



Research, Development and Innovation Activities at Kymenlaakso University of Applied Sciences

Introducing the main projects conducted between the years 2010–2014



KYAMK

University of Applied Sciences

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/ PREFACE

MARKKU HUHTINEN, RDI DIRECTOR

The present publication is a broad-based summary of the main research and development projects realised by Kyamk in the past few years.

The objective of Kyamk's RDI activities is to promote vitality, competence and well-being in the Kymenlaakso region. RDI activities are conducted in close cooperation with companies, organisations and public sector agencies. This cooperation promotes the success and growth of local industry and commerce and further improves the level of competence at Kyamk. RDI activities bring together representatives from industry and commerce, Kyamk's RDI personnel, teachers and students.

Kyamk's RDI activities specialise in

- Well-being and business services (29 projects in 2014)
- Competitive logistics, sea transportation and safety (10 projects in 2014)
- Sustainable energy solutions (eight projects in 2014)

There were a total of 58 projects, meaning that 11 of the projects did not relate directly to any of our specialisations. These projects were more general in scope, focusing on topics such as developing education or promoting internationalisation or entrepreneurship.

In 2014, the total RDI turnover was EUR 4 million and the total budget for all projects (the value of the project portfolio) was EUR 10 million.

Our RDI projects have mainly been financed using locally available European Regional Development Fund (ERDF) or by European Social Fund (ESF) capital. We have also participated in several internationally funded projects:

- Two projects funded by FP 7
- Five projects funded by the Finnish-Russian ENPI programme
- Two projects funded by the Central Baltic programme
- Two projects funded by the Baltic Sea Region programme

Our aim is to expand our international RDI activities. The Kymenlaakso Region is represented in Brussels by the Helsinki EU Office. We are participating in the the European Regions Research and Innovation Network's activities related to preparing new project proposals for calls for the Horizon2020 programme.

Our aim is to conduct high-level research work in all of our three areas of specialisation. We hope that you receive the same impression by familiarising yourself with the articles in this publication.

If you are looking for an acknowledged, responsible and internationally active partner for your RDI project please do not hesitate to contact us.



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KYAMK'S SPECIALITIONS:

SUSTAINABLE
ENERGY
SOLUTIONS



EMISSION MEASUREMENTS IN THE BSR INNOSHIP PROJECT

JOUNI-JUHANI HÄKKINEN

Kyamk's emission measurement laboratory models itself as a service for higher research by providing empirical findings and first-hand information from authentic situations.

The emission measurement laboratory of Kymenlaakso University of Applied Sciences (Kyamk) has over 20 years' experience in shipping-related emission measurements. Over this period, the laboratory has gathered significant on-board experience.

The emission measurement laboratory was established at Kyamk in 1992. It serves as a reliable source of measured data for the needs of various research programmes. The laboratory performs emission measurements in land-based power plants and on board ships.

Most of the laboratory's workload is commissioned by commercial customers; however, participation in research activities is ubiquitous and a vital part of the laboratory's operations.

The emission measurement laboratory is accredited by FINAS according to the SFS-EN ISO/IEC 17025:2005 standard.

Experience of several large-scale projects

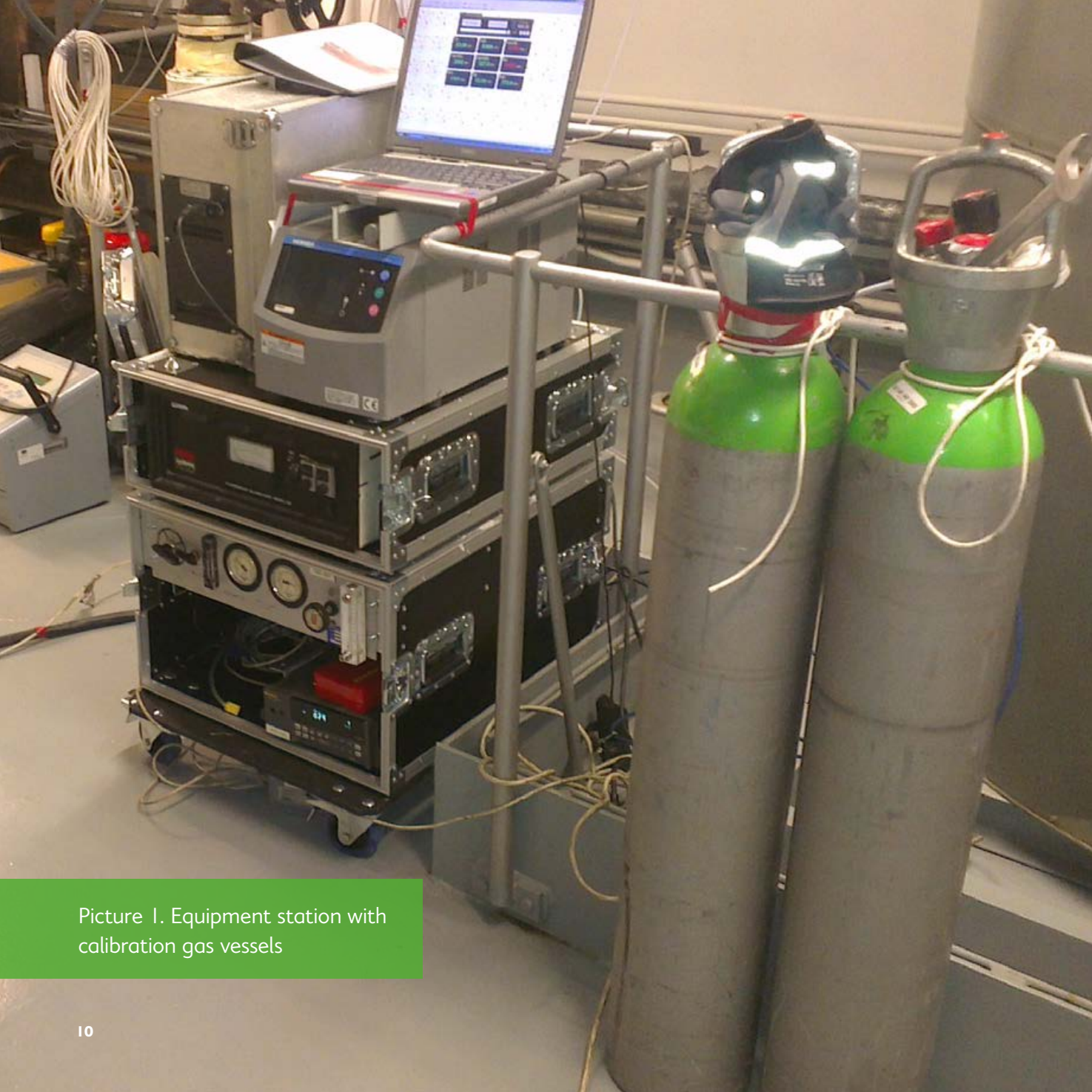
The laboratory has taken part in several major international projects and has completed measurements on

well over one hundred vessels with a total of hundreds of engines.

There are several international projects worthy of note, including the Mobile project and the recent Snoop and BSR Innoship projects.

The Mobile project was managed and conducted by VTT, the Technical Research Centre of Finland. It involved measuring 58 engines over a time span of several years, and it was considered to be very successful. The Mobile project had a considerable impact on environmental research and legislation in Finland.

The BSR Innoship project is the latest project to include a long-term measurement campaign. BSR Innoship addressed the common challenge of countries on the Baltic Sea and key maritime stakeholders to cooperate in minimising ship-based air pollution, while aiming to optimise the competitiveness of the maritime industry. The project will promote an innovative transnational approach to harmonising the various needs and interests of the maritime sector and to ensuring a level playing field for more sustainable and economically viable management of the Baltic Sea's resources. The project will provide the knowledge and best practices that policy- and decision-makers need to develop and implement national and transnational policies, strategies and concrete measures to implement international low-emission requirements.



Picture 1. Equipment station with calibration gas vessels

Practical models and tools were elaborated to estimate the economic implications of the required emission reductions and encourage voluntary measures and economic incentives for low-emission solutions locally, nationally and in the Baltic Sea area as a whole.

Specialised in practical elements

The role of the Kyamk emission measurement laboratory in large research projects has focused on practical work, which includes conducting the measurements and reporting results.

The laboratory usually does not draw scientific conclusions or conduct any deep analysis of the findings. This is due to the usual organisation of large projects: project groups normally include several fundamental scientific organisations for both basic and advanced research. These organisations do not usually have suitable field equipment or trained personnel for working in a ship environment.

This is a niche for Kyamk, as the capacity to perform in field operations is the main strength of the Kyamk emission measurement laboratory. The diversity of the usual project organisation has resulted in the current arrangement, which represents a successful and functional division of labour between practical measurements and scientifically oriented studies.

Marine emission measurements

There are several possible approaches to measuring marine emissions on board. The methodology used depends on the objectives of the measurement. The Kyamk emission measurement laboratory has chosen to streamline the

process and concentrate on basic tasks. The measurement repertoire is carefully chosen and limited to the necessary and most useful measurement subjects.

Ships are a very special working environment. Carrying out precise laboratory measurements on board a ship with a dismountable laboratory is a challenging line of work.

The typical setup of the equipment station is illustrated in picture 1.

Links:

- www.baltic.org/projects/bsr_innoship
- cleanshippingcurrents.eu/ojs/index.php/CSCurr/issue/archive
- publications.theseus.fi/handle/10024/64240
- energylab.kyamk.fi

/ BIOTULI (BIOFLAME)

WP4 KUAS

HANNU SARVELAINEN

Execution period

1 September 2010 – 31 August 2013

Budget and financiers

EUR 252,000

Etelä-Suomen EAKR,
Etelä-Karjalan liitto, Kyamk,
UPM-Kymmene,
Stora Enso, Andritz

Partners

LUT (coordinator), Cursor Oy,
Kouvola Innovation Oy, Imatra Region
Development Company,
Lappeenranta Innovation Oy, Saimia

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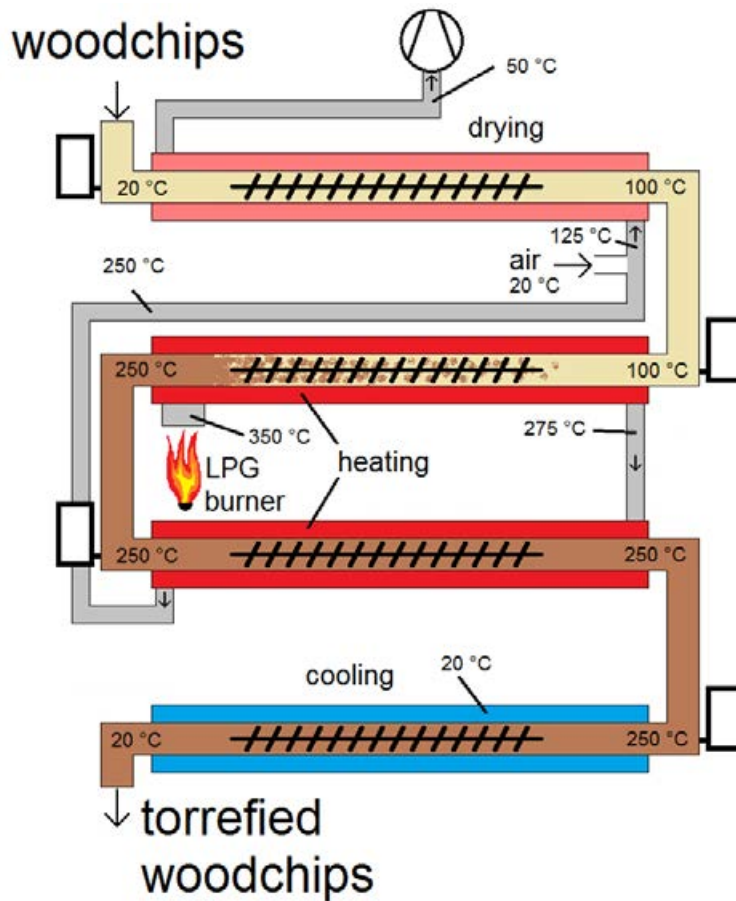
Renewable biomass could be a good alternative to fossil fuels such as coal. However, the physical properties of biomass differ from those of coal to the extent that biomass cannot directly replace coal. A heat treatment called torrefaction changes the properties of biomass such that it becomes more coal-like, which can enable it to replace coal.

Objectives, actions, results and efficiency

The main aim of the WP4 Kyamk part was to develop test equipment for torrefaction of biomass. The total duration of the Biotuli project was three years (September 2010 – August 2013). The budget for the project as a whole was EUR 1.4 million. The project financier was the Southern-Finland ERDF programme, the Regional Council of South Karelia. The main partners for WP4 were the Lappeenranta University of Technology, UPM-Kymmene, Stora Enso and Andritz.

The equipment was successfully developed. It is capable of producing torrefied woodchips continuously at 10 kg per hour with adjustable heat treatment times and temperatures. The theoretical design production capacity is 25 kg per hour, but this requires the raw material to be completely dry.

The working principle of the equipment is simple: woodchips are moved inside a metal tube by a screw conveyor with an absence of oxygen. The tube is heated from the outside with hot flue gases produced by liquefied petroleum gas. The test equipment



occasionally has problems with oxygen leaking and woodchip jamming, but it usually works as designed. The screw conveyor principle is commonly used in small-scale torrefaction devices.

Woodchip torrefaction could be a good business for heat entrepreneurs. In the summertime, the need for heating buildings is low and excess heat can be used for torrefaction. This would enable heat plants to be utilised closer to maximum load, producing greater financial returns. Also, local biomass resources could be utilised for torrefied biomass production.

The reliability of the test results must be examined critically because the woodchip torrefaction data obtained in this project is based on this test equipment. Different types of test equipment may produce different test results. Currently, it is still hard to find end users for torrefied woodchips since the price of torrefied woodchips is quite high. In the future, the processes will become more efficient and torrefaction of biomass could become an important way to help mankind fight against climate change.

Execution period

1 June 2011 – 31 March 2014

Budget and financiers

Kyamk: EUR 589,000 (total: EUR 2.9 million)
European Regional Development Fund (ERDF), Regional Council of Päijät-Häme, Kotkan Energia Oy, Haminan Energia Oy, Kyamk, Haminankotka Oy, Mesera Oy, Meriaura Oy, Steveco Oy

Partners

Cursor Oy (Coordinator), Kymenlaakso University of Applied Sciences (Kyamk), Lappeenranta University of Technology (LUT), Lappeenranta Innovation Oy, Etelä-Kymenlaakso Vocational Collage (EKAMI)

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Chief Research Officer Juhani Talvela,
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WWW address of the project

www.neli.fi/Hankkeet/RENEWTECH

RENEWTECH

DEVELOPMENT OF WIND POWER TECHNOLOGY AND BUSINESS IN SOUTH FINLAND

MERVI NURMINEN & MARKKU HUHTINEN

Kymenlaakso Region in South-East Finland has been and still is one of the largest production concentrations of pulp and paper products in the world. However, a structural change has been underway in the field of pulp and paper industry: the markets for pulp and paper produced in Finland are decreasing. This is why several pulp and paper factories have been closed in South East Finland and elsewhere in the country. A new industry with growing markets is required to replace the lost jobs. Once such industry appears to be the wind energy industry. In Finland, the government has set a target of increasing the share of wind energy to 6 per cent of total electricity production (which equates to 6 TWh) so almost 1000 new wind turbine units should be built in Finland by 2020. To support this development, the idea of this project was to develop a strong Wind Energy Technology Cluster in South-East Finland.

Objectives

The main objective of this project was to develop a strong and cost-effective Wind Energy Technology Cluster in South-East Finland including high-level research, development, testing, educational and logistical services for companies operating in the wind power plant business.



Picture: Mikko Pitkäaho

Actions

The ReNewTech project was divided into five work packages:

- WP 1: Introducing and applying new wind power technologies: Cursor Oy
- WP 2: Developing airflow models for wind parks in Finland: LUT
- WP 3: Conceptualising and commercialising maintenance and operation optimisation of wind farms: Lappeenranta Innovation
- WP 4: Developing a Wind Cluster logistics system: NELI, Kyamk
- WP 5: Developing R&D, test and measurement services, as well as training and educational curricula: Kyamk & Ekami

Kyamk was responsible for work packages 4 and 5. The activities of those work packages are described more detail below.

In ReNewTech work package 4, NELI developed logistics systems for the wind energy cluster and the planned tasks were as follows:

1. Identifying synergies in the component, raw material and material supply chains of the wind power cluster
2. Optimising the logistical infrastructure of the Port of Hamina to handle wind turbine projects and identifying the lifting capacity available in Europe
3. Clarifying the storage and transport technologies required

4. Arranging component and spare part management systems and connections to the cluster's actors
5. Carrying out a feasibility study for sea transportation of wind turbines (comparing onshore and offshore solutions)
6. Piloting and commercialising a logistics system

In ReNewTech work package 5, Kyamk developed testing and measuring services to support the wind power industry. The planned tasks were as follows:

1. Wind measurements.
 - Kyamk developed Sodar measuring services according to best practices and standards. Acquiring wind data is important for assessing potential wind power sites.
2. The installation of a common monitoring system for wind power plant operation and maintenance was examined together with local energy companies.
3. The construction laboratory examined how its testing facilities may be used to test concrete structures in the towers and foundations of wind power plants to assess maintenance needs.
4. The composite material laboratory cooperated with project partners to develop methods for maintaining the blades of wind turbines.
5. An education scheme was developed for the energy engineering degree programme to provide the necessary wind energy know-how.



Picture: Mikko Pitkäaho

Results and efficiency

The final report of the logistics WP presents the logistics operations needed when a wind farm with four separate wind turbines was built in Hamina. The logistics operations begin with the unloading of the ship at the Port of Hamina and end with the erection of turbines on the wind farm site. There is a video of these logistics operations available on YouTube.

The carrying capacity of routes and platforms at the Port of HaminaKotka was assessed, along with the internal storage capacity of the harbour's operating companies with regard to the wind power industry cluster's needs. Furthermore, a system was developed that has resulted in cost savings when ships are unloaded or loaded.

Kyamk acquired a new sound level meter to measure the noise output of wind turbines. The IEC 61400-11 standard regulates wind turbine noise measurements and the noise measurement device was tested in accordance with this standard in Kotka and Hamina. Based on this experiment, we now have the possibility to take noise measurements for wind turbines.

Kyamk now has Sodar, a device that can reliably measure the wind profile from the ground level up to 300m altitude. On the basis of our wind measurements, the energy production of wind turbines on the site can be reliably estimated. During the project, we were qualified to analyse the measurement data and a model for measuring service quality assurance has been created. This has included reference measurements with other wind measuring devices. The quality system also includes the regular maintenance of the measuring device. Kyamk is now able to offer wind measurement

services for anybody who wishes to find the most suitable place for a wind turbine.

Companies that build and maintain wind power plants may use the testing services provided by Kyamk's construction laboratory to test concrete structures (in towers and foundations) in order to assess their maintenance needs.

Kyamk's composite laboratory examined the condition and repair methods for wind turbine blades together with a leading company in Finland. As a result, a better understanding of blade inspection, maintenance and development needs was obtained.

The curriculum of the energy engineering degree programme at Kyamk now includes a basic course in wind energy, which is carried out in conjunction with the Lappeenranta University of Technology.

/ BLESK

PROMOTION OF THE USE OF WIND ENERGY AND LANDFILL WASTE IN ENERGY PRODUCTION

MARKKU HUHTINEN & TUOMO PIMIÄ

Execution period

22 March 2011 – 22 March 2014

Budget and financiers

Kyamk: EUR 282,000
(Total: EUR 1.7 million),
South-East Finland – Russian ENPI
programme, Empower Oy,
Windwind Oy, Kyamk

Partners

Lead Partner: Cursor

Russian Partners: St Petersburg State
Polytechnical University, Russian Association
of Wind Power Industry, St Petersburg
Foundation for SME Development, OJSC
Technopark of St Petersburg

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RDI Director Markku Huhtinen,
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The EU has set a goal of increasing the average share of renewable energy to 20% of total consumption at the EU level (for Finland the goal is 38%) by 2020. In Finland this means an increase of approximately 10 per cent compared to the situation in 2012. As a means to achieve this objective in Finland, the government has set a target to increase the share of wind energy to 6 per cent of total electricity production (equating to 6 TWh).

Kymenlaakso University of Applied Sciences has carried out research work on promoting the use of renewable energy by Finnish/Russian cooperation since 1999. The main cooperation partner has been St Petersburg State Polytechnical University. We have carried out the following projects:

- Feasibility of renovating old water power plants in Karelia (Fresco/LUT/Kyamk) 2004
- Utilising Finnish Bio Energy Technology and Know-how in North-West Russia (Gross Border Bio Energy Partnership / Mamk/Kyamk/LUT) New Neighbourhood 2006
- Developing an innovation and production network between Finnish and Russian small and medium-sized enterprises in the bioenergy sector (Bio-integration/Cursor/Kyamk) 2008

Objectives

The goal of this BLESK project was to continue promoting the use of renewable energy in the fields of wind energy and landfill waste

as energy. The main aims were to transfer knowledge, to produce information for educational purposes and to provide information to support decisions concerning renewable energy investments.

Actions

In order to investigate the feasibility of wind energy a prefeasibility study was carried out for a wind park situated in the Primorsk harbour area. The results indicated that a wind park investment in this area would be profitable if the electricity could be sold to the grid with the feed-in tariffs used in Finland. However, with Russian tariffs, the profitability was poor.

In order to produce general information for educational purposes and to support decisions two information packages were published:

- Pimiä Tuomo (ed.), Biktuganov Rinat, Gerltic Iuliia, Häkkinen Jonni-Juhani, Kakko Markku, Martikainen Jenna, Mäkelä Merja, Tuliniemi Erja, Törylä Niko, Mykkänen Kai; Information package on wind energy; 2014, (Kyamk, Series B Research and Reports)
- Pimiä Tuomo (ed.); Kakko Markku, Tuliniemi Erja, Törylä Niko; Organic waste streams in energy and biofuel production; 2014, (Kyamk, Series B Research and Reports)

For the purpose of knowledge transfer, several seminars and roundtable meetings were organised both in Kotka and in St Petersburg:

- Visit of a Russian delegation to Mäkelänkangas wind farm to follow the erection of four wind turbines on 27 March 2012

- Wind modelling workshop on 16 April 2012 in Kotka
- Global wind day public event on 15 June 2012 in Karhula
- Bioenergy seminar on 21 and 22 May 2012 in Kotka
- Bioenergy seminar on 21 and 22 October 2012 in St Petersburg
- Final seminar on 20 and 21 February 2014 in Kotka

Results and efficiency

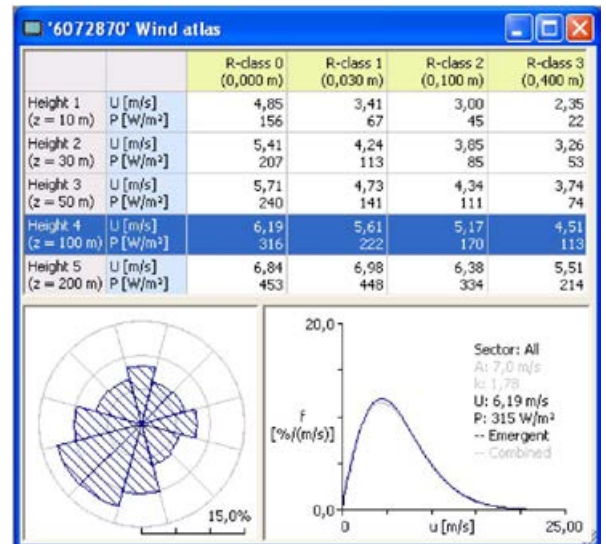
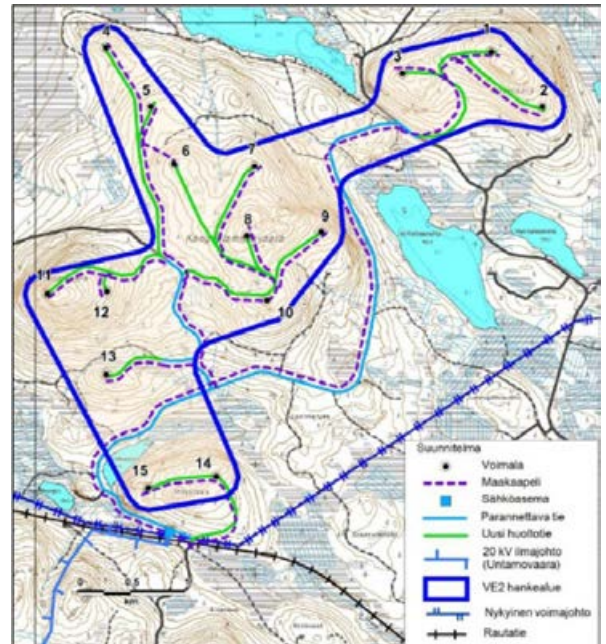
Valuable results were received through networking and cross-border information exchange thanks to successful seminars in Russia and Finland. These seminars also included company visits in Finland and Russia. In Russia, there are extensive possibilities to improve waste management on a national level. On the other hand, the situation in Finland is a lot better and, in some cases, even better than required by the laws and regulations of Finland and the EU. For this reason, Finnish companies such as Kotkan Energy Ltd (waste-to-energy plant) and Kymenlaakson Jäte Ltd (waste separation plant) were very interesting companies to visit for the Russian participants. Concerning future cooperation on waste management, visits to the Russian companies were also very useful for the Finnish participants and partners. Based on the results of this project, new project ideas have been planned for the BLESK network. These projects will concern landfill sites as development sites and also as research into the future use of waste in energy production, as well as reduction of the waste load into landfill. There are also future plans to exchange know-how between Kyamk and St Petersburg State Polytechnic

University on the technologies that are best suited to measuring landfill gases.

In the wind energy sector, information concerning the current situation in Russia was difficult to obtain. However, information was provided by Bachelor's theses completed by our exchange students, along with the latest information from RAVI concerning Russian wind energy. Information regarding the latest developments in wind energy projects and possibilities in the Russian wind energy markets also made the project possible. There were also several conversations between RAVI and Finnish companies about future cooperation.

The main outcomes of the BLESK project were:

- New international networks between project partners and seminar participants in the field of utilising wind and waste energy
- Publications on wind and bioenergy (Kyamk Series B Research and Reports)
- Wind park construction video from Mäkelänkangas
- Information exchange between project partners and seminar participants
- Information on the Russian wind energy situation, laws, practices, electricity transmission grid and current regulations
- The Kyamk teachers' wind energy and bioenergy know-how improved
- New project ideas arose regarding promoting the use of landfill waste as energy



/ STEP TO ECOSUPPORT

ARJA SINKKO

Execution period

2 January 2013 – 31 December 2014

Budget and financiers

EUR 543,321

Co-funded by the European Union,
the Russian Federation and
the Republic of Finland

Partners

Committee for Nature Use, Environmental
Protection and Ecological Safety Friends
of the Baltic, St Petersburg; KOSMOS Ltd,
St Petersburg (Environmental bureau);
Kymenlaakso University of Applied Sciences

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Project Manager at Kyamk:
Arja Sinkko, arja.sinkko@kyamk.fi

WWW address of the project

www.ecosupport.fi

The project was targeted to support sustainable development along both sides of the EU's external border by implementing eco-support activities within the participating municipalities. A further aim was to increase public awareness of eco-efficiency.

Objectives

The overall objective of the project was to improve the environment in the Baltic Sea Region by supporting the development of new tools for sustainable city management in the Region.

Kyamk's Energy Technology department was responsible for Activity 7: Energy Efficiency in Real Estate. The aim of increasing energy conservation awareness was to create savings and to decrease greenhouse gas emissions by the city's real estate.

Actions

Activity 7: Energy audits implemented according to the Motiva Model.

The need for energy audits was based on the New Energy Efficiency Agreement Scheme for the Promotion of Energy Efficiency and Use of Renewable Sources of Energy in 2008–2016 by the Ministry of Employment and the Economy. The Energy Efficiency Agreement was undersigned by the City of Kotka in 2010. According to the Agreement, the city is obliged to take actions to improve energy efficiency and to promote the use of renewable energy resources.



Picture: Päivi Franzon

Energy audits are comprehensive studies of energy consumption representing opportunities for more efficient use of energy, which are implemented in accordance with separate instructions for improvements.

Results and efficiency

The project had several targets, most of which were reached. The concept of eco-support activity was tailored to bridge the gap between practical everyday actions and the environmental policies of organisations in the city of St Petersburg. Environmental Advisor training and Basic training were produced for the participating cities and for different target groups. Eco-supporters were nominated and trained to implement eco-support activities in the partner organisations. In St Petersburg, tailored guidelines, manuals and handbooks were produced for schools, maintenance services and SMEs. The aim of these written documents was to support the implementation of eco-support activity.

Kyamk's Energy Technology department was in charge of Activity 7, which consists of Energy Efficiency in Real Estates, mainly in the City of Kotka and other municipalities including Kouvola, Hamina, Virolahti and Miehikkälä. During the project, energy experts worked with energy technology engineering students to conduct energy audits (measurements, interviews). The information obtained from these measurements is vital to creating savings and decreasing greenhouse gas emissions. Correct control and instruction practices are critical for achieving energy efficiency in a building. Their results were then analysed and reported to the owners along with improvement proposals.

Energy Audits were implemented for the following public buildings

- Kotka, Kindergarten "Kotilo", Autumn 2013
- Kotka/Jylppy School premises, two buildings, Autumn 2013
- Kouvola Ice Stadium, Autumn 2013, Spring 2014
- Kotka Ice Stadium, Spring 2014, Autumn 2014
- Kotka/Sunila Activity Centre for people with disabilities, Spring 2014
- Kotka, Public Swimming Hall, Autumn 2014
- St Petersburg, Russia Cultural Activity Center for young people, ("Voznesenskij Bridge"), Autumn 2014
- Energy efficiency activities with Kotka, Hamina, Virolahti and Miehikkälä municipalities within the Renewable Energy Municipal Audits in 2014

The Kyamk Project Team (Activity 7) consisted of

- Hannu Sarvelainen, energy expert/heating (qualified by Motiva), teacher
- Marko Saxell, energy expert/electricity (qualified by Motiva), teacher
- Erja Tuliniemi, energy expert, research engineer
- Arja Sinkko, energy/sustainable development, EcoSupport project manager at Kyamk, teacher

More information about the project and its results can be read on the publication "Energiatsehokkuuden kehittäminen energiakatselmuksilla", translated and published in Finnish, English and Russian in Kymenlaakso University of Applied Sciences publications, B131.



Energy Technology students Santeri Väre and Andrey Soldatenkov are measuring radiator temperatures in St Petersburg energy auditing target.

/ MIDNIGHT SUN FINLAND 2

MIKKO PITKÄAHO

Execution period

1 February 2013 – 31 August 2014

Budget and financiers

EUR 68,000.

EU, companies, foundations, Kyamk

Partners

3M, ABB, Ahlstrom, Ashland, Axson, Bang& Bonsomer, Cencorp, Fibertex, Fortum, Jacomp, Kevra, Merenkulun säätiö, Oceanvolt, Rohacell, Savon koulutuskuntayhtymä, Savotta, Styroplast, Suntrica, Ursuit, Kymin 100 vuotissäätiö

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WWW / Facebook address of the project

www.facebook.com/midnightsunfinland
www.dongenergysolarchallenge.com
www.solarlraces.com

Every second year there is a World Cup Race for solar powered boats in the Netherlands. Teams from all around the world participate. 2012 Kyamk raced for the first time and took third place in class B. The race proved to be a great learning experience, a valuable benchmarking tool and a way to promote the knowledge of Kyamk and its partners. For the 2014 race we aimed to integrate boat design and manufacturing courses in the race and to do real RDI work with a selected group of companies. The bar was raised even higher for the race in 2014: we decided to take part in the top class, which is the most technically demanding class of the race. All the aspects of the design and build of the boat were completed to the highest level together with twenty partners. Companies, the EU and foundations gave their support for the project in the form of funding, materials and work.

Objectives

The objective of the project was to design and build a winning boat for the Dong Energy Solar Challenge 2014. The process increased the level of knowledge of boat design and the use of solar power with electric drives in lightweight vehicles. The key to the whole concept was to minimise energy consumption and maximise the efficiency of the entire chain, from energy production to propulsion. The project provided an excellent learning experience for the staff and students and a good opportunity for the partner organisations to do RDI work, benchmarking and promotion of their products in an international competition.



Pictures: Markus Bruun

Actions

The boat hull shape is one of the key elements of the design. The race route was analysed and, based on the permitted battery capacity and an estimate of the solar power available, the hull was optimised for the appropriate power and speed range. The hull optimisation was done using Michlet software. The propeller was optimised and modelled using JavaFoil and JavaProp software. From the start, the boat was designed to have hydrofoils to increase its high-speed performance. The parts were made mostly of composites, which have the best possible weight-to-stiffness ratio. The hull was made of carbon fibre sandwich laminate. The moulds and plugs were manufactured using CNC. Both one-off and serial production methods were tested and developed. Most of the parts were manufactured in-house from carbon fibre/epoxy composites. The materials came from the partner companies. Some of the materials were new for the distributors and the project was used as a pilot to gather user experience. Rapid prototyping (plastic and metal) was used in some parts, such as the propellers. Most of the electric parts were selected from products already on the market. The parts were sourced on the internet and ordered from around the world. They were then carefully tested to verify their efficiency. For example, the efficiency of the electric motor and controller was tested on a purpose-built hydraulic test bench. The same test bench was also used to test motors from Oceanvolt. The lightweight solar panels were developed together with Cencorp. The hydrofoil control system was designed by software students using an Arduino microcontroller. Design and building was done by all classes of the students on the boat technology degree programme in 2013 and 2014. Because of the lack

of test drive time in spring 2014 we had to go to the race without the hydrofoils. The three-week trip to the Netherlands and to Monaco races began at the end of June.

Results and efficiency

A high performance boat was designed and built from scratch using advanced design and manufacturing methods. The efficiency was maximised by careful selection and testing of components and lightweight building. The carbon fibre structure, solar panels and drive system were developed. The development of hydrofoils was almost complete but had to be excluded from this race. The boat was one of the lightest, best built and most efficient boats in the race. The team Midnight Sun Kyamk won the endurance races, both in the Netherlands and in Monaco. In both of the races the overall result was third place, meaning that we were the best student team. There were about forty teams competing in the Netherlands from all around the world. The project was a good example of the integration of learning and real RDI work in an international setting. The project increased the knowledge of boat design, composite manufacturing and solar power. Energy saving and the use of renewable energy, as well as the strength of co-operation with high-tech Finnish companies and education, was promoted on several occasions during, before and after the race.

/ VEBETER

THE MAINTENANCE AND EXTENSION OF THE USEFUL LIFE OF UNDERWATER CONCRETE STRUCTURES

SIRPA LAAKSO & ANNA ESKOLA

Execution period

1 November 2010 – 30 April 2014

Budget and financiers

EUR 497,464:

TEKES, the Port of Helsinki,
the Port of HaminaKotka, Kymenlaakso
University of Applied Sciences

Partners

The Port of HaminaKotka;
the Port of Helsinki; Insinööritoimisto
Matti Pitkälä Oy; the Finnish Transport
Agency; Matti Ruuti Oy; Mikkelin
University of Applied Sciences

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In Finland, there are several underwater reinforced-concrete constructions of various ages in locations such as harbours, bridges and power plants. The existing building stock and infrastructure must be kept in good condition and this requires information about the condition of structures. The Vebeter project was started because the condition and deterioration of underwater constructions has rarely been inspected systematically. Often decisions to start repair and maintenance activities are based only on sensory examinations of the structure. On occasion, maintenance activities have also been carried out unnecessarily or ignored. Instead, the decisions should be based on more exact investigations because repair work must be conducted in difficult conditions, leading to considerable costs. Precise research and testing methods that are suitable for underwater structures are needed for more exact examination.

Objectives

The objective of the project is to develop research methods and devices for monitoring the condition of underwater reinforced-concrete constructions. A further objective is to strengthen cooperation between the different partners (the harbour companies, designers, surveyors, contractors, research institutions) in these projects.

Actions

Initially, a survey of the current examination methods of underwater concrete structures was carried out. A condition assessment



Rebound hammer modified for underwater use.



A diver at work.

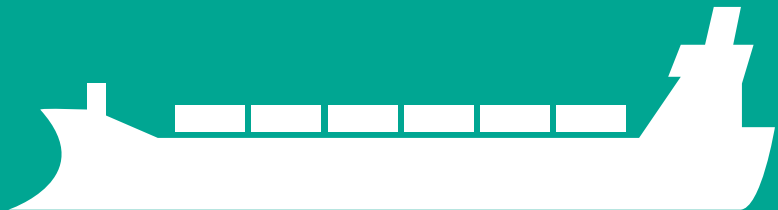
was then carried out for the chosen, exemplar constructions using the ordinary methods. The results and methods were analysed and development work began with new research devices. Modified devices were tested in the laboratory and in practice.

Results and efficiency

As a result it was noted that mere visual examination does not provide enough reliable information about the state of the structure. By examining drill samples in the laboratory, a more exact idea of the condition of the structure can be obtained. However, it is slow and laborious to take samples underwater. Non-destructive testing methods could more easily provide information about the structure. In the project, a modified rebound hammer was developed for testing the strength of concrete underwater. In addition a covermeter was developed for underwater use to determinate the location of the reinforcing in concrete. As a result it was noted that the points examined had to be located close to each other to provide useful results.

KYAMK'S SPECIALITIONS:

COMPETITIVE
LOGISTICS AND
SEA TRANSPORT
AND THEIR SAFETY
SOLUTIONS



Execution period

1 September 2009 – 30 April 2012

Budget and financiers

Budget: EUR 1,825,333

Main financier: Regional Council of Päijät-Häme, European Regional Development Fund programme for Southern Finland

Other financiers: KYAMK University of Applied Sciences, HAMK University of Applied Sciences, Lappeenranta University of Technology, Regional Council of Southwest Finland, Regional Council of Kymenlaakso, Regional Council of South Karelia, City of Lappeenranta, City of Salo, City of Kotka, Forssa Region Development Centre, Turku Region Development Centre, Port of Helsinki, Port of HaminaKotka, Logistics Research Foundation, Otsakorpi Foundation, Turku Science Park, Nordic Solutions

Partners

KYAMK University of Applied Sciences, HAMK University of Applied Sciences, Lappeenranta University of Technology, University of Turku Centre for Maritime Studies, Turku Science Park

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/ ELLO

INCREASING THE COMPETITIVENESS OF THE SOUTHERN FINLAND TRANSPORT CORRIDOR

TEIJA SUOKNUUTI & JUHANI TALVELA

Competition between the transportation corridors within the Baltic Sea region has intensified throughout the last decade. Cargo flows between the EU and Russia, boosted by Russian economic growth, have increased steadily since 1998. Despite the economic crisis, the logistics cluster in Southern Finland has strong faith in the business between East and West and the logistics centres continue to develop new solutions to attract new international customers.

Finland has established a leading role in the EU-Russia cargo flows amidst the increased competition between transportation routes. According to recent research and studies to measure the competitiveness of transit routes to Russia, the key variables in Finland's favour have been:

- Fluent cooperation between the public and private sectors
- Geographical location
- Competitive infrastructure
- Security
- Value-added services
- Competence in logistics services

The increased competition over global cargo flows does not permit anyone to rest on their current strengths; businesses are challenged to develop new services. The logistics sector is an important employer and a significant source of income for the regional



ACCESS VIA
FINLAND

Final seminar in Kotka 15
March 2012.





A deck of cards with 15 future research methods.



economies in Southern Finland. Therefore, improving the profile and conspicuousness of the Southern Finland transport corridor enhances economic prosperity and offers new opportunities for regional development.

Objectives

The ELLO project was launched to meet the following challenges:

1. To create a common marketing brand and to increase the visibility of the transportation corridor

The logistics sector and customer industries are a significant source of income and employer for Southern Finland's regional economies. However, international customers do not recognize the potential of the Southern Finland transport corridor due to scattered marketing. By improving the profile and image of the corridor, the regional economies can obtain greater benefits from international cargo flows. The international marketing campaign designed and conducted during the ELLO project enhances the image of the Southern Finland transportation corridor as the most attractive and effective corridor within the Baltic Sea region. The project results in a unified brand covering a service network from the Southwest to the Southeast and highlighting the logistics centres along the way.

2. To produce information about economic performance, the needs of customer industries and the future business potential of the logistics sector

The logistics sector is a catalyst for regional development. The performance of the Southern Finland logistics sector has a direct impact on the competitiveness of

the regional economies. In order to develop the transportation corridor, specific information about logistics companies and customer industries is required. A special set of indicators needs to be developed that takes into consideration the features of the logistics sector, the different types of companies and operations. The ELLO project meets this need and develops a tool to analyse the current status and trends of the logistics sector.

3. To create scenarios for the logistics corridor and Southern Finland logistics regions

A need for greater foresight in logistics development has been clear for many industries. Logistics is an important business in Finland, especially since logistics costs contribute a much higher share to total industry and commerce costs than in most other European countries. A set of 15 future research methods were selected and applied in the ELLO project to create scenarios for the logistics regions and the logistics corridor. A thorough analysis of the various industry sectors was carried out in advance to validate the basis for future scenarios. The selected future research methods were developed into a deck of cards that can be easily used in education/learning processes, as well as for creating company-specific foresight actions for businesses in co-operation projects.

4. To develop the security and sustainability of the transportation corridor

Service concepts that are simultaneously sustainable and cost efficient are becoming a necessity as environmental rules and regulations are tightening up and customers are more aware of environmental matters. In order to increase the competitiveness of the Southern Finland

transport corridor it is vital to develop business models and logistics concepts in which green values are taken into account. Sustainability will also have an increasing impact on customers' buying behaviour and their decisions regarding a transportation route. Therefore, logistics service providers should be able to offer environmentally friendly services at competitive prices. The EcoHub business model developed in the ELLO project provides a concept for building logistics centres in a sustainable way and operating them ecologically throughout their entire lifecycle.

Better security systems must also be developed as security threats around the world are increasing. New technical innovations offer a variety of tools to tackle different risks. Ports have been at the forefront of safety and security systems but the same threats are forcing inland terminals and logistics areas to assess security issues. The ELLO project creates security guidelines for logistics areas.

Actions

The project consists of six subprojects as follows:

- WP1 Financial performance, business outlook and customer needs for the logistics sector
- WP2 Changing business environment and the investigation of bottlenecks in the transportation corridor
- WP3 Future scenarios for the transportation corridor, and adopting and applying a set of methods for future research
- WP4 EcoHub concept

- WP5 Regional safety in the logistics centre
- WP6 International marketing campaign

Results and efficiency

- Over 30 research publications
- 6 future scenarios and toolbox for futurologists
- 6 safety cards as guidelines for logistics hubs
- Branding of Southern Finland transport corridor, www.viafinland.eu web pages, media visits and increased international recognition of Finnish logistics services
- Enhanced cooperation between logistics companies throughout Southern Finland
- New efficient, safe and ecological service concepts

/TRIK

A STUDY OF PASSENGER AND CARGO TRAFFIC POTENTIAL BETWEEN THE PORTS OF KOTKA, FINLAND, KUNDA, ESTONIA AND KRONSTADT, RUSSIA

PIA PAUKKU

Execution period

1 January 2013 – 31 December 2013

Budget and financiers

EUR 50,000

The European Regional Development
Fund (ERDF) via the Regional Council of
Kymenlaakso

The City of Kotka

The Trik project studied the conditions for passenger and cargo vessel traffic between Kotka, Kunda and Kronstadt. Both freight and passenger potential was discussed in relation to the destination ports from the viewpoint of Finnish companies or consumers. In addition, studies in Russia and Estonia, which were carried out by the regional authorities, were considered and included in the conclusions.

The Trik project was initiated in cooperation between regional authorities in the three countries involved: the Regional Council of Kymenlaakso, St Petersburg district in Russia, and the district of Lääne-Viru county in Estonia. The study was created in cooperation between the regional administrations and it received funding from the European Regional Development Fund (ERDF). The project is also funded by the City of Kotka.

The Trik project was based on interviews and surveys conducted from March to August 2013. In addition, a variety of passenger and freight transport statistics, and other reports and studies were taken into account. Statistical data was also discussed with project partners, as well as the analysis of the current situation. The report collected information from consumers, tour operators, shippers, freight forwarding and transport companies.

Passenger traffic

Based on the analysed statistics and conducted interviews, fair interest for the new passenger traffic could be found, as more than

60% of the respondents saw the proposed triangular route and its destination cities to be of interest. Respondents showed reasonable interest in leisure travel to the destinations. However, a number of competitive factors affect the transformation of consumer interest in the new route and destination cities into real consumer behaviour in terms of using the planned ship lines. Eastern Finland as a whole, with its 900,000 inhabitants, could in some respects be considered a potential Finnish customer base for Kotka-based passenger traffic, but in practice the intense competition in Helsinki–Tallinn ship routes and Helsinki-oriented travel agencies will attract most customers with a good variety of services and moderate pricing. In this market situation attempting to launch a new passenger port in Kotka would be challenging, but there is nevertheless reasonable potential for a successful launch with adequate marketing efforts. Eastern Estonia is considered an emerging tourism area. However, there are no major cities or other driving destinations. Kronstadt (part of the St Petersburg district) is small in population but rapidly developing as a tourist attraction. With good road connections to central St Petersburg and the surrounding areas of six million inhabitants, Kronstadt provides a rich basis for significant growth in the passenger/leisure travel in the Baltic Sea.

The St Petersburg region's large population base constitutes significant potential for passenger ship traffic, as well as the rise in Baltic tourism in general. Approximately 80% of St Petersburg's inhabitants have never travelled to Finland. Rising standards of living in the St Petersburg area are yielding more consumer interest in Baltic tourism. TAK's 2013 report on a potential visa waiver programme states that a visa waiver between

Finland and Russia would multiply the passenger potential. In addition to this, travel from the Moscow region toward Finland is expected to increase strongly.

Freight traffic

According to the Trik findings, the potential flow of goods and cargo for a new ship route from the port of HaminaKotka toward Kronstadt or Kunda is generally low or moderate. The indicated interest in the new route was quite cautious. However, it should be noted that a shorter sea mileage distance and potentially lower transportation costs from Kotka to Kunda generated some initial interest for cargo traffic. At present, timber, wood chips and other forest products are shipped through the Port of Kunda but the port also hosts excellent facilities for chemical and liquid terminal operations. There are currently no passenger facilities at the Port of Kunda. In order to receive passenger traffic, the port of Kunda would require significant financing and development of its facilities for tourism purposes. Also, in order to increase cargo operations above the existing level, some major investments in port infrastructure should be made.

Freight shipments to Russia (mainly to the St Petersburg area) are mainly operated on wheels. The cost of land transportation via truck is moderately low, which decreases the competitiveness of sea freight to Russia. In addition, there are several existing cargo ports and terminals in the greater St Petersburg area. The new Port of Bronca is being built within sight and only a few miles away from Kronstadt. Russian passenger travel is serviced by St Petersburg's new passenger terminal. Thus the development of the Kronstadt marine area into

a future freight or passenger port is not very likely. The Kronstadt Marina is very suitable as a centre of small boat tourism. The Port (Yachting Marina) of Kronstadt, with the city's developing tourist attractions, and hotel, restaurant and customs services situated in the Marina, would be very well suited for development into a Russian centre for Baltic leisure boating. The joint improvement of the safety of small vessel traffic in the Gulf of Finland between Finland, Russia and Estonia could be one of the key development aspects for the future.

/ SULOIN

SUSTAINABLE LOGISTICS THROUGH INTERNATIONAL NETWORKING

MERVI NURMINEN

Execution period

2010–2013

Budget and financiers

Regional development

Päijät-Hämeen Liitto:

EUR 851,000.

Kyamk: EUR 300,000

Partners

Lahti University of Applied Sciences,
LAUREA, Kyamk, Port of HaminaKotka,
Finngas Oy, Baltic Tank Oy, NEOT Oy,
Teboil, Neste Oil

Contact person

(Pia Paukku, Tommy Ulmanen)

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www.neli.fi

NELI members visited several logistics clusters and logistics cluster development organisations in European countries in Spring 2009.

- The following lessons were learned:
 - » Logistics development must be seen as a whole, including R&D, business and marketing
 - » Sustainability (green logistics) is becoming increasingly important
 - » The role of ports is vital as the heart of the transportation system and regional development
 - » There is a common interest in networking among European logistics clusters
 - » Logistics clusters share analogies we all can learn from
- Cluster development
 - » How do we compare our logistics systems? Where are our weaknesses and strengths? How do we improve our core competences and competitive advantage in the global economy?
- Best practice exchange
 - » Applicable development ideas from international benchmarking are valuable for sustainable regional development and can benefit other sectors
- Continuum of results from previous and ongoing projects

Objectives

- Cluster development
 - » How do we compare our logistics systems? Where are our weaknesses and strengths? How do we improve our core competences and competitive advantage in the global economy?
- Best practice exchange
 - » Applicable development ideas from international benchmarking are valuable for sustainable regional development and can benefit other sectors
- Continuum of results from previous and ongoing projects
 - » Internationalisation of project results and application to regional and corporate development

Actions

Risk analysis for terminals regarding the safe and secure handling of liquid cargo between the vessel and the quay. Skills analysis for terminal operators and security staff in the oil and gas harbour area. Meetings and seminars with the international clusters and partners. Several final theses for cluster development. Benchmarking of cluster development at the ports of Altameira and Rouen. Cluster planning at Hamina harbour for the oil and chemical cluster and Hyötyvirta areal clusters for companies recycling waste and hazardous materials. Cluster modelling and business plan for the Finnhub

logistics cluster: the idea here was to include business development and applied science in the marketing network of logistics service providers to increase the competitiveness of the companies.

Several discussions and negotiations between the international partners to build up the mutual trust needed for closer cooperation and common projects.

Results and efficiency

- Strong and active network of international logistics players
- Cooperation model for international logistics cluster developers
- Increased knowledge of international logistics cluster operations and development
- Increased awareness of the role of sustainability in logistics development
- International, comparative case studies (PILOT cases) in selected fields
- New opportunities for businesses in Southern Finland to internationalise and create new start-ups
- International projects together with SULOIN partners
- Participation in several research and development organisations and clusters at the EU level
- Several contacts for consortiums of international programmes and call for papers

- International knowledge for operational safety, security and risk management for oil and gas terminals
- Risk management programme for HaminaKotka Oil and Chemical port
- Method for skills analysis and training programme for terminal operators
- New projects for cluster development at Hamina Eco Port, Finnhub, Tehola-Kullasvaara
- Cluster development method and roadmap for further projects

/ HAMINA ECOPORT

PIA PAUKKU

Execution period

1 September 2013 – 31 December 2014

Budget and financiers

Total budget of EUR 162,600.

Financiers: the European Regional Development Fund (ERDF), the City of Hamina, the Port of HaminaKotka, Hamina Energy, Haminan Vesi, Kymenlaakso University of Applied Sciences

Partners

HaminaKotka Satama Oy, Basf Oy, Neste Oil Oyj, Prefere Resins Finland Oy, Teboil Oy, StI Biofuels Oy, J.M. Huber Finland Oy, Vopak Chemicals Logistics Finland Oy, Adven Oy, Haanpaa Oy, Lukoil Lubricants Europe Oy, NEOT, Baltic Tank Oy, Styron Suomi Oy, Centos Central Logistics Oy, FGG Finngas GmbH, Oy M. Rauanheimo Ab

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In recent years, the need to strengthen the Southern Kymenlaakso region's competitiveness and attractiveness has become apparent. There is an outspoken will for stronger networking and inter-company interaction between companies in the Hamina EcoPort area.

Both businesses and regional authorities wish to strengthen cooperation between industries, authorities and logistics companies in the Hamina Liquid Port area.

The Port of Hamina has undergone several changes in recent years. The port and city authorities, together with the companies located in the area, feel the need to face challenges and opportunities, and to respond to them by developing the port area's functions, services, safety and joint marketing. Logistics and shipping operations create a traditional company basis for the port area, but there is also a dynamic concentration of international bio-energy and chemical companies. The port industrial area, EcoPort, is at the heart of the Hamina region's future development. A vibrant industrial symbiosis benefits all parties by offering great facilities, a well-adjusted and eco-friendly infrastructure, and flexible mutual services for cooperation and information sharing. The port area aims to become recognised as a safe, well-functioning, cost- and eco-efficient location in order to attract new businesses to the area.

Industrial symbiosis and voluntary cooperation between businesses provide ways to increase energy efficiency, as well as the use of eco-efficient practices in the area. In addition, the aim of the Hamina EcoPort project is to identify common development needs and grounds for cooperation. The project will enable companies to

pilot cooperation models that improve cost-effectiveness and profitability. The long-term indirect objectives of the project are to boost the region's attractiveness and competitiveness, and to increase companies' competences and profitability by providing effective training and solutions based on mutually shared objectives, and therefore to also have a positive effect on employment in the area.

Objectives

The main objectives of the Hamina Ecoport project were:

1. To facilitate and to enhance cooperation between the companies located in the area in order to identify common areas of development where real synergies could be created through long-term cooperation
2. To improve the visibility of the port industrial area's existing strengths via marketing
3. To improve the business environment in the Hamina Liquid Port area

Actions and Results

The aim of the Hamina EcoPort project was to launch and promote an internationally renowned industrial area specialising in bio-energy technology, the chemical industry and logistics. To initiate steps towards building an industrial business network, shared business activities and services in the area were surveyed for further development. Actions were adjusted accordingly. The area was co-marketed with the Port of HaminaKotka and the City of Hamina as an industrial symbiosis/cluster, and the cooperative activities will be further developed after the termination of the project.

The Hamina Ecoport project arranged meetings, workshops and events for the partner companies. The project also conducted several surveys on issues that arose in the workshops. Training and guidelines were produced according to the needs of the participants. Some joint initiatives were further developed into concrete action proposals for the companies. A few of these initiatives proceeded to the level of formal cooperation contract negotiations. In addition, a variety of marketing materials were produced.

The participants (company representatives) commented that thanks to the project, cooperation between businesses in the port area reached a new level: information sharing and interaction between the companies through workshops and training events increased during the project. The project not only facilitated cooperation but also provided tools for increasing occupational safety, ecological practices and personnel training in the companies in the area.

As a result, the Hamina EcoPort serves as a home to a diversified base of businesses and industry, and as a major manufacturing, logistics, supply and service hub for the Hamina-Kotka region. At Hamina Ecoport, businesses collaborate and network around services leading to improved cost-efficiency, economic opportunities, safety and ecological integrity. Hamina EcoPort industrial cooperation benefits from its convenient and strategic location in the Gulf of Finland, proximity to major transportation modes, quality industrial land and utilities, and the amount of industrial activity already serving the region. Efficient use of land and resources make EcoPort an ideal choice for new industrial development.



NORTH EUROPEAN LOGISTICS INSTITUTE

MERVI NURMINEN

Execution period

2007–2013

Budget and financiers

Budget: EUR 1,300,000

South Finnish Regional Development
Instrument 70%

National 30%, City of Kotka,
Hamina and Kouvola,
Straightway Finland ry
and Limowa ry

Partners

NELI project:
143 companies participated
in 22 separate projects

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The NELI programme's mission was to improve the competitiveness of enterprises and logistics to generate new business and jobs in the sector. The aim of the programme was to continue the Southeast Finland Centre of Expertise Programme and develop the logistics status of Kymenlaakso. The target groups were Kymenlaakso logistics operators and SMEs.

Kymenlaakso's location close to the EU-Russian border provides special opportunities for the logistics business. Kymenlaakso is known as a logistics province, as well as a reliable and safe transit route between the EU and Russia. Finland's largest general harbour, HaminaKotka, is located in the area, as well as one of Finland's biggest railway hubs and dry-ports in Kouvola. The area is home to several global logistics centres and warehouses and also a range of companies that recycle and process hazardous materials and waste. The North European Logistics Institute (NELI) is today a permanent part of the Kymenlaakso University of Applied Sciences' RDI activities.

The programme aims to improve the competitiveness of logistics businesses in the region, as well as the logistics expertise of companies.

NELI focuses on the supply chain and logistics business processes from the companies' perspective and need. Important parts of NELI's research work are improving the border-crossing process and innovative logistics technology solutions.

Action is strongly networked nationally and internationally. The project improved contact between the logistics research and

development networks. Co-operation between VIL, the Flemish Logistics Institute, Wallonia Logistics Institute, the Aragon region, the Leipzig-Halle Logistics Network, several universities and regional development companies in Russia and Baltic countries will be utilised in the future.

Objectives

The NELI programme started in 2007 with the aim of developing business competitiveness and logistical expertise in the Kymenlaakso region.

The main targets for development were port and port technologies and functions, road and rail transportation, and cross-border processes via strong national and international networking and wide-ranging expertise to create the conditions for regional success.

Results and efficiency

The best results of the NELI programme can be considered to be the creation of business networks and national and international cooperation. The debate on the development of common issues has been very enjoyable and it has also been positive to obtain different views from experts on the direction the industry is heading. It is difficult to predict which innovations will arise in the long term.

Development work is carried out mainly by logistics service providers by developing the industry from inside. The best innovations, however, arise between different business sectors by cooperation.

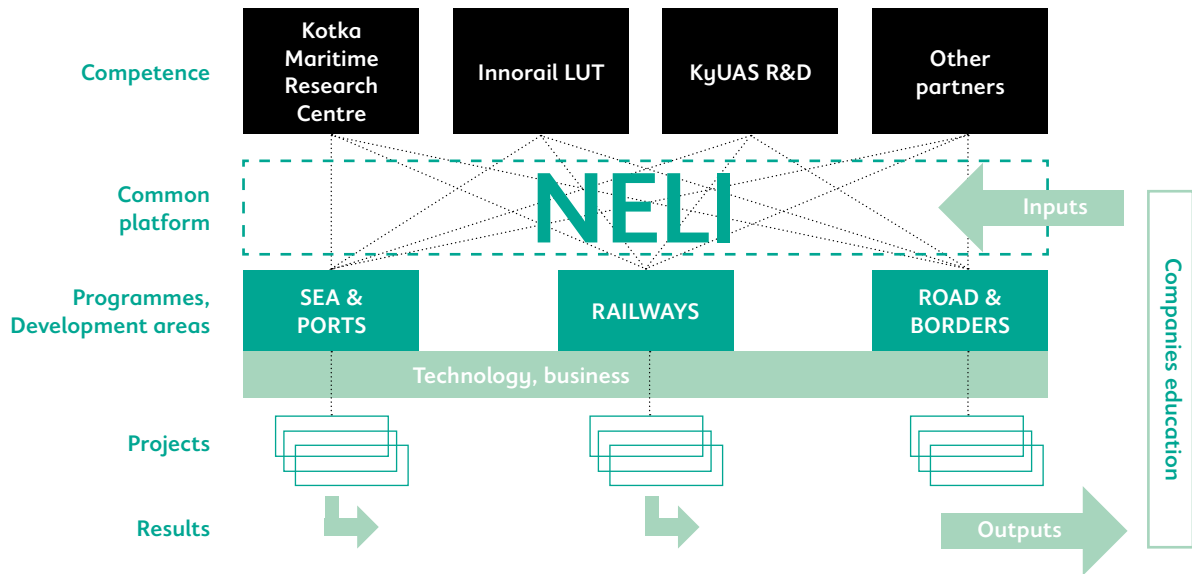
The logistics field underwent a major change during this project.

Finnish logistics chains are largely structured around the forest industry. Also, ports and logistics centres are operating in support of forest industry parties as the owners.

Logistics service requirements have, however, increasingly turned to the needs and requirements of the trade and food industry. Digitalization is also a watchword in the logistics business. New business areas and innovations in logistics are in technology, ICT, smart traffic, green traffic and transportation solutions, as well as well connections between different transportation models and regions. Intermodality and cargo pools will become big logistics businesses.

The aim of the NELI programme was to create new development projects between the logistics parties to increase the logistics value of the region. During the programme period, NELI implemented 22 separate, business-driven logistics development projects that included over 140 companies, most of which were SMEs.

Actions



Execution period

1 December 2012 – 30 November 2014

Budget and financiers

Total budget: EUR 570,140

Financier: South East Finland
– Russia ENPI CBC 2007–2013

Co-financing from Lead Partner
and Partners: Russian State
Hydrometeorological University
(Lead Partner), Ust-Luga Company JSC,
Kymenlaakso University of Applied Sciences,
University of Turku,
Centre for Maritime Studies

Partners

Russian State Hydrometeorological
University (Lead Partner), Ust-Luga
Company JSC, Kymenlaakso University of
Applied Sciences, University of Turku,
Centre for Maritime Studies

Associates

Port of HaminaKotka, City of Kotka,
Finnish Port Association, Administration of
Leningrad Regional Committee
on Natural Resources

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ECOLOGICALLY FRIENDLY PORT

ANNI ANTILA

Environmental safety and protection, as well as ecologically sustainable development, are currently among the greatest challenges of our society. Concerning maritime ports and related activities, environmental issues are constantly emerging and becoming a competitive factor in the sector. According to the EU's Baltic Sea Strategy, the state of the Baltic Sea must be improved and cooperation between the Baltic region countries should be promoted and supported in order to develop environmental protection.

Objectives

The overall objective of the project was to improve the environmental status of the eastern part of the Gulf of Finland by establishing close cooperation between citizens, port actors and authorities based on green values and sustainable development. The main objectives were improving environmental protection activities and sustainable development methods in the ports of HaminaKotka and Ust Luga. These ports and their stakeholders aim to improve their knowledge, skills and practices with regard to environmental protection. The aim was to collect and exchange results and experiences broadly across the project area and also internationally.

Actions

Activities included implementing several stages, analysing the environmental status in ports and developing compensatory measures, compiling best practices and environmental regulations, estab-



Picture: Ust-Luga Company JSC

lishing an environmental monitoring centre and environmental strategy for the Ust-Luga region, improving the cooperation between the port and stakeholders and a social project called “Port in the city”.

Results and efficiency

The Ecologically Friendly Port results consist of environmental protection activities, energy efficiency improvements, recommendations for sustainable development, an environmental monitoring centre and an environmental strategy for the Ust-Luga region, and improved cooperation between the subject ports on the Gulf of Finland. The project received widespread attention and the cooperation extended to other European ports and port-related organisations. According to the joint managing authority, Ecologically Friendly Port was one of the best projects during the programming period 2007–2013.

/ RESCOP

DEVELOPMENT OF RESCUE OPERATIONS IN THE GULF OF FINLAND

MERVI NURMINEN

Execution period:

2011–2014

Budget and financiers:

SouthEast Finland-Russia CBC ENPI
2007–2013 programme EUR 1,624,994,
co-financing EUR 325,000, KUAS WP 3

Partners:

Kotka Maritime Research Centre, KUAS,
Aalto University, the Finnish Lifeboat
Institution, Admiral Makarov State Maritime
Academy, Russian Voluntary Maritime
Rescue Society Kronstadt, St Petersburg
State Marine Technical University, Central
Marine Research & Design Institute Ltd.,
Committee for Nature Use, Environmental
Protection and Ecological Safety,
St Petersburg State University, Division of
International Baltic and Arctic Projects, Pilarn

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Between South-Eastern Finland and North-Western Russia, increased maritime transport has created a need to improve safety and to ensure smooth and undisturbed traffic. In spite of the recent recession, the prognosis is that continuous growth in maritime transport will take place in the future. Increased transportation volumes of oil and dangerous goods have, together with the Russian priority to build up new harbour capacity, created a situation where the preparedness of rescue operations and oil combating capacity is not sufficient.

The fragile marine environment of the Gulf of Finland and dangerous cargo transportation increases the need for proper training in various environmental conditions. As stated in the EU's transport policy, the maintenance of high maritime training standards and the competence of crews are essential to ensure safe, secure and environmentally sound shipping operations.

The RescOp project and WP 3 have strong practical connections to the Interreg IIIA and Interreg IVA (VOMARE) projects for the enhancement of voluntary rescue services in Estonia.

Objectives

To improve the safety and security level in the Gulf of Finland by offering better rescue coverage and service for maritime transport, tourism and yachting to help the officials and border guards with the new voluntary SAR service.



To enhance the capabilities of the newly established voluntary rescue service to an operational level and to raise the standard of the new Russian voluntary rescue service to an international level by creating a training programme for the rescue society and by means of joint training sessions between Russia, Estonia and Finland.

To develop a training programme for the rescue society and arrange joint training sessions between Russia, Estonia and Finland, as well as to conduct risk-based studies to identify and evaluate necessary rescue equipment and investments required to support the activities.

Actions

WP 3 is the basic module of the RescOp project. It runs parallel with WP 1 which, after a detailed risk assessment, provides justification for detailed planning of the rescue activities and the required training. The necessary training platform (a rescue vessel) as an elementary part of the activities will also be planned in this WP. The investments will be realised in a separate investment project. The execution of this WP will address the needs and challenges of the rescue service identified in the ENPI Programme Manual. The practical goal of this work is to have a new resource to help officials and national border guards to improve the safety and security level in the Gulf of Finland and to offer better rescue coverage and service, both for maritime transport and tourism, as well as for boating and yachting.

This activity included the preparation of a training manual for the voluntary rescue association of Kronstadt. The planned activities contained both the preparation of training programmes and workbooks for





the association, and preparation and execution of various training missions. During the project, two full-scale training exercises will take place both in Russia and Finland. The exercises in the Russian territorial area were conducted to focus on local needs and the management systems to be developed, while the missions in Finland are related to ensuring harmonisation of the training methods based on international rules and standards. The definition of suitable rescue resources required for training and operations was based mainly on the outputs of WP1. The main aim is to define the requirements for training vessel characteristics and operational capabilities for the eastern part of the Gulf of Finland. The second task is to prepare manuals and operational instructions for the vessel usage with a detailed definition of the crew on board. Third task here is to define the resources required for the base station with all the necessary support functions.

Results and efficiency

An internationally accepted training programme adjusted for the needs of Russian volunteers has been planned, trained, exercised and taken into use in Russian waters (AMSM, FLI, Kronstadt, KUAS).

The outcome of this WP3 was the definition of the pilot boat and necessary equipment for the investment project. During the execution of this task, studies and visits needed to be carried out to study suitable, effective and economically sound solutions for the investments. The investment for the vessel was not included in this project but a suitable vessel was found in Finland: the Finnish Lifeboat Institute was selling two older rescue vessels. After a separate foundation was set up just before

Christmas 2013, they got their new vessel. The RescOp project offered a significant boost for the Russian Voluntary Maritime Rescue Society. The Society now has the capacity to assist boaters in trouble in Russian waters in the Eastern Gulf of Finland. There are already new plans to expand the service to several other areas.

The best result of this project was that safety measures for boating near the border zone and in the waters of Russia have been improved.

/ MIMIC

MINIMISING RISKS OF MARITIME OIL TRANSPORT WITH HOLISTIC SAFETY STRATEGIES

MERVI NURMINEN

Execution period:

2011–2013

Budget and financiers:

Interreg IVA, Central Baltic

Budget: EUR 2,072,341

National: EUR 481,779

ERDF: 76.75%

Kyamk budget WP3: EUR 260,000

Partners:

Kotka Maritime Research Centre,
University of Turku, Aalto University,
Helsinki University, Tallinn University,
University of Tartu, Swedish Meteorological
and Hydrological Institute,
Finnish Environmental Institute

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Oil transportation in the Baltic Sea and Gulf of Finland poses transnational risk to the marine environment. Maritime oil transportation is also vulnerable to security threats, an area of less attention in the Baltic Sea. Traditionally, improvements to maritime safety regulation have only been made after major accidents. Post-accident policies are not very comprehensive and may be biased by the characteristics of a certain accident. In general, the cost effectiveness of policy instruments in increasing maritime safety is poorly studied. The limited resources for improving maritime safety should be optimally distributed to obtain maximum benefit. The project “Minimising Risks of Maritime Oil Transport with Holistic Safety Strategies” (MIMIC) work package 3 concentrated on maritime security issues, especially the identification of security threats and evaluation of security risks in the Baltic Sea area.

Objectives

The MIMIC project integrated the knowledge gained from earlier projects and new information on the less studied aspects of accidents. The objective was to study and compare the effect of different management actions on avoiding accidents and to provide insight regarding the cost-effectiveness of these measures. Based on the modelling work, the most effective measures were identified and recommendations presented. One of the new and specific aims of the project was to view the problem from the perspective of private companies as well as society and to try to

find ways that society can influence private activities most effectively to decrease risks.

A totally new element is to link safety issues, where the same actions can support both interests and same methodology can be used to assess the risks. The main deliveries are:

- a) Integrative Probabilistic Model for comparing management actions
- b) SmartResponse web application for decisions analysis and support

Actions

At the moment, the Baltic Sea region is a relatively stable, peaceful and controlled area. However, the results of the study indicate that security threats, such as smuggling of weapons or drugs, theft, vandalism, human trafficking, violent crimes, illegal fishing, illegal discharge and illegal environmental activism occur in the Baltic Sea region. Still, the prevalence of most of these threats is low. Smuggling of drugs, weapons and humans in the Baltic Sea are increasing problems that should be noted. The MIMIC project combined the results and lessons learned from other projects with current knowledge and less studied aspects of the accident risk and threats related to maritime oil transportation using the risk assessment and decision support tool.

The project assessed the current control options, policy instruments and overall safety management in society and provided this information to stakeholders and decision makers. The project estimated the effects on the ecosystem and financial consequences of oil spills.

Results and efficiency

In conclusion, the situational awareness and national and international co-operation between the authorities and other parties appear to greatly contribute to overall security. Situational awareness and co-operation help the Baltic Sea states to better prepare for security threats, existing as well as potential, and thus guarantee a safe living environment for the people in the Baltic Sea region. The MIMIC project created recommendations for society regarding improving the safety and security of oil transportation. New elements for legislation and international agreements were recommended. During the project, safety- and security-related international co-operation was strengthened among the authorities and scientists from all Baltic Sea countries. The efficient outreach and dissemination of the project results was achieved using an interactive web application, seminars and training exercises about the security threats and response to oil accidents.

SÖKÖ I, SÖKÖ II and TalviSÖKÖ projects

Execution periods

2003–2007, 2007–2011 and 2013–2014

Budget and main financiers

SÖKÖ I: Ministry of Education EUR 300,000

SÖKÖ II (A30065): Regional Councils
EUR 213,300 and European Regional
Development Fund EUR 646,700. Total
budget: EUR 860,000

TalviSÖKÖ (A32372): European Regional
Development Fund EUR 50,000

Partners

Kymenlaakso, Eastern-Uusimaa,
City of Helsinki and Western Uusimaa
Rescue Services, Uusimaa and Southeast
Finland ELY Centres. Finnish Environment
Institute and Ministry of Environment,
Finnish Defence Forces and other spill
response related authorities,
educational institutes, businesses and
non-governmental organisations

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/ SÖKÖ

PROJECTS IMPROVE THE OPERATIONAL RESPONSE CAPABILITY FOR OIL SPILL INCIDENTS

JUSTIINA HALONEN

The sÖkÖ projects were established to improve the Rescue Services' oil spill response capability. The projects are carried out together with the rescue authorities themselves and the results are incorporated into their statutory contingency plans.

The main focus of the sÖkÖ projects is to provide concrete guidelines and recommendations on how to conduct major oil spill response operations in coastal areas. These guidelines comprise a spill response management model involving the response and recovery operations in nearshore waters and on the shoreline. The need for a more detailed and comprehensive spill response management model arose when renewed oil pollution response legislation extended the responsibilities of regional rescue services.

The first oil spill response project, sÖkÖ I, was executed as a pilot project in collaboration with Kymenlaakso Regional Fire and Rescue Service from 2003 to 2007. The success of the response guidebook, created as part of the project, led to the expansion of the sÖkÖ model to cover all other rescue service regions on the coast of the Gulf of Finland: the Fire and Rescue Services of Eastern Uusimaa, the City of Helsinki and Western Uusimaa. The continuation project, sÖkÖ II, took place from 2007 to 2011. Both of these projects focused on improving response preparedness for large-scale oil spills in open sea seasons. The third spill response project, TalvisÖkÖ (2013–2014), was initiated together with all the mentioned rescue services to increase preparedness for spills in cold conditions, ice-infested waters and shorefast ice. A fourth project, sÖkÖSaimaa (2015–2018), is currently seeking funding in order to



SÖKÖ project personnel participated several oil spill response exercises. (Picture Olli Kilpeläinen 2009)



Picture: Melinda Pascale 2007.

develop an oil spill response management model for inland waters.

The sökö spill response management model is scenario-related, scaled to the worst-case oil spills expected. The model consists of guidelines for response tactics, oil containment and recovery, oil spill tracking and reconnaissance, shoreline protection, onshore clean-up operations, waste management, spill response logistic support, internal and external communication, human resource and financial management, claim and compensation procedures, and health and safety issues. The sökö response model also includes several spill response management tools, such as operative charts with shoreline segmentation, waste flow charts, reconnaissance forms and data management applications.

The main input for the sökö model is generated from the workshops that were conducted with experts in the field, accompanied by interviews and literature studies. Most of these studies were executed as master theses by higher education students. The devoted involvement of the students and the multiagency participants contributed to the achievement of the project goals through interdisciplinary cooperation.

The project's results have been taken into constant operative use. The sökö guidebooks are utilised for contingency planning and in training by rescue authorities, as well as by regional and national environmental authorities and volunteers. The Finnish Defence Forces maintain oil spill reconnaissance processes and will develop them further. The management tools are operated by all response-related authorities through the national situation awareness system, BORIS 2.0, administered by the Finnish Environment Institute. The sökö projects

have also contributed to the implementation of similar projects in the Gulf of Bothnia (the PÖK project) and in the Finnish Archipelago Sea (Archoil and Sulku projects).

As practical tools for oil spill response authorities, all three sökö projects have greatly improved the shoreline oil spill response capability. The sökö model is today seen as an integrated part of Finnish oil spill preparedness. The sökö guidebooks are referred to in governmental oil spill response manuals and preparedness recommendations. Furthermore, the sökö model was evaluated in parallel with the national contingency plans as the Finnish oil spill response capacity was subjected to the inspection of the National Audit Office of Finland in 2014. The sökö II project is also recognised as an example project for implementing the EU strategy objectives for the Baltic Sea Region (Action plan, COM2009, 10 June 2009).

/ MOBILE PORT (MOPO)

JUHANI HEIKKINEN

Execution period

August 2009 – May 2012

Budget and financiers

EUR 770,000: European Regional Development Fund (ERDF), the Finnish Funding Agency for Technology and Innovation (Tekes) and the following companies: Cursor Oy, Port of HaminaKotka Ltd (formerly Port of Kotka Ltd), KYMP Oy, SE Mäkinen Logistics, Steveco Oy, Suomen 3C Oy, Oy TransPeltola Ltd and VR Group.

Partners

University of Turku Centre for Maritime Studies, Maritime Logistics Research unit and the Lappeenranta University of Technology's Kouvola unit

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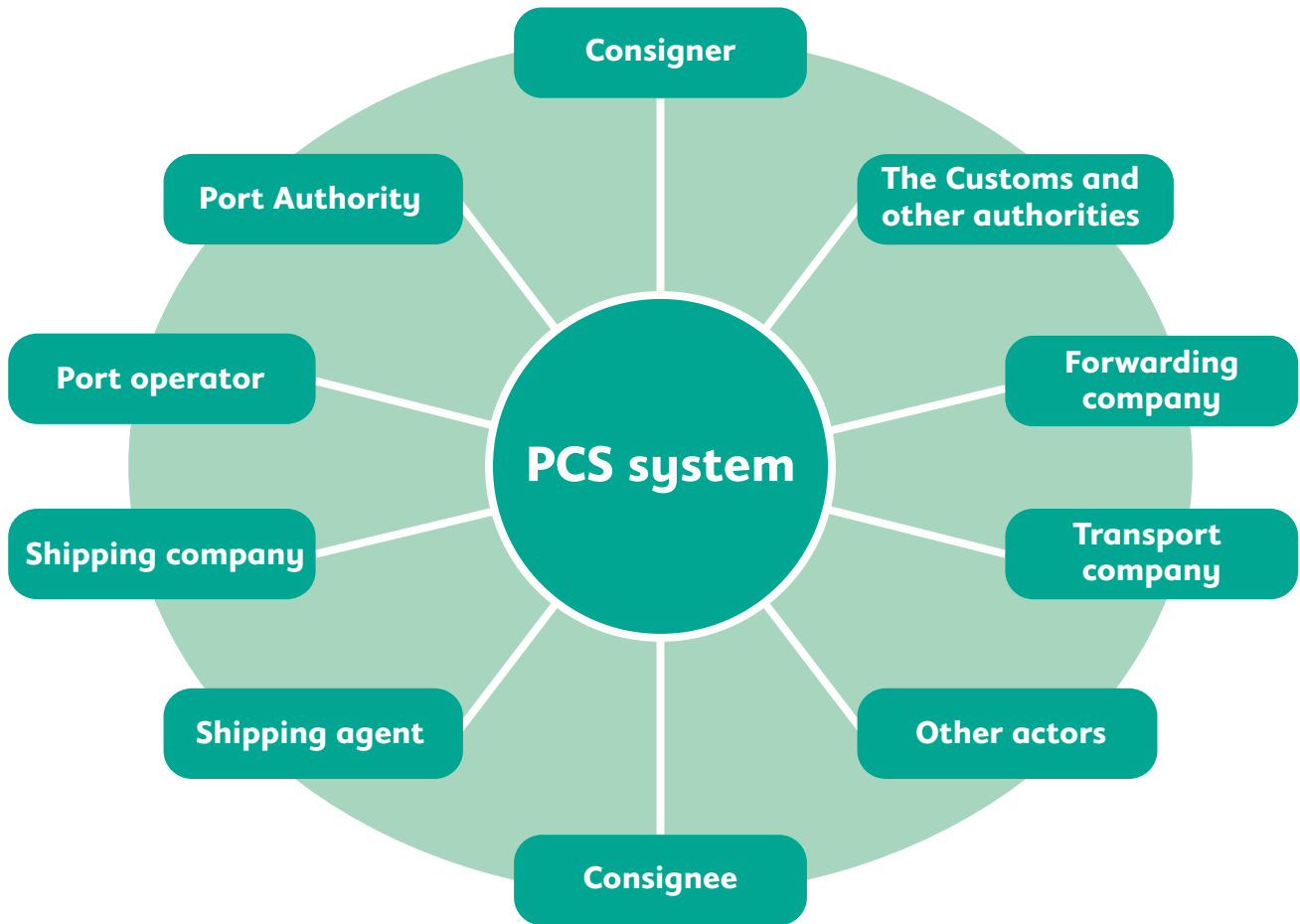
WWW address of the project

www.merikotka.fi/mopo

Despite relatively advanced information systems and services, information sharing in a typical Finnish port-related supply chain has several bottlenecks that cause delays in shipments and waste resources. The main reasons behind these bottlenecks are the extensive use of traditional bilateral communication methods, the large number and diversity of documents/messages (the same data must be entered many times in several places) and the incompatibility of information systems of different port-related parties. The practices and requirements also vary between different parties, ports and states, which causes problems in exchanging information. Furthermore, the information systems and services used in Finnish ports are relatively diverse from the users' point of view. They are also orientated to serve the needs of the authorities in the maritime environment while less attention is paid to landside transportation and the business needs of companies.

Objectives

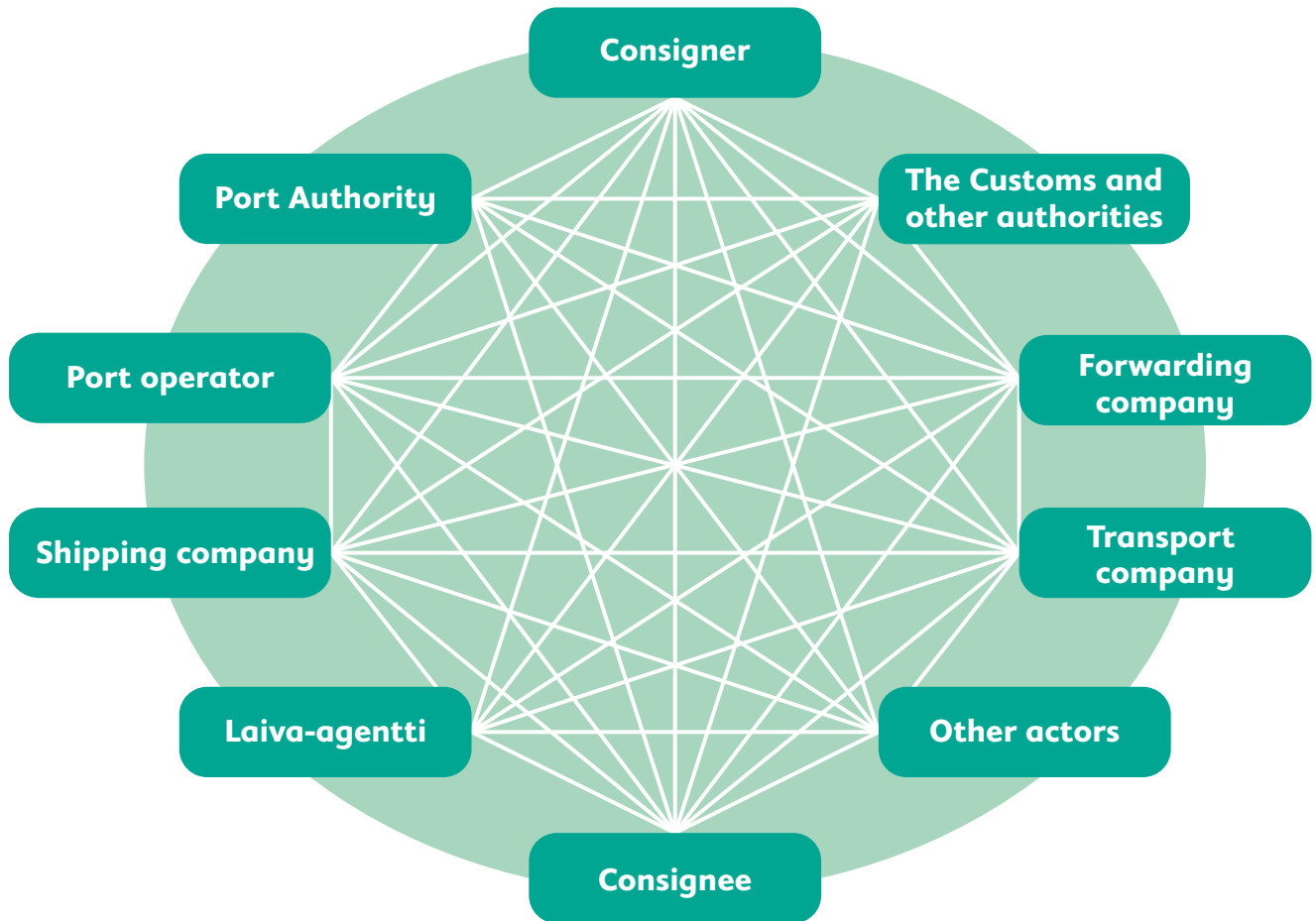
The purpose of the Mobile Port project was to study the business processes of Port Community Systems (PCS) in Southern Finland's ports. PCS shares information between different port stakeholders and acts like an "air traffic controller" for cargo flows in port. This enhances information flow, reduces congestion, errors, damage and environmental harm. The target is to improve the fluency of transport traffic, thereby reducing costs, the risk of accidents, congestion and harmful emissions.



Actions The project studied port community systems (PCS) used worldwide, evaluated the suitability of a PCS for the Finnish port operating environment and created a pilot solution for a Finnish PCS in the Port of Hamina-Kotka. Further, the dry port concept and its influences on the transportation system have been explored. The Mobile Port project comprised several literature reviews,

interviews with over 50 port-related logistics and/or ICT professionals and two different simulation models, as well as designing and implementing the pilot solution of the Finnish PCS.

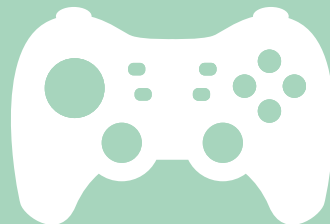
Results and efficiency Almost 30 different potential services or service entities for a Finnish PCS were identi-



fied during the study. The basic requirements, structure, interfaces and operational model of the Finnish PCS were also defined in the study. On the basis of the results of the study, a pilot solution for the Finnish PCS was implemented in the Port of HaminaKotka.

Image source: Posti, A. (ed.) (2012). E-Port – Improving the efficiency of Finnish ports with intelligent systems. Final report of the Mobile Port project. Publications from the Centre for Maritime Studies University of Turku, A 58.

KYAMK'S SPECIALITIONS:
WELL-BEING
AND BUSINESS
SERVICES



EMPOWERMENT OF FAMILIES WITH CHILDREN

MINNA VEISTILÄ & TUIJA SUIKKANEN-MALIN

Execution period

29 April 2011 – 28 April 2014

Budget and financiers

Overall budget: EUR 1,320,736.

KyUAS' contribution: EUR 79,537.

Partners

University of Helsinki, Palmenia Centre for Continuing Education, Kotka unit (LP), State University of St Petersburg, Faculty of Sociology, International Centre of Social Service Studies, Cities of Imatra, Kotka, Hamina, Svetogorsk, Pikalevo, Viburg and St Petersburg's Admiralty district, Saimaa University of Applied Sciences

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Family work is a relatively new form of social work in Russia and the need for methods and training is clear. The number of Russian immigrant families has grown very rapidly in South-Eastern Finland and the social workers in the area need multicultural skills and knowledge in order to be able to provide the necessary family work services. The Bachelor and Master level students of Social Services at Kymenlaakso UAS as well as their teachers need to be proactive in their multicultural understanding.

Objectives

The objectives of the project were to improve the well-being of families in the Finnish-Russian border area, to ensure high-quality and easy-access services in a multicultural society both in Finland and Russia, and to increase mutual understanding of social service systems and family cultures in Finland and Russia. The KYUAS subproject's objective was to improve the understanding of Russian culture and methods for working with families with a Russian background among its students and teachers.

Actions, results and efficiency

The project organized four international seminars, four study trips, four training events for local professionals and three professional exchange weeks. A new model for family work – cultural interpretation – was also invented and tested with 46 families. Three books and several scientific articles were published. In the

KYUAS subproject, Bachelor level students and their teachers participated in the seminars and study trips and reported on their experiences. Master level students and their teachers participated in the seminars and study trips, but also annually concluded a group assessment of the project as a part of the course, "Early support and responsibility", worth 4 ECTS. Seven Bachelor level students wrote their theses for the project. A 15 ECTS study module of multicultural studies was planned and tested at KYUAS with 171 students who carried it out. Two local seminars were organised with 134 participants. KYUAS teachers participated in the planning of all the local and national seminars, research and other actions together with the other project partners.

Links

- Project website
www.helsinki.fi/palmenia/kotka/hankkeet/empowerment/
- Empowering Social Work: Research and Practice
helda.helsinki.fi/bitstream/handle/10138/41105/empowering_social_work.pdf?sequence=1
- Vastavuoroiset ja voimaantumista tukevat käytännöt perhetyön kehittämisessä
helda.helsinki.fi/bitstream/handle/10138/42547/Empowerment_nettiversio.pdf?sequence=1
- Kulttuuritulkki: toimintamallin kuvaus
helda.helsinki.fi/bitstream/handle/10138/44967/Kulttuuritulkki_toimintamallin_kuvaus.pdf?sequence=1






Final seminar in St Petersburg
25 to 28 March 2014 with all
partners.



Kymenlaakson
ammattikorkeakoulu
University of Applied Sciences



Professional exchange from
Pikalevo and Svetogorsk.

/ STAY ONBOARD

FINNISH SEAFARERS STAYING AND LEAVING THE SEA AT WORK DURING 2012–2014

MINNA VEISTILÄ & TUJJA SUIKKANEN-MALIN

Execution period

1 January 2012 – 31 December 2014

Budget and financiers

EUR 420,000: European Social Fund,
Kymenlaakso University of Applied
Sciences, the Seafarer's Pension Fund (MEK),
Merenkulun säätiö / Sjöfartsstiftelsen.

Partners

Cooperation with the Ministry of Social
Affairs and Health, the Finnish Shipowners'
Association (FSA), the Seafarer's Pension
Fund (MEK), the Finnish Seamen's Service
(FSS), the City of Kotka,
the Finnish Transport Safety Agency (Trafi),
the Finnish Institute of Occupational Health
and other maritime stakeholders.

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WWW

www.kyamk.fi/stay

The Finnish population is ageing. This means that the workforce will diminish by approximately 10% between 2010 and 2013. At the same time, the dependency rate will weaken dramatically. In order to prolong working careers we have to analyse the reasons for workplace turnover. Therefore we must analyse both the attractive and negative aspects of work and the working environment.

Between 2000 and 2013, the normal retirement age among seamen increased by two years and the retirement age for disability increased by a little more than one year. The Seafarer's Pension Act will be modified to better comply with the Employees Pension Act (TYEL), thereby raising the earliest retirement ages.

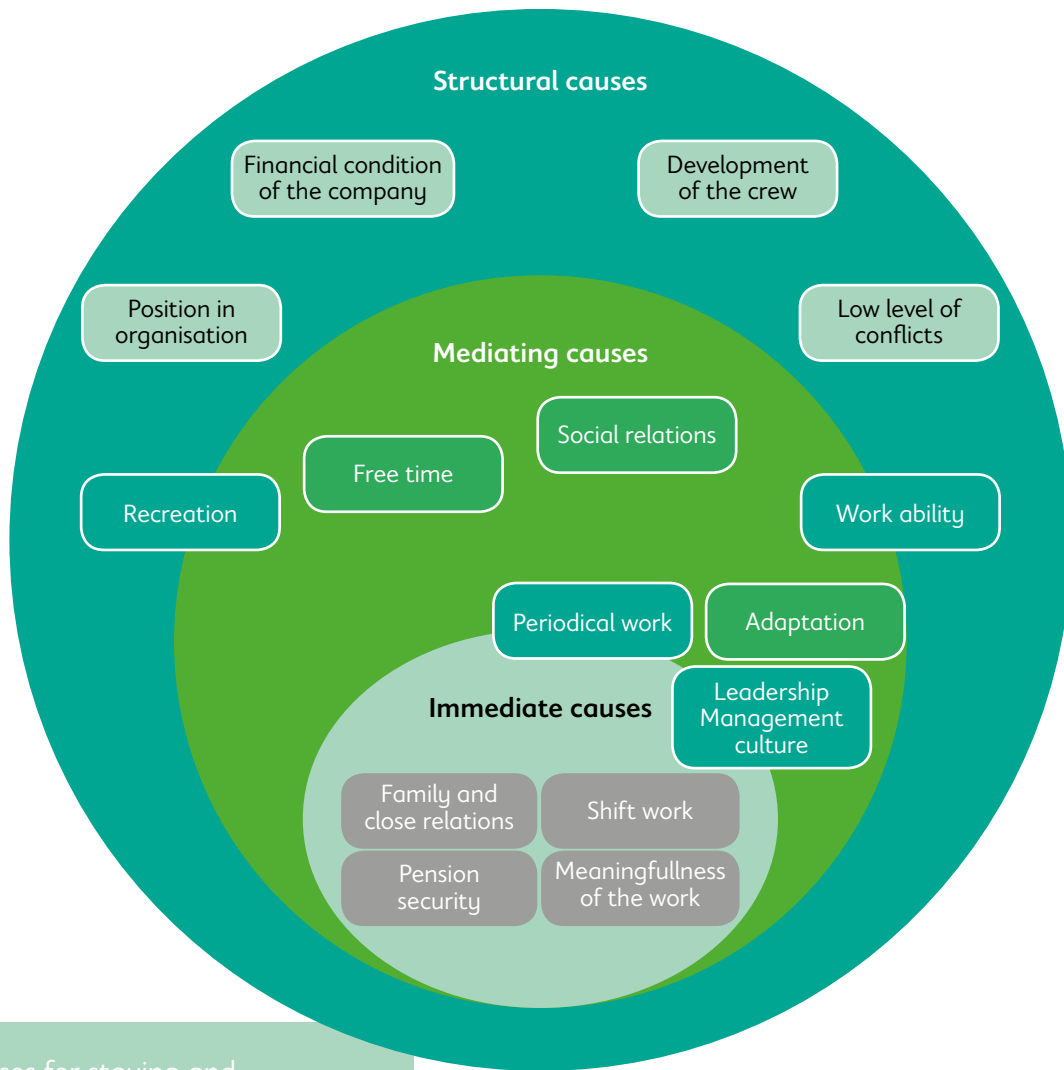
Objectives

The main aims of the Stay Onboard project are as follows:

1. Sustainable use of human ability
2. Increasing wellbeing at sea
3. Analysing the reasons for turnover and staying at work
4. Improvement of the industry's competitiveness
5. Definition of development actions

Actions

KUAS organised a major survey among seamen and 63 interviews among seamen, parties from the occupational health system,



Causes for staying and leaving ship work.

employers, social partners and other stakeholders. The project produced a final report, seven scientific articles, four student theses and various popular articles. The project organised two major seminars.

Results and efficiency

A ship can be considered an exceptionally challenging workplace that is occasionally exposed to adverse conditions. Seafarers' health and physical capability is examined in order to determine their suitability for on-board work. On average, seafarers are healthier and have better working capacity than the rest of the population. In addition to occupational health services, other organisations support seafarers' well-being.

A high level of standardisation is typical of the maritime industries and restricts the organisation of work and production of equipment and service innovations. Due to technological development, ships employ fewer people. The position of seafarers in the Finnish labour market is similar to that of other employees. Aboard ships, however, bullying is more common and the level of conflicts is higher. Notwithstanding this, seafarers are satisfied with their career choice, and 75% of them intend to continue in their jobs for the foreseeable future.

The periodic nature of work (the rotation of work and free time) is often the reason people aim at work at sea. Other reasons are job security, the nature of the work itself and professional skills. Deck and engine room officers are typically motivated by their career development prospects and the nature of the work itself. The catering department and other personnel are usually motivated by wages and job security. Job satisfaction is

based on the periodic nature of work, organisation of shifts, meaningfulness of work, occupational safety and social relationships.

Long careers are facilitated by factors including a favourable financial position on the part of the employer, the employee's standing in an officer position, maintenance of employees' working capacity, sufficient rest time and personnel development activities. In addition to the maintenance of working capacity and sufficient rest time, the amount of free time, social relationships, adaptation to working conditions and the quality of management affect seafarers' decision to stay in the job. The main factors that determine whether a person stays in the job are family and other close relationships, shift work, pension security and the meaningfulness of work. One man's motivation is another man's burden. The working conditions and personal objectives determine how well the employee will adapt to offshore work, and the quality of management and personnel development activities also greatly affect job satisfaction. Sometimes offshore work is impossible due to the needs of a partner or children. It is not uncommon to transfer to a shore-based job despite being satisfied with on-board work. The relation between an individual and his/her work is becoming more flexible. The life trajectories of individual seafarers vary, and a common course of offshore work cannot be found. Instead, decisions concerning the start, continuation and end of a career are affected by various factors.

In the shipping industry, the pension system is being changed with the aim of raising the legal retirement age. In order to diminish the gap between the real and legal retirement age, the introduction of the pension reform

should be combined with a development policy that would improve the quality of working life and productivity at the same time. In order to enhance employees' well-being, it is recommended to support a positive balance between work, family and career development. In maritime industries, there is clearly a need to evaluate and improve the workplace and management practices. Also, more synergetic and profound cooperation between the supporting and labour market organisations as well as estimation of the intangible assets and branding of strengths would have a positive influence on the business and well-being of ships' crews.

ACADEMIC ENTREPRENEURSHIP

FROM UNIVERSITY RESEARCH TO IMPLEMENTATION AND
COMMERCIALISATION OF INNOVATIONS – A COMPARATIVE STUDY (FORFI)

ARI LINDEMAN

Project period

2011–2014

Budget and financiers

The project was financed by the Research Council of Norway and the University of Tromsø. The total budget was NOK 3,000,000 (approximately EUR 330,000), with a matching contribution from the University of Tromsø. Kymenlaakso University of Applied Sciences' share of the Research Council of Norway's financing was EUR 18,000.

Project partners:

Professor Lene Foss, Tromsø University
Business School, Norway

Associate Professor Elin Oftedal,
Tromsø University Business School, Norway

Associate Professor, Tatiana Iakovleva,
Stavanger School of Business,
Stavanger University, Norway

Team leader Ari Lindeman, Leadership and
Entrepreneurship, Kymenlaakso University
of Applied Sciences, Finland

Professor Mats Lundqvist,

Chalmers School of Entrepreneurship,
Chalmers University of Technology, Sweden

Professor Jill Kickul, Leonard N. Stern School
of Business, New York University, USA

Senior Lecturer Christina Butler,
Kingston University, UK

Professor David Gibson, the University of
Texas at Austin, IC2 Institute, USA

Senior Researcher Einar Rasmussen, Bodø
Graduate School of Business, Norway

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Project information in the Research Council of Norway databank:

[www.forskningsradet.no/prosjektbanken_](http://www.forskningsradet.no/prosjektbanken_beta/#/project/212290/no)
[beta/#/project/212290/no](http://www.forskningsradet.no/prosjektbanken_beta/#/project/212290/no)

The project addressed thematic area 1 of the FORFI project call: “Norwegian research and innovation policy – in meeting the global structural changes of research”.

The project aimed to strengthen knowledge about how collaboration and entrepreneurial education in universities is conducive to the implementation and commercialisation of research-based innovations. The project offered an extensive comparative and in-depth processual focus that facilitates the design of good models and incentives for collaboration and education in developing entrepreneurial universities.

The project consisted of two main parts:

1. a comparative survey of the effects of entrepreneurship education in selected countries and universities, and
2. an extensive comparative study of the entrepreneurial architecture and institutional change of the entrepreneurial universities in relation to ecosystems around those universities.

The latter qualitative study collected 10 narrative case studies written by inside informants from 10 universities from five countries: Norway, Sweden, Finland, the United Kingdom, and the United States of America. For the survey part, Kymenlaakso University of Applied Sciences' students in entrepreneurship courses acted as respondents. For the case study part, an in-depth case narrative was produced about the development of Kymenlaakso University of Applied Sciences from the perspectives of entrepreneurial university architecture and institutional change.

The main immediate result of the project was the forthcoming book (June 2015, Routledge) entitled “The Entrepreneurial University: Context, Institutional Change, and Architecture”. The book is edited by the project leader, Professor Lene Foss, and Professor David V. Gibson. The book includes an in-depth case study of the unique journey of Kymenlaakso University of Applied Sciences entitled “Kymenlaakso University of Applied Sciences, Finland: In search of university-wide entrepreneurial action.”

The book's case studies, analysis and conclusion inform its policy recommendations for the development of entrepreneurial ecosystems in Norway, in particular, but also elsewhere in the world.

/ BOAT

KARI STENMAN

Execution period

The project ran from 1 January 2012
to 30 June 2014

Budget

EUR 116,600 (Kymenlaakso University
of Applied Sciences)

Financiers

Häme ELY Centres, Kymenlaakso University
of Applied Sciences, Companies

Partners

HAMK University of Applied Sciences is the
project co-ordinator. The project partners
are Laurea University of Applied Sciences
and Turku University of Applied Sciences.

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The BOAT project promotes co-operation in a network of higher education institutions and companies in the Baltic Sea region. The emphasis is on the technology industry and its importance for improving the employment rate and social well-being throughout the Baltic Sea region. The project aims to develop means for the promotion of entrepreneurship and the advancement of innovation and internationalisation in SMES.

Actions

The project looks at established co-operation models between higher education institutions and companies in the Baltic Sea region. Information about these models is disseminated across the project region. The project aims to develop and strengthen an extensive international co-operation network for innovation and internationalisation, particularly in the Baltic Sea region.

Results and efficiency

The result of the project will be an international innovation network environment for Finnish companies. The innovation environment will include efficient forums for participation, useful information channels and effective innovation systems, with inspired and active participants whose interaction with each other is uncomplicated.

NUORET KASVUYRITTÄJÄT – YOUNG ENTREPRENEURS

JUHANI TALVELA

Execution period

1 October 2013 – 31 March 2015

Budget and financiers

Budget: EUR 480,000

Main financier: the Centre for Economic Development, Transport and the Environment in South-East Finland, the European Social Fund programme for Finland

Other financiers: Kyamk University of Applied Sciences, Cursor Oy

Partners

Kyamk University of Applied Sciences,
Cursor Oy

Contact person, e-mail

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Previous projects have found the support and encouragement of entrepreneurship among young students in the region to be inadequate and underperforming. Individual students and student teams that are interested in entrepreneurship regularly lack the connection between the idea and the actual step of setting up a company. As ideas and innovations among students are considered a major source of potential new start-ups and employment, support for students interested in entrepreneurship that enables students to actually become entrepreneurs could be beneficial for all parties involved. Good teams need adequate and timely support to smooth the process from idea to start-up, and then support to transform from a start-up into a growth company.

Objectives

The project applies a process (“from an idea to an enterprise”) and further develops it to provide cross-sectoral student teams with the actions necessary to enable them to become successful entrepreneurs. The project also enhances entrepreneurial studies within the Kymenlaakso University of Applied Sciences to better meet the needs of young entrepreneurs-in-waiting.

The primary target audience is 20–30-year-old students or recent graduates who are interested in entrepreneurship, possess a business idea to work on, and who are willing to form a team to transform their idea into a start-up. University staff (teachers and R&D personnel), who may support and promote entrepreneurial

ideas and processes among students, form a secondary target audience for the project.

Actions

The project team has interviewed students, supported the initiation of entrepreneurial teams and helped them to apply to join the project. The accepted teams have then undergone a comprehensive training and support programme, where their business ideas have been thoroughly analysed and documented. An inspirational environment of co-operation and knowledge sharing between the teams has been created and the teams have been prepped to present their ideas to potential investors and customers.

A co-operation programme has been created with Cambridge University's Judge School of Business to allow young entrepreneur teams to participate in the Cambridge entrepreneurial programme and pitching sessions. Co-operation has also been established with Aalto University's Aalto Venture Programme to provide best knowledge and training for the teams.

Kyminlaakso University of Applied Sciences has significantly improved its capabilities to support entrepreneurship among students.

Results and efficiency

The project was still running at the time of writing, so the final results were not available. However, the main results are that 20 student teams have been formed and they have undergone a comprehensive training and skill-boosting programme. The main engine to promote the

teams' capabilities has been two boot camps comprising a one-week prep camp and another week participating in intensive workshop sessions in Cambridge.

The project has revealed that setting up and supporting a student entrepreneurship society is a powerful tool for promoting entrepreneurship among students. Actions have been taken to set up an entrepreneurship society on the Kotka campus and the project will work on this topic for its remaining runtime.

/GAME-INNOVATION

IN DEVELOPING SECURITY AND WELLBEING ENTREPRENEURSHIP

SAARA ESKOLA

Execution period

1 August 2013 – 30 April 2015

Budget and financiers

The project's budget was EUR 450,000 and the financiers were the European Social Fund, Kymenlaakso University of Applied Sciences, the City of Kouvola, Cursor Oy and the Finnish basketball association.

Partners

The project partners at the end of December 2014 were the Kymenlaakso rescue department, the Finnish basketball association, Kakspy, Palvelukeskus Iltatähti, Vellamo Maritime centre, Nitro Games, Mediamaja and Kouvolan lääkärikeskus.

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Coping with everyday life and feelings of lack of security and exclusion have created a need for multi-disciplinary research that focuses on developing safety and wellbeing by gamification.

The need for new business and entrepreneurship has arisen from Kymenlaakso's abrupt structural change, which affected employment and caused major job reductions in the area.

Objectives

The project's main aim is to create a multi-disciplinary network that studies and develops new security and wellbeing business opportunities, as well as developing security and wellbeing entrepreneurship in Kymenlaakso to compensate for the lost industries and companies in the area. The other aim is to create a new type of business for Kymenlaakso's security and wellbeing companies by gamification.

Actions

The actions in this project are:

- Creating an innovation network of safety and wellbeing businesses
- Developing security and wellbeing entrepreneurship
- Holding security and wellbeing entrepreneurship training
- Promoting health, wellbeing and security by gaming and via the game industry
- Developing safety training

Results and efficiency

The results and efficiency by the end of December 2014 were:

- An information security event (“Pelaa, älä pelkää”) for citizens and events for students to promote entrepreneurship.
- The project has also networked by participating in the Games for Health seminar, Game Developers’ Conference in Europe, Games for Health Jam and Games for Health Europe Expo.
- Games that were developed: Susijengipeli, Memonic memory game and a demo of an action game that gives hidden information about diseases and how to prevent them.

The results that are expected by the end of April 2015 are:

- Developing Kymenlaakso’s security and wellbeing companies by business expansion plans
- Making new business concepts for the security and wellbeing field in Kymenlaakso
- A game workshop event for Kymenlaakso University of Applied Science students and for Kymenlaakso’s security and wellbeing companies
- Children’s fire security game
- Seminar
- A report on game innovation in developing security and wellbeing entrepreneurship

/ AURESTUDIO

STUDIO FOR AUGMENTED REALITY PRODUCTIONS

SAMULI KAREVAARA

Partners and budget

The AuReStudio project was done in co-operation with the Game Design and Communications departments of the Kymenlaakso University of Applied Sciences and the machine vision research laboratory of the Lappeenranta University of Technology.

The project lasted from 1 January 2012 to 30 June 2014.

The total budget was EUR 451,000.

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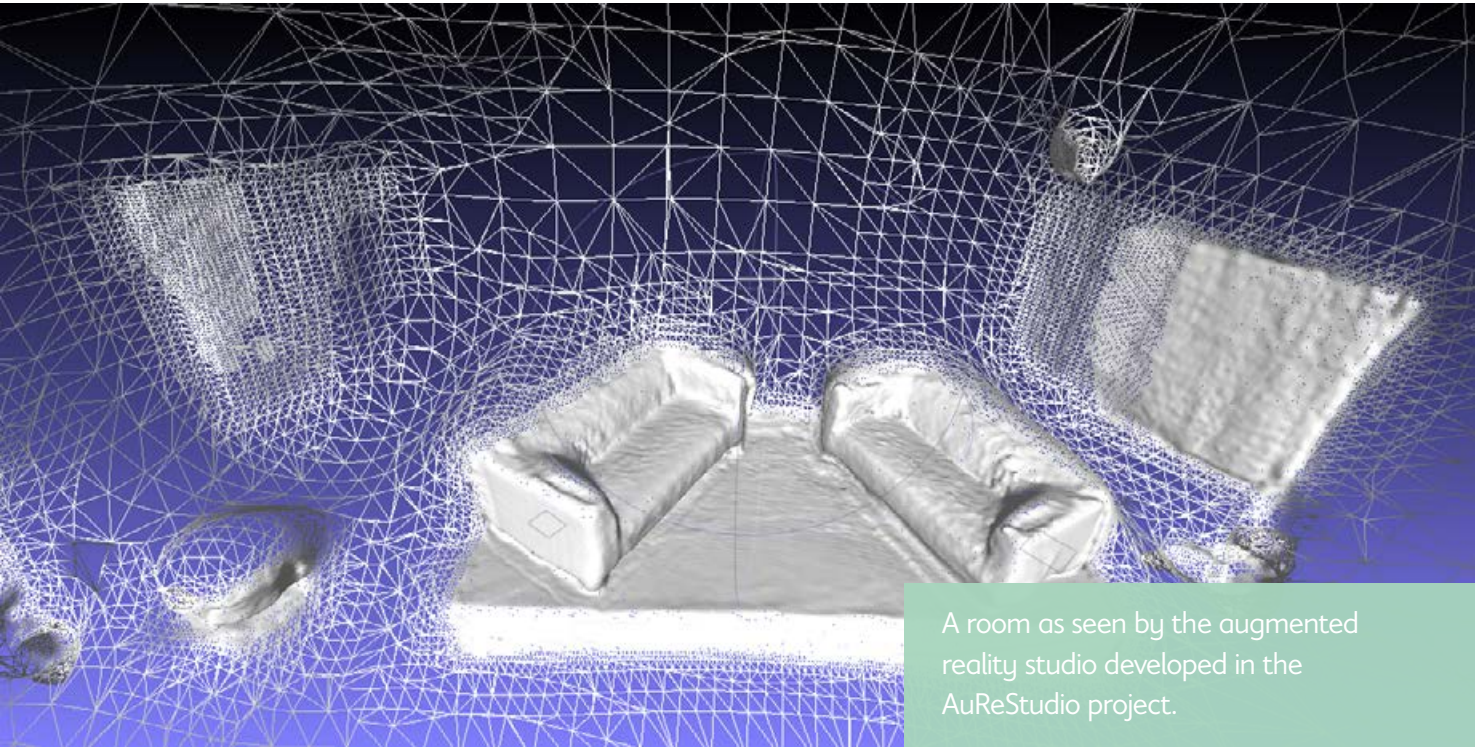
A huge hole appears in the wall of the exhibition centre. A life-sized train slowly rolls into the hall on the stage. Next, a car will levitate from a PowerPoint slide show to the stage and circle around the audience. In a sports hall nearby, an airplane lands on the basketball court.

The illusions described above are of course only possible in virtual reality. Augmented Reality (AR) technology brings these events to our reality by adding the illusions to video image in real time. Anyone following the show in the exhibition centre or the basketball game via video will see the events as if they are actually happening right now.

To make the illusion as real as possible, a computer has to have a precise understanding of where the video camera is and what it is pointing at. This information allows the computer to produce 3D images to be part of the video picture. The 3D images will have the right perspective and they will move along with the scene when the camera moves. Technology to allow for position calculations of greater precision is being developed in the AuReStudio

Results

The augmented reality studio was built in the Meduusa Studio at the Kasarmimäki Campus of Kymenlaakso University of Applied Sciences. The AuReStudio project has co-operated with the Game Cluster project and equipped the studio with high-end graphics hardware such as Quadro SDI graphics cards, a motion capture rig and a special hardware for chroma keying of the video stream.



A room as seen by the augmented reality studio developed in the AuReStudio project.

The augmented reality studio has an 18-camera Natural-Point OptiTrack motion capture rig with an area of 6×6 metres and a height of three metres. The motion capture rig and the augmented reality camera technologies can be utilised by companies and university projects alike. The augmented reality cameras are equipped with Ultimatte 11 HD/SD chroma keyer with a Smart Remote 2 control panel.

The algorithms developed in the project by the Lappeenranta University of Technology were designed to be capable of running both on high- and low-end hardware. The augmented reality pilot case was demonstrated to work with an Xbox Kinect camera and a low-end Linux laptop.

/ MODELLING SERVICES – 3D STUDIO

ARI HAAPANEN

Services are offered for 3D design, CNC machining and 3D printing to students in basic education and project studies, as well as to industrial parties. The services for companies improve learning and boost understanding of today's industrial and business needs.

The service was established with financing from the Centre for Economic Development, Transportation and the Environment. The project has significantly contributed to the creation of services and knowledge of the development of competence. The project made it possible to acquire key software and hardware for digital manufacturing.

3D modelling services are provided to facilitate companies' research and development. The main content of the plan is the use of digital manufacturing processes in the manufacture of products, or design that will aim to manufacture products with 3D devices in the studio and partner devices in industry. 3D modelling is available in a variety of modelling software and 3D scanners.

3D scanners are suitable for modelling pieces of furniture. The scanner technology uses a regular flash bulb instead of a laser, so the scanner is completely safe for the eyes. The scanner is hand-held and portable and it is ideal for the field of heritage preservation. Precious archaeological finds and timeless statues in museums do not need to be moved or touched to create a 3D record

of them. The scanner has the ability to capture texture and it captures brilliant colour at up to 24 bits per pixel. This means that the resulting texture is of great quality, similar to that of a modern video camera.

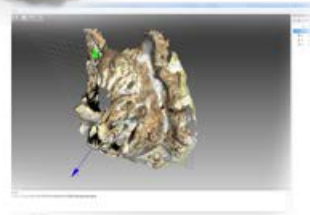
3D printing services are provided to customers in the printing section. There are three different technologies for manufacturing: fused deposition modelling, material jetting and binder jetting for gypsum powder. Two of these methods produce plastic models and one produces gypsum models. All of the techniques have slightly different characteristics: plastic printers can make workable mechanisms and relatively accurate, robust models. The gypsum powder printer can quickly produce figure models, multi-coloured models and even metal casting moulds.

The 5-axis head CNC machine is used for milling. The machine is suitable for machining wood and plastics. The table of the machine is quite large, meaning that it can produce fairly large pieces at a time. We have produced boat moulds, pulp fibre moulds and wooden products.

3D Printing



3D Scanning



CNC Machining



RESTORATIVE ENVIRONMENTS

WELL-BEING AND THE BUSINESS OF WOOD

ARI HAAPANEN

Restorative environment design approach

The lifestyle that is gaining ground all over the world is controlled by corporates, fashion, media and fast food. People do not recognise what is essential or what is good for them. Additionally, the built environment is designed for cars, corporates and consumers.

We spend 88% of our lives indoors. The importance of how interiors affect people needs to be addressed and decision-makers' ecological and social awareness needs to be improved. The restorative environment design approach aims to raise awareness of design solutions. Also, the effect of wood in the interior was studied in a series of projects at Kymenlaakso University of Applied Sciences.

Restorative interior design is a complex multiprofessional task. The amount and spread of information is vast. Multiprofessional networking including architects, interior designers and researchers in the fields of acoustics, light, behavioural sciences, environmental psychology, wood technology and interior air is needed in the planning process. The importance of different experts varies regarding interior design task.

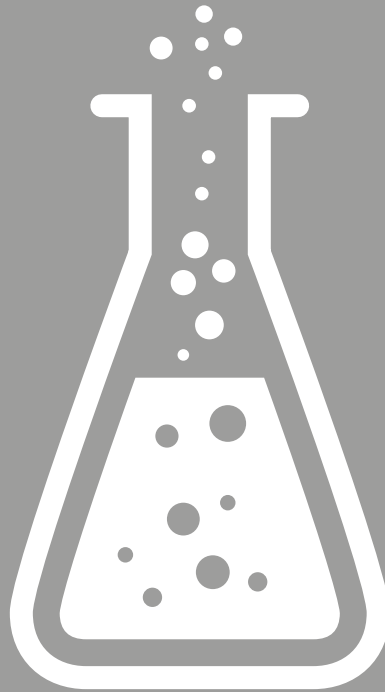
The healthcare environment needs special attention in order to make patient visits safe, understandable and healing for people who are weak or have deficient senses.

Other interior environments that need enhanced design input are day-care facilities and schools.

The goal of the restorative environment design approach is to raise awareness of the decisions made by designers, developers or owners of the interior design solutions, and especially that of healthcare, day-care and education facilities. There is a need to simplify the guidelines and give examples of successful solutions. The information is gathered via desk studies of the research and researchers involved. New information is created by a research group. The information is disseminated via publications and communication.

The result will be an international network between universities and companies creating concepts that can be worldwide. In the 1930s, architect Alvar Aalto inspired discussion of the need to study how people react to the technical and built environment. The goal for this approach is to study just that.

KYAMK'S SPECIALITIONS:
OTHER



/ BRIDCE-MOCT

KARI KOKKONEN

Execution period

1 September 2013 – 31 August 2014

Budget and financiers

EUR 50,000 financed by Kymenlaakso
Regional Council

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The main need for the project arose from the efforts to develop internationalisation in the Kymenlaakso Region and Kymenlaakso University of Applied Sciences in the fields of research, development and innovation. The BIC Kymi society, with its three members, Kymenlaakso UAS, Cursor Ltd and Kouvola Innovation Ltd, invested in internationalisation in cooperation with the Helsinki EU Office and its network in Brussels, as well as the European Business Network. Following the decision to close down BIC Kymi, there was a need to preserve investments in knowledge, skills and social capital in networks, as well as to develop it further in the EU context and expand it towards Russia, especially St Petersburg and Leningrad Region.

The other reason for the project was to further export education. Kouvola Innovation had completed the groundwork and feasibility studies regarding developing cooperation in our region as well as our neighbouring regions. There is a need for all of the stakeholders to put these ideas and results into action – individually and in close cooperation together.

Objectives

The main objective was to develop a three-year project proposal to satisfy the needs of internationalisation development. The primary aim was to preserve the knowledge-based investments and further develop EU-based work and expand towards Russia. Secondly, the project built a link between the EU framework programme periods in research, development and innovation.

A further main objective was to include systematic development and marketing of further education export in the project proposal. The main target areas were Russia and the other BRIC countries. The objectives were to build a bridge between the European Union and Russia by using the Kymenlaakso Region and Kymenlaakso UAS with its partners as an intermediary.

Actions

The project interacted with the Cursor FiFi project and the Merikotka Research Centre Inter project, as well as with the Helsinki EU Office in Brussels and the Helsinki Centre in St Petersburg. This resulted in commitment and proof for the actions to be taken, developing on-going EU actions and widening the scope into Russia.

The project's ideas were also presented at DG Research and Innovation in Brussels as well as to funding authorities in our region to analyse funding opportunities and to test the project's ideas in general. Russian Universities were contacted and asked to deliver a memorandum of understanding regarding taking part in the proposal. Two project proposals were submitted to the ESF and ERDF funds.

Results and efficiency

The project resulted in a Smart Specialisation strategy for our region. It was based on the ERDF project, building it into internationalisation development work between the EU and Russia. The ideas resulted in practical work in the Northern Growth Zone. The Northern Growth Zone is a development programme that links Russia, the whole of Southern Finland, Stockholm, Copenhagen

and Oslo as a zone with the EU. It is a testbed for various actions in developing smart, sustainable and inclusive growth for our regions. The other project for ESF fund was to do the same type of work in the field of social inclusion, excluding smart specialization.

Further education export was analysed and omitted from the targeted proposals. The challenge is so demanding that it needs to be developed in its own context. Also, the actions taken in the region regarding clustering development in further education supported this decision.

