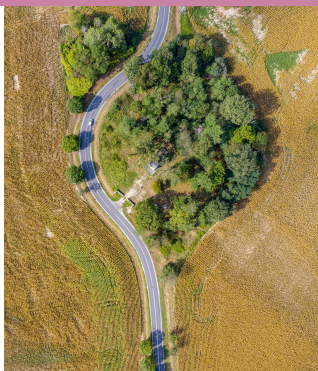


# LOW CARBON LOGISTICS

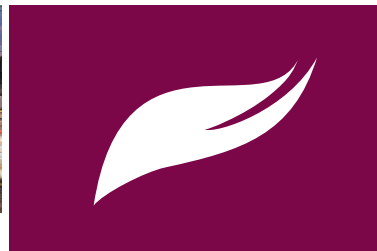
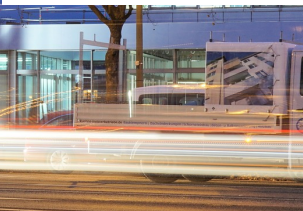


## Mission Possible – Low Carbon Logistics in the South Baltic Region

Editors:  
Udo Onnen-Weber; Clemens Weiss



## PROJECT BOOK



European  
Regional  
Development  
Fund

This publication was published by Competence Center for rural mobility Wismar (Germany) as a deliverable of the project “Low Carbon Logistics”.

Project “Low Carbon Logistics” (No.STHB.03.01.00-SE-0008/15/RM/1731) is implemented within the framework of the Interreg V-A Poland – Denmark – Germany – Lithuania – Sweden (South Baltic) Programme 2014-2020.

The contents of this publication are the sole responsibility of the author and can in no way be taken to reflect the views of the European Union, the Managing Authority or the Joint Secretariat of the Interreg South Baltic Programme 2014-2020.

Editors: Prof. Udo Onnen-Weber; Clemens Weiss

Wismar (Germany), 2019  
www.lcl-project.eu

## PROJECT PARTNERS AND ASSOCIATED PARTNERS



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## Foreword



The project Low Carbon Logistics provides a great opportunity for our Energy Agency to actively work on decreasing emissions from freight transports. The project derived from a previous South Baltic project partnership, but was further developed to fit the logistic focus rather than the passenger transport focus. We are very pleased and proud to work with our new partners and they have all very generously shared their knowledge. We think that the mix of expert organisations and local/regional authorities and organisations will allow to successfully implement our project ideas in the different involved regions.

A joint effort to develop this project idea, that was supported by seed money from the South Baltic Programme, gave us the chance to get to know each other before the project was supposed to start. It was beneficial for the partnership and we had a good and inspiring project start.

All partners have been working to realise improvements in the regions of Olofström, Rietavas, Bad Doberan and Neringa. They have cooperated on local level, national level and cross border level to achieve good local results that gives local benefits. Joint results were in the focus here, for example to present our common knowledge and experiences in this book, to share new contacts, to establish an expert team that can support new initiatives etc.

As the different regions involved into the project have worked on different solutions to decrease the environmental impact from transports, this book is an important result that facilitates the sharing of knowledge and experiences within the partnership and with external actors (third parties).

During the development of this book, all involved partners have been working in local/regional teams to prepare and implement physical measures. The partnership has also exchanged experiences across the Baltic borders and opened up for international knowledge and dissemination through conferences, networks and business contacts.

This book is a clear result describing the essence of the project work and teamwork. It will be a permanent deliverable full of inspiration and experiences.

Finally, I would like to mention another part of the project that has contributed to this book, the expert team. The team consist of project partner organisation members and was established in the beginning of the project. It has been supporting the local/regional work. The low carbon logistics partnership, and especially the expert team, have made international expertise available to support our local and regional authorities and businesses. The expert team has the potential to be an enduring result if we can be successful in presenting our services as an attractive offer in the future.

**Anna Månsson**

Lead partner

Project manager

## Introduction



Good supply is one of the bases of our life quality and precondition for economic growth, whereas the permanently growing freight transport is responsible for seven percent of the entire CO<sub>2</sub> emission. This particularly applies for city centres – even those of smaller towns. Due to this, the EU project Low Carbon Logistics has elaborated innovative logistics solutions aiming at making the freight transport in small and medium-sized towns and cities more sustainable and efficient. In a cross-border cooperation, different concepts have been tested in five model towns and cities and related consultancy offers have been developed.

The responsibility for inner-urban transport is a regional one. Accordingly, town and city administrations are asked to work on this issue. They have to comply with the challenge to achieve the climate goals to reduce greenhouse gas and pollutant emissions. Thus, for example, the inner-urban traffic has to become CO<sub>2</sub> neutral all over Europe before 2050 according to the EU Commission<sup>1</sup>. This is an enormous task as freight transport amounts to about 30% of this traffic-related CO<sub>2</sub> emission even today<sup>2</sup>. According to an International Trade Forum report, a fourfold increase of the

freight traffic might occur by 2050, which would countermand the climate protection goals if not designed CO<sub>2</sub> neutrally.

Against this background, the EU project Low Carbon Logistics (LCL) investigates innovative logistics solutions that allow to make the freight traffic in small and medium-sized towns and cities more environmentally friendly and efficient. The present book presents the results of this project.

In the chapter **The vision**, an introduction into the topic Low Carbon Logistics concepts and urban logistics will be given. Furthermore, a vision of the effects the project could have on sustainable urban logistics in the South Baltic region will be outlined.

The chapter **Regional concepts, action plans and pilot measure** deals with the measures that have been elaborated in the pilot towns and cities. Related concepts and action plans have been elaborated, implemented and evaluated for every region. The ecological and economic analysis of the measures as well as the benefits for the pilot locations are particularly considered here.

Concluding, the chapter titled **Dissemination and Expert Team**, will present additional outputs of the project. This includes an award for sustainable companies and institutions created in the project as well as a list of green policy elements elaborated in cross-border investigation. Furthermore, the expert team established in the project will be presented. It will be available to support interested municipalities on their way towards sustainable urban logistics.

**Udo Onnen-Weber; Clemens Weiss**

Editors

Project managers

1 European Commission (2011): White Paper – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Online available at

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>

2 OECD/ITF (2015): The Carbon Footprint of Global Trade. Online available at

<https://www.itf-oecd.org/sites/default/files/docs/coppdf-06.pdf>

## The vision



Mobility and logistics are crucial success factors for a highly developed economy and of fundamental importance to society. But what will be the future of mobility and logistics? In this paper, an attempt is made to draw up a general vision inspired by knowledge from actors from the south Baltic area.

At the beginning, seven challenges for low carbon logistics concepts are mentioned. As a result of these challenges, the subject of city logistics has evolved over the last decades. City logistics is a generic term for activities for bundling of urban freight traffic.

The EU-project Low Carbon Logistics took up the subject city logistics and is looking for innovative logistics solutions to make freight transport in medium and small cities environmentally friendly and efficient. In the project, partners from Sweden, Germany, Lithuania and Poland work transnationally on concepts, visions, solutions and evaluation methods. In five pilot cities, various logistics concepts are being explored.

In this context, a vision for the impact of LCL solutions in the future has been developed in section 3. One aim of the project is to disseminate the experiences and concepts in order to extend them to other cities or towns. So the vision is designed to show the impact of LCL solutions on Logistics, cities, people and environment when implemented in many regions in SBR.

## 1 CHALLENGES FOR LOW CARBON LOGISTICS CONCEPTS

*Authors: Udo Onnen-Weber; Clemens Weiss*

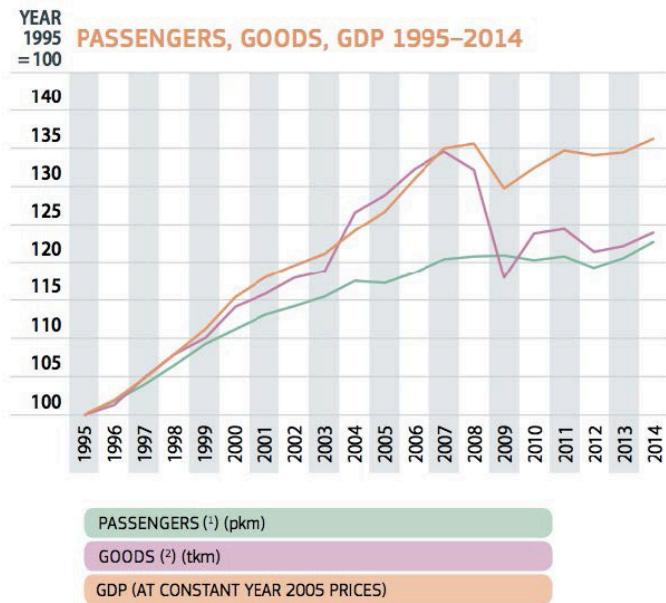
Passenger and freight transport are on the rise in the long term and remain crucial for economic growth in democratic societies. But the environmental conditions are changing. Uncertainties about the economy, finance, energy shift, political stability and especially climate change lead to unprecedented volatility in development. Politics, business, science and society are moving closer together and establish networks. Mobility, logistics, telecommunication and energy systems are intelligently linked to achieve the ambitious climate, environmental and energy goals. The transport sector will benefit from new technologies that will allow the implementation of new and more intelligent transport and logistics concepts. Inter- and multimodality by exploiting the comparative advantages of the respective modes of transport will determine the future. This is not possible without information and communication technology, global and intermodal freight and passenger transport. Not all technological possibilities are foreseeable and predictable; new developments are entering the market quickly. However, they must be recognized, used and evaluated at an early stage.

In the following selections, some global challenges will be outlined, which will affect innovative logistics concepts.

### 1.1 CHALLENGE 1: ECONOMY

The process of globalization can be generally described as the international intertwining of many economic and social spheres. The increasing global network makes it possible to expand the exchange of goods or services and thus expand the goods transport with high dynamics.

The worldwide exchange of goods continues to grow; the volume of traffic is massively growing at a global scale. The following figure 1 shows the development of passenger and goods transport in the EU.



**Notes:** (1) Passenger cars, powered two-wheelers, buses & coaches, tram & metro, railways, intra-EU air, intra-EU sea.  
 (2) Road, rail, inland waterways, oil pipelines, intra-EU air, intra-EU sea.  
 GDP: at constant year 2005 prices and exchange rates.

Fig. 1: Transport growth EU-28<sup>1</sup>

As a result of the increasing liberalization, particularly large companies will have easier access to workforce and resources, investment and tax conditions of other countries and can use them to their benefit. Fast and powerful global transport and communication facilities are the foundation of globalization. The international division of labour as well as the global use of raw materials continue to serve as drivers of development. In addition, the search for new sales markets is intensifying the extent of global interdependencies.

As a counter-movement, local initiatives in the cycle economy are evolving. In times of increasing globalization of economic interdependence, mobility and communication, many people find it increasingly important to recall the identification space known to them. In many regions, local initiatives and approaches have emerged which respond with regional value creation to the global unification. This idea will find more imitators. One goal is the strengthening of the “own” region, which is familiar to the inhabitants in which they have networks and in which they can exert a visible influence. This principle of decentralized, selective self-sufficiency and participation does not only relate to food grown, marketed and consumed on site.

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Part of this development is also strengthening the local small and medium-sized business and thus the creation of jobs and/or the granting of low interest rate loans by local banks. An important driver for the actors is the ecological component, by implicitly avoiding long commutation and transport routes and producing regenerative electricity consumed without significant losses of throughput, thus improving the carbon footprint. Last but not least, to raise awareness of the strengths and characteristics of their region, especially in the increasingly perceptible rural areas threatened by emigration and aging. This is to give the inhabitants in those areas good reasons to continue to live in the area and attract more people.

## 1.2 CHALLENGE 2: DEMOGRAPHIC CHANGE



The demographic change in all its facets has an increasing influence on social developments. The world’s population continues to grow, primarily in emerging and developing countries. Today, we are 7 billion people in the world and by the year 2050 at the latest, we are assumed to exceed the 9 billion people. In most industrialized countries, however, the population is only slowly growing or even decreasing. In many EU countries the population is declining<sup>2</sup>.

In spatial terms, the processes are very different: shrinking regions in the rural periphery and in old industrialized areas are facing few metropolitan regions, which remain attractive to immigrants

1 | EU transport in figures – statistical pocketbook 2016, page 21.

2 | European Commission. Demography Report 2015, page 7.

from Germany and abroad over the next 20 years. The spatial disparities in transport and infrastructure demand will continue to grow accordingly. The share of older people in the total population has been growing steadily in many European countries for two decades<sup>3</sup>. At the same time, the proportion of young people decreases. The distortions in age structure will not be without consequences for society.

There are also profound upheavals for the transport markets: elderly retired people will travel less and shorter distances a day, but more and more often have a driving license. On the other hand, the range of active participation is increasingly shifting to a higher age. This is a challenge for mobility service providers, as the increase in driving performance is predominant in the leisure sector, which is difficult to combine in transport. At the same time, school transport is a major contributor to public transport by at least one fifth in Germany until 2020. The aging of society is not a singularly German or European phenomenon, but will increase in 2030 and beyond in many world regions.

In 2009, for the first time, more people lived in cities than in the countryside, in 1950 it was only a third. This development will continue: the UN expects that this share will reach a good 60% in 2030<sup>4</sup>. The progressive urbanization leads to ever larger cities. The reasons for the strong growth: the lack of economic prospects in the countryside and, on the other hand, the hope of securing a livelihood in the city.

Therefore, everywhere in the world, pressure is increasing as a result of the immense urban traffic problems, since the increase of capacities is limited, primarily in the road network. This is particularly true for freight transport due to the greater demand for space.

### 1.3 CHALLENGE 3: CLIMATE CHANGE

Experts in climate research are almost convinced that a further increase in weather extremes can be expected in the future. The vulnerability of a region is still low in Central Europe compared with many other areas of the continent and the world. The background to the increasing number of extreme events is global warming caused by the release of climate-damaging, anthropogenic gases such as CO<sub>2</sub> or methane into the atmosphere<sup>5</sup>. Due to the global population growth, the growing prosperity and the further increase in traffic and transport services, the emission of climate-damaging gases will continue to increase.

In the transport sector, vulnerable and exposed traffic structures such as overhead lines, bridges or dams will be subjected to increased storms, heavy rain, hail, floods in the river valleys and low mountain range, storm surges on the coasts and extreme heat and cold periods. The accumulated extreme events lead to the temporary abolition of traffic, which leads to considerable economic losses due to production losses. The

<sup>3</sup> Ibid. Pages 9-11

<sup>4</sup> United Nations, Department of Economic and Social Affairs, Population Division (2015). World Urbanization Prospects: The 2014 Revision, page 78.

<sup>5</sup> Myhre, G. et al. 2013: [Anthropogenic and Natural Radiative Forcing](#).

direct consequences of natural catastrophes tend to be reflected in an increase in costs for mobility and transport.

One of the reasons is that the transport sector has so far only made a very modest contribution to CO<sub>2</sub> reduction compared to other emitters. Given the reduction targets envisaged by the EU, there will be considerable pressure on the industry to take measures for the “decarbonisation” of traffic, e.g. through low-CO<sub>2</sub> or CO<sub>2</sub>-free drives. This too will entail considerable costs.

### 1.4 CHALLENGE 4: ECOLOGICAL AWARENESS



The transition to a more sustainable future has begun.

A drastic reduction in emissions of greenhouse gases is necessary worldwide to limit global warming to a level below 2°C compared to pre-industrial levels. In addition to security considerations, the concept of climate protection was a key motivation for the “Energiewende” (energy turnaround), which was propagated by the EU and decided in Germany.

In addition to the objectives in the electricity sector, sustainable strategies are also being implemented in the transport sector in order to achieve sufficient decarbonisation. In the transport sector, which has so far only made a very modest contribution to CO<sub>2</sub> savings, this includes all modes of transport on land, water and in the air, which should contribute to the post-fossil movement. However, the “electrification” of the vehicles will not be sufficient. Rather, new holistic approaches are being used to test and implement resource-conserving transport and logistics concepts systematically and with the involvement of users and consumers.

Sustainability trends are also on the rise in logistics. Freight transport is faced with a particular challenge and responsibility until 2030 due to the expected strong growth rates. Just as people’s own mobility and eco-balance are increasingly questioned, sustainable-oriented consumers want transparency on the level of the specific emission values of goods before they make a purchase decision. As a result, sustainability is

increasingly becoming an important criterion and the services of transparent “Green Logistics” are becoming increasingly important for business and private customers in logistics. The customer will demand a more environmentally friendly and CO<sub>2</sub>-efficient transport emissions or as final option neutralize them through compensatory measures. The focus is not only on the actual transport services, but also on the entire value-added chain. Also the resource and energy efficiency of goods handling facilities, logistics properties and, for example, administrative activities are optimized with regard to their sustainability. In doing so, green logistics does not only serve the enhanced image of a company or a brand, since the cost savings that can be achieved through economies of scale are becoming a significant factor in sustainability and competitiveness. Return on investment and sustainable action will no longer be a contradiction when the emissions from greenhouse gases are priced and a timely conversion to ecological economies has proved to be a decisive advantage.

Ecological awareness also results from the fact that traffic directly shows negative effects on people’s health. Heavy trucks pass through inner cities, producing noise and air pollution. Noise may lead to severe physical and mental consequences in our health, and is harmful particularly at night. With air pollution, it is the fine particles that are being emitted by traffic, hazardous to health if not lethal. In 2014, almost 400,000 died early because of fine particle concentrations<sup>6</sup>. The logistics sector too, is liable to reduce and minimise the negative effects of traffic.

## 1.5 CHALLENGE 5: COSTS/BUDGET

The social costs for infrastructure and operation continue to rise, hence the mobility budgets are under pressure. Public funds are becoming increasingly scarce, the gap between infrastructure requirements and the necessary expansion and/or replacement investments are growing.

How the costs of freight transport will develop is currently difficult to predict. On the one hand, the sector may face considerable additional costs, e.g. through fuel price increases (trucks, inland waterway transport), noise protection measures and interoperability (rail). On the other hand, intra- and intermodal competition has already been strongly contested over the past few years. Many rationalization potentials are now exhausted. With regard to forwarders in the road transport sector of western countries, the competition and cost pressure from Eastern Europe will continue in the coming years and force a sustainable optimization process to ensure competitiveness. In the long term, the transport costs of all modes of goods transport are increasing. This can be partly countered by the intelligent linking of the systems in the context of inter- and multimodal logistics solutions.

6 European Environment Agency: [Air quality in Europe](#), page 56

## 1.6 CHALLENGE 6: NEW TECHNOLOGIES FOR TRANSPORTS

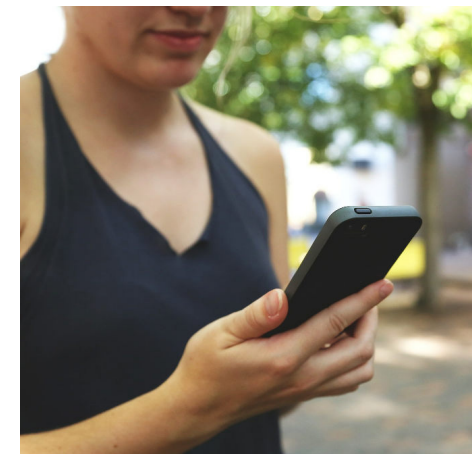
Vehicles with alternative drives, e.g. battery-powered or hydrogen fuel cell technology, have been in trial for several years. The electric vehicle can ideally be integrated into intermodal concepts and promote the sensible integration of transport modes, especially in urban areas. In addition, there is an urgent need in many cities worldwide to limit local emissions of airborne pollutants through the increasing road traffic.

A number of innovative concepts for increasing energy efficiency and CO<sub>2</sub> savings in public transport are currently being tested, e.g. for inductive underfloor quick charge.

At present, there is no market-ready alternative technology to the internal combustion engine for trucks. But the engine technology for trucks will continue to develop until 2030.

Hybrid drives and battery-powered engines are more likely to enter urban transport until 2030. They are beneficial because of low noise and emissions in the inner. Efficiency gains can be achieved, but high initial investments are still crucial, especially for purely electric vehicles. This also applies to vehicles with hydrogen and fuel cells; in addition to high costs, this technology is currently not yet fully developed for logistical requirements. Ultimately, it should be noted that innovations in the drive sector for passenger and freight transport are also making a significant contribution to the reduction of operating costs through the savings effects of climate protection in the long term.

## 1.7 CHALLENGE 7: DIGITALIZATION



The increasing use of smartphones have created new possibilities. On the one hand, the user can be located, at any time, if he has given his consent; on the other hand, he is offered new options for organizing his mobility individually. Intermodal mobility will be considerably facilitated by the individualized “navigation devices”.

In this context, intermodal transport can contribute to a more efficient use of capacities, since the long-distance main route by train or inland waterway can be combined with the collection and distribution function of the truck on the “last mile”.

Modern data communication also opens up unprecedented opportunities for networking in the mobility and logistics sector. Intermodality also permeates the freight and logistics sector, as well as indirectly the infrastructure sector. Rural and suburban areas are also benefiting from this technological advancement: operating centres of public



collective transports can make their services even more flexible. Even after the start of a journey spontaneous travel or transport wishes can often still be realized

ICT (information and communications technology) solutions that are relevant to logistics are also constantly being developed. They serve to further rationalize and increase the efficiency of the production of transport process. Innovations in telematics and fleet management contribute to the increase in effectiveness in positioning, communication and scheduling support. Further improvement potentials are a faster and more reliable transport organization and in an improved transparency for the customer and improved problem solving. More and more, “cloud services” will dominate, i.e. service companies offer the complete processing of ICT services without customers being required to provide their own hardware.

As outlined above, along with the developing electricity industry and on the basis of technological, political and social dynamics, relevant and growing interfaces will emerge between the mobility sector on the one hand and the spheres of information and communication technology on the other hand. So far, those components have remained relatively independent single systems and markets, which are now growing closer. Within the mobility sector, there is a strong momentum as well: Major car manufacturers and car rental companies have identified a new profitable market in networked mobility services and are currently entering the economy massively. The trends described for intermodality and the “electrification” of road traffic as well as the political decisions to implement the “Energiewende” (energy shift) offer new business opportunities – also for other industries. These will be able to offer a triple networked mobility between transport, energy and communications services as a whole. In this context, the concept of mobility will be expanded automatically. In the long run, with comparable offers, the competition will be decided over the quality of customer data and the depth of service.

## 1.8 CHALLENGE 8: LEGISLATION AND REGULATIONS

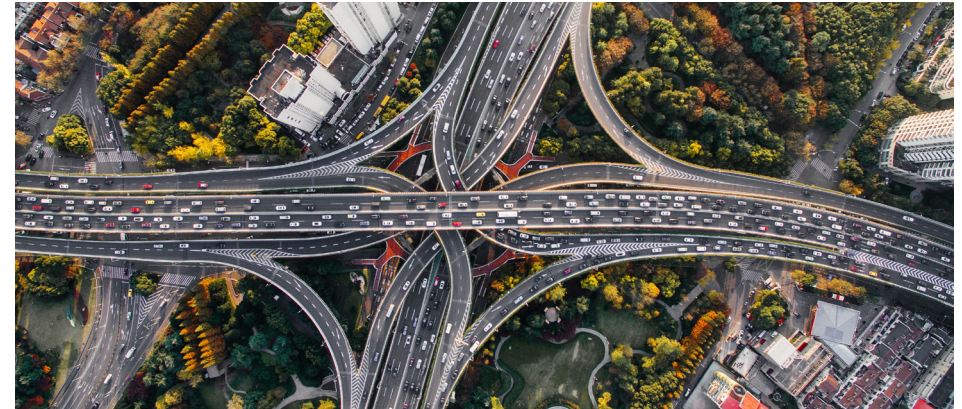
Legislation and regulation can effect the future of logistics decisively. Even today, access controls impose challenges to businesses. Cities face EU pressure to observe limits for noise and air pollution. In order to adhere to these limits, cities resort to measures against a constantly growing volume of traffic by increasingly declaring low-emission-zones or charging city tolls (see Figure 4). In consequence, logistic entrepreneurs are facing rising costs for toll fees or the conversion of their vehicle fleets. Itinerary planning as well needs to be adjusted to time restrictions, so delivery dates may be met.

Political pressure towards a sustainable logistics keeps growing. The EU white book on traffic sets the goal for CO<sub>2</sub>-free logistics at 2030<sup>7</sup>. That implies fully abandoning vehicles driven by conventional fuels. That would put the logistics sector in face of an enormous change. Actually, alternative drives such as hydrogen or electricity are hardly backed upon.

7 European Union 2011: [White Paper on transport](#), page 9

With the ambitious goals of the EU, even market-based instruments can no longer be excluded. The EU has introduced emissions trading as one instrument of limiting greenhouse gases. So far, apart from air traffic, the transport sector has not become affected by this. However, with emissions on the rise, emissions trading is under debate for this sector as well. Businesses in logistics would then have to account for their emissions and comply with limits. As a further instrument, a CO<sub>2</sub>-Tax is being discussed, meant to limitate the consumption of fossil fuels in traffic.

These examples show how legislation and regulation may revolutionise the daily business in logistics. Entrepreneurs will have to face the challenges early enough, in order to keep asserting themselves on the market.



## 2 URBAN LOGISTICS

*Authors: Kinga Kijewska; Stanislaw Iwan; Clemens Weiss*

Within these challenges, the subject of city logistics has evolved over the last decades. Today’s city logistics concepts are characterized by a broad problem focus as well as a large actor base.

Fastly growing cities as well as a related increasing complexity of processes forces changes in planning and managing them. The development of advanced societies that translates into increasing requirements regarding the provision of products and services necessary for the well-being of a city’s users, businesses and visitors results into more and more complex tasks for city administrators.

The research conducted in Germany has shown that 80% of the transport performed within cities occurs as road traffic. Choosing this kind of transport for making deliveries in urban areas leads to many adverse effects connected mainly with environmental pollution, compromised safety on the roads and a negative image of a city along with diminishing its functionality. Another problem is the congestion effect which contributes to increasing costs of vehicle operation and infrastructure maintenance, time

wasted by transport users and losses caused by the time needed for delivery etc. The majority of transport in urbanised areas is generated by industrial, commercial and service companies. The distribution function initiated by businesses contributes to increasing logistic flow streams within a limited area. Currently they are usually implemented in an uncoordinated and chaotic manner and it is extremely difficult to organise, manage and optimise them.

A solution to stop all those negative processes is sustainable growth which deals mainly with analysing the reasons for excessive use and deterioration of the environment, and also with specifying a strategy for limiting the process in three main areas: ecological, economic, social and cultural. The most effective activities in a sustainable freight transport policy are those which concurrently take into account all the three aspects while minimising the costs connected with meeting the expected goals. All these topics are the basis of the concept of city logistics.

City/urban logistics is focused on freight flows implemented in a city or urban area. According to the classic definition, this is “(...) the process for totally optimising the logistics and transport activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, its congestion, safety and energy savings within the framework of market economy”<sup>8</sup>. These activities are mostly focused on freight flows within the city area. Due to that city logistics is mostly understood as optimization of the urban freight transport system.

Many different freight flows constantly enter, cross, and leave urban areas. Examples include consumer goods, building material, waste, parcel and mail deliveries etc.<sup>9</sup> The exact definition for urban freight transport differs from author to author. Urban goods movement is defined as “(...) the movement of things (as distinct from people) to, from, within, and through urban areas”<sup>10</sup> or “(...) those movements of goods that are affected by particularities associated to urban traffic and morphology”<sup>11</sup>. OECD defines it as “(...) the delivery of consumer goods (not only by retail, but also by other sectors such as manufacturing) in city and suburban areas, including the reverse flow of used goods in terms of clean waste”<sup>12</sup>. Finally, it should be mentioned that city logistics is focused on three major types of the flows<sup>13</sup>:

- all types and sizes of goods vehicles and other motorised vehicles used for (core) goods collections and deliveries at premises in the urban area,

8 Taniguchi E., Thompson R. G., Yamada T. (2001): Recent Advances in Modelling City Logistics. In: Taniguchi E., Thompson R. G. (eds.): City Logistics II, Institute of Systems Science Research, Kyoto, 3-34.

9 Dablan, L. (2007): Goods transport in large European cities: Difficult to organize, difficult to modernize. In: Transportation Research Part A, 41 (3), 280-285.

10 Ogden, K. W. (1992): Urban Goods Movement: A Guide to Policy and Planning. Ashgate, Aldershot.

11 Munuzuri J. J., Larraneta L., Onieva L., Cortes P. (2005): Solutions applicable by local administrations for urban logistics improvement. Cities, 22 (1), 15-28.

12 OECD (2003): Delivering the goods - 21st century challenges to urban goods transport. OECD working group on urban freight logistics, Paris.

13 Allen J., Anderson S., Browne M., Jones P. (2000): A framework for considering policies to encourage sustainable urban freight traffic and goods/service flows. Transport Studies Group, University of Westminster, London.

- all types of goods vehicle movements to and from urban premises including goods transfers between premises, ancillary goods deliveries to urban premises, money collections and deliveries, waste collections and home deliveries made from urban premises to customers,
- service vehicle trips and other vehicle trips for commercial purposes which are essential to the functioning of urban premises.

The activities realized in city logistics systems are focused on three dimensions of impact<sup>14</sup>:

- Economic dimension:
  - o reduction of transport congestion (inter alia, additional time spent on a journey, journey time, journey speed),
  - o reduction of the route length,
  - o reduction of the delivery times,
  - o reduction of the infrastructural costs;
- Social dimension:
  - o decrease of the interference between the individual segments of urban mobility (inter alia, cars, trucks, pedestrians),
  - o decrease of the number of vehicles engaged in their tasks,
  - o decrease of the number of traffic accidents,
  - o increase of the city's convenience in terms of living conditions;
- Environmental dimension:
  - o decrease of the pollution,
  - o decrease of the noise level,
  - o loss of residential space.

To achieve these objectives many activities and measures are implemented and developed. It is possible to divide them according to:

- Results criterion<sup>15</sup>:
  - o Soft measures – mainly organizational and promotional activities and those related to the collection of information.
  - o Hard measures – usually infrastructural activities, based primarily on the implementation of new technologies, technical systems and projects of high implementation complexity (such as urban consolidation centres, transshipment hubs, etc.).

14 Russo F., Comi A. (2012): City characteristics and urban goods movements: A way to environmental transportation system in a sustainable city [w:] Procedia. Social and Behavioral Sciences. Vol. 39, Elsevier, 61-73

15 Iwan, S. (2013) Implementation of Good Practices in the Area of Urban Delivery Transport, Wydawnictwo Naukowe Akademii Morskiej w Szczecinie, Szczecin.

- Restrictiveness level<sup>16</sup>:
  - o Push measure – imposed on operators with the intention to influence delivery or operational practices. These can be divided into financial instruments (e.g. higher parking charges and road tolls) and technical and regulatory constraints (e.g. access restrictions). “Push” measures are closely related to more efficient and equitable transport pricing which seeks to require transport users (including freight operators) to bear a greater proportion of the real costs of their journeys, including costs of pollution, accidents and infrastructure.
  - o Pull measure – designed to encourage more sustainable and energy-efficient freight traffic by offering various additional services (e.g., improved mapping), facilities (e.g., preferential access to loading bays for “clean” vehicles) or incentives (e.g., access to priority lanes) to operators or shippers. In many cases, the measures are combined with information and publicity campaigns designed to further reinforce the good practice measures.
  - o Push-and-pull measures – a combination of the aforementioned two, aim at providing incentives for good practice whilst simultaneously using fiscal or technical tools to deter practices that shall be discouraged.
- Area of the activity<sup>17</sup>:
  - o Measures related to material infrastructure:
    - Linear, if they refer to links of the urban/metropolitan transport network (e.g. use of an urban transportation sub-network only for freight vehicles);
    - Surface (and/or nodal), if they refer to areas that can be reserved for freight operations (e.g. areas for loading and unloading operations, logistic nodes to optimise freight distribution in metropolitan/urban areas like urban distribution centres).
  - o Measures related to immaterial infrastructure (telematics) or Intelligent Transportation Systems. This class includes systems for traffic information, freight capacity exchange systems, route optimisation services, vehicle maintenance management systems, other information services through internet access, and centralized route planning.
  - o Measures related to equipment. This class includes measures:
    - On loading units, if they refer to the introduction of new standards for loading units to optimize handling and transport by new low-emission vehicles;

- On transport units, if they refer to characteristics of transport units (e.g. reduction in truck emissions and use of electric vehicles, methane vehicles, metropolitan railways and trams).
- o Measures related to the governance of the traffic network, which includes traffic regulations (e.g. access times, heavy vehicle networks, road-pricing, maximum parking times, maximum occupied surface and specific permission).

Table 1: The examples of city/urban logistics measures

Push measures	Pull measures	Push-and-Pull measures
<ul style="list-style-type: none"> <li>• Access restrictions</li> <li>• Low Emission/ environmental Zone</li> <li>• Promotion campaigns for sustainable freight traffic</li> <li>• Utilization of the time windows for the delivery</li> <li>• Access fee systems</li> <li>• Noise reduction systems</li> <li>• Special urban planning conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Telematics logistics tools</li> <li>• On-board computer systems in commercial vehicles</li> <li>• Intelligent Transport Systems</li> <li>• Incentive systems</li> <li>• Carpooling</li> <li>• Advance booking of (un)loading slots</li> <li>• Alternative delivering systems</li> <li>• Transport exchange systems</li> <li>• Freight Quality Partnerships</li> <li>• Freight Operators Recognition Schemes (FORS)</li> <li>• Driver trainings for sustainable freight traffic (eco-driving)</li> </ul>	<ul style="list-style-type: none"> <li>• Intelligent freight traffic routing (including navigation systems)</li> <li>• Utilization of environmentally friendly vehicles</li> <li>• Urban hubs and Urban Consolidation Centres</li> <li>• Urban delivering micro-platform</li> <li>• Utilization of rail transport (rail, metro, trams) and inland shipping water ways for delivery implementation</li> <li>• Distribution plan-schemes</li> <li>• Vehicle financing schemes</li> <li>• Mobility credits schemes / congestion charging</li> <li>• Local Freight Development Plans</li> </ul>

Furthermore, modern transport service providers, as the main players of city logistics projects, provide the following offers to the intra-urban trade:

- Disposal logistics for the bundled removal of valuable materials and packaging material,

<sup>16</sup> Bourn J., MacDonald G. (2012): Definition of suitable set of actions/measures for an efficient and energy saving organization of goods transport and delivery in urban areas. C-LIEGE Project output nr. 4.2.

<sup>17</sup> Russo F., Comi A. (2010) A classification of city logistics measures and connected impacts, *Procedia Social and Behavioral Sciences*, Volume 2, Issue 3, 2010, Pages 6355-6365

- Installation of picking warehouses and services, i.e. the provision of temporary storage areas and logistical equipment, as well as services for commercial customers and businesses looking for a location,
- Establishment of industry logistics for specific sectors such as health, banking and financial services and government agencies.

These are often linked to technical measures such as the use of low-noise and low-pollutant vehicles or traffic solutions. Further measures include improved land use by introducing loading bays or loading and unloading stations for the intra-urban distribution of goods, taking commercial traffic during parking planning into account. Additional measures are access restrictions for traffic-sensitive inner city areas by the introduction of delivery time windows, city centre toll systems or entry bans for vehicles of certain weight or emission classes.

In addition, conventional approaches to city logistics are taken. These include in particular:

- Model “Cargo Transport Centre”: Spatial organization of legally autonomous transport, logistics and service companies with the aim to provide a logistical total offer.
- “Pick-up” model for optimizing the distribution traffic: The cooperation partners compile the city-specific goods. An involved or independent freight forwarder collects and delivers the goods.
- “City-Terminal” model: forwarding companies hand over their daily transport volume to an independent freight forwarder which collects the shipments. Shipment compaction is carried out by sorting and bundling in near to city terminal.

The major effector of a successful implementation of good urban logistics practices is the involvement of stakeholders into every stage of the process, which includes a continuous search for compromises in view of diverse problems and needs voiced by them as well as the adaptability level of the city being the implementation environment. When classifying UFT stakeholders, it is first and foremost necessary to identify entities, institutions and organisation representing the private sector (chambers of commerce, wholesalers, retailers, manufacturers, logistic services providers, and also city residents and users, shop owners, developers, etc.) and the institutions and organisations from the public sector (in particular the self-governing bodies – local, regional and national, road administrators, the police, etc.). Generally, it is possible to divide them into five major groups which determine the system’s functioning to different degrees and in different contexts<sup>18</sup>:

- Shippers: This is a group that includes both, senders and recipients of goods, usually retailers (small shops independent from large chains), wholesalers and manufacturers. These are customers who use the services of carriers who send

goods to other companies or private customers as well as receive goods from these entities and are interested in maximizing the level of services offered to them. This includes costs, times of loading and transportation, reliability of transportation and the reception of information.

- Freight carriers: This group includes external professional transport operators, logistic services providers, courier services, private providers (e.g. retailers who independently organize deliveries to their stores using their own transport), urban managers of distribution centres and dispatchers. Representatives of this group are usually interested in minimizing costs associated with the collection and delivery of goods to customers, which allows them to maximize their profits. It is expected that their services will be of high quality and are provided at relatively low total cost, which is particularly important in cases where the expected delivery depends on a specific time frame.
- Residents: This group should include both, city residents as well as its other users (for example, commuters and visitors to the city), people who come to the city for shopping and any other road traffic participants such as store owners, developers, associations and organizations of citizens and consumers. This group is not favourable to big commercial vehicles entering the city, even when these vehicles provide them with necessary products, due to the fact that it prefers the minimum level of congestion, low noise and pollution, and it expects a reduction of the number of accident.
- City administrators: This group can be divided into administrators of urban systems for goods distribution (regional authorities, municipalities), other administrators providing inputs to the system (planners, policy makers, infrastructure managers) and supporting institutions (such as chambers of commerce, associations of cities, etc.). This group of stakeholders focuses on urban development and increasing employment opportunities. Furthermore, it is interested in limiting congestion and the environmental impacts of transport and on increasing road safety in the city. Its members should be neutral and play a key role in resolving conflicts between other interest groups involved into urban area deliveries.
- Truck & vehicle manufacturers: This is an important element, because it includes mainly companies that provide the transport system with components necessary for its operation: commercial vehicles (hardware) and software that supports or even determines their use. In the light of the emerging new concepts and technologies for distribution of goods in the cities (packing stations, freight trams and, in the future, underground freight transport, etc.) it is worth expanding this group to include manufacturers of non-conventional technologies.

The factor that directly impacts on the heterogeneity of urban freight transport is the diversity of needs (goals) and expectations of stakeholders representing the aforementioned groups. Generally speaking, the goals mainly focus on increasing the profits

<sup>18</sup> Taniguchi E., Thompson R. G., Yamada T., van Duijn R. (2001): City Logistics. Network Modelling and Intelligent Transport Systems. Pergamon, Oxford; Lepori C., Banzi M., Konstantinopoulou L. (2010): Stakeholders’ Needs. CITYLOG deliverable D1.2. ; Roissac Z. (2010): User needs and requirements, CityMove Project - Deliverable No. D2.1.

made by freight carriers and their customers on the one hand and on ensuring the well-being factors for city residents (safety, life quality, and possibility to easily move around the city) on the other. From the public administration's perspective, the key issues is to increase the economic effectiveness of cities and to decrease the negative impacts of transport on the city environment.

Implementing modern measures that support the functioning of urban freight transport is complex and depends on several factors that impact on the final results. However, an active participation of stakeholders into the implementation of deliveries within the urban space is of vital importance. Their involvement into the evaluation of the implementation processes and their cooperation display how these processes are carried out and to what extent the current results are consistent with the stakeholder expectations. This is crucial as without their subsequent involvement into the development and maintenance of the adapted measures these actions may prove themselves as ineffective and, thus, quickly lose their socio-economic value. Active city authority policies on organizing an urban freight transport system shall aim at developing a consensus among various interest groups. These authorities should also be the initiator and main patron of the implemented measures and shall continuously supervise the relevant processes. It is recommendable to nominate a specific organizational unit within the urban structure (so-called urban logistics manager) which are mainly responsible for controlling the operation of freight transport in the city, identifying emerging issues and initiating actions that improve the quality of the transport processes.

### 3 THE VISION OF THE PROJECT LOW CARBON LOGISTICS

*Authors: Udo Onnen-Weber; Anna Månsson; Clemens Weiss*

In this wide field of challenges Low Carbon Logistics has started as a project, and its purpose is to implement concrete solutions low carbon logistics. Low Carbon Logistics is searching for innovative logistics solutions in order to make freight transport in medium and small cities environmentally friendly and efficient. In the project, partners from Sweden, Germany, Lithuania and Poland collaborate transnationally on concepts, visions, solutions and evaluation methods. Within five pilot cities, various logistics concepts are being explored. The focus is on distribution centers and last mile logistics.

#### 3.1 JOINT VISION OF LOW CARBON LOGISTICS

In the future vision, LCL initiatives will have been developed and become implemented in full scale in most small and medium sized cities or regions. Also, businesses will have realized the benefits of adopting LCL solutions for freight transports, for example the increased competitiveness. This will become even more important since while the market for green solutions and products is steadily growing.



The cost of transport, especially the use of fossil fuel, will have increased, and will accelerate the transition to a more efficient and fossil free transportation system.

The municipalities in the South Baltic Region (SBR) will be coordinating their incoming and internal freight transports and hence the engagement of manpower can be foreseeable and decreased. Many freight transports in a municipality are delivered to kitchens, schools, hospitals etc. There are many positive effects from consolidated, efficient transports, for example less stress and more time for the core business (in most cases cooking) can be achieved. The surrounding environment will also benefit from LCL solutions due to fewer trucks around public buildings such as schools etc. Less pollutions, better safety and less congestion are some examples.

Also, a large part of the of freight transports to schools, and to other places dedicated to child care will take place by night using quiet vehicles with renewable fuel or electric vehicles. Fewer trucks and a better fill rate will add to efficiency (fewer deliveries), and the low-carbon solutions combined with renewable fuel will, in total, result in a fossil free transport sector in most municipalities.

Private businesses will also have developed models for efficient transportation both in clusters, individually and in partnership with public actors. The driving incentives being competitiveness, attractiveness and nature/culture values in particular areas.

#### 3.2 THE IMPACT OF LCL GOOD-PRACTICE SOLUTIONS IN THE SBR IN THE FUTURE

**Implementation** of a dedicated parking space for trucks in the small municipality in south east Sweden lead to a number of improvements. A parking space solved many problems in the city such as heavy traffic in the city center and a lot of parked trucks. Inhabitants do not suffer from those problems anymore and feel both safer and perceive the village as more attractive. The parking space has also improved the working environment for the truck drivers and last but not least, the companies receiving the deliveries feel an improvement from this solution. The companies developed their relationships and created an efficient solution including a digital information sharing system.

Many good examples of **Distributions Centers (DCs)** can be shown from municipalities in the SBR. The DCs reduce traffic and make logistics more efficient. This has increased the attractiveness of these municipalities, which has led to satisfied inhabitants and more tourists.

**Business models** of LCL solutions have shown that green logistics can also work economically. This has motivated many logistical companies in the South Baltic Region (SBR) to make their logistics chain more environmentally friendly. The companies could thereby improve their image.

The test with **cargo bikes** in Bad Doberan for parcel services was just the beginning. Cargo bikes are now regarded as a standard vehicle in logistics and are used in many sectors. Municipalities support the use of cargo bikes in order to reduce fossil fuel traffic in the inner city. Also, the development towards prohibit diesel in certain areas, have increased the speed of transformation.

Municipalities in SBR implemented LCL solutions to protect their **pedestrian zones** safer. Environmentally friendly delivery with cargo bikes and electric vehicles take trucks and transporters out of the pedestrian zones, hence people no longer feel disturbed by traffic when they are shopping. The result are more visitors, both locals and tourists, who secure the business of small regional shops and many cities are now following the good examples from the LCL pilot regions.

The **Co-distribution for local products** in Rietavas inspired further regions in SBR to implement their concept. Local food gains a great importance in these regions. A reduction of emissions is achieved as a result of short transport routes and the local businesses have increased their competitiveness. At the same time, local municipalities, restaurants and other organisations have been more aware of the origin of their products and the demand for local, fair, ecological products have increased.

Neringa has become a good-practice example in SBR for **sustainable logistics in resorts located in national parks**. The co-distribution system of public sector reduced the number of vehicles and CO2 emissions in the area. Community and guests are less disturbed by traffic noise and affected by air pollution. Many other municipalities located in national parks in the SBR are implementing similar LCL solutions because of the successful concept in Neringa.

LCL solutions are important activities for the EU objective to make **city logistics** free of emissions.

**Co-packed distribution for municipalities**, CoDiMu®, is a concept that has been disseminated through the LCL project and is now practiced in all SBR countries. Municipalities has decreased the average GHG emissions of their own transports by 50% after implementing this concept. In combination with other measures transports are now independent of fossil fuels.

**Regulative measures** are proven to be an important part of the transition to a fossil independent transport sector. The authorities responsible for the regulations must work together with the municipalities and local companies. Regulations are especially

important for areas where there are natural and/or cultural values. The LCL project has been sharing its experiences from cities with those preconditions.

**Changing behavior** is the hardest challenge. The consumption in general has not been the focus in the LCL project but the project team has been trying to understand and improve how project participants' behavior can be change in order to consume less transports.



## Regional concepts, action plans and pilot measures



In the context of the project LCL, low carbon logistics solutions were to be developed and implemented to contribute to the efficiency and ecological sustainability of the transport sector in the South Baltic region. Five pilot cities were identified as examples for “good practice” in LCL where various concepts have been implemented. These concepts focus on the “last mile” in small- and medium-sized cities as follows:

- **Olofström** (Sweden): Truck parking area and cargo bikes for a public housing company
- **Neringa** (Lithuania): Electric vehicles for transporting goods in a National Park
- **Bad Doberan** (Germany): Sustainable last mile distribution of parcel services in a small town
- **Rietavas** (Lithuania): Dissemination of eco-friendly transport and examination of the potential of a consolidated last mile delivery system for public institutions
- **Stargard** (Poland): Cargo bikes experiment

This chapter shall describe the regional concepts of the pilot cities, discuss the challenges outlined in the vision and present the results of the pilot measures.



Fig. 1: Pilot cities in Low Carbon Logistics

# 1 Olofström



Authors: Anna Månsson (1.1; 1.2); Alija Balta (1.3)

## 1.1 REGIONAL CONCEPT

The concept for Olofström includes two options, both aiming to increase the environmental efficiency of transporting goods. The first aim, to build a truck parking area (TPA), was postponed due to several regional/local reasons related to stakeholders, land owners, spatial planning etc. The second option (in *italic*), aiming to replace cars by cargo bikes, was elaborated after the TPA was postponed. Therefore, we include both regional concepts. The details related to work on the TPA and the findings from that process will be separately presented in a report that addresses the regional protagonists.

### BACKGROUND

There are a lot of trucks arriving at and departing from Olofström each day. Because of its business structure, there is a lot of freight transportation in the municipality and its surroundings. ONAB has identified the large companies' transports as the main reason for the heavy flow of goods and their role in this project is to coordinate the company activities towards creating opportunities for collaboration in the area of local/regional freight transportation (last-mile or short-distance transportations). The industries in the municipality will soon face an increase in production volumes and ONAB

wants to address the importance of collaboration to avoid sub-optimizations (leading to unnecessary transports) within the geographical borders of Olofström municipality.

*Both, employees and inhabitants of Olofström are very dependent on cars. The number of kilometers driven per person in the municipality is increasing and that trend needs to be changed in order to reach the climate goals on national and global level. There are a lot of travels that involves one moving person only, but there are also travels of logistical character performed by persons in their private/company car.*

### REGIONAL GOALS AND LONG TERM FUTURE VISION IN THE LCL PROJECT

The goal will be to find positive effects from consolidation/co-packing and thereby to reduce CO2 emissions in the municipality and to enhance the competitiveness among regional companies. To be able to do this in an efficient and innovative manner the exchange of experience with South Baltic partners is crucial. Inhabitants hope to experience less littering and disturbance from heavy trucks.

*The goal will be to find positive effects from replacing fossil fuel-driven cars by electrical cargo bikes and, thus, to reduce CO2 emissions in the municipality. To be able to do this in an efficient and innovative manner the exchange of experience with South Baltic partners would be crucial. Inhabitants hope to experience less noise and air pollution as well as more safety and increased health.*

### COMMON CHALLENGES

#### Challenge 1: Economy

The global economy significantly impacts on the Olofström area due to an unique local business structure that is heavily dependent on one large global car manufacturer. A foreseen increasing production needs to be managed in order to retain the attractive city and an efficient industry.

Solutions that could be implemented to cope with an increased production volume: 1) Change of working times related to 24-hour-deliveries; 2) Night deliveries; 3) Distribution central (DC), i.e. coordinating and consolidating deliveries outside the city center; 4) Inter-company-collaboration; 5) Dedicated truck-parking-area (TPA) giving all trucks a place where they can wait for new assignments after a delivery.

*In this region it is important to have a car to be flexible and available, both for working and for private and social activities. There is a resistance and anxiety that a reduction of transports and travels cannot go hand in hand with to local and regional development and economic growth.*

#### Challenge 2: Demographic change

The municipality is slowly growing and, however, there is a general trend towards urbanization in Sweden. It is important that the area stays attractive in order to maintain the competence to supply the industry. To increase safety, attractiveness etc. it is important that the traffic does not pass and/or occupy the city and the main city roads. An outside-city DC or TPA could solve this problem.



Solutions to maintain the attractiveness of the city could be a replacement of cars by cargo bikes, offering consolidated home deliveries or vehicle-sharing systems.

### Challenge 3: Climate change

The city center is not suffering from a high degree of air pollution due to the traffic. The decrease achieved via LCL-measures will not be visible for the inhabitants in the city. Initiating a trend towards prohibition of diesel vehicles could be a future measure. The solutions that are relevant in this case are: 1) DC; 2) collaborations in order to optimize the transports; 3) TPA with electricity; 4) electrical vehicles that decrease the local emissions; 5) an establishment of environmental zones.

### Challenge 4: Ecological awareness

The global business can significantly impact on the local and global awareness. The local inhabitants and visitors of this area are mainly experiencing some transport related problems that are not specifically elaborated in the common vision. These are traffic safety, noise, congestion, attractiveness of the city and environmental impact from drivers.

*The awareness and the ambitions are high as Sweden aims to be one of the first fossil free welfare countries. There are a lot of measures being implemented and one of the toughest challenge is the behavioural change. The willingness to change the individual lifestyles is still low and there are large differences among the inhabitants.*

### Challenge 5: Costs/budgets

The discussion about an increase of the transportation costs can lead to better incentives for replacing the car or starting collaborations or sharings between actors. The collaboration can for example be a physical area where goods and/or transports are coordinated and/or consolidated i.e. DC, TPA or vehicle-sharing systems.

### Challenge 6: New drivers

Autonomous trucks are one potential area of development. The car factory in Olofström could be a suitable place to start such an innovative initiative.

*The following new drivers could influence the choice of transport: subsidies for electrical bikes, sustainable development and Agenda 2030, gender equality and diversity and trend towards sharing economy.*

### Challenge 7: Digitalization

As described in the common vision, the use of smartphones is an opportunity but also a challenge. The possibilities are enormous, but the data mining must be efficient to add value to the transport processes. Opportunities for Olofström are 1) to coordinate information between companies since they are located close to the city and close to each other; 2) to physically gather all trucks in one spot (TPA or DC) and to provide information and service there; 3) to facilitate sharing systems and a higher utilization of vehicles.

### Challenge 8: Legislations and regulations

The following possibilities for regulations and legislation were identified for Olofström: 1) to allow heavier trucks as this can reduce the number of trucks and make the transportations more efficient; 2) to investigate an implementation of environmental zones to see if there are any regulative measures needed. There can also be a synergy between environmental zones and implementation of a TPA or DC.

*To promote a use of cargo instead of private cars measures, for instance, related to parking policies in the city or increased cost of ownership for cars can be taken.*

## SUMMARY AND PRIORITIZATION OF REGIONAL CHALLENGES

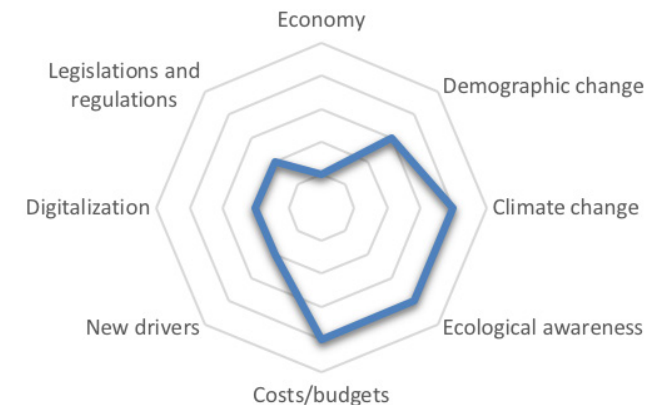
### Summary of option 1:

It is important for the project team to describe a solution which can be further developed after the end of the project. The challenges that are prioritized in this region are the economy and the ecological awareness, because the most important stakeholders in this region are the inhabitants/municipality suffering from “social” problems and the strong industrial culture and business structure. Therefore the measure that is chosen for further investigation is the dedicated TPA. It will clearly decrease the number of trucks in the city center and it will also give the companies and municipality an area that can be developed according to future needs.

### Prioritization and summary of option 2:

*The challenges for different target groups will differ and the incentives to use a cargo bike must be adapted. It is important for the cargo bike solution to be attractive and to serve as good example in the field. The challenge to be further investigated is how to maximise the utility of the cargobikes.*

### Challenges for LCL in Olofström



## 1.2 REGIONAL ACTION PLAN

### THE MEASURE

**Option 1:** The TPA is a first step. From this area, the DC, the digital solutions, etc. can be developed. The limited budget available in the project will start the implementation of the TPA in order to create preconditions for the regional actors to continue the LCL solutions implementation. At this stage, the project participants, together with local and regional stakeholders, have investigated the conditions for a TPA run by a company/cluster of companies. A lot of work has been done and unfortunately, in October 2017, the decision of the private companies changed. Thus, the project team changed direction and approached the municipality. The political organization gave their approval to continue the work in January 2018. Unfortunately the new investigation with new preconditions showed that there are no suitable locations that fit into the LCL time schedule. The municipality still has the intention to establish a TPA. After discussions in the municipality and together with LCL partners a new solutions was presented and accepted by the municipality of Olofström and a new stakeholder group was formed.

**Option 2:** *The public housing company sees the potential to increase the environmental efficiency of their internal transports, today only performed by cars. Cargo bikes are an attractive option the employees will benefit from - and in the long term also the tenants. Cargo bike solutions will be implemented in a number of areas in Olofström. Those will be utilized by service staff during the working hours and by the tenants when available. Furthermore, the volunteers who have already started to work in some of those areas will be able to use the bikes for their tasks.*

*The municipal IT department also sees that there is a potential to replace a lot of transports of smaller equipment to public entities around the city. They will be a forerunner for other municipal departments that can follow their good practice and hopefully also inspire small private companies.*

### STAKEHOLDERS

The predefined and initial stakeholder group was the company cluster “Techtank”. The idea was driven by the project partner ONAB and supported by the Techtank cluster. ESS has supported ONAB with knowledge from former projects and also provided guidance in accordance with the application form. NetPort Science Park has contributed with knowledge and expertise related to digitalization and with ideas for the operating agreement. The municipality has supported the stakeholder group.

The main stakeholders for option 2 are:

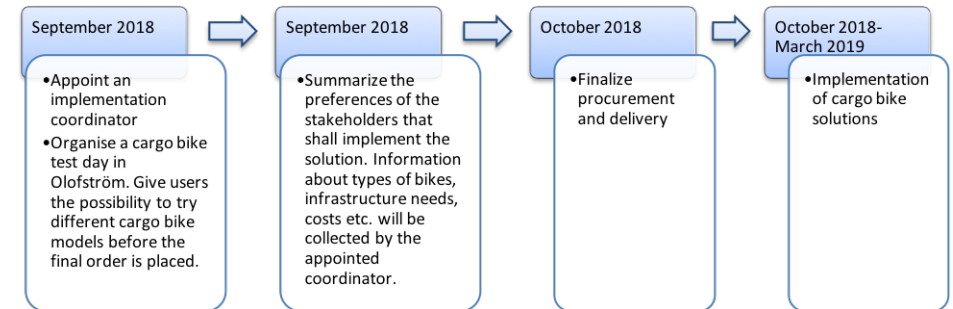
- Olofströmshus (public housing company)
  - Service personel
  - Volunteers working in the housing area
  - Tenants
- IT department Municipality of Olofström

### CONDITIONS

The new solution will require cargo bikes and surrounding infrastructure, for example parking spaces for bikes, lighting, possibilities to lock items (“cargo boxes”), a booking system, charging etc.

### TIME PLAN

The new stakeholder group had its first meeting in May 2018. Therefore, the time-schedule is still under development.



*We realized that the evaluation period is very short and that the time of the year might affect the utilization rates of the bikes.*

*After the project, the implemented cargo bike solutions will serve as an inspiration to other organisations and companies in the region. The main stakeholder is very active in social and environmental projects and will continue to develop the solutions and promote their progress. ESS will support this dissemination and is, via other projects, able to arrange, for example, study visits.*

### FINANCING

*Olofströmshus and the Municipality of Olofström will contribute to the financing of the cargo bikes.*

*There is a possibility that a small charge for the tenants that are interested in using/sharing a cargo bike will be available in the future.*

## 1.3 PILOT MEASURE

### DOCUMENTATION

By participating in the LCL project, Olofströmshus intended, as far as possible with the available capacities, to make use of the opportunities and benefits of using cargo bikes instead of a company cars at work. Since we did not have any own related experiences, we searched for other companies from the same sector that had already taken steps towards cargo bikes use. We talked to other housing companies that currently offer this service to their employees, to benefit from their experiences.



Our investigations showed that those housing hosts who used cargo bikes were experienced as more present and that this, in turn, created a higher feeling of security among the people living in this residential area. It became clear that the employees were not only much more visible on their bikes, but also saved a lot of time when not driving around in other traffics. Another benefit was that some residential areas that are difficult to reach by car became more accessible now: with a cargo bike, one could easily make all the way to the gates. The staff has experienced this getting out and cycling in the fresh air as healthy and positive. They have had a positive feeling when being able to work without placing a lot of exhaust gas in the residential area. They have started to plan their work in a completely different way and experienced that they are able to do their job as good as previously done by car, in some cases even better.

We were really pleased about these survey results when summing it up and started, as the next step, to plan a purchase of cargo bikes. As nobody in the company had related experiences, we had to collect information via desk searches and contacting various potential suppliers. Furthermore, we took part in a networking event on cargo bicycles which was organized by the Energy Agency for Southeast Sweden in Emmaboda/Sweden.

Out of this preparatory work, the decision was taken to buy cargo bikes offered by two different brands. This was supposed to allow a comparative analysis and evaluation of different products. Accordingly, the brands Babboe and Christiania Bikes were selected here. Both offered the same type of bike, but with slightly different design details and features. We placed the bikes in the residential area selected for this pilot project, asking all staff members to test them.

When we first started discussing cargo bikes, many team members were quite skeptical. Due to this, an easy approach was chosen: to involve only those who wanted to try at their own pace. We did not want to force anyone to ride, nor did we want to exclude anyone from driving. We simply wanted the bikes to be a complement and that the staff themselves could discover the benefits. It did not take long before the bicycles began to be used frequently. It was even so that many preferred them to cars.

The advantages of the cargo bikes have primarily been noted by the customer hosts, especially during fine weather periods where driving in a warm car is uncomfortable. The bikes offer plenty of space for tools and spare parts that are needed to carry out the daily tasks. The project has only been tested for some months, but already now an increasing interest among the staff members was to be observed. Staff from all of our residential areas have started to contact us and wants to use a cargo bike on trial. The response among our tenants has also been very positive. They, for example, think that the customer hosts are much more present and visible when arriving by bike.

## RESULTS

### Ecological analysis

Olofströmshus's own vehicle fleet is dominated by biogas cars and electric cars, but as the customer hosts precede with good example, more tenants are motivated to go by bicycle instead. Due to this, the number of short-distance car rides is reduced for both customer hosts, tenants, young people and employees at the local Youth centre. Olofström is a small town with short distances, so that an electrically powered cargo bike can replace the car on many trips.

### Economic analysis

The project is implemented by the municipal real estate company Olofströmshus, which primarily considers this as an important part of its environmental work - but at the same time can count on economic benefits. Reducing the number of car transports reduces fuel consumption and allows reducing the number of cars in the company. A more flexible work provides healthier employees, thus, reducing the number of sick days for the staff and related costs for the employer. The well-being of the tenants results into less damage and increased care for their own home.

Ekerydsplan is located near the center. With approximately 40% of Olofströmshus's total apartment holdings, it is the company's largest residential area. A project called "Eco-Living" with focus on urban cultivation was started here in 2014. This project has been developed and many tenants grow vegetables now, which also increased the cooperation in the area. Furthermore, the newly started EU project "Project for Social and Ecological Harmony" with focus on creating socially and ecologically sustainable living environments in order to create good life quality is in progress at Ekerydsplan. The project aims at offering more meeting places and areas towards strengthening the Ekerydsplan community.

### Benefits for the city

In addition to reduced climate stress, there are also gains to be made in several other areas. The city will benefit from a reduction of car rides regarding the following:

- The air pollution decreases: The annual traffic statistics of central Olofström show that more than 10,000 vehicles drive through the city center daily - a great potential for improvement.
- A cycle trip is good for health. This applies for both, customer hosts who use the bicycle in their daily work and tenants who choose a bicycle to go to the

food store. And an improved public health is beneficial for the individual and the society as a whole.

- Customer hosts riding a bicycle come closer to the tenants than car-borne customer hosts – green transportation enables personal meetings.
- A bicycle is inexpensive to operate and saves money for the person who does not use a car instead.
- The traffic safety in the area increases where more people choose the bike and car traffic decreases.
- Fewer cars reduce the space needed for parking lots in the area.
- A cyclist does not need to look for parking space.
- A bicycle is smooth in city traffic.

## OUTLOOK

The goal in the future is to implement the working method with cargo bicycles in all areas where there is a need and opportunity for use. A sub-goal is to create a good co-operation with the youth center Våxtverket, where cargo bicycles can be used for the institution's operations.

Furthermore, the company intends to build a rental business where tenants can test cargo bikes. We are in the process of deciding on various alternatives of enabling this in a resource-efficient way. This will be one of the future challenges. We also want to review the storage possibilities for cargo bikes and would like to offer secure storage facilities to the tenants.

Olofströmshus aims at being fossil-free until 2030, also with the help of other means of transport than just cars. We want to take the environment into consideration, but at the same time we wish to be effective and to create a proximity to the customer in our areas. We can succeed in this by presenting various attractive alternatives to cars, letting the staff members themselves participate in their evaluation and come up with suggestions for improvement.





## 2 Neringa

Authors: Jonas Matijošius; Vilma Kavaliova

### 2.1 REGIONAL CONCEPT BACKGROUND

The town of Neringa is located on the southeastern coast of the Baltic Sea, in the Curonian Spit National Park. It spans the peninsula and can be accessed from the mainland of Lithuania by ferries. The town is a tourist destination, and the status of a National Park territory restricts the pursuit of industrial activities there. The town has excellent transport infrastructure, from roads to bike paths, which allows expanding the town's trading and leisure places for tourism purposes. Cargo is transported to these trading places by cars and lorries. These vehicles emit pollution (Fig. 1) and noise. Therefore the implementation of the LCL project in this region would render obvious benefits.

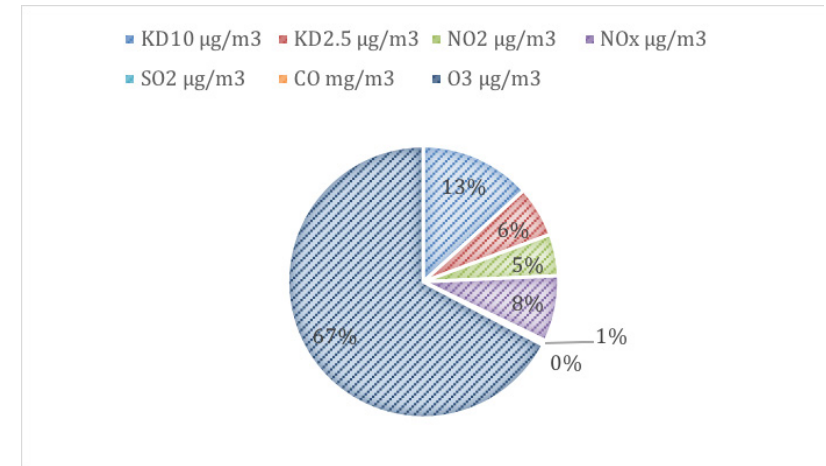


Fig. 1: Air pollution structure in Neringa municipality<sup>1</sup>

It should be noted that cargo flows are highly dependent on the flow of visiting tourists, and the latter depends on seasonality (with the greatest tourist flows at summer time). In the context of the LCL project, Neringa will demonstrate a positive experience for business using environmentally friendly vehicles which would reduce emissions of CO<sub>2</sub> and other pollutants.

### REGIONAL GOALS AND LONG TERM FUTURE VISION IN THE LCL PROJECT

In the future, only environmentally friendly transport will be developed in the region, which will not pollute the nature with harmful substances and have low noise emissions. The LCL project will allow the municipality to develop an environmentally friendly cargo policy. Since the largest cargo flow is expected in summer, Neringa will be able to develop the concept of cargo transportation by electric, hybrid vehicles and pilot cargo deliveries by Segway (transwheel system), just like those carried out in several cities in Israel now.

Furthermore, the use of these vehicles will significantly reduce the noise level, especially during the summer season. This will allow to create a sustainable mobility system, which will protect the fragile ecosystem of the Curonian Spit.

### COMMON CHALLENGES

#### Challenge I: Economy

Having held some public procurement procedures, the municipality could support the renewal of the vehicle fleet in its established and subordinate institutions. This would increase the visibility of electric or hybrid cars and demonstrate their capabilities in solving economic and social challenges. The use of new environmentally friendly vehicles for transporting cargo at the municipal level will allow to reduce pollution taxes (currently

<sup>1</sup> Ministry of Environment of Lithuanian Republic. Pollution level in Lithuanian's regions. Internet access: [http://www.am.lt/VI/article.php3?article\\_id=7638](http://www.am.lt/VI/article.php3?article_id=7638) Last seen 05-05-2018

paid based on fuel consumption) and vehicle maintenance funds. Companies carrying cargo in electric vehicles will be subject to tax reliefs on entry into the municipality (Nida ecological fee). The LCL project will enable an advancement of new electrified vehicles in the region, ensure the development of the necessary infrastructure and create new jobs.

### Challenge 2: Demographic change

The number of people living in Neringa municipality depends on the seasonality: it increases in the summer, when tourists arrive to the region, and it decreases at the end of the resort season. When it comes to the local population, their number has been steadily increasing (3.097 residents in 2017 compared to 2.752 in 2014)<sup>2</sup> due to an excellent living environment, developed tourism and low pollution in the region.

### Challenge 3: Climate change

Marine climate dominates in Neringa, resulting into summers being not too hot. The unique ecosystem of Neringa, which is most affected by the warming of the climate, is worth to be mentioned here. The LCL project will allow to reduce the greenhouse gas emissions in the region and to develop an environmentally friendly cargo delivery system in Neringa.

### Challenge 4: Ecological awareness

Residents of the municipality are aware of the health effects of emissions of harmful substances from cars, but few of them state that they know what can be done to eliminate or reduce this effect. Although technical solutions for electric transport have virtually been found, the general level of the population's related applied knowledge is still limited. Environmentally friendly transportation is being developed in Neringa municipality (bicycles, Segways, free charging of electric and hybrid cars). Cargo is transported in M1, N1, N2 and N3 category vehicles, thus, having replaced at least some of vehicles owned by municipal enterprises and organizations by electric or hybrid vehicles, so that emissions would be reduced. The reduction of adverse environmental impact of heavy transport involves the establishment of logistics centres in rural areas and the diversion of freight transport via bypass roads. Due to the low density of the road network of Neringa municipality and the need to preserve the natural landscape, it is not possible to build bypass roads, while logistics centres will not pay back because of seasonality. Therefore the only expedient measure is the limitation of heavy traffic during the day and in the evening.

### Challenge 5: Costs/budgets

The municipality's budget is low but well-balanced to support the ongoing activities. A great deal of attention has been paid to cleanliness and order in the town, focusing on both, economic and environmentally friendly technologies.

### Challenge 6: New drivers

Electric or hybrid vehicles should dominate in Neringa in the mid- and long-term planning period. N1 and N2 class electric or hybrid vehicles would be mainly used for cargo delivery, and the Transwheel system currently tested in Israel could be used to transport small cargos.

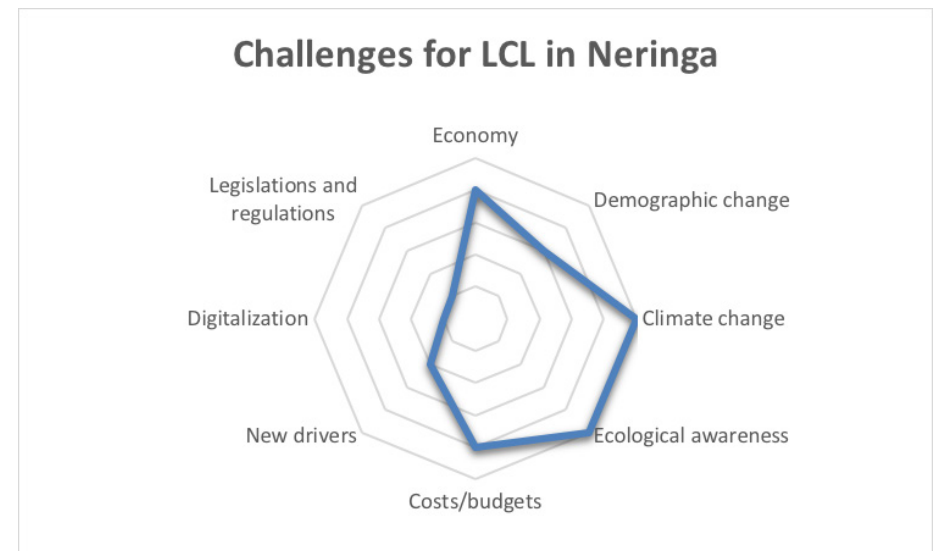
### Challenge 7: Digitalization

Lithuania is highly developed in the fields of digital technology, internet penetration and WiFi. This could ultimately enable a creation of an efficient cargo ordering and delivery-monitoring system. This system would ensure an efficient exploitation of electric vehicles, and would create preconditions for future use of autonomous vehicles to transport cargos.

### Challenge 8: Legislations and regulations

The White Paper lays down the European Union's transport development policy. It emphasizes sustainable development of the transport system, which allows reducing pollution and ensures its further development. The emission requirements for vehicles become more stringent every year. This becomes relevant in the case of heavy vehicles that usually carry cargo. The CO<sub>2</sub> emissions level of 2021 from diesel-fuelled vehicles will be hard to reach (from the current 130 g / km to 95 g / km in 2021). The LCL project allows Neringa to make a significant contribution to EU initiatives: By 2030, 20% of vehicles must be powered by electricity<sup>3</sup>.

## SUMMARY AND PRIORITIZATION OF REGIONAL CHALLENGES



2 Department of Statistics of Lithuanian Republic. Population of Lithuania. Thematic tables. Internet access: <https://osp.stat.gov.lt/gventojai> Last seen 05-05-2018

3 WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system /\* COM/2011/0144 final \*/ Internet access: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52011DC0144> Last seen 05-05-2018

In the future, only environmentally friendly transport will be developed in the region, which will not pollute the nature with harmful substances and will have low noise emissions. The LCL project will allow the municipality to develop an environmentally friendly cargo policy. Since the largest cargo flow is expected in the summer, Neringa will be able to develop a concept of cargo transportation by electric, hybrid vehicles and pilot cargo deliveries by Segway (Transwheel system), just like those carried out in several cities in Israel now.

Furthermore, the use of these vehicles will significantly reduce the noise level, especially during the summer season. This will allow to establish a sustainable mobility system which will protect the fragile ecosystem of the Curonian Spit.

## 2.2 REGIONAL ACTION PLAN THE MEASURE

Since there already is an electric car charging station in Neringa and the plan is to further expand its network in the future, developing a concept for electric and hybrid vehicles for transporting cargo is advisable. It would manifest through the acquisition of electric vehicles and allows to develop other alternatives (hybrid vehicles).

### Electric vehicle

This vehicle would allow to ensure a smooth delivery of cargo in Neringa, with zero air pollution and a low level of noise. Since Neringa is located on a peninsula, the developed network of electric charging stations will allow to effectively ensure a full load of this vehicle.

### Hybrid vehicle

This alternative could be used, but it does not ensure zero air pollution. On the other hand, its use allows a reduction of air pollution and noise and it is less dependent on the location of electric charging stations.

## STAKEHOLDERS

Two stakeholder groups are relevant for the performance of the planned LCL project activities in Neringa:

- The local community;
- Municipal enterprises and small business entities in the town of Neringa.

Local community members and incoming tourists will feel a positive impact due to lower emissions of CO<sub>2</sub> and other hazardous substances. The application of the principles of green logistics will allow to create a sustainable cargo supply chain system.

The town of Neringa and its companies will jointly operate a new environmentally friendly vehicle. The air quality in the region will be improved and new green and innovative transport will be encouraged. This will also reduce traffic in the region, achieving economic effect as a result of reduced maintenance costs.

## CONDITIONS

Neringa uses standard vehicles fuelled on diesel, gasoline or LPG and hybrid vehicles. Their quantity is highly dependent on seasonality: during the summer season the number of vehicles increases up to 100,000. Utilities transport, which can be characterized by highest emissions levels, can be measured in terms of consumed amount of fuel per year. These data are presented in Table 1:

Table 1: Highest amount of fuel used per year by road vehicles used by municipal enterprises in the territory of Neringa municipality<sup>4</sup>

Company	Fuel	Amount, t/year	Exhaust gas, t/year				
			CO	NOx	HnCm	SO2	PM
JSC "Neringos komunalininkas"	Diesel fuel	53.65	8.56	1.9	3.03	0.056	0.266
	Petrol	19.31	8.14	0.65	1.65	0.017	-
JSC "Neringos energija"	Diesel fuel	2.594	0.499	0.086	0.135	0.002	0.009
	Petrol	2.203	0.909	0.048	0.205	0.002	-
JSC "Neringos vanduo"	Diesel fuel	6.369	1.309	0.208	0.411	0.051	0.013
	Petrol	3.087	1.738	0.132	0.363	0.007	-
Total:		87.213	21.155	3.024	5.794	0.135	0.288

As displayed in Table 1, the maximum sustainable impact of emission reductions could be reached through the use of environmentally friendly transport in municipal enterprises. Since an electric car charging station was set up next to the Neringa municipality administration, it supports 4 Modos fast charging mode and has Combo 2 and CHAdeMO "Connect" connections. It is also compatible with all electric car manufacturers. The plan is to purchase a fully electrified vehicle, which would reduce emissions and serve as a positive example for other businesses. One of them would be enough to demonstrate the impact, both economically and ecologically.

One maintenance engineer would be enough to maintain the infrastructure of electric vehicles.

The overall reliability of electric vehicles and their charging stations is guaranteed by manufacturer's warranty, a maintenance of high-quality equipment, a timely diagnosis and a repair of failures.

As only new vehicle are used and the procurement system has already been developed, there is no need to create new reliability systems - they would be the same ones that apply to current orders.

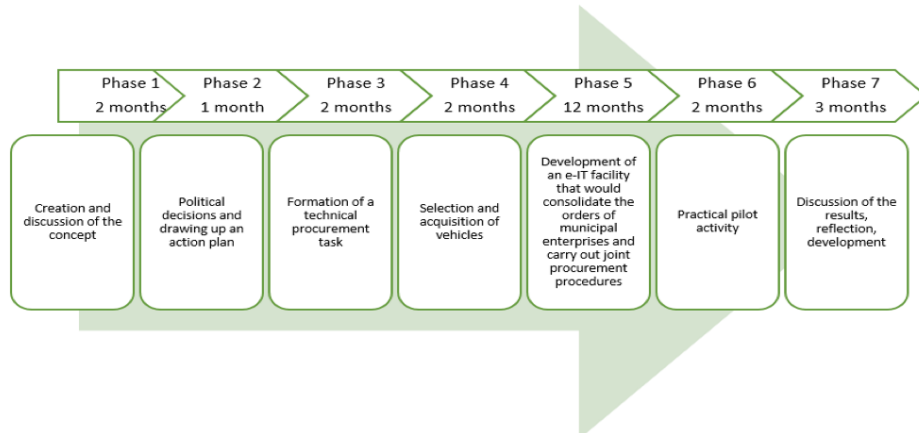
<sup>4</sup> Environmental Air Quality Management Program of Neringa Municipality. See <https://www.neringa.lt>

## TIME PLAN

### Development phases

The introduction of new technologies will stimulate new investments in the region, which will positively affect the region's infrastructure development. New types of transport (electro vehicles, segways) will allow to successfully develop cargo transport in the region.

The air pollution will be reduced, which will have a positive impact on human health.



### The following steps should follow after the end of the LCL project:

- Development of an electric/ hybrid vehicle fleet;
- Development of the infrastructure needed for the operation of electric/hybrid vehicles;
- Development of good practice and adaptation to private business interests;
- Research and feasibility study on how to generate electricity from renewable and ecological sources used by regional electrolytes.

## FINANCING

### Financing: within the project phase LCL

The financing will be ensured according to project requirements; the municipality provides sufficient financing to maintain and improve the achieved project results at the end of the LCL phase. The project has the following resources:

- Purchase of a hybrid vehicle – 60 000 Euros;
- Personnel training – 200 Euros;
- Acquisition of possible operational means and materials – 500 Euros;
- Environmental education via a demonstration vehicle as a model for reducing emissions to the public – 500 Euros.

### Financing systems after the LCL project phase

The operation of a hybrid vehicle is cheaper compared to diesel and petrol-driven vehicles which allows to save money. The saved funds will be used to finance the LCL activities after the end of the project.



## 2.3 PILOT MEASURE DOCUMENTATION

Vehicles that are non-polluting and, thus, more environmentally friendly than fossil fuel-powered vehicles are considered as green transport. This term can be related to electric, hydrogen-powered or other eco-friendly cars. The concept of green transport combines the efficient and productive use of resources and the modifications of the vehicle structure with a healthier way of traveling. Bicycles, hoverboards, eco-friendly trucks and other clean vehicles fall into this category. All these vehicles can significantly contribute to reducing pollution and becoming important charging network users. The development of electric cars is of particular importance for achieving the goal to halve the use of conventional fuel-powered cars in cities by 2030 and making them completely disappear from cities by 2050. The EU aims at reducing greenhouse gas emissions by 20% by 2020 compared to 1990.

Taking the aforementioned aspects into account, a public procurement documentation for pilot investment was elaborated as a contribution to the project goals. The public procurement procedures revealed that the electric and hybrid vans (vehicles) market is still very small in Lithuania and gets very little attentions from the suppliers. The public procurement procedures were carried out several times and it took more than half a year to finalize them by signing a related contract.



## RESULTS

### Ecological analysis

Electric cars are widely used in modern logistics, but Neringa municipality is one of the first users of a consolidated goods delivery model based on electric vehicles in the South Baltic Region's public sector. A wider use of electric vehicles in Neringa would have a significant influence on the reduction of greenhouse gas emissions. Since electric motors of electric cars emit no greenhouse gases, they would efficiently replace fossil fuel-powered cars.

Electricity is used to drive electric cars. Thus they can, like other electricity-powered means, use electricity from renewable energy sources. A development of electric cars would increase the use of electricity as well as the use of electricity from renewable energy sources.

New vehicles, which will be less polluting thanks to the latest technology, are to replace the old ones and contribute to the achievement of the ecological goal (pollution reduction). The EU has established that starting from 2020, new cars sold in the European Union will have to emit 95 grams of carbon dioxide (CO<sub>2</sub>) per kilometre travelled maximum. For comparison: a car with a petrol internal combustion engine (hereinafter referred to as ICE) manufactured in 2011 emits an average of 168 grams of CO<sub>2</sub> per kilometre. Carbon dioxide accounts for 99 percent of greenhouse gas emissions from the transport sector in the region, so that a renewal of the vehicle fleet would make a significant contribution to reducing greenhouse gas emissions.

Green public procurement are an additional measure that contributes to green, environmentally friendly transport development. These days, such procurement procedures have been recognized as an effective tool for efficiently implementing the concept of sustainable development. States are proposing to expand green procurement requirements, which includes the requirement that electric cars shall account for a certain share of the purchased M1 and N1 class cars.

The application of even the minimum criteria focusing on the most important areas of Neringa's environmental performance could significantly contribute to achieving the environmental objectives. This particularly applies for CO<sub>2</sub> emissions from transportation, because the overall transport-related CO<sub>2</sub> emissions have steadily increased despite of technological progress. The greenhouse gas emissions from road transport have increased by 26% since 1990.

### Economic analysis

A consolidated goods delivery business model which was elaborated and implemented as one low-carbon logistics (LCL) solution has shown that green logistics can also work economically, where including the following:

- an application of financial incentives;
- a reduction of fuel costs;
- a reduction of vehicle maintenance costs.

The consolidated goods delivery model by electric car allows to replace five vehicles used for goods transportation in Neringa municipality.

### Benefits for the city

Currently, a renewal of the car fleet in form of replacing old cars by electric vehicles is one of the possible measures to achieve the target of 2050. The EU aims to reduce greenhouse gas emissions in the transport sector by 20% by 2030. To achieve the EU's target of 2050, Neringa has to take additional measures, which currently includes the replacement of ICE-driven vehicles with electric cars.

Companies operating in Neringa, which travel short distances, have their own charging equipment or are located close to equipment installed by the municipality. Accordingly, it will be no problem for them to exclusively use green transport. Green transport is more attractive for small and medium-sized businesses that do not need a large fleet of vehicles. Companies of this type dominate in Neringa.

Neringa has become a good-practice example for green logistics in national parks in the South Baltic region. The established co-distribution system reduced the number of vehicles in the area. Guests and animals feel less disturbed by the traffic and the noise.

### Reaching CO<sub>2</sub> emission reduction

The report is based on the data collected by the European Environment Agency (EEA) concerning the CO<sub>2</sub> performance of passenger cars, in accordance with Regulation (EC) No 443/2009 (EU, 2009), and of light commercial vehicles (vans) in accordance with Regulation (EU) No 510/2011 (EU, 2011). The regulation for passenger cars sets the average CO<sub>2</sub> emissions for new passenger cars at 130 g CO<sub>2</sub>/km by 2015 while the regulation for light commercial vehicles sets the average CO<sub>2</sub> emissions for new light commercial vehicles at 175 g CO<sub>2</sub>/km by 2017. Stricter targets will apply under these regulations from 2020 (vans) and 2021 (cars).

The implementation of pilot measures / investment in Neringa will allow to reduce 0.184 tones of CO<sub>2</sub> emission per year (see Table 2)<sup>5</sup>.

Table 2: Emission reduction after pilot investment implementation

Company	Engine type	Emissions, t per year				
		CO	HC	NO <sub>2</sub>	PM	SO <sub>2</sub>
Skoda Boomster	Gasoline	0.052	0.009	0.004	0	0.000206
VW Multivan	Diesel	0.035	0.004	0.003	0.015	0.000182
VW Caravelle	Diesel	0.035	0.004	0.003	0.015	0.000182
VW Transporter	Diesel	0.01	0.005	0.019	0.06	0.0005
Skoda Fabia Combi	Gasoline	0.052	0.009	0.004	0	0.000206
Total:		0.184	0.031	0.033	0.09	0.001276

<sup>5</sup> Since a zero-emission car has been chosen, the emissions are reduced by the sum of the amounts given in Table 2

### What would be effect to use zero emission vehicle?

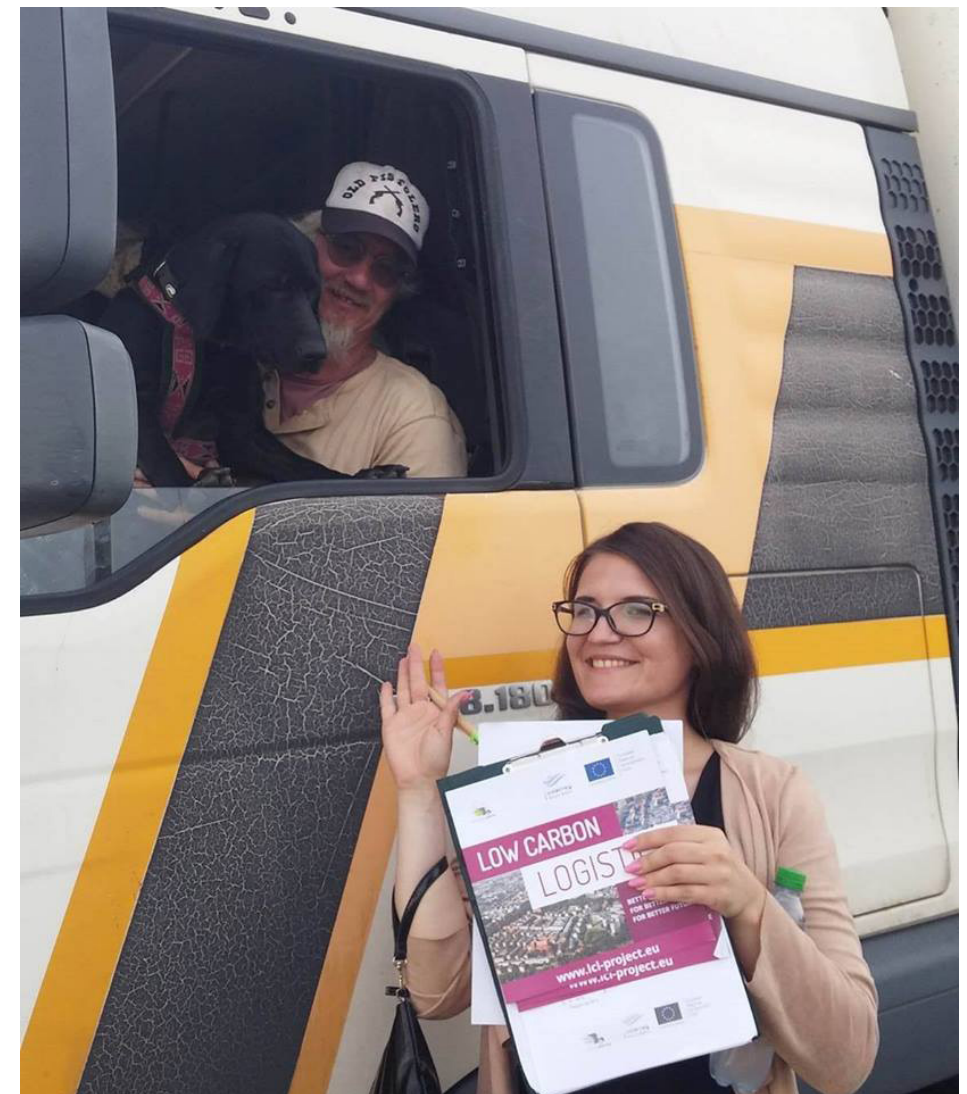
In our case study, a zero emission of CO<sub>2</sub> in Neringa municipality was assumed. The pollution level was calculate in comparison to standard gasoline engine vans. The standard CO<sub>2</sub> emission level from 2020 would be 145 g CO<sub>2</sub>/km. The difference would amount 145 g CO<sub>2</sub>/km.

### OUTLOOK

Possibilities to charge green vehicles throughout Neringa, thus, reducing the noise level and greenhouse gas emissions should be aspired. According to the programme, 5% of all new vehicles registered in Neringa should be eco-friendly by 2020, by 2025 this share should be increased to 10%.

Neringa municipality has elaborated strategic documents that shall enable a development of the infrastructure needed for ecological cargo transport in the region, ensuring the supply of green energy to charging stations and coordinating the installation of private stations. Public charging stations should be used to charge electric vehicles of guests of Neringa, while the locals could charge their green vehicles at home at night. To enable this, considering the best options for installing private stations is particularly important. An installation of charging stations during the construction of new buildings should be promoted and supported by municipality.

Replacing vehicles used by Neringa municipality by electric and hybrid ones for consolidated goods delivery is also assumed to be an inspiration for other regions. By replacing its fossil fuel-powered vehicles by electric or hybrid vehicle the municipality intends to contribute to the achievement of the set environmental goals.



## 3 Bad Doberan



*Authors: Clemens Weiss; Udo Onnen-Weber*

### 3.1 REGIONAL CONCEPT BACKGROUND

Located in the north of the German province Mecklenburg, near the Baltic Sea, Bad Doberan is a small town with seasonal peaks in tourism. Because of the importance of tourism, the inner city of Bad Doberan has developed into a compact city centre with many shops, whose supply with goods by trucks and transporters causes air pollution, noise and congestion. Moreover, the goods delivery in Bad Doberan faces several obstacles due to a pedestrian area with time restrictions, narrow streets and few loading zones.

### REGIONAL GOALS AND LONG TERM FUTURE VISION IN THE LCL PROJECT

Within the EU-Project Low Carbon Logistics, the small German town Bad Doberan has accepted the challenge of making the transport routes of parcel services in the town more environmentally friendly. The vision is to implement green solutions for all CEP-services to free the inner city from trucks and transporters.

As a result, the motorised delivery traffic in the city centre is expected to be reduced, which will lead to a reduction in emissions and an increasing attractiveness of the shopping zones and the entire town.

### COMMON CHALLENGES

#### Challenge 1: Economy

In the consciousness of entrepreneurs and residents, transport is the core aspect of development. The concern is great that traffic-related changes might negatively impact on the development opportunities of the community, the economy and private life. It is mainly the concern for economic losses that results in the company's resistance against changes in the transport sector

But logistics can be changed without a loss of revenue. On the contrary, an even higher attractiveness in inner cities may be achieved out of this. Therefore, a project like LCL needs to take actions towards behavioural changes.

#### Challenge 2: Demographic change

Demographic change is quite advanced in Germany and also in Bad Doberan. Both, residents and tourists are of comparatively advanced age. These people are rather immobile but consider environmental protection as highly relevant, which is why it should be easy to also convince them of traffic avoidance and relocation. This stakeholder group will be crucial in Bad Doberan, primarily for altering convictions in administration and politics regarding the mobility change.

#### Challenge 3: Climate change

Climate change will affect Bad Doberan in the near future, mainly due to the increasing of extreme weather events. One result will be that the guests will change from beach mode to city mode in the future and traffic burden for Bad Doberan will be even higher than today.

#### Challenge 4: Ecological awareness

The ecological awareness is strong in Germany, but the intention to change and implement is weak. Projects like LCL have to demonstrate that taking action is often easy and that the change does not hurt. This is why a positive impact of LCL on the region is anticipated and it will presumably serve as catalyst for further green projects.

#### Challenge 5: Costs/budgets

The small towns in eastern Germany belong to the poorest in the country. Therefore, all measures that lead to traffic avoidance or relocation have also to be examined from the cost perspective. Especially in Bad Doberan, where no sustainable transport policy has been conceived yet, the first demonstrator needs to remain cost-neutral. That is why the first two cargo bikes were financed by project funds.

#### Challenge 6: New drivers

Furthermore, it has to be clear that conventionally powered vehicles will no longer have a perspective in Bad Doberan in the medium term. LCL concentrates on transports with manpower drive and electrical support (cargo bikes, hand trucks).

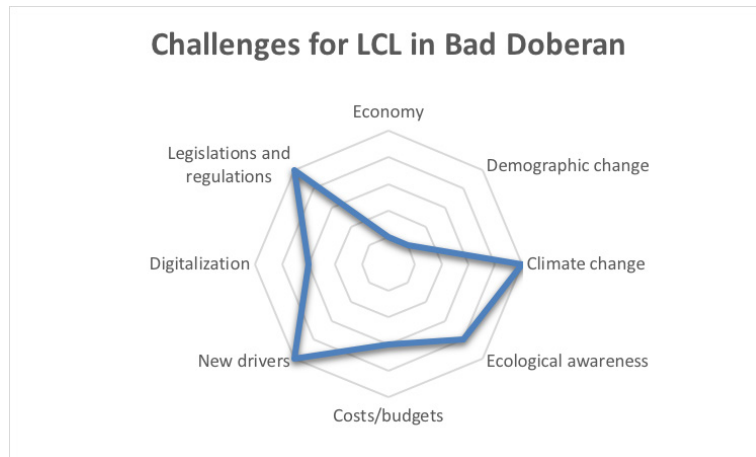
### Challenge 7: Digitalization

Digitization is the driver of mobility change. Although it is at the very beginning in Germany, and especially in rural areas, the bandwidth remains within the 2-digit range. Still, software platforms for distribution, dispatching and transport logistics are developing very fast. LCL must and will pay attention to it and develop a digital strategy.

### Challenge 8: Legislations and regulations

In Germany, there is a big discussion about the driver diesel because of the Volkswagen emissions scandal. As a result, diesel bans are required for the inner cities. Most of the transporters of the CEP-sectors are diesel-driven. Thus, there is a need to test new delivery concepts on the last mile in order to be prepared for coming changes.

## SUMMARY AND PRIORITIZATION OF REGIONAL CHALLENGES



The key challenges for Bad Doberan are new drivers and legislations and regulations. In the medium term, conventionally driven vehicles will no longer have a chance in Germany, resulting from the current discussion about climate change and air quality in cities. To enforce this, cities will employ regulations, which is why CEP-services will need new drivers and have to react with new concepts for the last mile.

## 3.2 REGIONAL ACTION PLAN

### THE MEASURE

Because there are various CEP services operating in Bad Doberan and they are not interested in cooperating, different concepts need to be tested. Among the CEP services, partnerships between UPS and DPD were established in Low Carbon Logistics. Furthermore, the IT service pakadoo shall be installed in administration buildings and companies for bundling parcels at the work place.

### UPS

Together with the parcel service UPS, the “Hamburgean model” was adapted to small-town needs: A micro-depot (a 10 ft shipping container) located on a city-owned parking area serves on the one hand as cargo bike storage place and the other hand as transshipment spot. The parcels are transported from the central depot to Bad Doberan where they are reloaded directly into the cargo bike and into the micro depot. The van coming from the depot continues its ride to the surrounding area then. The parcels that shall be delivered to Bad Doberan city centre will now be brought there by cargo bike.

### DPD

In addition to UPS, the parcel service DPD has joined the project. The company wants to handle inner city supplies with hand trucks. The vans are parked on the edges of the city centre in a star shape and the parcels are delivered from there. For this model, a test phase is initially scheduled as the running work will increase significantly. Still, as no search for a parking space is needed anymore, a total time advantage can be expected for these deliveries.

### pakadoo

Parcels related to online shopping activities are usually delivered when the recipient is not at home but at work. The service of the startup Pakadoo enables the delivery of private packages to the employer’s post office. In Bad Doberan, a set up of “pakadoo points” is intended to make the last mile more efficient as unloading the parcels for the employees at a central point reduces traffic.

### Municipal building yard

Due to the attention raised by the LCL activities, the head of the municipal building yard became aware of the cargo bikes. Together, a concept was elaborated on how to use a cargo bike for the building yard. Two fields of application were identified in this process:

- Waste disposal of public dustbins
- Maintenance work in parks

For the requirements of the building yard, the cargo bike, in contrast to the CEP services, requires an open box to handle bulky items.

## STAKEHOLDERS

Two stakeholder groups are important when it comes to implementing LCL solutions in Bad Doberan:

- Local authority and politics
- CEP services

The local authorities are interested in optimizing and reducing the traffic in their towns because of climate protection and the concerns of the residents. The CEP-services are interested in green logistics due to their image as well as for economic reasons.

Both should cooperate with each other to make the implementations successful and sustainable. The local authority can support the CEP services, e.g. with special authorizations and restricted stopping areas.

Shops and residents also benefit from the LCL solution because the traffic in the city center is reduced. The pedestrian zones become safer and more attractive without the delivering vans.

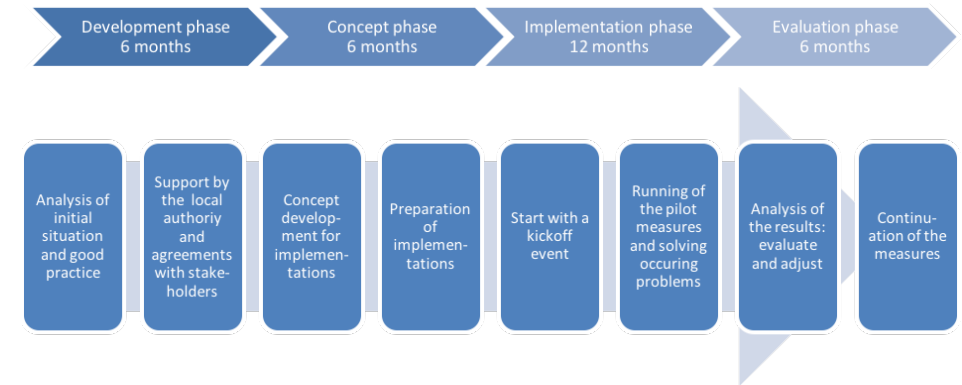
## CONDITIONS

The various concepts in Doberan imply the following infrastructure requirements:

Table 1: Conditions for pilot measures in Bad Doberan

Conditions	UPS	DPD	pakadoo	Municipal building yard
<b>Vehicle</b>	Cargo bikes	Hand trucks	No vehicles	Cargo bike with a box canopy
<b>Infra-structure</b>	Container (alternatively: closed space)  Parking space for the container  Charger	Reserved stopping areas for the vans	Post office at the institution  IT system for post office workers (set by pakadoo)	Garage in the building yard  Charger
<b>Staff</b>	Local driver for the Cargo Bike	No additional staff necessary		
<b>Other</b>	Special authorization for cargo bike driving in pedestrian zones	-	-	-

## TIME PLAN



### Development and concept phase (one year):

- Analysis of the initial situation (Which logistics sector causes the most traffic in the inner city?)
- Support by the local authority (By which measures could the city support implementations?)
- Agreements with stakeholders (Which CEP-services want to test sustainable Last Mile Distribution in small towns?)
- Concept development for implementations (What could be a business model for sustainable Last Mile Distribution of CEP-services in small towns?)
- Preparation of implementations (Micro Depot, Cargo Bike, hand trucks stuff, special authorizations)

### Implementation phase (one year):

- Completion of all measures needed for the implementation
- Start with a Kickoff event
- Running of the pilot measures
- Solving of problems that occur during operation

### Evaluation phase (half a year):

- Ecological analysis of the measures
- Economic analysis of the measures
- Benefits for the city
- Continuation of the measures

## FINANCING

The LCL solutions in Doberan aim at evaluating the economic feasibility of the concepts. After the end of the LCL project, the solutions shall be operated and financed by the CEP-services.

The pakadoo service is financed by pakadoo's business concept. So there are no additional costs for the implementing company or institution.

Regarding the cargo bike in the municipal building yard it is expected that the use is significantly cheaper than a small truck.



## 3.3 PILOT MEASURE DOCUMENTATION

### UPS

For implementing the micro depot model, the project staff cooperated with the town administration Bad Doberan as well as with the stakeholder UPS. All needed infrastructure, such as the container and the cargo bike, were purchase in the project. UPS elaborated the operational concept and the town of Bad Doberan's building yard supported the installation of the micro depot. In addition, the town administration provided the container storage space on a town car park as well as a special permission for the cargo bike to drive within the inner-city pedestrian zone.

After a local driver of the cargo bike had been found, the parcels to Doberan town centre were delivered by cargo bike day by day. Limitations were caused by bad weather, such as heavy rain or snow or in when repair works had to be carried out at the cargo bike. Unfortunately, the latter occurred more often than anticipated. Only the (heavy) cargo bikes of the first generation were available on the market when the project was started. These, for instance, still comprised of normal cargo bike components which had not been designed for cargo loads that exceeded 100 kg yet. Meanwhile, the potential of heavy cargo bikes was recognized by the manufacturers and new models exist that have been designed for these loads, thus, being no longer that susceptible.

### DPD

The implementation with DPD did not need a lot of time in advance. After the hand trucks were purchased, the delivery agents were advised to exclusively use these hand trucks for deliveries to the town centre. Soon after, the problem of lacking loading zones for these transporters occurred. Thereupon, a stakeholder dialogue was organized to determine locations for such loading zones. Still, the implementation failed because of a lacking legal framework (see economic analysis). Such reserved loading zones for parcel services have been discussed in Germany only recently again. Until then, parcel deliverers will have to keep on searching for free parking spaces before they can start a delivery via hand trucks. It is anticipated to establish these zones in Bad Doberan as soon as legally possible.



### pakadoo

Within the context of the project, attempts were made to install so-called "pakadoo points" at the town and district administration and in two larger local companies. Despite of first positive talks, no pakadoo point could be finally installed. Even though a multitude of good pakadoo practices was presented, the main argument against the system was that no additional work load for staff members in charge of the mail should occur as the inquired companies and administration have not had own post offices.

### Municipal building yard

After the cargo bike operation concept had been developed in cooperation with the building yard manager, the decision to buy the cargo bike had to be taken. The town administration had a positive attitude towards the purchase but was insecure if the investment would pay off. Due to this, the LCL expert team searched for a solution and found it in a national funding program where cargo bikes used for economic purposes can be tested over a period of three months. The Doberan building yard, supported by the LCL expert team, applied for the funding and the application was approved. A cargo bike with a portable garbage can was tested from



February to May 2019. A staff member of the building yard who was pleased to take over this task was quickly found. Day by day, all over the testing period, this person was on the road with the cargo bike, cleaning park and pavement areas.

The project members were finally able to draw a positive conclusion. Although the cargo bike purchase was still considered as costly, a consent of the town administration to this purchase can be anticipated.

## RESULTS

### Economic analysis

To enable a continuation of the implementations initiated by the project even after the project has come to an end, these must become economically viable. Unfortunately, the evaluation carried out in the project period has shown that the parcel amount to be delivered within the town Bad Doberan is not high enough to economically operate the micro depot model by UPS. Stop rates of 20 to 30 per tour were achieved in Bad Doberan where it should have been twice as much for self-sustaining business operation.<sup>1</sup> The German parcel market is dominated by five large logistics companies with half of the parcel amount being allocated to the parcel service DHL. Accordingly, the parcel amounts in towns are shared in a way that makes it difficult for the single companies to reach the stop rates needed for efficiently operating the micro depot models.

The initially described continuous growth of freight transport also increases the demand for skilled workforce in the logistics sector. The demographic change in Germany and the negative perception of the logistics sector will result into a significant labour shortage. The working conditions with low wages and many working hours plus on-call times do not make the occupational profile attractive for the younger generation. The micro depot model in Bad Doberan was able to demonstrate that it can contribute to coping with the challenge of driver shortage in Germany. On the one side, the requirements on the personnel decrease where the delivery from the micro depot can be made by cargo bike and hand truck as no drivers' license is needed anymore. Furthermore, the working conditions can become more attractive.

Where the staff is deployed for last mile deliveries, the early morning parcel sorting at the depot is no longer needed. Part-time and mini-job models become possible, thus, enabling additional groups to work in this profession. Furthermore, the staff catchment area will be expanded. These days, parcel services work with a few central large depots in non-city states like Mecklenburg-Vorpommern, which results into long commutes for the employees. These will be omitted for local staff at the micro depot.

For dpd deliveries by hand trucks, the parcel deliverer has to reliably have the opportunity to store the transporter in loading zones in the delivery area environment – with the advantage that no searches for parking places occur. Loading zones are often occupied by wrongfully parking cars. This was also the case in Bad Doberan. The current discussion in Germany about an installation of additional parking signs for parcel

<sup>1</sup> Further information provided at BAYER, MARIUS; SEIDENKRANZ, MARKUS (2019): Erfolg durch Methodik beim Mikro-Depot-Projekt in Nürnberg. In: Nachhaltige Stadtlogistik – Warum das Lastenfahrzeug die Letzte Meile gewinnt. Bogdanski, R. (ed.), 59-94

services has been welcomed as a solution here, but was not implemented in the project due to a lack of regulatory framework. It is anticipated that Bad Doberan will establish such zones as soon as related laws exist. The delivery by hand truck can be reassessed then.

To conclude, especially towns are not suitable for establishing isolated delivery logistics solutions due to the low delivery quantities. Instead, a holistic approach to this topic is needed here. In the case of KEP services, establishing a central supply hub at the periphery where the parcels are bundled could be a town-appropriate solution. This would be operated independent from the KEP services, i.e. a local forwarder that uses environmentally friendly vehicles would take over the delivery.

One challenge in the project were the high cargo bike purchasing costs. Thus, the decision if the investment would pay off had to be taken, for instance by the Bad Doberan building yard. The solution to initiate a three months cargo bike testing financed by a federal funding program was found in the project. Thus, the handling and application scenarios for the cargo bike in operation were tested. This was a successful step on the way towards a purchase decision made by the Bad Doberan town administration.

### Benefits for the city

The project was able to make clear that it is essential for towns to work on the topic sustainable urban logistics. It must be positively highlighted here that a straightforward stakeholder dialogue was possible due to the narrow administration structures. Thus, the different involved protagonists were able to work jointly and at eye-level towards finding a solution for the town.

Thus, the lean administrative structures of small towns were an advantage for the project. Compared to big cities, permissions and infrastructural measures were much easier and faster to implement. As other big cities report related problems, small towns seem to be very suitable for pilot projects with limited project timelines. Still, it needs to be considered here that the small town needs to benefit from this itself instead of only serving as a laboratory.

As visible at the example of the Bad Doberan building yard, projects like Low Carbon Logistics may encourage cross-sectoral cooperation on the topic environmentally friendly small town. Thus, town administrations could lead the way here and demonstrate other sectors via practical examples how easy and also innovative sustainable solutions can be implemented. Cargo bikes have proven to be very suitable here. Within an otherwise so complex logistics structure, they are a practical and simple means of last mile transport. Logistics companies should not be considered as only field of application here. Nearly every sector is involved into procurement, be there retail traders, gastronomers or town and city administrations.

What needs to be highlighted is the public awareness the project and its sustainable implementations were able to create. In this project, this became evident by the interest aroused in Rostock. Small towns are recommended to see their lean administrative structures as an advantage for innovative implantations. In the Bad Doberan case, there

was also a supra-regional media coverage that made the small town better known and more attractive for tourism.

## OUTLOOK

The KOMOB has taken enormous efforts to animate third towns and cities to introduce the concept for a transition from KEP services to cargo bikes in the inner-urban area.

This had been largely successful in the Hanseatic City of Rostock. The city agreed to implement a pilot project in its city centre. At the moment, there are still bureaucratic hurdles that need to overcome, but this will happen within the coming weeks. Due to some unpleasant communication from the City of Rostock side, the KEP services are a bit hesitant at the moment, but at large, LCL is expected to be implemented in the Hanseatic City of Rostock by the end of this year.

Furthermore, the concept was presented to the planning committee and the relevant KEP companies in the Hanseatic City of Wismar and got a lot of positive response. The city administration has initiated the implementation, so that a realization of LCL in Wismar can be presumably announced in early 2020.

As third model, KOMOB presented LCL in the context of a holistic mobility concept for the town Malchin and discussed it with the town parliament. The mobility concept shall be implemented in 2020. LCL will come into effect in Malchin then as well.

A continuation of the pilot project in Bad Doberan seems to be unlikely these days. City administration and politicians of the town are enthusiastic and would like to continue LCL, but the KEP entrepreneurs say that the parcel quantity is too low to efficiently operate the micro depot model.

KOMOB intensively negotiates with companies on how to implement LCL solutions these days. We are currently testing our motivation strategy, but could also imagine to continue with a sanctions strategy (entry restrictions for certain streets).

The result cannot be foreseen at the moment – the future will tell.





# 4 Rietavas



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## 4.1 REGIONAL CONCEPT BACKGROUND

Rietavas is located in the southern part of Telšiai County, Lithuania. On a map of Lithuania, it may look like a remote area, but reality is a lot different: The territory of the Rietavas municipality is crossed by one of the most frequented highways Vilnius-Klaipėda. Rietavas is only 50 km away from Klaipėda and its seaport, only 60 km away from Palanga and its airport and 22 km away from Plungė and its railway station. One of the most important peculiarities of Rietavas is the geographical location on the cross road of transport flows related to Mazeikiai, Skuodas and Plunge, which turns Rietavas into a transit town with no detour around the city centre and living area. This fact also has a strong impact on the Rietavas business map: a majority of companies located there in 2017 was very much connected to the transportation sector. Different cargo and goods deliveries in the area “to” and “from” the seaport, airport and railway station including deliveries directly to Rietavas make transportation flows very intense and cause air and noise pollution.

## REGIONAL GOALS AND LONG TERM FUTURE VISION IN THE LCL PROJECT

The EU-Project Low Carbon Logistics caused an awareness raising in the transport intense town Rietavas regarding transport emission and initiated actions aiming at decreasing pollution in the town through several measures, ranging from social and psychological to logistical and technological. All activities during the LCL project fall under the following few categories:

1. **Gaining experience in exploiting new eco-friendly technology-based transport.** By introducing a pollution friendly cargo van in Rietavas we will gain experience on how to exploit and use this type of transportation. This will add a new perspective to the mind-set of the society as well as municipal administration staff, i.e. enable on overcoming of scepticism and provincialism out of real life experience.
2. **Ecological awareness building in the community.** Through the practical experiment of introducing an eco-friendly van, we will create a **reason** and a **communication** channel to communicate with society about the gains of energy sufficiency and low emissions.
3. **Optimisation of transport in the city through consolidated purchases.** After we start using the eco-friendly van and after we will have a specific know how, we will further optimise transport routes by investigating and combining delivery routes of suppliers and local farmers to local institutional / corporate consumers and implement consolidated purchase and delivery measures.

As a result of the abovementioned aspects, we expect a reasonable shift in the mindset of business companies, state organisations and community towards emission-friendly transportation, thus, making Rietavas reasonably eco-friendlier in terms of emission, noise and transport intensity.

### COMMON CHALLENGES

#### Challenge 1: Economy

Rietavas is a geographically well located city with convenient living conditions and wide range of possible business investment areas. The prices of realty for living have increased quite significantly proving the high demand and interest in the region. Being in reachable distance from other bigger cities, Rietavas can provide companies with well-educated professionals trained by Klaipėda University, colleges, vocational training centres. This ensures a future potential of Rietavas while today there is a need for improving the reputation and for positioning the image of the city. The LCL project will serve as a kick-off initiative to provoke a tangible improvement of living conditions and a novel mind-set of the community.

#### Challenge 2: Demographic change

Rietavas municipality has one of the youngest populations in Lithuania: every fourth resident in the area is aged between 18 and 40 years. Rietavas has had an innovation driven spirit over years of history and is known as a very intellectual region. But inspite

of the aforementioned aspects, Rietavas region is continuously losing the most productive and viable part of its population. Recently, the vocational college was closed in Rietavas, which forced young families to also consider a move to a place where their children could have their education. Analysing and understanding demographic dip in Rietavas has given hints to a new strategy comprising of complex measures aiming at developing this region into the healthiest place to live in terms of ecology of air and food, emission friendly transport, innovation driven education and support for individual or corporate entrepreneurship. The LCL project is has empowered one of the complex measures, the shifting to emission free transportation.

### **Challenge 3: Climate change**

Global climate change is well visible in many different areas of life also in Rietavas, including, for example, extreme temperatures that affect heat consumption during the cold periods or loss of crops for the farming industry due to extreme summers. These are longterm consequences that must be considered with adequate measures and by changing the way we behave. Transport and emission are among the most tangible, visible and easy to communicate measures. Thus, awareness and consciousness building about the global climate change and impact to our individual lifes must be considered as one of the key goals of the LCL pilot measures.

### **Challenge 4: Ecological awareness**

The ecological awareness in Rietavas is reasonably high, but the intention to act and change behaviour is very low due to small scale mind-set. Road transportation is the highest emission source in the transport sector and it includes all types of vehicles on roads (passenger cars, light duty vehicles, heavy duty trucks, buses, motorcycles, mopeds). There are statistical predictions for an intense growth of transport means over the upcoming decade in Lithuania. Thus, it is the very right moment to educate the society and to remove scepticism about zero emission transport through a real and tangible example, using the LCL project sponsored eco-friendly cargo van.

### **Challenge 5: Costs/budgets**

The transportation sector for small municipalities is particularly investment intense. Thus, in many cases transport means are old, polluting and require significant investments for maintenance and keep up. Rietavas is no exception here. The municipal budget cannot afford costs of new technology and emission-friendly transportation. Without having a real example and intense communication about it it is much harder to overcome scepticism and to convince local business representatives and the community itself to consider emission-friendly transportation. The LCL project has enabled to start this initiative and we expect that, after acquiring and exploiting the emission-friendly van, creating charging infrastructure with proper publicity will cause a snow ball effect and private plus business investments into emission-friendly transportation will significantly increase.

### **Challenge 6: New drivers**

Rietavas has been and will be an innovative region characterized by its spirit and willingness to implement social, economic and environmental changes. These are activities of the LCL pilot project:

- More eco transport means (eco cars, eco scooters, electric bicycles, etc.) are planned to be used for municipal as well as community purposes (e.g. post office services, small package delivery, small purchase home delivery, etc.);
- Charging points for electric transport means in the town will be installed;
- Organisational changes will be made in the municipal (including subordinate organisations) structure to become more efficient and sustainable via consolidated purchases and transport management;
- Continuous communication about the environmental status of the region will increase the awareness in the society.

### **Challenge 7: Digitalization**

Rietavas, as well as the whole Lithuania, has the best internet technologies in the world. The fastest EU fibre-optic internet is available to both, residents and businesses. By the way, it is distinguished by one of the lowest prices in the EU.

Rietavas municipality will introduce online data about the LCL project's impact on saved emission (per kilometre and over the specific period of time) and on the benefits these activities bring to people's lives.

### **Challenge 8: Legislations and regulations**



Rietavas municipality administration is willing to take all necessary measures to make LCL concept ideas the sustainable change drivers in the region. Yet, all foreseen actions do not require any specific legislation or regulation changes.

Additionally, the Ministry of Energy of the Republic of Lithuania determines the rates of vehicle circulation tax and tries to formulate recommendations for the taxation of vehicles in Lithuania as the impact of the introduction of environmental car circulation tax with the calculation of the tariffs based on CO<sub>2</sub> emissions and type of fuel. It was estimated that such tax could bring up to 76.6 million Euros a year and would reduce the CO<sub>2</sub> emissions for 1.2 million tonnes over a period of 15 years.

## 4.2 REGIONAL ACTION PLAN

### THE MEASURE

LCL in Rietavas concept has two major activity and impact streams:

#### 1. Stream:

Eco friendly (electric) transport is still considered as too expensive, not sustainable and not reliable by the transport users and consumers. There are very strong traditions in the attitude of the population to focus on petrol or diesel run transport. We are also witnessing a certain degree of provincialism in the mind-set of citizens that eco-friendly transportation may only be impactful and important for extra large cities. As the first priority of the LCL concept we plan to educate the society regarding the reliability and impact of electric transport in the Rietavas city by replacing a regular Rietavas eldership transport with electric one. In doing so, we will educate the society by making the transportation visible in the town and creating communication reasons as well as the educational tool for citizens. We believe that there are no stronger arguments for eco-friendly transportation than a personal experience. We will also develop incentives to encourage a use of eco-friendly transport as a priority in applying for services provided by Rietavas eldership. With all experience gained it will be much easier to continue transport modernization and to keep up the investments for transport electrification;

#### 2. Stream:

Examining the consolidated purchase and the last mile delivery system potential in Rietavas public institutions. Currently all institutions are supplied with goods and raw materials in a non-coordinated manner and directly from suppliers. This means there is a much higher impact on load and transport intensity of the town due to the number of necessary deliveries. Developing a consolidated purchase and a delivery concept and combining it with the first LCL project impact stream – the electric van – will have a significant impact and reduce the transport in the city. A consolidated purchase system may also have a local business support impact (e.g. buying from a short haul provider), thus enabling a local economy that gets more vitality and power.

### STAKEHOLDERS

There are two major stakeholder groups involved and expected to significantly impact on the processes:

- Local municipality administration;
- Rietavas business and citizen community.

Rietavas municipality is creating an opportunity to directly experience emission-friendly inner-city transportation. Out of this, a „snow ball” reaction is expected due to statistical data about a strongly increasing transport sector. The LCL project may serve as a game changer to shift personal investments from traditional into emission-friendly transport units. Furthermore, there will be infrastructural changes where charging

points installed in the town make it easier to charge newly acquired private or corporate electric cars, which, thus, become more convenient to use. Yet without any related infrastructure no changes can be expected. We hope this is a very realistic agenda, considering the short distances of transport communication in the city and between the most commonly visited places.

### CONDITIONS

The LCL project activities will require dedicated spots for electric car charging stations in the town and infrastructural investments that ensure electric power supply at decent output.

The emission-friendly van dedicated for LCL project promotion and all the aforementioned intentions in Rietavas city will be administrated by a subordinated structure, the Rietavas Eldership. The legal documentation has to be arranged and the accountability of the measures needs to be ensured accordingly.

Furthermore, a convenient online communication channel has to be created and professional continuous communication about achievements and impact of LCL project must be ensured.

### TIME PLAN

The development phases of the LCL in Rietavas are the following:

- Identification of the most local transport intensive municipality administration services and units generating the traffic and provision of possible optimization as well as replacements by eco-friendly transport solution;
- Investigation of the potential for consolidating purchases among the municipal subjects in Rietavas, thus combining the delivery and decreasing transportation load in the town;
- Development of the cost benefit measuring system of the chosen means of LCL in Rietavas;
- Preparation of the business model that enables a future self-sustainability of the measures undertaken during the LCL initiatives.

### FINANCING

Rietavas municipality in cooperation with the Rietavas business and tourism centre as a key role player in bringing all stakeholders of the project initiatives together are willing to provide financial support to ensure the sustainability and continuation during the project phase as well as after the LCL project phase. Due to the size of the municipality and the budget, potential stakeholder participation initiatives will be very much appreciated. Piloting activities will be financed by LCL project and local municipal budgets, but when emission lowering measures will have proved to be impactful and reasonable they should attract and involve private business and household investments. This can also be fostered by national policy and financial benefits from acquiring emission-friendly transport means.

### 4.3 PILOT MEASURE DOCUMENTATION

The regional LCL concept of Rietavas mainly focuses on two work streams having the triple regional impact – societal awareness, ecology of transportation and economical sustainability of measures taken. The work streams and developments in each area are the following:

**1. Stream focused on citizen awareness.** The acquisition of a plug-in hybrid vehicle for Rietavas municipality (Rietavas Eldership) needs had multiple intentions. Firstly, eco-friendly (hybrid diesel - electric) transport is still considered as too expensive, not sustainable and not reliable enough among the transport users especially in remote, small municipalities. This attitude of the population results from very strong traditions that have focused on petrol or diesel run transport for a long time. Furthermore, there is no convenient infrastructure to publicly charge fully electric transport. We needed to change this approach and mindset. We have also witnessed a certain provincialism in the mind-set of citizens that eco-friendly transportation may only be impactful and important for extra-large cities. Thus, the first priority of the LCL concept aimed at educating Rietavas community about the reliability and impact of PHEV transport on Rietavas region. This was done by replacing a regular Rietavas eldership transport by a PHEV one. It took quite an effort to precisely describe the needs and have procurement procedures run smoothly so that project aims could be reached and needed transport mean could be acquired within budget limits. The car was acquired and it will be made visible (with targeted visual advertising) in the town as a communication channel by itself – while providing delivering services or serving as a information board car during city events. The elaboration of incentives to use PHEV transport as a priority when applying for services provided by Rietavas eldership are still in progress.

**2. Stream focused on consolidation initiatives.** We examined consolidated purchase and last mile delivery system potentials in Rietavas public institutions as well as consolidation possibilities among farmers (for storage and delivery of goods). Regarding consolidating purchases among municipal institutions we have a strict regulation of procurement procedures and are involved into raising this question on a national level to the Public Procurement Service office. We also collect the needs of institutions and we will have initiatives for consolidating in non-unique purchases next season (starting with September). We believe even the smallest initiative will be an experience as well as a reason to widely communicate among municipalities and the society in general.

We also had multiple meetings and discussions with farmers on last mile delivery and LCL topics. Here, a clear need to get assistance in centralised storage, last mile delivery in small scale and sales services was identified. These are topics we continue to work on to have practical action and impact.

### RESULTS

#### Ecological analysis

There is quite a bunch of data provided by environmental organisations, the Lithuanian Ministry of Environment and European LCL policies. One key message is clear: If we do not start significant actions, we will be late in reducing pollution. Rietavas is very small municipality indeed, but also a very convenient place for piloting different activities in the LCL field. General ecological data are the following:

According to the projected number of the registered vehicles in Lithuania the fuel consumption in road transport would increase from 65,721 TJ in 2014 to 88,848 TJ in 2035. The main fuel used in the transport sector will remain diesel (69% in 2035) and gasoline (13% in 2035). Road transport will remain the main fuel consumer in the transport sector. As a result, it will remain the main GHG emissions source in this sector (92% of total transport sector emissions). This results from the increasing number of vehicles in Lithuania. It is projected that the number of registered passenger cars in Lithuania will increase for 1.46 times by 2035 (1,727,703 in total) and that it will stand for 90% of the total registered vehicles in Lithuania. It is projected that diesel oil and gasoline will remain the main fuels used in the transport sector. This is mainly influenced by the fuel use trend in road transport sector.

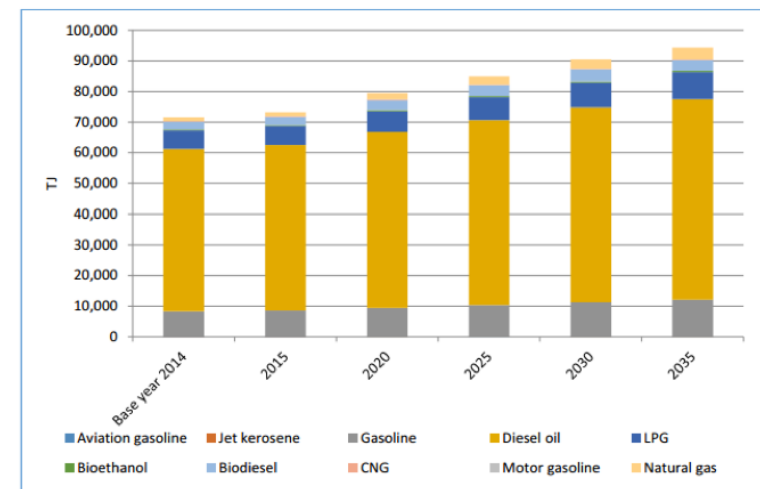


Fig. 1: Projected total fuel consumption in transport sector

GHG emissions from transport sector are projected to increase up to 6,682 kt CO<sub>2</sub> eq. in 2035. Compared to 2014, the GHG emissions from this sector will increase for 1.32 times. The increase of GHG is mostly stipulated because of the increased use of fossil fuels in road transport and transportation in pipelines due to an increased need for natural gas.

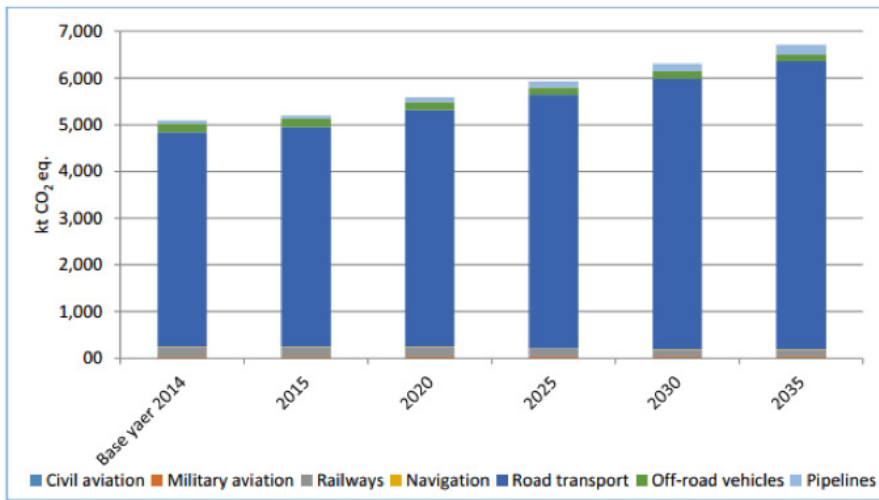


Fig. 2: Projected total GHG emissions in transport sector

Road transportation is the most important GHG emissions source in the transport sector. This sector includes all types of vehicles on roads (passenger cars, light duty vehicles, heavy duty trucks, buses, motorcycles, mopeds). The current GHG emissions from the road transport subsector amount to 4,597.29 kt CO<sub>2</sub> eq. The GHG emissions related to road transport were calculated on the basis of historic data on the increase of vehicle number in Lithuania according to the data of the State Enterprise “Regitra”. The increasing number of vehicles registered in Lithuania was linearly interpolated according to the historic data from 2005 to 2014 for separate types of vehicle types, which included passenger cars, light and heavy duty vehicles and motorcycles and mopeds. The results deriving from the increasing number of vehicles are presented in table below.

Table 1: Number of registered vehicles

Vehicle type	2015	2020	2025	2030	2035
Passenger cars	1 215 445	1 343 510	1 471 574	1 599 639	1 727 703
Light duty vehicle	47 547	49 542	51 537	53 532	55 526
Heavy duty vehicle	50 610	52 487	54 364	56 241	58 119
Motorcycles	32 805	43 545	54 285	65 026	75 766

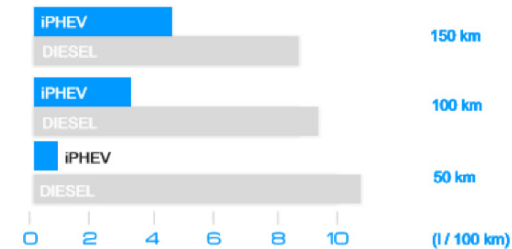
As we can hardly influence the number of newly registered cars and bearing in mind that Rietavas municipality aims at increasing the number of citizens of the region, the transport pollution problem becomes more important and inevitable. Thus, ecological transport introduced during LCL in Rietavas will help to promote eco-friendly transportation.

Direct and measurable impacts of the LCL pilot measure in Rietavas will be achieved by replacing a Volkswagen Transporter van (produced in 1993) with the fuel consumption of 9-10 litres per kilometre and mileage of 350,000 km so far by an intelligent

plug-in hybrid cargo truck (3,5 tons category) on Iveco base. This particular vehicle is intelligent, efficient and green:

- **Intelligent:** The vehicle senses green zones using GPS and automatically switches to pure electric traction;
- **Efficient:** The hybrid control unit coordinates the electric motor with the diesel engine. In combined mode, the electric motor assists the diesel engine during acceleration and reduces consumption by 25%. A regenerative system charges the battery while braking;
- **Green:** With a 110 Hp to 170 Hp, 900 Nm electric motor, the vehicle is smooth and comfortable to drive. In pure electric mode, it has a range of 50 to 70 km, depending on the selected battery capacity and the vehicle weight. The vehicle complies with Euro 6 standard. Its extremely significant effect on fuel economy is displayed in the picture below.

According to the fact that 1 litre of burned diesel produces around 2.3 kg of CO<sub>2</sub>, the Rietavas Eldership Volkswagen transporter emits 1,380 kg CO<sub>2</sub> per year (500 km range in short hauls per month; equal diesel consumption of 50 litres; thus, generating



115 kg of CO<sub>2</sub> monthly). Accordingly, the LCL project pilot measures in Rietavas will have an annual impact of 966 kg CO<sub>2</sub> emission saving (500 km monthly range in short hauls with a fuel consumption of 3 litres per 100 km of diesel; generate 34.5 kg of CO<sub>2</sub> monthly to compare with 115 kg of CO<sub>2</sub> with previous vehicle). We consider this as a significant saving on small-scale level and aim to promoting this approach on a national level.

### Economic analysis

The economic benefits of the pilot measures in Rietavas will be multiple according to the activity streams.

As follows regarding the transportation of Rietavas eldership:

- Annual savings on car maintenance of 2,000-3,000 Euros (the new car has a 3-years-guarantee, covering a 100,000 km range);
- Annual savings on fuel consumption: 180 litres of diesel annual consumption in comparison with previous 600 litres. Considering the diesel prices, this amounts to an almost 462 Euros savings. If the prices of diesel go up, the impact will be even higher;

- Better provision of Rietavas eldership services as transportation becomes more efficient and environmentally friendly;
- Better image and higher social responsibility of Rietavas' eldership exploiting an eco-friendly vehicle instead of well-worn van.

In the field of consolidation and cooperation among municipal institutions as well as local businesses and farmers, the impacts of pilot measures are:

- Business model for consolidated purchases are examined and experimented;
- Fuel consumption and cost reduction are examined and experimented;
- Transport maintenance costs are reduced

### Benefits for the city

The LCL in Rietavas concept and all activities around it are focused on decreasing the road transport emission and its impact in Rietavas town through several measures ranging from social, psychological to technological. All activities and benefits fall under three logical categories:

1. **Experience gain in exploiting hybrid or electric transport.** By introducing a PHEV cargo car as a transport mean at Rietavas Eldership and replacing the current Volkswagen Transporter, the city administration and Rietavas Eldership have gained experiences in exploiting PHEV car. This brings new perspectives for the mind-set of the society as well as of the municipal administration staff, overcoming scepticism and provincialism through real life experience. This is a perfect reason to further proceed with becoming more and more eco-friendly as a town and – on a larger scale – a region.
2. **Eco-awareness building in the community.** Through the practical experiment of introducing an eco-friendly vehicle (PHEV cargo car) we created a reason and a channel (web page, car itself as a billboard, etc.) to communicate with the society about the benefits of energy sufficiency and low emission. We will be able to practically estimate and share (daily, monthly, quarterly, annually) the price per kilometre and the saved emission per hour, kilometre or serving time.
3. **Optimisation of inner-city transportation through consolidated purchases.** After we started to intensively use the PHEV and gain know-how with real efficiency data, we will be able to communicate more precisely as well as to go continue the implementation of LCL concept ideas. We will consolidate purchases of municipal institutions, which will help to investigate the overall amounts of purchases and to combine and consolidate them if we are successful in arranging procurement procedures accordingly with the national Procurement Purchase authority.
4. **Sustainability and business model development.** LCL in Rietavas must follow the principles of sustainable actions and measures. Rietavas administration will continue to work on relevant business models for consolidating purchases based on practical experiences within consolidating purchases among municipal

institutions. It will communicate and promote it among farmers and business companies.

### OUTLOOK

Many times in history, Rietavas has been a pioneer in bringing innovations to Lithuania. There are many „first time“ dates in historical perspective associated with Rietavas and an introduction of novelties: In 1859, an agricultural school was founded, where the Lithuanian language was taught. In 1872, the first professional music school in Lithuania was opened in this town. In 1882, the first telephone line in Lithuania (54.8 km long) was installed in Rietavas. It is also important to mention that this happened only six years after the telephone was invented. In 1892, the first power plant in Lithuania was launched in Rietavas and the first light bulb was lit here, only 10 years after the launch of the first power plant in world and only 12 years after the invention of the light bulb. On 17 April 1892, at Easter time, the first street lights were turned on in Rietavas manor, park and church. In 1915, Rietavas was the centre of the county and later on the centre of the eldership. During the inter-war period, a public library (in 1928) and a cinema theatre (in 1931) were established in Rietavas.

There are many more to mention but these facts talk of themselves and are a strong proof of the culture and mind-set in Rietavas region that promotes inventions for better economy, sustainability and life quality.

Rietavas has proven that experimenting DNA over the ages and will continue introducing and bringing new inventions, thus, making region the best place to live in, with an eco-friendly society, a healthy live style and happy communities. Being a comparatively small municipality, Rietavas is quick in testing and implementing innovations. With its quality infrastructure, healthy nature and communication technologies Rietavas will quickly turn into a living district of bigger cities like Klaipeda, Plunge, etc. It is becoming more and more popular among young families to move here for stress-less, slower living.

The vision of Rietavas in 10 years is: A high quality of life through a healthy and sustainable environment, innovation and an entrepreneurial culture, a modern lifestyle in combination with history and traditions.



# 5 Stargard



Authors: Kinga Kijewska, Stanisław Iwan, Natalia Wagner, Mariusz Jedlinski

## 5.1 REGIONAL CONCEPT BACKGROUND

Stargard is a city with a population of approximately 71 thousand inhabitants and covers an area of more than 48 km<sup>2</sup>. It is situated in north-western Poland, in Zachodniopomorskie Voivodship, and belongs to the Szczecin's Metropolitan Area. The city is located 38 km away from Szczecin, the capital of the region, 45 km away from the Solidarity Szczecin-Goleniów Airport, 126 km away from ferry terminal in Świnoujście and 189 km away from Berlin. Stargard is the third largest city in the region regarding population and economy.

### REGIONAL GOALS AND LONG TERM FUTURE VISION IN THE LCL PROJECT

Owing to the fact that Stargard is a rapidly developing city, its citizens are facing the problem of increasing dioxide emission, which is one of the main factors causing air-pollution and global warming. All the subjects situated in Stargard send different parcels, letters or packages to other parts of the city even several times a day. This problem is related to all municipal entities. It is expected that the participation in the Low Carbon Logistics project will help to find solutions that could help to reduce the number of

fragmented deliveries. Thus, it will be possible to reduce the congestion, noise and pollutions in the major areas of the city.

The goals and future vision for Stargard are determined in the document Social and Economic Development Strategy for Stargard City which was updated in January 2016. It includes the Mission of Stargard, which says that sustainable development in the harmony with economic, social and natural environment is essential for Stargard's present and future. It enables to convert Stargard into an attractive place for living, working and relaxing, which stands out in Zachodniopomorskie Voivodship. The vision and development aims of Stargard correspond to the targets determined for the regional level, which are included into Development Strategy of Zachodniopomorskie Voivodship until 2020. The document consists of several objectives and targets, some of them also referring to urban transport solutions.

The concept of the Urban Consolidation Centre for Municipal Entities (UCC-ME) in Stargard is related to the strategic documents and the general vision of Stargard as a friendly liveable city. The reduction of the number of deliveries will help to reduce the inner-city traffic and result into less pollution and noise. Mostly important is that the deliveries from (UCC-ME) to the municipal entities will be implemented by using environmentally friendly vehicles (electric vans or cargo e-bikes).

## COMMON CHALLENGES

### Challenge I: Economy

Stargard is a very fast growing city, thanks to opportunities, friendly authorities, good conditions and the infrastructure available for citizens and investors. As a result, the number of investors interested in green-field investment is increasing. Stargard is a very attractive place for investors from industrial and logistics sector. There are two industrial parks located within city boundaries: the High Technologies Industrial Park in Stargard and the Stargard Industrial Park. It has been planned to develop the road infrastructure in that area and to improve the transport connections between the industrial areas and the city.

According to the city authorities the number of building permits has skyrocketed over the recent months. As an example of new housing estates two new housing micro-districts can serve: Stella Park and Osiedle Centrum. Both are situated close to the city centre. It can be expected that the number of cars in that area will increase. One of the results of economic growth is an increasing number of cars in the region, which will be a challenge for the future. In Social and Economic Development Strategy for Stargard City it is planned to develop transportation routes and to change the traffic organisation to optimize the traffic flow into the city centre.

It is worth remembering that Stargard is the local centre for the surrounding villages. The city provides not only educational institutions but also the hospital, health care providers, administrative, culture and leisure facilities for the whole powiat.

## Challenge 2: Demographic change

In 2016, the population of Stargard amounted to 68 477, the population density was 1424 inhabitants per km<sup>2</sup>. The population has been slightly decreasing over the recent years. This trend is typical for region, Poland and, to a greater extent, many other developed countries.

The LCL concept designed for Stargard focuses on goods deliveries to educational entities. That is why the population of children aged under 14 and future trends in that field are especially important. In 2016, there was an increase of that population group by 0.3% compared to 2015. In some districts of Stargard, the high population density results into transportation problems that can be solved by the LCL concept. Some educational institutions which are located inside tower-block housing estate (Os. Zachód) share the joint problem of missing suitable road infrastructure. These schools are surrounded by blocks of flats and the roads leading to them are very narrow. As the result the streets are always packed with cars which can lead to organizational trouble for suppliers and more time spent on manoeuvring. This means more air emissions and noise close to the school buildings. Furthermore, there is a negative impact on safety of children when several deliveries are realised at the same time.

## Challenge 3: Climate change

Economic development can improve the citizens' quality of life. However it can also have several negative effects, such as GHG emissions, dust, vibration and noise. According to the strategy for Stargard, the greatest threats for the air quality in Stargard are: the burning of solid fuels (such as coal) and car emissions. The increasing number of transport means significantly contributes to the GHG emission. Even though the number of inhabitants is not growing the society is getting more and more mobile. A typical family often possesses more than one car. In 2005, the air emissions in Stargard were [Social and Economic Development Strategy for Stargard City, updated in January 2016]: sulphur dioxide: 302 t per year, nitrogen oxide: 133 t per year, carbon dioxide: 103 t per year. In 2013, the CO<sub>2</sub> emission inventory has been elaborated. The results show, that the whole CO<sub>2</sub> emission in Stargard amounted to 324,282.5 Mg (entities participating in European Union Emission Trading Scheme EU-ETS were excluded) [Low-carbon economy roadmap for Stargard. updated in 2016]. The biggest CO<sub>2</sub> emitters were sectors classified as follows [Low-carbon economy roadmap for Stargard. updated in 2016]: industry, trade, service and others (37,24%), housing (36,58%) and public transport (22,5%).

## Challenge 4: Ecological awareness

The authorities of Stargard are fully aware of their ecological responsibility and intend to promote a green attitude among the citizens. Ecology is one of a few priorities mentioned in strategy for Stargard. It includes a lot of actions focused on different fields, e.g. the development of a rainwater sewage system, waste management, the extension of green space in the city. One of them is also taking actions towards a reduction of GHG emissions, noise and vibration. There are several aims set for Stargard up to

2020 in relation to low-carbon economy [Low-carbon economy roadmap for Stargard. updated in 2016]:

- Reduction of CO<sub>2</sub> emission by 8.39% compared to 2013,
- Reduction of final energy consumption by 3.87% compared to 2013,
- Increase of the share of renewable energy sources in energy consumption by 0.09% compared to 2013,
- Reduction of the pollutants emissions to air according to the air protection program for Zachodniopomorskie Region and an achieving of an average pollution reduction of about 53% (including CO<sub>2</sub> reduction by about 13,4%) compared to the present state.

## Challenge 5: Costs/budgets

Funds for the realization of the aims described in Social and Economic Development Strategy for Stargard City may be provided by: own sources (budget of Municipality), the Regional Operational Programme for the Zachodniopomorskie region, Private-Public Partnerships and private capital.

## Challenge 6: New drivers

The Stargard authorities are interested in implementing new ideas and solutions that are ecological and work on improving the goods distribution as well as the passenger traffic in the urban area. There are some examples of such activities:

- It is planned to establish an integrated interchange station at Towarowa Street in Stargard. This involves a rebuilding of several streets, a redevelopment of a bus station and parts of a railway station and a construction of new car parks (Park&Ride and Kiss&Ride type).
- A new electricity driven van Nissan NV200 for Municipal Guards was bought this year. More electric drive cars are planned to be used for municipal purposes in the future.
- A network of charging points to support the widespread introduction of electric cars will be built.
- Some organizational changes in the municipal structure are going to be implemented in order to improve the management of traffic flow in the city. To achieve these objectives, a separate Transport Division is going to be created.
- More bicycle paths are planned to be built. Bicycles may be considered as one of the transport modes for the LCL concept.

## Challenge 7: Digitalization

It is planned to introduce a City Card usable for paying for public transport and parking space, by 2020. It can be used for booking parking spaces for goods deliveries as well.

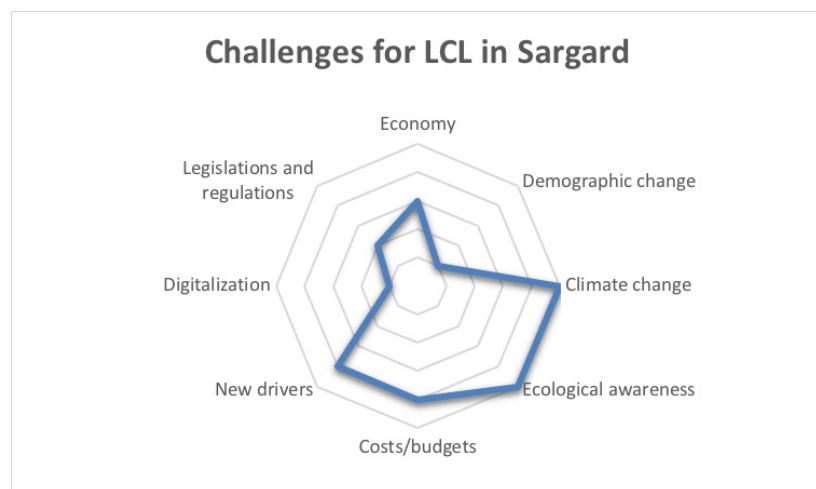


## Challenge 8: Legislations and regulations

On the local and regional level, new ideas and concepts concerning ecological transport and deliveries are included in following documents:

- Social and Economic Development Strategy for Stargard City till 2020, updated in January 2016;
- Low-carbon economy roadmap for Stargard, updated in 2016;
- Development Strategy of Zachodniopomorskie Voivodship till 2020;
- Integrated Low-carbon economy roadmap for the Szczecin's Metropolitan Area, 2015;
- Strategy of Integrated Territorial Investments in the Szczecin's Metropolitan Area, Szczecin 2017.

## SUMMARY AND PRIORITIZATION OF REGIONAL CHALLENGES



The background and challenges described above create an important and good environment for the activities planned for a realization of the Low Carbon Logistics project in Stargard. All of them have been discussed by the municipality representatives and the LCL project staff. Based on this, the most interesting measure has been determined – the Urban Consolidation Centre for Municipal Entities. It is expected that the proposed concept will help to reduce some inner-city transportation problems, taking especially the environmental impact of the transport system (challenge 4 into account. It is planned to start to implement the idea of sustainable city logistics to make it the better place for living and investing. However, the most challenging issue for the project staff and municipality is to find the best organizational solution and a financial model for this measure. It has to be realistically implemented with the limited time and budget. Furthermore, it is necessary to establish the background, assumptions, expectations and conditions for the future UCC-ME, to be further developed after the end of the project.

## 5.2 REGIONAL ACTION PLAN

After prioritising the challenges, the solution of Urban Consolidation Centre for Municipal Entities in Stargard will be further elaborated in this section. The action plan will describe shortterm and longterm aspects of the measure. A clarification of tasks, steps and responsibilities will be provided and a related time plan will be presented.

### THE MEASURE

The LCL concept is to implement the Urban Consolidation Centre (named: Urban Consolidation Centre for Municipal Entities – UCC-ME) idea in Stargard that will serve several public entities located in the city. Presently freight deliveries in Stargard are realised directly from suppliers to receivers. They are managed separately and are not coordinated with each other. Because every delivery is realised independently, it generates negative results for the city environment due to an increased number of van or truck rides. Developing the concept of UCC-ME will allow to eliminate these problems.

### STAKEHOLDERS

The idea of UCC-ME has been established as a potential measure for Stargard. The municipal authority is the initiator of that idea and it is responsible for appointing the formal operator, choosing the property, adjusting it to suit the tasks and coordinating the proper implementation of the UCC-ME. This will be done with the support of a scientific partner – the Maritime University of Szczecin. As the main regional partner acts Goniec – a company specialised in courier services with the use of cargo bicycles.

The beneficiaries of the UCC-ME can be divided into two groups: direct and indirect ones. The first one consists of entities involved into the project: the town Office, kindergartens, primary schools, secondary schools, high schools, Vocational School Complexes, Social Welfare Centre and others. They use cargo transportation every day, as they need a huge number of parcels to be delivered to them or to be sent to other institutions, which enables all the aforementioned institutions to function in the best possible manner. The indirect stakeholders comprise of various groups of local inhabitants and entities which will benefit from the UCC-ME results.

Presently there are 14 objects chosen to elaborate and implement the UCC-ME in Stargard: 4 kindergartens, 9 primary schools (3 of them with junior school classes) and the City Hall.

Most of the objects are concentrated at 2 locations: Os. Zachód with its neighbourhood area (1) and the western part of the city located close to the City Hall and historical sites of the town (2). There is only one school located far from the city centre (Primary School no 8). The distance to that school from the City Hall is 6 km. From city centre there is the two-lane provincial road no 106 with no bicycle path.

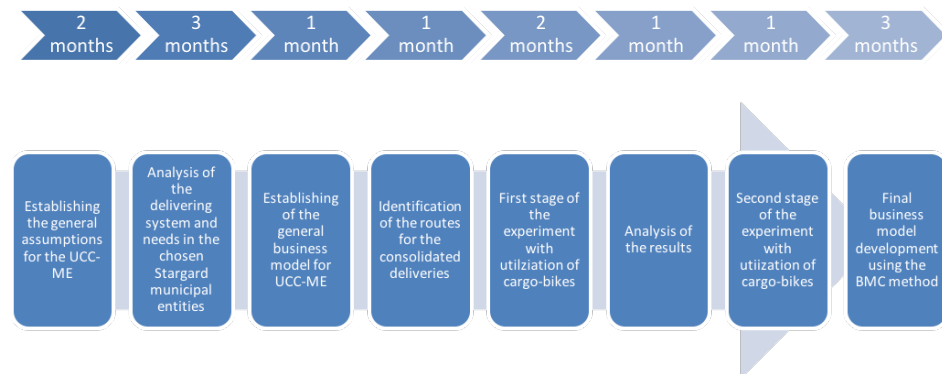
## CONDITIONS

The concept of UCC-ME assumes a use of e-bikes and/or electric vehicles. It will be necessary to obtain a place for a consolidation hub. The detailed conditions concerning UCC-ME functioning will be specified at a later stage of concept development. The reliability of the concept is ensured by the readiness for cooperation and involvement of the Municipal Authorities of Stargard.

## TIME PLAN

Several development phases can be named as follows. Some of these have already been started:

- The Municipality of Stargard defines the municipal units generating the traffic.
- The Municipality of Stargard implements a deep research that aims at specifying the number and drawing up the inventory of parcels sent via cargo transport per day/month/year by the municipal subjects situated in Stargard (nursery schools, schools, town office, municipal companies and other municipal institutions).
- The Municipality of Stargard jointly with Maritime University in Szczecin develops the UCC-ME concept to cope with the aforementioned problems caused by the intensification of cargo traffic.
- The Municipality of Stargard together with Maritime University of Szczecin identifies the best location for the consolidation hub based on a traffic analysis and the analysis of delivery needs.
- The Maritime University of Szczecin prepares the business model based on a utilisation of the business model canvas and the LCL methodology.
- The pilot experiment based on the concept of UCC-ME will be prepared and conducted.



## FINANCING

The Stargard Authorities may consider a financial participation during and after the LCL project phase. However, they would prefer to involve a private company to run the newly designed consolidation centre. One of possible option is to create a Private-Public Partnership to finance the realisation of the concept. The activities undertaken in Stargard are not directly financed by LCL project budget.



## Dissemination and Expert Team



### 1 CONSULTANCY OFFERS

*Authors: Sophie Werdin; Clara Burzlaff*

#### 1.1 INTERNATIONAL CONSULTANCY TEAM

The international consultancy team consists of the LCL Expert Team members and is established to offer individually tailored consultation for low carbon logistics initiatives from the South Baltic region.

The consultancy offers are directed towards two target groups: municipalities and business entities. Experiences and lessons learned from implementing the pilot measures of the project are integrated in the consultancy offers to help municipalities and business entities from other regions to optimize their city, town or regional freight logistics towards a significant reduction of carbon emissions. Since this undertaking is dependent upon different stakeholders who are willing to implement LCL solutions, the consultancy team also presents specific arguments which help to convince stakeholders to join the project. These arguments are mainly drawn from the project's developed business models.



*The LCL expert team*

#### 1.2 CONSULTANCY OFFERS

The LCL consultancy offers include regular client meetings (in person, via Skype or phone) while the engagement in on-going discourses with stakeholders is ensured by established communication structures.

The consultancy team guides its target groups step by step through the process of establishing LCL solutions. The offered activities are structured in ten different steps which secure an alignment to the specific needs of every involved municipality or business entity.

A checklist serves as an independently applicable guide, ensuring that none of the steps is skipped. The consultancy team also offers several templates and questionnaires for the target groups to use.

## 1.3 10-STEP PROGRAM FOR LOW CARBON LOGISTIC SOLUTIONS

### Step 1: Definition of scope and regional characteristics

In the first step, the scope as well as the regional characteristics are determined. This includes the area's population density, topography, size, type, protection status and the existing climatic conditions. An area could, for instance be characterized as medium-sized, sparsely populated, mountainous, suburban area with long snowy winters that partially comprises a nature reserve. As regional characteristics may have a critical effect, it is crucial to not only analyze the status quo but additionally the impact of these characteristics on the area's transport infrastructure, maintenance and consumption intensity.

The consultancy team offers expert-guided study trips for interested target groups to best practice places as well as visits by experts to be presented with best practice examples on-site.

### Step 2: Evaluation of existing transport and logistics infrastructure and their interconnections

In the second step, the existing transport and logistics infrastructure is evaluated. While transport infrastructure comprises roads, cycling paths, access roads and bridges, the logistic infrastructure includes logistic centers, distribution centers, warehouses, goods and cargo consolidation/deconsolidation terminals as well as the number of service points. Additionally, the level of interconnections and the variability of potential opportunities of use are assessed. The consultancy team provides specific templates for the evaluation of the transport and logistics infrastructure.

### Step 3: Determination of transport types and flows

In the third step, the different transport types (passenger, freight, special, service, supply, waste disposal transport, etc.) and flows are determined. The transport flow is quantified by choosing the same measurement method for every type, e.g. estimating the amount of seasonal transport flow fluctuations, the daily, weekly repartition of transport flow trends or within respective months, seasons and any other chosen criteria.

The consultancy team offers an inventory to enable a thorough analysis of the situation. Based on this analysis, an individual working plan and a long-term strategy including suitable measures to achieve the desired objectives are developed.

### Step 4a: Stakeholder Analysis: Determination of the regional business development level

Step 4a concerns businesses that are operated in the respective area and use an existing transport and logistics infrastructure for e.g. production processes, commercial and service activities, supply and distribution flows.

The consultancy team offers support by organizing different event formats that aim at raising awareness for the planned project and thereby, attracting possible project

partners. Support with the identification of relevant stakeholders is offered by a stakeholder list template.

The consultancy team also helps to outline how the involvement of the relevant stakeholders can be arranged. For this purpose, consultation on the organization and, if requested, supervision of background talks and one-to-ones are offered. This includes briefings about the stakeholders and presentations of persuasive arguments (political, ecological, economic and financial) that convince them to join the project. Support is ensured for the introduction of measures that engage private businesses, such as the establishment of public-private partnerships (PPP) and freight-quality partnerships (FQP).

### Step 4b: Stakeholder Analysis: Determination of public entities

Step 4b is targeted at municipalities, determining respective public entities that can profit from low carbon logistics solutions, e.g. hospitals and sanitary establishments, nurseries, preschools, schools, public transport entities, retirement homes, specialized education and care institutions.

The consultancy team offers support with organizing different event formats (e.g. panel discussions) that aim at raising awareness for the planned project and, thereby, attracting possible project partners. Support with the identification of relevant stakeholders is offered by a stakeholder list template.

The consultancy team also helps to outline how the involvement of the relevant stakeholders can be arranged. For this purpose, consultation on the organization and – if requested – supervisions of background talks and one-to-ones are offered including briefings about the stakeholders and about a presentations of persuasive arguments (political, ecological, economic and financial) that convince them to join the project.

### Step 5a: Determination of consumer behavior and their respective supply modes

Step 5a is targeted at regional businesses and comprises the determination of consumer behavior and their respective supply modes. Consumer behavior means not only the consumption intensity but also the types of goods and services that are consumed. Furthermore, it should be differentiated between direct and indirect supply. The former includes e-commerce, direct presentation of goods, press and correspondence while the latter focuses on shops, restaurants, hotels etc.

The consultancy team offers a questionnaire that helps to realize step 5a in a structured manner.

### Step 5b: Determination of goods and services for public entities and their respective supply modes

Step 5b considers the municipalities identified in step 4a, determining their consumption intensity, the type of goods and services as well as the nature of their supply in the respective area.

The consultancy team offers a questionnaire that helps to realize step 5b in a structured manner.

## Step 6: Development of suitable low carbon logistics system

In the sixth step, a suitable LCL system is developed in accordance with the analysis and evaluation of the existing situation. This system could entail the development of new supply and distribution schemes, route optimizations and selections of suitable green vehicles.

The consultancy team offers guidance on relevant green policy instruments for the given region by outlining how they can support the desired objectives. Ideally, the expert team helps to develop strategies for determining initial investments needed for the implementation and for realizing funding opportunities. Moreover, the expert team offers consultancy on public involvement campaigns and the implementation of PR measures.

## Step 7: Implementation of suitable low carbon logistics system

The seventh step comprises the implementation of the developed LCL system that utilizes new supply and distribution schemes with optimized routes and appropriate green vehicles.

During this crucial step, the consultancy team offers active implementation support which includes the provision of a timetable, a highlighting of aspects that need to be considered in the process (e.g. deadlines which ensure a smooth implementation process as well as insights on how to organize a kick-off workshop for the involved stakeholders at the beginning of the cooperation process). Additionally, the consultancy team encourages the organizational harmonization of all business areas involved to ensure a coordinated involvement of the relevant stakeholders and an effective and efficient implementation of the planned activities.

## Step 8: Monitoring

In step 8, the implemented measures for a suitable LCL system are being monitored to enable an objective assessment. The optimum process is based on a predefinition of different success factors/indicators (e.g. air quality, noise emission, profit, number of vehicles used).

The consultancy team offers to support the elaboration of tailored monitoring reports summarizing the implementation process and important external developments. This includes the monitoring of the stakeholder involvement and the cooperation process.

## Step 9: Evaluation

In step 9, the results of the monitoring are being evaluated. The evaluation needs to be carried out continuously, integrating its results into further strategy development.

The consultancy team offers to support the provision of a report based on the inventory's evaluation, highlighting amongst other things where measures have been implemented successfully as well as where room for improvements has been identified. A final workshop helps to discuss the results of the report and their possibility to ensure a lasting implementation of green logistic solutions.

Additionally, the findings of the report are being communicated and disseminated strategically. Therefore, the consultancy team supports the organization of a conference to present the results and to ensure public outreach and corresponding public awareness.

Finally, the stakeholder involvement needs to be analyzed answering questions such as: Which stakeholders have been successfully involved? Which stakeholders only insufficiently provided necessary input and commitment? How can they be approached in a better way?

## Step 10: Continuous Improvement

The evaluation leads to the tenth and last step, namely the adaptation of the applied measures to improve LCL solutions. In addition, the working plan is being adapted accordingly.

1

### DEFINITION OF SCOPE AND REGIONAL CHARACTERISTICS

Topography, climatic conditions, area size, type and protection status (e.g. nature reserves) and their corresponding impact on transport infrastructure.

2

### EVALUATION: EXISTING INFRASTRUCTURE AND INTERCONNECTEDNESS

Transport infrastructure: roads, cycling paths, access roads, bridges.  
Logistics infrastructure: logistic centers, distribution centers, warehouses, goods and cargo consolidation/deconsolidation terminals, number of service points.

3

### DETERMINATION OF TRANSPORT TYPES AND FLOWS

Passenger, freight, special, service, supply, waste disposal transport, etc.

Business Entities

Municipalities

4a

### STAKEHOLDER ANALYSIS

Inventory of business structures which operate in a region and use an existing transport and logistics infrastructure – production, commercial and service activities; supply and distribution flows.

4b

### STAKEHOLDER ANALYSIS

Hospitals and sanitary establishments, nurseries, preschools, schools, retirement homes, specialized education and care institutions, public transport.

### 5a CONSUMER BEHAVIOR AND SUPPLY MODES

E-commerce, consumption intensity type of goods and services as well as the nature of their supply.

### 5b SUPPLY MODES OF GOODS AND SERVICES FOR PUBLIC ENTITIES

Consumption intensity, type of goods and services as well as the nature of their supply.

### 6 LOW CARBON LOGISTICS SYSTEM DEVELOPMENT

Development of new supply and distribution schemes, optimization of itineraries and selection of appropriate green vehicles.

### 7 LOW CARBON LOGISTICS SYSTEM IMPLEMENTATION

Implementation of new supply and distribution schemes with optimized itineraries and appropriate green vehicles.

### 8 MONITORING

of the implemented measures with the help of defined criteria.

### 9 EVALUATION

of the monitoring results

### 10 ADAPTATION

of the applied measures to improve low carbon logistics solutions.

Fig. 1: Flow chart of the 10-step program

## 1.4 EXAMPLES OF CONSULTATIONS

### CITY OF ROSTOCK



Inspired by the successful LCL pilot project in Bad Doberan, the City of Rostock expressed interest to implement LCL solutions in its city center with special attention to the main pedestrian zone and shopping area, Kröpeliner Straße. A workshop was organized by the German representatives of the LCL Expert Team. The municipality of Rostock invited not only the LCL experts, but also city administration representatives as well as CEP-services and retailers. The goal was to create an aware-

ness of each other's problems regarding the delivery of parcels and express deliveries. Out of this, measures that serve all relevant stakeholders were to be identified and implemented. As a result, a cargo bike concept that included the establishment of a micro-depot was implemented in cooperation with the CEP-service Hermes in September 2018.

### SZCZECIN MUNICIPALITY

In a meeting with representatives of the City of Szczecin's planning office and the department of project management, the Polish representatives of the LCL Expert Team discussed two problems, namely, the low level of utilization of cargo bikes and the insufficient amount of unloading bays in Szczecin. The aim was a development of unloading bays and charging stations as well as an establishment of cargo bike deliveries. In preparation, the existing transport and logistics infrastructure and their interconnections were evaluated and a plan for a joint development of unloading bays and charging stations in Szczecin city centre was prepared.

### SZCZECIN METROPOLITAN AREA ASSOCIATION

To increase the level of understanding regarding city logistics problems in other cities of the region, the Polish LCL Expert Team members got together with representatives of the Szczecin Metropolitan Area Association, representatives of the City Planning Office of Szczecin Municipality. Plans for an LCL awareness campaign in the region, suitable actions such as meetings and study visits and a Freight Quality Partnerships were prepared in this meeting.

### STARGARD MUNICIPALITY

The LCL Expert Team met with representatives of the Stargard municipality to discuss the continuation of the cooperation established under the LCL project and the determination of sustainable city logistics measures in the city of Stargard. The aim was to identify possible future actions and cooperation, which could be implemented also within the scope of another project: Electric Urban Freight and Logistics (EUFAL). Out of this understanding, assumptions were formulated and a plan for future actions was prepared.

### DPD POLAND

Since the CEP-service DPD Poland plans to develop an urban depot in Szczecin, the Polish LCL Expert Team members offer support with analyzing the efficiency of cargo bike utilization for last mile delivery. In order to realize urban depots in combination with cargo bike utilization for the last mile, a technical and operational analysis of the different types of cargo bikes was prepared.

## POCZTA POLSKA (NATIONAL POST OPERATOR)

The national postal operator, Poczta Polska, also plans to implement cargo bikes for their last mile deliveries. Thus, they met with representatives of VonRoll Polska and the Polish LCL Expert Team members. The LCL experts helped preparing the plan for the technical and operational analysis of the different types of cargo bikes.



## 2 METHODOLOGY MANUAL FOR ANALYSIS WORK

Authors: Kinga Kijewska; Stanisław Iwan; Mariusz Jedlinski, Natalia Wagner

The main aim of this document is to present simple and general tools for an assessment of the city logistics activities realized within the context of the Low Carbon Logistics (LCL) project. The approach has a general methodological value for further actions and other cities. From a methodological point of view the results of LCL project have aimed at supporting the city logistic planning process especially in small and medium-sized towns and cities, often with historical sites and tourist attractions.

The method of the evaluation is based on five dimensions as presented in figure 2.

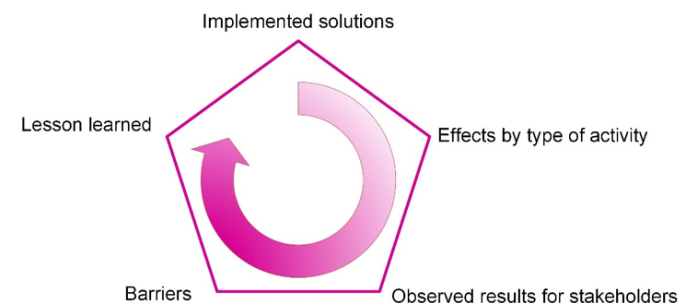


Fig. 2: Structure of the evaluation framework

All LCL partners have been asked to fill in the tables below according to their knowledge and opinions on implemented and planned solutions, effects of taken activities, observed results, restrictions and lesson learned.

### 2.1 YOUR CITY LOGISTICS MEASURE GENERAL DESCRIPTION

Provide a general description of your city, identified problems, ambitions and objectives as well as the implemented measure.

<b>Name of the town/city</b>	
<b>City - general description</b>	
<b>Mayor logisitcs problems of the town/city</b>	

<b>Ambitions and objectives</b>	
<b>Measure - general description</b>	

## 2.2 DESCRIPTION OF THE MEASURE

### The categorization the implemented measure

To which city logistics measures categories the measure implemented in your city only is related? Choose (ticking "X" in the relevant rows, last column each) all options related to your implementation.

City logistics measures' categories		
Administrative measures	Access restrictions in terms of time	
	Vehicle restrictions	
	Low emission zones/Environmental zones (Engine restrictions)	
	Road pricing	
	Parking and unloading restrictions	
	Vehicle load factor controls	
Financial measures	Mobility credits schemes/congestion charging	
	Vehicle financing schemes	
Technical/organisational measures	Freight traffic routing information	
	Intelligent freight traffic routing	
	Integrated logistics tools	
	Alternative delivery systems	
Promotional/awareness/information	Promotion campaigns for sustainable freight traffic	
	Driver training for sustainable freight traffic (eco-driving)	
	Freight Operators Recognition Scheme (FORS)	

Urban planning and governance measures	Sustainable Urban Logistics Plan (SUPL), Local (freight) transport plan, Local Freight Development Plan (LFDP)	
	Freight transport Quality Partnership	
	Special urban planning conditions	

Consider please following city logistics measures' categories:

- Access restrictions in terms of time** – Time access restrictions, also known as time-windows, restrict trucks from entering a certain area within a certain period of time. Time-window areas are often city centres or smaller parts of it, such as pedestrian areas. Time-window restrictions sometimes allow delivery trucks to access areas where no motorized vehicles are allowed, such as pedestrian areas, for a certain time period.
- Vehicle Restrictions** – Vehicle restrictions prevent vehicles that have certain characteristics from entering a certain area (e.g., city centres, specific streets). Vehicle restrictions can apply to various vehicle characteristics, such as length, width, height, axle pressure and/or weight. A specific vehicle restriction, the amount of emissions emitted by the vehicle's engine, is considered with another restriction, the low emission zone.
- Low emission zones/Environmental zones (Engine restrictions)** – Institution of protected areas that include both, vehicle access restrictions and incentives for environmental or historical/heritage reasons.
- Road pricing** – Road pricing is an access regulation that usually does not only apply for freight transport but all means of transport, although the prices might differentiate between passenger and freight transportation. Depending on the primary function of the road pricing, the price may increase at different times of the day or depending on how "clean" the vehicle is. Note that this is not a per se restriction, but falls more under traffic management schemes.
- Parking and unloading restrictions** – Finally, parking and unloading restrictions specify the locations in an area where large vehicles are allowed to park in order to unload deliveries or load pickups. Parking restrictions on other road users might also be used to facilitate the loading and unloading activities of freight vehicles on a particular street at a particular time.
- Vehicle Load Factor Controls** – A vehicle's load factor should ensure that only fully (or at least to a certain extent) loaded vehicles enter an area, such as the city centre. Urban freight vehicles have, on average, a low load factor (due to several reasons). Enforcements of such controls are difficult.
- Mobility credits schemes/congestion charging** – Limiting the access of freight vehicles to an urban area by making freight operators 'pay' for each access with mobility credits that were initially distributed by the public administration (or money payments for entries in excess of the assigned credits). Access control equipment in freight vehicles record every entry to the zone and permit the implementation of a mixed pricing / enforcement schemes for different users.
- Vehicle financing schemes** – Attractive, publicly subsidized financing (e.g. leasing) models that stimulate freight operators to use more environmentally friendly freight vehicles.
- Freight traffic routing information** – Channelling trucks that drive into cities of the urban agglomeration through designated truck routes, e.g. by setting up special road signs or providing special maps with designated routes and lorry-relevant road information.
- Intelligent freight traffic routing** – Integrating designated lorry routes and lorry-relevant information in navigation software. On this basis, data received from freight vehicles in traffic in regard to their current locations, loaded cargo and destination plans can be connected with real-time road traffic data.
- Integrated logistics tools** – Web-based logistics tools linking and coordinating producers, recipients and freight operators in order to optimise logistics flows.
- Alternative delivery systems** – Van-sharing, cycle-logistics, night-delivery service, pack stations (parcel lockers), cargo bikes etc.



13. **Promotion campaigns for sustainable freight traffic** – Awareness-raising campaigns to promote responsible, eco-efficient logistics among freight recipients and distribution firms.
14. **Driver training for sustainable freight traffic (eco-driving)** – Training of drivers on responsible and eco-efficient driving behaviour.
15. **Freight Operators Recognition Scheme (FORS)** – Public authorities (or freight partnerships) awarding noticeable signs to logistic firms which employ eco-friendly vehicles and/or other similar measures. This shall contribute to a better image and an increased importance of the topic of eco-friendly logistics.
16. **Sustainable Urban Logistics Plan (SUPL), Local (freight) transport plan, Local Freight Development Plan (LFDP)** – Strategic freight transport plans (formal or informal), which are based on a systematic analysis of freight traffic and local stakeholders and include goals and planned measures for the medium or long term.
17. **Freight Quality Partnership** – Freight Quality Partnerships (FQPs) are means for urban authorities, businesses, freight operators, environmental groups, the local community and other interested stakeholders to work together to address specific freight transport problems. Typically, partners exchange information, experiences and initiate transport projects.
18. **Special urban planning conditions** – Integrating sustainable transport conditions into the land use and urban planning processes, e.g. by making special freight traffic related contractual arrangements (including enforcement powers) a precondition for a new business or large complex to receive a building permit.

## THE IMPLEMENTED MEASURE IMPACT ASSESSMENT

Assess the impact of the measure implemented in your city, taking the following aspects into account:

The area of the impact	The level of impact				
	None	Very small	Small	High	Very High
Positive environmental impact					
Better quality of deliveries					
Economic benefits for stakeholders					
Reducing average delivery time					
Strengthening cooperation between stakeholders					
Less energy-consumption					
Increased traffic safety					

## THE STAKEHOLDERS ENGAGEMENT

Assess the level of stakeholders' commitment to the implementation of your city logistics measure.

The stakeholders' engagement	The level of impact				
	None	Very small	Small	High	Very High
Logistic entities (e.g. carriers, logistic operators, warehouses)					
Local/regional authorities					
Residents (inhabitants, tourists, other city users)					
Public entities (e.g. educational units, the police, municipal guards)					
Road infrastructure providers					
Vehicles Producers					
Other, describe what if any: .....					

## THE BARRIERS OF THE IMPLEMENTATION

Evaluate the barriers that were encountered during the preparation and implementation of the measures that you chose as most appropriate ones for your city. Use the symbols from the legend below.

Remember!

Provide the answers for the measure implemented in your city only!

The stakeholders' engagement	The level of impact				
	None	Very small	Small	High	Very High
Administrative					
Organizational and legal					

Economic					
Psychological					
Access to the information					
Other, describe what if any: .....					



### 3 GREEN POLICY INSTRUMENTS

Authors: Sophie Werdin; Clara Burzlaff

The need and benefits of low carbon logistics solutions have been broadly recognized since transport – including logistics – is a major source of pollution. The lack of implementation still to be observed was addressed by various green policy instruments established by the EU and its member states. To enable their efficient use, it is important to gain understanding of the different types of instruments and their effectiveness. However, not only their environmental effectiveness but also their effect on specific systems, such as mobility, are important to better evaluate how policies can contribute to transitions towards a more sustainable society.<sup>1</sup>

First, this chapter outlines the variety of green policy instrument types, which is then followed by an overview of their application in Sweden, Lithuania, Poland and Germany. Finally, recommendations for green policy instruments in each of the four European countries are given.

#### 3.1 METHOD

To develop recommendations for green policy instruments, the legal frameworks for low carbon logistics solutions are analyzed in each of the five partner regions, namely Sweden, Lithuania, Poland and Germany. Within this legal inventory, political targets, strategies and action plans as well as laws and funding options are investigated on EU and each national level. The needed data were collected by PPI0 with support from the regional partners. To avoid legal limitations, the legal inventory presents the framework in which green policy instruments can be implemented. In addition to elaborating the respective legal framework, the results of a brainstorming session<sup>1</sup> are incorporated into the recommendations. During the session, the members of the LCL Expert Team contributed with their knowledge of green policy instruments. Thereby, not only good or bad practices from the partner regions but also best practices from other countries have been gathered and investigated. Literature research complements the findings of the legal inventory and the expert knowledge to then formulate a list of recommendations for green policy instruments. One main message to the regional authorities and politicians constitutes how these instruments can help their region to contribute to their nation's action plan and fulfill the EU climate protection goals.

#### 3.2 GREEN POLICY INSTRUMENTS

Green policy instruments play a key role in determining and improving the state of the environment. They are understood as environmentally friendly interventions made by the government or public authorities and are ideally applied cross-sectoral and

<sup>1</sup> OECD (2019). Database on Policy Instruments for the Environment. ([www.oecd.org/env/policies/database](http://www.oecd.org/env/policies/database))

equally in all sectors.<sup>2</sup> As shown in figure 1, there are different types or approaches of policy instruments that are subsequently explained in more detail. These are (1) traditional regulatory approaches, (2) market-based instruments, (3) planning instruments, and (4) voluntary approaches.

The description of the instrument types is fully aligned with the definitions of the OECD's Policy Instruments for the Environment (PINE) database and the European Environment Agency (EEA).

Traditional Regulatory Approach	Market-based Instruments	Planning Instruments	Voluntary Agreements
Standards	Taxes	Demonstration and Pilot Projects	Labels
Bans	Fees or Charges	Support for Research and Development	Awareness Raising
	Environmentally Motivated Subsidies		
	Tradable Permits		
	Incentives		

## TRADITIONAL REGULATORY APPROACHES

Traditional regulatory approaches are so-called demand-and-control measures. Here, legislation directly regulates an industry or activity by mandating which technology to use or what performance to achieve. A technology or design standard mandates the specific technologies or production processes that must be used by the polluter to meet a set emission standard. A performance-based standard also requires polluters to meet an emission standard. However, the method how to meet this standard can be decided by the polluter. Aside from setting **standards**, regulatory approaches include **bans**, especially for the use or production of a specific product or pollutant.

## MARKET-BASED INSTRUMENTS

Market-based instruments or incentives use economic variables to balance, reduce or eliminate negative environmental externalities. They can be implemented in different systematic ways, either across regions, across economic sectors, or by an environmental medium, e.g. related to CO<sub>2</sub> emissions. Market-based instruments include taxes, fees or charges, subsidies, tradable permits and deposit-refund schemes.

**Environmentally related taxes** are understood as compulsory, unrequited payment to the government levied on tax bases. They are proven to have a specific adverse impact on the environment. They increase the costs of a polluting product or activity, which tends to discourage its production or consumption. Tax bases include energy

products, transport equipment and transport services, pollution (emissions to air and water, ozone-depleting substances, waste management and noise) as well as natural resources. Thus, tax bases of environmentally related taxes may include both taxes on negative by-products such as emissions as well as taxes on outputs of a polluting activity, for example the purchase of fuel.

**Fees and charges** are defined as compulsory, required payments to the government. They are levied in proportion to the services provided and are paid for government services directed at a specific beneficiary. Thus, they differ from taxes which are used to raise revenue to fund government expenditure.

**Environmental subsidies** directly or indirectly reduce the use of products or services that are proven to have a specific adverse impact on the environment. Different types of environmentally motivated subsidies exist, including payments from the government to producers, preferential tax treatments, feed-in-tariffs, premiums, grants and loans.

**Tradable permits** are mostly used to allocate pollution rights. Permits can be issued under a trading system such as (a) a cap-and-trade system where an upper limit on allowances is fixed and the permits are auctioned or distributed according to specific criteria, or (b) a baseline-and-credit system with no fixed emissions limits but the option to earn and sell credits when the polluter has reduced the emissions below the mandated level.

**Deposit-refund schemes** combine a product charge, the “deposit”, with a subsidy for the product’s recycling or proper disposal, the “refund”. The general aim is to discourage an improper or environmentally harmful disposal of products. By collecting unmixed materials, a high-quality recycling of those materials is ensured which prevents the use of new materials. Therefore, the need to extract natural resources is reduced. Deposit-refund schemes can be either implemented on a voluntary basis or be mandated by legislation.

## PLANNING INSTRUMENTS

Planning instruments primarily include measures designed to increase the attractiveness of alternatives. In contrast to subsidies, the focus is particularly on the planning approach to initiate profound and longer-term changes in the respective structures. To this end, an increased **support for research and development**, as well as **demonstration and pilot projects**, can help to ensure good planning. A holistic design as well as the integration into more than one planning scheme or objective is necessary. In case of transport, for example, it must be understood as part of a larger system that cannot be planned separately but needs to be integrated at least into urban, spatial and environmental planning as well.

## VOLUNTARY AGREEMENTS

Voluntary agreements include information and awareness raising campaigns as well as the use of labels.

<sup>2</sup> ibid.

**Awareness raising campaigns** are mainly used to inform and educate users, e.g. with the help of trainings, online tools or guiding systems. Even though they have no direct steering effect, information and awareness raising campaigns can cause concrete behavioral changes by establishing options for a more environmentally friendly, time-efficient or cost-effective behavior.

The **labeling** of products and services aims to sensitize consumers for the effects those products and services have or do not have on the environment. Moreover, it allows an informed decision-making. Also, the identification of certain product characteristics, e.g. fuel consumption, helps consumers to consider them in their purchasing decisions. The product information must be reliable for the labeling to be effective. In more complex cases, additional regulation, control and sanctioning in case of disrespect or misinformation might be necessary because labels often become an important part of product marketing.<sup>3</sup>

### 3.3 EFFECTIVENESS OF GREEN POLICY INSTRUMENTS

To ensure the long-term effectiveness and sustainability of an environmental policy instrument, certain criteria need to be considered. The cost-effectiveness and eco-efficiency of an instrument are the most significant indicators to achieve long-term environmental benefits. Instruments that not only consider but focus on regional development are highly needed and can significantly contribute to minimizing the growing urban-rural disparities. Another major criterion is the legitimacy or acceptance of the instrument. Here, not only the legislative background needs to be taken into consideration but also whether the instrument is likely to reach public acceptance. Therefore, it is fruitful to either analyze the public need first and then make targeted policy decisions or to combine a regulatory or a market-based instrument with voluntary approaches such as awareness raising campaigns. For an effective strategy it is moreover essential to combine market-based instruments with direct public intervention. The aim is always to achieve the translation from regulation to implementation and finally acceptance. The fact that



green policy instruments can be applied on different regulatory levels heavily influences the instrument choice, meaning that green policy instruments for the municipal level may be very different from those that find acceptance on EU level. However, the international competitiveness is a criterion that needs to be considered to ensure long-term effectiveness. Generally, green policy instruments as part of environmental policies should be integrated into other policies to encourage sustainability and environmental consideration in all sectors.

## 3.4 RECOMMENDATIONS FOR GREEN POLICY INSTRUMENTS

Before analyzing the status quo of Sweden's, Lithuania's, Poland's and Germany's use of green policy instruments to give specific recommendations for every country, this chapter provides some general recommendations for green policy instruments.

### GENERAL RECOMMENDATIONS

Firstly, increased support for and funding of research and development as well as demonstration and pilot projects are highly recommended as, in this way, alternative transport and logistics concepts can be developed and regionally tested.

Secondly, greater consideration must be given to the municipal planning level so that guidelines and action plans are included – safeguarding a successful implementation. In this regard, the process of public procurement can be improved by setting up sustainable and environmentally friendly requirements, such as e.g. the use of electric instead of fuel-based vehicles. Also, the purchasers of vehicles need to gain clarity of the fuel efficiency. Thus, a coherent labelling needs to be provided and ensured.

Moreover, the importance of traditional regulatory approaches needs to be acknowledged. To only regulate environmental deterioration with market-based instruments is neither fully effective nor a sustainable long-term solution. In particular, a CO<sub>2</sub> differentiated vehicle tax and fuel taxes are drivers for change towards a cleaner mobility. Driving bans, environmental zoning and limited delivery times should not be understood as last resort but rather as a promotion of healthier interactions between different use groups.

Another recommendation is to use affirmative instead of restrictive taxes for green technologies to incentivize sustainable behavior. A cultural shift towards more sustainable modes of transport is clearly needed, therefore, new forms of investments are required and voluntary agreements, especially awareness raising campaigns, are crucial for public acceptance and sustainable learning.

A shift to low carbon logistics and generally more environmentally friendly transportation of goods highly depends on integrated planning with transport, logistics, urban design, human ecology, environmental and spatial planning working hand in hand.

### SWEDEN

Sweden's climate policy is considered as the most efficient among the selected countries and shows an overarching policy framework including laws, strategies and targets. Many laws directly address fuels, e.g. the act on the obligation to supply renewable fuels, the fuel quality act, the act on the reduction of greenhouse gas emissions through the inclusion of biofuels into petrol and diesel fuels and the act on sustainability criteria for biofuels and bioliquids. Thus, many of the green policy instruments also focus on fuels. All taxes, as market-based instruments, target fuels, including an energy, a carbon dioxide and a sulfur tax. Especially the CO<sub>2</sub>-tax is a very positive example that should be adopted by the other European states. Unlike Lithuania and Germany however, Sweden does not make use of tax exemptions as incentives to use alternative fuels or electric

3 AEE (2016). Metaanalyse: Maßnahmen und Instrumente für die Energiewende im Verkehr

vehicles. Hence, a tax reduction or exemption for biofuels and electric and/or hybrid vehicles would be a first recommendation. What Sweden lacks in „positive” taxes, it gains in environmentally motivated subsidies. The subsidy for electric bikes offers a discount of 25% (or maximum 10.000 SEK) while the subsidy for installing home chargers for electric cars covers up to half the cost of the charging station and the electricity supplied to it. A bonus system for new environmentally friendly cars and electric buses exists as well as free charging for electric vehicles at public charging stations. A second recommendation is to broaden the incentives for electric vehicles. This should encompass exemptions from parking fees or certain access restrictions but also allow electric vehicles the use of public transport lanes, which would have significant advantages for low carbon freight transport in cities.

## LITHUANIA

The Lithuanian policies do not comprise any traditional regulatory approaches such as standards or bans, but set the focus on market-based instruments. However, the government plans to introduce environmental zones, limited delivery times for non-electric vehicles and a driving ban for Diesel vehicles in big cities by 2020. The law on environmental pollution taxes abolishes the application of increased and reduced tax rates for environmental pollution. While it encourages the reduction of environmental pollution by generally facilitating the reduction of CO<sub>2</sub> emissions, the tax reduction for electric vehicles and the exemption from the exercise tax for biofuels directly target the transport sector and enable the use of more environmentally friendly technologies. However, a first recommendation would be to offer commercial electric vehicles a tax reduction on road fees. By focusing on affirmative taxes for green technologies in form of tax reductions or exemptions rather than taxing traditional vehicles and fuels, these instruments can be considered to incentivize sustainable behaviour instead of being restrictive. Thus, by 2020, plug-in hybrids will be exempt from the excise tax. Further incentives that are applied in Lithuania specifically target electric vehicles by exempting them from parking fees, offering free charging at public charging stations and allowing them to use public transport lanes. In 2020, the Lithuanian government plans to introduce another market-based approach: environmentally motivated subsidies. A funding program for electromobility as it is already in place in Germany and a bonus for sustainable urban environments comparable to the Swedish example should be realised. Unfortunately, Lithuania does not create possible planning instruments. Therefore, the focus should be set on pilot projects and the support of research and development to facilitate the transformation from scientific knowledge into practical, sustainable application. Also, voluntary agreements such as fair transport labels, eco-driving guides or an overarching climate initiative should be exploited as important means to raise public awareness for low carbon logistics solutions, since awareness is the first step on the road to acceptance.

## POLAND

Although both, Swedish and the Polish law, mention the availability of alternative fuels as a shortcoming, Poland does not set a standard that guarantees a minimum share

of biofuels in the total quantity of market fuels and an increased accessibility of alternative fuels. Hence, this would be a first recommendation that also interlinks nicely with the existing instrument of fining the manufacturing, storage, transport and distribution of fuels that do not comply with set quality requirements. Generally, Poland neglects the opportunity to utilize traditional regulatory approaches and instead focusses almost entirely on market-based instruments. Such a one-sided approach is neither very effective nor sustainable. Therefore, the overarching recommendation is to have a multi-faceted approach with a variety of green policy instruments. It also becomes apparent that Poland does not have specific taxes targeting fuels but instead offers excise tax exemptions for electric vehicles and plug-in hybrids. However, a fee system for using the environment (kg substance/air) is intended to cover this base. All other implemented instruments only target electric vehicles, e.g. exemptions from access restrictions and parking fees as well as incentives to use public transport lanes and larger depreciation write-offs from companies using electric instead of fuel-engine vehicles. Although incentives help to promote more environmentally friendly modes of transport, they do not prevent the continuance of harmful practices. This again shows the importance of a multi-faceted approach or instrument mix. Both planning instruments and voluntary agreements need to be integrated in Poland's environmental policies. Here, Poland shows significant room for growth and development towards sustainable low carbon logistics solutions.








































## GERMANY

Germany has implemented a variety of green policy instruments and is the only one among the four countries to cover all instrument types. Germany's action plan on freight transport and logistics refers to delivery vehicles and cargo bikes and thereby, highlights the relevance of low carbon logistics solutions. Environmental policies often refer to the local level and municipalities to ensure a stringent implementation. Especially the European Climate Initiative is a good example for voluntary agreements and promotes the deepening of transboundary dialogue, the exchange of experiences and knowledge as well as the establishment of networks and capacity building. It also covers awareness-raising for the professional use of cargo bikes and an eco-driving guide. However, a registry for greenhouse gas emissions and the use of labels give room for improvement. Germany has a strong focus on planning instruments which becomes even more apparent since Sweden, Lithuania and Poland have not utilized that instrument type so far. It is important to emphasize that the planning practice can be optimized by an integrated planning approach where not only transport or logistics is considered but their

interconnectedness with urban design, human ecology, environmental and spatial planning. With a funding program for electromobility, Germany subsidizes electric vehicles and adds further incentives such as a bonus-malus system to increase the sales volume of electric vehicles, reserved parking in public areas, exemption or lowering of parking fees, and granting exemptions for certain access restrictions. However, free charging at public charging stations would be a logical continuance of this incentive strategy and should be further developed. Taxes, affirmative or restrictive ones, do not play a major role in Germany's environmental policies. Instead, standards and bans are used. Especially the establishment of environmental zones requiring a certain Euro class and/or fuel type served as a best practice for other European countries.

## GREEN POLICY INSTRUMENTS

Traditional Regulatory Approach	Market-based Instruments		Planning Instruments	Voluntary Agreements
<p><b>Standards</b></p> <p>Fines for the manufacturing, storage, transport and distribution of fuels that do not comply with quality requirements </p> <p>Guaranteeing a minimum share of biofuels in the total quantity of market fuels and an increased accessibility of alternative fuels </p> <p>Environmental zones requiring a certain Euro class and/or type of fuel </p> <p>Limited delivery times for non-electric vehicles </p>	<p><b>Taxes</b></p> <p>Exemption from excise tax/tax reduction for electric vehicles </p> <p>Exemption from excise tax for plug-in hybrids </p> <p>Exemption from excise tax/tax relief for biofuels </p> <p>Energy tax for fuels </p> <p>Carbon dioxide tax for fuels </p> <p>Sulfur tax for fuels </p> <p>Taxation of fuels and vehicles </p> <p>Environment Pollution Taxes </p>	<p><b>Tradable Permits</b></p> <p>Emission trading system </p> <p><b>Incentives</b></p> <p>Bonus-malus system to increase the sales volume of electric vehicles </p> <p>Exemption from or lowering of parking fees for electric vehicles </p> <p>Reservation of parking spaces for electric vehicles in public areas </p> <p>Granting exemptions for electric vehicles to certain access restrictions </p>	<p><b>Demonstration and Pilot Projects</b></p> <p>Cargo bike testing with pilot businesses </p> <p><b>Support for Research and Development</b></p> <p>Scientific evaluation and assessment of consumer acceptance, vehicle deployment and environmental impacts of cargo bikes </p>	<p><b>Labels</b></p> <p>Fair transport label </p> <p><b>Awareness Raising</b></p> <p>Registry of greenhouse gas emissions </p> <p>Eco-driving guide (for drivers using heavy vehicles) </p> <p>Awareness raising for the professional use of cargo bikes </p> <p>European Climate Initiative (deepening transboundary dialogue, exchange of experience and knowledge, capacity building, establishment of networks) </p>
<p><b>Bans</b></p> <p>Driving ban for Diesel vehicles </p>	<p><b>Fees or Charges</b></p> <p>Fee system for using the environment (kg substance/air) </p> <p>Congestion fee in larger cities </p>	<p>Free charging for electric vehicles at public charging stations </p> <p>Incentivization of biofuel production </p> <p>Incentives for the supply and the consumption of electricity-based fuels </p> <p>Use of public transport lanes for electric vehicles </p> <p>Larger depreciation write-offs for companies using electric vehicles </p> <p>Prioritization of support mechanism applications according to the best climate value </p>	<p><b>Environmentally Motivated Subsidies</b></p> <p>Subsidy for Electric Bikes </p> <p>Funding Program Electromobility </p> <p>Subsidy for Installing Home Chargers for Electric Cars </p> <p>Bonus for Sustainable Urban Environments </p>	



## 4 LOW CARBON LOGISTICS AWARDS FOR CHANGE LEADERS IN BUSINESS, PUBLIC AND NGO SPHERES

Authors: Ieva Budraitė, Šarūnė Dargyte-Kregždė

The international conference GREEN CITIES: GREEN LOGISTICS FOR GREENER CITIES held in Szczecin in September 2018 presented and awarded the most innovative businesses, NGOs and municipal initiatives that work on decreasing greenhouse gas emissions, traffic volumes, accidents and other transportation-related issues.

### Awards inspired by challenges of the future

The awards, initiated by the Lithuanian Green Policy Institute, saw the participation of companies and organizations from Lithuania, Poland, Sweden and Germany. These competed in the categories of *Business Project of the Year*, *Municipality Project of the Year* and *NGO Project of the Year*.

Ieva Budraitė, Executive Director of Green Policy Institute, claims that the inspiration for the awards came from predictions of a future that has no place for polluting transportation: "It is anticipated that the transportation sector will massively grow by the year 2050. In order to avoid the consequences of growing traffic volumes, we must implement low-emission solutions such as freight consolidation, route optimization and environmentally friendly vehicles. Applying green solutions to the area of logistics would contribute to cutting down on greenhouse gas emissions, traffic volume, traffic accidents and other related issues. By hosting the Low Carbon Logistics Awards we wanted to bring together the leaders of an environmentally friendly change from the business, public and NGO sectors of the four South Baltic region countries. Their initiatives should develop a role model effect for those who seek sustainable solutions for business and changing cities to follow", Ieva Budraitė stated.

### Attention to projects that create economic, environmental and social benefits

The participants in the awards had the chance to demonstrate their achievements, to be noticed and to be evaluated by an international audience. The winners received the privilege to use the Low Carbon Logistics Awards mark. It is expected that this mark will evolve into a new symbol for recognizing and appreciating low carbon logistics.

The winners were nominated in a two-step process, the first being implemented on the national, the second on the international level. A committee of experts selected commendable initiatives and projects that made tangible contributions to creating economic, environmental and social good.

The initiatives presented in the awards shall be implemented within the South Baltic region. Germany, Sweden, Poland and Lithuania are cooperating in the Low Carbon Logistics project, the goal of which is to lower pollution levels in the regions of Neringa (Lithuania), Rietavas (Lithuania), Olofström (Sweden), Stargard (Poland) and Bad Döberan (Germany) by applying environmentally friendly solutions.

The Baltic Sea region is unique in its biodiversity and natural beauty – however, it is badly affected by pollution. Transportation and logistics are the fields of activity that do most of the damage. Therefore, environmentally friendly logistics solutions are becoming ever more important in the region. A similar innovative and environmentally approach is what many of the European metropolitan areas need as well.

### Business Project of the Year winner: Electrically powered freight transportation by Elinta.

The application process for the Business Project of the Year award was open to any business working in the sphere of logistics: freight vehicle manufacturers and distributors, exporters and logistics innovators.

The biggest tendencies in this sector were the development of environmentally friendly transport solutions and its application in transporting goods. Two Lithuanian companies stood out among the best in this category. One of them won the Business Project of the Year award: the Kaunas-based company Elinta, which overcame competitors from Sweden, Germany and Poland. The Lithuanian enterprise developed 3.5-7.2 ton electrically powered vans and hybrid trucks. The iPHEW hybrids manufactured by Elinta can drive for 50 kilometres solely on electrical power. Meanwhile, a traditional diesel engine can cut down fuel consumption up to 70% when working in tandem with an electrical engine - without sacrificing range. According to the company's estimates, a single iPHEW can save 28-42 tons of carbon emissions over 10-12 years.

### Best Business Project of the Year awards saw competition between environmentally friendly goods delivery system and electric robots that pull train cars.

Elinta was competing with finalists Meck-Schweizer from Germany and the sea freight company BEGA from Klaipėda (Lithuania).

Meck-Schweizer was nominated for a regional drop-shipping system that encourages supporting local food producers and reduces carbon footprint. The company program connects regional food producers, manufacturers and sellers in a way that provides customers with fresh, locally grown or manufactured products. The orders are shipped from the producer or manufacturer directly to the client. Deliveries are made via an electrically powered van that uses solar power to refrigerate food.

Among the best in the Business Project of the Year was the Klaipeda-based sea freight company BEGA. It has started a locomotive modernization program that aims to refurbish diesel engines into electrically powered robots that only use energy when pulling train cars. The three ROB-45 robots manufactured by the company have cut yearly emissions down to 7.2 tons.

### Municipality Project of the Year winner: The environmentally friendly goods delivery model from Ystad - Österlen



The awards also aimed at supporting initiatives that foster social, environmental and economic advancements which are tied to logistics solutions at the municipal level.

The Municipality Project of the Year award went to the project from the Southeast Swedish municipality of Ystad. In this Baltic Sea coast city, two biogas-fuelled vans deliver 45 tons of goods to 350 inhabitants ever week.

The suppliers drop off their goods at a consolidation centre. There, they are sorted and handed off for delivery to the consumer. This method of delivery enables a delivery of goods to schools, kindergartens and retirement homes during one single trip. It was observed that the related reduction of traffic volume has resulted into an increased safety in the area.

Over the first year of this project, the towns of Ystad, Tomelilla and Simrishamn experienced the new delivery model cutting down the number of stops in the delivery chain from 26,500 to 7,000. Meanwhile, this model was adopted by more than 40 municipalities in Sweden. It is expected to see this system spread to other municipalities across the country.

### Neringa entry toll – among the exemplary projects

Another nominee for the award was the municipality of Neringa. The award committee of logistics experts from Lithuania, Poland, Germany and Sweden highly rated the local ecological fees in the Neringa municipality, aimed at reducing the amount of vehicle traffic that enters the Curonian Spit National Park. The eco toll sums up to 20% of the income of Neringa municipality - funds that are used to improve the local infrastructure and similar developments.

### The NGO sector displayed a leadership in logistics planning and protection of community interests



NGOs were not only involved into implementing sustainable logistics, but also into ensuring the citizens' rights clean environment.

The nominated NGO Project of the Year was the initiative started by Poznan's (Poland) Instytut logistyki i magazynowania (The Institute of Logistics and Warehousing). Its project is called SULPiTER and aims at improving the planning of urban freight shipping in Central Europe. The institute also consults decision makers and prepares sustainable logistics plan for cities.

Other nominees in this sector were the Klaipėda-based initiative "Už demokratiją ir ekologiją" (Klaipedians Initiative for Democracy and Ecology – KIDE) and the Polish Alternative Fuels Association.

KIDE aims at raising awareness and influencing decision makers on the topic of the Klaipeda State Seaport expansion project, which is projected to further increase freight traffic on both, roads and railroads (by 13.000 trailer trucks per day). It is hoped to ensure a more environmentally expansion of the ground-based freight.

The Polish Alternative Fuels Association (Polskie Stowarzyszenie Paliw Alternatywnych – PSPA) was nominated for its exemplary conduct in the area of logistics. The organization works on analysing electric car infrastructure in Poland, supporting the establishment and expansion of an electric transportation network for both passengers and freight and encouraging the use of alternative fuels in the transportation system.



## REFERENCES

- AEE (2016). Metaanalyse: Maßnahmen und Instrumente für die Energiewende im Verkehr
- Allen J., Anderson S., Browne M., Jones P. (2000): A framework for considering policies to encourage sustainable urban freight traffic and goods/service flows. Transport Studies Group, University of Westminster, London.
- BAYER, M.; SEIDENKRANZ, M. (2019): Erfolg durch Methodik beim Mikro-Depot-Projekt in Nürnberg. In: Nachhaltige Stadtlogistik – Warum das Lastenfahrrad die Letzte Meile gewinnt. Bogdanski, R. (ed.), 59-94
- BOURN J., MACDONALD G. (2012): Definition of suitable set of actions/measures for an efficient and energy saving organization of goods transport and delivery in urban areas. C-LIEGE Project output nr. 4.2.
- DABLANC, L. (2007): Goods transport in large European cities: Difficult to organize, difficult to modernize. In: Transportation Research Part A, 41 (3), 280-285.
- DEPARTMENT OF STATISTICS OF LITHUANIAN REPUBLIC. Population of Lithuania. Thematic tables. Internet access: <https://osp.stat.gov.lt/gyventojai> Last seen 05-05-2018
- EUROPEAN COMMISSION (2016): EU transport in figures – statistical pocketbook 2016, page 21.
- EUROPEAN COMMISSION (2015): Demography Report 2015, page 7.
- EUROPEAN COMMISSION (2011): White Paper – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Online available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>
- EUROPEAN ENVIRONMENT AGENCY: Air quality in europe, page 56
- IWAN, S. (2013) Implementation of Good Practices in the Area of Urban Delivery Transport, Wydawnictwo Naukowe Akademii Morskiej w Szczecinie, Szczecin.
- MINISTRY OF ENVIRONMENT OF LITHUANIAN REPUBLIC. Pollution level in Lithuanian's regions. Internet access: [http://www.am.lt/VI/article.php3?article\\_id=7638](http://www.am.lt/VI/article.php3?article_id=7638) Last seen 05-05-2018
- MUNUZURI J. J., LARRANETA L., ONIEVA L., CORTES P. (2005): Solutions applicable by local administrations for urban logistics improvement. Cities, 22 (1), 15-28.
- MYHRE, G. ET AL. 2013: Anthropogenic and Natural Radiative Forcing.
- OECD (2019). Database on Policy Instruments for the Environment. ([www.oecd.org/env/policies/database](http://www.oecd.org/env/policies/database))
- OECD (2003): Delivering the goods - 21st century challenges to urban goods transport. OECD working group on urban freight logistics, Paris.
- OECD/ITF (2015): The Carbon Footprint of Global Trade. Online available at <https://www.itf-oecd.org/sites/default/files/docs/coppdf-06.pdf>
- OGDEN, K. W. (1992): Urban Goods Movement: A Guide to Policy and Planning. Ashgate, Aldershot.
- RUSSO F., COMI A. (2012): City characteristics and urban goods movements: A way to environmental transportation system in a sustainable city [w:] Procedia. Social and Behavioral Sciences. Vol. 39, Elsevier, 61-73
- RUSSO F., COMI A. (2010) A classification of city logistics measures and connected impacts, Procedia Social and Behavioral Sciences, Volume 2, Issue 3, 2010, Pages 6355-6365
- TANIGUCHI E., THOMPSON R. G., YAMADA T. (2001): Recent Advances in Modelling City Logistics. In: Taniguchi E., Thompson R. G. (eds.): City Logistics II, Institute of Systems Science Research, Kyoto, 3-34.
- TANIGUCHI E., THOMPSON R. G., YAMADA T., VAN DUIN R. (2001): City Logistics. Network Modelling and Intelligent Transport Systems. Pergamon, Oxford; Lepori C., Banzi M., Konstantinopoulou L. (2010): Stakeholders' Needs. CITYLOG deliverable D1.2. ; Roissac Z. (2010): User needs and requirements, CityMove Project - Deliverable No. D2.1.
- UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, POPULATION DIVISION (2015). World Urbanization Prospects: The 2014 Revision, page 78.

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