



# River Port Cities Facing Climate Change: Global Examples for Heritage-Based Sustainable Development

Noémi Mené , Avicenna Tanubrata  & José Manuel Pagés Sánchez 

## Abstract

River port cities are on the frontline of climate change – as both part of the solution and as early victims of its impact, which demands new strategies for all river port communities. With several study cases, we explore how actions being taken relate to sustainability agendas such as Agenda 2030 of the Association Internationale Villes et Ports. We illuminate the role of heritage in maintaining and fostering identity, integration and sustainable development in port cities. In Strasbourg (France), we show how a port authority can act to improve the connection between port and urban activities, but also how port heritage can be used to educate citizens about port activities. We consider a more institutional approach to fluvial heritage preservation in the case of Lyon (France) and cases in Australia and Cameroon that show how local and port authorities can make efforts to respect local communities along the river and how those efforts can help them plan their development more sustainably.

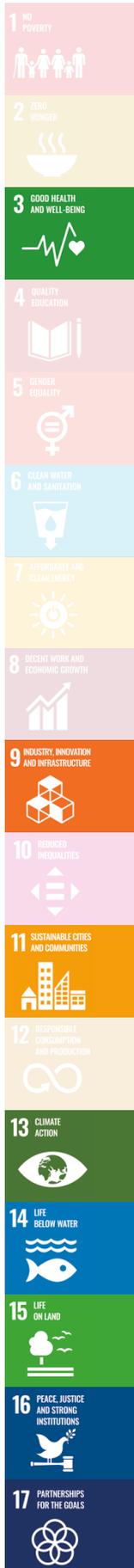
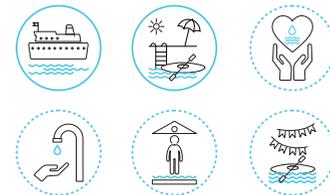
## Policy Recommendations

- Decision-makers in river port-cities should leverage their river heritage – whether historical, cultural, industrial or spiritual – to promote sustainable development of their territories.

## KEYWORDS

river port cities  
good practices  
sustainable development  
cultural heritage  
climate change

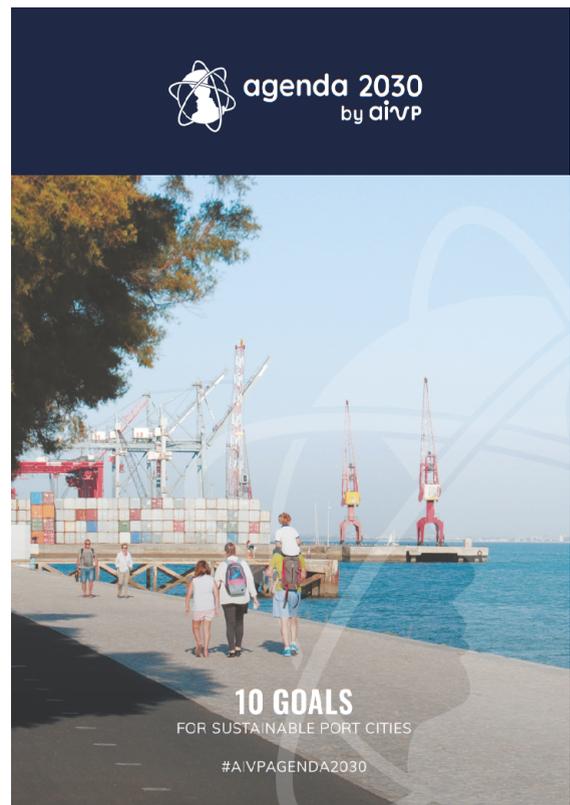
## WATER ICONS



## Introduction

Historically, many major cities have developed by taking advantage of a strategic location along a river (e.g., Paris, London, Hamburg, Rotterdam, New York). Watercourses have played a key role in urban development, fulfilling many functions necessary for their evolution from simple human settlements to the global cities of today. They have provided water for drinking, cleaning, farming, worship and spiritual and religious rites, but also have provided water as an infrastructure for transport and trade – effectively including a wide range of the water values identified in a previous edition of the *Blue Papers* (Hein et al. 2025). Each river port city has its own size, geographical, political, economic and social context. Members of the Association Internationale Villes et Ports (the AIVP), represent the global variety of river port cities, ranging from local ports to global epicenters of trade. Despite their diversity, we can observe similar processes everywhere, linked to the relationship between port and city, as well as the impact of climate change on both.

Improving the multifaceted relationship between local authorities, port authorities and local stakeholders was one of the original goals of the AIVP, which became an international NGO in 1988. Since then, the AIVP has developed a process of cooperation and economic development that aims to make ports and cities more sustainable, innovative and inclusive, while placing citizens at the heart of the dialogue. Notably, in 2018, the AIVP translated the framework of the sustainable development goals (SDGs), developed by the United Nations (UN), into its own Agenda 2030 (fig. 1; the AIVP 2018b). While the 17 UN SDGs promote international cooperation and aim to provide a “shared blueprint for peace and prosperity for the people and the planet” (United Nations 2025), the



^ Fig. 2 AIVP Agenda 2030 Cover Image (Source: AIVP, 2020).

AIVP's Agenda 2030 comprises 10 goals aimed at achieving its vision for sustainable port cities and offering a holistic framework for port-city relationships (see fig. 2). Addressing a wide range of issues, from biodiversity to governance, the Agenda 2030 recognizes the specific role of port cities as innovative and key players in sustainable development that is adapted to present and future effects of climate change. The adoption of the Agenda 2030 goals by port city territories represents a step forward in aligning with global and national efforts to implement the SDGs.

Challenges faced by river port cities can be captured in one key question: How can local stakeholders use their spatial, geographical,



^ Fig. 3 AIVP Agenda 2030: The Ten Goals for Sustainable Port Cities (Source: AIVP, 2020).

cultural and economic advantages, as well as their heritage, to be at the forefront of the fight against climate change? We offer some examples that showcase the resilience and resourcefulness of river port cities in adapting to threats, and how those examples can leverage sustainability agendas such as the AIVP's Agenda 2030.

Of the 10 goals identified in the AIVP Agenda 2030 we showcase/highlight four more relevant for the present paper:

- Climate change adaptation (Goal 01): River basins will be impacted heavily by climate change. More specifically, river port cities will suffer most from the two extremes of severe droughts and heavy flooding. In responding to climate change, quality of life in river cities should be considered important for example, their ability to offer cooling spaces. However, these advantages

are severely impeded by climate change itself, with increased periods where the waterways are not navigable or usable due to extreme weather events.

- Sustainable mobility (Goal 03): inland waterways can be the facilitator of the transition to more sustainable modes of transport of goods and people (Notteboom and Rodrigue 2022), notable by being way more fuel efficient than other modes of transport (Niu, Shao and Zhu 2024). Inland waterways' restrictive geographical nature also tends to be a source of tension, with the shared usage of inland waterways an important challenge. Logistics companies need to ensure their operation while considering environmental impacts along the waterways and respecting a variety of recreational uses.
- Port-city interface (Goal 08): This goal aims to balance port and urban function by improving measures to reduce port



^ Fig. 4 View of the Capitainerie, to be transformed into a Port Center in the Port of Strasbourg (Source: Niko67000, 2014. CC BY-SA 4.0, via Wikimedia Commons).

nuisances and promote the architectural and landscape integration of port facilities. Recently in many cities, citizens have returned to rivers, notably for leisure activities. Whether for swimming, rowing, or stand-up paddleboarding, citizens request more access to the water and its leisure activities.

- Port culture and identity (Goal 06): (Re)creating a sense of identity linked to the river and activities carried out on it can be a way for port city actors to bring citizens closer to the port. According to UNESCO experts, heritage-based sustainable development plays a key role in promoting social cohesion and the livability of cities (Hosagrahar et al. 2016). This perspective is further supported by ICOMOS (the International Council on Monuments and Sites), which emphasizes a need to consider culture and cultural heritage in urban and infrastruc-

ture planning, while also working to conserve both tangible and intangible heritage (Hosagrahar et al. 2016).

The role of heritage for achieving the SDGs can be seen in several case studies, presented in the next section.

#### **Using Heritage to Pursue Sustainable Development in River Port Communities: Strasbourg and Lyon**

The river port city of Strasbourg (France) faces the challenge that both its urban and port areas are expanding. As they have expanded, the buffer zone between them has begun to disappear. To affirm its role as part of the solution and not as a source of the problem in terms of climate change, the Port of Strasbourg has formulated a strategy to enhance



^ Fig. 5 Quai Fulchiron in Lyon, France (Source: Krzysztof Golik, 2024. CC BY 4.0, via Wikimedia Commons).

its visibility and help the public understand its operations and significance. It implemented information boards outside port areas to allow residents to observe port operations and explain the work, without allowing residents to enter the operational area. The port authority is also converting the old harbormaster building, la Capitainerie, (fig. 3) into a Port Center<sup>1</sup> (a concept developed by the AIVP 2018a). The Port Center will offer a mediation space where port authorities can present their activities and foster dialogues with the local authorities and citizens. This building is in the Coop subdistrict, where the dichotomy of urban space usage and port activity is readily apparent. The Port Center is a good example of how a port heritage building can be used to improve the relationship between a port and its citizens to create a more sustainable future. The port authority also wishes to promote river transport and transition from traditional industrial activities to more sustainable ones, including a shift in the type of energy that is produced in the port. One of the energy transition projects is to transform the historic oil depot into a hub

for decarbonized energy (Port Autonome de Strasbourg 2024a). The port has been working very closely with local authorities to align as much as possible with their policies and signed a “development contract” with the municipality, the Metropolitan Authority and the Region Grand Est, an administrative entity responsible for some policies over the whole administrative region (Port Autonome de Strasbourg 2024b). This strategy is heavily influenced by the New Green Deal of the European Union (European Commission 2025), and it is aligned with the AIVP Agenda 2030, more concretely with Goal 2, the energy transition, as the port authority has been a long-time member of the AIVP network. This is an example of a port authority using its heritage to promote sustainable development. It is also an example of the necessity of engaging in constructive dialogue with local and regional authorities.

To leverage heritage preservation amid sustainable development, stakeholders often need institutional assistance. Recognition as a UNESCO World Heritage Property can be a very

1. <https://www.aivp.org/en/home/our-initiatives/port-center-by-aivp/concept/>.

powerful tool to achieve sustainable goals and the Historic Urban Landscape (HUL) approach offers a means to achieve that (Hosagrahar et al. 2016). This can be seen in the case of the Saône and Rhône rivers in Lyon (France), which formed the city's historic boundaries. Approximately 10 per cent of Lyon's territory is designated as a World Heritage Site (UNESCO 2025), and both rivers are encompassed in the site, with the Saône riverbank particularly dotted with significant historical landmarks (fig. 4). The city's 2024–2030 strategic plan for the UNESCO site emphasizes the importance of leveraging the rivers and their heritage to future-proof the city (Métropole de Lyon 2025). Heritage quays are being used for testing innovative solutions in river transportation and urban logistics. Voies Navigables de France (VNF), the French waterway manager, oversees the two rivers upstream of Lyon and in the city center, providing technical and financial support for experiments concerning the urban logistics linked to waterways and cycle transport (Voies navigables de France 2025). The Compagnie Nationale du Rhone (CNR), the agency that oversees the Rhône River and its ports, is experimenting with projects such as a river-based waste disposal system to reduce congestion and CO<sub>2</sub> emissions (CNR 2023; VNF 2023). In 2024, the VNF, the CNR and the Metropolitan Authority of Lyon released a Riverbank Use Plan, a partnership agreement for the harmonious development of riverbank uses. It has three main axes: strengthening the link between citizens and rivers, preserving natural heritage and re-naturing spaces. These initiatives, supported by the continuous engagement of the stakeholders in the AIVP's activities and aligned with national river transport strategies, are key to Lyon's sustainable development, although viable business models for these experiments are still being established (Voies navigables de France n.d.).

### **Broadening the scope of the AIVP Agenda's goal on "Culture and Identity": International Examples of Religious and Community River Values**

When analyzing the French cases above, we considered four goals of Agenda 2030. The discussion of the following two cases will emphasize on "culture and identity." Outside Europe, we can observe very different river port cities, with challenges and advantages of their own. In the cases of Congo and Australia, it is possible to consider the role of cultural and religious rites and how they can be used to promote sustainable development. As Fuldauer and colleagues (2022) emphasize, heritage-based sustainable development must involve the participation of Indigenous communities when they are part of the broader community. The port authority of Fremantle (Australia) developed in 2023 a Reconciliation Action Plan (Fremantle Port 2023) to support and engage with Aboriginal people following the environmental and ecological changes produced in the 1890s by the construction of Fremantle Inner Harbor. The Noongar people in the Walyalup/Fremantle region anchor their territory where the Swan River is located (Western Australia Government 2024). The Fremantle port is now located at the river's mouth, and the port authority acknowledges the Noongar people as the Traditional Custodians of the port land and waters. This involvement of the Aboriginal society is now crucial for balancing heavy industrial development of port areas and has the potential to protect the natural environment. This intangible heritage holds important value within the community and can serve as a driving force for sustainable development (Lerario 2022). While these aspects are not key levers in most Western countries, they can be powerful ways of syncing port development with the aspirations of



^ Fig. 6 Ngondo Festival scene (Source: BACHELOR45, 2024. CC BY-SA 4.0, via Wikimedia Commons).

local communities and should be highlighted as a way to translate and empower sustainability agendas in some parts of the world.

Another example of leveraging the cultural and religious heritage of a river for sustainable development is the Wouri River in Cameroon. The river is of great importance to the various populations living around it, such as the Sawa people, who highlight the importance of the river during their Ngondo festival (Mazo 2016). The autonomous port of Douala is situated at the mouth of the Wouri and is also responsible for several improvement projects along the river. The port authority's revitalization of infrastructure along the Wouri is much needed due to the popularity of the Ngondo festival, which has boosted tourism and contributed significantly to the local economy (Meikengang 2023; Mazo

2016). Many informal settlements are located close to the river, but with no access to it; most of the space is occupied by the port. The city is trying to improve the connection with the water, but a better balance of use has yet to be found. The port authority, citizens and the municipal government still lack a common vision for the city's sustainable development, which would need to consider both natural and cultural preservation. Port and local authorities could be inspired by measures such as the ones in Australia to promote sustainable development, including responsible tourism and port activities, while respecting the Wouri people's right to engage in spiritual activities.

In the AIVP's Agenda 2030, the culture-and-identity goal is more specifically related to port activities and history. However we believe

its interpretation should be extended to the relationship to the river itself. Activities and rites happening in the river's vicinity can help make a stronger case for sustainable development.

## Conclusion

The initiatives mentioned above can serve as inspiration for river port cities around the world. The various cases are works in progress: Some solutions will need to be adjusted, as in the case of Lyon, where the different parts of the local governance are aligned, but the business case still needs to be made, and the strategy needs to be translated into practice. In the case of Douala, there is work to be done to develop dialogue between the port and local authorities.

The Agendas 2030, from the UN and AIVP's, both foster local dialogue and provide guidance towards sustainable development in the local contexts. While the United Nations framework serves as the primary global reference, the AIVP's Agenda 2030 constitutes a limited but valuable sector-specific initiative that complements and operationalizes these objectives within its scope. We also acknowledge that the SDGs and Agenda 2030 both have limitations that we cannot fully detail here. However, we support the idea that these frameworks can be opportunities for local stakeholders to grasp the very complex and global challenge that is climate change.

We call on river port city actors to use local levers they can make use of – whether heritage buildings, natural heritage, aligned governance or the national and international sustainability frameworks – to build a common vision and a commitment to action for port territories that are fit for the future.

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## References

- AIVP. 2018a. *Port Center by AIVP: Concept*. Accessed May 14, 2025. <https://www.aivp.org/en/home/our-initiatives/port-center-by-aivp/concept/>.
- AIVP. 2018b. *Agenda 2030: Engagements*. Accessed May 14, 2025. <https://www.aivp.org/en/home/our-initiatives/agenda-2030/>.
- CNR. 2023. *What Is CNR?* Accessed May 14, 2025. <https://www.cnr.tm.fr/en/cnr/what-is-cnr/>.
- European Commission. n.d. *Finance and Green Deal for Europe*. Accessed July 17, 2025. [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal_en).
- Fuldauer, Lena I., Scott Thacker, Robyn A. Haggis, Francesco Fuso-Nerini, Robert J. Nicholls, and Jim W. Hall. 2022. "Targeting Climate Adaptation to Safeguard and Advance the Sustainable Development Goals." *Nature Communications* 13 (1): 3579. <https://doi.org/10.1038/s41467-022-31215-0>.
- Fremantle Ports. 2023. *Reflect Reconciliation Action Plan – May 2023*. Accessed May 14, 2025. [https://fremantleports.com.au/docs/default-source/corporate-docs/fremantle-ports-reflect-reconciliation-action-plan-may-2023.pdf?sfvrsn=88ecef8\\_6](https://fremantleports.com.au/docs/default-source/corporate-docs/fremantle-ports-reflect-reconciliation-action-plan-may-2023.pdf?sfvrsn=88ecef8_6).
- Hein, Carola. 2025. "Toward a Value Case Approach for Designing Sustainable Water Systems." *Blue Papers* 4 (1): 30–43. <https://doi.org/10.58981/bluepapers.2025.1.01>.
- Hosagrahar, Jyoti, Jeffrey Soule, Luigi Fusco Girard, and Andrew Potts. 2016. "Cultural Heritage, the UN Sustainable Development Goals, and the New Urban Agenda." *Bollettino del Centro Calza Bini* 16 (1): 37–54. <https://doi.org/10.6092/2284-4732/4113>.
- Lerario, Antonella. 2022. "The Role of Built Heritage for Sustainable Development Goals: From Statement to Action." *Heritage* 5 (3): 2444–2463. <https://doi.org/10.3390/heritage5030127>.
- Mazo, Paulette. 2016. *The Impacts of the Ngondo Festival on Cameroon Tourism Sector*. Bachelor's thesis, Centria University of Applied Sciences, Kokkola, Finland. Accessed August 20, 2025. <https://www.theseus.fi/bitstream/handle/10024/118158/Mazo-Paulette.pdf?sequence=1>.
- Meikengang, Avenir Geradine. 2023. "The Ngondo Cultural Festival in Cameroon: Between Cultural Identity, Territorial Development and Promotion of the Local Economy." Preprint, HAL (hal-04076555). Accessed August 20, 2025. <https://hal.science/hal-04076555>.
- Métropole de Lyon. 2025. *Le Site UNESCO de Lyon*. Last modified June 26, 2025. Accessed August 20, 2025. <https://www.grandlyon.com/mes-services-au-quotidien/sinformer-sur-lurbanisme/le-site-unesco-de-lyon>.



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- Niu, Tianlin, Zhenying Shao, and Geyi Zhu. 2024. *Toward Greener Freight: Overview of Inland Waterway Transport for Freight in the European Union*. Research Brief ID-152. International Council on Clean Transportation. Accessed November 11, 2025. [https://theicct.org/wp-content/uploads/2024/08/ID-152-%E2%80%93Inland-waterway\\_final.pdf](https://theicct.org/wp-content/uploads/2024/08/ID-152-%E2%80%93Inland-waterway_final.pdf).
- Port autonome de Strasbourg. 2024a. *Projet Stratégique 2024–2028*. Accessed August 20, 2025. [https://www.strasbourg.port.fr/wp-content/uploads/2018/06/PAS\\_ProjetStrategique.pdf](https://www.strasbourg.port.fr/wp-content/uploads/2018/06/PAS_ProjetStrategique.pdf).
- Port autonome de Strasbourg. 2024b. "Signature du contrat de développement." *Ports de Strasbourg*. Accessed August 20, 2025. <https://www.strasbourg.port.fr/actualites/signature-du-contrat-de-developpement/>.
- Rodrigue, Jean-Paul, and Theo Notteboom. 2022. "Inland Ports / Dry Ports." In *Port Economics, Management and Policy*, edited by Theo Notteboom, Athanasios Pallis, and Jean-Paul Rodrigue. New York: Routledge. Accessed May 14, 2025. <https://porteconomicsmanagement.org/pemp/contents/part2/dry-ports/>.
- Schneider, Flurina, Andreas Kläy, Anne B. Zimmermann, Tobias Buser, Micah Ingalls, and Peter Messerli. 2019. "How Can Science Support the 2030 Agenda for Sustainable Development? Four Tasks to Tackle the Normative Dimension of Sustainability." *Sustainability Science* 14 (6): 1593–1604. <https://doi.org/10.1007/s11625-019-00675-y>.
- UNESCO. 2025. *Lyon, France*. Accessed August 18, 2025. <https://whc.unesco.org/en/canopy/lyon/>.
- United Nations. n.d. *The 17 Goals*. Accessed July 17, 2025. <https://sdgs.un.org/goals>.
- Voies navigables de France. 2023. *Rivertri: La Décettérie Fluviale Lyonnaise*. Accessed May 14, 2025. <https://www.vnf.fr/vnf/dossiers-actualites/rivertri-la-decettérie-fluviale-lyonnaise/>.
- Voies navigables de France. 2025. "Développer la logistique urbaine fluviale à Lyon." *VNF Rhône–Saône*, May 21, 2025. <https://www.vnf.fr/vnf/developper-la-logistique-urbaine-fluviale-a-lyon/>.
- Voies navigables de France. n.d. *Le cadre partagé pour le développement des usages des rives fluviales des Grands Lyonnais*. Accessed July 17, 2025. <https://www.vnf.fr/vnf/dossiers-actualites/le-cadre-partage-pour-le-developpement-des-usages-des-rives-fluviales-des-grands-lyonnais/>.



**Noémi Mené** has been working with AIVP for over two years as a Project Leader. She specializes in river port cities and sustainable mobility. Within the organization, she leads the Connected River project, an Interreg North Sea EU-funded project dedicated to ensuring the safe shared use of waterways and waterfronts. She also leads the Working Group on River Port Cities, bringing relevant members of the organization to work on their specific challenges. Before her work at Association Internationale Villes et Ports (AIVP) she worked for CODATU, an NGO dedicated to promoting sustainable mobility in countries and cities of the Global South.

Contact: [nmene@aivp.org](mailto:nmene@aivp.org)



**Avicenna Tanubrata** completed his master's degree in urban studies at the Institut d'Urbanisme et de Géographie Alpine (IUGA) in Grenoble by a thesis on "The Rhenish Port-City Interface and Its Regional Inland Waterways Connectivity" and an internship at the Association Internationale Villes et Ports (AIVP). He previously conducted research on synchromodality practices at the Port of Strasbourg, France and now works as a Project Administrator for Muehlhan Wind Service.

Contact: [tanubrata@muehlhan.com](mailto:tanubrata@muehlhan.com)



**José Manuel Pagés Sánchez** has been the Director of the Agenda 2030 for International Association Cities and Ports (AIVP) since 2016. He is an architect by training, with a master's degree from Lisbon's Technical University. His passion for port and urban development led him to pursue a PhD in Hamburg's Hafencity University, completed in 2019.

Contact: [jsanchez@aivp.org](mailto:jsanchez@aivp.org)