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PRESERVATION OF THE ARCHITECTURAL
HERITAGE / STRUCTURAL, SEISMIC
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URBAN PLANNING, DESIGN AND POLICY



Chair:
Prof. Alessandro Rocca

DOCTORAL PROGRAM IN ARCHITECTURAL URBAN INTERIOR DESIGN

The Architectural Urban Interior Design (AUID) Ph.D. program promotes research focused on architectural design, with studies and projects aiming at different scales, contexts, and finalities. Research activities are based on the critical analysis and development of design processes and techniques, in dynamic relationships with the urgent questions related to the urban and rural environment, the green, blue, and grey infrastructure. Research is supported by the acquisition and elaboration of insights and skills precisely linked to the contemporary architecture's theoretical and critical horizon.

The Program foresees a constant elaboration and discussion of theoretical and operational tools. This dialectic process aims to foster the development of a critical and creative reflection on architectural design, exploring and testing experimental approaches, and delivering autonomous and innovative scientific products to be disseminated through seminars, publications, conferences.

The Program is embedded into the Department of Architecture and Urban Studies (DASTU), which hosts more than 160 professors and researchers engaged in an open multidisciplinary scenario of architectural and urban studies, including every branch of design culture.

The Program offers an intense sharing of knowledge, information, and practices. AUID is a creative, open, multicultural environment where the researchers find frequent occasions of exchange with the board of professors, other research centers and doctoral institutions; the Program supports international exchanges, conferences, exhibitions, and research networks.

The Program provides opportunities for teaching and tutoring activities, which is considered an essential research complement, thanks to the close connection with the Polimi 'School of Architecture, Urban Design, and Building Construction'. The Program is also included in the Polimi Ph.D. School, which gives the candidates the possibility to attend many interdisciplinary courses, keeping in contact with the larger Polimi doctoral community.

The Program aims to train and prepare highly qualified researchers and professionals who will work in academic institutions, research centers, public administrations, and the private sector, in the field of architectural, urban, and interior design.

Eligible students hold a master's degree in architecture or close disciplines and can read, write, and speak English fluently. A background in Architecture is mostly appreciated, but are accepted a curriculum based in Design, Media, History, and other programs related with Art and Humanities.

The Program is run by a Head, who coordinates all activities. Then, different actors cooperate in the program development. Deputy Heads have specific assignments related to foreign relations, interior relations, departmental research. The Faculty Board has the scientific responsibility of all researchers, together with a Board of Experts composed of professors and lecturers with bold academic research experience. An international Advisory Board connects AUID with an extensive international network.

Research topics

The Architectural Urban Interior Design (AUID) Ph.D. program promotes research focused on architectural design, with studies and projects aiming at different scales, contexts, and finalities.

Research activities point at the critical analysis and development of design processes and techniques in dynamic relationships with the urgent questions related to the urban and rural environment and the green, blue, and grey infrastructure. Research is based on the acquisition and elaboration of insights and skills explicitly linked to contemporary architecture's theoretical and critical horizon.

Every year, the Program focuses on specific topics to be explored theoretically and designerly in respect of its general directions. Within the 38th Cycle, starting in 2022-23 academic year, the preferential research lines follow these topics, which be pursued choosing various viewpoints and fields:

- Theory of architecture and architectural Design: reframing premises and goals, with case studies from the past and from the present times.
- Architecture and mass media: how architectural design interacts with political and social issues.
- Architecture as a contemporary narrative: research, criticism, education form an elaborate creative engine of producing ideas, ideologies, fetishism, and critical thought.
- Research by design: this relationship, carefully investigated in the past years, is a test site for specific Design-driven research applied to different contemporary challenges.

The Candidate will develop a research methodology starting from the lectures and assignments of the AUID courses and the courses of the Polimi Ph.D. School.

Studying the different formats, methods, expressions of research in architectural design, the Candidate will profile a personal methodology considering the specificity of the selected object, the target, the attended results.

The Program considers that design is a relevant and necessary component of any research. Together with the AUID Faculty and the Supervisor, each Candidate will find a specific position between design and research.

Professional opportunities and job market

Educational objectives focus on the deep understanding of a well-selected and defined topic; the main goal is to develop research containing a comprehensive survey of the chosen question, which leads to an original track and output. The Candidate will acquire the skill to organize a consistent analysis of case studies, formulate a clear proposal for an original approach to a question, and elaborate innovative strategies and research methods.

The Candidate will be supported to deliver autonomous and innovative scientific products to be disseminated through seminars, publications, and conferences.

Enrollment: Admission requirements

Italian and International citizens are requested to have graduated according to the pre-existing laws D.M. 3.11.1999 n. 509, or to have a Master of Science degree following D.M. 3.11.1999 n. 509, or a Master of Science following D.M. 22.10.2004 n. 270, or similar academic title obtained abroad, equivalent for duration and content to the Italian title, with an overall period of university studies of at least five years.

A Master of Science degree in Architecture is highly recommended; candidates who graduated in disciplines as Landscape, Design, Art, Media, and Communications are allowed to enroll in the Program.

A certified knowledge of the English language is a requirement for admission. Please refer to the Ph.D. School website for details.

The admission to the Program will be established according to the evaluation of the candidates' curricula, motivation letters, and a proposal of a Ph.D. research, which candidates will send contextually with their application to the admission announcement. A shortlist of applicants may be requested to meet delegates members of the Faculty Board. The Program welcomes both foreign and Italian students. English is the official language.

Scholarships are available on general and specific themes, following the parameters illustrated in the call for admission. Candidates supported by scholarships of other national and international institutions may obtain a direct access to the AUID Ph. D. program, after the Board approval.

Requirements for the Ph.D. title achievement

The achievement of the Ph.D. title in "Architectural Urban Interior Design" requires a study and research activity of at least three years equivalent of full-time study, focused on the development of a Ph.D. thesis.

Ph.D. candidates must earn a minimum of 30-course credits (see paragraph 5.3 below) and regularly conduct studies and research. At the beginning of the course, the Faculty Board can assign a tutor to supervise and assist the Ph.D. candidate. The tutor shall be a professor belonging to the Faculty Board or the Groups of Experts.

The Faculty Board may assign extra course credits to one or more candidates if they need to complete their preparation in specific topics relevant to their research projects.

Research development

The main aim of all Polimi Ph.D. Programs is the development, for the candidates, of a research-oriented mindset, with expertise and skills in a specific research topic. Ph.D. candidates are requested to develop an original research contribution.

The Ph.D. thesis must thus contribute to increasing the knowledge in the architectural design research field. Besides, it has to be coherent with the general research lines of the Ph.D. Program.

The research results are collected in the Ph.D. thesis, where the candidate's contribution is put in perspective to the research state of the art in the specific research field.

The research develops under the guidance of a supervisor, who supports the candidate in the setting-out and everyday activities related to the thesis development. The supervisor is not necessarily a member of the Faculty Board and may also belong to an institution that is not Politecnico di Milano. The supervisor can be supported by one or more co-supervisors.

Further activities are encouraged during the Ph.D. path to enhance the candidate's personal skills and research expertise. Candidates must acquire the capability to present and discuss their work in the research local and global communities. Consequently, both the participation in international conferences and the publication of the research results in peer-reviewed journals are supported. The Program encourages the candidates' research interactions with other groups in their research field, in national and international areas. Research visits of at least three months are strongly fostered, as through them, the candidates may acquire different skills to develop their research work and thesis.

The minimum duration of the Program is three years.

Objectives and framework of the teaching activities

The Ph.D. Polimi Programs and the Ph.D. Polimi School activate teaching forms of different kind and credit value, including courses, seminars, project workshops, laboratories. Teaching activities cover the fundamental research issues (problems, theories, methods), representing the founding element of the Ph.D. Program. Lessons are held in English. Structured teaching activities allow earning ECTS credits. The Ph.D. School offers courses aiming to train the Ph.D. candidates in soft and transferable skills. These courses' skills and abilities are expected to help candidates across different areas of their careers to respond to the rapidly evolving needs of the global economy and society at large.

The Ph.D. School courses activated for the 2022-2023 academic year will be visible at this link: <http://www.dottorato.polimi.it/en/during-your-phd/phd-level-courses/>. At least 10 of the 30 credits (ECTS) that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the Ph.D. School.

The educational structure can include:

- Lectures, training sessions, guided tours, and seminar cycles.
- Seminar activities and individual stages/internships particularly important for enhancing the students' curriculum.
- Individual research driven by a supervisor and discussed with the Faculty Board.

Each learning activity is subject to grading through oral examination and/or the submission of written papers. Detailed programs are available on the Program's and Polimi websites. Programs and bibliographies of courses are available online and will be communicated at the beginning of each activity.

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THE LEAN.CITY: DESIGN+EXPERIENCE+NEW MEDIA FOR MILLENNIALS AND GENERATION Z

Federica Marchetti – Supervisor: Prof. Pierluigi Salvadeo

The research investigates the transformation of contemporary cities after the advent of digital culture, new online media and related technologies. A series of changes that have affected people's lives and characterized the lifestyle of the Millennials and Generation Z, the so-called digital natives. In particular, the aim of the work is the evaluation of the effects of the digital revolution within the design of the space considering material and immaterial dynamics and its relationship with the final users. To define the perimeter of the thesis the main research questions are: which kind of design process can relate these aspects? Which kind of space is produced, and which is the relationship with the users? How does the role of the architect change?

In the first part of the work is defined the State of the Arts, the cultural background behind the topics, the methodology of the research, the multidisciplinary approach in the search of sources – from literature and from web. In particular, the cultural field of Design is related to the one of Digital Innovation, Cyber Philosophy, Cyber Psychology, Media Sociology, Design/Lean Thinking. Starting from the Crisis of the Modern in Architecture, firstly utopian projects and then informal processes have developed a vision of the city flexible, fluid and characterized by multiple aspects according with the contemporary society. Observing the work of Team X, Structuralists, Radical Architects and, in the recent years, the bottom-up design experiences that start from web communities, the city appears more able to changes

according with people needs. This is related to new possibilities, such as the sharing economy and open-source attitude of the people that inspires a co-design approach in the new processes of urban transformation. As in a lean start up, defined by Eric Ries in its book, and therefore in the definition of new businesses, products or services, the city changes considering cyclical phases of research and analysis, design, prototyping and testing with the final users. Considering this background, the thesis investigates the design space through examples and urban phenomena together with a qualitative method of selection based on a series of characteristics: the presence of a web site, apps or platforms, social media pages, call for ideas/workshops that involves the users, a Co-design process, a Pilot project, a test with the users to define an open project. The research moves transversally to traditional design scales, looking at the urban dimension as a container of complexity and not as a specific scalar choice. The second part of the thesis shows and describes this set of phenomena to understand the new characteristics and the quality of the space that is produced: projects, processes, situations that are generated in the city by the hybridization of material and immaterial dynamics, but also by a different approach to the traditional design categories and typologies: inside and outside, public and private, online and offline. Dynamics that take shape starting from the relationship with people, in their real/virtual dimension and with respect to the experience they make

of the space itself. This collection of 88 observations allows the definition of 3 main fields of investigations: DOMESTIC EXTENTION – Digital Nomadism and Sharing Attitude: the idea that domesticity comes into play both in the internal and external space is a topic strongly linked to the relationship with the digital world. Extending domesticity in the workplace, public and open spaces is now possible and usable thanks to the integration with platforms that manage causes and outcomes; HYPER NATURE – Collective Re-Vegetation Projects: the re-vegetation of the city which improves the quality of the environment. Also in this case, thanks to digital technology, it is possible to bring people together and have that human and collective resource capable of entering a process that can often only be managed with large investments or maintenance costs; NATIVE SPACES & SOCIAL HUBS –



Fig. 1
The lean.city:
the main fields of investigation.

Activators of Experiences and Onlife Spaces: places and processes that could not have been activated without the digital revolution. Phygital spots between virtual and real, the so called instagrammable spaces, nodal and/or punctual elements that concentrate flows, relationships, material and immaterial uses.

In conclusion, the emerging contemporary city goes beyond the concepts of the so-called Smart City. It is a place capable of constantly changing according to the needs of its inhabitants, thanks to the traditional tools of design and those who come from digital and web world. Considering the examples, spaces assume new characteristics: they become adaptable where the structure of the city or the building act as a framework for the insertion of elements that are connected but independent. For this reason, they can be adapted according to needs

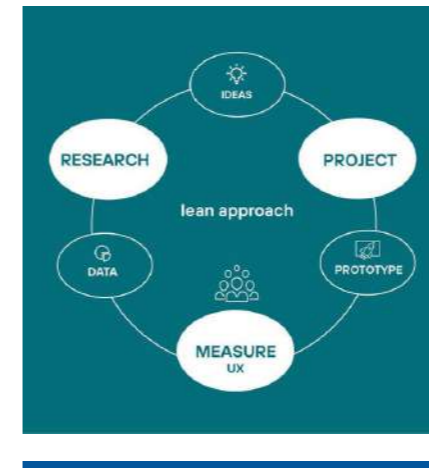


Fig. 2
The lean city cycle: the process
describes a series of steps in the
definition of a project.

without losing design cohesion. They are dynamic spaces because can accommodate different uses in the same area and in different times. They are hybrid spaces, because various uses coexist and they connect people with different characteristics, in this case everyone can find something that represents themselves and it is the hybridization that brings a sense of identity. In the end, they are domestic spaces, as welcoming as a private space even when they have a public value because they are focused on the users. According to the lean method these characteristics are part of a process of transformation that is not just bottom-up or top-down, but a combination of the two experiences. In this framework also the role of the architect change, appearing more as a curator that facilitate the process than as an author. The novelty of the research is exactly the identification of this common process in practices, oriented to these new forms of collaboration and the definition of a background behind the concept of the lean.city. Interesting aspects, related to the thesis, are become evident in the condition of extreme difficulty occurred with the pandemic for Covid-19. A case that can be seen as a magnifying glass on the issues and reasoning presented in the work, given the radical nature of some moments in which many activities continued only thanks to the web and information technology. But also, as a moment of validation of some virtuous perspectives presented in this research since the lean tools of the project were able to respond to various emergency issues.

THE UNCERTAIN PROJECT EXPERIENCING DEVICES FOR THE MODIFICATION OF MARGINAL CONTEXTS

Gianfranco Orsenigo – Supervisor: Prof. Andrea Di Franco

How can the pavilion project give a glimpse of prison redevelopment (if it can)? And therefore, of the Italian prison system? How can a street's conversion reveal an urban district's regeneration story (if it can)? And therefore of a marginal territory? The investigation moves around these questions and advances through the participation in action-research experiences. It is an empirical investigation concerning how architectural design can equip itself to be a key step in regenerating marginal contexts.

It is customary to think of architecture as the outcome of a process responding to needs and problems. In recent decades, the belief has led architectural practice to be circumscribed by much more instrumentals demands, in which action is determined in reaction to the short-term priorities of clients and the market. It happens in a period in which society is increasingly talking about the future through architectural images. "We are building a lot, but we are building big investment projects, as if we are doing architecture without architecture" (Chipperfield 2018). Several studies highlight the current changes and difficulties of design action to be a critical medium of comparison with reality. We witness a progressive renunciation, or exclusion, of being a decision-making tool, especially in marginal contexts. They are situations where the overlapping of problems, the concentration of fragilities and the scarcity of resources seem

to make any change insufficient because it is too partial. Complexity and uncertainty, conditions of contemporaneity, push these situations to the edges of the city's transformation processes, making them inert.

Practising a self-reflexive observation concerning two academic research, I try to experiment with a possible design method and tools capable of supporting urban regeneration for these contexts. The comparison with real processes allowed me to simultaneously practice the designer and the researcher's dimensions. On the one hand, one is called upon to deal with the contingency of a design process made up of documents, bureaucracy and unforeseen events. On the other hand, it was possible to question it, distancing oneself when necessary to reflect on the implications and effects of one's practice. Designing: it was possible to test, make mistakes, try again, record the successes, and make the failures profitable. Reflecting on the design process: it was possible to represent, in an oriented way, the events, the technical operations carried out, the processes and their outcomes. Telling stories: It attempted to communicate the similarities and differences in recognised methods and tools.

The research moves along three levels: the project environment and posture, the action-research practice, and the observation of the

design methods and tools used. Each plan has its field of action, but its progress cannot be without the other two, along a non-linear path that moves between opportunities and possibilities in a multi-directional way. The terms of research, the first part, defines the framework in which research is moving. The core is the possibilities of architectural design today and the looking for some clues to be effective in the contingency. It is a survey on the tools, forms and methods of design carried out by architects, starting from the 60s of the last century. With the contribution of researchers and scholars, a critical point of view on the possible project's action in socially complex contexts is highlighted: the project as a social practice.



Fig. 1
The *little red house* and the *pergola* were built in Milano-Bollate prison and designed with Prison Architecture research (FARB2016).

The second part, an investigation by opportunities, tells the experiences that grow up in the involvement in two action-researches at DASTU of Politecnico di Milano. The first one is on the habitability of the prison and the second one on peripheral areas of Milan. After a brief description of the context in which they operate, the narrative focuses on design actions undertaken, tools used, artefacts produced and events. Multiscalar forms of design emerge, interweaving architecture, policies and people's lives. In these experiences, the design is used as a probe to understand reality and test transformative actions. It allows crossing a series of paradigmatic situations that intercept the material, social and institutional dimensions. The exploratory character, combined with a clear intent devoted

to action, aims to produce narratives, provoke new imagery, and trace replicable methods.

The last layer, the tools of the possible, tries to recognise new elements in terms of strategies and tools of the architecture project. Three devices are identified. The design guesswork is a design vision, among the possible ones, that draw a framework to select and interpret the heterogeneous opportunities that happen. At the same time, it indicates a direction for a multiplicity of ongoing transformative actions and/or encouraging new ones. The built experiments are punctual events to situate the project in context. They activate and feed a process of pertinent knowledge that encourages inert situations to action. It happens by "making together". The relational

device is the habitat where general and particular are put in tension. It is capable to record and, at the same time, making openly operative the project's data stratified over time. It supports a multi-actor process in making decisions. These are devices of a project-process that put in particular and general vision in a circular tension.

The research on design in action and its products is intended to engage in dialogue with: who today are questioning and observing different forms of project operations (researchers); who are practising adaptive forms of architectural design (architects); who are trying to open up new forms of interaction with the architectural project (administrators and the third sector).

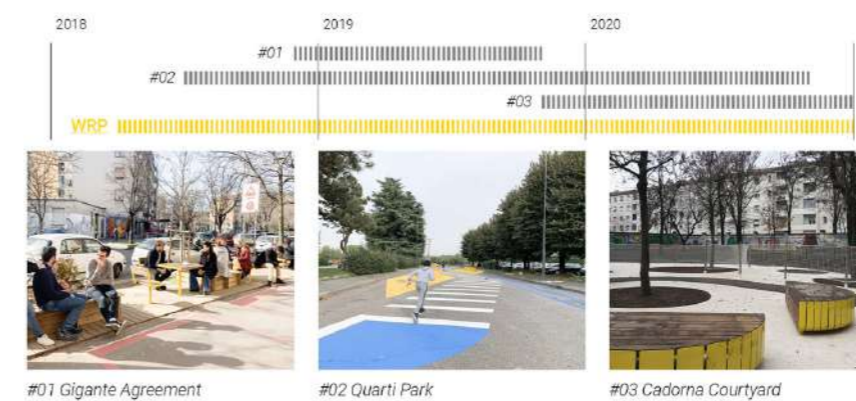


Fig. 2
Three built experiments in the periphery of west Milan design with West Road Project research (Polisocial Award 2019).

VIRTUAL EXPERIENCE IN AUGMENTED EXHIBITION

VIRTUAL TECHNOLOGY APPLICATION IN REAL MUSEUMS AND ITS IMPACT ON EXHIBITION SPACES

Shilong Tan - Supervisor: Prof. Luigi Cocchiarella

The museum, undertaking to demonstrate the starting point of a particular country and regional civilization, is a country or a region's "cultural genes" that integrate functions of collection, education, academic research, international exchanges and cooperation, tourism, and others one place. Therefore, the museum's design is crucial to embody the museum's level and plays an essential role in the museum undertaking. The museum, as a social public service agency, is an essential part of social culture. Its preservation and study of the antiques aim to contribute to society's harmonious development and serve the social public. Exhibitions are the most effective spiritual and cultural products provided to society by the museum. It is an important means of social service, particularly the application of the novel exhibition methods in modern museum brought by the influence of the new technological revolution. Museums have always played a crucial role in narrating identities, and have been involved in their production and construction. The accelerated planetary circulation of people(s), objects, ideas and information, and the increasing encounter and hybridization of cultures, languages and histories are consistently challenging the traditional understandings of memory, cultural belonging and identity as they have usually been proposed until recently in European museums. In this framework, the politics and practices of museum representation are being questioned in their ability to depict and

convey the complexities of present political, social and cultural scenarios and efficiently address diversified and multicultural audiences.

This research, will try to explain the new vision technology, mainly referring to one kind of virtual vision technology, augmented reality (AR), and virtual reality (VR) for the museum. VR can be considered an extreme form of AR. It can be said that AR is an application form of VR essence of A/VR to construct virtual exhibits digitally and display them to visitors through different devices. Simultaneously, it makes a more in-depth discussion of how the scientific and technological revolution changes the way museum exhibitions, spatial composition and interaction paradigm. Then proposes a design approach driven by user experience based on applications in the digital age and museum space experience. Redefines the relationship among visitors, exhibits, museum spaces, and curators. On this basis, try to estimate



Fig. 1
Vision in different means in exhibition space, source: made by author

the technological development in the future, while discussing the new forms and reshaping museums and their spaces in the near future under the influence of virtual technology.

In the first half of the thesis an in-depth excavation of the existing virtual visual technologies and a detailed analysis of their application in the display space is made, including their historical background and development trajectory. On this basis, the possible trends of the display space under the influence of such technological changes and its update in the dimension of user experience are explained. Virtual exhibits and augmented space have presented as a solution for the future museum experience. With the support of technology development, we can improve the user experience when using augmented space and virtual exhibits in a low-cost development environment, even though the user experience is very different from the previous static display, whether it is

from the users' behaviour feedback or the logical relationship between the user and the object. The experience upgrade brought about by this digital technological innovation is subversive. The exhibition and its space design need to pay more attention to visitors' experience during the exhibition. Architects need to present people's vision and expectations for future museums through architectural vocabulary, space creation and the convenience brought by digital technologies.

In the second half of the paper, based on a large number of case studies, a deeper exploration of spatial experience and spatial value is launched. It also shifts the core viewpoint of the thesis from technology to spatial experience itself. And a certain degree of comparison and analysis with traditional spatial

design methods. And from a spatial perspective, this design approach can still play a role. Pay more attention to the visitors' personal attitude in the museum space. From the perspective of experience, it is supplemented by technical means and augmented exhibits. It is one of the best choices for a contemporary museum to enhance self-attraction and contribute social value. Driven by virtual vision technology, the relationship between exhibits, space and visitors in the museum has been redefined. If the concept of the future museum is expanded to an urban scale, it can be foreseen that in the future, the spatial environment in the city, the relationship between virtual elements and residents will also change accordingly. The city may be full of augmented spaces at all levels. And augmented space also means the blurring of the boundary

between private space and public space. Customized enhanced space allows users to experience the virtual environment more specifically. The future museum and future city under this hypothetical environment also make new requirements for the role of architects, and even change the production logic and production relations. The new augmented spatial form and aesthetic cognition in the digital age will eventually bring architectural design back to creativity as the core and user experience as the drive.

	Level1	Level2	Level3	Level4
Interior Scale	Floating Info.	Virtual Furniture Augmented Exhibits Preview Unbuilt	Customized Furniture Interactive Space	Customized Interior Impossible Space
Urban Scale	Floating Info. Real-time navigation	Virtual Landscape Augmented Exhibits Preview Unbuilt	In-depth Environment Changes Interactive Space	Customized Architecture Impossible Space New Architectural Vocabulary
Percentage of virtual/augmented elements in the real environment	Real Environment	Real Environment	Real Environment	Real Environment
	2D Virtual Elements	3D Virtual Objects 2D Virtual Elements	3D Virtual Objects 2D Virtual Elements	3D Virtual Objects 2D Virtual Elements

Fig. 2
Four levels of reshaping in architectural and urban level, source: made by author

JOINT-SUPERVISION

Parisa Vaziri – Supervisors: Prof. Guya Bertelli (Polimi); Prof. Dr. Sören Schöbel-Rutschmann(TUM)

Despite the increasing demand for environmentally friendly energy production, we are currently confronted with a lack of systematic design approaches for areas of renewable-energy plants. The need for such an approach remains largely unaddressed, and there are only a small number of realized projects for renewable-energy with spatial and social value as reliable references (Fig.1).

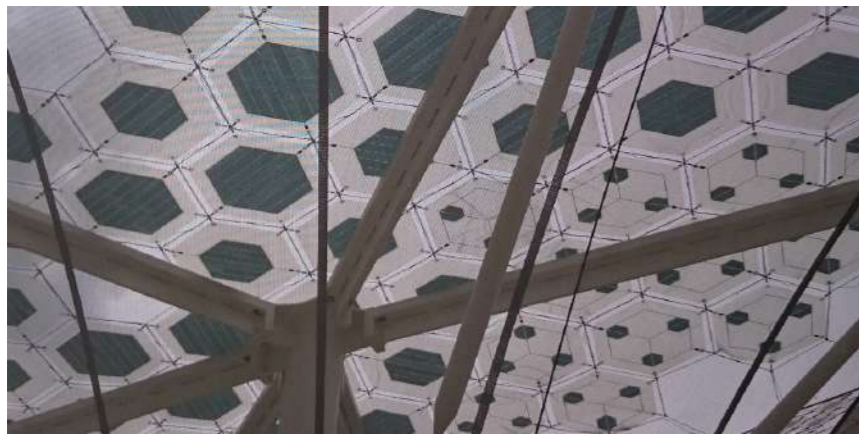


Fig. 1
Hexagonal organic photovoltaic modules installed in the German Pavilion at 2015 EXPO Mila-no. De-signed by SCHMIDHUBER. (Photo by author)

Although renewable-energy installations take up huge areas of landscape, they have not received enough attention from the architecture community. Near residential areas aesthetics has always been one of the main obstacles to the social acceptance of the energy plants. Although aesthetics, social and spatial issues are the subject of architecture, there is no framework or systematic studies for the task of

connecting designers and architects with renewable-energy. As a result, planning is usually mono-functional and does not create a place that attracts people and offers the experience of an attractive space with social value. The main objective of the present work is to design innovative investment technologies for renewable-energy architecturally in such a way that they can develop social effectiveness. The concepts

of atmospheres according to Gernot Böhme and the space of flows according to Manuel Castells are used as the key to identify socially effective spaces. The lack of renewable-energy projects with social value is a problem that sets limits to this research topic and makes it seem a challenge to create a framework or typology for this architectural task. To link the two concepts of energy and architecture,

it is first necessary to have a common language, as it could be defined by an archetype that conveys the meaning of the two concepts “transformation of social and physical flows” with an easily understandable idea: “Station”. Thus, two methodological challenges arise: first, to find a common linguistic level in the fields of energy and architecture; second, to use this linguistic connection to generate new knowledge to meet the social challenge.

To develop a strategy for designers and planners that can transform social flows, atmospheres of places and facilities of renewable-energies are identified and classified. The method includes research through design, abductive thinking, and qualitative clustering as well as a systematic formation of categories of perception and interpretation. Due to the current lack of realized renewable-energy projects that are architecturally designed for social effectiveness, the data will be obtained from the creative ideas of international designers, artists and architects who participated in the 2014 Land Art Generator Initiative (LAGI) biennial competition with the motto: “Renewable Energy can be beautiful” (Fig.2).

The 64 concepts of the competition will be analyzed by interpreting the atmospheric, social and energy information they contain as ideas of flows and Stations. The projects are thus identified abductively with an atmospheric term and grouped into nine categories - clusters - according to similarities. This clustering provides a framework, or, in the sense of Christopher Alexander, a pattern language for atmospheric and meaningful spaces of renewable-



Fig. 2
Example of clustering with the master students in the course Research by Design, TUM, Faculty of Architecture (Photo by author, Dec 2019). (Photo by author)

energy production, which, in addition to the energetic aspects, are decidedly oriented towards social aspects. The Flow-station model combines the concepts of energy production and architecture and thus gives the planning a holistic view. Station and flow become keywords to generate further ideas and categories, depending on the location of a project, that connect existing and desired physical and social flows. The generated categories are finally evaluated by a design study. This test shows how the categories presented can be a tool for architects to design a “social power plant”. The concrete case shows how energy generation plants can be used to regenerate an inhabited urban landscape and revitalize the adjacent social housing (Fig.3). The result of the work provides new insights for spatial planning and can inspire designers and architects to participate in this movement of transforming energy production in the landscape, which is crucial for the future.



Fig. 3
Futuristic exhibition: eye catcher. The pilot project designed by author.