

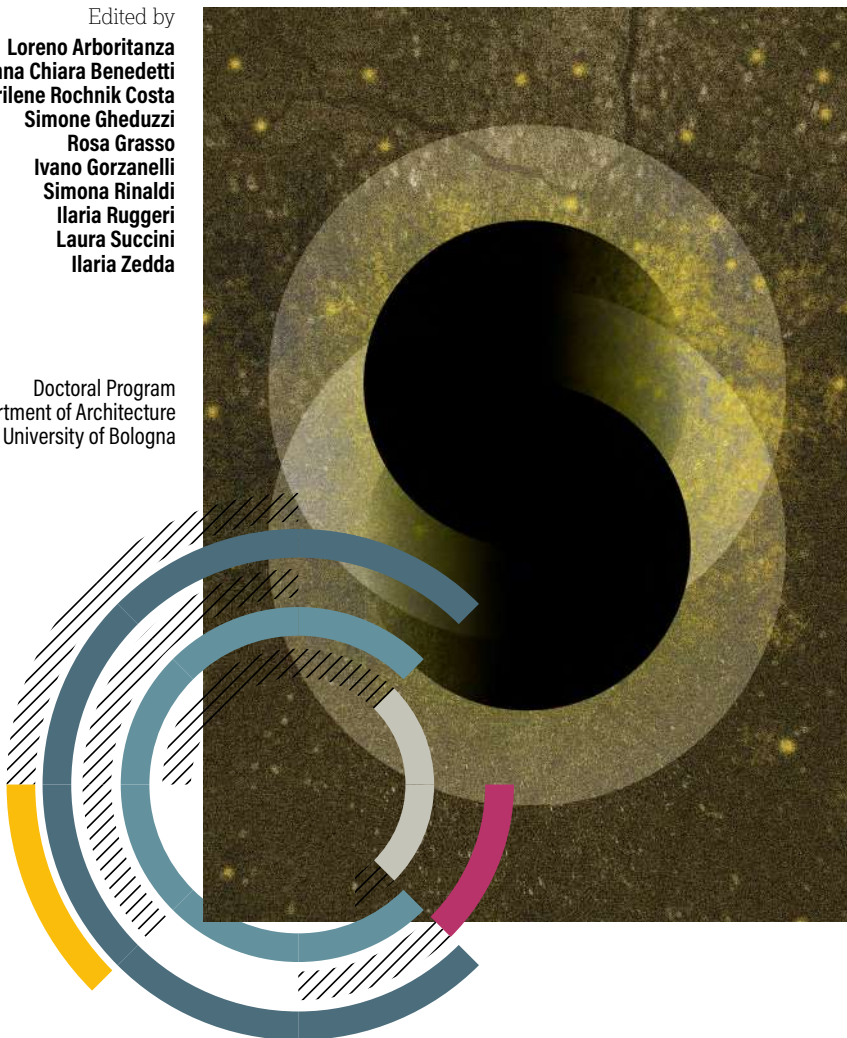
# The Ecological Turn

Design, Architecture and Aesthetics  
beyond "Anthropocene"

Edited by

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Doctoral Program  
Department of Architecture  
University of Bologna





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## Material Preservation: Reuse of Man-made Capital as an Ecological Approach in Architectural Design

Built Environment; Circular Economy; Reuse; Urban Mining; Bricoleur.

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This paper aims to depict the potential role of the reuse of building products and components as a sustainable strategy for the management of the built environment, as well as evaluate the contributions this perspective brings to the architectural and cultural debate. Among the circular strategies, reuse exceeds the ecologic potential of recycling processes, as through the preservation of man-made capital – understood as a product of the Anthropocene – it ensures the persistence of the material culture that conceived it. In this paper I shall discuss the implementation of reuse through an overview of the European practitioners' activity in the field. The first section contextualises reuse within a multidisciplinary framework, illustrating its role as a resource efficiency approach in urban mining strategies. The second section details the implications of this approach for the methods and outcomes of architectural design, both through an examination of the current theoretical position and the analysis of contemporary case studies, stressing the ecological purpose and cultural significance of these practices. The third section analyses how the *bricoleur* approach in architecture represents an attitude able to ensure the preservation of both cultural and natural capital, framing this perspective in the contemporary architectural domain.

## Introduction: value retention of resources in the Anthropocene

Although still lacking a formal definition as a geological time unit, the Anthropocene is generally considered the consequence of the mounting impact of human activity on Earth.<sup>1</sup> According to stratigraphic evidence, current research<sup>2</sup> identifies the mid-20<sup>th</sup> century as the breaking point in Holocene dynamics and patterns. As the traces of this change in pace must be sought in the sediments of human activities, nothing better illustrates the stratified evidence of contemporary consumption and production patterns than our built environment. In this respect, Waters and Zalasiewicz<sup>3</sup> argue that concrete, “a ubiquitous component of the modern technosphere” since the 20<sup>th</sup> century, could be considered “the most abundant anthropogenic sedimentary rock on the planet”.

As part of the man-made capital, human settlements were designed according to a linear approach, that is, without taking into account their end of life.<sup>4</sup> Since Construction and Demolition Waste (CDW) accounts for a considerable share of the total waste production, the current state of the European building stock<sup>5</sup> leaves little room for optimism. In the next decades, a large number of buildings will require too many energy, seismic and dwelling improvements to be renovated, and will more likely be demolished. The resulting materials will be recycled, if not disposed of. However, since both energy and matter are subject to degradation, recycling reveals itself as unfit for dealing with linearity's product – waste.<sup>6</sup>

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1 Results of binding vote by AWG (Anthropocene Working Group) released 21st May 2019. Available at: <http://quaternary.stratigraphy.org/working-groups/anthropocene/> [last accessed: 10.2020]

2 Zalasiewicz et al., “The Working Group on the Anthropocene”, 55

3 Waters and Zalasiewicz, “Concrete”, 84

4 Papanek, *Progettare per il mondo reale*, 8

5 EU Buildings Database

6 Georgescu-Roegen, *Energia e miti economici*, 37

Moreover, the circular economy is recently gaining momentum as a strategy fostering sustainability, suggesting how processes belonging to the “inner loops” (e.g. repair, reuse, and remanufacture) should be preferred to recycling since they represent higher forms of “value retention”.<sup>7</sup> In this perspective, the intrinsic value of material resources differs from their economic one: the more the original state of a manufactured good in the economy is preserved through lifespan extension, the more its value retention is ensured. Avoiding the energy and emissions required for both new manufacturing and recycling, or, rather, saving “most embodied resources (energy, material and water)”<sup>8</sup> of a product, reuse strategies prove to preserve both natural and man-made capital.

Consequently, the implementation of reuse processes may constitute an appropriate tool for the sustainable management of the current building stock, promoting life extension of products and components when a building’s end of life appears no longer deferrable.

Could these processes play an active role in contemporary architecture as a means to encourage the preservation of both the natural and built environment? What are the implications of this paradigm in architectural practice and cultural debate?

### **Approach and structure of the research**

According to the perspective outlined above, this paper investigates the reuse of building elements as a significant tool to promote a transition towards a more sustainable built environment, identifying how this contemporary architectural practice demonstrates an ecological approach.

The first part of the paper (paragraph 3) contextualises reuse practices in architecture as instruments for an efficient material

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7 Reike et al., “The Circular Economy”, 248

8 Stahel, *The Circular Economy*, 30

resources management from a multidisciplinary point of view, highlighting the social and economic advantages such practices may generate, as well as their suitability for the preservation of both manufactured and natural capital.

The second part (paragraph 4) examines the dynamics that reuse processes could activate in the resource management of future urban areas, according to a metabolic perspective and through urban mining strategies.

The third part (paragraphs 5 and 6) reflects on the practitioners' bricoleur approach, which enables them to apply their ingenuity in redefining the relationship between the material and form of reclaimed elements and their "second life" function, according to the specific residual performance. This section analyses several international case studies, identifying the reasons that motivated designers to reuse building products and components, besides ecological purposes.

The fourth part of the paper (paragraph 7) analyses and discusses the investigation in relation to current policies and research in the field, finally drawing the research conclusions in the fifth part (paragraph 8).

### **Reuse processes in construction: more than material efficiency**

The externalities of the post-industrial linear economy emerged during the 1960s, under the guise of the "environmental crisis."<sup>9</sup> Although the development myth<sup>10</sup>, advocating an infinite growth in a finite system, does not envision the concept of "limits,"<sup>11</sup> the irreversibility of the economic process<sup>12</sup> was never tackled as a factor leading to resources depletion and environmental

9 Commoner, *Il cerchio da chiudere*, 10

10 Latouche, *Come sopravvivere allo sviluppo*, 27

11 Boulding, "The Economics"; 4; Schumacher, *Piccolo è bello*, 35

12 Georgescu-Roegen, *Energia e miti economici*, 30

deterioration.<sup>13</sup> In this perspective, the circular economy “inner loops”, shifting the focus from production to durability, could contribute to foster sufficiency, rather than efficiency and growth,<sup>14</sup> hence reducing waste.

These strategies could represent a means to address the construction materials footprint, since “even though materials can change their form, they cannot disappear”,<sup>15</sup> and neither can CDW. Acknowledging an economy that “remains too ‘linear’”<sup>16</sup>, recent European policies have been addressing resource efficiency in constructions beyond the buildings’ operational energy, as well as issuing guidelines and protocols to foster proper CDW management. The two Circular Economy Action Plans<sup>17</sup> stress the importance of adopting a life-cycle approach, identifying the construction sector as a key value chain in which to enact circularity and enhance overall sustainability of the built environment.

In particular, the reuse of building elements, preserving the energy and carbon embodied within products and components, enables the reduction of manufacturing emissions, and “is also likely to promote local sourcing, manufacturing innovation and job creations”.<sup>18</sup> The social advantages of processes such as reuse and remanufacture are extensively illustrated by Stahel,<sup>19</sup> who argues their higher labour input due to the connection to a local context in geographical and volume terms, also requiring additional activities that are absent in manufacturing. Moreover, reuse preserves, within the durable elements’ features and

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13 On the contrary, the solution was quite promptly identified in the “sustainable development” narrative, allowing the linear paradigm to endure by relying on green growth (Latouche, *Come sopravvivere allo sviluppo*, 29; Parrique et al., *Decoupling debunked*, 58)

14 Stahel, *The Circular Economy*, 66

15 Lynch, *Deperire*, 125

16 EC, 2019

17 EC, 2015; 2020

18 Gorgolewski, *Resource Salvation*, 21

19 Stahel, “Policy for material efficiency”, 9



performances, the traces of the human design and activities that shaped them.<sup>20</sup> This artificial capital management represents a twofold contribution to the future sustainability of urban areas, promoting both the reduction of their ecological footprint and the conservation of a sedimentary and stratified built environment [Fig. 1].

### Reclamation as a strategy for a circular built environment

Cities' metabolism represents one of the fields to be more carefully governed to foster carbon neutrality. Regarding material flows, buildings and infrastructures fall victim to real estate dynamics, whereby their obsolescence no longer reflects a structural or functional failure,<sup>21</sup> but mainly market trends. The

Fig. 1

Reclaimed tiles, Rotor Deconstruction showroom, Brussels.  
Image by the author

20 Ghyyot et al., *Déconstruction et réemploi*, 84

21 Abramson, *Obsolescence*, 4

assumption that a standing building is more likely a material mine than its rubble in a backfilling would be,<sup>22</sup> implies a more conscious approach than the selective demolition one. Indeed, while separating material flows merely leads to more efficient waste management, salvaging all material resources resulting from a clever strip-out process means considering them as valuable products and components. Urban mining strategies in the architectural field are gradually adopting this perspective, recognising the value embodied in the material stock of a city,<sup>23</sup> and European practitioners in the field have recently been fostering deconstruction more than destruction, hence reuse more than recycling.

The current built environment was not designed for disassembly – as hopefully future constructions will be, which will enable a more efficient management of the elements composing them. Rau<sup>24</sup> argues that contemporary cities represent more “depots” than “mines”, due to the lack of information concerning their embedded stocks. Ghyoot et al.<sup>25</sup> identify the main features of the “ore” that increase salvaging difficulties in its being heterogeneous and unpredictable, scattered and private, and therefore hard to estimate in amount and value. Other difficulties include storage management, higher labour costs, and the amount of time involved in deconstruction. Nevertheless, regardless of the obstacles posed by logistics and market trends, reuse is gradually leaving its niche and becoming part of contemporary architectural research. This approach revives attention to the local as environmentally appropriate, but also to the urban as the ecological and cultural perimeter that is the source of both inspiration and – literally – means.

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22 Lynch, *Deperire*, 217

23 Gorgolewski, *Resource Salvation*, 48

24 Rau and Oberhuber, *Material Matters*, 126-130

25 Ghyoot et al., *Déconstruction et réemploi*, 92-95



“But what would our cities look like if our buildings were to be built from locally available, renewable and salvaged resources”?<sup>26</sup>

### **Making do: the embodied significance of what is at hand**

The environmental advantage is a shared and fundamental motivation among the researchers and practitioners implementing the reuse of building elements. Moreover, the importance given to locally harvested or recovered products and components does not suggest only an ecological motivation, but also an acceptance related to their history. It is therefore worth analysing whether this implication of reuse strategies accompanies the ecological motivation in contemporary design.

In the architectural past, reclamation was a conventional building practice, a way to save materials and labour and, in many cases, to convey a message as well.<sup>27</sup> Even nowadays, reuse means dealing with the history of a man-made product. It involves the context of its design and production, its installation and setup, the construction it was a part of and removed from, but, moreover, it represents the opportunity to design the next step of that product's narrative.<sup>28</sup> These circumstances refer to a resource-conscious approach, which involves several domains of the architectural sphere, including the technical, the material and the cultural ones.

Jeanne Gang<sup>29</sup> argues that the unique physical characteristics of construction materials make it “possible and exciting to work with them as generative forces for a project, rather than relying on form or imagery as a starting point”. The architect suggests that adopting a pre-industrial experimental approach, flexible and open to possibilities, and re-focusing mining on

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26 Gorgolewski, *Resource Salvation*, 1

27 Esch, “Reimpiego”, 876

28 Manzini, *Artefatti*, 45

29 Gang, “The Cook”, 163

the man-made world, would convey this perspective into practice. Analysing 6a architects' attitude, Scalbert<sup>30</sup> points out how "architecture involves some detective work. You look at things, you look under and through things because they are a source of knowledge, signs of a momentary resourcefulness". The author then draws a parallel between a professional practitioner and Levi-Strauss' *bricoleur*, operating within the bounds of "the restrictions imposed by the specific history of materials at his disposal". Manelius et al.<sup>31</sup> illustrate how Vankunsten Architects led the Nordic Building Component Reuse research project (2014-2016), in order to maximise the reuse of elements harvested from a large residential refurbishment. Their experience led to the introduction of the term "rebeauty", implying the weathering aesthetics as an essential part of a future circular culture in architecture. Ghyoot et al.<sup>32</sup> argue how "preserving the formal integrity of an element is not just a way to amortise its environmental impacts on a longer lifespan, it is also a way to consider a more significant and complete heritage", introducing the concept of "embodied culture". As the authors are members of the Rotor collective, this perspective clearly emerges in their work.

### Re-interpreting the material history

Rotor's recent consultancy for the Multi Tower design project in Brussels, led by CONIX RDBM, aims to integrate in the refurbished building an amount of reclaimed elements equal to 2% of the total, in weight. This will allow the modernist building – in some way an undesired product of a time of dramatic urbanisation in Brussels' history – to preserve its character through both on-site reuse and off-site reuse, the latter mainly involving elements harvested from constructions belonging to the same age. The reclaimed products and components are interior finishings,

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30 Scalbert, *Never Modern*, 38

31 Manelius et al., "Rebeauty", 2

32 Ghyoot et al., *Déconstruction et réemploi*, 86



such as false ceilings or paving, but also façade cladding elements such as limestone or aluminium profiles [Fig. 2].

In Copenhagen, Lendager Group is likewise involved in the monitoring of the material flows circulating in the urban area, looking for opportunities to reuse elements in their projects. Combining the design practice (Lendager ARC) with a team constructing and testing the prototypes (Lendager UP), they were able to salvage masonry portions of several residential and industrial buildings set for demolition, and assemble them in modules used for the external layer of the Resource Rows (2015-2019) façades. This unprecedented experiment led to the creation of a heterogeneous texture embedded in the walls of a new building, while preserving old buildings walls.

Mecanoo's Maritime and Beachcombers Museum in Texel (2011) recalls, in its wooden exterior cladding, the building tradition of the Dutch island dwellers who, for hundreds of years, "made use of driftwood from stranded ships or wrecks to build their houses and barns".<sup>33</sup> Shading the main glass façade with reclaimed vertical wooden boards, the architects intended to reinterpret the

Fig. 2

The deconstruction of the Multi Tower original aluminium cladding in progress, December 2019. CONIX RDBM, Rotor. Image by the author

33 Houben, *People Place Purpose*, 159



local tradition of beachcombing and recycling. Indeed, like many of the objects exhibited in the museum, these cladding elements also come from the sea – in this case sawn hardwood sheet piling recovered from the North Holland Canal and given a “second” life in the building [Fig. 3].

The Circular Pavilion, designed by Encore Heureux, was conceived as a temporary construction to be exhibited in Paris on the occasion of the COP21 (2015). The name of the pavilion itself reveals the principles guiding the selection of its material components: since it was meant to represent a symbol of the circular economy, it maximised the use of reclaimed elements. 180 doors recovered from a social housing refurbishment in the city were used to clad the fronts of the pavilion, while the timber structure, the insulation, the interior finishings and furniture were harvested in different construction sites, where they were considered leftovers or waste.

### **A bricoleur in the Anthropocene**

Both the positions in architectural theory and the practitioners’ perspective illustrated above reveal how reclamation and repurposing processes are rooted in a specific “place” understood as a product of social and cultural forces. The choice of an urban or regional sourcing perimeter due to environmental reasons does

Fig. 3

The Maritime and Beachcombers Museum cladding. Mecanoo. Image credit: © Wim Goedhart

not entail restrictions in terms of building opportunities; it rather represents a chance to merge the ecological advantages with the prospect of rediscovering appropriate means to deliver a construction, and rethinking the function of elements.<sup>34</sup> Design is strictly bound to the technical feasibility of constructing with the given tools – the elements at hand, which, deriving from the local context and having a previous life, also have history. In this perspective, reuse represents a way to add another material layer – one that was already there, but in a different way – to the built environment as a socially, economically, politically, and culturally produced stratification.

These considerations, in light of the analysis of current European reuse practices described in paragraph 6, disclose two essential features of the practitioners' approach. The first lies in the interest the reclaimed object raises in the architect, generating a design process in which the aesthetic and technical results are produced by an experimental method,<sup>35</sup> at times an unprecedented pattern. The second is related to the importance recognised to ingenuity as an essential tool to turn an idea into practice through an almost artisanal perspective. These features depict a *bricoleur* approach linked to the architects' ability to understand the material nature of the products and components, and to deal with them.

As fascinating as this perspective may be, the contemporary European building sector does not appear as a likely context in which an architect-bricoleur could easily adopt such a design approach. This mainly depends on two different factors. The first is related to the conventional practices in the sector, as nowadays "buildings involve matter and energy that come from all over the world"<sup>36</sup>, while the second involves the necessary introduction of the reclamation topic in building codes

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34 van Hinte, Pieren and Jongert, *Superuse*, 18

35 Brooker, "Tabula Plena", x

36 Benjamin, *Embodied Energy and Design*, 51

and related norms. Hopefully, international and national policies will steer the construction sector towards circularity, enabling processes environmentally sounder than recycling to gain both the attention of stakeholders and economic feasibility. The integration of reclaimed elements in contemporary buildings could hence foster reuse processes as a way to preserve the formal and cultural features of the built environment through a closed-loop local metabolism. This approach would also yield environmental benefits, fostering circular patterns that avoid the externalities arising from extraction and transformation of raw materials, but also prevent useful building products and components from becoming waste. The acceptance of reuse practices as a means to preserve both the natural and built environment could play a part in this transition.

Even though anthropocentric products may represent the result of an uncaring attitude toward the environment, the future necessity to mine the man-made capital in order to preserve the natural one requires a new design approach, willing to re-evaluate the building stock as a source of both inspiration and – literally, again – means. After all, it would foster more sustainable cities, embedding culture in the ecology paradigm.

## Conclusions

In the essential transition towards a new interaction between Man's production and consumption patterns and the Earth's biological cycles, urban areas play a key role. Our built environment, albeit produced without taking into account the consequences of its obsolescence, represents a chance to mine the artificial capital while preserving the natural one.<sup>37</sup> In this perspective, reuse practices in architecture could provide sustainable outcomes, focusing on the local as appropriate, and considering its immaterial heritage as a resource embedded in building products

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37 Ruby and Ruby, "Mine the city", 243-244

and components. The designer's ingenuity hence represents a crucial tool to govern urban material flows, maximising resource efficiency and shaping a sustainable urban environment through the reinterpretation of the built products of the Anthropocene.

## Bibliography

- Abramson, Daniel M. *Obsolescence: An Architectural History*. Chicago; London: The University of Chicago Press, 2016.
- Benjamin, David. "Embodied Energy and Design", in *Embodied Energy and Design: Making Architecture between Metrics and Narratives*, edited by David Benjamin. New York: Columbia University GSAPP / Lars Müller Publishers, 2017.
- Boulding, Kenneth Edward. "The Economics of the Coming Spaceship Earth", in *Environmental Quality in a Growing Economy. Essays from the Sixth RFF Forum*, edited by Henry Jarrett. Baltimore, London: The John Hopkins Press (1966). New edition: Washington, London: Earthscan (2011): 3-14.
- Brooker, Graeme. "Tabula Plena", in Baker-Brown, Duncan, *The Re-Use Atlas: A Designer's Guide Towards a Circular Economy*. London: RIBA Publishing, 2014.
- Commoner, Barry. *Il cerchio da chiudere: la natura, l'uomo e la tecnologia*. Translated by Virginio Bettini. Milan: Garzanti, 1972.
- EC (European Commission). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: "Closing the loop – an EU action plan for the Circular Economy"*. COM (2015) 614.
- EC (European Commission). *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: "The European Green Deal"*. COM (2019) 640.
- EC (European Commission). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: "A new Circular Economy Action Plan for a cleaner and more competitive Europe"*. COM (2020) 98.
- Esch, Arnold. "Reimpiego," in *Enciclopedia dell'Arte Medievale*, IX, 876-883. Rome: Istituto della Enciclopedia Italiana, 1998.
- EU Buildings Database, 2014. <https://ec.europa.eu/energy/en/eu-buildings-database>. Last accessed: 10.2020.
- Gang, Jeanne. "The Cook, the Prospector, the Nomad and their Architect: Three Approaches to Building with Local Resources", in *Re-inventing Construction*, edited by Ilka and Andreas Ruby. Berlin:



- Ruby Press, 2010.
- Georgescu-Roegen, Nicholas. *Energia e miti economici*. Translated by Pier Luigi Cecioni. Turin: Bollati Boringhieri, 1982.
- Ghyoot, Michaël; Devlieger, Lionel; Billet, Lionel and Warnier André. *Déconstruction et réemploi: Comment faire circuler les éléments de construction*. Lausanne: Presses polytechniques et universitaires romandes, 2018.
- Gorgolewski, Mark. *Resource Salvation: The Architecture of Reuse*. Hoboken: John Wiley & Sons, 2018.
- Houben, F. *Mecanoo Architecten: People Place Purpose*. London: Artifice, 2015.
- Latouche, Serge. *Come sopravvivere allo sviluppo: dalla decolonizzazione dell'immaginario economico alla costruzione di una società alternativa*. Translated by Fabrizio Grillenzoni. Turin: Bollati Boringhieri, 2005.
- Lynch, K. *Deperire: rifiuti e spreco nella vita di uomini e città*. Translated by Vincenzo Andriello. Naples: CUEN, 1992.
- Manelius, Anne-Mette; Nielsen, Søren and Schipull Kauschen, Jan. "Rebeauty – Artistic Strategies for Repurposing Material Components", in *IOP Conference Series: Earth and Environmental Science*, 225, 012023 (2019). doi:10.1088/1755-1315/225/1/012023.
- Manzini, Ezio. *Artefatti: verso una nuova ecologia dell'ambiente artificiale*. Milan: Domus Academy, 1990.
- Papanek, Victor. *Progettare per il mondo reale. Il design: come è e come potrebbe essere*. Translated by Guido Morbelli. Milan: Mondadori, 1973.
- Parrique, T.; Barth, J.; Briens, F.; Kerschner, C.; Kraus-Polk, A.; Kuokkanen, A. and Spangenberg, J.H. *Decoupling debunked: Evidence and arguments against green growth as a sole strategy for sustainability*. European Environmental Bureau: 2019.
- Rau, Thomas and Oberhuber, Sabine. *Material matters: L'importanza della materia – Un'alternativa allo sfruttamento*. Translated by Mario Corsi. Milan: Edizioni Ambiente, 2019.
- Reike, Denise; Vermeulen, Walter J.V. and Witjes, Sjors. "The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options". *Resources, Conservation & Recycling* 135 (2018): 246-264.

- Ritzen, Michiel; van Oorschot, John; Cammans, Michelle; Segers, Martijn; Wieland, Tom; Scheer, Pieter; Creugers, Bart; Abujidi, Nurhan. "Circular (de)construction in the Superlocal project", in *IOP Conference Series: Earth and Environmental Science*, 225, 012048 (2019). doi:10.1088/1755-1315/225/1/012048.
- Ruby, Ilka and Ruby, Andreas. "Mine the City", in *Reinventing Construction*, edited by Ilka and Andreas Ruby. Berlin: Ruby Press, 2010.
- Scalbert, Irenée and 6a Architects. *Never Modern*. Zürich: Park Books, 2013.
- Stahel, Walter R. "Policy for material efficiency – sustainable taxation as a departure from the throwaway society". *Philosophical Transactions of the Royal Society, A* 371: 20110567, 2013.  
<http://dx.doi.org/10.1098/rsta.2011.0567>.
- Stahel, Walter R. *The Circular Economy: A User's Guide*. New York: Routledge, 2019.
- van Hinte, Ed; Perea, Cesare and Jongert, Jan. *Superuse: Constructing New Architecture by Shortcutting Material Flows*. Rotterdam: 010 Publishers, 2007.
- Waters, Colin and Zalasiewicz, Jan. "Concrete: The Most Abundant Novel Rock Type of the Anthropocene". *Encyclopedia of the Anthropocene*, Volume 1 (2018): 75-85.
- Zalasiewicz, Jan; Waters, Colin N.; Summerhayes, Colin P.; Wolfe, Alexander P.; Barnosky, Anthony D.; Cerraeta, Alejandro; Crutzen, Paul; Ellis, Erle; Fairchild, Ian J.; Galuszka, Agnieszka; Haff, Peter; Hajdas, Irka; Head, Martin J.; Ivar do Sul, Juliana A., Jeandel, Catharine; Leinfelder, Reinhold; McNeill, John R; Neal, Cath and Williams, Mark. "The Working Group on the Anthropocene: Summary of evidence and interim recommendations". *Anthropocene* 19 (2017): 55-60. 10.1016/j.ancene.2017.09.001.