26

PAD

HUMANIZING ENERGY

PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
founded by Vanni Pasca in 2005

Publishing Consultant
Vincenzo Castellana, Architect, Italy

Art Direction
Francesco E. Guida

Web Site
Pietro Forino, www.pietroforino.com

Correspondents
Amina Agueznay (Morocco), **Hèla Hamrouni** (Tunisia), **Vesna Kujovic** (Montenegro), **Can Özcan** (Turkey), **Ana Perkovic** (Croatia), **Filip Roca** (Montenegro), **Azadeh Sabouri** (Iran), **Marco Sousa Santos** (Portugal), **Pascale Wakim** (Lebanon)

Reviewers
Anna Anzani, Venanzio Arquilla, Michela Bassanelli, Marco Boffi, Luca Botta, Laura Carugati, Mauro Ceconello, Annalinda De Rosa, Barbara Di Prete, Susana Gonzaga, Chiara Lecce, Francesca Maria Mauri, Dario Pedrabissi, Nicola Rainisio, Lucia Ratti, Agnese Rebaglio.

PAD
via Francesco Soave 15 – 20135 Milano – Italy
via Roma 171 – 90133 Palermo – Italy
info@padjournal.net – editors@padjournal.net

Publisher
Aiap Edizioni
via A. Ponchielli 3 – 20129 Milano – Italy
aiap@aiap.it – www.aiap.it

PAD © ISSN 1972-7887
#26, Vol. 17, June 2024
www.padjournal.net

0. EDITORIAL #26

I. VALUES: ENERGY CULTURES & BEHAVIORAL CHANGE

II. MODELS: ENERGY COMMUNITIES & COLLABORATIVE LANDSCAPES

III. TOOLS: ENERGY TECHNOLOGIES & DIGITAL AWARENESS

III. BIOGRAPHIES

II

MODELS
ENERGY COMMUNITIES & COLLABORATIVE LANDSCAPES

Designing Community-Driven Energy Solutions

Reflecting on Design for Future Social Systems and the Ability to Shape Change

Marta Corubolo
Politecnico di Milano
Orcid id 0000-0002-0917-7078

Stefana Broadbent
Politecnico di Milano
Orcid id 0000-0002-9038-0531

Valentina Auricchio
Politecnico di Milano
Orcid id 0000-0003-2138-5854

Chenfan Zhang
Politecnico di Milano
Orcid id 0000-0003-1456-2680

Beatriz Bonilla Berrocal
Politecnico di Milano
Orcid id 0000-0002-5686-9667

Keywords
Energy Communities, Product Service Systems, Social Transition, Design Education.

Abstract
Electrification is a promising strategy to reduce CO2 emissions by 2050 as solar, wind, and other renewable sources substitute fossil fuels. It is also a significant way to reduce energy poverty in disconnected areas. Electricity can be produced from different sources and by individuals or communities. Community energy solutions allow citizens to participate in the energy transition by pooling resources with their neighbours and community for larger-scale installations, bringing cheaper and cleaner energy and economic and social benefits to households and businesses. Community energy projects enhance the sense of belonging, build social capital, and improve well-being by involving renewable energy technologies that feed existing grids and networks or are autonomous local grids and networks with different distribution infrastructure ownership models. A master class of international students tasked with designing product-service systems for energy communities has developed concepts aimed at communities with limited resources undergoing pressure due to heat waves or massive tourism or providing support to vulnerable populations. Challenges and complexities in finding innovative solutions for radical infrastructural changes have emerged in addressing community solutions and the transition toward local empowerment.

1. Introduction

One of the most challenging demands to engage design students is to ask them to imagine systemic transformations that affect the current or future social systems. Due to the major social and environmental challenges we are facing, there is a growing need to build a design culture through the education of future designers for radical transitions (be it social, digital, technological, ecological, energetic, etc.) and to significantly contribute to the design of social systems as a future-creating, collective human activity (Banathy, 1996). This requires embracing new methods and approaches and deeper reflections on how it is possible to rethink design education when addressing global challenges that deal with complex sociotechnical systems (Banathy, 1996; Pizzocaro, 2000; Friedman, 2012; Norman & Stappers, 2015; Mayer & Norman, 2020).

The project challenge given to design students of the master course Innovation Studio[1] in the first semester of 2023 was to develop a service system and one physical touchpoint for an energy community. Students could focus on developing countries or areas with limited energy resources, but there was a preference for existing or future communities in Europe. The question was to envision product-service systems that could benefit from the possibilities of locally produced energy potentially managed by the community of users.

The students of the Master's course come from all over the world and from different bachelors. Hence, each group defines

1 The course Innovation Studio is a design studio of the Master in Product Service System Design of the School of Design of the Politecnico di Milano where 87 designers coming from 14 different countries have developed 15 ideas for an efficient energy consumption future.

a methodology based on the different project cultures and contexts they will address. Exercises are given to support research, such as Bodystorming, a specific method designed for the course (Broadbent et al., 2023), and *Scaling*, taking inspiration from the work done by Hunt (2020). The main aim of the course is to test ideas rather than develop perfect solutions, and it is structured in cycles of iteration with moments of confrontation and proof of concept through peer-to-peer feedback. Students also learn how to prototype services and touchpoints, developing *Desktop Walkthroughs* (Auricchio et al., 2022). Students had also gone through a phase of desk research in which they examined existing cases and a phase of primary research in which they interviewed members of energy communities in Italy, individual households that had installed solar panels for their consumption, or simply communities that were considering new forms of collaboration, especially considering the cost of energy crisis in the past years. The results of the master course were exhibited in the museum of the main energy provider of the city of Milan – AEMuseum,[2] where a final narrative of the class results was designed by a group of selected students.[3] According to this narrative, projects were divided into the following macro-categories:

- *Power For Optimising:* projects that face the current challenges and adapt to a transforming reality. The projects proposed efficient energy use by fostering a sense of unity and innova-

2 https://fondazioneaem.it/aemuseum/

3 Curators of the exhibition were: Alessandra Coppola, Alissa Sara Zaouali, Büşra Yeliz Karaoğlu Balcı, Camilla Cristante, Elena Buccelli, Federica Francesca Pancari, Sara Faustini, Zhenqi Xu. For more details see https://www.uncertaintimes.polimi.it/powerfor-2024/

tion within communities, reflecting on the power of collaboration and how community-led and community-driven initiatives can lead to sustainable and practical energy solutions.

- *Power For Inventing:* projects to explore new technologies by imagining the future. Solutions that look at tomorrow introduce opportunities and innovative approaches to redefine the concept of energy, as well as visionary and transformative approaches, showing how today's creativity can be directed towards shaping uncertain but potentially revolutionary futures.

In the following paragraphs, projects describe some issues encountered in this coral experimentation in designing for autonomous and self-organised communities. This paper aims to create a bridge between education activity and research through three main reflections on challenges related to: 1) imagining radical social transformations, defining a community and delimiting its boundaries; 2) designing the infrastructure and the social systems as materials (Blomkvist et al., 2016), bringing into the design process both the whole and the single elements of the service to be designed and deeply understanding what needs to be designed, from tangible touchpoints to intangible community interactions; 3) understanding design methods needed to address community engagement and to achieve social impact. The economic and legal implications that socio-technical systems are bound by were not a constraint given to the class. However, they were considered in project discussions and debates related to the feasibility and critical assessment of concepts.

Overall, the main hurdle was to imagine how a community could create a system of governance for the common good. While many projects intended to serve a community, the issue is to define a service that can be self-managed and regulated. It is, in a sense, much easier to think of services "for" a community – solutions that benefit a community but are managed by a third party (a traditional centralised model or the old approach to development projects) –, than to rethink systems made by services "growing within" and "led by" a community.

2. Imagining Radical Social Transformations

When addressing electrification and energy communities, we enter not only a technical realm but, more significantly, a re-definition of institutional and economic structures that define the organisational models of energy production and distribution. From a centralised model in which energy utilities produce energy through carbon, hydro, nuclear or wind power, and energy distributors convey the energy to households and businesses, the new distributed electrification models envisage individual or local production. Energy communities, household solar panels, or local alternative energy networks all reduce the role of the utilities and push onto communities and the individual the efforts and benefits of energy production. This is a very major transformation of resource management from the social perspective. How radical this change could be is well illustrated by the analysis of some feminist researchers, who point out the profound political implications of the current fossil fuel and energy systems. Sheena Wilson, who leads the *Feminist Energy Futures* project, suggests that decarbonizing our energy supply

> [...] could provide opportunities to develop more socially just ways of living that put the concerns of those most exploited – women, people of colour, and the global 99 percent - at the core of energy transition politics. (Wilson, 2018)

A feminist perspective on energy offers an important framework to understand why moving away from unsustainable energy cultures seems so difficult. In their introduction to *Petrocultures*, Wilson, Carlson, and Szeman (2022) point out, as other researchers before them (Smil, 2017), the profound cultural transformations and identities that have accompanied the recent decades of fossil fuel consumption and the cheap and plentiful availability of high-density energy. The centralisation of production, distribution, and governance, which characterises the energy industry, has significantly reduced participation in the decision-making processes, the distribution of benefits and costs, and representation of the people and entities concerned and made people dependent on utilities. Warren (2000) suggests rethinking energy production with four objectives: a) a political objective, ensuring democratic, decentralised, and pluralistic systems; b) an economic objective, which prioritizes human well-being and biodiversity over profit and unlimited growth; c) a socio-ecological objective which engenders relationality over individualism; d) a technological objective, which requires an approach that privileges distributed and decentralised fuel power and people power. These principles do not suggest a unique model of energy production and distribution but invite a pluralistic approach:

> A commitment to democracy goes hand-in-hand with a commitment to pluralism. In terms of energy, this means that instead of advancing a single, universal energy solution for everyone, feminist energy analysts would support the blossoming of multiple ways of designing and living with energy. While there are many benefits to decentralised and distributed fuel production and consumption, feminist energy approaches do not rule out in advance that larger, democratically coordinated systems may be appropriate for certain regions, or that longer-distance energy sharing and gifting (as opposed to buying and selling) may also play a role. (Bell et al., 2020, p. 5)

In light of such analyses, we can see why energy communities are emerging as loci of considerable social transformation and how they are being used to subvert structural inequalities in some regions of the world. Some interesting examples of radical systemic approaches are, for instance, programs that focus on women as the main actors of energy projects. They start from the realisation that in many societies, women are bearing the consequences of the climate crisis more than men, and this will continue to increase existing gender inequality and challenge women's livelihoods, health, and safety. In many rural areas, women have also traditionally been the purveyors of fuel and water for their families, tasks that are becoming more challenging when environmental conditions are modified. Energy community projects that target women offer, therefore, multiple benefits by providing an essential resource such as energy, by providing training and an income to women, by building a system of governance that allows women to control the production and distribution of energy and the decision on

how to use it, by designing a system that will enable women of the community to appropriate for themselves the technology and infrastructure. A significant project in this domain is *The Barefoot College*, started in Rajasthan and now present in 95 countries, an organisation that trains women in rural communities to assemble, install, and maintain solar equipment. These women, who have little-to-no formal education or literacy, receive hands-on education in installing and managing solar panels and on the economic value they can produce (Minnini, 2022). As Solar Mamas, they not only gain a sustainable income and financial independence but go on to distribute clean, sustainable energy for their communities.

The project combines design solutions that address sustainable energy, governance, knowledge transfer, and economic gain. What seems particularly significant is the combination of strategies, knowledge training, income, distributed systems, and access to an essential resource. While this combination can be seen as the hallmark of modern development programs, Barefoot College offers a systemic approach to the energy transition that can inspire projects in many other contexts. A similar philosophy has been followed by *Solshare* in Bangladesh (Dumitrescu et al., 2023), which helps set up peer-to-peer microgrids for households and small businesses. While not uniquely centered on women, they are particularly attentive to enabling women to create sources of income through the resale of energy.

3. Defining a Community and Delimiting Its Boundaries

The first task students gave themselves was identifying the communities that would transform.

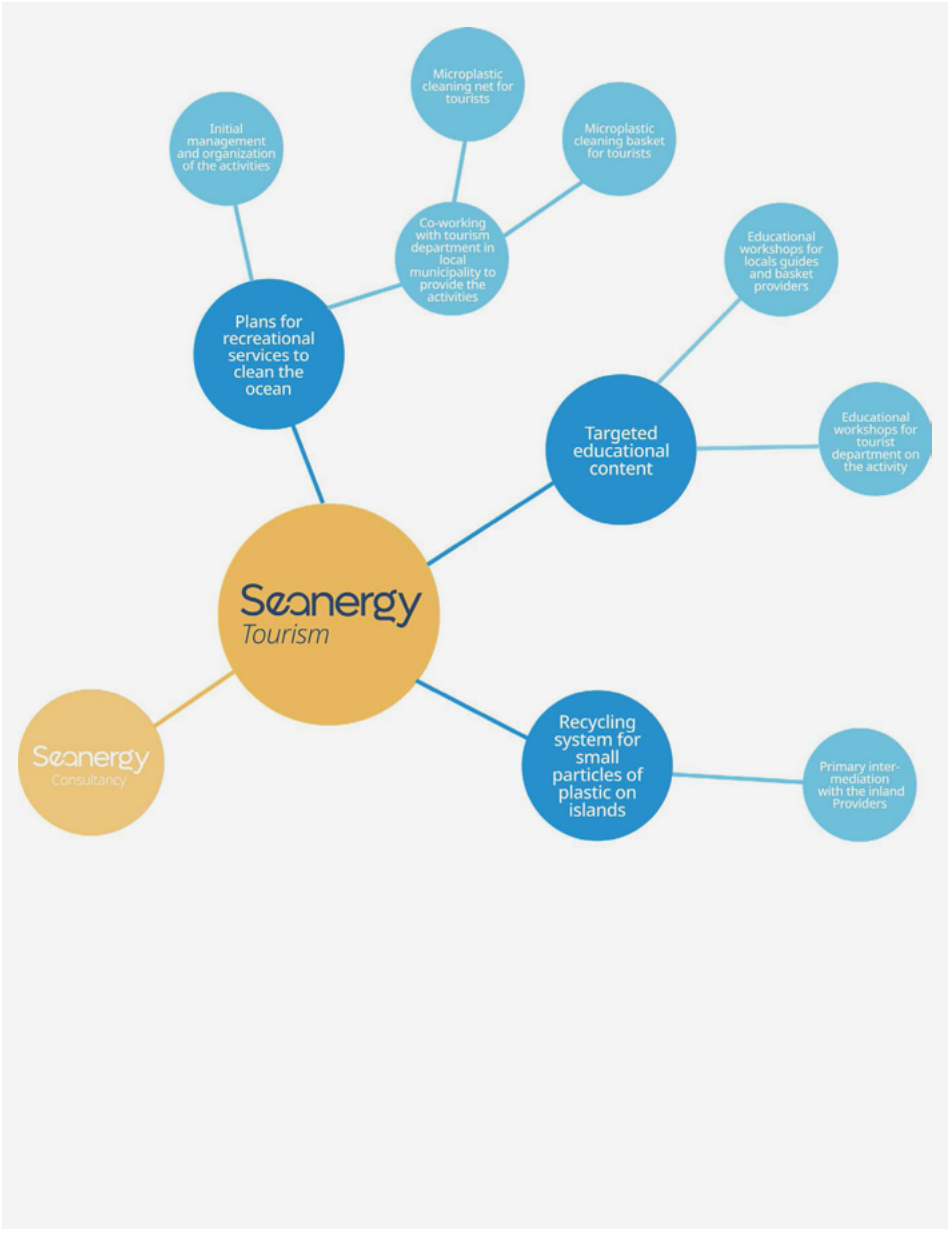


Figure 1. *SeaEnergy*. Project developed by Daniela Achury, Kimia Chavoshi, Alessandra Coppola, Chiara Corti, Yexin Jin. SeaEnergy collects plastic fragments from the sea and provides sustainable tourism services on the island, introducing cooperation and respect into the travel experience.

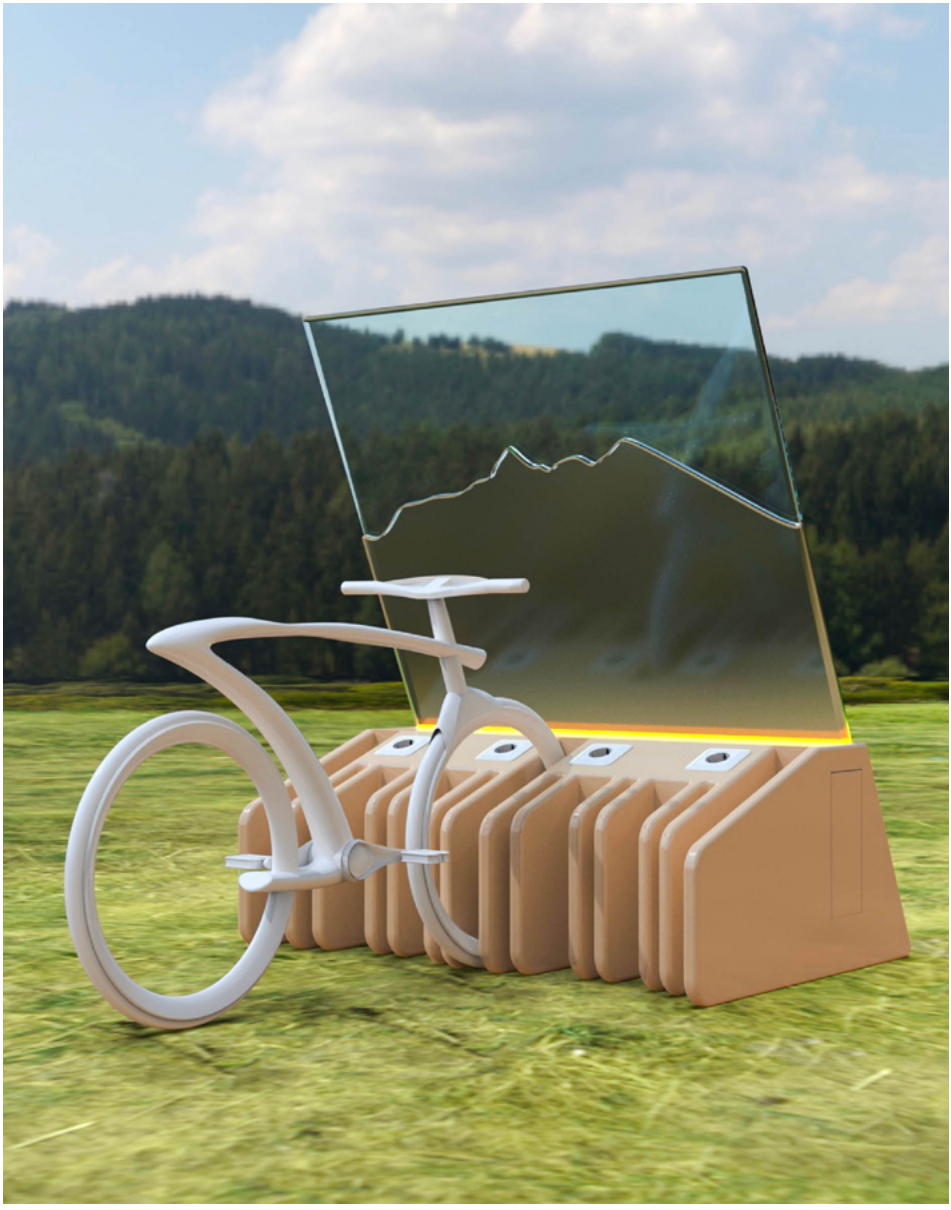


Figure 2. *Sunday*. Project developed by Ingrid Berre, Eleonora Gasparino, Chiara Mazzeo, Federica Pancari, Yaxin Ran, Zhelin Yan. Sunday transforms the energy produced by idle, second-hand real estate in small tourist villages into public economic resources for the community, contributing to local sustainable tourism.

Transitory and temporary communities. A first cluster of product-service systems explored the fluidity of community boundaries, envisioning their potential expansion or contraction over time, acknowledging, for example, temporary inhabitants as tourists, remote workers, and city users as likely new members of such a community. This transient nature led to a deeper investigation of the potential motivations and visions that could trigger the contribution of both permanent residents and temporary users to the community in terms of engagement, shared governance, and user experience. For example, the project *SeaEnergy* (Fig. 1) engages responsible tourists in island communities' energy production by involving them in collecting microplastics from the sea. While considering the impact of traveling in small and fragile ecosystems, this solution makes explicit the trade-off between tourism, sustainability, and energy production. It reveals the challenge of going beyond mutual exploitation.
Conversely, the project *Sunday* (Fig. 2) envisions an energy community fostering trust and collaboration between residents of remote areas and second-home owners. Operating on principles of mutual and shared responsibility, this service promotes a cooperative model and a series of touchpoints and landmarks for a solar energy co-production and management system. This approach cultivates a symbiotic relationship between diverse groups, emphasising accessibility, collaboration, and sustainability for all involved.

Potential and prospective communities. A second group of projects worked on building solutions that reveal potential or build prospective communities through infrastructure by sup-

porting users in using eco-efficient services and sites. Here, the community comes into being by sharing the convenience and efficiency of energy systems and products that retrofit shared spaces, renew abandoned or underutilized areas, and recover undervalued competencies and professions. *Revita* (Fig. 3) repurposes neglected spaces and second-hand clothes by involving local artisans in creating eco-efficient furniture. These products optimise the heating and cooling systems of co-working spaces and handicraft production areas. At the same time, a service focuses on strengthening relationships fostered by working in and utilising such locations.

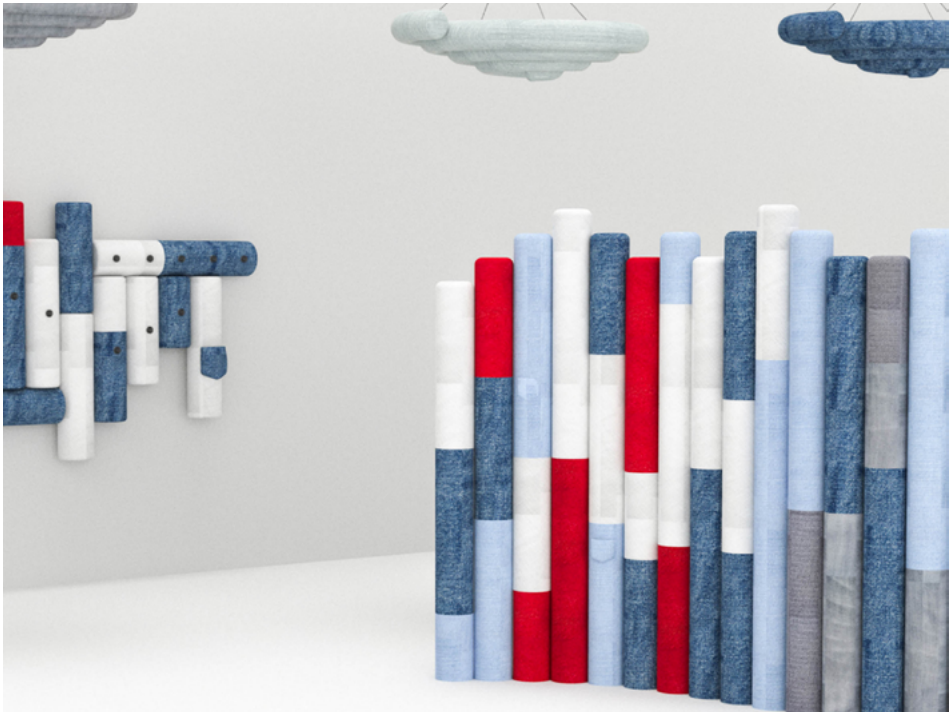


Figure 3. *Revita*. Project developed by Luisa Valentina Arosa Cely, Junyan Lu, Elisa Pinizzotto, Kezia Jane Rivan, Erika Vuthoj. Revita tackles the problem of discarded second-hand clothes by transforming them into various materials needed for energy-saving facilities.

Figure 4. *Netnook*. Project developed by Giulia Badocchi, Jin Deng, Gorkem Er, Sara Faustini, Ada Hatipoğlu, Xilian Liu, Caterina Polese. Netnook provides energy-efficient hubs in underutilised residential areas, promoting a sustainable work environment.

Similarly, *Netnook* (Fig. 4) envisions a future where a widespread remote workforce will still require shared and temporary offices while confronting the challenges of climate change in outdated and energy-inefficient settings. *Courtile* (Fig. 5) develops solar-powered shared spaces in condominiums, facilitating neighbour interactions and supporting local associations in their initiatives for community development.

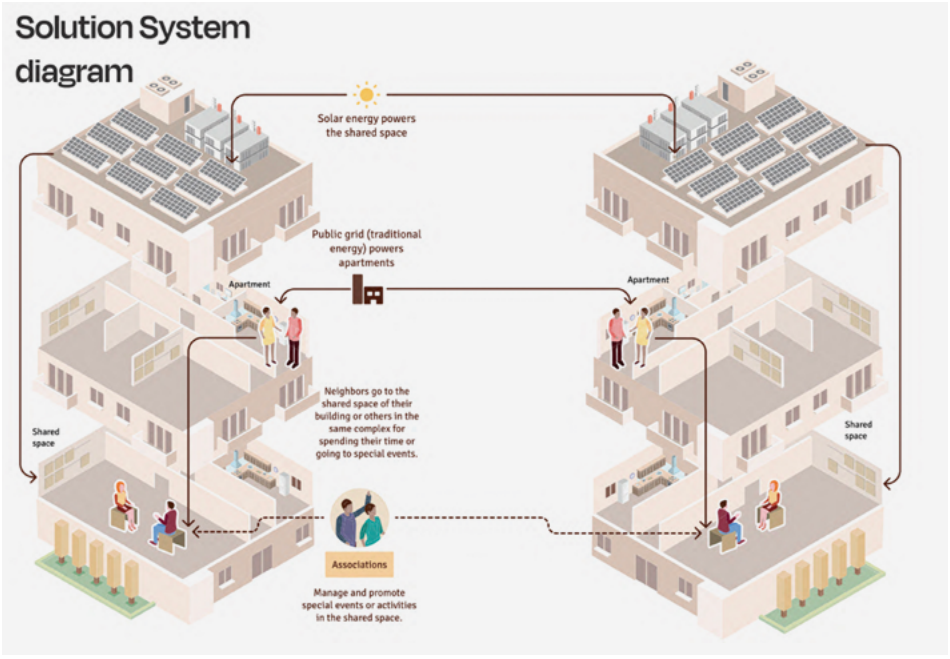


Figure 5. *Courtile.* Project developed by Miriam Cianci, David Martinez, Tita Nikolopoulou, Emanuela Ruggeri, Zebin Yin, Alissa Zaouali. Courtile is a centralised energy and knowledge centre for community well-being.

Although they refer to collaborative models, these services mostly adopt a top-down approach and rarely empower the community in the governance of the system, understanding the community itself as an outcome of a service governed by third parties.

Communities in crisis: A third cluster moved in a scenario where uncertainty is deeply intertwined with emergency situations such as blackouts, earthquakes, and floods. In these extreme circumstances, solutions proposed by students aim to offer support and assistance, reactivating and nurturing social ties while working on the theme of access, management,

Figure 6. *Occa*. Project developed by Tomás Barros, Beatrice Cinquepalmi, Chiara Lualdi, Lorenzo Mangilli, Laura Vieira, Zhenqi Xu. Occa provides an innovative and reliable emergency drinking water service during extreme heat waves and water shortage.

and distribution of common goods, particularly in contexts where community cohesion is weak. This perspective can offer new avenues for strengthening not only social bonds but also resilience within communities facing emergency situations. For example, by providing access to common goods like electricity and water, initiatives such as *Occa* (Fig. 6) can serve as emergency drinking water filtering and distribution services, utilising water from public swimming pools during prolonged blackouts, or by rethinking emergency rescue objects as in *Ecos* (Fig. 7), a radio as a service for communities in danger during blackouts due to major earthquakes.

Figure 7. *Ecos*. Project developed by Elena Buccelli, Andrea Di Lenardo, Naz Derin Sahin, Yaren Sevval Yilmaz, Linwei Yu. Ecos, as a radio communication platform, improves earthquake preparedness, fostering community resilience in emergencies.

Communities beyond humans: Another group of projects delved into the concept of "more-than-human" energy communities, recognizing the interconnectedness of all living beings. These solutions seek to integrate animal and plant species into the fabric of renewable energy systems. These communities aim to promote biodiversity, enhance ecological resilience, and foster symbiotic relationships between humans and the natural world. *Litus* (Fig. 8) empowers remote coastal communities through an algae farm lab run by local fisher communities, which cultivates bioluminescent species capable of absorbing sunlight and emitting natural blue light at night.

Figure 8. *Litus*. Project developed by Chiara Colombo, Daniele Landi, Valentina Phung, Elizaveta Pustovit, Maryam Roozbehi, Nicoló Vespini. Litus introduces bioluminescent buoys for coastal communities as a new innovative local co-produced service.

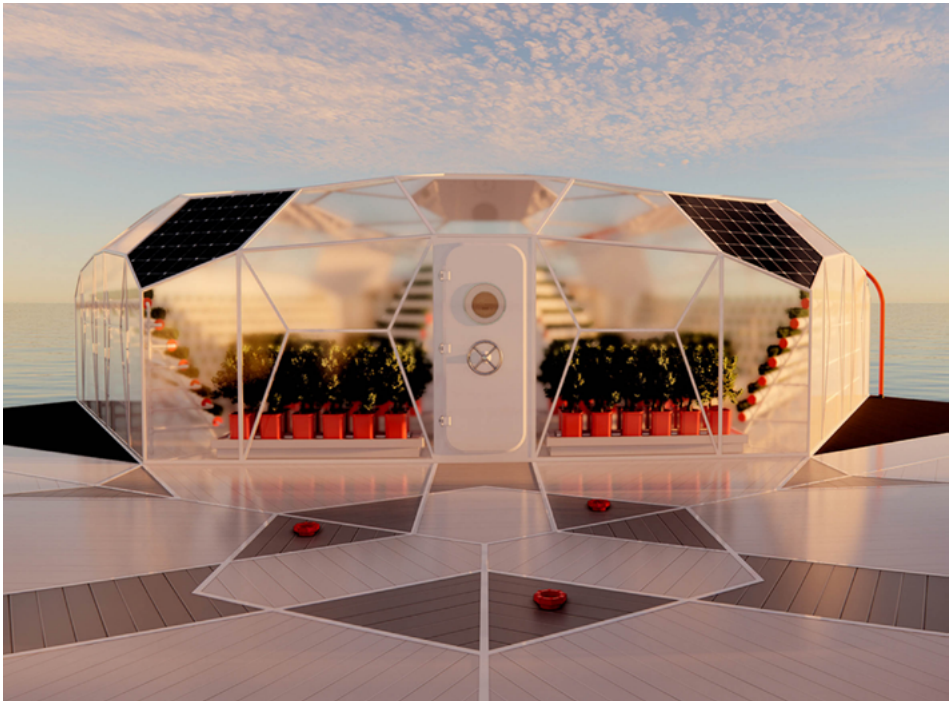


Figure 9. *Atholou*. Project developed by Yaru Bao, Selene Garresio, Kyeongmin Han, Marzieh Khorramabadi, Marcello Mariotti, Nandini Mehta, Sandra Quintana Echemendia. *Atholu*, a floating farm in the Maldives, supports sustainable aquaculture for communities confronting sea-level rise.

Communities as geographical locations: Other groups of students considered that a geographical location could define the needs of its inhabitants and started from specific challenges that the region would be facing. In this category, three projects addressed climate change. In *Atholou* (Fig. 9), the effects of sea rise on agriculture of the archipelagos of the Maldives were addressed through a system of floating agriculture powered by waves and solar panels. A speculative and futuristic solution that attempts to reduce the dependency of the islands on imported food and limit the risk of depopulation and the preservation of skills and local culture.

Figure 10. *Coolwaves*. Project developed by Camilla Cristante, Nastaran Kalvandi, Sana Farooq Khan, Cecilia Pizzagalli, Camilla Porrini, Chi Yuanlong. *Coolwaves* faces the climatic challenges of Milan, reshaping the urban landscape through sustainable cooling solutions in public spaces.

Finally, *Coolwaves* (Fig. 10), a project for the city of Milan, starts from the current and expected significant rise in temperature during the summer months. By proposing communal cooling spaces in the city squares, it wants to address the urgent need to find alternatives to residential air conditioning technology and ensure that outdoor spaces in the city remain accessible and used.

Figure 11. *Nexu*. Project developed by Aashka Dhebar, Chiara Laudonia, Letizia Perico, Marco Gugliuzza, Ruth Asfaw, Zahra Mazrouei. *Nexu*, as a new decentralised data centre system, provides services for the fast-paced digital world. Collaborating with communities, it aims to achieve truly sustainable realms.

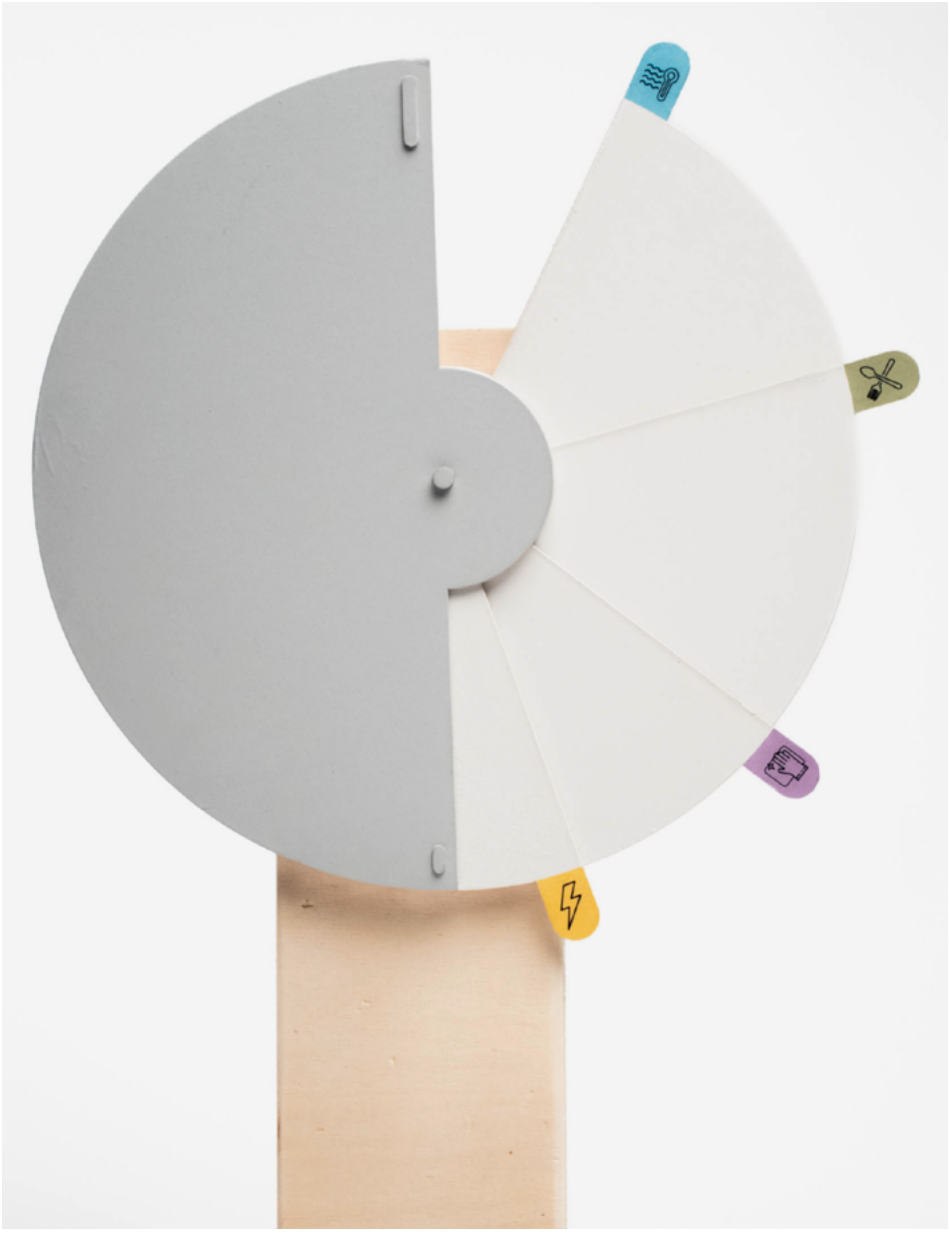


Figure 12. *Hom.e.* Project developed by Maria Camila Diaz, Catarina Landim, Sirui Lu, Valentijn Raes, Paola Rapino, Bianca Selvatici. *Hom.e,* by providing devices as touchpoints for people living in the apartments, enhances energy awareness assisting the Housing First Associations and their beneficiaries.

4. Designing Infrastructures as a Material and Social System

When looking at the projects from the lens of the proposed system of services and materials, we can see the emergence of different models of infrastructural transformation. Three main categories emerged: *solutions to control energy consumption, solutions to share energy,* and *solutions to harness energy.*

Solutions to control energy consumption. The first category encompasses projects that seek to raise energy consumption and management awareness while providing practical, readily adaptable tools to translate this consciousness into tangible actions and services. As an example, *NexU* (Fig. 11) is a project that addresses the energy consumption of our digital activities and aims at bringing data storage closer to the end users. A decentralised edge data centre system integrated within energy communities, aiming to encourage people to achieve a more sustainable digital world. Working on a similar theme but involving a completely different target, *Hom.e's* (Fig. 12) touchpoint focuses on Housing First Association's beneficiaries, often individuals with a history of chronic homelessness. Addressing challenges in comprehending abstract energy concepts, the touchpoint delivers intuitive feedback on the daily energy usage of four groups of appliances. Its primary goal is to enhance knowledge on the subject and ultimately reduce energy bills for these associations.

Solutions to share energy. In the second category physical spaces become the means to share energy creating common spaces of energy consumption for cooking, working, and leisure. These projects rethink existing public and private

spaces as physical facilities that allow communities to reduce energy consumption while creating new encounters, such as the projects described above *Coolwaves* (Fig. 10) and *Courtile* (Fig. 5) respectively in public parks and in residences for social housing, or *Hygge Hub* (Fig. 13) which instead unites neighbours in a communal kitchen in Denmark to reduce energy consumption when cooking. This last solution addresses inequality due to energy poverty in vulnerable areas by facilitating communal cooking.

Figure 13. *Hygge Hub.* Project developed by Büşra Yeliz, Karaoğlu Balcı, Silvia Emuli, Emilia Galli, Suofeiya Nanxi, Li Zihan. *Hygge Hub* provides a shared community kitchen to reduce energy consumption and enhance communities in disadvantaged neighbourhoods.

Figure 14. *Stelo*. Project developed by Yang Cen, Marta Grauso, Julienne Joven, Giovanni Malausa, Kangling Qin, Benthe Schümmer. *Stelo*, reestablishing the relationship between children and nature, provides a breathable, healthy learning environment powered by plants.

Solutions to harness energy. Energy harnessing is capturing available energy and converting it to electrical power. This challenge requires a deep knowledge of past, recent and future technologies. The projects in this field either stand on the shoulders of existing solutions and replace (or displace) them in new contexts of use, such as the touchpoints of the projects described above *Ecos* (Fig. 7) and *Sunday* (Fig. 2), or they imagine the use of future technologies, based on desk research and data available, for example, *Litus* (Fig. 8) or *Stelo* (Fig. 14) an indoor plant-based air purifier for schools.

Figure 15. *Novomodo*. Project developed by Chiara Mele, Ayano Osawa, Ganjar Satrio, Francesco Tomio, Xinyi Zhu. *Novomodo* aims to solve food issues and provide a new eating solution by using freeze-drying techniques on surplus vegetable products.

In the project *Novomodo* (Fig. 15), instead, the whole concept of what we will be eating in the future changes to avoid energy consumption in food preparation, proposing a diet based on dried food and preparing on-the-go nutritious snacks using a shaker. This project is based on a food preparation methodology used in Japan for making rice balls.

5. Conclusions: Community Involvement and Social Impact

The transformative shift to distributed energy production models also asks for a deeper reflection on how we design, which are the appropriate methods, approaches, and creative constraints, and if we need to envision new ways of thinking

and making (Görnsdotter et al., 2023). After desk research, students defined their specific context of action. Still, one crucial question emerged when moving into the concept definition phase: Are we designing a speculative solution, or should we solve a real problem? Interestingly, answering this question opens up two separate design directions: the first aims at envisioning and placing the project in a possible future (Dunne & Raby, 2024), and the second aims at solving a problem by analytically understanding the complexities of the present situated challenges within the transition, we could call the first *paradigm shift* projects and the second *transitional* projects. Students were free to choose any direction and define how far into the future the solution could be developed, basing their assumptions on technological and social projections found in the desk research. In general, speculative design was mainly chosen by groups looking at geographically distant[4] realities (Maldives, Ventotene Island, Catania). At the same time, a more problem-based approach was preferred when looking at nearby and known communities in the region where we were physically working. This decision was mainly determined by the level of access and relationship a designer may have with a community, whether one works for, in, or with a community (Villari, 2021; Selloni, 2017). The decision will determine how creative thought gives shape to solutions, such as building utopic or dystopic hypotheses of a faraway future or making sense out of on-field research and interviews with experts and stakeholders

4 Distant here is intended as a place that is physically far away from the designer, so, since the course was in Italy we are considering here places that were difficult to visit or reach for on-field research in the time span and economy of the educational project.

within a specific community. The scope of the projects will also differ in terms of impact; while a speculative project aims at igniting critical reflections on the present state of the art and the consequences of decisions we might take today, a problem-solving approach aims at finding real solutions to existing challenges - the first imagines paradigm changes in the way we see the future of energy production and consumption while the second gives shape to innovative ideas within the present world and the infrastructural constraints described above.

The most successful cases of energy communities, such as the *Barefoot College*, are characterised by a deep embedding of the design process in the social environments for which solutions are being developed. Participatory approaches in design are even more crucial in this field because the actors can only indeed decide the models of access and governance of energy resources, who, how, and especially for what energy will be used needs to emerge from a dialogue with the interested parties. The nature and duration of student projects make it difficult for them to embed themselves in their imagined target communities, and they must rely on desk research, interviews, and case studies. This means the available data may not provide them with enough information to drive their creative process fully. The iceberg model illustrates this issue well. Just like the portion of the iceberg above the water's surface is limited, so is the visible information about the community (Vink & Koskela-Huotari, 2021). Discovering regulative, normative, and cultural-cognitive qualities of a community is difficult based only on secondary research (Zhang & Auricchio, 2023). As the

design process moves forward, it requires enhanced calibration of the details to ensure that the design outputs are self-consistent within the context of the chosen community. The challenges students face, however, are not dissimilar from many development projects that have attempted to serve communities in top-down initiatives and that have met with resistance or failure. A case in point is numerous off-grid projects (Jeuland et al., 2023) in which the well-intentioned energy actors, after building a local energy production system, are shocked to see that the inhabitants of the area that previously lacked access to electricity, underuse the service. It often takes redesigning the main tools and diesel-powered machines for agricultural processing (fundamental for their livelihood) to finally see an uptake of electricity and a change in daily practices. Participatory design approaches in something as fundamental as energy access and use are simply a precondition for a successful project. In educational terms, for students to realize this firsthand and understand that participatory techniques are the drivers of their creativity is a major step.

Interestingly, the more speculative-driven projects, which endeavour to craft a fresh narrative and subvert existing models and organisations, are more generative of creative leaps, such as the project of floating agriculture, the recuperation of water from swimming pools in extreme blackouts, or the luminescent algae. During the final exhibition, speculative solutions inspire visitors to interpret and fill some gaps.
As students embark on the journey of designing sustainable energy solutions, it is crucial that they integrate future thinking into the design process, envisioning alternative futures

and exploring different scenarios to identify potential risks and opportunities and develop robust and future-proof strategies. “From the dialectic of past and present come the situations that determine the possibilities for the future. To plan effectively in the present requires a vision of what the future could and should be” (Margolin, 2007). However, in so doing, their awareness of the role of the participatory process will allow them to address complex projects that are transformative in their objectives.

Acknowledgments

We warmly thank Fabio Diliberto and Ilkka Suppanen, who are an integral part of the course’s teaching staff and all the students who have participated in this experimentation.
A full list of students in the different years can be found on the official websites with project details and student names:
https://www.uncertaintimes.polimi.it/powerfor-2024/
https://www.instagram.com/uncertaintimes_/

References

Auricchio, V., De Rosa, A., & Göransdotter, M. (2022). Experiential Ways of Mapping: Revisiting the Desktop Walkthrough. In B. Camocini, & A. Dominoni (Eds.), *Engaging Spaces. How to Increase Social Awareness and Human Wellbeing Through Experience Design* (pp. 131–158). Franco Angeli. https://series.francoangeli.it/index.php/oa/catalog/book/836

Banathy, B. H. (1996). What Is Design? Why Do We Need It? In B. H. Banathy (Ed.), *Designing Social Systems in a Changing World* (pp. 11–47). Springer. https://doi.org/10.1007/978-1-4757-9981-1_2

Blomkvist, J., Clatworthy, S., & Holmlid, S. (2016). Ways of Seeing the Design Material of Service. In N. Morelli, A. De Götzen, & F. Grani (Eds.), *Service Design Geographies. Proceedings of the ServDes.2016 Conference* (Vol. 125, pp. 1–13). Linköping University Electronic Press. https://ep.liu.se/en/conference-article.aspx?series=ecp&issue=125&Article_No=1

Bell, S. E., Daggett, C., & Labuski, C. (2020). Toward Feminist Energy Systems: Why Adding Women and Solar Panels is Not Enough. *Energy Research & Social Science*, *68*, 101557. https://doi.org/10.1016/j.erss.2020.101557

Broadbent, S., Auricchio, V., Corubolo, M., & Monna, V. (2023). Building Design Agency Through Bodystorming. In D. De Sainz Molestina, L. Galluzzo, F. Rizzo, & D. Spallazzo (Eds.), *IASDR 2023: Life-Changing Design* (pp. 1–12). DRS. https://doi.org/10.21606/iasdr.2023.207

Dumitrescu, R., Groh, S., Tetteh, N., Islam, S., & Ahmed, S. (2023). Swarm Electrification at Scale: An Innovative Partnership Model for Sustainable Energy Development in Bangladesh. *Natural Resources Forum*, *47*(4), 842–857. https://doi.org/10.1111/1477-8947.12359

Dunne, A., & Raby, F. (2024). *Speculative Everything: Design, Fiction, and Social Dreaming*. The MIT Press.

Friedman, K. (2012). Models of Design: Envisioning a Future Design Education. *Visible Language*, *46*(1-2), 132–153. https://journals.uc.edu/index.php/vl/article/view/5859

Hunt, J. (2020). *Not to Scale: How the Small Becomes Large, the Large Becomes Unthinkable, and the Unthinkable Becomes Possible*. Grand Central Publishing.

Jeuland, M., Babyenda, P., Beyene, A., Hinju, G., Mulwa, R., Phillips, J., & Zewdie, S. A. (2023). Barriers to Off-Grid Energy Development: Evidence from a Comparative Survey of Private Sector Energy Service Providers in Eastern Africa. *Renewable Energy, 216*, 119098. https://doi.org/10.1016/j.renene.2023.119098

Margolin, V. (2007). Design, the Future and the Human Spirit. *Design Issues*, *23*(3), 4–15. https://doi.org/10.1162/desi.2007.23.3.4

Meyer, M. W., & Norman, D. (2020). Changing Design Education for the 21st Century. *She Ji: The Journal of Design, Economics, and Innovation*, *6*(1), 13–49. https://doi.org/10.1016/j.sheji.2019.12.002

Mininni, G. M. (2022). The Barefoot College 'Eco-Village' Approach to Women's Entrepreneurship in Energy. *Environmental Innovation and Societal Transitions*, *42*, 112–123. https://doi.org/10.1016/j.eist.2021.12.002

Norman, D. A., & Stappers, P. J. (2015). DesignX: Complex Sociotechnical Systems. *She Ji: The Journal of Design, Economics, and Innovation*, *1*(2), 83–106. https://doi.org/10.1016/j.sheji.2016.01.002

Pizzocaro, S. (2000). Research, Theory and Design Culture: A Knowledge Growing within Complexity. In S. Pizzocaro, A. Arruda, & D. de Moraes (Eds.), *Design Plus Research Conference Proceedings*. https://www.dplusr.polimi.it/ita/01/dpr00/syno/090.htm

Smil, V. (2017). *Energy and Civilization: A History*. The MIT Press. https://doi.org/10.7551/mitpress/10752.001.0001

Selloni, D. (2017). Expert Designer's Role—Much More Than Facilitating. In D. Selloni (Ed.), *CoDesign for Public-Interest Services* (pp. 169–175). Springer International Publishing. https://doi.org/10.1007/978-3-319-53243-1_10

Vink, J., & Koskela-Huotari, K. (2021). Social Structures as Service Design Materials. *International Journal of Design*, *15*(3), 29-43. https://ijdesign.org/index.php/IJDesign/article/view/4137/960

Villari, B. (2021). Community-Centered Design: A Design Perspective on Innovation In and For Places. *The International Journal of Design in Society*, *16*(1), 47–58. https://doi.org/10.18848/2325-1328/CGP/v16i01/47-58

Warren, K. J. (2000). *Ecofeminist Philosophy: A Western Perspective on What It is and Why It Matters*. Rowman & Littlefield Publishers.

Wilson, S. (2018). Energy Imaginaries: Feminist and Decolonial Futures. In B. R. Bellamy, & J. Diamanti (Eds.), *Materialism and the Critique of Energy* (pp. 377–412). MCM' Publishing.

Zhang, C., & Auricchio, V. (2023). Offline and Online Collaboration in Providing Service Design Projects for Social Innovation to Villages: A Co-Creative Action in Quanzhou. In D. De Sainz Molestina, L. Galluzzo, F. Rizzo, & D. Spallazzo (Eds.), *IASDR 2023: Life-Changing Design* (pp. 1–19). DRS. https://doi.org/10.21606/iasdr.2023.401

IV

BIOGRAPHIES

Valentina Auricchio
Assistant professor of the Design Department of the Politecnico di Milano. Her research is focused on Design Methods and managing strategic design projects with small and medium industries including Design Thinking processes. Her main interest is in design processes, methods and tools and their application within different sectors for strategic innovation. Member of Polimi DESIS Lab and of the international DESIS Network.
valentina.auricchio@polimi.it

Leire Bereziartua Gonzalez
She is an Industrial Design Engineer, from the Mondragon Polytechnic School (Mondragon Unibertsitatea) and Politécnico di Milano. She is currently part of the Deusto Design Research Group team and teaches at the Faculty of Engineering, at the Bilbao campus of Deusto University. She teaches several subjects related to Technical Graphic Expression in different engineering studies, both at grade level and master level, also "Sustainable Design" and "Laboratory III: Experience and Service Design" in Industrial Design engineering studies. She is also part of the Deusto FabLab team (creativity, innovation and development centre for new products, services and experiences) as FabExpert, she has made FabAcademy during 2018. In addition, since 2018 she collaborates with projects within the Digital Industry Cathedra. In 2014 she holds a master's degree in Teaching Training, which helped develop her teaching skills further, and since the 2019/2020 course she is in PhD adventure, specializing herself in Circular Economy, new technologies and Renewable Energies.
leire.bereziartua@deusto.es

Mario Bisson
Associate Professor at the Department of Design of Politecnico di Milano where he teaches and has taught Industrial design, Visual elements for the project and Color at the School of Design. He is currently Scientific Director of the Color Laboratory of the Department of DESIGN, he is promoter and co-founder of the Interdepartmental Laboratory of Politecnico di Milano EDME (Environmental Design and Multisensory Experience). In 2013 he is co-founder of the MDA Association (Mediterranean Design Association) that deals with topics related to Environmental design.
mario.bisson@polimi.it

Beatriz Bonilla Berrocal
PhD candidate in Design at the Design Department of Politecnico di Milano, member of Polimi DESIS Lab. Her research interests focus on Design for Social Innovation and its application both in business and communities.
beatriz.bonilla@polimi.it

Stefana Broadbent
Associate Professor in the Design Department of Politecnico di Milano. Between 2014 and 2016 she was Head of Collective Intelligence at Nesta, UK's innovation agency. Previously Stefana was a Lecturer in Digital Anthropology at University College London where she led the Master in Digital Anthropology. Her research interests are in the area of digital and sustainable social practices.
stefana.broadbent@polimi.it

Alessio Caccamo
Alessio Caccamo, PhD (1991) is Information Designer and Junior Researcher (RTDA) at Sapienza – University of Rome. He combines theoretical research with applied research in Communication Design - specifically in Data Visualization and Information Design - focusing on pedagogical, sociological and critical aspects, i.e. the human-data interaction. Co-Head of the SID Group – Design for Education, he specializes in Design for Learning, researching through design hybrid projects both analogue and digital for learning environments.
alessio.caccamo@uniroma1.it

Massimiliano Cason Villa
Designer and Ph.D. Student at Iuav Universtiy of Venice, he pursued his education with an interdisciplinary outlook, somewhere between Interior and communication design, attending the environment of makers and digital fabrication.

Since 2019 he has been collaborating with the startup Design Differente, taking care of participatory didactics projects on Circular Design topics, with partners such as the Municipality of Milan, La Triennale di Milano and the SOUx school of Milan. Since 2022 he has been teaching at the New Academy of Fine Arts in Milan; today he is a student at the Doctorate in Science of Design at the Iuav University of Venice, with a research focus on Design and Circularity studied under the lens of product life cycle assessment tools.
mcasonvilla@iuav.it

Francesca Cellina
Researcher at the University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Francesca Cellina has a background in both environmental engineering (master) and social sciences (PhD). She performs trans-disciplinary research activities to foster the transition towards a low carbon society, particularly in the domains of mobility and household energy consumption. She exploits ICT tools and devices in participatory, living lab interventions that leverage co-creation and co-design methodologies to engage individuals and stakeholders in real-life interventions aimed at triggering societal transitions.
francesca.cellina@supsi.ch

Davide Crippa
Architect and Ph.D. in Interior Architecture and Exhibit Design, he attended the masters of Italian design, completing his training with an interdisciplinary outlook. In 2004, he founded the Ghigos studio and since then has been pursuing a wide-ranging research among exhibitions, installations and projects of international relevance. From 2007 to 2021 he taught at the Milan Polytechnic and the New Academy of Fine Arts in Milan; today he is a Researcher at the Iuav University of Venice, where he is investigating the potential of interaction design and new digital fabrication technologies with a view to the circular economy, with a thematic focus on the sustainability of installations.
dcrippa@iuav.it

Marta Corubolo
Researcher at the Design Department of the Politecnico di Milano. Her research interests cover service and strategic design and social innovation, community centered design and collaborative services, with a specific focus on the incubation and growth of local initiatives and their relationship with the private and third sector. She is a member of the Polimi DESIS Lab.
marta.corubolo@polimi.it

Michele De Chirico
He is a PhD student in Design Sciences at Università Iuav di Venezia. His research relates to design of materials, focusing on design for the sustainable management of production waste and on materials as contextual actors and cultural meaning-makers. Since 2020, he has also been engaged as a lecturer in courses dealing with design and materials and design history and criticism.
mdechirico@iuav.it

Barbara Di Prete
Architect and phd in Interior Architecture and Exhibit Design, is an associate professor at the Design Department of the Politecnico di Milano, where she carries out research between urban, exhibit and interior design. In 2004 she founded the Ghigos studio, designing exhibitions, installations and projects for institutions of international relevance (Maxxi, Expo2015, MoMA, Milan Triennale, Venice Biennale). Since 2015 she has been coordinating the Specializing Master in "Design for Public Space" provided by POLI.design. She is currently following funded research for ENEA, CAP, Regione Lombardia, investigating the instances of sustainability in the energy, environmental and social fields.
barbara.diprete@polimi.it

Raffaella Fagnoni
She is full professor of Design at Università Iuav di Venezia, where she teaches design laboratories and civic space design. She also directs the PhD school in Science of Design. She has lectured abroad, in Iran and China, and has coordinated local and international research groups, both public and privately funded. Her research topics focus on design for social impact,

service design for public interests, social innovation, reuse and recycling, and design for sustainability, with the aim of intervening in emerging issues through active stakeholder involvement and the enhancement of local heritage. She is focused on the ongoing role of design in contemporary society, considering environmental emergencies and the state of alert in which our planet finds itself, working on the circular economy, local territory, waste recovery, and care for people and habitats.
rfagnoni@iuav.it

Rossana Gaddi
Designer and PhD. Associate Professor at the Department of Architecture of the University "G. d'Annunzio" of Chieti-Pescara, where she deals with Communication Design and enhancement of local resources and the territory. She took part in national and international seminars and research programs on the topics of innovation for cultural and territorial enhancement, and Communication and System Design for social inclusion.
rossana.gaddi@unich.it

Letizia Giannelli
Research fellow affiliated with the Service Design Laboratory at University of Florence. With a background in video production in the documentary film industry, her current focus is on research on Service Design and its applications in the textile industry.
letizia.giannelli@unifi.it

Debora Giorgi
Phd and Architect, she is Associate Professor in Design (ICAR/13) at the Department of Architecture, University of Florence (DIDA-UNIFI). President of the CdL in Textile & Fashion Design, visiting professor in international Universities, she teaches the Laboratory of Service Design at the CdLM in Design and works on design for services with a particular focus on social innovation and collaborative services.
debora.giorgi@unifi.it

Pasquale Granato
MSc in Computer Engineering, he has built a long career developing complex applications across various domains. He is currently a researcher at SUPSI (University of Applied Sciences and Arts of Southern Switzerland), focusing on renewable energy, particularly solar energy, and sustainable mobility. Pasquale is also an expert in games and gamification, integrating innovative approaches to enhance engagement and learning.
pasquale.granato@supsi.ch

Luca Incrocci
Industrial and UX/UI designer with a background of experience in graphic and service design. He is currently a researcher at the Service Design Lab at the University of Florence, focusing on service design methodologies applied to the textile industry.
luca.incrocci@unifi.it

Carmelo Leonardi
Product designer and Ph.D student in Design Sciences at Università Iuav di Venezia, Carmelo Leonardi graduated from the same university in 2022, with a master thesis titled "Melior de cinere surgo, design of a new ecological material derived from Tephra and its applications" which allowed him to deepen the concepts of social and environmental sustainability in design.
cleonardi@iuav.it

Ami Licaj
Research Fellow at the Laboratory of Design for Sustainability at the University of Florence with a PhD in Design, obtained in 2018, on Data Visualization entitled "Information Visualization. Intersubjective Liquid Discipline." Passionate about processes - and the "designerly" way of dealing with them - applied to all things digital/social/intangible/future. Academic career includes activities as Visiting Professor, national and international seminars by invitation, and design courses in other universities.
ami.licaj@unifi.it

Evelyn Lobsiger-Kägi
MSc Environmental Sciences ETH, she has been researching and teaching sustainable development and energy behaviour at the ZHAW (Zurich University for Applied Sciences) for 15 years and is now co-leading the "Energy Behaviour" Team at the Institute for Sustainable Development. Her main focus is on the participatory development of sufficient and energy-efficient interventions at household and neighbourhood level. She works in a transdisciplinary manner with cooperatives, energy supply companies, municipalities and NGOs to develop and test practice-oriented approaches.
kaev@zhaw.ch

Giuseppe Lotti
Full professor of Industrial Design, is President of the Degree Course in Product, Interior, Communication and Eco-Social Design of the Department of Architecture (DIDA) of the Università degli Studi di Firenze. He is scientific manager of research projects at the European Union, national and regional level. He is the author of publications on the culture of the project. He has been curator of design exhibitions in Italy and abroad. He is the technical-scientific coordinator of the Interior and Design District of the Tuscany Region – dID.
giuseppe.lotti@unifi.it

Marco Manfra
PhD candidate in Innovation Design at the University of Camerino and former research fellow at the University of Ferrara. He was Visiting PhD(c) at the Architecture Faculty of Lisbon University. He is professor of the course "Processi del design per l'impresa sostenibile" in the I and II level Master's degree program in "Design della Comunicazione per l'Impresa" at the University of Ferrara. He carries out research activities mainly in the field of design for social and environmental sustainability - with eco-social approach -, theories and culture of the project, media ecology, and regeneration of marginal territorial contexts.
marco.manfra@unicam.it

Raffaella Massacesi
Architect and PhD. Communication designer. She is Assistant Professor in Design at the Department of Architecture of the "G. d'Annunzio" University of Chieti-Pescara, and sole director of university spinoff SOS-Habitat. Her research interests relate to digital design, webdesign, environmental communication, communication for public utilities.
raffaella.massacesi@unich.it

Luciana Mastrolonardo
Architect and PhD. Assistant Professor at the Department of Architecture of the University "G. d'Annunzio" of Chieti-Pescara where she deals with Architectural Technology and process sustainability. She took part in national and international seminars and research programs on the impact of sustainability at various scales and in different dimensions, through metabolic and qualitative studies.
l.mastrolonardo@unich.it

Michele Mauri
Researcher at Politecnico di Milano—Design Department, he's co-director of DensityDesign Lab. Within the laboratory, he coordinates the research, design, and development of projects related to the visual communication of data and information, particularly those related to born-digital data and Digital Methods.
michele.mauri@polimi.it

Claudia Morea
Architect and PhD in Design for Sustainability, she is currently adjunct professor at BA Textile & Fashion Design, University of Florence. Expert in Life Cycle Assessment, she focuses her research on the spread of sustainability assessment capabilities, with specific regard to engagement and sustainability empowerment.
claudia.morea@unifi.it

Stefania Palmieri
Associate Professor at Politecnico di Milano, PhD in Industrial Design. She is Head of Relations with Businesses and Professions for the School of Design - Integrated Product Design. Her research and teaching activities deal with methods and processes, with particular attention to innovation processes in relation to different productive, organizational and cultural contexts, in which to enhance and strengthen the collaboration between University and business. She is part of the Scientific Committee of the interdepartmental laboratory EDME, which deals with digital technologies, immersiveness, new relationships and synergy of knowledge.
stefania.palmieri@polimi.it

Fabiola Papini
She holds a double degree in Communication Design from the School of Design, Politecnico di Milano, and the Shanghai International College of Design and Innovation, Tongji University. She is co-founder of an independent magazine and digital designer at a Milan-based information design agency. Her interests range from data visualisation to digital design, sustainability, and editorial design.
fabpapini@gmail.com

Adrian Peach
He is a practicioner and teacher, has spent three decades working with a diverse range of international brands from Alessi to 3M, with prestigious architectural practices including Antonio Citterio and David Chipperfield, with artisans and industries. He has collaboration with several research centres and universities in Europe and Middle East, like Academy of Art, Architecture and Design (UMPRUM, Prague), Domus Academy (Milan), German University in Cairo (Berlin and Cairo), German International University (Cairo), Istituto Marangoni (London), KLC (London), Istituto Europeo di Design (Milan), Hochschule Hannover, Hochschule für Technik und Wirtschaft (HTW-Berlin), Hochschule der Bildenden Künste Saar (Saarbrücken), Kunsthochschule Weißensee (Berlin) and Università di Bologna.
info@adrianpeachdesign.com

Silvia Peluzzi
Designer, she graduated with honors at Politecnico di Milano in the Master's deree of Product Service System Design. In 2022, she participated in an international mobility program at FH Salzuburg where she studied Design & Product Management. With a background in Interior Design achieved with distinction in the year 2021, she had a previous mobility at LAB University of Applied Sciences in Finland.
peluzzi.silv@gmail.com

Giovanni Profeta
Giovanni Profeta holds a PhD in Design from Politecnico di Milano, where he completed his thesis titled "Displaying Open Cultural Collections: Design Guidelines for Cultural Content Aggregators" within the DensityDesign research lab. As a researcher at the Institute of Design of the University of Applied Sciences and Arts of Southern Switzerland (SUPSI), he conducts applied research projects focusing on data visualization and algorithmic methods for accessing and analysing cultural collections. Additionally, he is also the teacher of the Interaction Design course in the Bachelor of Visual Communication and the Master of Arts in Interaction Design and the teacher of the Data Visualization course in the Bachelor of Data Science and Artificial Intelligence.
giovanni.profeta@supsi.ch

Grazia Quercia
PhD in Communication, Social Research and Marketing from Sapienza University of Rome and Adjunct Professor of "Laboratorio di Design Transmediale" at University Guglielmo Marconi, she is a member of the editorial board of the "Transmedia" series by Armando Editore and a member of the research unit GEMMA (Gender and Media Matters). Her research interests include cultural and creative industries, media ecology, transmedia design, participatory culture, sustainability communication and gender studies.
g.quercia@unimarconi.it

Lucia Ratti
Designer and Ph.D. student at the Design Department of Politecnico di Milano, her research activity touches different intersections between design and sustainability, ranging from urban biodiversity to circular exhibit design, to the energy transition and its diffusion. Since 2019 she has been an assistant in didactic activities in the Interior Design Bachelor Degree of Politecnico's School of Design, and in 2020 she started working with the association Repubblica del Design, where she takes care of the design and implementation of participatory design-didactic workshop, with partners such as the Municipality of Milan, Milan Triennale, ans SOUx school of architecture for children.
lucia.ratti@polimi.it

Agnese Rebaglio
Designer and Ph.D., Associate professor at the Design Dept. of Politecnico di Milano. Her research activity focuses on designing innovation processes of urban contexts, from a perspective of sustainability and social inclusion. Scientific director of the Specializing Master "Design for Public Spaces" provided by POLI.design. She is currently developing research on design for urban regeneration and energy sustainability promoted by design. Promoter, for the Interior Design Degree Course, of GIDE (Group for International Design Education), a network of European design schools that collaborates in educational programs.
agnese.rebaglio@polimi.it

Chiara Rutigliano
PhD candidate in Sustainability and Innovation for the Design of the Built Environment and Product System at the University of Florence. Designer with experience in graphic and innovative service design, particularly in the study of user experience and relationships in complex systems. Currently his research is focusing on traceability and transparency in the textile industry.
chiara.rutigliano@unifi.it

Carla Sedini
She is an Assistant Professor at the Design Department of Politecnico di Milano and PhD in Sociology. She is a member of the D+S research group at Polimi, where she combines and integrates social research and design. She has been researching and teaching issues related to Territorial Development, Social Innovation, and Quality of Life, with specific attention to fragile populations. She published a book titled "Collectively Designing Social Worlds. History and Potential of Social Innovation".
carla.sedini@polimi.it

Andreas Sicklinger
He is Full Professor in Industrial Design, focuses his research interests on three main fronts: Design as Science (human factors and new human factors), Design Education and Future Aesthetics, Design for Territory and the Mediterranean. He worked for Aldo Rossi on the projects Schuetzenstrasse e Landdsberger Allee in Berlin, covered the role of Product Manager in the retail sector. He has been professor and head of department at the German University of Cairo from 2012 to 2018. He has published books and articles on topics of his research interest. He is member of the Committee of the Institute of Advanced Studie of University of Bologna and Distinguished Visiting Professor at Malaysia Italy Design Institute, Kuala Lumpur.
andreas.sicklinger@unibo.it

Abhigyan Singh
Assistant professor at the Department of Human-Centered Design of Delft University of Technology (TU Delft), The Netherlands. With a background in new media design, anthropology, and IT engineering, his research examines social, cultural, and economic aspects of emergent local energy systems and services. His research makes theoretical, conceptual, and methodological contributions to the emerging disciplines of design anthropology and energy research. Abhigyan's work has earned him awards such as the WWNA Apply Award (2021) from the European Association of Social Anthropologists' Applied Anthropology Network (EASA-AAN) and Cumulus Association's 'Young Creators for Better City & Better Life' Award. In addition to his academic work, he is Co-lead of the Social and Economic Value Sub-task of the International Energy Agency's Global Observatory on Peer-to-Peer Energy Trading (GOP2P).
a.singh@tudelft.nl

Manfredi Sottani
He is a Designer and PhD Candidate (Curriculum in Design) at the Department of Architecture, University of Florence. He carries out research activities at the Design Sustainability Lab (Department of Architecture, University of Florence, scientific supervisor Prof. Giuseppe Lotti), specifically in the field of Digital Design, Sustainability Design, Communication Design and Strategic Design for Territorial Systems. He also participates in regional R&D as well as in international and European projects.
manfredi.sottani@unifi.it

Davide Stefano
Architect and PhD. Researcher in Real Estate Valuation at the Department of Architecture, "G. d'Annunzio" University of Chieti-Pescara, where he deals with cost estimation of post-earthquake reconstruction, relationships between urban quality and real estate values, and price formation of raw materials in the construction sector.
davide.stefano@unich.it

Suzanna Törnroth
She is an Associated Senior Lecturer (PhD) in Design at Luleå University of Technology, Sweden. She researches on the feminist technoscience perspectives of emerging technologies in human and non-human worlds. Particularly, her recent research delves into the ecological and multispecies perspective of solar energy technologies, following a dissertation titled called: "Solarscape: The power of humanity in designing solar imaginaries, entangled worlds, and critical sustainable futures". She also has a practice-based design and urban planning background in Sweden, Singapore, Dubai, Copenhagen and Maldives.
suzanna.tornroth@ltu.se

Anna Turco
She holds a degree in Design, Visual and Multimedia Communication from Sapienza University of Rome. She is the recipient of a research scholarship entitled "Visual Communication Design for Natural Capital and Material and Immaterial Cultural Heritage." Since 2022, she has been pursuing a PhD in Design at the Department of Planning, Design, and Architecture Technology at Sapienza University of Rome and works as a teaching assistant in the Communication Design Laboratory, the Public Space Design Laboratory, and the Design and Representation Laboratory. She has participated in the European project "Conference on the Future of Europe" in Brussels, Strasbourg, and Warsaw, addressing issues related to climate change, environment, and health. Her areas of scientific research focus on Visual Communication Design, specifically Environmental Graphic Design, applied to public space for reactivation and regeneration purposes.
anna.turco@uniroma1.it

Annapaola Vacanti
She is a Research Fellow at Università Iuav di Venezia, where she teaches in design laboratories for the curricula of Product design and Interior design of the master degree design courses. She obtained a PhD in Design at the University of Genoa in 2022. Her research focuses on Interaction Design and the opportunities offered by data-driven tools and Artificial Intelligence for design, exploring the challenges that lie at the intersection between technology, human factors, and sustainability issues. She is working within the iNEST (Interconnected Nord-Est Innovation Ecosystem) project, funded by the National Recovery and Resilience Plan (PNRR). Alongside her academic career, since 2018 she has been art director and organizer of TEDxGenova, an autonomous event operating under official TED license for the local dissemination of valuable ideas.
avacanti@iuav.it

Francesca Valsecchi
She is an Associate Professor at the College of Design and Innovation at Tongji University and director of the Ecology and Cultures Innovation Lab. She develops research on more-than-human design and the challenges of the post-development paradigm. Her research includes published, speculative, and exhibition works about mapping ecosystems, ethnography of waterscapes, ecological data, and urban-nature interaction.
francesca@tongji.edu.cn

Gijs van Leeuwen
PhD Candidate at the Department of Human-Centered Design of Delft University of Technology (TU Delft), The Netherlands. His research is concerned with relations of power and politics, and how these co-evolve with emerging energy infrastructures and technologies. Methodologically, he is developing a transdisciplinary approach that is based on design anthropology. He has a multidisciplinary background with two Master's degrees in Energy Science and Philosophy of Science, Technology, and Society.
g.e.vanleeuwen@tudelft.nl

Desirée Veschetti
Designer and research and teaching assistant at the University of Applied Sciences and Arts of Southern Switzerland (SUPSI), she has been involved in research dissemination projects concentrating on accessibility and cultural heritage. With her background in editorial and interaction design, she incorporates these skills into SUPSI's Bachelor in Visual Communication program, teaching in courses centred on Creative Coding with Machine Learning and User Interface Design.
desiree.veschetti@supsi.ch

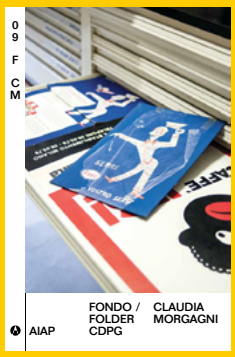
Devon Wemyss
PhD Science and Technology Policy Studies, she has been researching in the field of energy digitalisation and behaviour change at the ZHAW (Zurich University of Applied Sciences) for 10 years. Her main focus is on collaborative processes to activate climate-relevant behaviour change, particularly looking at how digital tools can support these changes in the long-term and at large scale to move beyond research.
wemy@zhaw.ch

Chenfan Zhang
PhD candidate of the Design Department of the Politecnico di Milano. Her research interests include design for social innovation, community and community development, and service design. Member of Polimi DESIS Lab and of the international DESIS Network.
chenfan.zhang@polimi.it

Francesco Zurlo
Ph.D., he is Dean of the School of Design of Politecnico di Milano. He is full professor of Industrial Design. His research interests are concentrated in strategic, systematic and creative research through design, focusing to the impact of business innovations and human flourishing. Professor Zurlo is the Director of the Design + Strategies research group, he is a member of the scientific committee of the Observatory of Design Thinking for Business of the School of Management of Politecnico di Milano, and of ADI Index (the most important organization for assessing the best design in Italy).
francesco.zurlo@polimi.it

Progetto Grafico
From 2003, the only Italian magazine totally dedicated to graphic design

AWDA
The International AIAP Women in Design Award



CDPG Folders
Booklets dedicated to the AIAP's Archives Funds and personalities of Design History.

CAMPO GRAFICO 1933/1939
The Birth of Graphic Design

AIAP PUBLISHES BOOKS, MANUALS, POSTERS, A MAGAZINE AND A JOURNAL. GRAPHIC DESIGN, COMMUNICATION DESIGN, DESIGN.

aiap.it/libreria/

AIAP EDIZIONI

AIAP CDPG
The Archives of Italian Graphic Design
Documents, Histories, Researches, Exhibitions, Publications, Tours

AIAP CDPG
ASSOCIAZIONE ITALIANA
DESIGN DELLA COMUNICAZIONE VISIVA

AIAP
via Amilcare Ponchielli 3
20129 Milano

www.aiap.it
aiap@aiap.it
biblioteca@aiap.it

PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
ISSN 1972-7887

#26, Vol. 17, June 2024

www.padjournal.net

AIAP
associazione italiana design
della comunicazione visiva