

# OUTPUT FACT SHEET

## Pilot actions (including investment, if applicable)

Version 2

Project index number and acronym	CE1044 TalkNET
Lead partner	North Adriatic Sea Port Authority
Output number and title	O.T3.10, PA for ECO-innovations on energy efficiency deployment: test of energy efficiency in cargo handling
Investment number and title (if applicable)	I1.1, PA for ECO-innovations on energy efficiency deployment: test of energy efficiency in cargo handling
Responsible partner (PP name and number)	Luka Koper, d.d.; PP5
Project website	<a href="https://www.interreg-central.eu/Content.Node/TalkNET.html">https://www.interreg-central.eu/Content.Node/TalkNET.html</a>
Delivery date	May 2020

Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character

One of the main goals in the port regarding the operational costs is the rationalization of the costs for energy. Luka Koper will achieve this goal also with the use of high-efficiency lighting technologies, like solutions based on LED (light emitting diode) and automated solutions. These solutions can offer significant improvement in energy efficiency compared with installed conventional metal-halide lighting system, while maintaining equal or providing even better quality of light and improved illumination. The upgrade of indoor lighting may require a significant modification of the existing electrical installations, which can be very expensive. Energy consumption for lighting can also be reduced with a lighting controls system (powerful monitoring and control capabilities). Market analysis and consultations with potential technology providers proved that a combination of a lighting controls system with occupancy sensors and energy-efficient lamps and luminaires produces the best possible outcome in terms of lighting performance in a selected general cargo warehouse.

Pilot action in the port of Koper (the selected general cargo warehouse no.33) was implemented to test the new lighting the new LED lighting system with a powerful monitoring and control capabilities in order to reduce electricity consumption and costs and to improve working conditions in the area.

The system provides a flexible and open concept for upgrading electrical lighting installations and it must be capable to operate in a standalone mode or integrated in a future smart grid. The documentation/project design of electrical installations and electrical equipment for reconstruction of the electrical installations in the warehouse 33A, B, C, D in the port of Koper was prepared on the basis of the project task of the investor (Implementation of alternative solutions for electrical installations in the warehouses 33A, B, C, D, in Luka Koper).

This project has high replicability potential since there are around 2,200 similar lamps installed in other warehouses in the port of Koper that can be replaced with new and energy efficient lamps. The proposed solution can operate fully automatic with remote control or in a standalone mode. Additionally, proposed solution has a potential to reduce a peak power on the port level.

Existing metering system was upgraded and additional sub-meters for direct measuring of electricity consumption for indoor and outdoor lighting were installed. The proposed solution upgraded existing light level/illuminance and consequently improve working conditions in the selected general cargo warehouse no. 33 in the port of Koper. It is positive that proposed LED based solution will require less maintenance than existing, conventional high-pressure metal halide lamps and it is desired that the electricity for port operations come from renewable or at least low carbon energy sources.

Key performance indicators were monitored before and after the implementation of the pilot action (described below in this document).

### NUTS region(s) concerned by the pilot action (relevant NUTS level)

NUTS I Slovenia, NUTS II SI04 Western Slovenia, NUTS III SI044 Coastal-Karst Statistical Region

### Investment costs (EUR), if applicable

Total costs of pilot action: 84.790,35 EUR (without staff costs).  
Investment cost that were reported: 42.068,31 EUR (30.185,48 EUR for equipment, 11.882,83 for infrastructure) and 9.714,55 EUR for external experts.

The rest of the costs were covered by Luka Koper d.d own sources.

### Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

Different KPIs were monitored before and after implementation of the pilot action. The analysis of the KPIs shows that the pilot action has major positive effects. The electricity consumption was significantly reduced and at the same time the luminosity in the warehouses was increased by 25%. Consequently, the costs of electricity consumption were lowered up to 50%. Following the results of this pilot action the Port of Koper will continue to implement new LED lightning systems also in other similar warehouses in the port, which will lead to even greater energy consumption and cost reductions.

	BEFORE PA	AFTER PA
Ratio between total electricity consumption for indoor lighting and total number of cargo handling operational hours	11,89 kWh/op. h.	4,63 kWh/op. h.
Ratio between electricity consumption for indoor lighting and total mass of cargo stored in the warehouse	1,81 kWh/t	1,37 kWh/t
Ratio of electricity consumption for indoor lighting and total number of cargo units stored in the warehouse	12,43 kWh/TEU	6,88 kWh/TEU

The solution of improvement of energy efficiency in the selected cargo warehouse (Luka Koper pilot action) has been developed to the point that can be adapted/exchanged in this case in all kinds of warehouses/warehouses on other terminals - nodes by all project partners and other stakeholders in the logistic area throughout the CE region. Certainly, Luka Koper will continue with usage of the lightning system also after the project implementation and will in the future transfer this solution onto other warehouses.

In terms of leverage of funds, up to 750.000 EUR is planned in next five years for replacement of old lightning systems in the port of Koper. The same system will be implemented in all warehouses in the port (for general cargo, bulk cargo, for refrigerated cargo). After warehouse nr. 33 (TalkNET pilot action), the warehouse nr. 29 was equipped with new LED lightning and monitoring system in 2020, afterwards the warehouse nr. 32 is being equipped this year. Renovations of warehouses will be carried out gradually, by 2030 we intend to use the same solution for 90% of warehouses for general cargo. General cargo terminal has the highest number of warehouses in the port.

Moreover, the reduced energy consumption will made available 54.000 EUR of funds leverage in the five next years.

## Sustainability of the pilot action results and transferability to other territories and stakeholders.

**Financial sustainability:** The pilot action is financially sustainable, since it leads to reduced costs of electricity consumption. The replacement of old lightning system with new one, that is automatized and based on LED technology and equipped with monitoring system, has turned out to be positive in cost and energy savings for up to 50 %. Luka Koper company has also planned the financial resources for the maintenance of such LED lightning system (minimum maintenance is required) and planned financial resources to gradually replace old lightning systems also in other warehouses in the port.

**Institutional sustainability:** Luka Koper has a maintenance service organized as an internal department. Since the warehouse no. 33 is a part of a profit centre Terminal for general cargo, the maintenance is planned within yearly regular maintenance. For the LED lightning equipment there is usually minimum maintenance needed. Also, the replacement in case of equipment failure is carried out by internal maintenance service. Therefore, no additional cost are required in terms of maintenance.

**Political sustainability:** The company management board support such investments that lead to cost savings, reduced energy consumption and better and healthier working environment. According to the Luka Koper strategic development plan for the period 2020-2025, accelerated development of energy efficiency and the use of renewable energy sources is a fundamental element of the transition to a low-carbon society. In the case of the Luka Koper can become the lever for further development of the port, as is described in the new strategic development plan. In the period until 2025, in order to achieve the highest standards of energy efficiency, Luka Koper will obtain and actively upgrade the ISO 50001 certificate - energy management system.

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For the purpose of transferability to other stakeholders, pilot site visit was organized on 5<sup>th</sup> of February 2020 in the port of Koper - warehouse nr. 33. The event gathered 26 participants from several logistics, transport, research and port services organizations. The pilot action implementation was presented on field by energy manager and construction project manager from Luka Koper. The discussion among stakeholders was mainly focusing on the topics of energy and costs savings when implementing such ECO-innovative solution in warehouses. The pilot site visit was an excellent example to expand the know-how and the positive results of such pilot actions.

Lessons learned and added value of transnational cooperation of the pilot action implementation (including investment, if applicable)

Added value of transnational cooperation is guaranteed by the fact project partners are sharing experiences and knowledge regarding improvement of multimodal logistics nodes efficiency throughout the entire project life-time. Mutual learning and transfer of best practices are key to promote economic, social and environmental growth in European regions. For us it is crucial to get information and recognize best practices, new solutions and innovative measures from other partners, especially when it comes to new logistics and transport technologies, processes and environmental solutions. Shared experiences within the project consortium will help to develop useful solutions in different EU regions.

Conclusions about added value of transnational cooperation are gathered during meeting of the working group for the pilot project assessment held on 27th-28th May 2020. In terms of added value of transnational cooperation, the results of the pilot action carried out by the Port of Koper have been assessed and the following results can be highlighted in relation to mutual learning among project partners:

Identified strengths of the pilot action are:

- Low operational costs
- Improvement of social conditions
- Improve performances
- Energy saving
- Own maintenance and not really required
- High rate of transferability
- Illumination improvement
- Private and public players can use it both in different frameworks

Identified weaknesses:

- High investments required
- Quite complex monitoring system
- Trained needed for a correct implementation
- Long payback period
- Energy price uncertain
- Necessity to aggregate resources to solve the long payback
- High cost in case of replacement
- Renewable resources still not fully underlined

Potential deployment of tested innovation:

- Easy to be transferred
- Cross fertilisation among different projects already ongoing
- Pilot testing planned in the ports of Venice and Trieste.

More in depth, installation of LED lighting system has been an important example of pilot investment in terms of energy efficiency for all TalkNET partners, that have capitalised the work carried out by the port of Koper. In particular, the lessons learned and benefits gained by Luka Koper are supporting to better planning such an activity for several ports, e.g. Ports of Venice, Trieste and Rijeka, that are cooperating within the project SUSPORT - Sustainable Ports (Interreg Italy-Croatia). In particular, although the pilot action was implemented in a warehouse, which the Port Network Authority of the Eastern Adriatic Sea does not manage, the Port of Trieste will replace all the existing lighting systems in the port's public areas within 2021, as well the North Adriatic Sea Port Authority in the port of Venice and the port of Rijeka Authority. Moreover, a model of cross-border plan for environmental sustainability and port energy efficiency will be developed, declined in each port through an ad hoc plan which will be tested in concrete pilot actions, with tangible results. As a part of the pilot activities, introduction of LED lighting will be an integral part.

LED lighting system is fully applied in the Freeport of Budapest too: the recently-build warehouses and office buildings use LED lighting with a similarly functioning controlling system used in Koper.

**Contribution to/ compliance with:**

- relevant regulatory requirements
- sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles such as equal opportunities and non-discrimination

For the implementation of the pilot action for ECO-innovations on energy efficiency deployment Luka Koper company had to comply with the Public Procurement Law. All procedures necessary to identify executors of proposed activities followed Slovenian national legislation on public procurement (Public Procurement Act, ZJN-3; Official Gazette No. 91/15 and 14/18). Such Act disciplines procedures of public procurement and introduces in Slovenian legislation among others the Directive 2014/24/EU on public procurement and the Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors.

There were no negative environmental effects.

**References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links**

**If applicable, additional documentation, pictures or images to be provided as annex**

- D.T2.5.4 - Action plans on eco-solutions deployment - LUKA KOPER (NAPA)
- D.T3.2.10 - PA for ECO-innovations on energy efficiency deployment: test of energy efficiency in cargo handling
- PILOT ACTION - FINAL REPORT

Attachment: PP5Luka Koper-TalkNET-PILOT ACTION\_final report (PowerPoint presentation)

- D.C3.5 - Pilot site visit - Koper

Attachments:

- TalkNET Pilot site visit\_Stakeholders Meeting Minutes

-General Pilot Action Assessment -WG Eco-Innovation\_T2