Disused Industrial Areas on the Waterfront. Between Sicily and Calabria

Celestina Fazia[1], Kh Md Nahiduzzaman[2], Cristina Natoli[3], Federica Sortino[1(✉)], and Clarastella Vicari Aversa[4]

[1] Department of Engineering and Architecture, University of Enna "Kore", 94100 Enna, Italy
celestina.fazia@unikore.it, federica.sortino@unikorestudent.it
[2] Citinnov SA for Integrated Territorial Planning and Smart Cities, Mohammed VI Polytechnic University (UM6P), Ben Guerir, Morocco
khmd.nahiduzzaman@um6p.ma
[3] Ministero dell'Ambiente e della Sicurezza Energetica (MASE), Rome, Italy
[4] Department of Architecture and Design – dAeD, University "Mediterranea" of Reggio Calabria - UNIRC, 89124 Reggio Calabria, Italy
clarastella.vicariaversa@unirc.it

Abstract. The relocation of industrial activities, which began as early as the last century in Europe and has accelerated in recent decades in the Mezzogiorno, has led to the gradual divestment of substantial portions of industrial assets in many rural and peripheral areas and urban centers. Because of this, even important and strategic industrial areas by the sea, such as the industrial zone of Termini Imerese, the former Puleo Brick Factory in Palermo, Sicily, and Saline Joniche in Calabria, have found themselves threatened by the progressive loss or decline of economic activities, investments, infrastructure and related services. The case studies analysed in the essay are Termini Imerese, which represents a depowered plant, the former Puleo Brick Factory in Palermo, which is a disused industrial site with considerable potential, and Saline Joniche in the province of Reggio Calabria, which is abandoned but never used. Three different case studies of industrial plants in port areas. Three cases, on the sea but different in history and design approach. Three possible and different design strategies for regeneration, preservation and enhancement of the industrial heritage, capable of involving the resources and actors of the area by returning the industrial heritage of the places to the collective cultural heritage as well.

Keywords: brownfield areas · architectonical and urban regeneration · disused industrial areas · Sicily · Calabria

1 Introduction

The delocalisation of industrial activities, which began in Europe in the last century and has accelerated in recent decades, has led to the gradual dismantling of large portions of industrial assets in the Mezzogiorno, with significant repercussions on urban, rural and peripheral areas. In particular, in the Strait of Messina area, the decline of production

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2026
O. Gervasi et al. (Eds.): ICCSA 2025 Workshops, LNCS 15889, pp. 19–36, 2026.
https://doi.org/10.1007/978-3-031-97603-2_2

sites once considered strategic has led to the loss of investments, infrastructure and services, compromising territorial competitiveness. Disused industrial sites are material testimonies of historical and social relevance, but their preservation is complex due to economic and structural factors and the effects of climate change, a global phenomenon that affects various contexts transversally. The presence of industrial settlements close to urban centres raises questions about the correlation between production activities, environmental degradation and climate vulnerability, with direct repercussions on the quality of life of local communities.

The paper invites reflection on the consequences that the presence of these sites has on people and human activities, in the knowledge that not only active plants, but also partially or totally abandoned sites have negative influences on the quality of the environment and urban life.

The paper intercepts "strategies and methods for the maintenance and continuity of those meanings that traces of the past take on in relation to the needs of the present" [1] and proposes an in-depth analysis of the sites, tracing their historical evolution and evaluating the numerous attempts at redevelopment.

The paper analyses industrial delocalisation in Europe and its impact in the Mezzogiorno, introducing the concept of the "industrial cemetery" and its cultural, economic and social value. The aim is to identify sustainable regeneration strategies that integrate physical, social and economic interventions, avoiding the risk of an "elusive exchange", in which the redevelopment of degraded areas can reduce the focus on other priorities, such as housing needs and public investment.

The methodology adopted for the analysis of the case studies is based on an integrated reading of environmental, landscape, historical and urban planning data. For each site, the following were identified: the degree of environmental vulnerability, the type of territorial context, the functions envisaged or proposed in the redevelopment projects, the status of the redevelopment initiatives (completed, planned or interrupted) and the critical issues that have slowed down or prevented their implementation. The data were organised in a comparative matrix that allows us to capture similarities and differences in the transformation pro-cesses.

The three selected case studies - the former Puleo factory in the municipality of Palermo, the industrial site of Saline Joniche in the municipality of Montebello Jonico (RC) and and the depowered industrial area of Termini Imerese in the municipality of the same name located in the metropolitan city of Palermo - were chosen on the basis of strategic, landscape and methodological criteria. Geographically, the sites are located in contiguous areas of Southern Italy, allowing the phenomenon to be observed in a coherent area from a socio-economic and infrastructural point of view. The selection also reflects the desire to represent a significant range of situations typical of deindustrialisation in southern Italy: from the risk of degradation of the historical-landscape heritage (Palermo), to the environmental impact and the effects of the failure of large energy projects (Saline Joniche), to cases of partial decommissioning with reconversion difficulties (Termini Imerese). This variety makes it possible to compare different approaches to redevelopment, offering useful hints for the construction of adaptive strategies capable of responding to the specificities of places.

2 Abandoned or Depleted Industrial Areas: Differences and Opportunities

In the context of the reflection on disused industrial heritage that has taken place in recent decades, urban and territorial regeneration represents a crucial challenge and an extraordinary opportunity for the recovery and valorisation of architectural complexes otherwise destined to oblivion. The industrial heritage, with its load of history and identity, constitutes a fundamental element in the transformation process of contemporary cities, favouring the dialogue between historical memory and innovation.

The main challenge lies in finding a balance between the preservation of historical-architectural value and the need for functional adaptation to new uses. This contribution, examining three emblematic cases in Sicily and Calabria, explores the theme of urban and territorial regeneration through the reuse of disused industrial complexes, highlighting the role of architecture in favouring processes of sustainable transformation and cultural valorisation.

One of the central aspects in the debate on the regeneration of industrial heritage concerns the duality between conservation and demolition. Disused industrial sites represent material historical documents of social relevance, but their integral preservation is often difficult due to economic and structural factors. In order to mediate between the two antithetical positions, an approach based on reinterpretation and adaptive reuse has emerged in Europe and beyond, which allows the preservation of historical memory without preventing functional transformations.

Architecture plays a fundamental role in this process: the recovery of industrial spaces through cultural and creative projects, for example, has proven to be an effective strategy to revitalise the urban fabric, making these places catalysts for social and economic innovation. The inclusion of new cultural and creative functions not only allows existing structures to be safeguarded, but also makes them usable again, contributing to the revitalisation of entire city areas.

Moreover, the recovery of industrial heritage offers the opportunity to rethink the relationship between city and landscape, fostering dialogue between pre-existing structures and new urban needs. This aspect is crucial in contexts characterised by high population density, where the reuse of existing spaces represents a valid alternative to uncontrolled urban sprawl.

In Italy, the case of Milan is emblematic for understanding the variety and quality of industrial regeneration interventions in recent decades. Projects such as the MUDEC in the former Ansaldo, the Fondazione Prada in the former Distilleria Società Italiana Spiriti, and the Hangar Bicocca in the former Pirelli factories, the Armani headquarter in the former Nestlé silos, testify to how the reuse of industrial spaces can be integrated into the urban fabric, generating new poles of cultural attraction [2]. These interventions not only preserve the memory of the place but reinterpret it, creating spaces that respond to contemporary needs for sustainability and innovation [3, 4].

Internationally, numerous examples demonstrate how the adaptive reuse of industrial buildings can transform abandoned areas into new poles of cultural and economic attraction. A significant case in point is the Carriageworks Arts Centre in Sydney, born from the conversion of a former railway workshop into a centre dedicated to the performing arts [5, 6]. Here, the recovery of industrial memory has been accompanied by the

introduction of flexible spaces for cultural events, in a perfect balance between past and present. Another emblematic example is the Schindler Factory in Krakow, transformed into a museum of contemporary art and historical memory. This project managed to integrate the preservation of the building with new facilities, offering a cultural experience that combines history and innovation.

Among the most famous models of urban regeneration, one cannot fail to mention the Tate Modern in London, built inside the former Bankside Power Station. This intervention has turned a former power station into one of the most important cultural hubs globally, thanks to an architectural project that has maintained the building's original shell while reinterpreting its interior spaces [7]. The success of this operation demonstrates how industrial reconversion can have a strong impact in defining new urban centralities and contributing to the enhancement of the city.

In the Netherlands, the Westergasfabriek in Amsterdam is another virtuous example of public-private collaboration in transforming a disused industrial plant into a multifunctional cultural district. The site, originally dedicated to gas production, now houses art galleries, shops, restaurants and event spaces, demonstrating the potential of industrial reuse in fostering local development.

The international approach to the theme of reusing disused industrial spaces offers further food for thought. From the United States, with pioneering examples such as the Quincy Market in Boston, to Europe, where former factories and warehouses have been converted into multifunctional cultural centres [8]. The Farnham Maltings in England, for example, became a cultural incubator through a participatory project that involved the local community from the earliest stages [9]. This regenerative development model, which blends ongoing cultural activities with the temporary use of spaces, represents a virtuous practice of how regeneration can support social cohesion and the local creative economy.

Traditionally, in Italy, industrial heritage has received sporadic and fragmented attention. The inclusion of industrial sites in the category of cultural heritage is relatively recent and still meets with resistance, due to the difficulty of recognising the historical and cultural value of architectures born for functional needs. However, a broader vision of protection has gradually become established, which considers these artefacts not only as testimonies of the past, but also as potential engines of development for the future.

The recognition of the importance of industrial heritage has led to an expansion of the regulatory and operational tools for its protection. The Cultural Heritage and Landscape Code, Legislative Decree 42/2004, updated by Legislative Decree 62/2008, introduced the concept of cultural interest for industrial sites, but much remains to be done to ensure effective protection and integrated valorisation with local communities [10]. The most successful experiences of reuse and urban regeneration show how historical memory can be a powerful catalyst for innovation. Examples of how industrial architecture, reinterpreted through new cultural uses, can become a symbol of the rebirth of entire pieces of city or territory. These projects share a holistic approach that integrates preservation of the material document with functional reinterpretation, incorporating new activities that respond to contemporary needs for sustainable development and social regeneration.

To stimulate discussion on these issues, it seems necessary to consider regeneration not only as an architectural or urban planning practice, but as a multidimensional process involving public policies, local communities, creative economy and environmental sustainability. Only through an integrated approach, which considers the specificities of each context and encourages dialogue between public and private actors, will it be possible to activate those virtuous processes capable of transforming urban voids into new engines of development.

The approach to the reinterpretation of the industrial heritage has evolved over time: from demolition and replacement interventions we have moved on to sustainable reuse strategies that recognise the testimonial value of industrial archaeology. European policies incentivise the recovery of these sites through funding programmes and guidelines for their valorisation, emphasising the need to integrate the needs of conservation with those of local development.

In the context of coastal areas, industrial heritage is of particular value. Many historic harbours, shipyards, refineries and fish processing plants are in an obsolete condition today, but offer enormous potential for conversion into multifunctional spaces. The recovery of these places can contribute not only to the preservation of industrial memory, but also to the creation of new attractive poles, capable of stimulating local economies linked to tourism, culture and environmental sustainability.

The rehabilitation of industrial heritage by the sea follows different approaches depending on the characteristics of the site and the needs of the urban and environmental context. Among the most effective strategies is the functional reuse and hybridisation of spaces modalities that lead to the transformation of disused industrial buildings into cultural centres, innovation poles or creative hubs. An emblematic example is the Tabakalera in San Sebastián, Spain, a former tobacco factory now converted into an international centre for contemporary culture, which has contributed to the regeneration of the city's waterfront [11]. Another method pursued is environmental regeneration linked to sustainability. The recovery of former coastal industrial sites often involves environmental reclamation and landscape redevelopment. In Marseilles [12], another interesting example, the vast 19th-century complex of the Docks port area has been reconverted into a multifunctional centre dedicated to art, commerce and culture. Alfonso Femia's project has reinterpreted the industrial identity of the place, creating a new gathering space for the city by including the creation of green spaces and pedestrian paths, integrating the industrial heritage with new tourist and cultural functions.

Industrial tourism and the enhancement of memory represent a strategic lever for the valorisation of disused manufacturing heritage. In Italy, a significant example is the redevelopment of the former Tonnara di Favignana, transformed into an interactive museum that tells the story of tuna fishing and Sicily's maritime traditions.

The circular economy and new production models can also be the driving force for reinterpreting urban fabrics that have lost their functions. This is the case in Rotterdam, where the M4H (Merwe-Vierhavens), a former port area in transformation, old warehouses and factories have been converted into spaces for start-ups, green companies and innovative residences [13, 14].

The recovery of industrial heritage can foster the creation of new public spaces on the waterfront, improving the quality of urban life. The case of Hamburg Hafen-City shows

how the regeneration of a disused port area can generate a new sustainable neighbourhood with a strong focus on functional mixity and architectural quality [15]. In conclusion, the reuse and regeneration of disused industrial heritage is a crucial challenge for the future of contemporary cities. The preservation of historical and architectural value, combined with the integration of new cultural and creative functions, makes it possible to transform abandoned areas into vital resources for society. International examples show that the success of these interventions depends on the ability to balance preservation, innovation and sustainability, ensuring an integrated approach that valorises the past without foregoing the opportunities of the future.

In this context, it is crucial that urban and territorial policies promote effective governance models capable of combining conservation and planning in a long-term perspective. Only through a shared and interdisciplinary approach will it be possible to ensure that industrial heritage continues to be a strategic resource for urban and cultural development.

3 Case Studies

3.1 Case Study 1: The Case of Ex Puleo Brick Factory, Palermo

The former Puleo brick factory located in Palermo, the capital of the Sicilian Region and metropolitan city of the same name, is an emblematic case of the city's industrial archaeology, as it bears witness to the city's urban evolution and production dynamics in the 19th century. The factory was founded in 1878 by the knight Giuseppe Puleo in the seaside village of Acqua dei Corsari. The factory exploited the availability of local clay for the production of bricks and terracotta artefacts, constituting a strategic production pole for the city's building expansion. The industrial settlement developed along the sea coast, in an area that, although peripheral to the urban centre, was strategically located along the main routes. The original structure extended over about 2500 square metres and included not only the buildings used for production, but also structures built in later phases to fulfil social and religious purposes [16].

The products of the Puleo furnace were used by illustrious architects of the time for the construction of prestigious buildings. Among them, Giovan Battista Filippo Basile selected bricks from the Palermo factory for the completion of specific parts of the Teatro Massimo, a symbol of the city's monumental architecture [17].

The factory's decline, which began in the early 20th century, is part of a broader phenomenon of industrial disuse that affected Palermo and other Italian cities during the same century. Economic and social transformations, the increasing competitiveness of markets and the need for technological upgrades made production plants progressively obsolete [18]. The crisis caused by the First World War led to the closure of the factory, which remained inactive from 30 November 1915 to 5 May 1921, when, after the death of Cavaliere Puleo (1918), the factory was sold by his sons to the Fazio brothers. The new purchasers resumed full operations, but the depletion of locally available raw materials slowed down production and caused a huge increase in costs. The clay quarry at Villa Amanda, used for on-site supply, was exhausted, and the increased cost of transporting the material from other locations contributed to the closure of the factory. Together, these factors led to the definitive cessation of operations in 1975 [19]. The abandonment of the

area generated a process of progressive degradation, turning the site into an industrial ruin with no current function.

From an urbanistic point of view, the Acqua dei Corsari area today presents a highly compromised layout. Despite its strategic location and proximity to the sea, the area suffers from serious environmental problems, aggravated by the presence of an oil products depot and an incomplete and inefficient sewage treatment plant. The site is also characterised by infrastructural marginalisation that hinders its integration with the surrounding urban fabric. Poor accessibility to services, combined with environmental pollution, has contributed to a general impoverishment of the area's social and economic fabric.

The inclusion of the Puleo factory among the assets protected by the Regional Territorial Landscape Plan [20] is a first step towards the definition of recovery and valorisation strategies. Despite the fact that the project launched by the Regional Province of Palermo in 2004 to redevelop the Oreto-Ficarazzi shoreline aimed to restore dignity to the historic bathing area, many of the planned works have never been completed. The original plan envisaged the creation of new green areas to connect the symbolic places of the southern coast, including the Sant'Erasmo railway depot, the Solarium, the Florio Stand, the Colonnella dell'Immacolata, the Bandita hamlet, the Brick Kilns and the Torre dei Corsari [21], but the failure to complete some works still leaves the area's problems of degradation and neglect unresolved (Fig. 1 and Table 1).

3.2 Case Study 2: Saline Joniche, Reggio Calabria

The industrial area of Saline Joniche, located in the municipality of Montebello Ionico, about 20 km from Reggio Calabria, is an emblematic case of environmental degradation and failure of industrialisation policies in southern Italy. The site houses the remains of Liquichimica Biosintesi, an industrial pole built in the 1970s with the aim of starting the production of bioproteins for animal feed. The infrastructure also included an industrial-commercial port, which never came into operation. However, the factory ceased operations a few days after its inauguration due to the discovery of the toxicity of the products produced, and has been abandoned ever since.

Today, the area is in an advanced state of disrepair: the metal structures are corroded and unsafe, the harbour is silted up and unusable, and the former industrial areas and groundwater are in need of urgent reclamation and safety work. Paradoxically, this context of abandonment develops in the vicinity of an environment of high ecological value: an artificial lake, a remnant of the ancient salt pans, which has been recognised as a Special Protection Area (SPA) for the presence of important bird species [21].

The Saline Joniche affair is part of a broader picture of failed attempts to industrialise Calabria. In an area historically characterised by the cultivation of bergamot and jasmine, the construction of the Liquichimica plant entailed the obliteration of entire agricultural areas and the transformation of about 2,000 m of coastline. After the closure of the plant, further industrial development projects proved ineffective: just two kilometres away, in 1989, the Officine Grandi Riparazioni delle Ferrovie dello Stato were inaugurated, also decommissioned in 2001. The result is a landscape marked by vast abandoned spaces, the symbol of an ineffective and unsustainable model of economic development.

Coastal erosion and the total lack of maintenance have aggravated the degradation of the area. Sea storms have progressively eroded the foundations of the industrial

Table 1. Descriptive-analytical table site 1 Former Mattoneria Puleo. Methodology: Celestina Fazia; Processing and Compilation: Federica Sortino

Site number:	Site number 1
Region:	Sicily
City:	Palermo
Name:	Ex Mattoneria a vapore Puleo
Expected functions:	Production of bricks, artistic vases and building artefacts
Age of construction:	1878
Dimensions (range):	area of approximately 2500 sqm
Relationship with the urbanized context:	exterior near urban areas: borough of Acqua dei Corsari along the coast road
Relationship with port area:	Existing. Proximity to Palermo's Cala for product trade
Current state of use:	abandoned, but previously used: permanently closed in 1975 and abandoned
Conversion implemented or in progress:	studies and proposals (restoration projects never implemented)
Environmental constraints present:	-
Environmental criticalities and vulnerabilities of the study area and context:	serious environmental problems amplified by the presence of a petroleum products depot and an incomplete and inefficient sewage treatment plant
Contaminated site:	Present (need for remediation indicated)
Widespread urban decay:	Present (advanced state of decay of the structure)
Lack of services and social hardship:	Present (abandoned and degraded area)
Recovery difficulties attributable to:	significant costs; contaminated site; bureaucratic and administrative criticalities

structures, leading to the collapse of entire sections of the complex. In particular, the progressive subsidence of the foundation plinths triggered a chain effect, leading to the structural collapse of some portions of the plant [22]. Today, Saline Joniche is an area poised between environmental criticalities and recovery potential. The presence of the SPA and the Pantano wetlands suggests possible reconversion strategies oriented towards the protection and enhancement of the natural heritage, in contrast with a past marked by failed industrial choices. However, any redevelopment intervention must necessarily go through careful planning, which considers environmental reclamation as an essential prerequisite for a new sustainable development of the territory (Fig. 2 and Table 2).

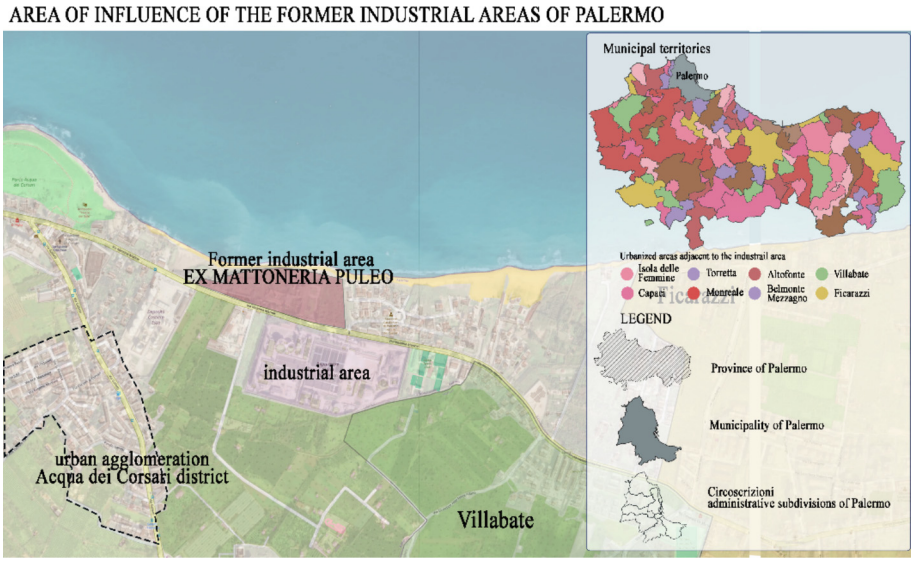

Fig. 1. Former industrial area Puleo brick factory (sites number 1), Sicily. Source: graphic design by Federica Sortino

Table 2. Descriptive-analytical table Site 2 Industrial area of Saline Joniche. Methodology: Celestina Fazia; processing and compilation: Federica Sortino

Site number:	Site number 2
Region:	Calabria
City:	Montebello Jonico
Name:	Industrial area of Saline Joniche
Expected functions:	Industrial production of bioproteins and citric acid (never fully realised); Subsequent proposal for coal-fired power plant (never realised)
Age of construction:	1970s
Dimensions (range):	area of 700.000 sqm
Relationship with the urbanized context:	Exterior near urban areas: located in the coastal hamlet of Saline Joniche
Relationship with port area:	Existing. Port built to support industry, currently unused and obstructed by sand)
Current state of use:	Abandoned, but previously used: industry closed in the 1980s, area unused since then

(*continued*)

Table 2. (*continued*)

Site number:	Site number 2
Conversion implemented or in progress:	Studies and proposals: Agapì project for an innovation district; attempts at revitalisation as a university campus and technology centre with institutional partners
Environmental constraints present:	Constraints on 18 areas, including 5 Sites of Community Importance (SCI) Environmental impacts related to unrealised projects (e.g. coal plant)
Environmental criticalities and vulnerabilities of the study area and context:	Environmental and infrastructural degradation (abandoned industrial plants, blocked harbour) Past influence of organised crime in construction and management
Contaminated site:	Potential pollution of soil and industrial infrastructure
Widespread urban decay:	deterioration of industrial facilities and surrounding area
Lack of services and social hardship:	abandonment of the area exacerbated emigration
Recovery difficulties attributable to:	Significant costs; presence of environmental constraints; bureaucratic and administrative criticalities; low attractiveness of the site

3.3 Case Study 3: Termini Imerese Industrial Area

Termini Imerese is an Italian municipality in the metropolitan city of Palermo in Sicily, 40 km from the capital, and is an important railway and maritime hub due to the presence of a well-connected railway station and a profitable commercial port. The industrial area, where the Enel Ettore Majorana power plant is located, is known for the former FIAT plant and is located in the backwater plain between the city and the archaeological area of Himera. The plant, which opened in 1970 and was characterised by a high degree of production specialisation in the automotive sector (FIAT and later also Lancia brands), was definitively decommissioned by FIAT spa in 2011. Following the closure of the FIAT plant (now Stellantis Group), a path for the re-industrialisation of the area was identified, with the signing of a Programme Agreement for the reconversion and redevelopment of the industrial pole between the Ministry of Economic Development, the Ministry of Labour, the Sicily Region and the Municipality of Termini Imerese. The area is one of the 'Complex Industrial Crisis Areas' and the Sicilian Region has recently approved the reprogramming of an agreement for the implementation of strategic works in the port and its industrial zone for a total of approximately EUR 120 million [23]. Among the planned interventions is the construction of a road connection between the port and

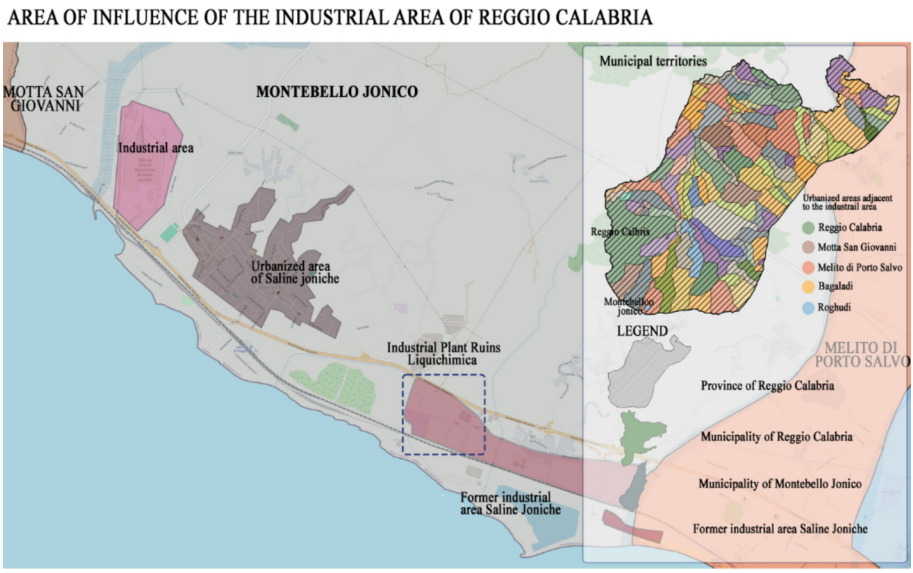

Fig. 2. Saline Joniche Industrial Area (Site number 3), Calabria. Source: graphic project by Federica Sortino.

State Road 113. Among the rescheduled interventions are also road connections, the completion of the wharf, and the construction of a fibre optic system.

The current need for port infrastructure renewal is part of a broader programme of territorial regeneration, outlined in the Strategic Planning Document of the Western Sicily Sea Port System (DPSS), approved by the Services Conference in 2022. This document constitutes the strategic framework for the enhancement and adaptation of the port systems of Palermo, Termini Imerese, Trapani and Porto Empedocle, with the aim of promoting integrated development in the commercial, infrastructural, tourist and urban sectors of Central-Western Sicily. A pivotal element of the DPSS is the redevelopment of the land-sea interface, no longer conceived exclusively as a transit point for goods and passengers, but as a strategic lever for economic growth and urban regeneration. In this perspective, the port of Termini Imerese is the subject of a transformation process aimed at integrating commercial functions with a new tourist vocation, favouring a mixed infrastructural set-up capable of combining economic needs with the enhancement of the territory [24]. The evolution of the port system is set in an urban context marked by an industrial crisis that began with the closure of the FIAT plant in the second decade of the year two thousand. The industrialisation that began in the 1970s initially produced economic growth, but this was followed by a progressive decline due to the ineffective management of the industrial decommissioning process.

The problem lies not so much in the establishment of a production pole, but in the manner of its realisation and subsequent decommissioning, which generated negative effects on the urban and social fabric. The transition to a tourist destination raises significant questions regarding the adjacent industrial areas. The increase in tourist traffic could stimulate investments aimed at redeveloping disused spaces, encouraging the

reconversion of areas into accommodation, commercial and cultural facilities. However, the need to preserve the attractiveness of the area requires the adoption of more rigorous environmental policies, with actions aimed at reclamation and mitigation of impacts in areas that are still degraded.

The area is also culturally interesting for the nearby ruins of Himera and the related antiquarium, for the presence of Roman archaeological sites and prehistoric artefacts. In the lower part of the town is the thermal spa of the Grand Hotel delle Terme, where fine volcanic-derived waters flow. In its territory, and in the nearby towns of Sciara and Caccamo, there is the Mount San Calogero Oriented Nature Reserve (Fig. 3 and Table 3).

Table 3. Descriptive-analytical table site 3 depotenziated industrial area of Termini Imerese. Methodology: Celestina Fazia; processing and compilation: Federica Sortino.

Site number:	Site number 3
Region:	Sicily
City:	Termini Imerese
Name:	Industrial Area of Termini Imerese
Expected functions:	Industrial production, specialisation in the automotive and chemical sectors
Age of construction:	First plants in the 1950s
Dimensions (range):	> 10,000 sqm (large industrial area)
Relationship with the urbanized context:	Exterior near urban areas: area between Termini and Himera
Relationship with port area:	Existing connection to the local port
Current state of use:	Used, but downsized/ partially decommissioned: numerous warehouses abandoned for decades
Conversion implemented or in progress:	Recovery projects in progress: redevelopment planned and in progress with the Pelligra Group
Environmental constraints present:	-
Environmental criticalities and vulnerabilities of the study area and context:	Significant structural and urban decay of the area
Contaminated site:	Potentially present (former industrial area with chemical activities)
Widespread urban decay:	Present (visible decay in warehouses)
Lack of services and social hardship:	Present (economic decline and loss of employment)
Recovery difficulties attributable to:	significant costs; contaminated site; bureaucratic and administrative criticalities

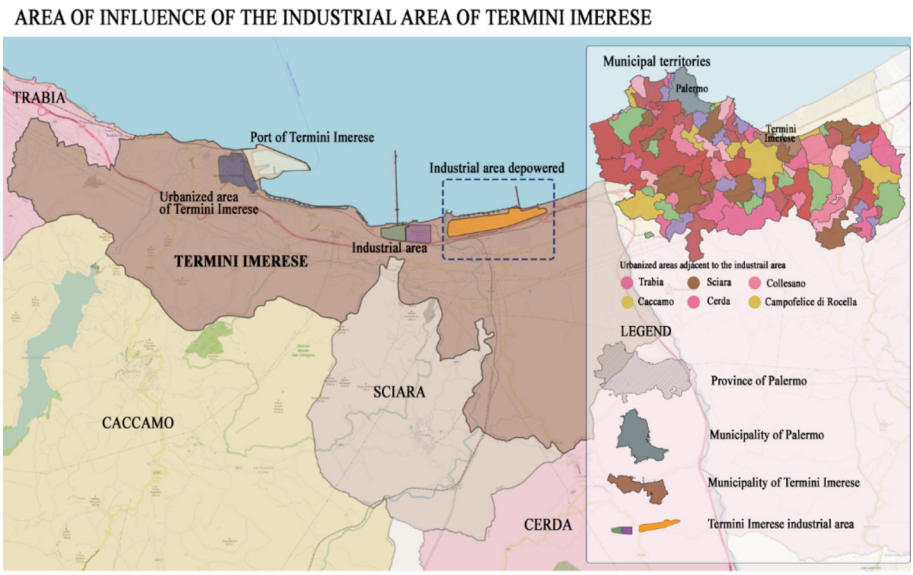

Fig. 3. Industrial area of Termini Imerese (site number 4), Sicily. Source: graphic project by Federica Sortino.

4 Strategic Solutions and Future Perspectives

The current degradation of the case studies analysed raises questions about recovery and regeneration through a project that enhances the traces of the past. These signs, instead of being erased, can become identity elements and seeds of new possibilities, reinterpreted as a memory to be preserved and a resource for the future.

A small example could be the chimney of Saline Joniche, of the former Liquichimica Biosintesi, which towers slender in the surroundings with its 174 m in height. For some, it is seen merely as a monument to the neglect and failure of a state industrialisation project that never really got off the ground and exposed the local population to serious environmental risks, bringing devastation to the area and deeply marking its recent history. And in line with this vision, again in Calabria, in the last months of 2024 the demolition of the chimneys of the Enel power station in Rossano began, seen as the last symbol to be hit of the industrialisation of the Sibaritide that never took place.

Yet it is precisely that slender concrete chimney stretching skywards that could itself become, within a broader project of architectural, urban, social and economic regeneration, an important and representative emblem of hope. Naturally framed within a wide-ranging intervention, envisaging recovery and regeneration actions for the entire area with new and different cultural, recreational, economic and social functions.

We need only think of exemplary industrial archaeology projects, barely mentioned in the previous paragraph, such as the iconic tower of the Tate Modern in London (Fig. 4), which stands inside a disused power station, designed by the Swiss firm Herzog & de Meuron, and has been one of the world's most popular museums of modern and contemporary art for several years now. "Tate Modern has changed London since 2000.

The impact it has had on urban design and the development of the South Bank and Southwark, has been as substantial as its influence on the city's artistic, cultural and social life," say the Swiss architects, winners of the Pritzker Prize in 2001 and students of the Italian Aldo Rossi.



Fig. 4. Tate Gallery of Modern Art with the tower of the former Bankside Power Station towering over the Thames and the City of London, 2019. Source: Photo by Clara Stella Vicari Aversa, 2019.

The two designers achieved fame precisely with this project to convert the former power station on the south bank of the Thames and, as further confirmation that this is the right approach, not only has the project become one of the most iconic museums in all of Europe but the same method has been taken up by the same designers and followed by many other designers, also for many other contexts in more recently regenerated former industrial areas. One thinks of Hamburg's HafenCity district, the protagonist of a vast urban and social redevelopment plan, where the Elbphilharmonie is also located, of which Herzog & de Meuron themselves chose to safeguard the existing volume, albeit internally emptied to house the new functions once used as a warehouse, with a trapezoidal plan and solid load-bearing structure - so as to support the weight of the thousands of sacks of cocoa it housed - further enhancing its image of solidity and compactness, to reuse it architecturally as the base of the new complex that stands, even more elevated and evident, on the tip of the new regenerated port. A graft to be looked to for possible recovery projects for the Puleo steam brickworks.

An emblematic example of architectural regeneration is London's Battersea Power Station on the Thames (Fig. 5), a historic coal-fired power station closed in 1986 and becoming a national monument thanks to its iconic four white smokestacks, long a part of the London skyline and a cultural symbol featured in films, video clips and on the famous cover of Pink Floyd's Animals. The ambitious restoration project, by Wilkinson Eyre [25], has transformed the power station into a multifunctional hub with 250 shops, restaurants, the 46,000 m2 Apple campus, leisure spaces, London's first Art'otel, over 250 residences and a panoramic glass lift inside one of the chimneys [26]. The latter take on a new landscape and symbolic value, dominating the view from the rooftop gardens designed by Foster + Partners and the Rooftop Pool Overlooking Battersea Power Station



Fig. 5. Battersea Power Station; London, 2023. Source: wilkinsoneyre.com/projects/battersea-power-station

[27]. The project is based on principles of integrated sustainability - environmental, economic and social - and aims to create a zero-energy neighbourhood. As stated by the architects: "we provide innovative, efficient and beautiful design solutions that strike a balance between ethical, environmental, social and economic sustainability" [28].

Like the chimneys of London, the soaring chimneys of Saline Joniche and the former Puleo steam brick factory, finally stripped of their shame and charged with a new pride, could become a highly iconic and emblematic element of the broader process of architectural regeneration of the entire area. Why then is there still talk of erasing traces of the past and demolishing what is still considered the shame of a time gone by? We need to know the past, not to deny it, but to look to the future with strength and awareness.

However, the example of London's Battersea Power Station, while representing one of the most fascinating contemporary reuse operations, also demonstrates the risks of a certain kind of regeneration: gentrification phenomena, loss of authenticity, limited accessibility for local communities and commodification of heritage have turned a site of collective memory into a luxury neighbourhood. For this reason, Battersea may be an excellent example to observe, but it is also a warning: the side effects of such transformations need to be governed and mitigated so that regeneration is truly inclusive, sustainable and respectful of the context.

It is essential that signs of the past remain legible in reuse projects, in order to give a new conscious meaning to disused industrial areas. Intervention must enhance the existing character and fit into contemporary spatial strategies, promoting an active memory and new opportunities for future reuse. It is no longer the time for the tabula rasa, but rather the time for the project of reusing the "masterless warehouses" or the "recycled ruins", which after all also belong to the "specific universe of Italian architecture, from

the monuments of ancient Rome a hundred times recycled" [29]. Regenerating industrial heritage requires integrated strategies, targeted funding and participatory approaches that enhance the traces of the past in a sustainable way by proposing approaches that are as inclusive as possible and avoid marginalising vulnerable groups. It is necessary to intervene with measured and respectful projects, capable of transforming the existing without erasing its identity and cultural value. Interventions must have a naturally regenerative character not only for the areas themselves, but also for their immediate and nearby surroundings.

Also in this context, the words written 25 years ago by the two Swiss architects mentioned above, regarding the guiding architectural strategies of the project, resound prophetic and enlightening, words that were used for the competition in London but that can and should resonate every time we approach new and different regeneration interventions: "Working on the existing and its constraints requires a different creative energy. In the near future this will be an increasingly important issue in cities all over Europe. Because you cannot always start from scratch" [30].

5 Conclusions

Industrial tourism and the valorisation of historical, architectural and landscape heritage represent a possible lever for the valorisation of disused manufacturing assets. The preservation of historical and architectural value, combined with the integration of new cultural and creative functions, makes it possible to transform abandoned areas into vital resources for society. The national and international examples cited in the paper show that the success of these interventions depends on the ability to balance protection, innovation and sustainability. The limitations that have emerged, and the restraining factors, can be attributed to the particular size of the sites (Saline joniche, for example), the complexity of the environmental issues (all three case studies) and the administrative procedures, linked to the protection regime. From the analyses of the case studies, thanks to the proposed reading methods, it emerged the need to implement projects for the regeneration of industrial areas that are synergic and in a sustainable and innovative key, also by developing, for example, risk assessment and risk management approaches.

More and more frequently today, in fact, we are faced with climatic events of extraordinary magnitude, which, for example, could jeopardise not only homes, but also production and plants, or compromise the functionality of infrastructures serving the same companies, such as sewerage and drainage systems. Here, a series of preventive actions and operational solutions for climate risk management can increase the resilience of businesses and the chances of success of planned regeneration projects. All this is also intertwined with the natural choice and awareness towards the integration of new uses and functions, compatible with the new redeveloped places but above all capable of activating new ways of regeneration. It is necessary that these problematic abandoned areas become a "resource for transformation" [31] and that new spaces flourish that are capable of restoring a collective and shared dimension, activating a strategic role in the construction of the rediscovered identity of the places themselves.

Contribution Authors. Although the research is the result of the work carried out jointly by all the authors, which Celestina Fazia and Clara Stella Vicari Aversa are the

supervisor, the drafting of the essay is to be attributed differently to each of them: § Abstract, by Celestina Fazia, Kh Md Nahiduzzaman, Federica Sortino; § 1. Introduction by Celestina Fazia, Kh Md Nahiduzzaman, Clara Stella Vicari Aversa, Federica Sortino; § 2. Abandoned or depleted industrial areas: differences and opportunities by Cristina Natoli; § 3. Case studies by Celestina Fazia, Federica Sortino, Clara Stella Vicari Aversa; § 4. Strategic solutions and future perspectives by Clara Stella Vicari Aversa; § 4. Conclusions, by Celestina Fazia, Clara Stella Vicari Aversa, Kh Md Nahiduzzaman, Cristina Natoli. The contributions are outcomes of some research carried out by the authors in their respective laboratories and in a joint convention related to "A.Ma.Te sponde", Agreement between Department of Architecture and Territory of the Mediterranean University of Reggio Calabria and Department of Engineering and Architecture of Kore University of Enna.

References

1. Russo, M.: Aree dismesse. Forma e risorsa della «città esistente». Ed. Scientifiche Italiane, Napoli (1998)
2. Negri, M., Politini, S.: Metamorfosi Urbane. Milano dall'archeologia industriale agli stili di vita del XXI secolo. Milano, Urban Center (2018). https://www.artribune.com/mostre-evento-arte/metamorfosi-urbane/
3. Natoli, C., Ramello, M.F.: Strategie di rigenerazione del patrimonio industriale. Creative factory, heritage telling, temporary use, business model. Edifir, Firenze (2017)
4. Preite, M., Maciocco, G.: Fabbriche ritrovate. Patrimonio industriale e progetto di architettura in Italia. Effigi, Roma (2021)
5. Tonkin Zulaikha Greer: Carriageworks Arts Centre. https://tzg.com.au/project/carriageworks-arts-centre/. Accessed 12 Feb 2025
6. De Manincor, J.: Carriageworks. Architecture Australia (2007). https://architectureau.com/articles/carriageworks/. Accessed 12 Feb 2025
7. Rogic, T.: Transformation of the Bankside Power Station into the Tate Modern in London: subversiveness of The Old. In: Overolland **4**, pp. 101–114 (2016)
8. Robiglio, M.: Re-USA: 20 American Stories of Adaptive Reuse. A Toolkit for Post-Industrial Cities. Jovis, Berlin (2017). https://www.artribune.com/professioni-e-professionisti/who-is-who/2018/05/intervista-matteo-robiglio/
9. Farnham Maltings. https://farnhammaltings.com/. Accessed 12 Feb 2025
10. Gazzetta Ufficiale: Serie Generale, n.110 del 13–05–2011, D.L. 70/2011 Decreto Sviluppo; Serie Generale, n.166 del 16–07–1941, Legge 22 aprile 1941, n. 633 Protezione diritto d'autore
11. Fernández Jubín, S.: De la antigua Fábrica de Tabacos de San Sebastián a la nueva Tabakalera: un estudio integral. In: E-RPH Revista electrónica de Patrimonio Histórico **34**, pp. 86–126 (2024). https://doi.org/10.30827/erph.34.2024.28431
12. Pietrangeli, M.: Atelier(s) Alfonso Femia *AF517 tra recupero e innovazione: i Docks di Marsiglia. In: Metamorfosi – Quaderni di architettura **4**, 116–121 (2018)
13. Jansen, M., Brandellero, A., van Houwelingen, R.: Port-city transition: past and emerging socio-spatial imaginaries and uses in rotterdam's makers district. In: Urban Planning **6**(3), 166–180 (2021). https://doi.org/10.17645/up.v6i3.4253
14. Caridà, F.: Rotterdam e la controversia delle trasformazioni di una città in movimento. Analisi del quartiere di Merwe-Vierhavens attraverso attori e contesto e formulazione di scenari progettuali per sua riqualificazione. Master's thesis, Politecnico di Torino (2022)

15. Frediani, G.: HafenCity Hamburg. In: Paesaggio Urbano. Urban Design **1**, pp. 57–79 (2011)
16. Pileri, M.A.: Quando a Palermo si facevano i mattoni (2024). https://www.palermoviva.it/quando-a-palermo-si-facevano-i-mattoni/. Accessed 17 Feb 2025
17. Fatta, G.: Architettura e tecnica nella costruzione del teatro Massimo VE di Palermo. In: Meccanica dei Materiali e delle Strutture 1 (2012)
18. Agnello, F.: Il disegno dei luoghi della produzione: tecniche/tecnologie. Tre esempi siciliani fra XVIII e XIX secolo. PhD thesis, Università di Palermo (1995)
19. Mauro, P., Pileri, M.A.: Palermo, La costa e la "mattoneria a vapore Puleo", riuso e riqualificazione: un istituto di biologia marina. Master's thesis, Università degli Studi di Palermo (2004)
20. Regione Siciliana: Piano territoriale paesistico regionale. Palermo (1999)
21. Assemblea Regionale Siciliana: Resoconto stenografico della 229ª seduta della XIII legislatura (2004)
22. Martino, G., Tralongo, S.: L'Avifauna della ZSC IT9350143 Saline Joniche e zone umide limitrofe: check-list commentata. In: Gli Uccelli d'Italia **46**, 162–180 (2021)
23. Barrilea, V., et al.: Realtà aumentata e tecniche di geomatica per la valorizzazione del patrimonio sottomarino. In: LaborEst **21**, 5–9 (2020)
24. Regione Siciliana: Termini Imerese, Accordo Irsap-Comune. https://www.regione.sicilia.it/la-regione-informa/termini-imerese-accordo-irsap-comune. Accessed 17 February 2025
25. Autorità di Sistema Portuale del Mare della Sicilia Occidentale: Documento di Programmazione Strategica del Sistema Portuale del Mare di Sicilia Occidentale. https://adsppalermo.portaletrasparenza.net/it/trasparenza/pianificazione-e-governo-del-territorio.html. Accessed 13 February 2025
26. Battersea Power Station, UK. https://batterseapowerstation.co.uk/
27. Editorial team: Two Foster + Partners buildings near Battersea Power Station completed. In: Domusweb (2024). www.domusweb.it/en/news/gallery/2024/06/16/battersea-roof-gardens-and-50-electric-boulevard-in-london-completed.html
28. Wilkinson Eyre: Battersea Power Station, UK. https://www.wilkinsoneyre.com/projects/battersea-power-station last accessed 13 February 2025
29. Ciorra, P.: Per un'architettura non edificante. In: Ciorra, P., Marini, S. (eds.) Recycle, Electa, Milano, p. 22 (2011)
30. Herzog, J., De Meuron, P.: The Tate Modern Project, Competition 2005, Project 2005–2012, Realization 2010–2016, London, UK. https://www.herzogdemeuron.com/projects/263-the-tate-modern-project/. Accessed 13 February 2025
31. Secchi, B.: Le condizioni sono cambiate. In: Casabella 498, Italy (1984)