – are just as important, if not more so, in the future as conventional connections of infrastructure. Digital solutions that save time and money will be at the heart of every future cross-border connection.

The next step in the Three Seas Initiative now is to move on with the implementation of infrastructure projects, to turn regional willingness into action. To this purpose the Three Seas Initiative Investment Fund was established this year in Luxembourg by Poland's Bank Gospodarstwa Krajowego and EximBank Romania, with the aim to engage, on a commercial basis, in Three Seas' regional infrastructure projects. The fund is now open for all Three Seas countries, partner states and institutional investors, such as European Investment Bank and European Bank for Reconstruction and Development, to join. **As the host of the next summit, Estonia will also concentrate its efforts on facilitating the development of the Fund further, so that first concrete projects in the region could be implemented as soon as possible.**

We welcome all involved countries in Estonia next summer to work on 3 Seas Initiative for stronger and more connected Europe. ■



URMAS REINSALU

Minister of Foreign Affairs of Estonia

JURIS PŪCE

Latvia is ready to be part of climate change solution

Expert article • 2546

Climate change is one of the defining issues of our time, posing an urgent and growing threat to our planet.

“Climate change is real, we are experiencing the negative effects of climate change more often. Finding solutions and limiting global temperature rise is the responsibility of our generation. This is the moment when Latvia with other countries has to decide – are we part of the problem of climate change or are we part of the solution. I am prepared to confirm internationally that Latvia is already on track to limit climate change. We are in favour of moving towards climate neutrality, by significantly reducing greenhouse gas emissions in transport, industry and agriculture. Yes, it will be challenging, but at the same time, it will create ample new opportunities to develop new “green” industries.”

2015 was a breakthrough year for the global climate policy, when in December 195 countries adopted the Paris Agreement, which is the first truly global agreement on climate change where all countries have set, in a nationally determined manner, their contributions to limiting climate change. Latvia is committed to the goals of the Paris Agreement and we continue to work on reducing our greenhouse gas emissions. We are already taking significant steps to meet these goals and aiming towards a climate neutral future which will limit the impacts of climate change.

Climate change is affecting all countries and regions of the world and Latvia is no exception. In Latvia under the impact of recent climate change one may observe a uniform increase of air temperature, expressed in mean, minimum and maximum air temperature values. Most changes has been observed in winter and spring seasons. Under the impact of general air temperature increase the length of growing season and the number of summer days and tropical nights has increased while the number of frost days and ice days has decreased. In the period from 1961 to 2010 one may observe an increase in precipitation, especially in winter and spring seasons. Also precipitation intensity has increased, which in turn has increased both the intensity and frequency of extreme precipitation event, which in turn leads to more frequent and severe floods.

Latvia as a country at the Baltic Sea with a coastline of almost 500 km is affected also by coastal erosion. Projections show that by 2060 territory of Latvia could lose up to 10 km² due to coastal erosion.

2018 was the driest and 3rd warmest year in Latvia since meteorological observations begun. Heat waves and severe drought was observed during the summer of 2018, which led to fires in Latvia's forests and bogs

Observed impacts of climate change also in Latvia show us that we need to do more to reduce greenhouse gas emissions and adapt to the negative effects of climate change. Therefore in Latvia we have changed our climate policy course towards more proactive and ambitious climate action.

Latvia has already confirmed that the rest of the international community can count on our support to more ambitious climate

policies. In May 2019, Latvia joined what was then a small group of EU Member States at the Sibiu Summit that called for more ambitious climate targets and setting a goal of climate neutrality for 2050 in line with the goal of limiting the global temperature increase to 1,5oC.

This summer, the Government approved Latvia's national position on the European Commission Communication “A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy”. With this position Latvia supports setting an EU level target of reaching climate neutrality by 2050.

In July, 2019, Latvia's government approved Latvia's Climate Change Adaptation Plan for 2030, setting out concrete actions on adaptation to be implemented in the nearest future. It includes more than 80 adaptation measures to help the population and economy of Latvia to better adapt to impacts of climate change, among others it includes specific measures, for instance to increase readiness in case of forest fires, improve infrastructure to manage increased precipitation.

We are currently in the process of developing Strategy for Low Carbon Development of Latvia by 2050. Together with the Ministry of Economy we are working on the National Energy and Climate Plan for 2021-2030, to be submitted to the European Commission by the end of this year.

Transitioning towards climate neutrality cannot take place without a significant shift in investment flows and financing. One of the long term goals of the Paris Agreement is to make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. At the EU level work is well underway with regards to the legislation to be set stemming from the European Commission's proposal “Action Plan: Financing Sustainable Growth”.

Addressing climate change cannot be done by governments alone and especially environment ministries alone. It is a complex challenge that needs active engagement from all actors across different sectors of economy. In Latvia we are currently working on the National Development Plan 2021 – 2027 which will look at climate change objectives horizontally across different sectors of economy. Climate change is a complex issue and to truly respond and act, we need everyone on board and working in towards the same vision.

We will be working hard to scale up investments in innovation, research and technologies to truly ensure that Latvia can be one of the frontrunners on climate change, to ensure that we are the ones providing the innovative, low-carbon solutions the world needs. This shift will provide a huge opportunity for businesses and innovators. Transitioning to climate neutrality in 2050 is a long term goal that will not only solve the climate crisis, but also will gradually increase competitiveness and prosperity. Green transition can go hand-in-hand with job creation, food security and public health and offers ample opportunities for sustainable growth. Ambitious, durable and robust climate policy making is foremost about transformative action

Expert article • 2546

and designing policies and measures that incentivise and regulate, encourage, and take advantage of the economic opportunities.

“The EU has to send clear signals to other countries, private sector, civil society and entire society that transitioning to climate neutrality is not only necessary, but urgent.” ■



JURIS PŪCE

Minister of Environmental Protection and
Regional Development
Latvia

MATTI ANTONEN

Northern Dimension 2.0

Expert article • 2547

The accession of Finland and Sweden in 1995, moved the European Union northwards. The Union extended over the Arctic Circle, and Russian Federation became a next-door neighbor. The accession negotiations with Estonia, Latvia, Lithuania and Poland further increased the role of the Union in the Baltic Sea region.

The Union needed a policy to build cooperation with its new neighbors in the north, and to take care of the challenges facing this region. This was the foundation of the Northern Dimension initiative, which since 2006 has been common policy of the Union, Iceland, Norway and Russia in the region.

The biggest successes have been achieved in improving the ecological situation of the Baltic Sea and nuclear safety in North-West Russia. The Northern Dimension Environmental Partnership has helped to finance major investments in wastewater treatment plants in St Petersburg, Kaliningrad and Petrozavodsk. The water quality has clearly improved. At the moment, similar projects are being realized in Belarus.

Similar partnerships have been created in fields like transport, culture and social and health questions. The Cross Border Cooperation projects jointly financed by the European Union and its member states and the countries in the region has helped both to create infrastructure like border crossing infrastructure, and other links between authorities and people in the border areas.

When the Northern Dimension idea was floated some twenty years ago, the focus was in the Baltic Sea region. At the time, arctic cooperation was taking its first steps after the establishment of in the Arctic Council in 1996. There was little talk about the economic prospects of the region.

Now the ongoing climate change and technological innovations are changing this picture. This summer, the ice cover of the Arctic Ocean was 2 million square kilometers less than decade or two ago. The area around Ob bay on the Arctic Ocean has become center for Russia's production of liquefied natural gas (LNG). Transporting this gas and other goods has led to increase the traffic on the sea route along the northern coast of Russia. This route shortens the distance between Western European and East Asian ports some 20 to 30 %.

In May, Finland finished its second two-year presidency of the Arctic Council. The environmental questions were in the foreground due to the fact that climate in the arctic areas is changing faster than elsewhere. In the Arctic, the emphasis is on adaptation as the emissions from the region are relatively limited. However, the countries in the region can play a role especially in curbing emissions of black carbon which makes ice and snow melt faster. This can be done most efficiently by reducing flaring of associated gas in oil production, by using cleaner fuels in arctic shipping or by cutting emission from local heat and power production.

Increased economic activity like shipping requires better and more reliable weather forecast and search and rescue capabilities. This is why meteorological cooperation was one of the priorities of our Arctic Council presidency. This work is being continued by Iceland, which holds the presidency at the moment.

The arctic countries have negotiated agreements on search and rescue and on Marine Oil Pollution preparedness and Response.

These questions are among the main topics in the Arctic Coast Guard Forum, which has been created to facilitate work of the authorities responsible for the safety of shipping and protection of marine resources. The same organizations bear the main responsibility in fighting oil spills and other environmental hazards as well.

Increased importance of the arctic region has widened the interest beyond the eight countries of the region (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, United States). In addition to the six permanent participants representing six arctic indigenous communities, there are 13 countries, and tens of intergovernmental and non-governmental organizations as observers.

Arctic Council is not the only organization, which has seen the challenges facing the region. The International Maritime Organization (IMO) has approved Code for Ships Operating in polar Waters, which entered into force in the beginning of 2017. It sets out regulations for shipping and ship design in arctic regions.

The Arctic region is more in the focus of the European Union as well. The Union is de facto observer of the Arctic Council. The Union approved its integrated policy for the Arctic in 2016. It calls for wide and deep multilateral and regional cooperation in the region. Since 2017, the Union has Ambassador for Arctic Affairs. There is increasing European funding for Arctic research.

With the growing role of the Arctic the scope of Northern Dimension is geographically larger but the goals remain: a cleaner and safer north based on good cooperation with our neighbors and partners. ■



MATTI ANTONEN
Permanent State Secretary
Ministry for Foreign Affairs of Finland

LASSI LINNANEN

From efficiency to sufficiency in climate policy

Expert article • 2548

Climate impact of end consumption is significant. Approximately 70 per cent of global greenhouse gas emissions come from domestic household consumption. This figure differs from the official emissions accounting. The traditional way of calculating carbon emissions is to focus on the emissions emitted within the territory of a country, called national emission inventories. These are the basis of the reporting of emissions to the UNFCCC.

Consumption-based emission accounting includes emissions from imported goods and services, and excludes emissions from exports. Approximately one quarter of global emissions are consumed in a different country than they are produced. Developed countries have outsourced a large share of their emissions to developing countries, leading to the situation that a large share of emission increase in developing countries comes from production aimed at export to developed countries.

Territorial emissions of a developed country might even seemingly decrease at the same time as the consumption-based emissions increase because of imported goods and services with embedded emissions. Allocating at least part of the emissions to the consuming country could make climate policy more effective and increase global equity. However, to date, no country has targets for reducing consumption-based accounting.

What is the right policy response to reduce our individual carbon footprint? The dominant approach for decreasing emissions has been to focus on efficiency, producing goods and services more efficiently. Less fuel consumption per kilometer, less energy required for a ton of steel or paper. This reduces resource input and emissions per unit, but does not address overall resource use. Remarkable increase in industrial efficiency has not brought about a decrease in total energy use despite potential to do so. It is widely recognized that a rebound effect is likely to occur, also known as Jevon's paradox. This means that gains in efficiency, leading to lower prices, are offset by increased consumption, which in turn leads to increased overall resource use and emissions. Relatively better, absolutely worse.

The concept of sufficiency is nowadays considered as a key to reach global environmental targets by many leading scholars. Sufficiency focuses on absolute reductions of consumption, emissions and material use. Sufficiency raises the question about how much consumption is perceived as enough providing what is necessary, and staying within the ecological boundaries. To illustrate the difference between efficiency and sufficiency: where efficiency reduces energy input and keeps the service unchanged, sufficiency means reduced energy input and that there is a quantitative or qualitative change in the service. Sufficiency view is closely connected to the notion that fundamental changes in the economy are needed, as has been brought up by many degrowth scholars.

Sufficiency policy differs from conventional policy. Rather than focusing on a specific product, the starting point is certain needs. What

is an acceptable minimum level and how much is too much? What is an appropriate level of consumption? What products and services are really necessary? According to theory of need by Gough, there are universal basic needs such as health and participation in society that are satisfied through adequate nutritional food and water, adequate protective housing and appropriate health care. On the other hand many current traits as air travel, meat, cosmetics, large houses and SUV:s are mentioned as negotiable, useless consumption.

Potential sufficiency policy instruments include:

- Banning and/or much higher taxation/ removal of subsidies of high-carbon options e.g. for meat (nutrition), flights (mobility)
- Obligation to provide low-carbon options
- Restriction on advertisements of specific products or services with high impact on resource consumption (like health consideration have restricted advertising of alcohol and tobacco products)
- Experimenting with personal carbon allowances

Since putting sufficiency policy into practice is new, small-scale experiments with motivated individuals may be needed before implementation at a larger scale. For example, our research group has experimented with personal carbon trade in Lahti. Within Citicap project, we have developed a personal carbon trading scheme for mobility as part of the Lahti region's transport policy. The scheme is now in testing phase. Participants in the personal trading scheme will get tangible benefits, e.g. free bus tickets, when reducing their own emissions from mobility. The project received substantial 4,7 million Euro support from EU's Urban Innovative Actions initiative. Citizens and households are indeed in a central position for innovations that take consumption practices in a sufficient direction. ■



LASSI LINNANEN

Professor
Lappeenranta-Lahti University of
Technology
Finland

MARI PANTSAR

The circular economy can solve critical crises

Expert article • 2549

The world is encountering a global sustainability crisis that has three dimensions: the climate crisis, the biodiversity crisis and the crisis caused by the overuse of natural resources. But instead of trying to mitigate the consequences, we should try to solve the root cause of it all: the growing consumption of resources and energy.

According to the UN Resources Outlook, the extraction and processing of natural resources causes 50% of global air emissions and 80 to 90% of biodiversity loss. To counter these losses, we must change the ways we produce and consume energy and materials. For this, the circular economy is one of the most powerful solutions. We must make better use of materials that already exist in our societies instead of extracting more and more resources – which in turn causes more and more emissions and kills off more and more species.

The carbon budget is already so tight that without the circular economy we are not able to meet the targets of the Paris Agreement. But the biodiversity crisis is seen by many experts as an even more acute threat than the climate crisis. Our current economic model is driving hundreds of thousands – even millions – of species to extinction. And ultimately it is us, the human race, that ends up paying for the damage we have caused.

But there is no reason to be pessimistic, because we already have the solutions.

The **circular economy** is a new, more efficient model of the economy. In a circular economy, products are designed so that the materials remain in circulation and do not end up being disposed of for good. Instead of extracting new materials, we use the materials that already exist. It is also an economic opportunity that could generate 4.5 trillion US dollars of additional economic output by 2030, according to Accenture.

So, what are we waiting for? Why are we not already rushing to embrace the circular economy?

The transformation to a circular economy requires systemic change. Circular economy solutions call for co-operation between all sectors of society. The key drivers of this transition will be **businesses**, as solution providers; **individuals**, as demanding customers; **cities**, as innovative platforms that can use public procurement as a strategic tool to help new circular economy innovations enter the markets; and **decision-makers**, to create a business environment that ensures that better business opportunities arrive at the doors of sustainable companies rather than at the doors of those companies that pollute the environment or waste materials.

The transition from a linear economy to a circular economy also requires a **change of mindset**. This is the most difficult part. Many people believe that buying and consuming more stuff increases well-being and happiness, although several studies show that this is not true. We need to challenge our current understanding of well-being and happiness. Businesses must sometimes even cannibalise their current business models that are based on producing and selling

more and more products.

There are many good things happening across the world. But we must pick up speed fast.

The European Commission has emphasised that the circular economy is the environmental leg of the EU's industry strategy. The Commission has a two-phase circular economy package, which contains the EU's Plastics Strategy published in early 2018 and a raft of initiatives covering the lifespans of products.

In Europe, many member states are competing – in a positive way – to see which country can lead the way on the circular economy. Ten European states have published a national road map or an action plan – Finland was the first one to do so in 2016.

To mitigate climate change, we need to scale up circular economy solutions on a global level. Co-operation and global leadership are needed. And we must ensure everyone is part of this monumental transition. Europe must show global leadership by ensuring cross-sectoral co-operation and senior leadership in the fields of governance and financial resourcing from the European Commission.

Sitra is part fund and part think-and-do-tank, and we report to the parliament of Finland. We are a self-financed and politically independent future-oriented organisation. Two years ago, when Finland celebrated its centenary, we presented a gift to the rest of the world: the World Circular Economy Forum. The forum has proved a success, and the fourth WCEF will be organised in Canada in 2020.

As my friend **Daniel Crespo Calleja**, the Director General of DG Environment of the EU Commission, often says: "there are not many good options left for tackling the sustainability crisis while simultaneously boosting economic growth – but the circular economy is definitely one of them."

The Baltic sea region has a lot to offer the world. Let us transform this into a circular economy region. Join us at the WCEF2020 in Canada and be part of the change to a sustainable economy! ■

MARI PANTSAR

Director

Sitra, the Finnish Innovation Fund
Finland

MARIA LAAMANEN

Climate change poses a challenge on cooperation to save the Baltic Sea

Expert article • 2550

In 2019, both June and July were hottest in the global record and the Arctic saw unprecedented wild fires and melting. Ocean heat content has also reached record high levels. The signals of anthropogenic global warming are getting clearer.

The Baltic Sea is not left untouched. An evident warming of surface water and decline of ice has taken place during the recent decades. It is assumed that the Baltic will warm another 2–4 degrees by the end of the century. This has impacts on the living conditions of all species.

Eutrophication is currently the major challenge, and the Baltic is in a vicious cycle where accumulated nutrient reserves together with bottoms devoid of oxygen feed eutrophication. The area of already record large anoxic bottoms is likely to spread further due to warming. Acidification caused by an increase in atmospheric CO₂ has not been recognized as a significant problem so far, but there are signs pointing towards progress of acidification too.

The Baltic Sea has been referred to as being a time machine: it has entered into environmental problems earlier than some other sea regions, and these problems have also been at least partly tackled in the Baltic Sea due to good cooperation and good scientific knowledge. However, climate change puts an additional burden on the ecosystem and challenges our efforts to ensure the recovery of the sea.

Current policies for protection of the Baltic Sea need to be clearer on how to address impacts of climate change. The EU Marine Strategy Framework Directive, the major piece of EU legislation for protecting oceans and seas in the EU, is not entirely coherent on how climate change should be handled. However, the directive is clear in its objective of maintaining the resilience of marine ecosystems to human-induced environmental change. That is important because warming and acidification, together with other anthropogenic stressors risk weakening the resilience and driving marine ecosystems across tipping points.

Cooperation on the protection of the marine environment of the Baltic Sea is active. HELCOM first addressed climate change in 2007, when the ministerial meeting which agreed on HELCOM's Baltic Sea Action Plan acknowledged that even more stringent action is necessary in the future due to climate change impacts. Since then, HELCOM, in cooperation with the scientific community, has produced two regional assessments of climate change in 2007 and 2013. Experts in HELCOM have also made proposals for action to take into account of climate in HELCOM's work.

In autumn 2019, Finland holds Presidency of the EU Council and Chairmanship of HELCOM. At the same time, EU's water and marine policies are being reviewed. The Water Framework Directive, which is crucial for limiting land-based marine pollution from member states, is undergoing a fitness check, and implementation of the Marine Strategy Framework Directive is under review. The deadlines set in both directives are near, a good status of the marine environment should be achieved by 2020 and a good ecological and chemical

status of surface water cannot be pushed further than 2027 at least not without using well-justified exceptions. We want to see the EU carry on ambitious implementation even after the deadline years, as it is unfortunately more than likely that good status will not be reached by those deadlines.

HELCOM is speeding up the implementation of its 2007 Baltic Sea Action Plan and has set out to update it by 2021. HELCOM allows formation of Baltic Sea specific policy and it engages all coastal states, the EU and a large number of observer organisations. HELCOM should strive to make a climate-proof updated Action Plan. This means that we should include measures and actions that allow us to reach a good status even in conditions impacted by climate change. Finland, as Chair of HELCOM, has defined updating of the Action Plan, reduction of nutrient loads, climate change and synergy with Agenda2030 sustainable development goals as priorities.

We still have many unknowns affecting our work in the Baltic Sea region. Major inflows from the North Sea greatly impact the Baltic. Nobody knows if their frequency or intensity will be affected by the changing climate. We still understand rather little of acidification and its effects. We do not know if climate change will make hazardous substances in the sea more harmful. One of the strengths of our work in the Baltic is good science-policy collaboration and it needs to continue for us to be better informed of the unknowns related to climate change.

What's clear, is that we need patience. There are delays in the ecosystem recovery. We have been able to revert a number of negative environmental trends, but there is still work to be done to reach a good status. We also need to be prepared for a Baltic Sea that will not be the same as in the 1960s. A warmer and less saline Baltic with a footprint from numerous human stressors will be different from what it used to be. ■



MARIA LAAMANEN
Senior Ministerial Adviser
Ministry of the Environment
Finland

Professor of Practice
Åbo Akademi University
Finland

NIKO SOININEN

Legal challenges for blue growth in aquaculture

Expert article • 2551

In 2014, for the first time in history, the aquaculture sector produced more fish for human consumption globally than wild-caught fisheries. With increasing demand on global fisheries and the need to support food security and blue economy in the EU member states, the EU Commission has set a blue growth strategy for increasing aquaculture production significantly. The Finnish Bioeconomy Strategy shares these goals. At the moment, the Finnish aquaculture sector produces annually 14.6 million kilograms of food fish, of which some 85 % is produced in the Baltic Sea.

Blue growth strategies aiming to increase aquaculture production around the Baltic Sea pose a significant environmental challenge: many coastal waters most favourable to fish-aquaculture are in ecologically poor or moderate condition, and the most commonly used open-pen rearing units are harmful point sources of phosphorus and nitrogen. Furthermore, the overall ecological trend of the Baltic Sea is negative. One can argue that the ecological resilience of this brackish, semi-closed sea cannot withstand an industrial scale increase in nutrients without transforming into eutrophic state even further.

The argument for managing the ecological resilience of the Baltic Sea from crossing unwanted thresholds is backed by heavy legal artillery, too. At present, the EU Water Framework Directive sets binding legal obligations for the member states not to authorise projects that may deteriorate the ecological status of coastal waters or jeopardise the achievement of Good Ecological Status in these waters. Original deadline for good status was in 2015, but can be extended up to 2027. Similarly, the Marine Strategy Framework Directive aims at Good Environmental Status of marine waters by 2020. Finally, the Baltic Sea Action Plan devised under the Helsinki Convention aims at Good Ecological Status of the Baltic marine environment by 2021. Is blue growth in fish-aquaculture an ecologically sustainable policy goal? Can the nutrient emissions of a growing industry be mitigated? What are the legal risks attached to these measures?

Opportunities for mitigating nutrients consist of four sequential stages: 1) avoidance; 2) minimisation; 3) remediation and 4) offsetting. The first step of the hierarchy would require locating aquaculture operations inland and utilising recirculation or closed loop systems for mitigating nutrients. This technology escapes most legal-ecological risks but suffers from high production costs.

The second step of the mitigation hierarchy is harm minimisation: locating operations offshore as well as efficient use of fish feed and effective waste-water management in the rearing units. The above measures may also be combined with a flexible farming strategy, in which different life stages of fish are farmed in different locations. So far, the above harm minimisation measures have been considered as meeting the legal requirements of Best Available Technology in Finland. If the scale of aquaculture grows from the current situation significantly as is the current policy goal, these harm minimisation measures will be likely to prove ecologically inadequate, and legally

problematic.

Thirdly, the nutrient footprint of aquaculture operations may be remediated within the project impact area. In Integrated Multitrophic Aquaculture different aquatic species are co-cultured in the same system. In such a scenario, algae or shell-fish could be used as biofilters to treat some of the nutrients produced by farming fish in open-pens. Currently, remediation lacks potential mostly for the lack of suitable species for remediation, scientific uncertainties, and significant spatial requirements to match the scale of fish-farms. All these challenges are coupled with legal risks, too.

Finally, nutrient offsetting could neutralise the net environmental impact of a fish farm by measures taken outside the immediate project area. Offsetting measures include using local feedstuff, such as Baltic herring-based feeds for salmonids, restoring and building wetlands to catch nutrients, or reducing agriculture close to the coast. From a legal perspective, the main challenge for offsetting is that the Finnish Environmental Protection Act as well as the Water Framework Directive focus on local negative impacts, and aquaculture operators cannot obtain a permit for a locally harmful project, regardless of the possible positive net impacts on a larger scale.

Overall, the current legal-ecological environment is posing severe challenges for traditional open-pen fish farms. Sustainable fish farming in the Baltic Sea does not currently seem possible without major investment in recirculation aquaculture on land, or without a major decrease in nutrient emissions in other sectors, mainly agriculture and forestry. To achieve sustainable blue growth, the strategy should be coupled with incentives to improve closed loop technologies operating on land, not with measures protecting existing open-pen production. Furthermore, the coastal states should invest in designing policy instruments that would consider nutrient emissions more holistically, integrating the legal requirements from different sectors, mainly agriculture, forestry and aquaculture. Although this was the original idea of the river basin management planning system created by the Water Framework Directive, holistic perspective to regulating the above three sectors has not been forthcoming. The future of the Baltic Sea – as well as the sustainability of blue growth strategies – will likely depend on how well the EU and the coastal member states are able to address this challenge. ■

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NIKO SOININEN

Assistant Professor in Sustainable Law, Regulation and Governance

Faculty of Law and Helsinki Institute of Sustainability Science
University of Helsinki
Finland

PER JONSSON

The future of the Baltic Sea

Expert article • 2552

Business-as-usual scenarios of socio-economic development predict dramatic changes in critical conditions for life in the Baltic Sea. A far-reaching question is if the future sea will be able to deliver ecosystem services demanded by human society, e.g. seafood and recreation. Development of science-based management and the possibility for advanced governance brightens the bleak picture.

Considering the multiple pressures from its large human population, it is not surprising that the semi-enclosed Baltic Sea is one of the most impacted seas worldwide with habitat loss, eutrophication, pollution and over-fishing. The Baltic Sea is also one of the fastest warming regions caused by climate change with dramatic retreat of winter ice-cover, rise of surface water temperature, and reduction of salinity caused by higher rain- and snowfall.

So, can we predict what the future Baltic Sea could look like?

The young geologic age and the strong salinity gradient make the Baltic Sea relatively poor in species and with low genetic diversity. The low biodiversity forms an ecosystem that may be more sensitive and less resilient to environmental changes. In the face of ongoing and future changes, organisms in the Baltic Sea may either be tolerant and stay, they may adapt if the genetic diversity is sufficient, they may move to more suitable areas, or they may go extinct.

Dramatic changes expected

A warmer and fresher Baltic Sea may drive some cold-water marine species to extinction, e.g. cod, or force them to deeper waters with new and unexpected effects on bottom organisms. Higher temperatures may also lead to intense plankton blooms, in particular if nutrient levels go unabated, which may cause toxic or smelly water making the coast less attractive for recreation. More plankton production could further increase the already large areas of oxygen-depleted seafloor.

An increase of rainfall leading to lower salinity may dramatically reduce the living-space for many marine species forcing them to shift their distribution south- and westward. Present key species as bladder-wrack and blue mussels may then go locally extinct, e.g. in the Bothnian Sea and the Gulf of Finland, completely changing the ecosystem. With lower salinity, more freshwater species will colonise larger areas of the Baltic Sea, and higher temperatures may promote the introduction of more non-indigenous species.

A continued over-fishing together with high nutrient levels and climate change effects will lead to a generally lower and altered diversity of fish species, which may change the ecosystem at lower levels in the food chain. Human development also claims an ever-bigger share of the coastal environment, e.g. jetties and marinas leading to loss of shallow vegetation and important ecosystem services, e.g. improving water transparency.

Actions give positive results

Although many of the scenarios are uncertain, they all paint a more or less bleak picture of the future Baltic Sea. However, there are bright spots.

The Baltic Sea is one of the best studied marine ecosystems, which has facilitated advanced science-based management. The international and multilevel governance of the Baltic Sea environment

is also unique, e.g. through HELCOM and EU, which has resulted in several powerful measures with successful results. Examples are the now falling levels of nutrients as a result of improved waste treatment and land use, and the return of top predators as seals and white-tailed eagle through control of toxic pollution.

Research models can help management

Ongoing research produce models which can be used to predict the outcome of management actions, and suggest where new marine reserves are best placed to protect areas that may serve as refuges with less climate-change effects. In a wider perspective, the already severe environmental impacts together with the development of advanced governance and effective management actions suggest that the Baltic Sea may be viewed as a 'time machine' for how to manage other coastal seas that are now facing similar challenges.

The Baltic Sea ecosystem may change dramatically during this century depending on our ability to curb climate change and to reduce the input of nutrients and pollutants. It is today unclear if a future ecosystem will continue to provide necessary ecosystem services like the cultural and recreational values that partly define the life around the Baltic Sea. ■



PER JONSSON

Professor
Department of Marine Sciences
Tjärnö Marine Laboratory
University of Gothenburg
Sweden

Visiting Professor
Environmental and Marine Biology
The Sea
Åbo Akademi University
Finland

PÄIVI ANTIKAINEN

The Baltic Sea – A new pioneer in sustainable shipping?

Expert article • 2553

The Baltic Sea Region is perhaps more closely linked to shipping, the sea and maritime industries than any other region in the world. The cities and States around the Baltic Sea are also bound together by maritime trade routes, culture, governance networks and, inevitably, the waves of future.

As about 90% of its exports and 80% of its imports are carried by sea, Finland is a maritime nation. It is therefore vital for Finland, that our sea routes are dependable, functional, safe and sustainable.

Furthermore, about 70 % of our freight transportation moves through harbors in the Baltic and the North Sea, making the Baltic our main market, our lifeline.

We want to make sure that it remains stable, its waters healthy and its vessels in competent hands. These goals are clearly worded and at the forefront of our Maritime Transport Strategy, our Strategy for the Baltic Sea Region, as well as the Programme of Prime Minister Antti Rinne's Government.

When it comes to good environmental status and ambitious climate goals for Baltic shipping and the region's maritime industries, we are not quite there yet. According to the most recent HELCOM State of the Baltic Sea report published in September 2018, our sea is not in a good state: eutrophication causes major stress, while plastic pollution and the effects of global climate bring about additional pressures.

In Baltic shipping, we need to better integrate national, regional and global environmental standards and climate goals to our key value chains, business ideas and modes of thinking. These standards and goals should not be seen as hindrances, but as success factors for Baltic maritime clusters.

Shipping as an industry still has great untapped potential to save fuel and therefore reduce carbon emissions: digitalization and open data. Today, container ships spend 25% of their time at berth. Reducing this through just-in-time arrival allows ships to sail slower and save fuel.

Real time slot information, smart vessels and connected information ecosystems enable just-in-time arrival – making digitalization and open data the new green heroes of shipping. In the future, we need also more IT-savvy seafarers – people who know both practical navigation and the world or algorithms.

There are of course numerous challenges still ahead for digitalisation and open data in shipping. These include reluctance to share market sensitive information in some segments, deeply embedded contractual frameworks, concerns related to cybersecurity and the lack of standards. But shouldn't we at least try to tackle these in the Baltic Sea first?

Think of the opportunities: the Baltic Sea Region as a pioneer for digitalisation, scaling up global solutions for emerging markets. Finland will strive towards this vision and hopes that our Baltic neighbors can share the vision in both the European Union Strategy

for the Baltic Sea Region as well as the HELCOM Baltic Sea Action Plan.

Shipping accounts for approximately 2.5 per cent of global GHG emissions, but without any reduction measures the emissions in the sector are expected to grow by 50–250 per cent in the coming decades. Growth in global trade will increase maritime transport considerably.

This is why we must adopt early measures with significant GHG emissions reduction potential before 2023 in accordance with the goals set in the International Maritime Organization's (IMO) Initial Strategy on reduction of GHG emissions from ships.

Here in the Baltic Sea, we have already taken the first steps on our way to low and eventually zero carbon future in shipping. Many vessels operate with Liquefied Natural Gas (LNG), which means complete removal of SOX and particles, reduction of NOX emissions of up to 85 percent, and CO2 emissions by at least 20 percent compared to traditional fuels. We also have several LNG terminals around the Baltic Sea, including the Nordic regions' largest on in Tomio in the Bothnian Bay.

Moving forward, biogas, hydrogen and battery technology are all viable options as main sources of power in shipping. Especially in short voyages with ferries, electricity has great potential. Finland supports speedy introduction of alternative fuels in shipping.

There is also a need to re-explore the merits and development potential of shore power in our ports. Shore power means hooking up to an onshore power supply, i.e. connecting to the local electricity grid, when at berth, and it is often a greener and quieter alternative to onboard power generation.

Regardless of the measures we ultimately choose to combat climate change, the Baltic Sea Region has been projected to warm up by 2–4 degrees by the end of the century because of global warming. This will lead to changing ice conditions and affect shipping, fishing, as well as distribution of marine life in the Baltic Sea. Are we prepared to these changes?

Baltic Sea has also all the potential to become a testbed for sustainable Arctic shipping. The ice-covered waters in the Gulf of Bothnia may be used to test and develop new services that will enable safe navigation and protection of the marine environment in Arctic shipping routes. These can include, among other things, weather and ice services, training, oil spill prevention and response in ice conditions, icebreaking innovations, as well as robust intelligent navigational aids.

According to the Programme of Prime Minister Antti Rinne's Government, Finland's target is to achieve carbon neutrality by 2035. The programme also states, that Finland will continue to play an active role in the EU-level and international organisations in promoting measures to reduce maritime emissions. In maritime transport, this entails not only fulfilling our obligations in the IMO and the EU, but also coming up with new solutions to reduce carbon emissions in all

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logistics chains in the short term. ■

PÄIVI ANTIKAINEN

Director of Climate and Environment Unit
Ministry of Transport and Communications
Finland

LARS JENSEN

The slow coming of the future

Expert article • 2554

Often it is seen that when you are forecasting the future of the shipping industry there is a tendency to make two assumptions which are often patently false. The first one is to be overly optimistic in terms of how quickly change might happen. The second one, which is usually seen when talking about timeframes further out – such as 2050 – is to try to imagine new and wonderful innovations that will be shaping that particular future.

In reality, none of those two assumptions are correct. This does not mean that the industry doesn't change. It actually changes a lot and has been through quite a few disruptive phases such as the shift from sail to steam or the advent of the standardized container just to mention two.

Before looking at what will actually transpire in shipping globally, as well as the impact this will have on the Baltic, it is worthwhile to look into exactly why those two assumptions are wrong as this will also provide insights into how to predict the next few decades in shipping.

Starting with the second assumption first. Not just for shipping, but for any industry, there is a long time for new innovations where they start out as crazy impractical innovations with high price tags until they finally permeate an industry. Just an extremely simple well-known example – the foundations for the internet were laid in the late 1960s, yet mainstream adoption only truly gained traction by the late 1990s. A 30-year lead time. Not because people were overly conservative, but because the technology had to mature, standards had to solidify, business models needed to be developed and infrastructure put in place. This is almost always the same for most innovations. When you are looking for mainstream technology 30 years into the future, don't use your imagination – look for costly, impractical prototypes which the engineers will then spend years on standardizing and bring the cost levels down.

And herein lies the cue for the first assumption – the timeline. In other industries there is often talk of a "hockey-stick" where a new technology gains a foothold extremely fast. But this is not what we see in shipping. Not because the shipping industry is averse to change per se, but because there are two fundamental aspects which makes rapid adoption near impossible.

The first one is related to the business environment. International shipping involves a large number of stakeholders for even a single shipment. Having 10-20 different companies involved, located in multiple countries dealing with government agencies in another handful of countries is quite normal. Hence any new development, no matter how good, needs to be adopted by a large number of diverse stakeholders at the same time. It is not like selling a book on Amazon where it only required one stakeholder – the consumer – to change his behaviour.

The second aspect is the legal framework. The rules governing shipping has developed literally over centuries. The Bills of Lading which forms part of the commercial foundation date back to the late 1800s. This clearly does not make them perfect – but from a lawyer's perspective brings something extremely value, namely legal precedence. Any attempt at a commercial engagement outside this framework is of course possible, but immediately raises the commercial risk as the lawyers then no longer know the extend of

the liabilities incurred. Then there are all the safety and security rules in for examples SOLAS. Also painstakingly developed over decades and ratified over just as extensive a timeframe. Any new innovations either not covered by, or in violation of, these rules will have a long adoption period while the legislation at IMO catches up.

And this then brings us to the question of what is in store for the industry in the coming couple of decades. We are already now beginning to see the unfolding of aspects that have underway for a while. For the container shipping lines, they have been through a 20-year period of consolidation and for the global carriers they have finally arrived at a degree of concentration where they are becoming an oligopoly. For the smaller regional lines, this will take a few more years – but it will be coming. This is the natural response to the commoditization of the industry.

Digitalization is beginning to gain traction. The first attempts were made in the early 2000s but without much success, but now the ball is indeed rolling – but as many stakeholders need to buy into the new tools, adoption rates will be low – but a full penetration of these are likely to be completed in the second half of the 2020s.

Looking further out, the key element is environmental performance – or more correctly, energy consumption. The ultimate goal is to become independent of the energy source – which requires the ability to store energy onboard vessels in the form of for example fuel cells or similar technologies. The first very small electric test ships are already entering into service, and the technology cannot yet power the large cargo vessels – but with a 30-year lead time, it is very likely that by 2050 we may indeed be seeing a Baltic region where all shipping is done with zero environmental impact. ■

LARS JENSEN

CEO

SeaIntelligence Consulting

Denmark

MERJA SALMI-LINDGREN

Towards smarter and more sustainable Baltic Sea

Expert article • 2555

Maritime transport and entire logistic chains are transforming, partly because they aim to minimize the effects of climate change and reduce emissions responsibly.

The International Maritime Organization (IMO) has set a challenging initiative to reduce GHG emissions by at least 50 % by 2050 compared to the 2008 base level. IMO has also set a goal to reduce carbon dioxide emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008. This is also due to meet the United Nations the 2030 Agenda for Sustainable Development.

Shipping plays a crucial role in the world economy. According to UNCTAD (United Nations Conference on Trade and Development) Review of Maritime Transport 2018, around 80 % of global trade by volume and over 70 % of global trade by value are carried by sea and are handled by ports worldwide.

The volume of goods carried by waterborne is predicted to increase 4 % worldwide and even double in the Baltic Sea during 2010-2030. According IMO GHG Study 2014, international shipping emissions account for approximately 2,6 % of global carbon dioxide emissions. Although shipping is the most environmentally friendly mode of transporting people and goods, the industry still needs and aims to reduce emissions, decarbonize and work persistently to achieve more sustainable solutions.

Unfortunately, the most polluted Sea in the world, the Baltic Sea, is crucial to about 85 million coastline citizens in nine countries. It has been the most important transport route with its harsh conditions and shallow, not very salty waters for centuries. There are about 2000 ships at the Baltic Sea at any one time (BSES 123), mainly cargo vessels, tankers and containers and about 5 % passenger ships.

Improving the status of the Baltic Sea is urgent. Over the last decades ship source pollution has been effectively handled, including 90 % reduction in sulphur oxide emissions from ships exhaust gases. There are decisions already made by the Marine Environment Protection Committee (MEPC) to ban untreated sewage discharges by 2021 and requirement of 80 % reduction of nitrogen oxide emissions for new vessels built in 2021 and later. However, in some types of ship source pollution stay unquantified, including litter, chemical residuals and others, such as underwater sound, are yet to be thoroughly grasped.

The expertise to reach these goals exists. Finnish maritime ecosystem has been the pioneer of green technologies to the Baltic Sea operators for decades. It is the forerunner in creating smart maritime technology solutions for sustainable shipping and usage of natural resources. In order to increase safety at sea and prevent accidents, one of the historical achievements was when Rolls-Royce and Finnish state-owned ferry operator Finferries demonstrated successfully the world's first fully autonomous ferry in the archipelago

south of the city of Turku, Finland. More effective shipping will be developed further towards e-piloting, where the ship will be helped to harbour from shore. The other example is Meriaura's and Stockholm Energy's contract for the sea transport of woodchips and wood pellets within the Baltic sea by using climate friendly 100 % biofuel as power source. According Meriaura, the lifecycle emissions of transport could be up to 96 % lower compared to fossil fuels (Meriaura 3 Aug, 2019). The new Wasaline ferry, which will be built at Rauma Marine Construction, will be equipped with the most environmentally friendly engine, provided by Wärtsilä. It can use both LNG and biogas and will produce 50% less carbon dioxide emissions compared the currently operating one. When entering to the harbour the vessel is utilizing batteries charged from shore power.

By innovating to solve local emissions at the Baltic Sea, the Finnish maritime cluster will be able to contribute to tackling emissions globally across the oceans. The focus is now in the development of energy efficient solutions, using automation and digitalization, sharing data to optimize fairways in an entirely new way, reducing fuel consumption and improving battery technology. Moreover, the Finnish maritime cluster has developed high tech innovation to all water and waste management systems. Renewable energy systems are being adopted, for example rotor sails to reduce air emissions and biofuels produced from waste. In Finland, marine logistics ecosystems are intensifying port operations and maritime transport, conserve nature and improve competitiveness. Baltic Sea has been the piloting area for Finnish maritime cluster where the Baltic Sea, oceans and operators have been beneficiaries.

The seas offer also opportunities for sustainable and low-carbon food and energy production that can reduce greenhouse emissions. These could be aquafarming, fish production and using offshore wind or waves in energy production. Harnessing blue growth requires collaboration to identify competences and develop the blue bioeconomy potential. The marine cluster ecosystem, including marine production and the Blue Bioeconomy, has a significant potential to generate new innovations to slow down climate change, benefiting all.

The Status of the Baltic Sea is improving only with persistent collaboration between actors and decision makers. Many organizations and companies have already made excellent work, one of the most impressive has been HELCOM. The Baltic Sea is and has been forefront piloting area for new marine and maritime innovations of green technology benefitting all oceans and operators. Despite of the world economic recession, uncertainty regarding fuel price development, the continual geopolitical uncertainty, it is now time to develop the Baltic Sea towards sustainable solutions persistently to mitigate climate change and use innovative solutions worldwide, with even stronger collaboration. ■

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MERJA SALMI-LINDGREN
Senior Advisor, Marine Industries and
Maritime Affairs
Meria Consulting
Finland

ANITA MÄKINEN

Climate change and international shipping

Expert article • 2556

I was pleased to celebrate, in person, in December 2015, the adoption of the Paris Agreement with the long term temperature goal to hold global average temperature increase to well below 2°C and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Last autumn, in 2018, the Intergovernmental Panel on Climate Change (IPCC) launched its report with a clear message: to limiting global warming to 1.5°C would require “rapid and far-reaching” transitions e.g. in transport.

The Third IMO GHG Study 2014 has estimated that GHG emissions from international shipping in 2012 accounted for some 2.2% of anthropogenic CO₂ emissions and that such emissions could grow by between 50% and 250% by 2050 mainly due to the growth of the world maritime trade. Therefore, shipping can play an important role in reaching the global GHG emission reduction goals.

International shipping and aviation were excluded from the Paris Agreement, and mandate was given for both the International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO) to set targets and goals of their own to decrease GHG emissions from the respective sectors.

Accordingly, the IMO's Marine Environment Protection Committee (MEPC) adopted in April 2018 the Initial IMO's Strategy on the reduction of greenhouse gas emissions from ships, setting out a Vision to reduce GHG emissions from international shipping and, as a matter of urgency, phase them out, as soon as possible in this century. Furthermore, the Initial Strategy envisages, for the first time, a reduction in total GHG emissions from international shipping, which, should peak as soon as possible, and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008.

Prior to the adoption of the Initial IMO's GHG Strategy, the energy-efficiency requirements of ships were adopted by IMO in 2011. All new ships need to be build according to the vessel type specific Energy Efficiency Design Index (EEDI). The requirements of EEDI Index has been strengthened in 2019 for some types of vessels such as gas carriers, container ships, general cargo ships, LNG carriers and cruise passenger ships having non-conventional propulsion. And we continuing our discussions at IMO if further strengthening will be needed. As all the ships under the Finnish Flag have an ice class, it is important that the special requirements for the ice class of the ship (e.g. engine power) are taken into account in EEDI calculations.

Furthermore, it is mandatory for all ships to have the Ship Energy Efficiency Management Plan (SEEMP), which is an operational measure that establishes a mechanism to improve the energy efficiency of a ship. The SEEMP urges the ship owner and operator at each stage of the plan to consider new technologies and practices when seeking to optimize the performance of a ship.

For the reason the shipping industry has not perhaps yet capitalized the full potential of new technology and communication tools, Finland is now globally promoting digitalization and automation of shipping and cargo operations together with other measures to

reduce GHG emissions.

In IMO we have developed the Data Collection System (DCS) to collect data on used amount of fuel oil/alternative fuel types and set of other parameters on annual basis to calculate the total amount of GHG emissions introduced by shipping. The year 2019 is the first year when all shipping companies globally need to collect the data of their ships and report it both to the IMO and to the flag state.

We do have a similar kind of legally binding system in place in EU called Monitoring, Reporting and Verification (MRV). Last year 2018 was the first year for the collection of data on used fuel oil and several other parameters. During the Finnish EU Presidency this autumn, our goal is to finalize the process to harmonize these two systems of IMO and EU.

After the adoption of the IMO's Initial GHG Strategy, we are now in a process to adopt short-term and medium-term measures to implement the Strategy even prior to 2023 when the Strategy will be revisited for update.

One of the low hanging fruits that has been discussed in this context is slow steaming. However, we need to consider carefully pros and cons, when deciding, if this is an appropriate option for short sea shipping in the Baltic Sea. For our Mare Nostrum alternative fuels, such as LNG, methanol, fuel cells (hydrogen and methanol), and alternative sources of energy like wind (rotor sails) and solar energy could be seen as key solutions. Additional measures could be optimized voyage planning, optimization of the utilization of cargo carrying capacity and improved energy efficiency of the whole chain of shipping including port activities such as shore power and efficient cargo handling.

It is important to remember that as we are in the same boat on the same globe, we need to do our outmost to reduce GHG emissions from shipping, which is, indeed, not as free as some people consider it to be. ■



ANITA MÄKINEN

Adjunct Professor, PhD
Chief Adviser to the Director General of
Maritime Sector
Finnish Transport and Communication
Agency TRAFICOM
Finland

MARKUS HELAVUORI

Ship emissions and the state of the Baltic Sea

Expert article • 2557

Despite significant efforts by HELCOM and its Contracting Parties, the Baltic Sea is not in a good environmental status. Decades of emissions and other anthropogenic impacts, combined with a low rate of water exchange, mean that any improvements to this sensitive brackish sea area are slow to emerge. The Baltic Sea has a large catchment area – four times the sea – hosting 85 million inhabitants, widespread traditions of agriculture as well as heavy industry. However, when considering the human pressures affecting the Baltic Sea environment, shipping is not to be neglected.

Automatic Identification System (AIS) data shows that there are typically around 1500 IMO registered ships en route in the Baltic Sea at any given moment. The number of individual port visits per year is in the range of 300 000. General cargo ships and tankers are the most common ship types, while the majority of port visits is accounted to passenger ships, notably because of several frequently plied ferry routes in the region.

With ships come effects on the environment. Although shipping is the most efficient and environmentally friendly mode of transport, its impacts cannot be neglected, especially in light of the increasing transport activities. Emissions to the air – such as SO_x, NO_x, particulate matter and CO₂ – cause some of the most obvious effects on the environment and human health. Discharges of oil, sewage, grey water, chemicals and even garbage are also associated with shipping. In addition, shipping may contribute to the spread of invasive alien species through ballast water and biofouling on ships' hulls. Awareness of the effects of underwater noise and disturbance of the seabed by shipping has also recently been raised among scientists and policy makers.

Due to its international nature, shipping is predominantly globally regulated through the International Maritime Organization (IMO). Over the past few decades, a number of international conventions and other instruments have been adopted and implemented in order to limit the risks of accidents and reduce the harmful impacts on the environment and human health.

It is nevertheless important to remember that progress can also be made on the regional level. Within the framework of the Helsinki Convention and the Baltic Marine Environment Protection Commission (HELCOM), the Baltic Sea riparian states and the EU have since the 1970s been proactive in addressing this important matter. Recent and very significant examples in this regard are the negotiations within HELCOM to both designate the Baltic Sea as a special area under Annex IV (sewage) of IMO's MARPOL Convention, and to a NO_x emission control area (NECA) under Annex VI (air pollution and energy efficiency) of the same convention, which is the main international treaty covering prevention of operational and accidental pollution from ships. After thorough groundwork in the form of studies on the effects of sewage and NO_x emissions respectively, and negotiations in order to agree on a joint position, the HELCOM

Contracting Parties submitted joint proposals, including the necessary justification, to the IMO's Marine Environment Protection Committee. In the case of NECA, the proposal was submitted jointly with the North Sea countries, as air emissions spread widely and affect the environment and populations beyond the sea areas where they are emitted.

After long negotiations within the IMO, both proposals were eventually agreed upon. Amendments to MARPOL were adopted and more stringent rules were put in place in the Baltic Sea for sewage discharges of passenger ships and NO_x emissions of all new ships. Together with the previously adopted Baltic Sea special area for sulphur emissions from ships, harmful effects on the inhabitants of the Baltic Sea countries will be reduced. Importantly, these new requirements will also lower nutrient input from ships, thereby taking an important step towards alleviating eutrophication of the Baltic Sea. Eutrophication caused by excess nutrients is considered to be the most significant environmental problem in the Baltic Sea, affecting inter alia biodiversity and tourism and estimated in the HELCOM (2018) State of the Baltic Sea – Second Holistic Assessment – to cause losses of up to 4,4 billion euros annually to the economies of the coastal states.

Emissions of greenhouse gases (GHG) from shipping are another topical issue on the agenda of IMO as well as HELCOM. Novel innovations are undoubtedly needed in order to reach reductions consistent with the temperature goals of the Paris Agreement. The Maritime Working Group of HELCOM has a dedicated sub-group bringing together industry and policy makers in order to facilitate the development and uptake of green technologies and alternative fuels for shipping. Discussions include e.g. options for economic incentives and recently a reporting mechanism has been set up to gather information on regulatory and technical obstacles for implementing cleaner alternatives in shipping.

The Baltic Sea Action Plan (BSAP), adopted by the HELCOM Ministerial Meeting in 2007 aims to reach good environmental status for the Baltic Sea by 2021. As it is becoming clear that this will not be achieved, the BSAP is now in the process of being updated. The HELCOM Secretariat is working hard together with the Contracting Parties in order to achieve commitments on ambitious actions to protect the Baltic Sea and, at the same time, facilitate the inclusion of ocean-related UN Sustainable Development Goals, Aichi targets and Marine Strategy Framework Directive descriptors into the process. Maritime related matters are sure to be included in the updated BSAP, which is expected to be adopted at the Ministerial Meeting in 2021 and to set an ambitious strategy for HELCOM for the coming years in working towards a good environmental status of the Baltic Sea. ■



MARKUS HELAVUORI

Professional Secretary
Baltic Marine Environment Protection
Commission (HELCOM)
Finland

YASSINE BAKKAR

New politics for financing Clean Shipping

Expert article • 2558

The main effort to control air pollution in shipping industry employed rigorous standards. But implementation is surely the tough part, not least because shipowners and operators need special financing supports to invest in greener technologies and converge towards more energy efficiency that is highly complex, long term and large in scope and scale.

Worldwide, maritime shipping is facing new stringent regulations, especially in Europe, as its contribution to the harmful air pollution accounts for about 1 billion tons of carbon dioxide (CO₂) and pollutants, that is up to 3% of the world's greenhouse gas emissions and 10% of transport emissions (3rd IMO GHG report). According to this report, maritime industry is also responsible for about 15% of nitrogen oxides (NO_x) emissions and up to 8% of sulphur oxides (SO_x) emissions, making it a major source of huge burden of air pollution, climate warming, acidification and eutrophication that potentially affecting people in countries along shipping routes.

Against this backdrop, the U.N.'s International Maritime Organization (IMO), has a long-term strategy to tougher rules on the shipping industry's sulphur emissions and cut the greenhouse gas emissions by 50% from 2008 levels by 2050. But, despite the IMO global approach to address emissions of air pollutants from international shipping and stricter energy efficiency targets for certain types of vessels, the relatively slow progress in the IMO and the enforcement of the shipping industry's compliance with environmental regulations have triggered Europe to take effective actions for environmental regulation.

Hence, in Europe, many new regulations were passed to control pollution and to promote existent technologies and good management practices to cut emissions from shipping industry. Thus, in 2012, the European Parliament established Sulphur Emission Control Areas (SECA) in Northern Europe comprising the North Sea, the Baltic Sea and the English Channel, where from 2015 ships are obliged to switch to bunker fuel with a sulphur content not exceeding 0.1%. To that end, the compliance with Emission Control Areas regulations confronted the shipping companies in Europe is costly. Mainly, the compliant lower-sulphur fuel is expensive. Experts affirmed that the use of the heavy-fuel oil with an abatement technology is the most cost-effective as the use of the marine-gasoline oil costs on average extra €4.8 million per year. Whereas, the cost of installing an exhaust abatement technology 'scrubber' to strip out the sulphur from emissions ranges from €4 to 6 million per ship. And although, the use of the Liquefied Natural Gas (LNG) appears to be efficient, as it fulfils regulations on the CO₂ and the NO_x; but, insufficient bunkering facilities and the expensive conversion costs stay the main hindrances. But now, all these challenges appeared for all ship operators due to the Global CAP valid from 2020.

At its core, cleaning up the shipping industry rests on the money that can be made available to invest on sustainable shipping, as well as presence of public funds. Hence, in the wake of the global financial

crisis of 2008–09, commercial banks have massively reduced their lending or completely withdrawn their activities from the shipping industry, given its high levels of capital utilization, cyclicity and associated risk.

As a response to this, European institutions have taken many initiatives to mobilise public and institutional funds towards strategic investments; thus, several EU financing programmes were announced. In 2016, the European Commission, the European Investment Bank and the European Investment Fund put in place jointly the €750 million European Fund for Strategic Investments (EFSI) Green Shipping Guarantee Programme (GSG) to fill the 'financing gap' and revive investment in sustainable shipping around Europe. This framework has been set up to ensure financing of new and greener vessels and support the adoption of alternative fuels such as LNG. The GSG initiative is also supported by the EU's Connecting Europe Facility Debt Instrument (2014–20), which is designed to promote cleaner maritime transportation and retrofitting ships with renewable energy and sustainable technologies. Other European initiatives include the Green Loan Principles, launched earlier 2019 by the Loan Market Association that provides clean transportation favourable financial instruments, and the EU Horizon 2020's that has €6.3 billion of funding for transport research and innovation.

Meanwhile, from 2016, the EIB has started signing guarantee framework agreements with many banks, as: Société Générale, KfW IPEX and ING, to support shipbuilding and retrofitting of existing vessels for sustainable transport.

Financing clean shipping remains a challenging issue; thus, the ongoing EU CSHIPP – Clean Shipping Project Platform aims to simplify and provide the best practices in green shipping financing. ■



YASSINE BAKKAR

Research Fellow, Project Specialist
Tallinn University of Technology
Estonia

RIITTA PÖNTYNEN

CSHIPP – Projects together for Clean Shipping

Expert article • 2559

Clean shipping is promoted and developed by many projects within the Baltic Sea area. The projects approach the issue from different perspectives of the environmental impacts of shipping: emissions to air and water, environmental regulations and tools available for complying with the regulations. CSHIPP aims to find synergies between the partner projects and organisations and synthesize the results.

CSHIPP is a new form of co-operation supported by the EU BSR Interreg Programme, a project platform, which compiles together seven clean shipping projects: EnviSuM, BONUS SHEBA, ECOPRODIGI, GoLNG, BalticLines, BSR Electric and Startup Accelerator. The EU BSR Interreg has financed the projects except BONUS SHEBA, and three of them are still ongoing. Behind these projects, there are a number of organisations, which have long expertise in research and development on maritime environment.

Results of Clean Shipping Projects to Main Target Groups

CSHIPP aims to find synergies of these projects and synthesize the results for more efficient communication for the target groups. Main aims of CSHIPP are to increase the uptake of scientific information in policymaking, enhance cooperation of businesses and the maritime industry with research and academia, and cooperation between the platform partners. For the projects, which have already ended, CSHIPP offers a possibility to continue dissemination more efficiently on the results of these projects. The projects still ongoing have more extensive possibilities for dissemination on the project's results and ongoing activities. Thus in a project platform, efficient and regular communication between the partners and projects is essential.

Research-to-Policy Clean Shipping Activities

Results of CSHIPP will provide knowledge and information as synthesis reports, policy briefs and best practice manuals. These results will focus on the environmental and health impacts of shipping for different emission scenarios, reporting on IMO regulation compliance control and enforcement on Baltic Sea Region, the analysis of knowledge gaps and stakeholder needs and best practices on clean shipping financing. CSHIPP will also draft policy recommendations for clean shipping. The aim of these activities is to establish a research-to-policy network for clean shipping oriented to regional, national and local authorities in the BSR.

Online Dissemination of the Clean Shipping Data

The website of CSHIPP is online with news and information on the events. CSHIPP aims to disseminate the results even more efficiently via two main new online channels, which are under development. Clean Shipping E-platform for wider audience will be a story map for wider public that can also be used by authorities or in teaching activities. The aim of the story map is to promote clean shipping, and the importance of shipping in general. Another website will be targeted

for scientists and authorities, with information on the effects of shipping on air and water quality with maps, scenarios and modeling methods. The overall aims of dissemination are to raise awareness, change attitudes, and increase knowledge on clean shipping. In developing the most effective ways of dissemination of the information, the experiences of the participating projects are being used.

Business Potential in New Clean Shipping Technology

CSHIPP also aims to support industry-research cooperation in future projects by providing best practice guidance and a comprehensive look into new green technologies in maritime industry. While the reduction of emissions is required in the maritime environmental legislation, there is business potential in the field of clean shipping. A state of play of current technologies used in the shipping sector will be gathered. We will focus on clean shipping financing, with information on different funding sources and types. The aim is to build a research-to-business network and provide information for business stakeholders and research organisations.

CSHIPP Platform Influences on policymaking

The most recent event of CSHIPP was organized in Gothenburg in the context of the second Shipping & the Environment – From Regional to Global Perspectives conference. In Science to Policy workshop, three topical issues in the field of clean shipping were discussed: scrubber water, biofouling and shore power development. The day continued with a Symposium of Scenarios and Policy Options for Sustainable Shipping. More events will follow, providing opportunities to enhance networking around the Baltic Sea Region. We also aim to find ways to continue the collaboration in terms of clean shipping. ■

Main facts about CSHIPP

Project consortium: 14 Project partners from 7 countries (Finland, Estonia, Sweden, Norway, Poland, Germany, Denmark, Russia), 13 associated partners. Coordinated by the University of Turku.

Project time: 10/2018 - 09/2020

Total budget: 1.08 million €, financed by the BSR Interreg, Priority Area Sustainable Transport.



RIITTA PÖNTYNEN

Senior Project Manager
Brahea Centre at the University of Turku,
Centre for Maritime Studies
Finland

TEEMU ITÄLINNA

Best practices on cross-sectoral collaboration in clean shipping

Expert article • 2560

The Interreg Baltic Sea Region Programme connects partners around the Baltic Sea to work together in transnational projects. The Clean Shipping Project Platform (CSHIPP), which brings together several projects and organisations, is a great example of a collaborative venture where organisations do valuable cross-sectoral work on common challenges. One of the tasks in the CSHIPP is to find out best practices of industry-academia collaboration. The research is still ongoing, but based on extensive interview material some conclusions can be drawn.

Universities and private companies are of course completely different types of organisations. So what exactly are they expecting to gain by joining in a collaborative project together? For academics, the reasons resembled much of the traditional roles associated with universities, namely research, education and societal discussion. Researchers noted that collaboration with industry enabled universities to do applied research based on 'real life' settings and have access to data and resources, which they otherwise would not have. As importantly, academics pursued dissemination of knowledge and contributed to science through reports and journal articles, but also increased the understanding of the wider public. From an educational point of view, the project gave students an opportunity to participate in project activities and gain practical knowledge about the industry.

Industry partners valued the possibility of product and service development, process optimisation and learning via knowledge transfer. Some partners saw the project as a promotion platform, which they could utilize to show the governments and the public that the maritime industry has addressed the current environmental challenges. For smaller companies the project gave an opportunity to develop prototypes together with qualified partners with financing included, larger companies appreciated an opportunity to develop demo cases before scaling them up. Business partners were eager to cooperate with other companies and learn from each other. Although some of them were competitors, they were generally willing to share information with each other even if it was not entirely in their immediate interest.

Project partners from both domains saw the cross-sectoral work as rewarding, though challenging at times. Academics were mostly satisfied with the engagement of the industry even though many of the companies were new to this kind of collaboration. The level of trust and openness between the partners was regarded as high and the companies were keen to explore new solutions. Companies valued the access to universities and many interviewees mentioned that they had learned new things from the academic partners, particularly because universities also possess a wide range of information about other industries, such as the automotive industry. Furthermore, company representatives noted that academics were able to examine industry processes with fresh eyes and new methods.

Nevertheless, industry partners were not completely without reservations. Many interviewees had concerns that the work would get 'too academic'—that is focusing too much on the theoretical side to the detriment of actual issues. Some were worried that the project might turn out to be a mere theoretical exercise, not something that could be put into practice. In addition, many felt that the 'clock speed' is often different in business and research domains. One interviewee thus reminded that when stirring people in the industry, they also expect at least some quick preliminary results, therefore academic papers to be published in the future are not enough.

Many of the business representatives saw some of the project related responsibilities as frustrating, at least occasionally. The project involves a lot of administrative burden, especially if the partners do not have previous EU project experience. Some smaller companies lacked both the experience and skills to manage the sometimes-complicated reporting procedures. As one interviewee noted, technical issues are their home field, with reporting they are less confident.

That said, companies acknowledged the important advisory role that the academics had. Universities generally have more experience of project reporting and they can ease the bureaucratic burden for the companies. One academic was particularly praised for having earlier experience from the industry and thus understanding how things work on both sides. Although every partner should make sure they have enough time and resources not only for project activities but also for reporting, skilful coordinators can ensure that everybody can focus on what they do best.

Ideally, the cross-sectoral collaboration creates synergies and pushes the partners to better performance. A project consortium, with the combination of practical and research-oriented people, creates a good platform for sharing ideas and expertise. But the more partners involved, the more complicated it will be to coordinate the consortium. It is important to cross the project work packages and technology cases in order to generate synergies—not just pursue isolated efforts but to create and learn together. It helps if the project partners have experience from other sectors; this kind of boundary spanning roles can be crucial to ensure the success of cooperation. Let it further be noted that time used in planning definitely pays back later. Finding content alignment between sectors requires recurrent talks, face to face if possible, and also informal meetings since collaboration of any kind can be broken down to a personal level. ■

TEEMU ITÄLINNA

Project Researcher
CSHIPP, Pan-European Institute
University of Turku, Finland

GUNNAR PRAUSE

Socio-economic impact of green shipping

Expert article • 2561

In 2012, the European Parliament established the Sulphur Emission Control Areas (SECA) in Northern Europe comprising the North Sea, the Baltic Sea and the English Channel where from 2015 ships are obliged to use bunker fuel with a sulphur content not exceeding 0.1%. Even though only about 0.3% of the world's water surface represents the SECA, the implementation of the regulations has spurred discussions on the impact on maritime economy and logistics. These discussions gained global interest and momentum in October 2016 after the decision of the Marine Environment Protection Committee of the International Maritime Organisation (IMO) to establish a global cap that limits the sulphur content in maritime bunker fuel to 0.5% on non-SECA waters from 2020.

Before the implementation of the SECA regulations in 2015, experts intensively discussed the tentative impact for maritime stakeholders and estimated the economic disadvantages for the BSR to be approximately €11 billion by 2020 because of the high additional compliance costs that would ensue. A large number of experts also forecasted that shipping companies and ports would lose handling volumes and income due to a possible disproportionately high increase of maritime transport costs with a possible cargo shift from sea to land transport as a significant consequence. Other discussions argued that the SECA regulations would weaken the competitiveness of the whole Northern European logistics sector with a shift of cargo flows away from SECA ports toward the Mediterranean ports and other transport routes.

Consequently, the EU commissioned a project – “EnviSuM – Environmental Impact of Low Emission Shipping: Measurements and Modelling Strategies” which started in 2016 with 12 project partners and 12 associated partners from all over the Baltic Sea Region (BSR) to investigate the different impacts of the SECA regulations. The project ended in April 2016 with quite several insightful results, one of which is that as opposed to the predictions, there were no significant economic changes in the SECA after 2015.

First, a BSR-wide survey among the maritime stakeholders at the beginning of the EnviSuM project showed only a neglectable impact of SECA regulations on BSR logistics sector and a later statistical analysis of foreign trade flows and maritime transport revealed no evidence for modal shifts or changes in transport patterns in BSR. Besides this, no significant logistics pricing issues were observed since most vessels that operate in the Baltic Sea now use low sulphur maritime fuel that has been less expensive than the formerly used heavy fuel oil since 2015. Most importantly, there has been an impressively high level of compliance of the SECA regulations (ca. 95%) within the BSR.

Following results on the estimations of the administrative burden of SECA regulations and a real option based evaluation of abatement technology investments also showed a neglectable impact on the maritime industry. Hence, the SECA regulation has not met the expectation of the maritime sceptics post-2015 SECA implementation.

Furthermore, the results of the “EnviSuM” project detected several benefits linked to the enforcement of the SECA regulations for the BSR. One crucial advantage represents the increase of the air quality within BSR together with a reduction of annual emissions of sulphur into the half with the consequence of about 1000 less premature deaths per year. Another beneficial outcome of the law is a push of the blue growth innovation activities in BSR, i.e. the SECA regulations seem to have created more innovative technological awareness among the ship owners and unleashed innovations towards clean shipping technologies for BSR companies.

After over three years of the SECA regulations implementation in the BSR, there is a renewed focus on the global Sulphur limit starting in 2020, a law which affects a broader audience and culture than the SECA regulations. Going forward, the findings of the “EnviSuM” project would surely have important policy implications that would help to provide and design effective future implementation strategies of regulatory instruments and ensures sustainability in the shipping industry. The BSR economy has not suffered until now from the SECA regulations, and the vanguard position of the Baltic Sea in clean shipping bears the opportunity that from 2020, the BSR may become an important export region for clean shipping products to other parts of the world. ■



GUNNAR PRAUSE

Professor
Tallinn University of Technology
Estonia

MIINA KARJALAINEN & EVELIINA KLEMOLA

How to manage alien species in shipping

Expert article • 2562

International shipping transports more than 80 % of global trade. The world commercial fleet consists of almost 100 000 vessels. Of these, ca. 1 500 ships are present in the Baltic Sea at any given time, and nearly 8 000 ships operate there annually. In addition, ca. 3.5 million leisure boats are active in the Baltic Sea. Due to its large scale, maritime traffic is a significant vector for species introductions. The world fleet constitutes a fast-moving floating archipelago carrying organisms both attached to hulls and living in ballast water. The total wetted surface area of the world fleet capable of transporting biofouling is ca. 325 km², and 3-5 billion tonnes of ballast water is transported internationally each year.

Alien species are considered to be the 2nd largest threat to biodiversity, after habitat destruction, and one of the largest environmental problems globally. 40 % of animal species extinctions are caused by alien species introductions, and their economic impact is ca. EUR 1 400 billion annually, i.e. 5 % of the global economy. In the EU alone, the annual damages account to ca. EUR 12 billion.

Whereas terrestrial alien species may be eradicated, if detected early enough, the introductions of aquatic alien species are irreversible. This is also the main difference between biopollution and other environmental impacts of maritime transport, such as GHG emissions. Once an aquatic organism has spread to a new area, its removal is practically impossible. Therefore, the only way to stop the establishment of alien species populations is preventing their spread to new areas.

The international maritime sector is committed to minimizing the transfer of alien species. The management of ballast water is regulated by the International Maritime Organisation (IMO) through the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWMC), which entered into force in September 2017. However, there is still much work to be done on e.g. the technical solutions, compliance monitoring procedures and harmonized implementation for reaching the aims of the BWMC.

In contrast, the regulation of biofouling is mainly based on voluntary actions through the implementation of guidelines and guidance by the IMO. Moreover, biofouling concerns recreational boating as well as the merchant shipping sector. Both ship and boat owners usually manage biofouling to some extent to save fuel and to improve the manoeuvrability of the vessel, but the aspect of preventing alien species introductions is often ignored.

The means to manage biofouling should, however, not cause harm to the environment. Currently, the prevailing method is to use biocidal antifouling substances on the vessel surfaces. There is an urgent need to adopt solutions which minimize both the use of toxic substances and the spread of alien species. Several options are already available, including innovative non-toxic vessel coatings and different hull cleaning methods both for commercial and recreational sectors. Their wide-scale adoption could result in significant monetary savings in terms of reduced fuel consumption and thereby

CO₂ emissions, in addition to reducing the risk for alien species introductions.

All in all, there is a lack of a consistent approach to biofouling management. In the Baltic Sea region, the EU Invasive Alien Species Regulation and the Marine Strategy Framework Directive provide a management framework for the Member States, but their interpretation in terms of biofouling management varies greatly between countries, which is difficult for the international shipping industry.

From the environmental point of view, there is an imbalance between the strictly controlled ballast water management and the varying biofouling management. One of the regional initiatives to search for solutions is the COMPLETE project (Completing management options in the Baltic Sea Region to reduce risk of invasive species introduction by shipping, www.balticcomplete.com, co-financed by the Interreg Baltic Sea Region), which addresses both of these major vectors of species introductions. COMPLETE works towards developing a consistent and adaptive management system for the Baltic Sea. COMPLETE supports the harmonized implementation and compliance monitoring of the BWMC, delivers a concept for the development of a biofouling management roadmap for the Baltic Sea Region, and gives recommendations for integrated alien species monitoring in the region.

A single project with limited resources cannot solve this complex problem alone. There should be a common pursuit to find a management framework that is consistent throughout the region and acknowledges the unique features of the Baltic Sea. This can be accomplished through international cooperation within the Baltic Marine Environment Protection Commission HELCOM. The involvement of all relevant actors, both public and private, in the process to gain their commitment is vital for its success. ■



MIINA KARJALAINEN

Project Researcher, PhD
Kotka Maritime Research Association
Finland



EVELIINA KLEMOLA

Senior Specialist, PhD
Wega Group Oy
Finland

PÄIVI HAIKKOLA & SINIKKA HARTONEN

Automation reshapes the maritime logistics

Expert article • 2563

owing to its potential for significant transformation and disruption of business models, digitalisation is one of the most influential trends shaping the industries, including maritime logistics. Approximately 90% of global trade is transported by sea, which means that improvements increasing the efficiency of this value chain have broad impacts.

New sensor technologies and data handling services offer the companies involved in maritime logistics access to a greater volume of data than ever before. This allows the companies to identify bottlenecks which need to be solved to gain better efficiency. However, the major opportunity to increase value creation is on the level of the whole maritime logistics chain. Digitalisation offers a possibility for the members of the logistics network to integrate their digital processes in a new way and creates an incentive for collaboration. The functioning digital ecosystems enable companies to create platform-based services which support the revenue growth.

Considering these possibilities, the established maritime logistics companies have so far made surprisingly small changes in their business models. However, as disruptive technologies emerge, the established companies will be forced to consider how to utilise the new tools and survive in the business environment with a new type of competition and competitors. The companies feel this pressure already as the new platform orchestrators have entered the market with previously unseen services.

The ships equipped with high-level technology and reliable connectivity form the core part of the evolving maritime logistics and business environment. Automation of the ship's operations is nothing new. IMO's Maritime Safety Committee discussed the automated ships already in the early 1960s and for example autopilot has been used for steering of ships for almost 100 years. However, it was not until the early part of the current decade that the waterborne industries started taking automated waterborne traffic seriously. Although the concept of the autonomous shipping is somewhat controversial, it is perceived by many the future of modern maritime traffic. The pursuit of safety, efficiency, sustainability and reliability are the key drivers of the development.

Future ships with an increased level of autonomy will operate as part of an ecosystem rather than in isolation. This reflects the change of the long-standing business models of maritime transport. For many years, focus has been on the economics of scale and a vessel as a stand-alone unit of production but now the digitalisation has changed the scenery. The future value drivers seem to be found from the efficient integration and the operation of the maritime logistics system as a whole.

The emergence of operative and strategic ecosystems and development of ships requires redefining and assessing the roles and duties of the existing ecosystem participants. In addition, maritime digitalisation and increased levels of autonomy will most likely introduce completely new roles. The increased automation will make

shipping a more integrated part of the logistic chains. This will make logistics leaner by allowing removal of the middlemen and in many instances putting the cargo owner in control of the supply chain.

One Sea is an industrial ecosystem with a primary aim to lead the way towards an operating autonomous maritime ecosystem by 2025. One Sea is by no means the only ecosystem or alliance aiming to advance autonomous solutions. NFAS in Norway, Chinese alliance for autonomous ships, De Vlaamse Waterweg in Belgium and many other alliances around the world work for making autonomous and remote-controlled maritime solutions reality. INAS is the International Network for Autonomous Ships, and it was founded to enable information exchange between the different alliances. Although One Sea ecosystem originates from Finland, it is an international initiative that connects global pioneers of maritime and ICT industries. One Sea is focused on international activities, as its founding companies are all international.

One Sea works through working groups and research programs, and the work is commented on by the external Advisory Groups. Much of the work also requires cooperation with several other organisations. The ecosystem is working on new industrial standards open to all and definitions for new autonomous technologies. Another important work item is international regulations. One Sea cooperates with flag states at the International Maritime Organization to evaluate current regulations and assists in the creation of new regulations.

The automation of operations, as well as ecosystem-based business development, offer maritime logistics intriguing options. Those players in the maritime logistics industry who can envision the possibilities, act in collaboration with others and skilfully lead their organisations to the future business environment will gain a unique competitive advantage. ■



PÄIVI HAIKKOLA

Ecosystem Lead
DIMECC / One Sea
Finland

SINIKKA HARTONEN

Head of Environment and Technology
Finnish Shipowners' Association
Finland

HARILAOS N. PSARAFTIS

The speed limit debate at the IMO

Expert article • 2564

At its landmark 72nd session of the Marine Environment Protection Committee (MEPC 72) in April 2018 the International Maritime Organization (IMO) took serious action for the reduction of maritime green house gas (GHG) emissions. The so-called Initial IMO Strategy includes, among others, the following elements: (a) the vision, (b) the levels of ambition, (c) the guiding principles, (d) a list of short-term, medium-term and long term candidate measures with a timeline, and (e) miscellaneous other elements, such as follow up actions and others.

Two important targets are included in the strategy: (i) to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 and (ii) to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008.

To reach these targets, a broad variety of short-term, medium-term and long-term measures are being contemplated. Among the set of short-term measures, those that are to be finalized and agreed to between 2018 and 2023, speed reduction was suggested as a possible measure.

However, Chile and Peru objected to the use of the term “speed reduction”, on the ground that this may constitute a barrier to their exports to Asia (and particularly to those that involve perishable products). They suggested the use of “speed optimization” instead. In a compromise solution, both wordings were included in the IMO decision text. However, what is meant by “speed optimization” in that text is far from clear and hence is subject to different interpretations.

It turns out that the term “speed reduction” is not well defined either. In many IMO submissions and in some other documents such as studies, papers, etc. there is widespread confusion on how this term is interpreted. Sometimes it is interpreted in a literal sense, that is, reducing speed irrespective of how the reduction is achieved. In that sense, it is often used as a synonym for “slow steaming,” which is a voluntary measure. But some other times the term is interpreted as mandating speed limits. In fact, a recurrent measure that has been and is being promoted by various Non-Governmental Organizations (NGOs) and other stakeholders is to impose speed limits.

This author has made a comparison between speed reduction achieved by a speed limit and speed reduction induced by a bunker levy. One of the results was that for any given level of levy, an equivalent speed limit can be devised so that speeds and therefore CO₂ emissions are exactly the same. Another result was that a common and uniform levy would result in different optimal speeds for different ships. A larger ship would in general imply a higher optimal speed, everything else being equal. Therefore, achieving equivalence such as the above by a common and uniform speed limit would be impossible. To do so, one would have to set size-specific (or maybe even ship type-specific, route-specific or even direction-specific) speed limits, which would make the whole exercise very difficult from an administrative viewpoint. Conversely, if a common and uniform speed limit is imposed, the limit may be superfluous for some ship types and sizes and binding for some others, depending on the state of the market, the price of fuel, and a host of other parameters. In

depressed market periods the speed limit may be superfluous, and in boom market periods the limit would force some ships (likely at the large end of the scale) to slow down whereas others do not. A speed limit may also be superfluous in one route direction and binding in the other direction.

A likely short term effect of speed reduction, either by a speed limit or by a bunker levy, would be an increase in freight rates due to the contraction of the fleet’s annual tonne-km supply curve. The other side of the coin is that shippers would be hit twice: they would pay more for their cargo and also suffer increased transit times and increased in-transit inventory costs. Also, the freight rate increase is likely to be short-lived, particularly in the speed limit scenario. In the long run, the expanded fleet that will have to be built to sustain trade throughput under a speed limit regime would be larger than a fleet without speed limits. This would ultimately result in fleet overcapacity and a subsequent drop in freight rates. A speed limit regime would exhibit reduced flexibility to further slow down whenever the market becomes depressed, and this may result in more ships laid up. Building more ships under a speed limit regime would also increase emissions due to shipbuilding and recycling (lifecycle emissions) and may have adverse implications on ship safety.

Last but not least, a speed limit scheme would offer no incentive to improve the energy efficiency of ships or invest in energy saving technologies or fuels. Two ships of the same type and size, one energy-efficient and the other energy-inefficient, would be forced to sail at the same speed, and this would unduly penalize the energy-efficient ship.

The speed limit option was discussed at latest IMO meeting, MEPC 74 (May 2019), among other measures. To the disappointment of its advocates, the measure was not endorsed, as many stakeholders objected to it. But MEPC 74 did not reject it either, so the measure is still alive, at least theoretically. By contrast, the bunker levy option (and in fact any market based measure) is barely visible in the IMO agenda at this point in time, and it is not clear when (or even if) the relevant discussion will open. ■



HARILAOS N. PSARAFTIS

Professor
Technical University of Denmark
Denmark

ANNALEENA MÄKILÄ

Finnish ports joining the digital age

Expert article • 2565

The digitalisation of logistics and port processes has the potential to massively streamline supply chains and improve the sustainability of existing infrastructure. This is an indisputable goal of macroeconomics.

In reality however, port authorities and the logistics companies working within ports have very different perspectives on how best to improve efficiency. For the port authority, the most important question is how digitalisation will change the role port authorities play in business.

The representative of Finnish ports, Finnish Port Association, held a poll among its members this spring where questions gaged the preparedness of ports to move to a system with digitalised processes and services.

Traditionally the port authority acts as a caretaker of the port and as the governing body, part of which involves improving the functionality of ports. Practically the first decision to make when considering digitalisation is which parts of the port's infrastructure should be opened up to the service provider. Data sharing is specifically directed, and can be done bit by bit. In this situation the port authority doesn't necessarily plan on offering digital services itself, rather offering an open interface for other service providers.

The port authority can of course digitalise its own internal processes, such as the handling of finances or its communication with others in the port community on health and safety.

In goods handling however there can be used automation and some degree of robotisation to accelerate goods handling services and improve the efficiency of loading and unloading ships.

At big ports or ports with long internal distances, internal transportation can be optimised by improving how data is shared, which these days is logical to do digitally. Measuring the emissions of greenhouse gases in ports and collecting data digitally creates possibilities for directing ships around the port area in a way that minimises particle emissions affecting the nearby city. Similarly, traffic arriving in the port over land can be optimised by digitally providing each transport with a time slot and the most efficient route into port.

All of these examples can be brought into use rather quickly. Clearly the more demanding task for port companies is to consider what customer value the port authority can provide to the final user, that is, the shipper in a transport chain and passenger of a shipping line using the port. Understandably it is most natural to develop the fluency of transport in ports (on land as well as sea side) and focus efforts in one area, with the help of other companies. While this business plan makes sense, it takes a lot of time and requires a great deal of trust between partner companies. In digitalisation projects it's important that a customer relationship can develop into a business partnership.

It's clear that companies' abilities to invest are in a very different situation and the interest in digitalisation services has not developed at the same pace either. I think it's also clear however that the port authority undoubtedly has a comprehensive interest in developing port transport to move fluently. One factor slowing down the digitalisation of ports and logistics is that the economic viability of investment doesn't fall into the traditional service tariffs of ports. That should not be the case just for the reason that f.ex investing in 5G-networks is

a port area it is about investing in infrastructure. A very typical role of port authority and covered by infrastructure charges in the tariffs of ports.

The data sharing happening in supply chains and the development of new digital services requires compatibility and teamwork between multiple businesses, even when technically the project involves open data services. Business partnerships develop between those who have interests and resources in common with which to invest. For this reason it pays to be careful that also smaller ports have the opportunity to be involved in the development of digitalisation.

What does the digitalisation of ports and logistics hope to achieve? Finland's long coast and scattered port network, long distances and small supply chains give an advantage in marine transport as half-loads can be combined, supply chains made more efficient, the emissions of transport reduced, infrastructure used more effectively, and the development of new business opportunities for port companies. The increased productivity in logistics will come when the entire transport system works together digitally.

I believe that in the development of digitalisation, the journey is more important than the destination. Ports have to consider with their partners when and how they want to take up opportunities. Not everyone has to make the same decisions, because ports can work in very different ways. Either way the goal is that Finland's 24 port companies and industrial ports are well connected in the near future, as befits the country of Nokia. ■



ANNALEENA MÄKILÄ
Managing Director
Finnish Port Association
Finland

TORBEN AABERG

A test lab for the Digital Single Market

Expert article • 2566

The countries in the Baltic Sea Region (BSR) are said to be digital frontrunners. With advanced digital services and developed infrastructure, high skilled citizens and innovative start-ups they are leading in many aspects of the digital economy. They also have a long tradition for cross-border trade, informal networks and a trustful public-private dialogue. All together a good starting point for becoming the first place where an integrated digital market becomes reality. But how can this digital potential be released?

DESI index, EU's digital scoreboard, displays a digital gap between countries. There are also digital gaps - and a risk of fragmentation - between urban and rural areas, companies more or less ready for digital transformation and between groups on the labor market. Furthermore, digitalization is still to some extent taking place in silos where every country and sector prefer to develop their own solutions.

With the Digital Single Market (DSM) all EU countries have committed themselves to break down barriers, develop common standards and ease cross-border flow of data. But it takes time for 28 countries to agree and there are many bumps on the road.

Could someone show the way with examples of how things can work smoothly across borders?

BSR is a place to look. Even here there is a digital gap as the Nordics are ahead of the Baltics and Poland, with Germany in between. But the ranking of countries is not constant across indicators (think tank "Top of Digital Europe"). A country like Estonia is catching up with the Nordics. Other eastern BSR countries are pioneers in e.g. fintech and ICT startups.

This indicates that regardless of formal scores the BSR countries can learn from each other by combining strongholds and aligning approaches to digitalization. They share digital opportunities and could benefit from being part of a larger macro-regional market. As they all have different success stories to bring to the table transnational collaboration is an efficient way to tackle digital challenges and bridge digital gaps.

But how to do it in practice?

One example is "DIGINNO", a pioneer project exploring new ways of transnational digital collaboration, co-funded by EU's Interreg BSR programme for the period 2018-2020. The aim is to increase the capacity of industry and governments to promote more efficient uptake of digital solutions and speed up the process towards a DSM. A partnership of 26 government digitalization agencies, ICT industry associations and knowledge institutions in nine BSR countries has identified areas where action is most needed:

- promote ICT uptake among industrial SME's
- improve cross-border interoperability of publicly provided

e-services for companies

- -strengthen cooperation and coordination of digital policies between BSR countries.

Lack of cross-border interoperability can be an obstacle for companies that want to trade, invest or establish cross-border. DIGINNO partners design show-case models of cross-border e-services for business, including feasibility analyses. They combine national priorities with business needs to develop "ideal solutions" based on direct dialogue between government agencies and industry in neighboring countries. They discuss what works and doesn't work in digital awareness raising. Inspired by identified obstacles, needs assessment and a creative approach to interoperability they propose policy changes as inputs to national and EU discussions.

What difference can such a project make?

Firstly, it offers a bottom up macroregional approach and a launch pad for new ideas of digital innovation. There is no one-size-fits-all in the DSM and adopting a full spectrum of cross-border interoperable services is not realistic. Technologies are available but there are legal and institutional obstacles and differing thematic priorities. DIGINNO prototypes can serve as supplementary tools for the member states and exemplify what can be agreed on across borders.

Secondly, at the personal level the project is an eye-opener for the national agencies and industry partners involved. Explaining differences in thematic priorities and approaches - combined with new personal contacts across borders and sectors - is inspiring curiosity and a transnational mindset. A key driver for change.

Thirdly, policymakers are increasingly aware of the value of informal transnational collaboration. MR Digital, the Nordic-Baltic ministerial collaboration, acknowledges DIGINNO use cases as tangible inputs to the work. The European Commission has shown interest in how the project can inspire the implementation of EU regulations.

Pioneer initiatives are on the rise with the ambition and ability to break down digital barriers. Other innovative tech regions globally are fast movers. But BSR provides an open lab where countries that trust each other can jointly provide functional solutions to make life easier for citizens and businesses, showcasing the added value of interacting with neighbors. ■



TORBEN AABERG

Interregional Programme Manager
Aalborg University Copenhagen
Denmark

VILLE SIRVIÖ

Estonia and Finland – Digital forerunners in cross-border cooperation

Expert article • 2567

The digital success stories and cross-border cooperation of Estonia and Finland trace back to the end of the 1990s. In Estonia, the X-Road data exchange layer solution project was initiated around 1998 and the X-Road software environment of Estonia, X-tee, was brought into use in 2001. The first digital ID cards were issued in Finland in December 1999 to Prime Minister Paavo Lipponen and in Estonia in February 2002 to President Arnold Rüütel and his spouse.

In August 2002, the Prime Ministers of Estonia and Finland, Paavo Lipponen and Siim Kallas, assigned a task to Jaak Jõeruut, a former Ambassador of Estonia to Finland, and Esko Ollila, a former banker, politician and long-time friend of Estonia, to evaluate the status of relations between the states just before Estonia would join the European Union in 2004. The evaluation resulted in a report entitled Finland and Estonia in the EU. The report mentions cross-border cooperation, information society and energy cooperation as common priorities for Estonia and Finland under the Northern Dimension policies of the EU.

In 2005, the Finnish Population Register Centre (VRK) and the Estonian Ministry of the Interior signed an agreement regarding the exchange of population register data between the countries. Since December 2005, VRK has provided data on Estonian citizens in the Finnish population register to the Estonian Ministry of the Interior, which in turn has provided data on Finnish citizens residing in Estonia since 2008.

In 2008, the prime ministers of Estonia and Finland assigned Jaakko Blomberg, a Finnish diplomat, and Gunnar Okk, Vice President of the Nordic Investment Bank, the task of investigating how Estonia and Finland could address the challenges of globalisation, while considering the goals of the Treaty of Lisbon. The Possibilities of cooperation between Finland and Estonia report was published in July 2008 with 55 recommendations emphasising education, science, technology and innovation. The other areas in the report included energy and information society, among others.

The report by Blomberg and Okk in 2008 included a vision of the countries' relations in 2030. According to the vision: "[In 2030] two thirds of Finns and Estonians use digital signature and digital authentication, and over 80 % of them use digital signature and digital authentication when doing business with public authorities and enterprises. All base registers of the public authorities of Finland and Estonia are implemented based on common principles that enable cross-border use."

How did the story continue from 2008 towards the vision of 2030? In 2013, the Prime Ministers of Estonia and Finland, Andrus Ansip and Jyrki Katainen, signed the Memorandum of Understanding initiating formal cooperation between the two states in respect of "developing and maintaining a software environment enabling secure connectivity, searches and data transfers between various governmental and

private databases" – X-Road. This is considered to be the world's first digitally signed international agreement.

In 2013-2014, the Finnish Innovation Fund Sitra played a key role in work leading to the implementation of X-Road in Finland, together with the Ministry of Finance of Finland and two experts from Estonia. Sitra funded two X-Road pilot projects in the cities of Espoo and Lahti. These pilot projects evaluated the feasibility of X-Road in producing social and health care services. In addition to nine municipalities involved in the evaluation of X-Road's feasibility in municipal use, the Association of Finnish Local and Regional Authorities and the Ministry of Social Affairs and Health also participated in the studies.

Even though X-Road was piloted in the social and health care sector in Finland, national information security legislation and policies limited the use of X-Road, especially in that sector. Estonia instead has built its information society upon X-Road and has very few limitations in its use. In 2016, Finland began renewing its information security legislation and policies, which will result in a new information management law entering into force in January 2020. This will probably develop new X-Road implementation cases in the social and health care sector in Finland.

The X-Road implementation project in Finland was kicked off in 2014 as part of the National Architecture for Digital Services (KaPa) programme. Suomi.fi Data Exchange Layer, the X-Road environment of Finland, was brought into use in November 2015.

In 2015, the Information System Authority of Estonia (RIA) and the Population Register Centre of Finland (VRK) concluded a cooperation agreement with the intention of formalising cooperation relating to X-Road. RIA and VRK were responsible for the coordination of X-Road core development, and a set of practices and guidelines were agreed to manage the cooperation.

Another important outcome of the collaboration between RIA and VRK was publishing the source code of X-Road core as open source under the MIT free software license. The source code was published in two parts in 2015-2016 and it was made publicly available to anyone. Since then, dozens of countries around the world have implemented X-Road as their national data exchange layer solution. The cooperation between Estonia and Finland has had a global impact.

Estonia and Finland decided to deepen the cooperation by forming a joint organisation to administer the development of X-Road. The formation and cooperation agreement of the Nordic Institute for Interoperability Solutions (NIIS) was signed by ministers Urve Palo and Kai Mykkänen in Helsinki in March 2017, during a state visit of the President of the Republic of Estonia, H.E. Ms Kersti Kaljulaid and her spouse. The Memorandum of Association of NIIS was signed in June 2017 and the institute launched its operations in August 2017.

In June 2018, NIIS took over the core development of X-Road from RIA and VRK. The first step of the handover had

been completed earlier in 2018 when NIIS took the responsibility of running the Working Group that comprises the platform for day-to-day coordination of the joint X-Road development. In June 2018 NIIS also took over the management of the source code of X-Road core.

There was extensive international media coverage of the Estonian–Finnish cross-border cooperation before, during and after the Estonian Presidency of the Council of the European Union (from July 2017 until the end of December 2017). Estonia, in cooperation with the President of the European Council and the European Commission, organised the Tallinn Digital Summit in September 2017 to bring together EU heads of state or government.

The governments of Estonia and Finland, led by Prime Ministers Jüri Ratas and Juha Sipilä, convened together for the first time in history in May 2018 in Tallinn, Estonia, to celebrate the 100th anniversary of both countries. They reached agreement at the anniversary meeting on many concrete measures by which digital connections between Estonia and Finland will be enhanced:

The governments decided to explore ways to bring the next digital service infrastructure components under joint development into NIIS, and to support the institute in efforts to find new member countries. The governments also decided to take all the necessary actions and ensure that the on-going data exchange projects will be completed in due time in 2018 and 2019, and the use-cases and roadmaps in the next data exchange areas will be identified by the end of 2018.

Finland's and Estonia's data exchange layers were connected to one another in February 2018, making it possible to easily transfer data over the Gulf of Finland between organisations that have joined the countries' national data exchange layers. Following the Estonian Presidency of the Council of the European Union, the most popular cross-border use case appearing in international media was the e-prescription, which has often been reported to be based on X-Road, though this is not the case.

In 2019, the national business registers and tax boards in Estonia and Finland are moving towards cooperation that would allow the agencies to exchange data in a more accurate and efficient way by using X-Road trust federation between the countries. In European energy cooperation, digital solutions are being developed to build smart grids and to enable the effective use of renewable energy. New cross-border services are being developed in both the public and private sectors.

Since the end of the 1990s Estonia has built a digital society from scratch, which has led to recognition as a digital pathfinder and resulted in modern digital services for its citizens. Finland with a long record in information technology and digital services leads the Digital Economy and Society Index (DESI) ranking in 2019. There are good reasons to believe the cross-border digital success story of Estonia and Finland will continue in cooperation with other Nordic and EU countries. ■



VILLE SIRVIÖ

CEO

Nordic Institute for Interoperability Solutions
(NIIS)
Estonia

JACOB MANGWANA HAAGENDAL

The Ålandic potential – Cross sectoral co creation as the key to success

Expert article • 2568

Aland is a small community but nevertheless full of ambitions to make a difference for the better. A shining example is the work on the vision for sustainability, which is described in www.barkraft.ax sustainability agenda.

With this agenda as winner of the European Sustainability Award in 2019, the outside world to some extent became aware of the work being done in Åland to handle future challenges and succeed with SDG objectives. Traditionally, there is a lot of talk about the environment, climate, regulations, responsibility and consumption when we focus on how we can be 100% sustainable in the future. The sustainability agenda focuses on selected SDGs where Goal 12 is a key focal point.

The model for Sustainability in cross sectoral co-creation I originally developed as an analysis tool in my cultural diplomacy work in new EU countries. It describes 4 pillars, each with its sector and each with its value set. The thesis is, that sustainable development is not possible, unless all sectors are represented, and that every sector manages to transcend one's own paradigm and one's own definition of added value. The 4 sectors are: Business, education, culture and governance. Each sector has its own set of values and defines its existence and success based on these sectoral set of values. I.e. Business – money / profit, education – knowledge / insight, culture – content / meaningfulness and governance – decision making / management.

With the sustainability agenda, Åland has taken a major, ambitious step forward ahead of most other Nordic countries. The effects of working with the ålandic sustainability agenda will undoubtedly be of great importance for Åland and act as a source of inspiration, problem solver and as a developer of lasting sustainable solutions.

Of the 4 sectors described, the education sector and the cultural sector in Åland have been quite focused on working on the sustainability agenda. This has been relatively simple primarily as these sectors do not necessarily enter into a classic growth mindset. It seems that the sectors have been successful in raising awareness in the civil society and are well on the way, creating microscopic but lasting changes in the mindset towards sustainability awareness at the individual level.

The Government in Åland, "Landskapsregeringen", employed in 2015 a development and sustainability strategist, probably one of the most important decisions made in modern sustainability work on Åland. Over the past three years the progress has been not as expected, but looking at the causes through our co-creation model, the great challenge is, that the whole thinking about our modern welfare system is driven by a growth mindset. The model points out that the future welfare society should be shaped by anchoring, investing and sharing.

It goes without saying that it is a challenge for the political sector to make the sometimes difficult and complicated decisions that come with working towards a 100% sustainable society. In Åland, one could

easily call for a little more courage to take part in several of the difficult decisions, which are not always popular but which, in turn, are very necessary, in order to be able to achieve the sustainability agenda.

This demand also applies to the business sector in Åland. The small and medium-sized businesses in this sector are already well represented in the work on the sustainability agenda and the recognition in the business sector, that it relies on common solutions, is also a very positive indicator of the ability to achieve goals. Unfortunately, it takes longer for the large international Åland companies to engage in the sustainability work, and join the dialogue about how Åland, as a self-government area, can succeed with the ambitions of being 100% sustainable by 2051.

It seems there is a long way to go. But the road may be shorter than one imagines, and the potential for both achieving goals and showing a viable path in the sustainability work, is strongly present in Åland. This is because the vision does not attack a particular sector, or point out where it is wrong, but instead tries to accommodate all sectors, while also addressing how each sector and individual person thinks.

The vision affects each sector's own values and success criteria. The sectors are invited through the vision to take an interest in a shared set of values and this process is just easier in a small island community like the Åland Islands.

Cooperation towards a sustainable Åland is best visible in the Bärkraft network, which represent a unified Åland. This network is in itself an embodiment of the potential and an indication of the importance that Åland can play in Baltic, Nordic and international sustainability work. With the Nordic Council of Ministers vision of a sustainable and integrated Nordic, the ålandic potential will be significantly strengthened in the coming years. ■



JACOB MANGWANA
HAAGENDAL

Director
Nordic Institute in Åland

VLADIMIR G. KIKNADZE

Military-political situation in the Baltic Sea region

Expert article • 2569

20 years of NATO membership of Poland and 15 years of Lithuania, Latvia and Estonia show that the threat from the Alliance's expansion to the East has not been exaggerated. As a voluntary hostage of bloc policy, the Baltic Rim (BR) countries – NATO members are forced to sacrifice the interests of regional development as a result of the aggravation of international relations at the global level.

The military situation in BR, as in Europe, is now largely determined by the negative dynamics of Russian-American relations. The Alliance's hard-line containment of the Russian Federation is newly consolidated. Russia's relations with the EU, burdened by the problem of economic sanctions, also remain at a low level. The reasons are related to the events of 2014, which Washington and Brussels consider as a policy of revival of the Russian world. There was a danger of forced drift of the BR countries to building managed relations of confrontational type with Russia.

The decision of the Alliance to reach a new level of military readiness of the BR countries by securing the position of "leading Nations" – NATO members-for Poland, Latvia, Lithuania and Estonia testifies to the projection of new dangers for Russia, and hence for BR. And they are already in the "best" of the program "2/20": Latvia, Lithuania and Estonia, reaching the required US indicators in 2019-2020 (according to the plan – 2024), and Poland is already at 2.5%. The number of US armed forces contingents in BR countries is increasing, especially in Poland ("increase funds for their own defense"). Increasing the intensity of combat training in the States of BR; the ships of the 2nd fleet of the United States after the reconstruction in 2018 already participated in training "Baltops" in the Baltic sea in 2019.

In these circumstances, a special role for the security of BR is the preservation of Finland's policy of non-aligned foreign policy and independent defense, a stable position of Finnish society to remain on the side of the policy of military non-alignment.

It is advisable to improve cooperation in all areas: military transit, safety of navigation and aviation operations in the Baltic sea. The annual meetings of the chiefs of staff of the armed forces of the BR countries, the resumption of Russia's participation in the exercises "Baltops" will also contribute to regional integration, increase the level of trust between the parties. Active cooperation in the military sphere makes the region less dangerous for all its participants. As soon as the regional format of real interaction gives way to the interests of global politics, the military sphere immediately catalyzes the aggravation of international relations.

The calls of European politicians (S. Mixer, W. von der Leyen) to engage in dialogue with Russia from a position of force are dangerous. World history has repeatedly demonstrated the futility of such a policy. The 80th anniversary of the beginning of WWII (1.9.2019) and the 75th anniversary of the Great Victory and of the Victory in WWII (2020) is not an extra reason to remember this.

In the medium term, the activities of Russia's partners – the BR STATES-will be subordinated to the interests of the United States, which can once again increase the size of American security guarantees for Europe. The regional policy of the "Kaliningrad problem" will continue to be dominated by the military factor at the expense of resolving the problems of "soft" security in BR, as it is beneficial for the United States.

What should be done to ensure security in the future?

1. Russia, taking preventive and retaliatory measures to ensure military security, should become a leader in solving the problems of "soft" security and development of BR: the BR countries should treat Russian vector of long-term guaranteed development in conditions of equal partnership as an alternative to the American one.
2. To use for the convergence policy on the Arctic. Half of the members of the Arctic Council (AU) are BR States and two more are observers. Finland has a special role as a neutral state with great authority in the AU.
3. The leaders of the BR STATES should proceed from the fact that it is the sovereign States that are the backbone of international relations and security, and the unjustified influence of the military-industrial complex on the power can negate the achievements of peaceful decades. Wait changing relations Russia-USA and then to adjust regional relationships is impractical. A worthy example is Turkey's position on the S-400, which "is not going to get permission from anyone to meet its needs in the defense sector." Projects of the European army, "European army", special Fund of Germany "to protect the Baltic countries and Poland from Russia", "Fort trump" in Poland – misconceptions. Shifting the focus from the development of our own national economies and social sphere to the military component can threaten the security of the state no less than external threats. For all countries on the shores of the Baltic more promising implementation of the thesis "the Baltic sea – the sea of peace" through the concept of small steps or rapprochement. ■



VLADIMIR G. KIKNADZE

Dr. Science (History), Associate Professor

Editor-in-Chief

Journal "Science. Society. Defense."

Adviser

Russian Academy of Missile and Artillery Sciences

Moscow, The Russian Federation

JAN SAARELA

The changing demography of Swedish speakers in Finland

Expert article • 2570

The Demography Unit at Åbo Akademi University was in early 2019 awarded status as one of the university's centre of excellence units. The project title is "Demographic change and ethnolinguistic identity in an intergenerational perspective: The Swedish-speaking population in Finland" (DemSwed). I will here briefly motivate and describe why this research area is important.

In Finland, a person can be registered with only one mother tongue, which basically means ethnolinguistic affiliation. The procedure is a scientific and societal impediment from the perspective that an increasing number of children grow up with both Swedish-speaking and Finnish-speaking parents or grandparents. While the Swedish-speaking population has been thoroughly mapped, there is little awareness of how group-specific traits are maintained over generations when individuals form mixed unions. Research on how the offspring fare on demographic and socioeconomic outcomes is also scarce. Our project studies how demographic changes of this kind affect the native population composition of the country by tracing the transmission of ethnolinguistic identity through families and generations. We map also the mechanisms behind the changes and for different subgroups in a manner that has not been done before.

These efforts will increase the knowledge about the resilience of the Swedish language issue in Finland, and contribute also to the international literature on ethnic minorities, their profiles and the associated consequences of demographic processes. The project is of increasing societal relevance given the transformation of Europe into multicultural nations, and has the potential to provide important lessons for how group identities relate to sociocultural variation in a wide variety of contexts. Unlike previous research within the field of multiethnic identities, we use large-scale longitudinal data that link generations. The data used consist of the entire Finnish population, and make it possible to follow individuals within and across lineages over more than four decades. These administrative population-register data provide a globally unique source of information.

There are some stylized facts to consider. The total effect of mixed unions on the Swedish-registered population has been negative. In the cohorts born in the 1950s to 1980s, only one third of all individuals with mixed background reproduced Swedish, that is, registered their children as a Swedish speaker. However, own ethnolinguistic affiliation highly matters. Two thirds of them registered their children as Swedish speakers if they were Swedish-registered themselves, while only one in tenth of those registered as Finnish speakers did so.

Own ethnolinguistic affiliation affects also partner choice, which in turn affects the ethnolinguistic registration of the children. About 40 per cent of Swedish-registered persons with a mixed background had a Swedish-registered partner, while the corresponding number for Finnish-registered persons with a mixed background was about 10 per cent. In the former group, almost all children were registered as Swedish speakers, while in the latter group, the corresponding number

was roughly 70 per cent. If the partner was Finnish-registered, very few Finnish-registered individuals with mixed background registered their children as a Swedish speaker, while almost half of all Swedish-registered individuals with mixed background did so.

Mother's ethnolinguistic affiliation is more important than father's for the ethnolinguistic registration of the children. Thus, Swedish-registered women with mixed background and a Finnish-registered partner had reproduced Swedish to a higher extent than Swedish-registered men with mixed background and a Finnish-registered partner.

It is also worth stressing that individuals with non-mixed Swedish background differ from Swedish-registered individuals with mixed background. Approximately 90 per cent of the former reproduced Swedish, while only two thirds of the latter did so, which is largely related to the partner choice.

From the Swedish speakers' perspective, one reassuring point is that the share of Swedish-registered children in mixed families has increased considerably. One third of the children born in such families in the early 1950s were Swedish-registered, as compared to over 60 per cent in the early 2010s. Yet, the increased prevalence of Swedish-registration of children in mixed families pertains foremost to those with a Swedish-registered mother, and not to those with a Finnish-registered mother. For children born in mixed families in 2015, almost 80 per cent were Swedish-registered if the mother was a Swedish speaker, and roughly half 53 per cent if the mother was a Finnish speaker.

To sum up, these patterns suggest that there are strong reasons to be concerned with ethno-linguistic registration across generations, and the gendered structure associated with it. ■



JAN SAARELA

Professor of Demography with Statistics
Demography Unit
Åbo Akademi University
Vasa, Finland

IRINA M. BUSYGINA & ANTON D. ONISHCHENKO

On fences and neighbors: The problem of Polish minority in Lithuania

Expert article • 2571

To date, European countries have worked out a number of mechanisms intended to manage the problem of ethnic minorities living on their territories. However, EU members are carrying out different approaches towards representation of minorities in a variety of areas. Most ethnic groups have close ties with their countries of origin, which may also cause considerable tension between two states and potentially even result in a bilateral conflict. In addition, the settlement of the problems of ethnic minorities is particularly difficult in those states where the process of nation-building is not yet completed. These states include the Republic of Lithuania. In spite of policy on ethnic minorities being not as an urgent problem in Lithuania as it is in the two other Baltic States, ethnic conflicts constantly continue to appear. Having successfully avoided problems with the Russian minority in 1990s, Lithuania up to this day failed to handle its relations with the Polish one. Instead, it attenuated these relations.

The Constitutions of all the states that have acceded to the EU in 2004 protect the rights of ethnic minorities, however, their practical approaches and their outcomes differ significantly in each CEE country. Despite the relatively low level of ethnic discrimination in Lithuania, the Polish minority living there constantly complains about discrimination from the authorities: this includes insufficient financing of the minority educational and cultural institutions, the Lithuanisation of Polish names and renaming streets in Polish communities. Moreover, the Lithuanian government has elaborated laws which make it more difficult for the Polish minority to get education in native language.

The roots of such a policy can be traced in complicated historical relations between Lithuania and Poland. The problems in bilateral relations date back to the XVI century, and emerged after the creation of the Polish-Lithuanian Commonwealth. This was the turning point in two countries' relations leading to deterioration of their ties: established confederation led to discrimination of Lithuanians as Polish nobility has gained superior position in the then newly state. Later conflicts over Polish refugees and the city of Vilnius in the XX century have contributed to the complication of bilateral relations.

The burden of the past still remains to "poison" Polish-Lithuanian relations although both countries have become the members of the EU and NATO which suggests a high level of mutual political loyalty. Indeed, we observe quite effective cooperation between Lithuania and Poland in economic and political spheres, though with regard to official attitude to Polish minority in Lithuania the situation is very different. Giving first priority to the task of titular nation's cohesion, the Lithuanian state denies any accusation made by Poland and in its turn blames the Polish authorities for trying to discredit the Baltic state (for instance, in 2014 Lithuania's president Dalia Grybauskaitė accused the Polish president of lacking political culture following his denunciation of discriminatory policy towards the Polish minority in

Lithuania). The Lithuanian official approach has led to the situation when the government has distanced from the cooperation with NGOs (a huge number of which represent various Polish groups in Lithuania) and with the Polish diaspora. Furthermore, the Lithuanian state and Polish agents of civil society (who serve a primary link between the minority and the 'country of origin') practically do not cooperate.

The lessons are to be learned. The ethnic minority problem in Lithuania has revealed an important feature of the emergence and evolution of the country's political system. The country, while promoting the institutional aspect of democracy through establishing democratic institutions (first of all competitive, free and fair elections and multiparty system), yet holds back development of the liberal aspect of democracy by repeatedly trying to suppress manifestations of ethnic diversity.

The EU membership has failed to automatically solve the problem of the Polish minority in Lithuania, the Union is objectively unable to solve the problems of such kind. However – and these are good news – the membership mitigates the problem by making relations more transparent and creating new channels for minorities to express themselves at the supranational level. For the solution of ethnic minorities problems domestic political factors are still more important than belonging to the EU (and commitment to its rules), but the EU influence is significant as it constrains the behavior of the member-states restraining them from launching a conflict. It creates an environment in which controversial issues may be settled. ■

IRINA M. BUSYGINA

Doctor of Sciences, Professor
Higher School of Economics – National Research University
(Campus in Saint Petersburg)
Russia

ANTON D. ONISHCHENKO

Higher School of Economics – National Research University,
Russia

EKATERINA A. SHLAPEKO

Finnish-Russian projects of cross-border cooperation

Expert article • 2572

Cross-border cooperation between Finland and Russia is one of the key areas of international integration relations between Russia and the European Union. The article considers the experience of program and project method in managing cross-border cooperation on the example of Karelia cross-border cooperation program for the period 2007-2013.

Program and project management can be defined as a complex activity with specified deadlines and results designed to achieve a specific goal using a certain amount of resources. This approach implies a special focus on planning and forecasting processes and a focus on results. The priority is to identify the problem, the needs of the target groups, coordinated interaction of all participants to determine research, production, socio-economic, organizational, economic and other measures to maximize the synergy effect and build the capacity of the enterprise or territory. The set of planned actions is formalized in the form of a special document – a program containing a detailed description of the goal set, the methods, mechanism and resources used to achieve it.

In the contemporary context, the cross-border shopping is one of the most popular trends in the consumption practices of the people living in the border areas of the neighboring countries.

The theoretical aspects and the development practices of the cross-border shopping tourism are widely presented in the scientific literature. There are four main conditions that reveal possibilities of the cross-border shopping tourism: difference in the range, quality and price of the product on the opposite side of the border; information about the opportunities on the opposite side of the border; the ability and willingness of the population to travel as well as the transparency of the state borders. Also, the development of the cross-border shopping is stimulated by the economic factors: tax free, shopping at the duty free shops, sales and shopping in the second-hand and the flea markets. Besides, the need to purchase the certain goods and services on the opposite side of the border, shopping tourism seems to be one of the ways of spending leisure and pleasant pastime during the holidays and vacations.

At present the Russian entrepreneurs who purchase the goods for the commercial purposes as well as the shopping tourists appear to be the source of wealth for some residents of the border regions of Finland. For instance, the development of the border town of Lappeenranta is closely connected with the Russian tourists. In 2013, 2 million tourists in the city of Lappeenranta (the population of the city is 75 thousand people), 1.8 million people were the Russian citizens with 300 million Euros spending.

The cross-border trade and the shopping tourism among the Russians have become popular in the recent years. The Russian tourists are the largest group (36%, 2016) in the inbound tourist flow to Finland. In 2016, the Russians spent about 470 million Euros in the neighboring state (in 2015 about 1 billion Euros; in 2013, 1.3 billion Euros) that accounts 174 Euros per trip or 82 Euros per person per

day. Finland is one of the most popular shopping directions among the residents of the border regions of North-West Russia. Among measures taken by business to increase the flow of Russian tourists are: the socializing function of navigation (signs in Russian); the tourist services in Russian; the publication of information and the tourist booklets in Russian; the development and operation of web-sites in Russian, etc.

The tax free system (from January 5, 2017 the refund is carried out at the Allegro and Leo Tolstoy trains), the invoice system, the service culture, the infrastructural features of the commerce, as well as Duty Free shops (at the border crossing points Torfyanovka, Brusnichnoye, Vyartsilya, at the Finland Station for the passengers of the 'Allegro' train, the airports and the ferries) are very important.

The Finnish border cities began to open the shopping centers (for example, Laplandia Market, 800m from the Brusnichnoye border crossing point) and the hotels with the different pricing and develop the related services (recreation, spas, water parks). Besides, they improve the advertising campaign in Russian. For example, the advertising and informational publications in the media, the social networks, the tourist portals and the shopping malls in St. Petersburg became the main tools within the promotional program of tourist opportunities in Lappeenranta and Imatra from the GoSaimaa information portal with a budget of 3.3 million euros.

The transport and price accessibility, the possibility of obtaining the multiple-entry Schengen visas and the convenience of the international border crossing points are of particular importance for the residents of the Republic of Karelia, the Leningrad Region and St. Petersburg. It should be noted that the citizens of the Russian Federation residing in the North-West Federal District and having permanent or temporary registration do not need to provide documents to prove the purpose of the trip. There is a wide range of the shop tours organized by the tourist and transport companies to Finland. The standard price of a tour package for the purpose of shopping includes: transfer, insurance, visits to the shopping centers, in some cases accommodation, food and sightseeing. In addition to the possibilities of shopping tours and the use of private vehicles, residents of the North-West Russia have the opportunity to get to Finland by train or the daily buses.

The implementation of the sanctions against Russia and the increase of the euro exchange rate had the negative impact on the inbound flow of the Russian tourists to Finland. In the recent years, there is a significant decrease in the interest of the Russian citizens to visit the territory of the neighboring Finland for the tourist purposes: in 2014 – 4.2 million people, in 2015 – 3.1 million people, and in 2016 – 2.9 million people. According to the Global Blue Oy, in November 2014 the Russians spent 43% less financial means compared to 2013. At the same time, the tax return of the Russians is 83.5% of the total tax refunds. In December 2014, the duty-free sales in the border cities of Finland decreased by more than 70%. It affected the

cities of Joensuu, Imatra, Kotka, Kouvola, Kajaani, Lahti and Kuopio. However, the cross-border trade continues to develop thanks to the shaped preferences of the Russian tourists. The shopping tourism from Russia gradually begins to recover after a sharp recession. For 2016, the high growth rates of sales are observed precisely in the cities bordering Russia: Lappeenranta (+ 34%) and Joensuu (+ 32%), Imatra (+ 19%) as well as at Vantaa Airport (+48 %), in Lahti and Hamina (+ 37%). According to the research center TAK Oy for January-August 2016, the average expenditure of the Russian traveler was 172 euros, 114 euros of which accounted for the shopping. In 2017, according to the Global Blue, the largest increase in sales in the Tax free system was recorded in Savonlinna (98%), Hamina (80%), Lahti (66%), Imatra (65%) and Rovaniemi (58%).

Thus, the growing trend in the shopping tourism among the citizens of the border Russian regions aims at acquiring the Finnish goods and services. Moreover, there is a need not only to purchase the goods and services, but also to organize the leisure activities. The interest of the local residents and the travel possibilities were determined by the degree of the border openness, the established contacts and the attractiveness of the adjacent territory. The contemporary residents of the Russian borderlands choose Finland as an attractive destination due to the transport accessibility, the developed tourist infrastructure and a wide range of the quality goods at affordable prices. ■

EKATERINA A. SHLAPEKO

Researcher, Department of Regional Economic Policy
Institute of Economics
Karelian Research Centre
Russian Academy of Sciences, Russia

DZMITRY KRUK

Belarus tends to face a ‘systemic fragility’

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In mid-2019 Belarus has entered a new stage of its development. In respect to the economy, one can argue that the period of recovery with somehow heightened growth has ended, while a subsequent stage is likely to be associated with a weaker growth. But this is not the only challenge. Economic threats tend to interrelate with social and political ones, which together may result in a systemic threat to the country. So, standing against them is the most crucial question on the agenda.

During the period of 2017-1H 2019 Belarus displayed somehow heightened GDP growth: 2.8% on annual average basis vs. the estimate of the equilibrium medium-term growth of around 2% per annum. Growth in this period was a recovery one (after the recession in 2015-2016): the incentives of ‘postponed’ production and consumption were behind the behaviour of firms and households. In mid-2019 the pre-recession level of output and incomes has been restored and such kind of incentives tend to decay. Hence, a ‘recovery growth mark-up’ is likely to disappear, which means that the actual growth rate will tend towards its estimate of equilibrium, i.e. 2%.

From a short-term perspective and ‘local’ view, this does not seem to change the environment considerably. According to such view, given the commitment of the authorities to monetary and financial stability (since 2015 it seems to be rather firm) the decay of the ‘recovery growth mark-up’ does not mean anything except weaker growth of incomes. Moreover, one can argue that during the period of the recovery growth the country has reinforced its resilience to external shocks. For instance, debt burden (both private and public) reduced, while the level of international reserves increased. Baseline projections based on this view mainly postulate further domination of low growth/stagnation environment, but without severe shocks and systemic threats.

However, from a longer-term perspective and a ‘big picture’ view, one can detect such kind of threats. First, meagre growth is likely to renew/strengthen squeezing of relative level of well-being in Belarus from international perspective. For instance, a relative level of well-being vs. CEE countries (the ratio between PPP-based GDP per capita in Belarus and the mean of the one in 11 CEE countries) began to decline gradually in 2012 (after 20 years of growth) and afterwards displayed a severe drop in 2014-2016. Hence, between 2012 and 2016 the level of well-being in Belarus reduced from about 77% down to about 65% of the average one in the CEE countries. The period of recovery growth in 2017-1H 2019 allowed freezing it nearby that level. A renewal of relative well-being downgrading is likely to result in increasing labour migration, as in recent years the latter has become extremely sensitive to the former. This constitutes an important challenge in economic, social and political dimensions. In the economic one, this would lead to further deterioration of growth perspectives because of labour and human capital outflow. Socially and politically, this trend is likely to challenge the consistency of the entire economic model.

Second, the risk of financial turmoil can again appear on the agenda. The main achievement of the period of recovery growth – strengthening financial stability – in a great extent fell back upon the growth of output. Just it was the core factor behind the reduction of debt burden and some improvements in the financial performance of firms. Poor growth environment is likely to reverse these trends, as despite some reinforcement of financial stability in recent years systemically it is still fragile.

Third, poor growth can challenge the commitment of the authorities to sound economic policies. Such commitments were introduced in 2015 given the environment of financial turmoil. A new policy mix has mitigated financial distortions, but has denuded poor growth potential. In case the ‘costs’ of poor growth mentioned above are treated as unacceptable by the authorities, and taking in mind some ‘margin of safety’ at disposal (higher international reserves, lower inflation expectations), they can begin a new round of voluntary expansionary policy.

So, unfavorable perspectives and policy dilemmas with hardly acceptable options are dominating today on the national agenda. This makes the country very attackable from outside and Russia seems not to lose this opportunity for promoting its interests. A so-called ‘integration promotion program’ is likely to be the instrument for weakening Belarusian sovereignty. What are the options for standing against? The authorities fall back upon ‘diplomatic maneuvers’. However, as shown above a ‘systemic fragility’ mainly stems from fundamental economic weaknesses. So, without readiness of the authorities to institutional reforms in the economy, the stance of ‘systemic fragility’ is likely to maintain. The latter can generate different development scenarios, even those that seem improbable today. ■

DZMITRY KRUK

Research Associate

BEROC (Belarusian Economic Research and Outreach Center)
Belarus



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