

Local Action Plan Port of Ploče

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1. Introduction

In accordance with the Maritime Development Strategy and the Integral Maritime Policy of the Republic of Croatia for the period from 2014 to 2020 [1], the Port of Ploče has been designated as one of the six main ports, which have been declared ports of particular (international) economic interest for the Republic of Croatia, and according to the aforementioned Strategy alongside the port of Rijeka, represents the second most important cargo port.

Although the Port of Ploče is a Croatian port, it is extremely important for the economy of neighboring Bosnia and Herzegovina. About 90% of the Port of Ploče activities is classified as transit traffic, as the port is the main approach to Bosnia and Herzegovina on the seaside and at the same time the destination of the Pan-European Corridor Vc (a port on the TEN-T Comprehensive Network). With the completion of the Vc corridor, the Port of Ploče will expand its operations to other countries in Western and Central Europe, especially Hungary.

In accordance with the National Plan for the Development of Ports of Special (International) Economic Interest for the Republic of Croatia [7], to increase the focus on environmental protection and sustainability, the Port of Ploče should aim to become a 'green' port. The focus should be on further meeting the requirements of port environmental management standards (PERS) and the certified Quality Management System promoted by the European Sea Ports Organization (ESPO). The port should also introduce incentives to promote low Sulphur emissions of shipping companies. Furthermore, the port should also prepare for the introduction of low-Sulphur areas in the Adriatic/Mediterranean by 2020, where ships would be limited to the use of low-Sulphur fuels. The port should also prepare to provide clean fuel storage, perhaps even include LNG (liquefied natural gas). In the long run, the port has initiated a feasibility study on the application of "Cold Ironing", or "Shore-2-Ship" technology, and preparation for the reception and storage of LNG (liquefied natural gas) is planned. An additional advantage would be the transition from road to rail transport mode. In line with the short- and medium-term development plan, the port has already started exploring opportunities for the deployment of clean energy technologies, i.e., electricity generation from renewable sources, and is implementing measures to optimize electricity consumption.

In accordance with national legislation and World Bank policies, a comprehensive environmental impact study has been developed for the container terminal and bulk cargo terminal [8], and separately, the Environmental Impact Study of the Container Terminal of the Port of Ploče was developed [9], and the Environmental Impact Study of the Bulk Cargo Terminal of the Port of Ploče [10] were produced, from which the conclusion emerged that both interventions were environmentally friendly with the application of environmental measures and environmental

monitoring programs, all in order to achieve the greatest possible preservation of environmental quality. Environmental management plans have also been developed for both terminals.

2. Weaknesses and threats regarding SWOT/TNA analysis

The Port of Ploče represents a modern medium-sized cargo port with a low level of greenhouse gas emissions. Precisely because of its level of modernization, and the still active development and application of the latest activities technologies to achieve environmental sustainability and energy efficiency, and in accordance with the SWOT analysis carried out, the activities in the area of the port designated in the form of:

- Lack of LED lighting.
- Inefficient air conditioning system of the server room.
- Untapped possibilities of production el. energy from renewable sources, in particular solar energy.
- Lack of "Cold Ironing"/"Shore-2-Ship" technology.

The determination of these elements, in particular the production of electricity from renewable sources, is encouraged in addition to the aspiration to achieve greater energy independence and to reduce the cost of electricity as the main energy source in the Port of Ploče, as well to reduce CO₂ emissions by the fact that each kWh of electricity generated using photovoltaic cells CO₂ emissions into the atmosphere by 0,542 kg [13].

3. Activities to achieve environmental sustainability and energy efficiency

In view of the European Union's reference policy, as well as accompanying strategies and acts supporting sustainability and energy efficiency in several ways, it follows the conclusion that an important difference between ports and terminals will stem from their ability to exploit new technological solutions that support environmental sustainability and enable optimization of port operations and therefore accompanying costs. As already mentioned, the area under the management of the Ploče Port Authority in addition to the entrance terminal includes three types of terminals for which it is necessary to ensure the achievement of environmental sustainability and energy efficiency:

- Container terminal – The first phase of construction was completed in 2010,
- Bulk cargo terminal – The first phase of construction was completed in 2016, with cargo handling equipment installed in 2017,
- Liquid cargo terminal.

Based on forementioned facts and TNA analysis, it follows that the Port of Ploče has modern and recently built infrastructure that does not produce significant greenhouse gas emissions and is in line with the aim of achieving the status of the "green" port. However, despite modern infrastructure, the Ploče Port Authority continues to carry out activities to increase environmental sustainability and energy efficiency. Following the above, the following activities of the Port Authority of Ploče in the short and mid-term period:

1. *Replacing existing metal-halide lighting in the port of Ploče area with more efficient and persistent LED lighting.*

Since the initial infrastructure equipping of the port area, market has emerged more modern public lighting solutions - LED lighting. By replacing existing metal-halide lighting with modern LED lighting will enable additional electricity savings and reduce CO₂ emissions.

2. *Replacement of the existing air conditioning system of the server room, a more modern and efficient conditioning system.*

By commissioning the server room, some shortcomings of the air conditioning system were identified, and it was found that there was a possibility of optimization of it given its exceptional importance and the need to work 24/7.

- 3. Feasibility study for the implementation of photovoltaic cells in the entry terminal area as a renewable electricity source.*

In view of the available free areas in the entrance terminal area, and the generally favorably geographical location of the Port of Ploče, a feasibility study will be developed to support the possibility and cost-effectiveness of installing photovoltaic cells to obtain electricity from renewable sources.

- 4. Initial Study for constructing photovoltaic power plant (70 to 100 kW of output power).*

In addition to installing photovoltaic cells in the entrance terminal, an initial study of the construction/installation of a 70 to 100 kW solar power plant is planned.

- 5. Feasibility study for the implementation of "Shore-to-Ship"/ "Cold Ironing" technology.*

Within the framework of activities to achieve environmental sustainability and energy efficiency, a feasibility study of the "Shore-to-Ship" or "Cold Ironing" technology is envisaged, which would further support the achievement of environmental sustainability in the Port of Ploče.

- 6. Implementation of "Shore-to-Ship" or "Cold Ironing" technology.*

Based on the results of the feasibility study "Shore-to-Ship" or "Cold Ironing" technology, its implementation is foreseen, which would allow a significant reduction in greenhouse gas emissions in the port area based on the TNA analysis to be carried out.

- 7. Introduction of an automated real-time environmental monitoring system.*

Although the Port of Ploče regularly implements the adopted procedures for continuous monitoring and reporting of the level of quality of the sea, air, wastewater, noise and

ornithophauna, surely an additional (synergistic) effect would be achieved by introducing a real-time monitoring system (CO, CO₂, SO_x, NO_x, PM, etc.).

8. *Transition from road to rail transport modality for liquid cargo.*

Achieving the transition from road to rail transport modality for liquid cargo, although physically possible in the port area, is not easily achievable, and can only be achieved by joint planning with port service users, i.e., users transporting liquid cargoes from the port.

9. *Electrification of railway infrastructure in the port area.*

One of the long-term activities is the possibility of electrification of railway infrastructure in the port area, however its implementation depends largely on the electrification of the entire railway network to which the Port of Ploče is connected.

4. Timeline and funding resources

The timeline for realization of the activities specified in the previous chapter is presented in Table 1. According to presented plan most of the envisaged activities are achievable in the short term, and that only the implementation of "Shore-to-Ship"/"Cold Ironing" technology, and the transition from road to rail transport modality for liquid cargo represent medium to long-term achievable activities.

Outbound cargo operations at the Port of Ploče could be optimized, i.e., by electrifying the railway infrastructure in the port area, but of course the same applies for electrification of the entire railway network to Bosnia and Herzegovina as the primary user of the services of the Port of Ploče. According to the results obtained from the CO₂ emissions, it is evident the railway has lower CO₂ emission rates compared to road transport modality. But for modal shift of liquid cargo transport could be made possible, it is necessary to align it with the needs of the cargo users. Possible solution would be setting up a liquid cargo handling terminal as close to the port's entry terminal as possible, thereby avoiding unnecessary entry of (heavy) trucks into the area of the Port of Ploče.

GODINA	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Upgrading to LED lighting	█													
Replacement of the server room air conditioning system		█												
Implementation of photovoltaic cells in the area of the entry terminal	█	█	█											
Feasibility study	█	█												
Implementation		█	█											
photovoltaic power plant	█	█	█	█										
Feasibility study	█	█												
Implementation		█	█	█										
"Shore-to-Ship"/"Cold Ironing" technology		█	█	█	█	█	█	█	█	█	█	█	█	█
Feasibility study		█	█											
Implementation			█	█	█	█	█	█	█	█	█	█	█	█
Implementing an automated environmental monitoring system				█										
Transition from road to railway modality of liquid cargo transport							█	█	█	█	█	█	█	█
Electrification of port rail infrastructure							█	█	█	█	█	█	█	█

Table 1: Activities timeline from 2021 to 2034

Funding for planned activities of renewal and construction of port infrastructure, and improving ecological sustainability and energy efficiency has been anticipated through the following identified sources:

- EU Operational Programme Competitiveness and Cohesion.
- The Environmental Protection and Energy Efficiency Fund (FZOEU)
- Innovation and Networks Executive Agency (INEA)
- Connecting Europe Facility (CEF)
- Horizon 2020 – Smart, green, and integrated transport + Secure, clean, and efficient energy
- European Structural and Investment (ESI) funds
- European Fund for Strategic Investments (EFSI)
- Innovation Fund (INNOVFUND)
- INTERREG
- Republic of Croatia national budget
- Private investors – concessionaires
- Croatian Bank for Reconstruction and Development (HBOR).

5. Compliance with environmental sustainability and energy efficiency policies

Aktivnosti navedene ovim planom sukladne su sa slijedećim politikama održivosti okoliša i energetske učinkovitosti na lokalnoj, nacionalnoj, Europskoj i međunarodnoj razini:

- Comprehensive environmental impact assessment, Ploče Port Authority, <http://ppa.hr/hr/wp-content/uploads/2016/04/Sveobuhvatna-procjena-utjecaja-na-okoli%C5%A1.pdf>
- Environmental impact study of Port of Ploče container terminal, Ploče Port Authority, <http://www.ppa.hr/hr/ekologija-izgradnja-kontejnerskog-terminala/>
- Environmental impact study of the Port of Ploče bulk cargo terminal, Ploče Port Authority, <http://www.ppa.hr/hr/ekologija-izgradnja-terminala-za-rasute-terete/>
- Environmental management plan of the container terminal of the Port of Ploče, Ploče Port Authority, http://ppa.hr/hr/wp-content/uploads/2016/04/EMP_eng_container_terminal.pdf
- Environmental management plan of the bulk terminal of the Port of Ploče, Ploče Port Authority, [http://ppa.hr/hr/wp-content/uploads/2016/04/TRT ENVIRONMENTAL-MANAGEMENT-PLAN_plan-upravljanja-okolisom.pdf](http://ppa.hr/hr/wp-content/uploads/2016/04/TRT_ENVIRONMENTAL-MANAGEMENT-PLAN_plan-upravljanja-okolisom.pdf)
- Ordinance on amendments to the regulations on the handling of dangerous substances, conditions and manner of carrying out transport in maritime transport, loading and unloading of hazardous substances, bulk and other cargo in ports, and how to prevent the spread of expired oils in ports, https://narodne-novine.nn.hr/clanci/sluzbeni/2020_11_128_2445.html
- National action plan for renewable energy sources to 2020, https://ec.europa.eu/energy/sites/ener/files/documents/dir_2009_0028_action_plan_croatia.zip
- Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32000L0059>
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02000L0060-20141120>

- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0056-20170607>
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705>
- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028>
- Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0135.01.ENG
- Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.328.01.0210.01.ENG
- Initial IMO Strategy on reduction of GHG emissions from ships, https://unfccc.int/sites/default/files/resource/250_IMO%20submission_Talanoa%20Dialogue_April%202018.pdf
- A European Strategy for Low-Emission Mobility, https://ec.europa.eu/clima/policies/transport_en#tab-0-1
- A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2015:80:FIN>
- The European Strategic Energy Technology Plan (SET Plan), <https://setis.ec.europa.eu/actions-towards-implementing-integrated-set-plan>
- A European Green Deal, https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.html
- Resolution on the European Green Deal, [https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2019/2582\(RSP\)](https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2019/2582(RSP))
- Resolution on climate change – a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy in accordance with the Paris Agreement,

[https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2019/2582\(RSP\)](https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2019/2582(RSP))

- Long-term low greenhouse gas emission development strategy of the EU and its Member States, <https://unfccc.int/documents/210328>

6. Conclusion

The Port of Ploče represents a modern port with relatively low greenhouse gas emissions with adopted procedures for constant monitoring and reporting on the level of quality of the sea, air, wastewater, noise and ornithophauna. Also, despite modern infrastructure, the Port Authority of Ploče is in constant efforts to increase the level of environmental sustainability and energy efficiency of the Port of Ploče, through the activities specified in this document. In accordance with the TNA analysis, and the presented content in the previous chapters of this document, the existence of awareness of the need to transform the Port of Ploče into a fully "green" port, by applying short-term feasible activities, as well as the planning of activities requiring a longer period, is clearly expressed.

7. References

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3. Hrvatske autoceste (HAC), <https://www.hac.hr/hr/interaktivna-karta>
4. Ministry of the Sea, Transport, and Infrastructure of the Republic of Croatia, <https://mmpi.gov.hr/promet/zeljeznicki-promet-129/129>
5. Google Earth Pro
6. Lučka uprava Ploče, <https://www.ppa.hr>
7. Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia, National plan for the development of ports of particular (international) economic interest for the Republic of Croatia, <https://esavjetovanja.gov.hr/Documents/Download?documentId=4556>
8. Comprehensive environmental impact assessment, Ploče Port Authority, <http://ppa.hr/hr/wp-content/uploads/2016/04/Sveobuhvatna-procjena-utjecaja-na-okoli%C5%A1.pdf>
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12. Environmental management plan of the bulk terminal of the Port of Ploče, Ploče Port Authority, http://ppa.hr/hr/wp-content/uploads/2016/04/TRT_ENVIRONMENTAL-MANAGEMENT-PLAN_plan-upravljanja-okolisom.pdf
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