



**International Expert Workshop
'The Science of the Smart City 2.0':
Urban Liveability, Climate Change and Circular Economic Futures**

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Cultural Heritage Adaptive Reuse in Circular Port Cities: An Overview

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Summary

1. Context of this research: the Horizon 2020 CLIC project – cultural heritage adaptive reuse in the circular economy / circular city framework
2. Circular city definitions
3. Adaptive reuse of the historic built environment
4. Circular historic port cities
5. Mapping circular strategies in historic port cities
6. Criteria for the evaluation of cultural heritage adaptive reuse projects in the perspective of the circular economy / circular city model
7. Pilot study: an example of circularity assessment for cultural heritage adaptive reuse in Italy
8. Conclusions

Q&A

1. Context of this research

- The Horizon 2020 CLIC project – cultural heritage adaptive reuse in the circular economy / circular city framework

CULIC

CIRCULAR MODELS LEVERAGING INVESTMENTS IN CULTURAL HERITAGE ADAPTIVE REUSE



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776758



Context and key concepts

Key concepts of the **CLIC project: cultural heritage adaptive reuse, circular economy, circular city/territory**. But why these keywords are put together?

Circular Economy and **Cultural heritage (and landscapes) adaptive reuse** have similar objectives:

- to **enlarge the time horizon of resources**, ideally in an indefinite time (**enlarging the perspective of «here and now»** and introducing a **longer time horizon in choices**)
- to **enlarge the set of values / objectives** including also **ecological** and **social** ones in choices

However, **cultural heritage and landscape are absent from the physical-spatial context of emerging circular city/city-region models**.

The **Circular Economy** aims to **reduce the growing entropy** generated by our current production-consumption economic models.

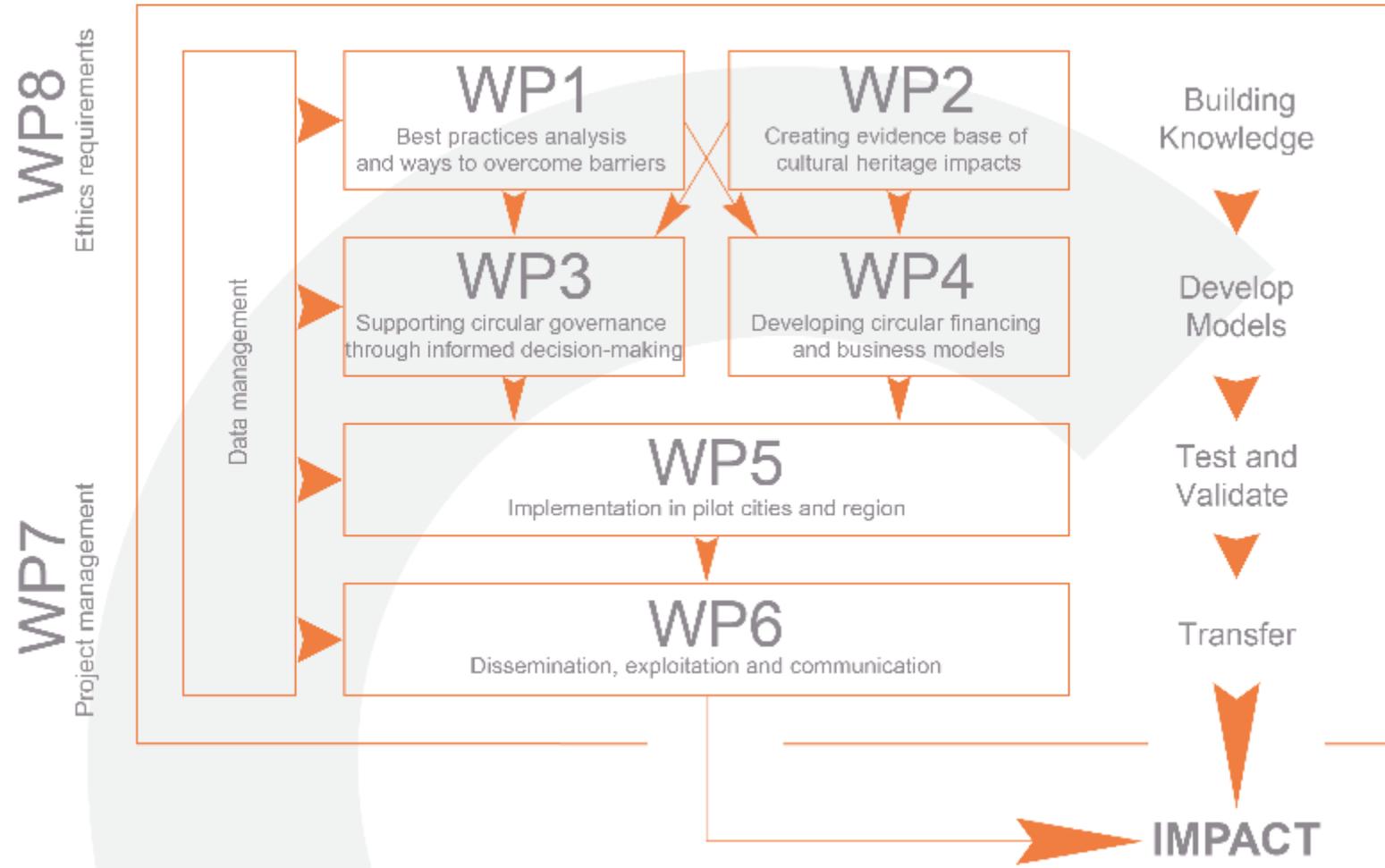
The **Circular Economy** promotes – and it is founded on – a **culture of cooperation**, that **reduces social entropy**, improving **resilience**.

In this perspective, the **Circular Economy** can help the **effectiveness of economic processes**, but also to **stand against the growing forces of fragmentation and atomization of the European society**, stimulating more **social cohesion**.

Focus on

CULTURAL HERITAGE ADAPTIVE REUSE and CIRCULAR ECONOMY

CLIC develops, tests and validates innovative **“circular”** **business, financing and governance models** to place **cultural heritage adaptive reuse** as at the forefront for the implementation of a European model of **circular economy** and **circular city-region** centered on the **regeneration of cultural and natural capital**





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PORTSMOUTH



Institute of Education



Local
Governments
for Sustainability



Institute for Ecological Economics



VÄSTRA
GÖTALANDSREGIONEN

PAKHUIS DE ZWIJGER*



City of Rijeka
European Capital of Culture 2020

PILOT CASES



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2. Circular city definitions

Which urgent challenges of urbanization?



2015 - United Nations

The 2030 Agenda for Sustainable Development and Sustainable Development Goals



TARGET 11.4

Strengthen efforts to **protect** and **safeguard** the world's **cultural and natural heritage**

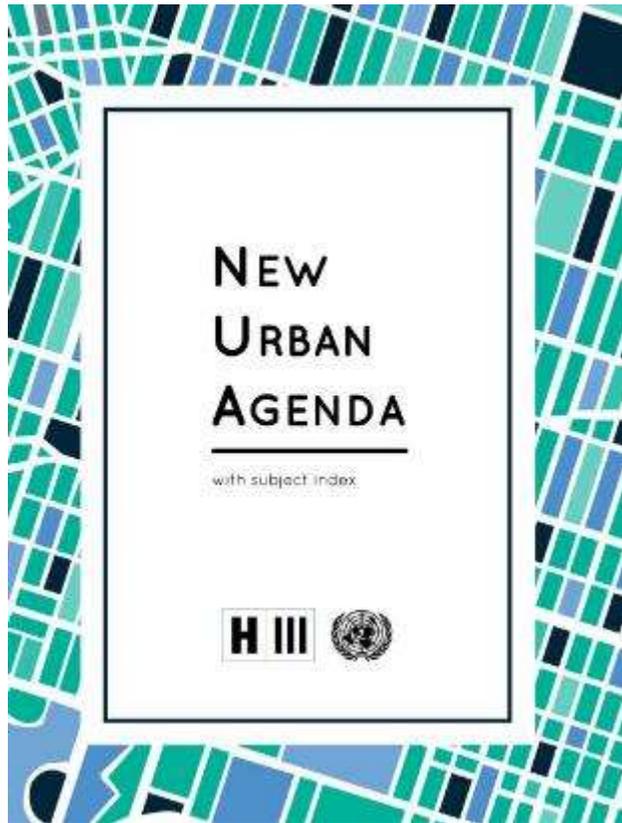
In 2015, close to 4 billion people – **54 per cent of the world's population – lived in cities** and that number is projected to increase to about 5 billion people by 2030. **Rapid urbanization** has brought enormous challenges. **Better urban planning and management** are needed. As of May 2017, **149 countries were developing national-level urban policies**.

CHALLENGES:

- . **Slums**
- . **Land and housing policies** - Expansion of urban land (cities are becoming less dense as they grow, with unplanned urban sprawl)
- . **Solid waste** - urban environmental services
- . **Air pollution**

Source: Report of the Secretary-General, "Progress towards the Sustainable Development Goals", [E/2017/66](#)

Which urgent challenges of urbanization?



Key dimensions of the New Urban Agenda:

- Provide basic services for all citizens
- Ensure that all citizens have access to equal opportunities
- Promote measures that support cleaner cities
- Strengthen resilience in cities to reduce the risk and the impact of disasters
- Take action to address climate change by reducing their greenhouse gas emissions
- Fully respect the rights of refugees, migrants and internally displaced persons
- Improve connectivity and support innovative and green initiatives
- Promote safe, accessible and green public spaces

Key **Heritage-Related Provisions:**

- “disaster risk reduction, climate change, public spaces, migration and others reflect topics in which the role of heritage is profoundly implicated”
- sustainably leverage natural and cultural heritage, both tangible and intangible, in cities and human settlements through integrated urban and territorial policies and adequate investments (Section 38)

(Source: Potts, A. 2016: The position of Cultural Heritage in the New Urban Agenda)

Circular Economy (§71): We commit ourselves to ... **transition to a circular economy** while facilitating ecosystem conservation, regeneration, restoration and resilience in the face of new and emerging challenges.

Which urgent challenges of urbanization?

The EUROPEAN vision

- **Urban Agenda for the EU – Partnership Circular Economy**
- European Commission (2014) ***Towards a circular economy: A zero waste programme for Europe***. Brussels, 2.7.2014 COM(2014) 398 final. Brussels.
- European Commission (2015) ***Closing the loop – An EU action plan for the circular economy***, 2.12.2015 COM(2015) 614 final. Brussels.

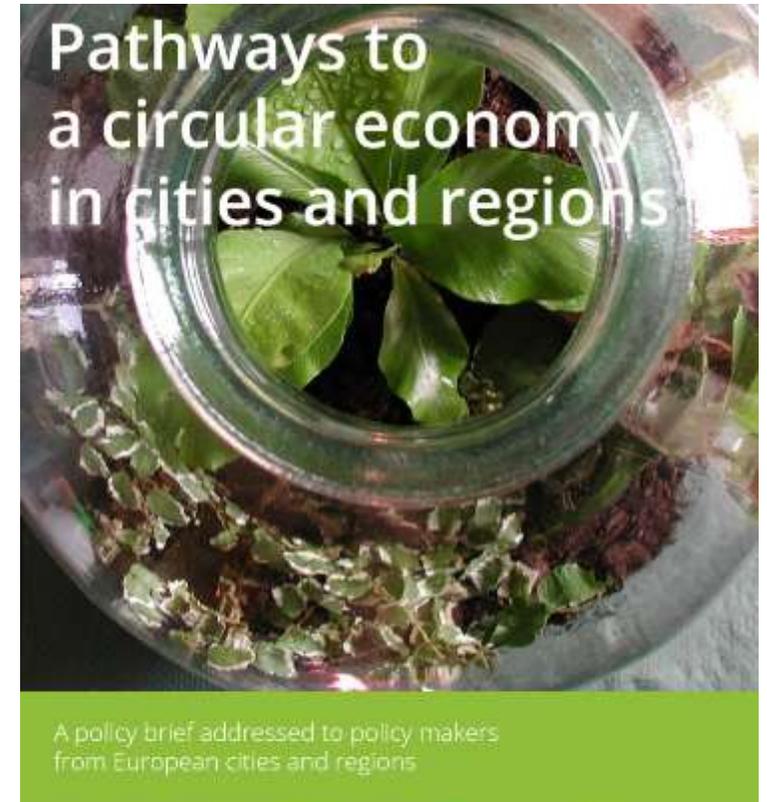


URBAN AGENDA FOR THE EU

ORIENTATION PAPER CIRCULAR ECONOMY

*** As the EU Urban Agenda has no legal basis and as participation is voluntary, the actions presented in this Orientation Paper are not compulsory. They are recommendations. ***

Date: 13.03.2017 Final Version



What is a circular city?

- 114 definitions of circular economy
- Many definitions of circular city: climate neutral, car-free, energy-balanced, waste-free
- CLIC project: 11 definitions of circular city from different perspectives: research – in economics, planning, ecological economics, applied finance, technology, decision science, governance models, social science – as well as cities, regions, practitioners.

What is a circular city?

- As for the **macro level**, the CE is theorised at a national or global scale, with an emphasis on legislation; regulatory impact analysis; zero waste regimes; and recycling oriented societies (Ghisellini et al., 2016; Zhijun and Nailing, 2007).
- At the **meso level**, the focus is on actor interaction especially inter-firm networks: industrial symbiosis; eco-industrial parks; green supply-chain management and reverse logistics (Zhu et al., 2010). It includes also **urban symbiosis and eco-towns**.
- At a **micro level**, the CE focuses on individual actors, particularly companies (Yuan et al., 2006; Zhu et al., 2010). Examples include: eco-design and cleaner production strategies; resource efficiency initiatives; labelling systems, and; sustainable production and consumption methods (Geng et al., 2009b, 2012).

de Jesus, A. et al. (2017) 'Eco-innovation in the transition to a circular economy: An analytical literature review', Journal of Cleaner Production. Elsevier Ltd, 172, pp. 2999–3018.

Future cities (Khan & Zaman 2018)

- Age-friendly city
- Compact city
- Creative city
- Eco-city
- Global city
- Liveable city
- Low-to-Zero Carbon city
- Regenerative city
- Resilient city
- Sharing city
- Smart city
- Zero Waste city
- ...

... CIRCULAR
CITY ?

CIRCULAR CITIES: ongoing experiences

- Dunkerque (FR) – *ecologia industriale*
- Il caso «scuola» di Kalundborg (DK) – *simbiosi industriale*
- Bruxelles
- London
- Paris
- Amsterdam
- Rotterdam
- Lisbon
- Glasgow
- Antwerp
- Hamburg
- Gdansk
- Peterborough
- Marseille
- Helsinki
- Edinburgh
- Barcellona
- Copenhagen
- Dublin
- New York
- ----

Networks, orientation documents and experiences



Report on State-of-the-Art Research in the Area of the Circular Economy

Draft Action Plan
09.02.2018



URBAN AGENDA FOR THE EU
Circular Economy

DRAFT ACTION PLAN

*** The Pact of Amsterdam states that the Action Plan "can be regarded as non-binding. Therefore, the actions presented in the Action Plan are not compulsory. ***

Date: 09.02.2018



CIRCULAR CITIES

Designing post-industrial Amsterdam
The case of Buiksloterham

Circular Economy in Cities around the World

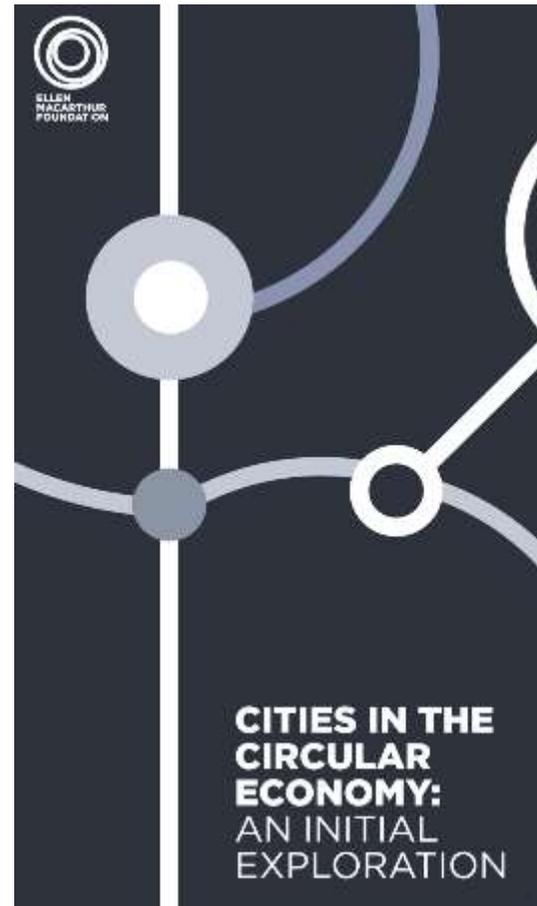
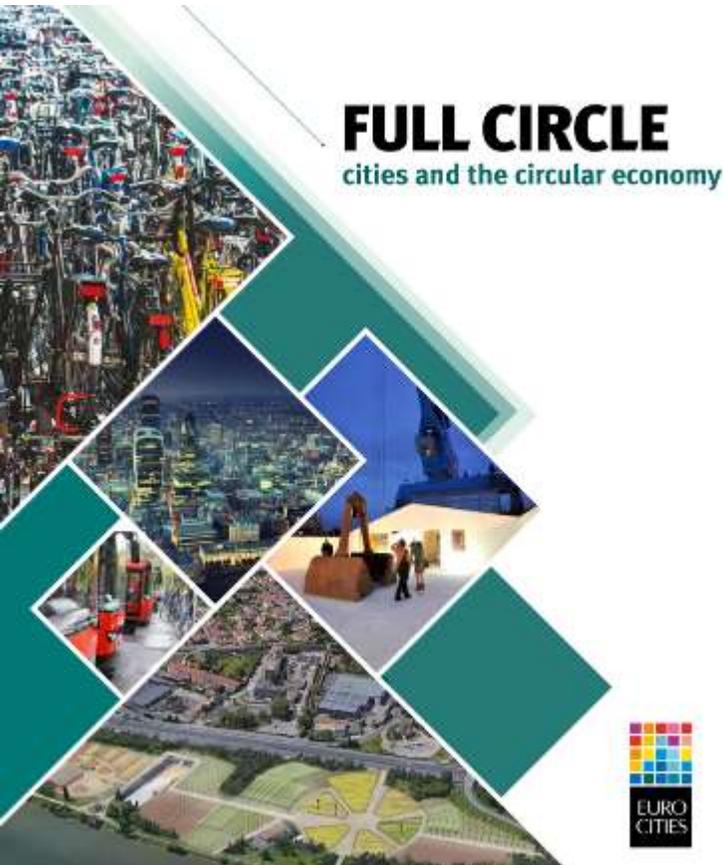
A Selection of Case Studies



Inspire policy making by territorial evidence



CIRCTER – Circular Economy and Territorial Consequences



Scientific papers



Original Research Paper

Circular Cities: Mapping Six Cities in Transition

Sharon Prendeville^{a,*,1}, Emma Cherim^b, Nancy Bocken^b

^a Institute of Design Innovation, Edinburgh University, Leazes, 3 George Square, The Braidside Centre, New East, Leeds, LS2 9JZ, UK

^b Design Engineering, Faculty of Industrial Design, Delft University of Technology, The Netherlands



Evaluation of Urban circular economy development: An empirical research of 40 cities in China

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^c Beijing Institute of Technology, School of Management and Economics, Beijing, 100001, China

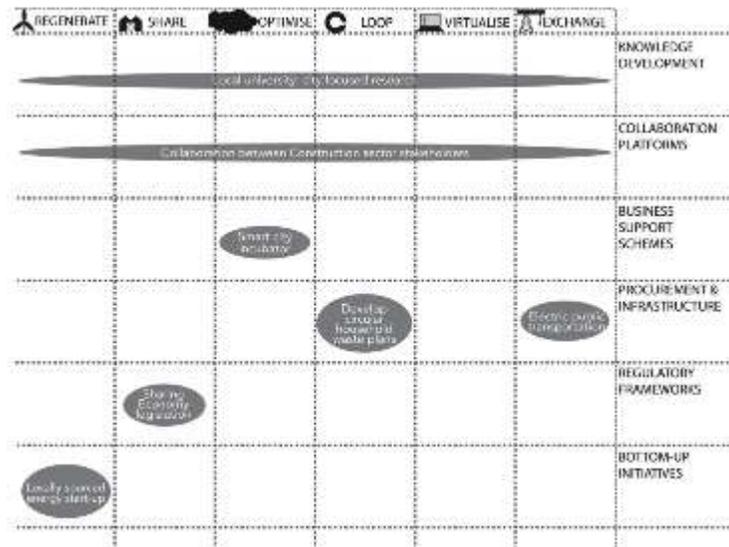


Fig. 2. Circular city project map adapted from circular city frameworks and ENI (2015) with examples.



Article

Interpreting Circularity. Circular City Representations Concealing Transition Drivers

Julie Marin^{*,1} and Bruno De Meulder

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What is a circular city?

- CLIC project: 11 definitions of circular city from different perspectives: research – in economics, planning, ecological economics, applied finance, technology, decision science, governance models, social science – as well as cities, regions, practitioners.

Some insights from CLIC project

- To be able to apply a circular economy in a society it necessary that the **thinking and mindset** of a sustainable city is working in a circular way. Therefore it's important and necessary to see **co-operation rather than competition**.
- A major issue that has been taken seriously in recent times is the **urban landscape and the countryside perspective**. How cities and countries can collaborate rather than seeing each other as competitors. But also how **rural areas are to be seen as a great resource** for much of the unified economy and products, how we **take care** of our resources and care for them properly.

(Vastra Gotaland region, Sweden)

Some insights from CLIC project

- We advocate that the circular city model treats the city as a consolidated and interdependent entity. Urban investments are thus examined as **integrated sustainable urban investments**, where a cross-subsidy process between projects can spread and decrease financial risks. Most importantly, the circular city model accelerates investments in projects like the **adaptation of urban heritage assets** without the need for grants or state aid, but rather by leveraging the different returns of the urban investments.
- In the circular city model, by **combining** different types of urban projects and **fostering synergies** and impacts between investments, it is feasible to **obtain effective financial returns** for investors.

(University College London - applied finance)

Some insights from CLIC project

- The circular city model as an answer to challenges stemming from exhaustion of natural resources and wasteful economy of modern cities. It proposes the waste management system that lowers the strain on the environment and **creates additional educative values including social responsibility and social entrepreneurship.**
- The circular city is where waste is managed and reused more effectively, and the resources and energy is saved and retrieved. The circular approach means less pressure on our environment, new business models, innovative designs and **new alliances and cooperation between different stakeholders.**

(University of Warsaw, Institute of Social Science)

Keywords of circular city from CLIC perspective

- **Reduction of wastes** and of **natural resources consumption**
- **Regeneration of city-countryside relationships**
- **Cooperation, symbioses, synergies**
- **Integration and optimization of urban investments** (systemic approach)
- **Reuse of urban «wastes»** as resources
- **«Mission-oriented» and self-sustainable businesses** and investments
- **Civic responsibility** and «care»
- **Multidimensional productivity**: economic, ecological, social, cultural
- **Cultural Heritage as the «memory» of the urban system**, a permanent but adapting element in the urban ever changing, living dynamic, a **connective infrastructure** able to «glue» people and places

Key strategies for circular cities from CLIC perspective

- Reduce natural resources consumption stimulating the adoption of suitable technology and sustainable production-consumption models
- Regenerate city-countryside synergies: relocalize close loops at local level (relocalize economic processes)
- Integrate the urban investments to generate positive cumulative impacts, optimising financial resources
- Stimulate cooperation, symbioses, synergies among city stakeholders and between different urban areas as well as entire regions
- Recover urban «wastes»: abandoned industrial areas / brownfields, disused buildings, landscapes, also stimulating sharing of spaces/uses
- Enhance businesses multidimensional productivity: re-generate economic value as well as ecological, social, cultural values - (also acting also on the market demand side for sustainable products and services)
- Stimulate mindset shift towards cooperation between all actors: research, local governments, enterprises, investors, civil society organizations
- Stimulate the **adaptive reuse of cultural heritage buildings**, sites and cultural landscapes

Drivers to the implementation of a circular city

- work closely together with the **private sector and research institutes**
- **involve the entire city administration** from the very beginning
- **use existing strategies**, such as green procurement
- **in-depth evaluation** combined with **strategic advice for political success**
- **multi-stakeholder approach**
- **political vision and leadership**
- **stakeholders commitment** and **pro-active role**
- **bottom-up approach**
- **co-creative and iterative process**
- **participatory governance**
- encourage **mindset changes**
- **sharing of resources**
- **sharing of costs**
- **spatial proximity of interlinked initiatives**
- **education and knowledge sharing**
- **trust, confidentiality, openness, equality and cooperation**
- ...

3. Adaptive reuse of the historic built environment

Circular city key strategy: Adaptation

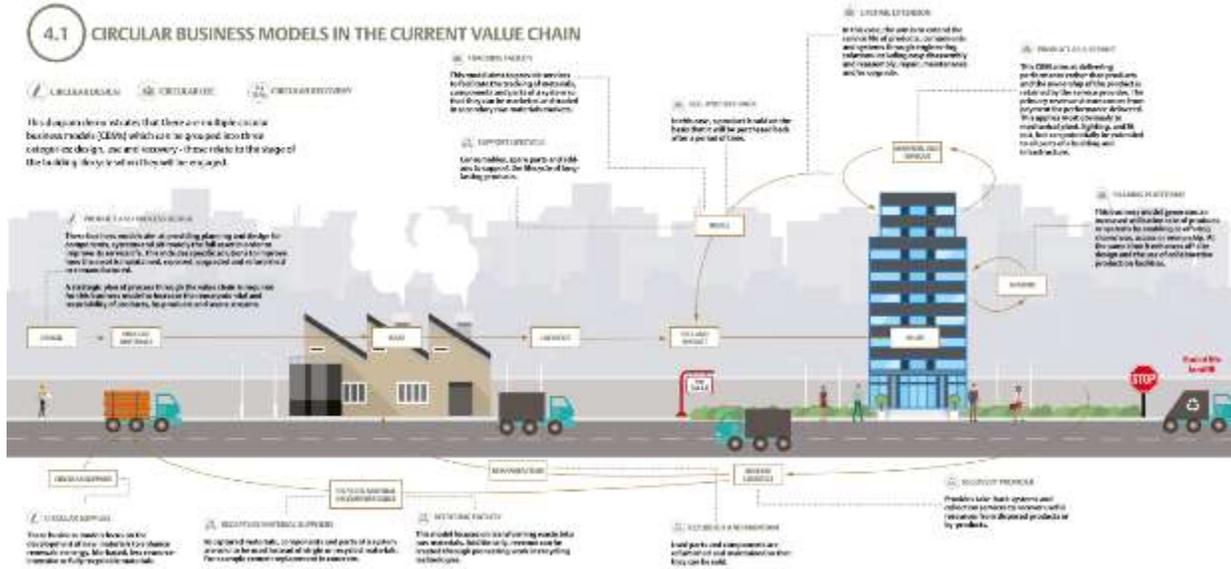
- **Adaptation** is the capacity of one entity or system to change over time in response to changing contextual factors.
- Adaptation implies the reuse, repairing, refurbishing, remanufacturing, repurposing, recycling and recovering of existing urban assets
- Applied to **built environment**, it *“involves shifting mindsets from designing buildings as if there was no tomorrow to envisaging their entire life cycle.”*

Should we favour structures such as Greek temples that reflect the great genius of their time and last for several thousand years or traditional Japanese houses home-made of paper and wood, designed to be repaired and eventually destroyed and replaced after only 20 years?

*These two options are not mutually exclusive. For landmark buildings or large infrastructure works, for example, designing a structure with **high embodied energy** can make sense as long as the design allows adaptability and flexibility in order to extend its lifespan”.*

(Gravis L on circulatenews.org, Future of cities construction and the built environment, 2018)

Circular economy for the built environment



2050, un modèle bruxellois circulaire



ARUP & BAM, Circular Economy for the Built Environment, 2018
 Brussels circular region, Construction sector in Brussels, Towards a circular economy, 2018

«Reuse» of intangibles in the circular perspective

- Adaptive reuse of cultural heritage contributes also to reuse / regenerate knowledge, as well as identity and meanings, contributing to regenerate micro-communities, community bonds

How to assess the contribution of cultural heritage adaptive reuse to circular city implementation?

4. Circular historic port cities

Circular historic port cities

- Why port cities?

Cities, in particular **port cities**, are hubs of economic activity, innovation, social exchange, built and cultural heritage, and environmental sensitivity.

Port areas/cities can constitute the **entry point and core place for sustainable development for the entire urban/metropolitan/regional system**. To understand and exploit the potential of cities it will be necessary to design an analytical framework which would **link the new opportunities provided by traditional urban areas to creative and sustainable urban development**. From that perspective, there is a need to develop fit-for-purpose, dedicated policy tools and initiatives, on the basis of general planning principles for transforming general issues into action practices.

The **evaluations of best/good practices** are considered as the first step for new knowledge production on the base of specific indicators, for **developing new tools, methods and approaches for planning and managing complex urban dynamic systems** that foster **creativity, resilience and sustainability of the city**.

(UNI Habitat, Urban Regeneration Hub: <http://uni.unhabitat.org/thematic-hubs/urban-regeneration/>)

The ongoing research on circular historic port cities

Overall research questions:

- Questioning the circular city model: which principles, approaches, strategies? Which urgent urbanization challenges it addresses?
- Which specific challenges for circular city implementation in historic cities?

Specific objective of this paper:

- To analyse circular city strategies in historic cities and assess whether and how cultural heritage adaptive reuse can be integrated into the circular city model – through the analysis of adaptive reuse projects in ‘circular’ historic port cities

Methodology:

- Identification of historic port cities that are adopting circular city strategies (Rotterdam, Marseille, Lisbon, Antwerp, Hamburg, London, Amsterdam ...)
- Analysis of overall circular city strategies in 5 selected historic port cities: Rotterdam, Marseille, Lisbon, Antwerp, Hamburg. Where are cities investing to boost circular economy?
- Identification and analysis of cultural heritage adaptive reuse projects: How are they contributing to circularization of processes at local level? How are they creating “complex” value? (economic, environmental, social, cultural)
- Evaluation framework for circular adaptive reuse of cultural heritage: identification of evaluation criteria at micro level in the perspective of the circular economy / circular city model

Next steps:

- Database of adaptive reuse practices, comparative analysis, best practices identification, identification of transferable models, feedback process with end-users, and recommendations to different stakeholders

5. Mapping circular strategies in historic port cities

- 5.1. Mapping circular city programmes, plans and policies
- 5.2. Mapping cultural heritage adaptive reuse projects

Review of literature / documents on circular city strategy

Hamburg

- **Vermeulen S.** (2016). A relationship between port profiles and policies regarding the circular economy. A policy study of a selection of ports in Hamburg - Le Havre range. Erasmus School of Economics – Erasmus University Rotterdam
- **Fiedler R.** Sustainable Waste Management in the European Green Capital 2011
- **Siechau R.** (2018). Waste management Germany – Hamburg
- **Plastic ZERO** - Public Private Cooperation for Avoiding Plastic as a Waste
- **Fusco Girard L., Di Palma M. (2016).** La simbiosi come strumento di rigenerazione urbana nelle città portuali. BDC Bollettino del Centro Calza Bini vol. 2 2016. ISSN 1121-2918, pp.239-250.
- Nudgesustainabilityhub.com
- www.windpower.org
- www.marketing.hamburg.de
- www.arthur-krveger.de
- www.nudgesustainabilityhub.com
- Port of Hamburg, 2015b: www.hafen-hamburg.de
- Nudgesustainabilitybub.com

Review of literature / documents on circular city strategy

Antwerp

- Invader (2015). Sustainable waste management in the circular economy. Sustainability report. www.invader.com
- Clark G., Moir E., Moonen T., Couturier J. (2016). Pathways to a competitive future. Antwerp case study. Urban Land Institute
- Marin J. De Meulder B. (2016). Antwerp city wastescapes – historic interplays between waste & urban development. 17th IPHS Conference, HISTORY - URBANISM – RESILIENCE, Volume 03 Change and Responsive Planning Ports, Industry and Infrastructure | Coastal Landscape. DOI: <http://dx.doi.org/10.7480/iphs.2016.3.1261>
- B. Kuipers (2015). Port as catalysts for change towards a circular economy. Illustrations from the ports of Amsterdam and Antwerp. Erasmus University Rotterdam. ESPO conference.
- www.vito.be
- www.sustainableportofantwerp.com
- www.uia.initiative.eu
- www.synchronicity-iot.eu
- Businessantwerp.eu
- www.plasticeurope.org

Review of literature / documents on circular city strategy

Lisbon

- Pinto M. J. N. et al (2006). Proposta de revitalização da Baixa-Chiado. Baixa Chiado, 2006
- M. Pinheiro (2018). Desafios Ambientais e da Sustentabilidade em Engenharia (DASE). Economia Circular - Projetar a sustentabilidade para Economia verde. Sustentabilidade nos Ambientes Construídos. Oportunidades de Mudança. Digitalização da Construção. Síntese. Tecnico Lisboa.
- www.indro.it
- www.repositorio.ul.pt
- www.cm-lisboa.pt
- www.circulareconomy.pt
- www.egf.pt
- www.portugalagro.fil.pt

Review of literature / documents on circular city strategy

Marseille

- France Urbaine. Vivapolis (2015). La creativite francaise pour la ville. La reseau des acteurs publies et prives de la ville durable. Economie circulaire
- Mat N. (2015) Using industrial ecology for energy transition of Marseilles-Fos's port city. Conference of E-harbours Movement in Amsterdam Metropolitan Area Energy transition in ports and cities. Institute Mines Ales
- Mat N. (2018). Plateforme industrielle e innovation de carbon tankin. Piicto by Marseille Fos. www.piicto.fr
- Cordier M. (2011). La reduction des deschets. Sur le territoire marseille provence. Aix Marseille provence
- www.marseille-port.fr
- www.epur.fr
- zerowastemarseille.org
- www.economiccirculaire.org;
- www.isige.mines-paristech.fr
- www.trionsnosdechets-mpm.fr
- <http://piicto.fr/en/>

Review of literature / documents on circular city strategy

Rotterdam

- Van der Does de Bye M. Roadmap circular economy Rotterdam. Gemeente Rotterdam
- Prendeville S., Cherim E., Bocken N (2018). Circular Cities: Mapping Six Cities in Transition. Environmental Innovation and Societal Transitions. Elsevier
- City of Rotterdam. Making sustainability a way of life Rotterdam. Rotterdam Programme on Sustainability and Climate Change 2015-201.
- <https://jaarstukken2016.rotterdam.nl/>
- www.rotterdamclimateinitiative.nl
- www.nereus-project.eu
- www.supplychaindive.com
- recycledpark.com

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- Van der Does de Bye M. Roadmap circular economy Rotterdam. Gemeente Rotterdam
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- www.rotterdamclimateinitiative.nl
- www.nereus-project.eu
- www.supplychaindive.com
- recycledpark.com

Historic port cities: circular sectors of investment identified

1. Overall literature review on circular city concept: including studies on **Japan's industrial symbioses, China's national plan for circular economy and cities, European orientation documents and research projects, European policy documents on circular economy and city including the Partnership Circular Economy in the Urban Agenda for the EU (Pact of Amsterdam).**

2. Analysis of specific city literature: orientation documents, policy documents, formal and informal initiatives on sustainable and circular city

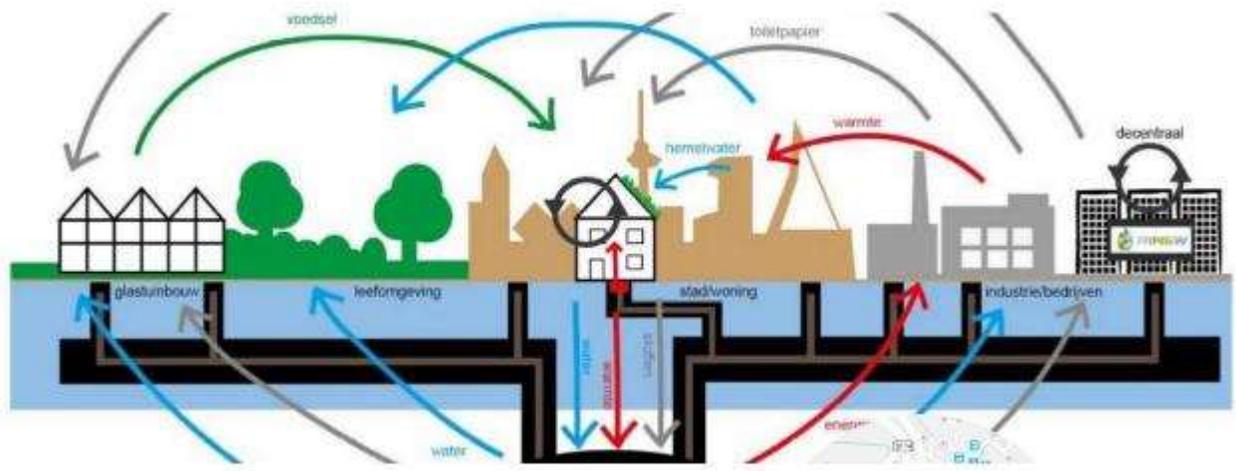


Key Sectors
Built environment
Energy
Waste
Water
Industrial production
<i>Plastic</i>
<i>Textile</i>
<i>Industry 4.0 and Circular Design</i>
Agri-food
Citizens and communities

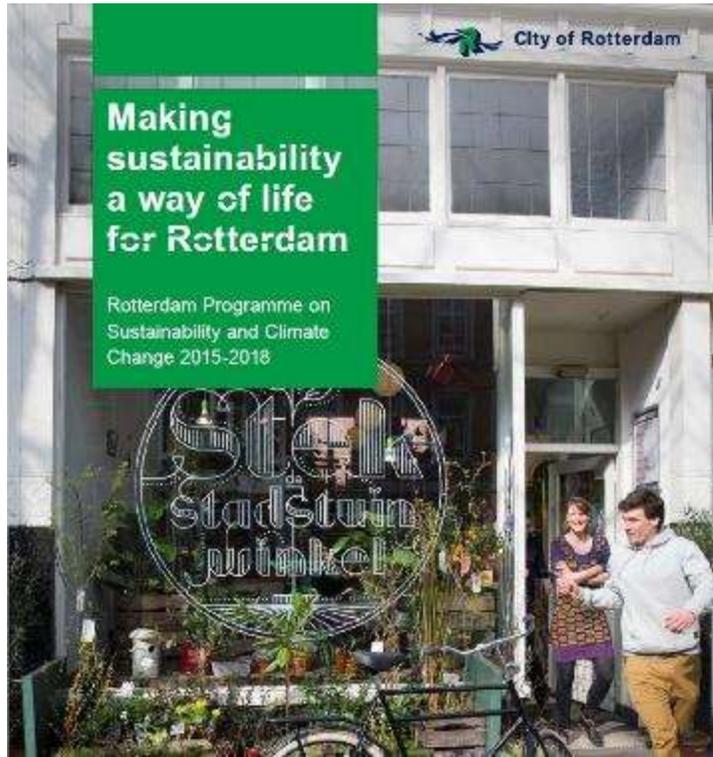
Sectors / Cities	Projects	Literature
Built environment	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 - Project Rosa 	<ul style="list-style-type: none"> - Van der Does de Bye M. - Prendeville S., 2018
Energy	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 - Rotterdam Programme on Sustainability and Climate Change 2015-2018 	<ul style="list-style-type: none"> - Van der Does de Bye M. - City of Rotterdam
Waste	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 	<ul style="list-style-type: none"> - Van der Does de Bye M.
Water	<ul style="list-style-type: none"> - Green Roofs Programme - Nereus Pilot Rotterdam 	<ul style="list-style-type: none"> - www.rotterdamclimateinitiative.nl - www.nereus-project.eu
Industrial production		
<i>Plastic</i>	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 - Port of Rotterdam plastic recycling project - Floating park - Recycled Park 	<ul style="list-style-type: none"> - Van der Does de Bye M. - www.supplychainedive.com - recycledpark.com
<i>Textile</i>		
<i>Industry 4.0 and Circular Design</i>		
Agri-food	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 	<ul style="list-style-type: none"> - Van der Does de Bye M.
Citizens and communities	<ul style="list-style-type: none"> - Jeremy Rifkin Future Vision - IABR Urban Metabolism - Biobased Delta - Blue City Sustainable Community - Rotterdam Climate Initiatives 	<ul style="list-style-type: none"> - Prendeville S., 2018
Waterfront regeneration	<ul style="list-style-type: none"> - Rotterdam circular: the aim for 2030 - Rotterdam Programme on Sustainability and Climate Change 2015-2018 	<ul style="list-style-type: none"> - Van der Does de Bye M. - City of Rotterdam



Project Rosa



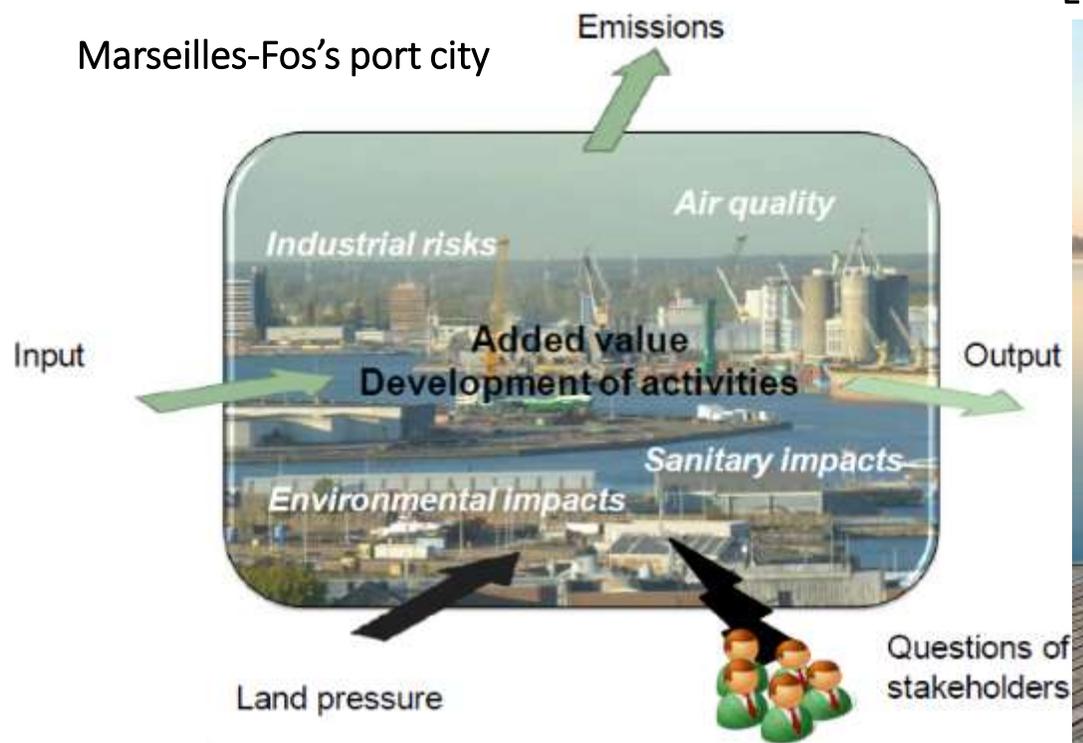
Green Roofs Programme



recycledpark.com



Sectors / Cities	Projects	Literature
Built environment	- Marseilles-Fos's port city	- Mat N., 2015 - Cordier M., 2011.
Energy	- L'innovation au service de la matière	- www.epur.fr
Waste	- Zero waste Marseille	- zerowastemarseille.org - Cordier M., 2011 - www.epur.fr
Water		
Industrial production		
<i>Plastic</i>	- L'innovation au service de la matière	- www.epur.fr
<i>Textile</i>	- Zero waste Marseille	- www.economiccirculaire.org ; - Cordier M., 2011
<i>Industry 4.0 and Circular Design</i>		
Agri-food		
Citizens and communities	- Zero waste Marseille	- www.isige.mines-paristech.fr - www.trionsnosdechets-mpm.fr - Cordier M., 2011 - www.marseille-port.fr
Waterfront regeneration	- PIICTO project Marseille	- http://piicto.fr/en/



L'innovation au service de la matière



Zero waste Marseille



Marseilles-Fos's port city



Sectors / Cities	Projects	Literature
Built environment	- Repositorio de mamaterials platform	
	- Baixa Chiado regeneration	
	- Reuse of recycled concrete for the Lisbon airport	
	- Requalification project of Belas Clube de Campo;	
	- Reuse of historical buildings for	- www.repositorio.ul.pt
	- miinistry of the environment	- Baixa Chiado, 2006 - M. Pinheiro, 2018
	- Requalification project for Hotel Jardim Atlantico	
	- infrastructure rehabilitation of Marginal Alges Oeiras	
<hr/>		
Energy		
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Waste	- Plano municipal de gestao de residuos do Municipio de Lisboa 2015-2020	- www.cm-lisboa.pt
	- Zero desperdicio platform	- www.circulareconomy.pt
	- Repair café Lisbon	- www.circulareconomy.pt
	- Reciclagem nas cidades – Projecto R4R	- www.circulareconomy.pt
	- Comboa	
	- Bazar Circular	
Water	- Valorsul/Epal Projecto	- www.egf.pt
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Industrial production		
	- <i>Plastic</i> Plastico Circular	- www.circulareconomy.pt
	- <i>Textile</i> Re:Costura	- www.circulareconomy.pt
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<i>Industry 4.0 and Circular Design</i>		
Agri-food	- Portugal Agro	- www.portugalagro.fil.pt
Citizens and communities	- Repair café Lisbon	- www.circulareconomy.pt
<hr/>		
Waterfront regeneration		

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BAIXA-CHIADO

PROPOSTA DE REVITALIZAÇÃO
SETEMBRO 2006



RE COSTURA



REPAIR CAFÉ

Lisboa

OBJECTIVO

REUTILIZAR
RECURSOS
SECUNDÁRIOS



EVITAR
DESPERDÍCIO

CONSEQUÊNCIAS

Redução
da utilização
de recursos
naturais



Menos gases
com efeito
de estufa

Mais
emprego



Mais valor

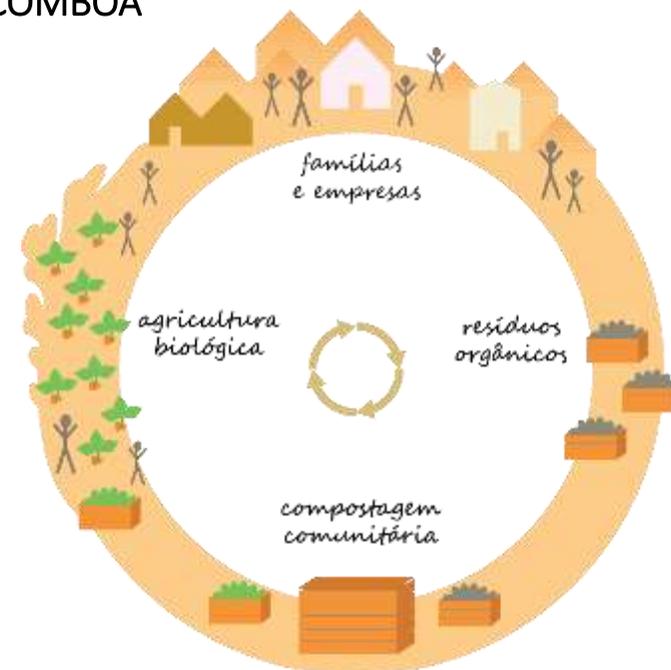
Preservar
o passado



Estimular
a criatividade

BAZAR CIRCULAR

COMBOA



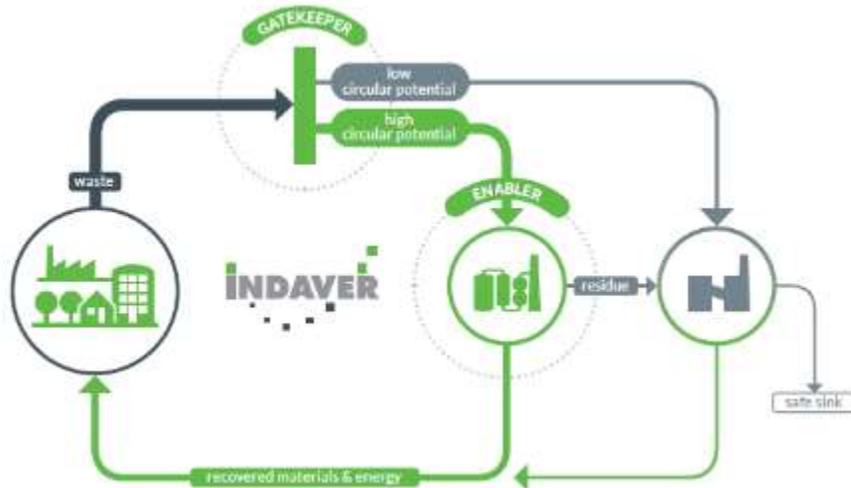
PLASTICO CIRCULAR



Sectors / Cities	Projects	Literature
Built environment	- New South circular waterfront district	- www.uia.initiative.eu
Energy	- Energy efficiency for smart buildings - Strategic plan for the city energy reconversion - Synchronicity platforms (to share energy data)	- Invader, 2015 - www.synchronicity-iot.eu - Clark G., et al, 2016
Waste	- A great European port city where innovation meets business	- Invader. 2015 - Businessantwerp.eu
Water		
Industrial production		
<i>Plastic</i>	- A great European port city where innovation meets business	- Invader, 2015 - www.plasticeurope.org
<i>Textile</i>		
<i>Industry 4.0 and Circular Design</i>		
Agri-food	- A great European port city where innovation meets business	- Businessantwerp.eu
Citizens and communities	- New South circular platform - Antwerp city wastescape	- Businessinantwerp.eu - www.uia.initiative.eu - www.vito.be - Marin J. De Meulder B., 2016
Waterfront regeneration	- Vision on technology for a better world	- www.vito.be - businessantwerp.eu - B. Kuipers, 2015

< ANTWERP AS A EUROPEAN LIVING LAB FOR CIRCULAR ECONOMY WITH CIRCULAR SOUTH

New South circular waterfront district



News

Home > News > New billion-euro investment in the Port of Antwerp

■ Radar 72 - May 2015

- New billion-euro investment in the Port of Antwerp
- Port of Antwerp invests in the future
- Another strong start after a record in 2014
- Antwerp keeps putting its weight behind world-class oil

New billion-euro investment in the Port

Thursday 07 05 2015 | The leading Saudi Arabian company Energy R (ERS) with its innovative solutions for recovering energy from waste in Delwaide dock concession.



The Antwerp Port considered the re-issued at the end areas of the Delwaide received, the Energy Recovery project for this port Authority managed

H A M B U R G

Sectors / Cities	Projects	Literature
Built environment	- Greenpace Germany Hamburg	- Nudgesustainabilityhub.com
Energy	- Danish Wind Industry Association	- www.windpower.org
Waste	- Stadtreinigung Hamburg	- Siechau R., 2018
Water	- Hamburg marketing	- www.marketing.hamburg.de
Industrial production		
<i>Plastic</i>	- Plastic ZERO - Public Private Cooperation for Avoiding Plastic as a Waste	- Siechau R., 2018 - www.arthur-krveger.de
<i>Textile</i>	- Nudge Sustainability Hub	- www.nudgesustainabilityhub.com
<i>Industry 4.0 and Circular Design</i>		
Agri-food		
Citizens and communities		
Waterfront regeneration	- Port of Hamburg (wind turbine, reuse the materials, monitoring the Co2 emissions, sustainable buildingsuse of sulfur.free fuel)	- Vermeulen S., 2016 - Port of Hamburg - Nudgesustainabilityhub.com

Greenpace Germany Hamburg

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nudge[©]

Sustainability Hub



STADTREINIGUNG.HAMBURG



Port of Hamburg



Port of Hamburg



capital of the wind energy



Comparative analysis (ongoing)

Sectors / Cities	Amsterdam	Rotterdam	London	Antwerp	Hamburg	Marseille	Lisbon	Frequency
Built environment	•	•	•	•	•	•	•	7/7
Energy	•	•	•	•	•	•	•	7/7
Waste	•	•	•	•	•	•	•	7/7
Water	•	•	•	•	•			5/7
Industrial production								
<i>Plastic</i>	•	•	•	•		•	•	6/7
<i>Textile</i>	•		•	•	•			4/7
<i>Industry 4.0 and Circular Design</i>	•		•					2/7
Agri-food	•	•	•	•		•	•	6/7
Citizens and communities	•		•	•		•	•	5/7
	9/9	6/9	9/9	8/9	5/9	6/9	6/9	

Mapping cultural heritage adaptive reuse projects in 5 selected cities

- Rotterdam
- Marseille
- Lisbon
- Antwerp
- Hamburg

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HAKA-building boasts



CULTURAL HERITAGE

'Pakhuismeesteren van de Thee'



Van Nelle Fabriek



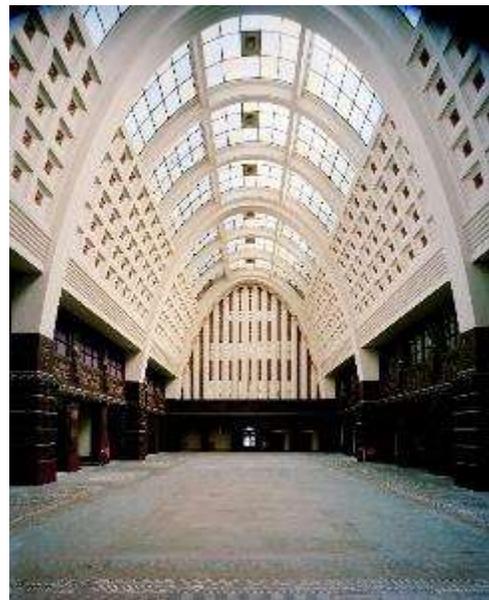
Bestand:Hotel New York Rotterdam

Venlo



Voormalig postkantoor
Rotterdam wordt hotel

village of Heijplaat



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La Friche de la belle de Mai



CULTURAL HERITAGE The docks of Marseille



Norman Fosters mirror pavilion



Redevelopment of the Hôtel-Dieu building in Marseille



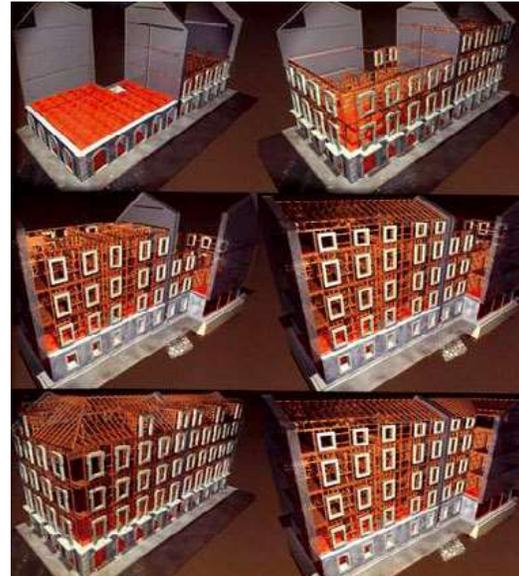
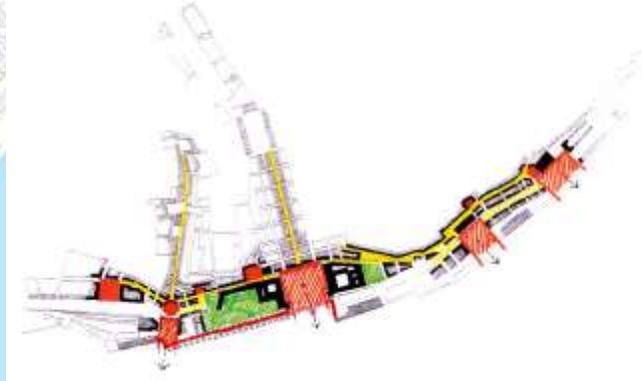
Le silo d'Arènes



BAIXA-CHIADO

CULTURAL HERITAGE

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Port House Zaha Hadid



Kanaal building



WDT hangar conversion



CULTURAL HERITAGE Kendall - Antwerp



Antwerp Stock Exchange - Being
reconverted into a Marriott Hotel



Mas Museum



Antwerp Water Tower
Transformed Into
Translucent 6-Story
Apartment



Reconversion of roof terrace



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Elbphilharmonie



Energy Bunker - Wilhelmsburg, Hamburg



CULTURAL HERITAGE

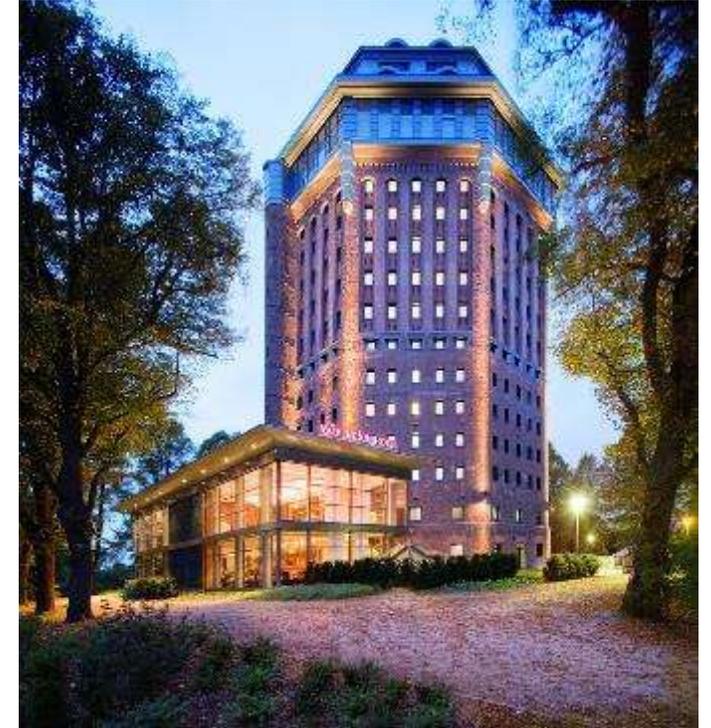
Kontorhaus District and Chilehaus



Oberpostdirektion



Mövenpick Hamburg



Störmer Murphy and Partners GbR



6. Criteria for the evaluation of cultural heritage adaptive reuse projects in the perspective of the circular economy / circular city model

Which evaluation criteria for circular adaptive reuse of cultural heritage?

Three levels of circularity:

1. **Cultural values conservation and enhancement**
2. **Circularity of conservation works (raw materials, energy, water, soil..)**
3. **Impacts in the area due to increased attractiveness**

Drawbacks:

- **Negative impacts:** gentrification, mass tourism, loss of authenticity, “AirB&b effect”, social conflict, loss of biodiversity, loss of local jobs...

Transferability:

- **Circular business, financing and governance model** enabling the success of adaptive reuse practices

Cultural values conservation and enhancement: criteria of evaluation

1. Conservation of heritage values
2. Communication of heritage values
3. Integration of historic and contemporary values
4. Enhancement of accessibility of cultural heritage
5. Enhancement of education, knowledge, skills

Circularity of conservation works: criteria of evaluation

6. Enhancement of energy efficiency
7. Water consumption reduction
8. Reduction of raw materials extraction
9. Reduction of construction waste and landfill
10. Reduction of soil consumption
11. Natural heritage preservation

Impacts in the area due to increased attractiveness: criteria of evaluation

12. Economic growth
13. Enhancement of attractiveness of the area
14. Urban landscape quality enhancement
15. Safety enhancement
16. Place identity enhancement
17. Social cohesion enhancement
18. Civic pride enhancement
19. Cultural life enhancement
20. Health and wellbeing enhancement
21. Reduction of inequalities
22. Optimization of urban finance
23. Enhancement of regional competitiveness and attractiveness
24. Enhancement of urban-rural cultural landscape
25. Enhancement of circular territorial relationships

Circularity of business model

- Economic and financial self-sustainability
- Circular uses / business activities
- Local resources valorisation
- Sharing of spaces, resources, knowledge

Circularity of financing model

- Reduction of pressure on public finance

(Private investment rate, Local investments made, Crowdfunding initiatives, PPP, Tax credit programmes, Foundations contributions, Banks contributions, ...)

- Circular investments / re-investment mechanisms

(Revolving funds, Impact-based investment products - e.g. Social Impact Bonds, blockchains, ...)

Circularity of governance model

- Multi-actor Partnerships / Agreements
- Involvement of third sector actors and “mission-driven” businesses
- Stimulation of ethical and local investments
- Management of heritage as common good
- Stimulation of civil economy

Negative impacts

- Gentrification
- Stable residents' abandonment (AirBnb effect, or due to financiarization of material assets)
- Mass tourism
- Traffic congestion
- Loss of authenticity
- Biodiversity loss
- Wastes production
- Unhealthy / unsustainable materials in the life-cycle perspective
- Social conflict (strengthening of in-group-outgroup processes, elitism)
- Loss of local skills
- Loss of local jobs
- ...

7. Pilot study: an example of circularity assessment for cultural heritage adaptive reuse in Italy

- Villa Campolieto, Metropolitan area of Naples, Ercolano, Italy

Villa Campolieto, Ercolano, Naples



Villa Campolieto, Ercolano, Naples



Villa Campolieto, Ercolano, Naples



View of the whole building

Villa Campolieto, Ercolano, Naples

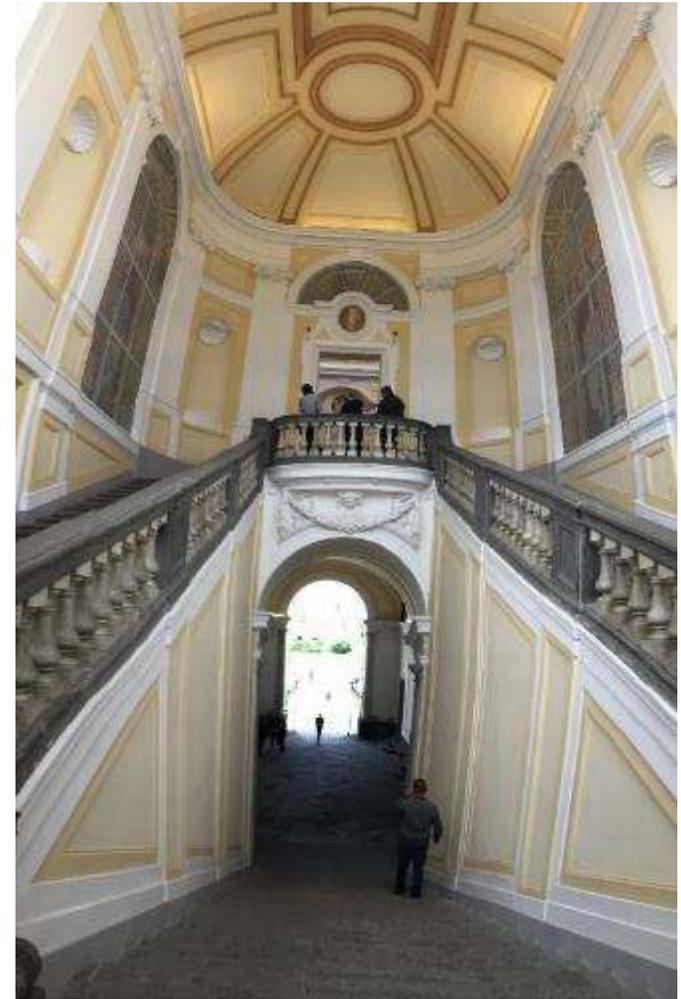
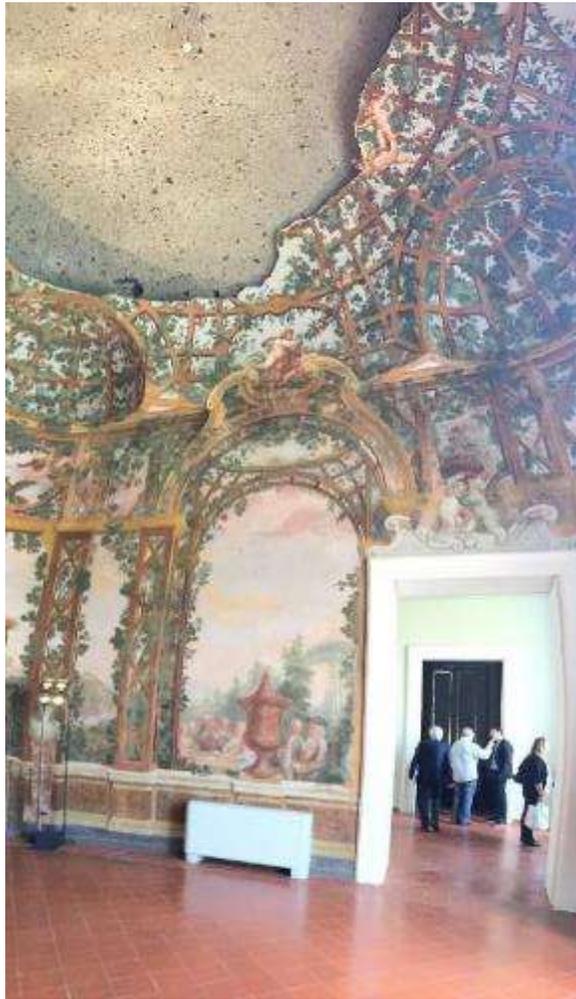


Interiors

Villa Campolieto | highlights

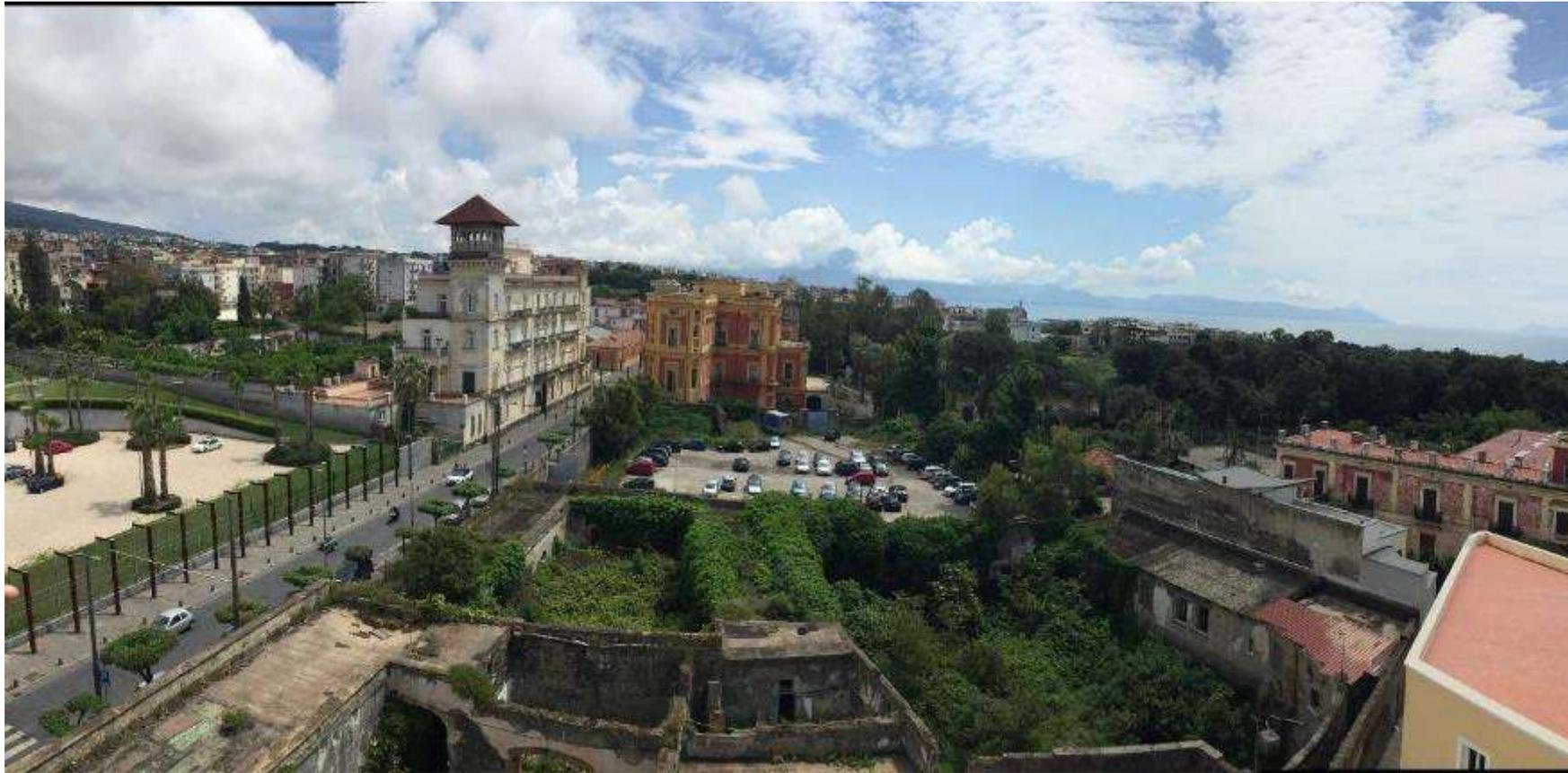
- Historic building and garden realized by arch. Vanvitelli and son between 1755-1775 as residential building
- It was in state of ruins in the early 70s
- Initial MIBACT Investment for the Restauration, 1 M€ between 1970 and 1980; further major restauration in 2010 of 6 M€ with public funding; ordinary maintenance works performed on a timely basis
- Today it is managed by the public Foundation «Ente Ville Vesuviane»
- Reuse for cultural visits, education and training centre, music and arts festivals, school educational activities, private events (marriage)
- Cost-Revenues annual balance in the management phase: no economic loss for the public owner for its functioning
- Renewable energy system on the roof, compatible with heritage value
- Recovery of the ancient water recycling system
- 10.000 visitors per year (40.000 € earned, standard ticket 3€ for 1 h visit)

Villa Campolieto, Ercolano, Naples



Restoration of the interiors: arch. Paolo Romanello (actual director of the Foundation Ente Ville Vesuviane)

Villa Campolieto, Ercolano, Naples



Surroundings

Villa Campolieto, Ercolano, Naples



Surroundings

Business/management model

Operating costs per year:

- Personnel costs (administrative and marketing): € 150 K
(tot. 300K to manage 4 buildings)
- Restoration, repairing and special maintenance /
upgrading works: € 50 K
- Electricity, Gas, Water consumption: € 18 K
- Property taxes: € 4 K
- Cleaning and ordinary maintenance: € 40 K

Total costs per year approx. € 260 K

Business/management model

Main revenues per year:

- Visits to the heritage building/site: € 40 K
- Renting of spaces for private events (marriage): € 100 K
- Renting of spaces for educational activities: € 91 K
(1.000 €/mq)
- Grants for specific projects (e.g. Festivals): € 300 – 500 K

Some private functions (marriage) cover costs for other public functions (free visits, heritage conservation...)

Total revenues per year manage to balance operating costs

Villa Campolieto, Ercolano, Naples



New uses: conference



New uses: education and training rooms

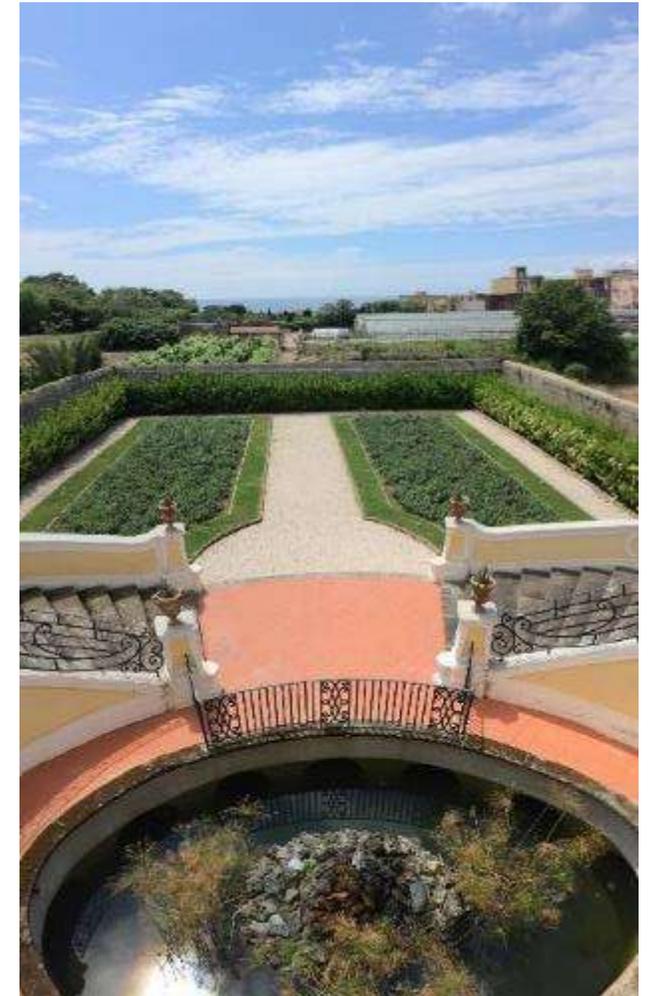
Villa Campolieto, Ercolano, Naples



New uses: banqueting



New uses: the «portico» and garden for marriages



IMPACTS

Environmental positive impact

- Energy efficiency technologies (led lightning), Renewable energy production (photovoltaic roof 60 KW power), Recovery of historic water management / storage systems

Cultural positive impacts

- Restauration, conservation and maintenance of the heritage
- New artistic lightning design ongoing

Social and economic impacts

- 8 permanent jobs created in administration and management, other jobs indirectly created through consultant companies working at specific events
- Creation of new commercial activities in the surroundings linked to the image of Villa Campolieto
- Attraction of foreign and domestic visitors (social cohesion)

WEAKNESSES (in respect to a first circularity assessment)

- Low participation of local community (associations, enterprises...)
- No private capital investment or donations
- Very low marketing and communication activity
- No involvement of cooperative enterprises, sharing economy enterprises, or SSE organizations

Villa Campolieto, Ercolano, Naples



Photovoltaic
rooftop

Villa Campolieto, Ercolano, Naples



Photovoltaic
rooftop

Villa Campolieto, Ercolano, Naples



Photovoltaic rooftop

8. Conclusions: Which motivation placing the adaptive reuse of cultural heritage in a circular city perspective?

- It **reduces wastes and natural resources consumption**, including recovery of lands, buildings and their embodied energy
- It stimulates the creation of new businesses and up-scaling of existing ones, fostering new jobs and **economic growth «decoupled» from resources consumption**
- It is **«convenient» in a multidimensional perspective**: the investment is «repayed» if multiple net impacts are considered, e.g. avoided environmental, economic, social and cultural costs of abandonment, recovery of embodied energy, etc.

But most of all:

- It is necessary to **regenerate «bonds» in our increasingly atomized society**, recovering the **relationship between people and places, people and nature, people and people**: the non-economic conditions for economic development.

To do this, it is necessary to **recognize the complex value of cultural heritage** for society, its meaning (Burra Charter, 2013; FARO Convention, 2005...) , its **«intrinsic value»**, to **identify compatible uses** able to stimulate and **regenerate relationships**.

Cultural Heritage adaptive reuse can support this **systemic multidimensional productivity** by **regenerating not only materials and assets**, but also **identities, values, sense and meanings**: regenerating the «intrinsic value» of cultural heritage.

Questions & Answers

**International Expert Workshop
'The Science of the Smart City 2.0':
Urban Liveability, Climate Change and Circular Economic Futures**

Naples, October 29-30, 2018

**Cultural Heritage Adaptive Reuse in
Circular Port Cities: An Overview**

Antonia Gravagnuolo

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Thank you!

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