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Enhancing Wind Farm Projects

A Systemic and Strategic Design
Approach to Community Acceptance
and Engagement

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Abstract

This study explores the local implications of increasing renewable energy production, with a focus on wind energy. Drawing on landscape knowledge and cultural significance, it employs the Territorial Capital concept to inform strategic design processes, considering factors such as local context and ongoing transformation dynamics. Landscape justice and energy democracy are highlighted as crucial concepts, alongside systemic perspectives, to address the research question: How can wind farm projects be innovated to enhance local acceptance? Through case study research involving fifty projects, various strategies are proposed to align wind farm installations with their surroundings' cultural and sensory fabric, promoting community acceptance and sustainable energy practices.

1. Introduction

The EU Green Deal decarbonization objectives have been influencing the development of policies at the local level, foreseeing the increase in the production and use of renewable energy and resources, especially as far as the wind sector is concerned (Sperati et al., 2022).

Drawing upon principles of landscape knowledge, historical context, cultural significance, and ongoing transformation dynamics, resumable with the Territorial Capital concept (Zurlo, 2003; Parente & Sedini, 2018), the discussion here presented seeks to inform the strategic design process with a multidimensional understanding of the environment and its potentialities in relation to its inhabitants. Defining landscape justice (Mason & Milbourne, 2014) and energy democracy (Wahlund & Palm, 2022) as crucial concepts to be attentive to and adopting systemic and strategic perspectives to the matter (Chilvers et al., 2018), the article addresses the following general research question: How might we innovate wind farm projects to make them more accepted by local communities, being aware of contextual limits and possibilities?

A case study research and analysis was carried out to give a first answer to this question. We selected fifty projects dealing variously with the energy transition, some specifically working in/for the wind power sector. In conclusion, we will anticipate the critical issues these strategies can answer related to the community's acceptance of wind farm installations that resonate with the cultural and sensory fabric of their surroundings, enriching the experience of both residents and visitors while promoting sustainable energy practices.

2. Understanding Complexities in Wind Farm Acceptance

The limits in the acceptance of wind farms installation cannot be reduced to NIMBY (Not in My Backyard) reactions because this concept simplifies and flattens the complexity of the reasons against them (Hagget, 2011; Pasqualetti, 2011; Castiglioni et al., 2021). Based on what Pasqualetti (2011) proposes, the critical factors identified are briefly presented here in a reasoned order. The first critical factor is "Imposition" because the installation is experienced as an imposition from above. Linked to the physical installation of turbines is the "Density" factor; being wind a localized resource, it does not allow the spread of turbines equally on the territory, and some places are therefore more impacted than others. One of the major requests of the inhabitants is "Respect" (the third critical factor) and attention to the relationship between land and the life on it. Moreover, the conservatory approach of inhabitants toward the landscape takes us to the fourth critical factor, which is "Immutability" and it represents the difficulty in accepting changes in a familiar landscape; this also leads to the consideration that wind turbines are seen as an attack on "Place identity" (fifth critical factor). Paraphrasing what is stated in the *Manifesto per le Energie Rinnovabili in Basilicata* (*Manifesto for Renewable Energy in Basilicata*) (March 9, 2021) written by Legambiente Basilicata, Alleanza per il Fotovoltaico in Italia and Rete degli Studenti medi Basilicata and the literature review, the most common believes and sentiment toward renewable energy, with specific attention toward wind energy, includes a negative perception of its impact on the landscape because of the installation of wind turbines and wind farms; moreover, inhabitants are often skeptical on the effectiveness of wind turbines which have been

often questioned about their sustainability, because of the need of large amounts of materials and energy to be installed and to function. Other issues are related to the actual benefits that inhabitants can receive, which are defined as mainly economic and environmental.

Starting with the discussion around the landscape, it is important to highlight that landscape and panorama are different concepts (Garibaldi, 2023). The European Landscape Convention (2000)[1] defines the landscape as an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors; moreover, the landscape is recognized as "being with us but also beyond us, spatially and temporally"; and as involving "multiple trajectories and a simultaneity of stories so far" (Brace & Geoghegan in Mason & Milbourne, 2014, p. 107). All these definitions make clear that given the importance of human actions in the processes that characterize the landscape, it is evident how it should be regarded as constantly changing and evolving; the landscape (whether natural or man-made) is not static but is in constant transformation. As a result of the installation of clean energy infrastructures, such as wind turbines, local communities experience a landscape transformation that can lead to uneven development, squeezed landscapes, and place identity transformation phenomena (Bridge et al., 2013). We have identified the concept of landscape justice as helpful for shifting the framing of climate change to spatial, temporal, and relational scales.

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1   Council of Europe Landscape Convention (ETS No. 176), opened for signature at Florence on 20 October 2000.

Indeed, the application of the landscape justice concept to evaluate change allows one to take under control risks of exclusion, the creation of public space, and antagonism and pluralism dynamics (Mason & Milbourne, 2014). Therefore, wind farm development should use the concept of justice to define various possibilities of recognition and participation going beyond the assessment of economic benefits to the community. Landscape governance (Görg, 2007) is needed to facilitate broad participation in public discussion and give space to local knowledge decision-making.

As far as the concept of benefit is concerned, its definition has to include more than just economic advantage, which can be acquired thanks to taxes, payments to landowners (where the wind turbines are installed), and shared management of wind farms (Copena et al., 2019; Rand & Hoen, 2017). There are potential indirect benefits (*fringe benefits*) that the installation of wind farms can generate, in addition to environmental (if the energy produced is used in favor of the area that produces it) and economic benefits. Similarly, critics were moved toward the sustainability transition initiatives regarding the real sustainability of wind farms. Also, in this case, a systemic perspective is needed when sustainability has to be evaluated. Indeed, sustainable development requires specific attention to several interconnected environmental (Planet), social (People), and economic (Profit) elements.

For all these reasons, the social acceptance of landscape changes due to wind farm installation should be the result of learning (and participatory) processes (Wolsink, 2010; Rand & Hoen, 2017).

We talk of processes because adopting a systemic strategy to the matter is needed. Complex transition processes, indeed, should go beyond the idea of participation as a single event but intend to understand how multiple engagement practices interact in/with larger systems where different forms of participation must be grounded in social, normative, cognitive, and material elements (Chilvers et al., 2018). As Chilvers & Kearnes (2015, p. 52) highlight, an ecological conception of participation suggests that is not possible to properly understand any collective participation without understanding its relational interdependence with other collective participatory practices, technologies of participation, spaces of negotiation and the cultural political settings in which they become established.

Co-creation practices are recognized as more inclusive forms of involvement, even if difficult to implement. These participatory strategies make it possible (Suboticki et al., 2023) to give marginalized groups a voice and broaden the diversity of participants involved (human and non-human); provide for more equitable decision-making; open up to possible new and unexplored alternative solutions; allow for a wider understanding than just identification of problems, valuing diverse expertise; and produce narratives that can ensure openness and inclusiveness. However, as several pieces of research highlight, the participants in co-design and co-production activities are usually highly educated women in good socio-economic conditions living in easy-to-access areas (Gheduzzi et al., 2021). For these reasons, in the following section, we present case studies from urban contexts, because of the greater ease with which partici-

patory strategies are adopted in highly urbanized places due to a greater tradition/experience due in part to the higher population density of higher schooling populations, greater availability of resources (time and economic), and the more concentrated presence of research and development institutions on site.

3. Research Objectives and Methodology

The research question, *How might we innovate wind farm projects to make them more accepted by local communities, being aware of contextual limits and possibilities?* is significant in the current energy and urban development sectors. A comprehensive case study research and analysis was carried out to answer this.
We meticulously selected fifty projects dealing with various aspects of the energy transition, some specifically working in/for the wind power sector. As previously explained, we also included case studies from different areas of interest (e.g., urban regeneration) to ensure a comprehensive understanding.
In the comparative table presented in Annex 1, each case study selected is described by its name, location, and implementation period; a short description highlighting the project goal is also presented. Finally, the analysis focuses on two levels of engagement, considering first the involvement during the project development and then the public involvement in the project's delivery phase, which has been analyzed through the classification in the Pine and Gilmore matrix (2011). Based on Pine and Gilmore's (2011) theoretical model, we defined a matrix to map the case studies and identify possible project scenarios. The model developed by the two authors is particularly useful in this research since it focuses on the perceived experience by considering the active or passive participation of the public

and its relation with the surrounding environment. This model goes beyond services and places experience as the culmination of economic value. The different experiences according to the presented model are classified concerning two dimensions: on the horizontal axis is placed the users' participation (extending from passive to active) and answer to the question *What kind of experience does the case study offer the user/community?* The vertical axis describes the users' perception of their surroundings (extending from absorption to immersion), answering the question: *What kind of physical presence does the intervention have in the context?* From the intersection of the two axes, four quadrants are generated (Pine & Gilmore, 2011):

- Entertainment: Users are led to see or hear but are not actively involved;
- Education: Users are actively involved while not being necessarily immersed in the environment;
- Escapist: Users immerse themselves in the environment while performing an action;
- Esthetic: Users contemplate the landscape and the works of art.

In the following section, we present the analysis of case studies using the developed matrix.

4. Case Study Analysis and Scenarios

The matrix helped us answer what kind of physical presence and engagement the case studies describe. As previously said, the crossing of the two axes allows the identification of four different quadrants representing four experience types.

1. Aero Art	26. Arc performance platform
2. Ball-on	27. aspern.mobil LAB
3. Bruxelles tool kit	28. Centre TERRE
4. Cerrone	29. Climate signals
5. Dream time	30. Ecosione
6. Flower pops	31. Enzeb
7. Flower power	32. GreenLab Danemark
8. Flower power Tulip	33. GreenColab
9. Hepburn wind	34. Let the wind blow
10. Middlegrunden wind farm	35. Lorraine Smart Cities Living Lab
11. Offshore wind for kids	36. Quartiere Bo01
12. Rampion wind farm	37. The big energy race
13. Samsø island	38. The Skydrain
14. SeaFlute	39. Transition Towns Totnes
15. SRE education campaign	40. Vauban neighborhood
16. Swing	41. When I grew up
17. Tvindkraft	42. Ground Control Ephemeral
18. UNWIND	43. High Line Park
19. Weightless Balloons	44. Mobile Garden City
20. Wikado	45. NEWRAIL
21. Wind Works campaign	46. Parque de la españa industrial
22. Windarp	47. Recyclerie
23. Windstalk	48. Santa Caterina Market
24. WindTree	49. SolarWind
25. Ærø island	50. Tempelhof park

● Wind farm
● Energy transition
● Urban structure

Table 1. The authors, adapted from Pine and Gilmore 2011, Case studies mapping.

The *Entertainment* quadrant corresponds to a passive involvement of the public with absorption from the surrounding environment (Pine & Gilmore, 2011); this may happen when watching, reading, or listening to something while out of the scene. *Flower pops* (6) is an example fitting this quadrant. The project aims to make offshore wind farms more attractive for people by creating an anthropomorphic landscape that recalls the flower's shapes. Working on the offshore wind farms' aesthetic provides the public with the experience of admiring, with binoculars, the created unique landscape. Other examples that can be placed in this quadrant are the ones regarding campaigns and messages such as *Climate signals* (30). This installation invites people to acquire information regarding the ecological transition on big street screens powered by solar panels.

Figure 2. Bricece Guariglia J. Climate signals, outdoor installation presented by the Climate Museum in NY, 2018, The Climate Museum © 2017.

The *Education* quadrant, still describing the physical absorption from the environment, involves active participation by users (Pine & Gilmore, 2011). This suits all the cases that provide awareness but engage the public in direct activities such as workshops and labs. An example is *Offshore wind for kids* (12), an association that aims to raise consciousness on the wind energy topic by targeting young people through small turbine construction workshops. In this quadrant are also all the projects designed to make people understand the abstract concept of green transition, giving physical elements with which to interact. Examples are the *Ecoesione* (31) and *Enzeb* (32) board games and the *Brussels tool kit* (3).

Figure 3. Teachers' toolkit, Pilot project run by WindEurope in Brussels to foster learning about wind energy by co-design a teaching tool kit, 2021, © WindEurope.

The *Escapism* quadrant describes the experiences where the public is engaged through active participation and is also immersed in the environment (Pine & Gilmore, 2011). Fit in this quadrant the case studies where people can discover the sites as protagonists of the experience. An example would be the *Windarp* (22) project, in which by reshaping the outlook of the wind turbine, the designers create an installation where humans can actively contribute to energy power production. The same idea is behind the *Swing* (16) project, where people have fun on wind turbines shaped like swings and contribute to energy production. The *Escapism* experience also has an educational role, in which people become the main actors due to their relation with the surrounding environment; the *Rampion wind farm* (12) is suited to this explanation: visitors here

get closer to the wind energy production topic thanks to an immersive VR experience provided by the wind farm museum. Other examples regard public spaces dedicated to the community, designed by the reuse of dismissed material. This concept is behind the *Wikado* (20) park, where a disassembled wind turbine creates a children's playground, but it is also the driving idea of the London *Mobile Garden City* (44) in which the no-more-used spaces and materials of the Olimpic site were used to create a community movable garden.

Figure 4. Superuse Studio, Wikado, playground in Rotterdam designed by reusing wind turbines, 2008, photo by Denis Guzzo, Copyright: http://www.denisguzzo.com/info/#acquire.

Figure 5. Flower turbines, Flower power team in front of their turbines, 2018, photo by de Groen J.

Finally, people participating in *Esthetic* experiences are immersed in the environment without active participation. The case studies located in this quadrant work on the aesthetic and the overall design outlook to improve the environment and allow people to be immersed in it. Examples are the *Dream Time* (5) and the *WindStalk* (23) projects. The first is rethinking the traditional wind turbine by creating an installation that recalls the northern lights in a public space. The latter improves the environmental qualities and creates a unique landscape that people can explore by redesigning the traditional turbines.

5. Insights from Case Studies

The case study research underscores the crucial role of community engagement, particularly in the design phase, for successful project outcomes. Notably, with a few exceptions, most of the cases examined only involved community engagement in the delivery phase. This finding highlights the necessity of both levels of engagement for achieving local population consensus. The case studies enabled us to envision general outlines to follow in order to meet the local community's acceptance. The state-of-the-art shows that the success of a project is possible without community engagement during the design phase. As it happened in the *Santa Caterina Market* (48) in Barcelona, an effective result would be reached through punctual and grounded research that respects the local environment while considering the place's cultural identity. The following output would have a positive indirect impact, generating new cultural identity hotspots and providing also indirect economic income. Similar results can be reached when general awareness is raised by designing museums, installations, parks, or events. Successful cases of those elements are for example, *Rampion wind farm* (12),*Climate signals* (30)*, Mobile Garden City* (44)*,* and *Middlegrunden wind farm* (10).

However, the current global scenario reveals a significant gap in community involvement, which is largely limited to the delivery phase. Shifting this focus to the design phase could lead to a more positive community response. The current situation only sees community involvement in specific activities such as co-funding and passive forms of participation like interviews, forms, and surveys. Active engagement, such as co-design and co-production, is a rarity.

Figure 6. Rampion Visitor Centre, VR experience inside the wind farm Museum, 2020, photo by © Southern News & Pictures Ltd.

Such a change would require a gradual evolution by implementing different integrated strategies. The research highlights that positive results can be achieved through people's literacy on the topic. Education is a fundamental step to reaching local acceptance: actions in this direction are needed, targeting both children and adults. The abstract concepts of sustainability and energy transition should be visualized through physical elements to facilitate people in understanding the importance of green energy (*Arc performance platform* (26)). The game dynamic has also been identified as an effective solution for visualizing those concepts and raising aware-

ness (as it happens for *Ecoesione* (31) and *Enzeb* (32) board games and in *The big energy race* (37)).

Different outputs could also be useful for visualizing green energy's direct and indirect advantages and details of wind turbines' workings and impacts. Workshops would not only be helpful for what just mentioned, but they would also provide occasions to co-design with the local community the experiences around the wind farm (similar to what is happening in *Hepburn wind* (9) and in *Tempelhof park* (50)).

5. Conclusion

In this conclusive discussion, some strategic answers to the critical statements previously introduced are proposed according to the Pine & Gilmore (2011) model used for the case study analysis.

To this end, the fifty case studies were clustered according to the defining themes that emerged from their analysis. In particular, we can divide them according to the goals addressed (aesthetics, sustainability, and identity), which activities were put in place to pursue and address these goals (tourism, information, education), and - the last category, as a relevant element of understanding of the wind energy topic - identifies parks as specific places were both goals and actions can take place. The different themes interface with each other, often generating overlap.

This classification helps visualize possible strategic directions to achieve community acceptance. In line with what has already been mentioned, the overview shows areas that can still be implemented where to foster innovation.
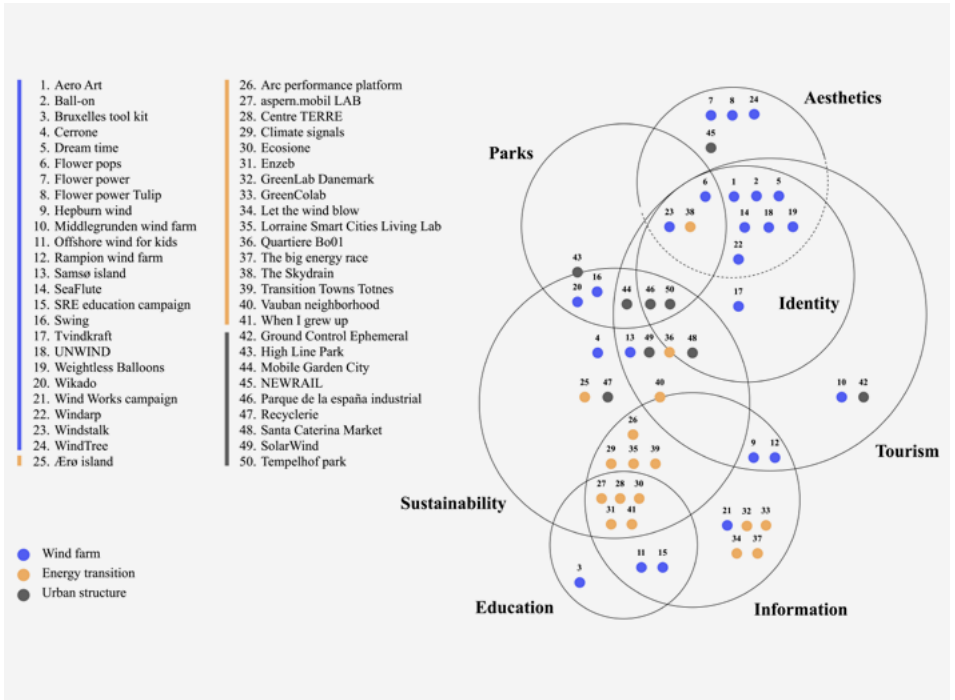
Figure 7. The authors, Case studies themes classification.

A way would be to design sustainable tourism solutions that act on the wind farm aesthetics while preserving and pointing out the place's identity. This would affect sustainability by considering the energy transition and providing indirect advantages such as economic income and social public spaces. As previously explained, those actions should be integrated with educative activities and information campaigns to engage the local community readily. In the following subsections, we will briefly overview strategic answers to the critical statements mentioned at the beginning of the contribution.

5.1. "Wind Farms Have a Strong Impact on the Landscape"

Entropic landscape[2] is a concept developed by Smithson and taken up by Careri in his book *Walkscapes* (2017) that we can adapt and interpret based on the wind power domain and context of interest (rural landscape). An entropic landscape dissipates energy through the inactivity of its structural elements. The shift from an entropic landscape to an energy landscape could be possible by applying strategies to make manifest and topic of conversation new landscape elements. The role of art and design can be crucial to act on elements such as:

- remembrance and (new) memory
- encourage active and contemplative life of/on the landscape
- foster the emotional participation of inhabitants (and others)
- helping/guiding inhabitants in understanding change.

Strategies to work on this specific issues should be focused on the integration of wind farms into the landscape through the construction of scenarios capable of promoting emotional involvement; wind farms could become places to be discovered and experienced where wind turbines could even become art installations, redefining the concept of "park". Moreover, wind farms should respect the local and cultural identity of the place (intended as Territorial Capital) to integrate and enhance the landscape through a careful study of the local identity.

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2   Entropology is a term proposed by Claude Lévi-Strauss resulting from the union of entropy and anthropology.

5.2. "We Don't Benefit from Wind Power"

As mentioned, wind energy can have fringe benefits beyond direct economic ones. It can be a great opportunity to

- revitalize rural areas and counter depopulation,
- fostering the diversification of the local economy and the creation of jobs,
- improve local infrastructure,
- promote sustainable tourism,
- develop technology and innovation.

These can result from a strategic exploitation of wind farms as places to visit and enjoy, as discussed above. Participation is crucial to contrast a poor recognition of the advantage that local populations received by developing the wind power economy. Indeed, local attitudes toward wind farms follow a "U-shaped" pattern (Wolsink, 2007). Studies show mixed results; some individuals express increasing appreciation over time for wind farms near them, while others express unchanged or decreasing appreciation. These differences are due to different experiences, very much linked with the direct involvement and engagement of inhabitants during the planning and construction processes (Hallan & González, 2020).

5.3. "Wind Energy is not Really Sustainable"

Broadening the common definition of sustainability allows one to look at the ecological transition as bringing environmental, economic and social benefits, in line with the New European Bauhaus (European Commission) approach (Rosado-Garcìa et al., 2021). Indeed, the NEB aims to facilitate and

guide the transformation of our societies along three values:

- aesthetics (*beautiful*): quality of experience and style (beyond functionality);
- sustainability (*sustainable*): from climate goals to circularity, zero pollution, and biodiversity;
- inclusion (*together*): from valuing diversity to ensuring accessibility and participation.

To gain trust, it is essential that information is accessible to everyone and that designers strategically facilitate the communication between inhabitants and other stakeholders, such as policymakers and entrepreneurs. Also, in this case, scientific dissemination can become an opportunity for benefit, favoring tourism, as in the case proposed by Smith et al. (2017). Through the involvement of different subjects (researchers, journalists, energy experts, designers, and architects, etc.) and use of different media, relevant topics could be explored (e.g., energy policies and their perception at the local level, risks and opportunities of energy in the local economy, the relationships between green energy and local communities).

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Annex 1

n°	Name	Location	Period	Short description	Goal	Engagement type during the design	Matrix quadrant
WIND FARM							
1	Aero Art	Germany	2012	A visionary project where the wind farm becomes a modern art site	Acceptance of wind farms (metabolisation) through the artistic rendering of the turbines	-	Esthetic
2	Ball-on	Melbourne, Australia	2018 (LAGI contest)	Floating aerial turbine (BAT) with horizontal axis covered with bright reflective fabric. Addition of organic photovoltaic cells (OPV)	Improving the wind farm scenarios by levering local weather condition	-	Esthetic
3	Brussels tool kit	Brussels, Belgium	2021	Generation of a wind energy learning programme, with the output of a replicable toolkit to be used in different contexts	Explaining to 12 years old children the wind energy	Passive participation - Consultation (co-design)	Education
4	Cerrone	Gubbio, Italy	2022	The biggest collective wind turbine in the Italian territory promoted by the cooperative ènostra	Contributing to the energy transition by including the population	Active participation - Share actions Based on the idea of citizens as prosumers (both promoters and consumers)	Education
5	Dream time	Melbourne, Australia	2018 (LAGI contest)	Fabric with triboelectric yarn, with an insulating part made of recycled plastic, into which silver threads are inserted. The energy is generated by the meeting of the two materials with opposite charges	Providing an artistic output of wind-generated energy using a different technology by shaping public spaces	-	Esthetic

6	Flower pops	Santa Monica, California	2016 (LAGI contest)	An unusual offshore wind farm designed as an anthropic garden made of different wind turbines to admire: each technology has a different "flower" form.	Creation of new scenarios and the related experiences	-	Entertainment
7	Flower power	Amsterdam, Holland	-	A metal tree with vertical-axis wind turbines.	Giving organic shapes to the wind turbines	-	Esthetic
8	Flower power Tulip	Holland and US	2018	Vertical wind turbines shaped as tulips	Placing of wind turbines in urban contexts	-	Esthetic
9	Hepburn wind	Hepburn, Australia	2011	A self-managed energy community that offers tours of the wind farm and houses artists' houses and an energy school. The wind farm has become a venue for art installations	Implement the energy transition	Bottom-up	Escapism
10	Middle-grunden wind farm	Middle-grunden, Danemak	2018	A wind farm that organises boat tours for different types of groups (experts, schools, tourists, etc.). Once every two years, it organises open days where it is possible to climb the turbines	Education of the vast public on wind energy	-	Escapism
11	Offshore wind for kids	Belgium	2021	A non-profit organisation that organises activities and events targeted to children and young people focused on wind energy	Educating and raising awareness of wind energy among children and kids	-	Education

12	Rampion wind farm	Rampion, UK	2018	An offshore wind farm with a museum dedicated to wind energy and the wind farm, where people can explore the topic through VR.	Educating and raising awareness of wind energy, specifically on the farm	-	Escapism
13	Samsø island	Danemark	From 1998 In 2020 it gained the title of the most sustainable island in the EU	A self-sufficient island that uses renewable resources only.	Ecologic transition while fostering local economic growth and proposing sustainable tourism solutions	Active participation - Shared action (co-funding)	Escapism
14	SeaFlute	Melbourne, Australia	2018 (LAGI contest)	An unusual wind farm with generators shaped as bottles which works thanks to the D-WEG technology (Direct Wind to Electricity Generator)	Changing the scenario of wind farms by changing the aesthetic of the turbines while working on the sound	-	Entertainment
15	SRE education campaign	Taiwan	2022	An education campaign in the libraries of the country promoted by SRE (Synera Renewable Energy)	Educating and raising awareness of wind energy among children	-	Education
16	Swing	Melbourne, Australia	2018 (LAGI contest)	An unusual wind farm where the turbines are swing, producing energy through both the air movement and human interaction	Changing the scenarios of wind farms by shaping public spaces	-	Escapism
17	Tvindkraft	Tvind, Danemark	1975	A Wind turbine designed and handcrafted by locals	Powering the Tvind school	Bottom-up	Esthetic

18	UNWIND	Melbourne, Australia	2018 (LAGI contest)	An unusual wind farm composed of kites	Changing the scenarios of wind farms by creating public spaces where to learn about wind energy	-	Education
19	Weightless Balloons	Santa Monica, California	2016 (LAGI contest)	An unusual offshore wind farm composed of fluctuant spheres that produce energy through waves		-	Entertainment
20	Wikado	Rotterdam, Holand	2008	A children's park made by the reuse of dismantled wind farms.	Reducing the environmental impact of post-dismantledg wind farms	-	Escapism
21	Wind Works campaign	London, UK	2012	A campaign for offshore wind farms levering on people's sentiments and referring to the Romanticism	Acceptance of offshore wind turbines	-	Entertainment
22	Windarp	Conhagen, Danemark	2014 (LAGI contest)	An unusual wind turbine, shaped like an arp and designed to play sounds through human interaction and air passage.	Making the wind farm sound pleasant for humans	-	Escapism
23	Windstalk	Abu Dhabi, United Arab Emirates	2010 (LAGI contest)	An unusual wind farm composed of 1203 poles of carbon fibre.	Changing the scenario of wind energy by designing less impacting wind farms for the landscape and environment	-	Esthetic
24	WindTree	France	2013-2016	A metal tree with vertical-axis wind turbines.	Integrating the wind farm in the cities context	-	Esthetic

ENERGY TRANSITION

25	Ærø island	Danemark	2021 (EU Responsible Island Prize)	An island that promotes the use of renewable resources for more than 30 years	Fostering green transition	Active participation - Shared action (co-funding)	Escapism
26	Arc performance platform	US	2018	A digital display for LEED - certified buildings that enable people to visualize the consumption and the quality of life	Encouraging positive behaviour and change to achieve the energy transition by reducing waste	-	Entertainment
27	aspern.mobil LAB	Vienna, Austria	2014 - on-going	Started by the Vienna University of Technology (TU Wien), the LAB is an open ground that engages citizens in developing mobility green solutions through innovatively designed tools	Raising awareness on green mobility and climate protection	Active participation - Shared action (co-design)	Escapism
28	Centre TERRE	Canada	2019	A centre focuses on co-creating sustainable energy solutions to meet the needs of groups not served by the national electricity grid.	Designing and improving sustainable energy solutions for rural areas of Canada	Passive participation - Consultation (co-creation)	Education
29	Climate signals	New York, US	2018	An Outdoor installation made by light street panels located in public spaces that project messages regarding the energy transition.	Warning people regarding the energy transition	-	Entertainment

30	Ecosione	Pisa, Italy	2020	A board game designed by the University of Pisa with energy transition as a focus	Education for young adults about the energy transition	-	Education
31	Enzeb	Italy	2023	A collaborative board game dedicated to adults	Making education related to energy efficiency more accessible	Active participation - Shared action (co-design)	Education
32	GreenLab Danemark	Spøttrup, Danemark	2012 - ongoing	A research platform focused on green energy development	Contribute to the development of sustainable energy systems while informing people and companies	Passive participation - Information (co-creation)	Education
33	GreenColab	Portugal	2018 - ongoing	Non-profit organisation focus on solutions based on algae	Fostering innovation and economic diversification in the algae biotechnology field	Passive participation - Consultation (co-creation)	Education
34	Let the wind blow	Worldwide	2019	An illustrated open-source book for children about removable resources and energy transition	Educating children about the energy transition	Bottom-up	Entertainment
35	Lorraine Smart Cities Living Lab	France	2008 - ongoing	Collaborative research project	Engage in user-driven co-creation for the green transition	Passive participation - Information and consultation (co-creation)	Education
36	Quartiere Bo01	Malmo, Sweden	2001	Residential neighbourhood born from the regeneration of a port area some Archistar	Shaping the sustainable solution through the aesthetics	-	Esthetic
37	The big energy race	London, UK	-	A collective game shaped as a challenge between different citizens	Reducing waste generation and fostering the energy transition	Bottom-up	Education

38	The Skydrain	Gulf of Mexico, Mexico	-	A public space where the green energy solution creates a unique ambient.	Envisioning a new scenario for the green energies solution while shaping public spaces	-	Esthetic
39	Transition Towns Tones	UK	-	A non-profit organisation led by the local community which proposes activities and events about energy transition	Educating and raising awareness regarding the energy transition	Bottom-up	Education
40	Vauban neighborhood	Freiburg, Germany	1996	An energy neighbourhood born from the requalification of an ex-French army quartier	Neighbourhood ri-qualification	Passive participation - Consultation (co-creation)	Esthetic
41	When I grew up	Worldwide	2021	An open-source book that shows the stories of some illuminated people related to the energy transition	Educating people about the energy transition	Bottom-up	Entertainment

URBAN STRUCTURES

42	Ground Control Ephemeral	Paris, France	-	Abandoned public spaces become the location for exclusive events	Temporary requalification of public spaces	-	Esthetic
43	High Line Park	New York, US	2003	Park generated from the requalification of the ex-railway station	Preserving a city symbol	Passive participation - Information and consultation (co-creation)	Escapism
44	Mobile Garden City	London, UK	2015-2018	An itinerant garden available for citizen	Re-using and recycling the materials and the spaces of the Olimpic village	-	Escapism

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45	NEWRAIL	Dronten, The Netherlands	2020-2024	Installation of solar panels and noise barriers on the railway lines	Improving the environmental landscape	Passive participation - Information and consultation (co-creation)	Esthetic
46	Parque de la españa industrial	Barcelona, Spain	1985	A park arose from the spaces of an ex-fabric company building	Creation of a public space dedicated to citizen	Active participation - Shared decision-making (co-design)	Esthetic
47	Recyclerie	Paris, France	-	A multifunctional space in an ex-station	Creating a common space for locals	Bottom-up	Escapism
48	Santa Caterina Market	Barcelona, Spain	2005	Roofs inspired by the local culture	Have a positive impact on the landscape, respecting local culture and identity	-	Esthetic
49	SolarWind	Calabria, Italy	2011	A bridge with wind turbines and solar panels	Re-qualification of an urban site with the improvement of green energy solutions	-	Esthetic
50	Tempelhof park	Berlin, Germany	2010	The biggest open-air area of the city, generated by the requalification of the dismissed airport	Requalification of the airport area providing a collaborative space	Active participation - Shared decision and action (co-design and self-management)	Escapism

IV

BIOGRAPHIES

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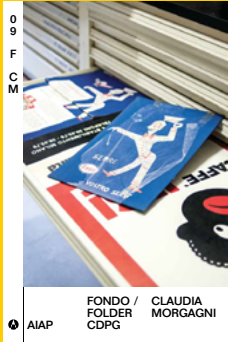francesco.zurlo@polimi.it

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