

**POSSIBLE AND PREFERABLE
SCENARIOS OF A
SUSTAINABLE FUTURE**
TOWARDS 2030 AND BEYOND

Edited by
Cesare Sposito



PALERMO
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PROJECT | Essays and Researches

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Volume 5

Edited by Cesare Sposito

**POSSIBLE AND PREFERABLE SCENARIOS OF A SUSTAINABLE FUTURE:
TOWARDS 2030 AND BEYOND**

Palermo University Press | Palermo (Italy)

ISBN (print): 978-88-5509-209-8

ISBN (online): 978-88-5509-232-6

ISSN (print): 2704-6087

ISSN (online): 2704-615X

Printed in January 2021 by Photograph srl | Palermo

Editing and typesetting by DEMETRA CE.RI.MED. on behalf of NDF

Book cover and graphic design by Cesare Sposito

Promoter

DEMETRA CE.RI.MED.

Centro Documentazione e Ricerca Euro-Mediterranea

(Euro-Mediterranean Documentation and Research Center)

Via Alloro n. 3 | 90133 Palermo (Italy)

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Viale delle Scienze, Edificio 16 (c/o ARCA) | 90128 Palermo (Italy)

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On the Book Cover: *Clean city logo template vector green town icon design (credit: M_Creative).*

Contents

Project into the Future. Introductory essay on the topic <i>Cesare Sposito (Editor)</i>	5
ARCHITECTURE	
ESSAYS & VIEWPOINT	
Voices from lockdown on future cities in leading magazines and online resources <i>Simona Talenti, Annarita Teodosio</i>	12
Hybrid communities and resilient places. Sustainability in a post-pandemic perspective <i>Lidia Errante</i>	32
Resilience, built environment, built heritage, culture and design in the Italian context <i>Federico Puggioni</i>	46
The role of the architectural project in the urban regeneration programs <i>Veronica Strippoli</i>	62
Adaptation, mitigation, and smart urban metabolism towards the ecological transition <i>Riccardo Pollo, Matteo Trane</i>	74
Intelligent information systems for the representation and management of the city. Urban survey and design for resilience <i>Maurizio Marco Bocconcino, Massimiliano Lo Turco, Mariapaola Vozzola, Anna Rabbia</i>	90
The sustainable project. Requirements and design strategies <i>Cristiana Cellucci</i>	108
Vision and project of the social space. Reconfiguration of the Tiberius Bridge basin in Rimini <i>Giacomo Corda</i>	124
RESEARCH & EXPERIMENTATION	
The robustness of cities. 2030 contended visions <i>Caterina Tiazzoldi</i>	136
Experimentation of a new adaptive model for envelope systems <i>Evelyn Grillo, Sara Sansotta</i>	166

	The contribution of energy poverty alleviation to sustainable future. Eastern European Urban Context <i>Georgi Georgiev</i>	178
DESIGN		
	ESSAYS & VIEWPOINT	
	FutureDesign. Reflections at the limit of impossible <i>Dario Russo</i>	194
	Designing the future. Open discussion on design ethics <i>Tiziano Manna</i>	204
	Territorial design and networking. Blended strategies to redesign future connections <i>Irene Fiesoli</i>	218
	RESEARCH & EXPERIMENTATION	
	Urban points of rest. An emerging digitally fabricated modular system <i>Lina Ahmad, Marco Sosa</i>	232

PROJECT INTO THE FUTURE

Introductory essay on the topic

DOI
doi.org/10.19229/978-88-5509-232-6/502021

This volume entitled ‘Possible and Preferable Scenarios of a Sustainable Future – Towards 2030 and Beyond’ is a collection of essays and researches dealing with a subject of sustained interest for the Academy and the craft and industry worlds. Investigating the future is an established practice for the academy and the world of crafts and industry. From the Chicago Columbian Exhibition of 1893 to the two Worlds Fairs of New York City (1939 and 1965) and so on, the future has been foreseen as filled with technology and amazing architecture. Not every vision of the future has described promising scenarios: the dystopian novel by George Orwell entitled *Nineteen Eighty-Four*, published in 1949, looked 35 years ahead, painting an anything but reassuring picture of the future. We have entered the third decade of the new millennium, and we must certainly reflect on the objectives we had set for 2020 and on the results we have achieved.

However, project into the future (*pro-jacere*, from Latin, jump forward), explore and imagine how your life will change, boosted by human ingenuity and with the support of science, is in the human nature. The four visions of the future proposed by Norman Henchey (1978) conceptualized in classes – ‘possible’ (any future), ‘plausible’ (future that makes sense), ‘probable’ (highly likely to happen), ‘preferable’ (the best that could happen) – have been brilliantly described in the ‘Futures Cone’ reinterpreted by Joseph Voros (2003). As we move away from the present, the ‘possible’ tends to ‘preferable’ due to the lack of elements and data on which to base the programming and the planning: in fact, the certainty on the type of technologies and production methods that will be available, on the social structure and user uses, and so on decreases.

By 2030, the world will already be different: Thomas L. Friedman (2016) highlights that the three main forces of our Planet – Moore’s Law (technology), the Market (globalization) and Mother Nature (climate change and biodiversity loss) – are all pressing at the same time, with inevitable consequences for the territory, cities, architecture, products and services that will be designed, developed and used in the future. The 17 2030 Sustainable Development Goals presented by the United Nations provide an answer for this time horizon, tracing the path towards a model to achieve a better and more sustainable future for everyone. But will these Goals be able to accelerate sustainable innovation? However, it is clear that how the future of our planet,

its landscapes, cities, architecture and consumer products will mostly depend on the decisions we make today, on our level of 'vision' and on how we will deal with the subject of sustainability with respect to the aforementioned Goals. Going beyond 2030, imagining 2050, we will certainly have to deal with a population growth that will reach ten billion people, of which 75% will be living in cities and urban areas (United Nations, 2019); therefore, the cities of the future will become crucial metropolises for the sustainability of the whole Planet. In the meantime, the academic, crafts and industry worlds are raising a series of questions.

Will we be able to promote the sustainable use of Earth ecosystems in the territories, to sustainably manage forests, fight desertification and stop biodiversity loss? How will the principles of circular economy have an impact on the design concept of the city, the architecture and consumer products? How will our cities change? Will they be more inclusive, smart, ecological, sustainable? Will they correspond to Carlo Ratti's vision of 'senseable cities', namely, will they be more human, sensitive, capable of 'sensing' through digital sensors and of meeting citizens' needs? Will they have a higher density and a vertical development to reduce land use? Will they be hyper-connected, efficient and less chaotic? Will we ever be able to handle the use of the resources in the cities with the regenerative ability of the ecosystem? Will we be able to significantly shift, at all levels, from urban to architectural, towards an ecological and smart management of water resources, in a circular and systemic perspective aimed at reducing consumption, introducing advanced and integrated ways of collection and purification, to reuse gray and rainwater in buildings and outdoor spaces? Will infrastructures, means of transport, roads, parking lots and green areas be influenced and deeply changed by the evolution of sustainable and/or autonomous mobility? Will green and blue infrastructure networks be implemented in our cities and territories? Will the use of green in cities be enhanced in its multifunctional value and in its ecosystem services supply? Will the outdoor areas be greener, public and 'people-friendly', safe and characterized by nature-based solutions?

The mixité of functions and uses will condition the creation and design of architecture, building types, outdoor spaces, urban design, with vertical 'neighbourhoods' of dwellings, offices, various services, commerces and entertainment to reduce mobility and travel times? Will the new buildings be, throughout their life cycle, zero-energy and zero-impact, green, smart, connected, resilient, adaptive, capable of optimizing the resource consumption and self-producing with renewable sources the energy necessary for their functions? Will we be able to deeply mark in the design, construction, maintenance and management of the built environment the awareness of the need to shift towards the reuse, recovery and recycling at different levels? Will we be able to make a deep renovation, also from an energy and ecological point of view, the existing building and to project it into the future? Will the implementation of 'enabling technologies' of Industry 4.0 (artificial intelligence, machine learning, virtual and augmented reality, robotics, etc.) have a significant impact on the innova-

tion of sustainable Living and consumer products, stimulating a new intelligence on ‘common responsibilities’? Will the contamination of knowledge, creativity, startups, open source and future crafts speed up the change of the artificial world to build a more sustainable future for our planet? Will the digital and parametric manufacturing be able to improve the quality of the built environment, cutting down costs and time of production, for example, allowing the self-production and customization of a sustainable house and consumer products affordable for everyone? Will we be able to create our buildings and consumer products with (fully) recycled and recyclable materials? How will the innovation of smart, bio and nano-structured materials influence our life? Will the digital devices be increasingly integrated up to become ‘wearable’? Will they favour a better quality of life? Will resilient societies and inclusive communities allow everyone access to services and economic opportunities? Will the services be more customizable, efficient, flexible and decentralized?

Paraphrasing Luciano Floridi, philosopher of Information and Technology at the University of Oxford, we ask ourselves if ‘green’ (of natural and artificial environments) and ‘blue’ (of science, technology and therefore the digital world) will succeed to guide a vision of the future capable of replacing ‘things’ (objects) with ‘relationships’, ‘individual planning’ with ‘common planning’, the ‘experience economy’ (and not consumption) with a ‘policy of care and relationships’ (and not production). Moreover, will we be able to anticipate the impact that these technologies will have on us and the environment around us, guiding the ‘fourth revolution’ – deeply linked to the role of digital technology in our lives, having the ‘infosphere’ at its core (the space of information of the digital era that concerns every aspect of our lives) – to overcome the distinction between real and virtual, always connected to the network, in a word ‘onlife’, while significantly improve our quality of life and ecosystem? How will customs and traditions, our way of living, working, producing, studying, consuming and socializing change? How will public and private health change, also in relation to the lesson we are still learning from Covid-19 pandemic emergency? How will the forms of living change with respect to emerging ‘remote’ modes, workplaces with smart working and co-working, learning environments with smart teaching and e-learning, business venues with e-commerce, etc.? How and with what tools and methods will we be able to safeguard, enhance and enjoy our landscape, cultural, architectural, and archaeological heritage? Will we be able to promote a territory through the virtualization of its cultural heritage and local traditions by uploading them online as a common asset for citizens and visitors?

The 15 published papers deal with only some points of this broad subject, open to many variations. They are food for thought and give good practices capable of contributing to the international research and debate. The volume opens with a critique analysis of the most renowned scholars and architects that lately have written for, mainly Italian, press and websites on the relationship between architecture, cities and the pandemic emergency, highlighting critical issues and solutions for the future from

different perspectives. Sometimes these opposite concepts converge on the necessity of transforming the crisis into opportunities for urban renewal at every scale (from domestic to public spaces, workplaces, health facilities, technological networks or transport systems). By using strategies – different in nature and goals – in a renewed relationship between rural and urban, this might be the perfect opportunity to balance spaces and relationships, smooth out social and economic inequalities and ensure a more sustainable life.

In the Architecture section, Resilience seems the key to project toward a sustainable future. Through new community forms – generated by the current pandemic crisis – stimulating the creation of new innovative social and planning strategies and practices. These include the Hybrid Communities of Place, ‘cultivated in the digital space’, capable of building enabling ecosystems, whose resilience is due to innovative forms of urban and architectural transformation. They include public residential districts where there are multiple levels of flexible sociocultural, typological-spatial and technical-environmental complexity, not only with respect to the reversibility or transformability of the proposed design solution, but in relation to the ability to interpret the different opportunities and potentials offered by each context, its values and reasons in relation to the moment of its creation. Through new interpretations of the concept of resilience applied to cultural heritage, detectable in Italy through the transformations occurred in historical urban areas and the role acquired by artisan and manufacturing activities in the applied arts, two specific and different events contribute to new economic paradigms. With the opportunities given by the digitization and dematerialization of processes, these paradigms can, on the one hand, boost economy and corporate assets of small and medium-sized companies, and on the other, promote unexpected scenarios capable of making the cultural characteristics of heritage more accessible and resilient.

Through new possible paradigms of urban regeneration – scalable processes, adaptable to realities with different (small) sizes and qualitative characteristics – in which the project loses its self-referentiality and, by assuming the role of coordinator with a ‘sociological’ mark, it can promote a cross-disciplinary process aimed at determining a model for the re-appropriation of smaller towns and villages, having a strong declared identity often not enhanced, and (in some cases) of the suburbs – often characterized by marginalization and deterioration. This has a double objective: the up-cycling/refunctionalization of the building heritage and the requalification/regeneration of open/public spaces for social sharing. Furthermore, through a proposal for the integration of digital tools (such as BIM and GIS), having an adequately structured data collection and processing methodology, the integration would allow, on the one hand, both the monitoring and management of the building heritage and the urban planning according to principles of sustainability, and on the other, to return to the man-made environment as dynamic inter-scalar model with in-depth information and with elements currently difficult to compare.

A study focuses on the relationship between adaptation and mitigation in the different dimensions (temporal, spatial, economic, political, psychological, social and design) aiming to highlight its existing or potential connections, in the perspective of a systemic, cross-disciplinary and multi-scalar design approach, capable of integrating the benefits in the imperative issues of global warming, measuring and evaluating the effectiveness of the two strategies by using concepts and enabling technologies consolidated in 'smart urban metabolism' to provide a relevant contribution to the ecological transition project and to favour a more effective reduction of material and energy flows in urban areas. Robust Design and Combinatorial Architecture are proposed as approaches to mitigate and modulate the contrast between visions and objectives of the 2030 Agenda for Smart Cities. They are developed through a decision tool and heuristic device, assisting the decision-makers in fixing the priorities related to urban morphology, architectural design, functional, technological, or engineering problem; the proposal is a method in which quantitative – predictable – and uncertain qualitative intangible and variable parameters (i.e., social, physical, sensorial, cultural, and economic) lead to a structural adaptation, emphasising the concept of formal adaptation to include the intangible aspects to mediate between the desires of the community in a specific moment and a long-term planning.

Another essay deals with a critical interpretation of the sustainability concept and the evolution of flexibility through different approaches created over time. They have defined, at a methodological level, the connection between the requirements for the sustainable project and, at an operational level, the actions taking place at the building and the public open space scales. The requirements are applied in design projects aiming to reach a comparison, on different scales, among physical elements and users, by acting not only in a spatial-three-dimensional sense but also in a metabolic and physiological sense, by enhancing and improving the psychophysical relationships between the environment – lit, with noises, spatial, biological, social – and people. A contribution on open spaces – mentioning the case study on the area surrounding Tiberius Bridge in Rimini – selects the project as a tool to transfer a structured knowledge capable of working with the social fabric, interpreting intangible demands and responding to the needs of the community that lives there. The space, 'open' to the different interpretations of its uses, can stimulate the sense of belonging to a community and expressing the values of an ever-evolving society. Moreover, it collaborates to create a truly lived-in place, therefore safe and active in the improvement of the quality of life of the community. According to this vision, it is not attractive because of scenic elements or devices added in it, but because of interventions aimed at making the place welcoming, respecting the local environmental values and restoring the relationship between park and city, showing possible freedoms where the functional aspect is overshadowed by the awareness of what the place can offer.

With respect to the development of technical solutions to increase the performance of building envelopes, in response to the stresses due to climate change, an experi-

mental research (currently developed at the Building Future Lab of the ‘Mediterranea’ University of Reggio Calabria) identifies a design methodology based on adaptive design techniques. These can dynamically answer reference contextual conditions, imagining working methods based on building dynamic simulation scenarios. Their goal is to create a highly adaptable model that can be used as a component for evolved envelopes to smartly and systemically manage the effects of climate variables and, at the same time, satisfy a wide range of needs. Energy accessibility, determined by low family incomes, high energy costs and low energy efficiency of housing, is the subject of a research investigating strategies that can favour it, in the long term and in the urban context of Eastern Europe, by adopting measures for the energy efficiency of multi-storey residential apartments, with the emphasis on achieving the optimal ratio between energy savings and financial resources used for the renovated houses.

The Design section includes essays and research on New Anthropocene, ethics, territorial design and networking, and digital manufacturing. In particular, the first essay proposes a new vision on design, compared to the one that has characterized it in recent decades, which has become a sort of magical glaze to make goods attractive rather than project size useful for facing the challenges of our time. The author recognizes the need to shift from the Paleo-Anthropocene in which we live – predatory and truly unsustainable – to a Neo-Anthropocene – socially and ecologically sustainable – where design, urban planning and all project disciplines should converge to create a Future City, an Augmented City, open, intelligent, sensitive, creative and fluid, characterized by empathy, the ability to design for and with people, for a better world. In relation to the liability system that revolves around man to alter and modify the landscape that surrounds them, a second contribution highlights the relationships between ethics and design, raising new issues that, untied from the rigid logic of the academic world, contribute to outlining a generative matrix of thought useful to provide elements for an interpretative exploration of the transversal aspects related to the taxonomy of design.

Overcoming the physical and digital distance – which has characterized this last year because of the pandemic – is the subject of the essay presenting considerations on a new innovative society (Society 5.0). In this society the companies are part of a complex relation system that can boost the creation of new sustainable and interconnected production chains (territorial design and networking), based on relational paradigms where the IoT, new methods and tools (the result of cross-fertilization and a cross-disciplinary or transdisciplinary approach) combine different, sometimes distant, scientific sectors and harmonize cultural, social, economic and political elements. The volume ends with a case study on digital manufacturing of street furniture elements marked by a participatory and interactive process, capable of satisfying social needs and preferences of a specific group of users in a context where this production method is little known and used. Modularity and stratification become the unifying element of the building language that does not follow a specific predetermined pattern but that is defined by the suggestive ac-

tivity that must be carried out. The modularity of the components is not guided by a pre-determined aesthetic but is moderately free to flow, expand, aggregate and generate.

In conclusion, we agree with Fabrizio Tucci (2020) who, in the editorial of volume 8 (2020) of *Agathón* journal, argues that a vision of the sustainable future of living, by looking at the two time horizons of 2030 and 2050, will be played on an increasingly synergistic work aimed at providing answers to the ten main macro-questions: 1) ecological transition and increase in environmental quality; 2) transition to the green economy and effectiveness and circularity in the use of resources; 3) mitigation and adaptation to climate change, towards total carbon neutrality; 4) bioclimatic, energy efficiency and renewable sources, towards the model of positive energy cities; 5) progressive reduction of land use, towards the 'zero land use' model; 6) dialectic between globalization and glocalization; 7) digital transition, enabling technologies and opportunities linked to Data Science systems and to Industry 4.0; 8) interaction of the most advanced and diversified expertizes with increasingly smart communities, to share and include; 9) 'polychrysis' challenges originating from the pandemic and the threat of future pandemic forms; 10) innovation of ways and spaces of living, working, studying, producing, consuming and socializing, in a synergic and transversal interface 'with' and 'between' all the previous macro-issues. These ten subjects, approaches and visions must be considered as actions of a strategic ever-evolving project that concur in synergically and systemically defining the scenarios that can allow us to create a built environment and a more desirable and sustainable future for ourselves and for future generations.

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