

May 2014

# A “Widespread Atelier” for Exploring Energy: “From Wave to Wave”, a Unique Place where Science, Art, and Design Intersect and Converge in an Open and Dynamic Way

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## Recommended Citation

Ceppi, G. (2014). A “Widespread Atelier” for Exploring Energy: “From Wave to Wave”, a Unique Place where Science, Art, and Design Intersect and Converge in an Open and Dynamic Way. *Occasional Paper Series, 2014* (31). Retrieved from <http://educate.bankstreet.edu/occasional-paper-series/vol2014/iss31/7>

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**Cover Page Footnote**

Translated by Marissa McClure

## **A “Widespread Atelier” for Exploring Energy**

### **“From Wave to Wave”: A Unique Place where Science, Art, and Design Intersect and Converge in an Open and Dynamic Way**

by Giulio Ceppi (translated by Marissa McClure)

*It is known that childhood is an interpretation, a cultural construction. Each society, each historical period defines its own childhood, what it means, dedicates to and expects from childhood...The image of the competent child is, I believe, by now familiar to all those present, the image on which the very experience of the infant-toddler centers and preschools of Reggio Emilia is founded. Competent at doing what? At forming relations with the world.*

—Carla Rinaldi, *Questions in Educating Today*

### **From Architecture to Territories, from Perception to Relationship**

As an architect and designer, I have had the good fortune to be involved with the infant-toddler centers and preschools of Reggio Emilia for almost 20 years. In 1997 Michele Zini and I provided the editorial and narrative structure for research conducted by the Domus Academy on the relationship between architecture and pedagogy, which is presented in *Children, Spaces, Relations: Metaproject for an Environment for Young Children*. The project included a multidisciplinary team comprised of designers, architects, educators, and various artists, including Paolo Icaro, a sculptor, and Luca Pancrazi, a painter. In addition, we asked art critic and curator Alberto Veca to write a short but significant essay on the representation of children in art throughout history. This book has been translated into several languages, including English, Chinese, Japanese, Spanish, and Korean. Now, after 15 years, it is a milestone in early educational culture. The project is perhaps one of the endeavors of which I remain most proud. I consider it a living and active project that has the capacity to stimulate and to aid architects and educators as they address the issues of designing spaces for children.

Almost every year since then, I have had the good fortune to attend conferences, workshops, and seminars in Reggio Emilia. Recently, we sat around the design table once again to work through a new challenge: creating a water and energy atelier to be located inside a power plant in the Apennine Mountains. The plant is owned and managed by Italy’s ENEL (National Electricity Board). It was built in the 1920s and still has the capacity to produce over 50,000 MWh per year through a sophisticated system of dams and reservoirs.

Located in the municipality of Ligonchio near the slopes of Mount Cusma in the Emilia-Romagna region, the facilities are about 1,000 meters above sea level. Ateliers are an integral aspect of the educational philosophy of the infant-toddler centers and preschools of Reggio Emilia. They are places where design is integrated with exploration and experimentation and where creativity connects to action and thought. They are poetic sites where theory and pragmatism combine and where imagination and expression mingle with cognition and rational thought. Similar interactions had occurred previously in Reggio Children ateliers that were devoted to special subjects—for example, the Ray of Light atelier located in the Loris Malaguzzi International Center in Reggio Emilia.

For over 30 years, the philosophy of the Reggio approach has conceived of the atelier as a place where learning involves sensory exploration as well as experimentation with and manipulation of the languages of ideas and media. In fact, the name “atelier” clearly references art. It is a place of artistic production and construction—a space in which an artist produces art, a space devoted to art, a specific and intentional space.

In Ligonchio, learning in the atelier moves outward from sensory exploration to investigations of significant questions of relationships between the environment, architecture, and energy production. With this in mind, we decided to create an atelier that would “spread”—a workspace that is not concentrated in one place. This atelier takes up an entire territory—a complex of forests and rivers that invites exploration and experimentation within a web of relationships that are connected to wider issues of science and ecology. It is an atelier where we can observe and explore nature and reflect upon its potential, which promotes the understanding that humankind and its habitats are in constant interaction and change one another. In this expansive sense, the ecological specificity of the park’s native plant species, animal species, and waterways become sites for investigation that are closely intertwined with the system of the hydroelectric power station.

Emilia-Romagna has some of the richest and most fertile land in Italy. It is traversed by the Po River, lapped by the Adriatic Sea, and shielded by the Apennine Mountains. In addition to its significant artistic and cultural heritage, Emilia-Romagna also boasts remarkable and widespread economic wealth, which was created by the development of agricultural, manufacturing, and tourist industries. Emilia-Romagna is without doubt the region of Italy that has invested most heavily in social policy and has been especially committed to supporting the elderly and children. As Bruner said:

*knowing where you are, where you find yourself, helps you to develop your sense of personal identity, your uniqueness, as well as your place in the world. After my first week of observation in Reggio Emilia, I was struck by*

*the fact that these are not only “Reggio schools,” but the expression of a kind of “Reggio spirit.” Every place has its own spirit, its own past, its own aspirations. This spirit comes straight from the land. In Greek they say “autoctono” – coming from the land. (Reggio Children, 2008, p. 36)*

Bruner’s description of Reggio Emilia helps to clarify what we mean when we describe the atelier that “spreads.” It is not only a geographical condition, but mainly a cultural one. The attention that the city of Reggio Emilia has always given to the education of its youngest citizens becomes even more essential for creating a future where individuals will respect and value differences rather than fear them. In fact, in the city and in the region, the public-private system of educational services and continuous research about innovative methods in response to families’ requests allows Reggio Emilia to achieve a high level of school attendance from the earliest years. Behind this is the conviction that a population that values childhood and recognizes children’s rights is the foundation of higher standards of citizenship. This is necessary for maintaining the atmosphere of civil coexistence that characterizes the city and region itself.

A new type of atelier integrates fields, themes, and practices. In this sense, we wanted to define this new type of atelier as widespread— interdisciplinary and experimental; sensitive to sustainability, seasonality, and local context; and aware of the complexity of these conditions. Our working group included child psychologists Carla Rinaldi and Claudia Giudici, studio teachers Veà Vecchi and John Piazza, professor of physics at the University of Modena and Reggio Emilia Olmes Bisi, executive coordinators Benedetta Barbantini and Marco Storchi, architect Tullio Zini, and myself.

Our team interacted and dialogued on three levels of parallel work for about one year in preparation for the project. We worked with the Tuscan-Emilian Apennines National Park and ENEL as formal partners. We defined the territory of the “fields” (a geographical term, but also one that is significant in the language of physics) with a base camp (the power plant) and three other satellite camps. The base camp is the main place where water can be explored as a raw material that produces energy and where this transformational process is highlighted.

We have defined three major narrative themes in parallel:

**The water cycle.** Water has qualities that support life and humankind’s development. Driven by the sun, the water cycle has provided energy for the development of modern society. Throughout nature, water exists in several states, passing from solid (ice) to liquid (water) to gas (water vapor). An awareness of these dynamic processes is fundamental for understanding how human ingenuity has led us to achieve extraordinary projects such as the Ligonchio hydroelectric power plant. In particular,

the different outlets and substations, the plant itself, and the basins become places for observing, analyzing, and understanding water as a carrier of life (and energy). In this way, they are comparable to the specific ecosystems of the Tuscan-Emilian Apennines National Park.

**Energy as a change in state of matter.** Matter is anything that has mass. Energy—even though it has no mass—can produce physical effects on matter. The context of the plant is a starting point for understanding what is happening not only upstream (the water cycle), but also downstream (the production of energy). This understanding supports a pathway for energy education and sustainable development. From this, a constant relationship between the macroenvironment (the hydroelectric power station in relation to the natural environment and the territory) and the microenvironment (the interior of the atelier) emerges. In the atelier, the phenomena of science and the concepts related to them transverse the two dimensions of the relationship.

**Complexity and Randomness in Nature: The Story of a Drop of Water.** The complexity and precision of the design underlying the natural world are often difficult to understand and visualize. But they deserve, in the context of the Tuscan-Emilian Apennines National Park and the plant, to be examined and studied as closely as possible. For example, consider a few drops of rain that fall on the park, which lies along the mountain ridge. These drops of water are essentially the same as they fall, and then they land on the ground, where their long journey toward the sea begins. But toward which sea? It depends on where the droplets hit the ground. A slight variation in where they land leads to a drastic change in their trajectory, with a difference of hundreds of kilometers. One drop of water can reach the Adriatic Sea, at the mouth of the Po River, while her twin sister, who hit the ground just a few millimeters from her, can reach the Tyrrhenian Sea.

Ultimately, we designed five large interactive installations (which the working group called “machines”) that would be placed in the environment of the station and then used by educators and children to explore different properties of water in a direct, open, and progressive way.

## **The smart design**

Ligonchio is a “crest park,” a place where Mediterranean and Continental climates match and generate a unique ecosystem—where micro and macro are connected and adaptation and evolution generate a unique biodiversity. Change and project are the same in nature lifecycles. So, the context of this atelier helps people to understand the application of the production of energy and its transfer to the daily life of consumption. This parallel understanding follows the direction of an “energetic education” that is linked to sustainability and to the awareness of complexity in both nature and industry.

## ***The Specificity of the Design Process: An Integrated and Open Space and Communication System***

The design of the communication systems and spaces—of, we would say, the whole identity of the atelier—was a complex and involved process. In August 2009, after a year of working with the project team in which I hoped to make a contribution to the concept and the definition of a “widespread atelier,” or an atelier that spreads, we presented a feasibility study with a special exhibition called “From Wave to Wave—Atelier of Water and Energy in the

Pipeline.” We hoped to show the entire region and community the policies and objectives of the project.

In July 2010 we began to create Field 1. As an architect, I was responsible for the entire design of the space in the power plant. In the so-called disassembling room, I had to consider both functional and aesthetic aspects of the project and work under the constraint that everything had to be temporary and easily dismantled and that the design had to allow operators access to one of the adjacent turbines in an emergency.

We had to soundproof the room. We divided it along the turbines and erected a large retractable wall made of iron and glass elements. The transparent wall maintained the space’s industrial look. We also air-conditioned the room by suspending innovative heating elements, made of carbon fiber, from the trusses. These units are low power consuming and have a reduced environmental impact. The furnishings were all custom made from colored polycarbonate that they would be translucent and create an energetic feeling. They were produced in a variety of hues and textures. We used water-steamed polyurethane foam to make sitting areas and soft working spaces that were warm and welcoming.

Our graphic design, from the logo to signage system to the website and Facebook page is intentionally simple. The yellow and blue typography incorporates waves as identifying elements. In our selection and use of materials, we privileged those that are certified green and have a low environmental impact. We also reduced the number and type of materials used in the project to encourage and facilitate future recyclability.

Today’s active base camp, located inside the historic ENEL hydroelectric plant, offers a close-up view of the phenomena that underlie the functioning of power plant itself and of the natural spaces there and encourages new, focused explorations. We are completing Field 1, located in the building that houses the headquarters of the community park. Here young visitors will be welcomed, share

information, consider possible directions for the visit, and later discuss the explorations that took place. In the outdoor fields, children, teens, and adults will soon have the opportunity to explore natural phenomena through immersion in a seasonal environment and in their perceptions of and emotional responses to that environment, which will generate different forms and subjects of research. In fact, this project proposes a new approach to science that invites children, teens, and adults to look at things in an unusual way, to be curious and ask about the things that cannot be explained, to search and try again, to build hypotheses and theories, and to try to verify them with experiments, as we often do in the art world. We think of the “From Wave to Wave” atelier as a “pulsating soul,” where the mind and hands and rationality and imagination work together, intertwining and complementing one another as they generate new knowledge about the world: an interesting, surely unique, place where art, science, and design intersect and converge.

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