

Environmental considerations for port concession agreements

CONSTANTINOS CHLOMOUDIS

Department of Maritime Studies, University of Piraeus, Piraeus, Greece
chlom@unipi.grs

PETROS PALLIS

Department of Maritime Studies, University of Piraeus, Piraeus, Greece
ppallis@unipi.gr

CHARALAMPOS PLATIAS*

Department of International, European & Area Studies, Panteion University of Social & Political Sciences, Athens, Greece
ch.platias@panteion.gr

VIRGINIA ZARAKELI

Department of Maritime Studies, University of Piraeus, Piraeus, Greece
virginiazarakeli@gmail.com

*Corresponding author

ABSTRACT:

Amidst significant environmental challenges and the overarching sustainability paradigm, port concession agreements require urgent and substantive transformation. Historically dominated by economic considerations, there's an imperative need to broaden their scope and integrate environmental sustainability. In this context, this paper aims to systematically identify and examine the environmental requirements and key considerations that should be incorporated into port concession agreements. Drawing on both academic discourse and empirical evidence from the field, the paper aspires to contribute to the discussion on environmental sustainability, laying the groundwork for future advancements in developing a clear reference framework for port concession agreements. By focusing on port organization, operation, and development, the paper emphasizes that environmental concerns should extend beyond mere compliance with existing legislation, advocating for elaborate sustainable strategies and practices. Recent trends in port concessions point to an increasing focus on environmental implications, yet there is still considerable progress needed to fully integrate these considerations into agreements. Despite this, the evolving dynamics in the field inspire optimism for the future, indicating that ports

can play a significant role in advancing sustainability while balancing the interests of all stakeholders.

KEYWORDS:

concession agreements; ports; environmental considerations; sustainability

EXTENDED ABSTRACT

Motivation and objectives

In recent years, ports have faced mounting pressure from local communities, states, and regulatory bodies to address the environmental impact of their operation and development (ESPO, 2023; Deloitte & ESPO, 2021; World Ports Sustainability Program, 2020). Pollution, habitat destruction, conflicts over land/sea use or activities, congestion, and greenhouse gas emissions linked to port activities have raised concerns about public health and well-being, environmental degradation, and climate change. Port expansion, intensifying of existing port activities and engaging in new ones, as well as port development create significant challenges (Puig et al., 2022 and 2015; OECD, 2011; Trozzi & Vaccaro, 2000). Consequently, there is a growing expectation for ports to mitigate their environmental footprint and embrace sustainable strategies and practices (Notteboom et al., 2021; Lam & van de Voorde, 2012; Hossain et al., 2021; Housni et al, 2022).

Concession agreements, which govern the terms of private sector involvement in port operations, play a pivotal role in shaping environmental standards and practices. However, historically, these agreements have prioritized economic objectives over environmental considerations (Pallis et al., 2015; Ferrari et al., 2015, Thys et al, 2010). The emphasis on sustainability (Özispä & Arabelen, 2018; Lim et al, 2019) and mainstreaming the environmental sustainability dimension into the port industry present substantial challenges for the sector (Chlomoudis et al 2022 and 2024), including concession agreements (Notteboom & Lam, 2018). As a result, there is a need for policymakers and port authorities to proactively define environmental standards that surpass mere compliance with existing legislation.

Within the framework of concession agreements, it falls upon states and port authorities to establish environmental standards and ensure their enforcement. These standards should not

only meet current legal requirements but also align with broader environmental goals and strategies outlined by policymakers and stakeholders. By embedding environmental considerations into concession agreements, policymakers can reduce environmental impact, mitigate environmental risks, promote environmental sustainability, and safeguard the interests of local communities and ecosystems (Notteboom et al., 2021).

However, achieving this alignment poses challenges, including reconciling economic imperatives with environmental objectives, adhering to evolving regulatory standards, and defining measurable environmental performance indicators (Housni et al., 2021; Styliadis et al., 2021). Private entities may be reluctant to adopt costly environmental measures or bear any additional burdens, thus some resistance is very likely.

In light of these complexities, this research aims to systematically identify and examine the environmental requirements that should be incorporated into port concession agreements. By advocating for the integration of sustainable strategies and practices, this research seeks to facilitate the transition towards environmentally responsible port operations while balancing the interests of all stakeholders involved, including local communities, states, port authorities, and private sector entities.

Methodology and data

The paper is considered a follow-up to the conceptual groundwork laid in a previous paper presented in IAME Conference 2023 entitled “Concession Agreements for Sustainable Ports”. In this previous research the authors identified and analyzed fundamental sustainability requirements and key factors across the economic, social, and environmental pillars of sustainable development to be considered in concession agreements, aiming to propose a reference framework for a model Concession Agreement. This framework informs the approach taken in the current paper, which specifically delves deeper into environmental considerations within port concession agreements, placing a strong emphasis on environmental sustainability and taking a much closer look into the subject. The paper builds on the findings of the previous research, specifying critical issues for concession agreements in the sector. In this regard, this research endeavor is part of an ongoing research on a broader scale. Presenting our research to an esteemed conference such as the IAME serves a threefold purpose: to share first results with the specialized academic and research community and gather useful input; to

validate methodology and results, produced so far; and to stimulate further discussion and research in the field.

Drawing on academic discourse and empirical evidence, the paper aspires to contribute to the discussion on environmental sustainability, providing useful insights for future advancements in developing a clear reference framework for port concession agreements. The methodology ensures comprehensive coverage of environmental factors relevant to port operation and development, considering both direct and indirect impacts, to provide a holistic understanding of environmental requirements. By setting specific objectives and outcomes, such as identifying key environmental parameters and developing actionable recommendations, the research serves a result-oriented approach capable to generate tangible results and facilitate meaningful change. Rigorous research methods and analytical techniques ensure robustness and guarantee the reliability and validity of the findings and recommendations. The paper also presents clear and accessible information regarding the environmental implications of port operations, regulatory requirements, best practices, and potential mitigation measures, essential for stakeholders to make informed decisions. By adhering to these criteria, the methodology can effectively guide the research process, ensuring the systematic and impactful integration of environmental considerations into port concession agreements.

The primary methodology employed is qualitative analysis, utilizing a sample of available concession agreements to gather initial insights into port concessions. While targeting a more extensive sample is deemed necessary to achieve a comprehensive understanding, this material provides a foundation for examining proposed hypotheses, deriving some interesting preliminary results, and validating findings from the literature review. Furthermore, the paper draws upon existing standardized text endorsed by esteemed international organizations such as the World Bank (The World Bank, 2007; World Bank, 2009), the United Nations (UN, 2016), and national authorities or agencies (USAID, 2018; Indian Ministry of Shipping, Road Transport & Highways, 2021) which delineates best practices for sustainable infrastructure projects and concession agreements or the 2014/23/EU Directive (EU, 2014).

Key findings and implications

The analysis conducted through the review of the afore mentioned sample of port concession agreements and relevant reference frameworks indicates a marked difference in the treatment

of environmental considerations compared to economic parameters. While economic aspects are extensively addressed, environmental concerns are often addressed in a cursory and ambiguous manner, with limited references and a lack of specific, enforceable terms for concessionaires or port operators. Existing environmental obligations typically reference prevailing legislation without extending beyond basic compliance requirements. This observed difference highlights potential deficiencies in the depth of integration and commitment to sustainable practices within port concession agreements.

The key findings of the paper highlight the importance of incorporating environmental considerations into both port operations and development strategies through concession agreements.

Regarding port operations, the concession agreements should place particular emphasis in concrete obligations aimed at significantly improving environmental performance and where provisions create an added value surpassing mere compliance with existing legislation. Concessionaires need obviously to adopt measures to protect the environment, including safeguarding water, soil, and air quality. This also entails developing proactive action plans and robust monitoring protocols to identify and address potential risks. Since waste is a major issue for ports, integrating circular economy principles into port operations and promote recycling efforts, waste minimization, and comprehensive waste management plans are essential for enhancing environmental performance and reducing the environmental footprint. Additionally, there must be concrete effort on energy efficiency, where concessionaires should be encouraged to optimize energy consumption, and prioritize the adoption of energy-efficient technologies and equipment. By investing in smart technologies for real-time energy tracking and decision-making, concessionaires can enhance the efficiency of port operations while reducing their environmental footprint.

Moreover, in terms of port development, there is a need to encourage a transformative process that steers the port toward a more sustainable trajectory. At a strategic level, port concessions should drive decisions and master plans aimed at reducing the port's environmental footprint in the medium and long term and addressing key environmental issues through fundamental changes in port organization, business models, and operations. Transformative initiatives include adopting circular economy principles, implementing robust environmental

management systems, investing in renewable energy sources, and integrating the port into land and maritime spatial planning efforts. Collaboration efforts are also vital for improving the port-city relationship and ensuring sustainable development practices.

Overall, the paper emphasizes the integral role of concessionaires in promoting environmental stewardship within both port operations and development activities. Through adherence to the obligations outlined in concession agreements, concessionaires can contribute to the advancement of sustainable practices, fostering environmental conservation and resilience within the port industry.

Certainly, environmental considerations vary across different port activities and terminals, reflecting the distinct nature of each operation and the diverse impacts they entail. Container terminals, passenger terminals, cruise terminals, cargo terminals handling bulk commodities like coal, ores, or grains, and LNG terminals all encounter their own set of environmental challenges. As ports increasingly diversify into new activities such as providing energy services or hosting offshore wind farms, environmental considerations expand to include issues such as habitat disturbance, marine pollution, and underwater noise. While certain issues such as air pollution, noise, degradation of the environment, and landscape change may be common across many, if not all, activities and terminals, the specific causes and manifestations of these challenges differ based on the specificities of each operation. Consequently, environmental considerations and relevant provisions to be integrated into concession agreements must be tailored accordingly in order to adequately address the specific environmental risks and impacts associated with each port activity and terminal.

Incorporating environmental considerations into concession agreements presents a critical governance challenge within the port industry. Port authorities and states play a central role in shaping concession agreements, providing an opportunity to establish a comprehensive framework that prioritizes environmental performance and sustainability. By negotiating terms with potential concessionaires, authorities can ensure that environmental objectives are given equal weight alongside economic considerations, fostering a more balanced relationship between these competing interests. While navigating this complex issue requires careful deliberation, the development of a model concession agreement based on a clear reference framework offers a promising path toward achieving fair and sustainable outcomes.

The evolving sustainability paradigm serves as a driving force behind this shift, as stakeholders increasingly recognize the value of integrating environmental concerns into business practices. As awareness grows regarding the benefits of environmentally responsible operations, there is a growing momentum for industry stakeholders to embrace sustainable approaches. In this endeavor, the support of EU and international organizations is invaluable, as they can provide guidance, resources, and incentives to facilitate the integration of environmental considerations into concession agreements. By leveraging the momentum of the sustainability movement and collaborating with relevant stakeholders, port authorities and states can chart a course toward a more environmentally sound and sustainable future for port operations and development.

The authors anticipate that the paper provides valuable insights for further research, policy development and governance, as well as practical applications in the port sector. Future research might delve into specific port activities, terminals, or individual ports, providing deeper insights through case studies or targeted analysis. Additionally, the findings are expected to contribute to policy discussions by highlighting key considerations for integrating sustainable practices into concession agreements, aiding policymakers in fostering environmental stewardship and providing input for informed decisions. Moreover, the paper emphasizes the importance of industry engagement, encouraging ports to prioritize environmental sustainability while addressing the interests of all stakeholders involved in a balanced manner. Overall, it has the potential to serve as a pragmatic guide for advancing environmental considerations within port concession agreements. applications.

Acknowledgment: This research was funded by the “Hellenic Foundation of Research and Innovation”, Grant No. 16107 “Greece 2.0. Basic Research Financing Action (Horizontal support of all Sciences), Sub-action II, Funding Projects in Leading-Edge Sectors”. The contents of the paper only reflect the views of the authors.

References

- Chlomoudis, C., Pallis, P., & Platias, C. (2022). Environmental Mainstreaming in Greek TEN-T Ports. *Sustainability*, 14(3). <https://doi.org/10.3390/su14031634>.
- Chlomoudis, C., Kostagiolas, P., Pallis, P., & Platias, C. (2024). Environmental management systems in Greek ports: A transformation tool?. *Environmental Challenges*, 14, 100837. <https://doi.org/10.1016/j.envc.2024.100837>.
- Deloitte, & ESPO. (2021). *Europe's ports at the crossroads of transitions A Deloitte and ESPO Study*. Deloitte.
- ESPO. (2023). *ESPO Environmental Report 2023. EcoPortsinSights 2023*. ESPO.

- <https://www.espo.be/media/ESPO%20Environmental%20Report%202023.pdf>.
- ESPO (2021). *ESPO Green Guide 2021. A manual for European ports towards a green future*. [https://www.espo.be/media/ESPO Green Guide 2021 - FINAL.pdf](https://www.espo.be/media/ESPO%20Green%20Guide%202021%20FINAL.pdf).
- European Union (2014). Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts. *Official Journal of the European Union*, L 94/1(28.3.2014), 1–64.
- Ferrari, C., Parola, F., & Tei, A. (2015). Governance models and port concessions in Europe: Commonalities, critical issues and policy perspectives. *Transport Policy*, 41, 60–67. <https://doi.org/https://doi.org/10.1016/j.tranpol.2015.03.012>.
- Hossain, T., Adams, M., & Walker, T. R. (2021). Role of sustainability in global seaports. *Ocean and Coastal Management*, 202(105435). <https://doi.org/10.1016/j.ocecoaman.2020.105435>.
- Housni, F., Boumane, A., Rasmussen, B. D., Britel, M. R., Barnes, P., Abdelfettah, S., Lakhmas, K., & Maurady, A. (2022). Environmental sustainability maturity system: An integrated system scale to assist maritime port managers in addressing environmental sustainability goals. *Environmental Challenges*, 7, 100481. <https://doi.org/https://doi.org/10.1016/j.envc.2022.100481>.
- Indian Ministry of Shipping, Road Transport & Highways (2021). Model Concession Agreement for Private Sector Projects in Major Ports. Department of Shipping (Ports Wing). <https://ppp.worldbank.org/public-private-partnership/library/model-concession-agreement-major-ports-india>.
- Lam, J. S. L., & van de Voorde, E. (2012). Green Port Strategy for Sustainable Growth and Development.
- Lim, S., Pettit, S., Abouarghoub, W., & Beresford, A. (2019). Port sustainability and performance: A systematic literature review. *Transportation Research Part D: Transport and Environment*, 72, 47–64. Monios, J., and Bergqvist, R. (2015). Intermodal terminal concessions: Lessons from the port sector. *Research in Transportation Business & Management*, 14, 90-96. <https://doi.org/10.1016/j.rtbm.2014.09.002>.
- Notteboom, T., & Lam, J. S. (2018). The Greening of Terminal Concessions in Seaports. *Sustainability*, 10(9). <https://doi.org/10.3390/su10093318>.
- Notteboom, T., Pallis, A., & Rodrigue, J.-P. (2021). *Green port governance* (pp. 340–355). <https://doi.org/10.4324/9780429318184-29>.
- Özispä, N., & Arabelen, G. (2018). Sustainability issues in ports: content analysis and review of the literature (1987- 2017). *SHS Web of Conferences*, 58(1022). <https://doi.org/10.1051/shsconf/20185801022>.
- Pallis, A. A., Notteboom, T. E., & de Langen, P. W. (2015). *Concession Agreements and Market Entry in the Container Terminal Industry BT - Port Management* (H. E. Haralambides (ed.); pp. 195–220). Palgrave Macmillan UK. https://doi.org/10.1057/9781137475770_10.
- Puig, M., Azarkamand, S., Wooldridge, C., Selén, V., & Darbra, R. M. (2022). Insights on the environmental management system of the European port sector. *Science of The Total Environment*, 806, 150550. <https://doi.org/https://doi.org/10.1016/j.scitotenv.2021.150550>.
- Puig, M., Wooldridge, C., Michail, A., & Darbra, R. M. (2015). Current status and trends of the environmental performance in European ports. *Environmental Science & Policy*, 48, 57–66. <https://doi.org/10.1016/j.envsci.2014.12.004>.
- Styliadis, T., Angelopoulos, J., Leonardou, P., & Pallis, P. (2021). Promoting Sustainability through the assessment and measurement of Ports ' Externalities : A Systematic Literature Review and future research paths. *IAME 2021, 29th Conference of the International Association of Maritime Economists*.
- The World Bank (2007). Port Reform Toolkit, Second Edition. Module 4: Legal tools for Port Reform. https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Portoolkit/Toolkit/pdf/modules/04_TOOLKIT_Module4.pdf (accessed on 8 January 2024).
- Theys, C., Notteboom, T. E., Pallis, A. A., & De Langen, P. W. (2010). The economics behind the awarding of terminals in seaports: Towards a research agenda. *Research in Transportation Economics*, 27(1), 37–50. <https://doi.org/10.1016/j.retrec.2009.12.006>.

Environmental considerations for port concession agreements

- United Nations - Economic and Social Commission for Asia and the Pacific (ESCAP). (2016). Model Agreement Development of a Dry Port under PPP mode. Volume-II of the Final Report is the Model Agreement for development of a dry port project under PPP mode in Asia-Pacific region. <https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAIQw7AJahcKEwjI8q3wrLGAAxUAAAAAHQAAAAAQAg&url=https%3A%2F%2Fwww.unescap.org%2Fsites%2Fdefault%2Ffiles%2FVolume%2520II%2520-%2520Model%2520Agreement%2520-%2520Dry%2520Port%2520PPP.pdf&psig=AOvVaw0LTvgHEHGR3DkQ-cKXaMul&ust=1690630415179639&opi=89978449>.
- United States Agency for International Development (USAID) (2018). Port Agreement Templates. Document prepared by Nathan Associates for the Cap Haitian Port (CHP). Regulatory Strengthening Project, contract number AID-521-C-16-00003. https://pdf.usaid.gov/pdf_docs/PA00THCT.pdf.
- World Bank Group (2009). Sample Port Concession Agreement. World Bank. <https://ppp.worldbank.org/public-private-partnership/library/sample-port-concession-agreement-civil-law>.
- World Ports Sustainability Program. (2020). *World ports sustainability report 2020*. World Ports Sustainability Program. <https://sustainableworldports.org/wp-content/uploads/WORLD-PORTS-SUSTAINABILITY-REPORT-2020-FIN.pdf>.