POLITECNICO
MILANO 1863

School of Design
MSc in PSSD

Innovation Studio
A.Y. 2022/2023

Professors:
Valentina Auricchio, Stefana Broadbent, Marta Corubolo, Fabio Di Liberto, Ilkka Suppanen

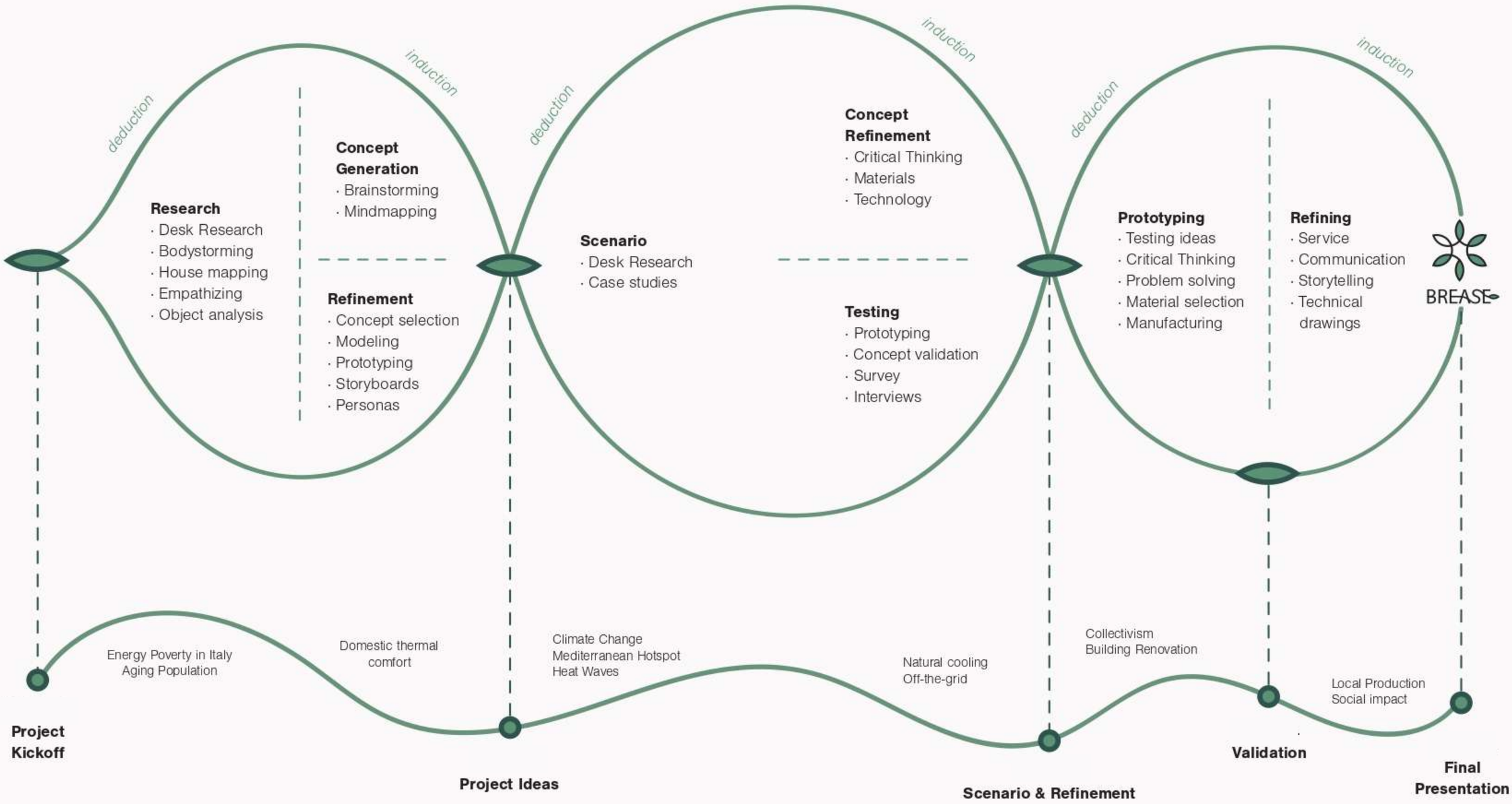
Tutors:
Vanessa Monna, Chenfan Zhang

Students:
Zhiben Zheng, Yanqianfang Sun, Mirjam Höchst, Iwana Raydan, Lorenzo Longieri, Ece Nur Temel

0.1 The Team


Iwana Raydan
Yanqianfang Sun
Ece Nur Temel
Mirjam Höchst
Lorenzo Longieri
Andrea Zhiben Zheng

0.2 The Process



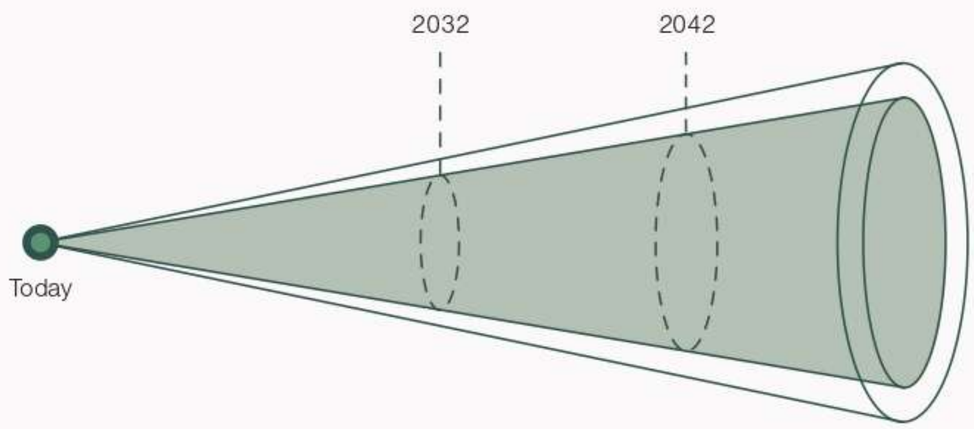
1.1 Italy, 2032

The global temperature will exceed the warning threshold of 1.5°C in comparison with the pre-industrial era around 2030. Heat waves will become recurrent in the Mediterranean hotspot and since the elderly are in mortality risk, senior citizens from many Italian urban areas will not be able to leave their homes during the summer days.

Staying at home will raise the domestic energy consumption of Italian families, and many households will be forced to adopt solutions that do not utilize energy powered sources to ensure their domestic thermal comfort.

In 10 years the Italian society will become aged, environmentally conscious, and digitized. As a consequence, the architecture of Italian urban centers will seem dramatically different. Cities will become greener and better connected with nature. The building walls and roofs will become green spaces, enhancing the biodiversity and climate in urban areas.

Buildings will function in a circular system by lowering energy demands, trash output, emissions and reusing what is necessary. Cities will evolve to net zero carbon emissions. Thus, the use of fossil fuels for heating and cooling will eventually decline and buildings will be more energy efficient, more livable, and benefit everyone's health.



1.2 Problems & Opportunities

Existing solutions for cooling houses require a lot of electricity, overload power plants in the summer, raise family energy expenditures, and are generally relied on nonrenewable energy resources, such as natural gas in Italy.

Furthermore, the majority of present alternatives are individualized. They only refresh one person or room in the house, and only a few are capable of operating on a domestic scale. These solutions return heat to the outside, negatively impacting the city environment.

Home renovation will be a way to combat energy poverty by improving the energy efficiency of dwellings, particularly in Europe, where architectural stocks are old and the worst performing buildings are primarily residential. In Italy, for instance, more than 60% of residential buildings were constructed prior to 1976, when the first energy-saving law was passed.

Despite the Italian government's offer of various financial support, there are numerous impediments to building renovation because the conditions to apply for aid are frequently difficult and the processes, too complex. Currently, there is a lack of clear and reliable information available to homeowners, as well as insufficient business and government cooperation. As a result, there is a lack of trust in the market, as well as perceptions of high risk and transaction costs associated with renovation projects.

Efficient renewable-based thermal comfort solutions will be an integral part of home renovations in the coming years. Rather than merely guaranteeing resources to support a wave of reforms, future products and services must be prepared to facilitate processes and stimulate decision-making inside a complex system.

A Renovation Wave

In 2020, the European Commission published an official communication on energy poverty as part of the European Green Deal. “A Renovation Wave for Europe” aims to renovate 35 million building units by 2030. This effort would require €900bn of investments, thus markets for green loans and green building will grow and expand. The building sector will transform as the EU collaborates to achieve the goal of being climate-neutral by 2050.

Green Cities

By the middle of this century, 70% of the world's population will be living in cities. Urban heat island (UHI) effect makes people living in urban areas particularly vulnerable to heat waves, which will be aggravated in the future due to the acceleration of global warming. Urban green spaces are proven to reduce the UHI effect by providing shade and by cooling the air through the process of evapotranspiration. Urban centers will become green cities in the near future, by investing in green spaces, renewable energy distribution systems and sustainable buildings, aiming for net zero carbon emissions.

Closer to Nature

As people will spend more time indoors to protect themselves from extreme heat, the interior environments will be in focus. Reconnecting people with nature will become a treatment for the global environmental crisis, both to improve people's physical well-being and also because environmental awareness will spread. In a world with excess of unreliable information, people will turn to traditional and established technologies, and the preference for materials with a natural finish that provide relaxation and a sense of closeness to nature will be one of the future trends.

Current system

from

individualistic and complex

- Low energy efficiency of residential buildings.
- Individual and carbon based solutions: fossil fuel heating equipment and electric cooling devices for cooling/heating one room/house.
- Complex, expensive and slow processes for house renovation.
- Hard decision making by homeowners thanks to a lack of information about home energy efficiency and benefits of building renovation.
- Uncoordinated actions between stakeholders.

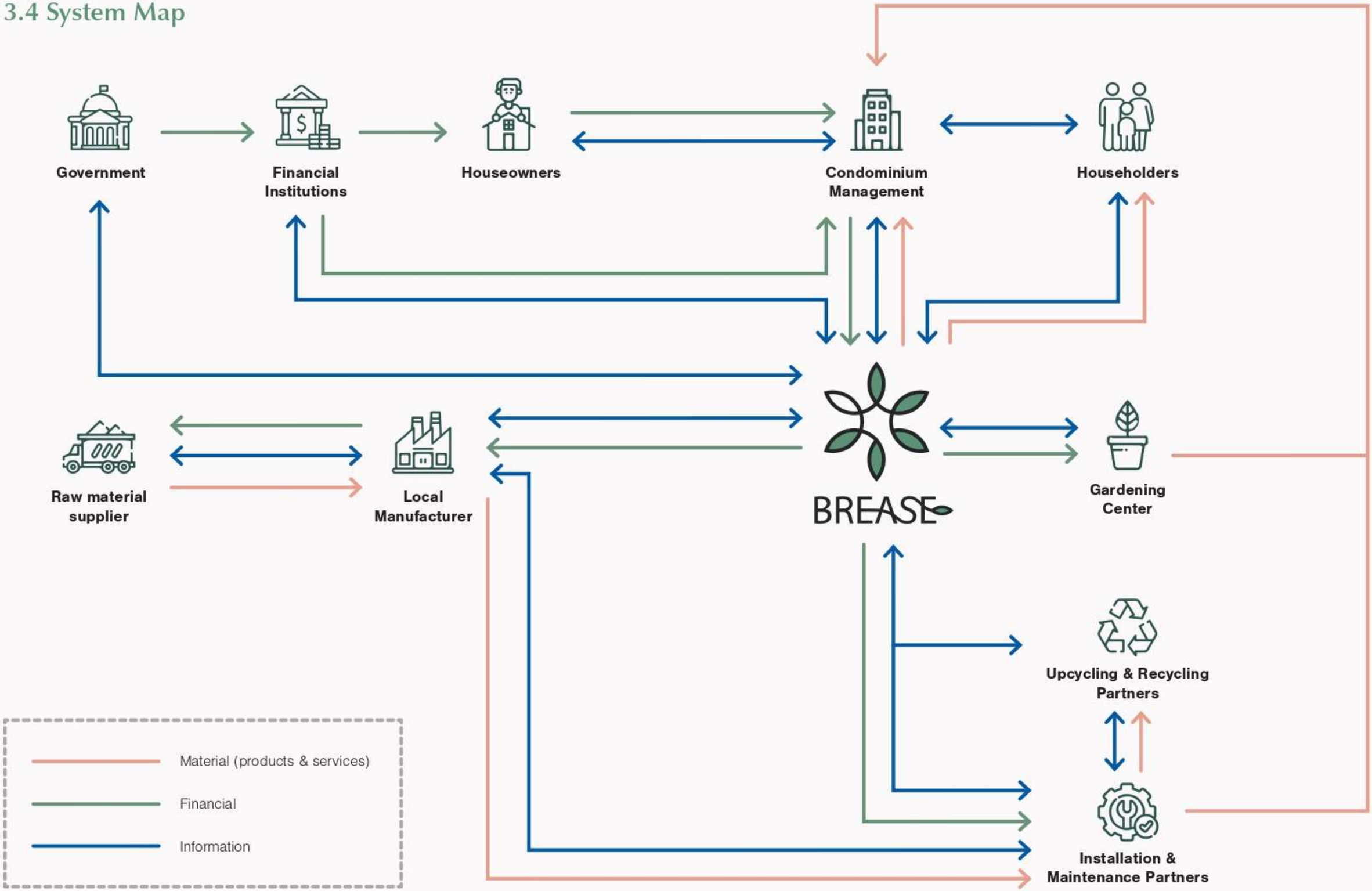
Proposed system

to

collective and easy

- Cooperation, transparency and trust in processes and information flows between companies, authorities and people.
- Empowered people and communities.
- Collective solutions for scalable futures.
- Thermal improvement in the urban scale.
- Affordable and low-impact solutions.
- Reconnecting people with nature.

3.4 System Map



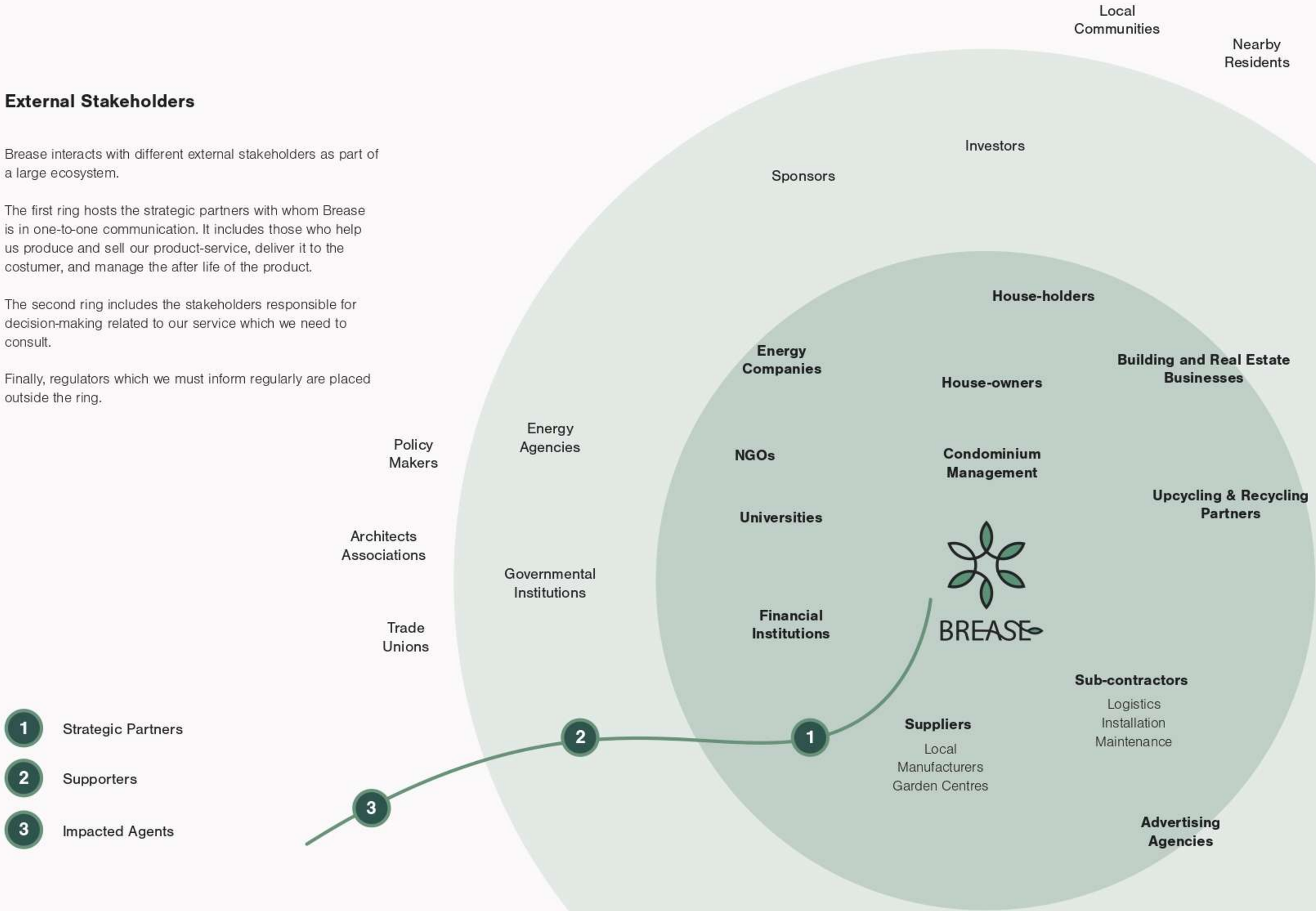
External Stakeholders

Brease interacts with different external stakeholders as part of a large ecosystem.

The first ring hosts the strategic partners with whom Brease is in one-to-one communication. It includes those who help us produce and sell our product-service, deliver it to the costumer, and manage the after life of the product.

The second ring includes the stakeholders responsible for decision-making related to our service which we need to consult.

Finally, regulators which we must inform regularly are placed outside the ring.



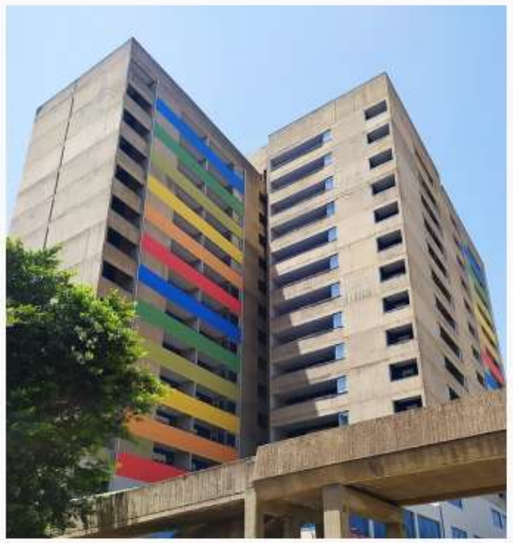
2.2 About Brease

An energy-saving, thermal insulating and modular panel system

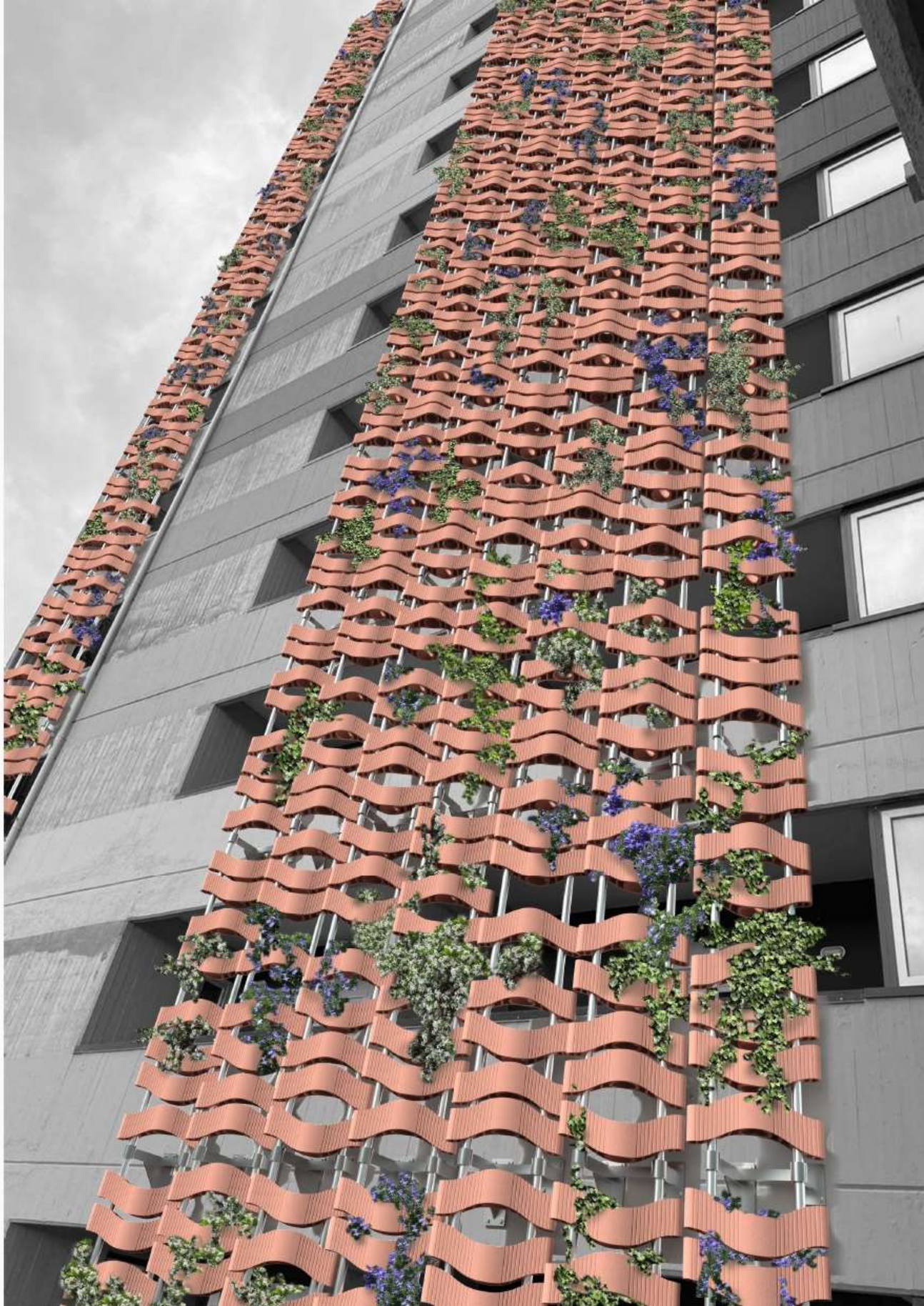
Brease is a modular panel system designed to be adapted to the facades of houses. Brease, which acts as an insulation and shading panel after being positioned on the exterior of buildings, does not require any energy to operate and provides the thermal comfort of its users, especially in hot weather, without increasing their energy expenditure. The product, composed by clay bricks and galvanized steel structure, offers a long-term use thanks to its modular and easy-to-maintain components. The panels become a vertical garden over time with the help of plants that grow from the pots inside the bricks, thus contribute to the shading and cooling purpose.

Reference Building for Brease: "Palazzo di Cemento"

Architect: Giacomo Leone
Year: 1981
Location: Librino, Catania, Italy



Torre Leone, better known as the "concrete palace," is a symbol of the havoc and decay of southern Italy. It is a 14-story building started to built in 1981. The construction was halted due to a change in regulations and the building remained uninhabited until 1992 when it was squatted. Fortunately in 2011 the issue was cleared and Families now live there regularly.



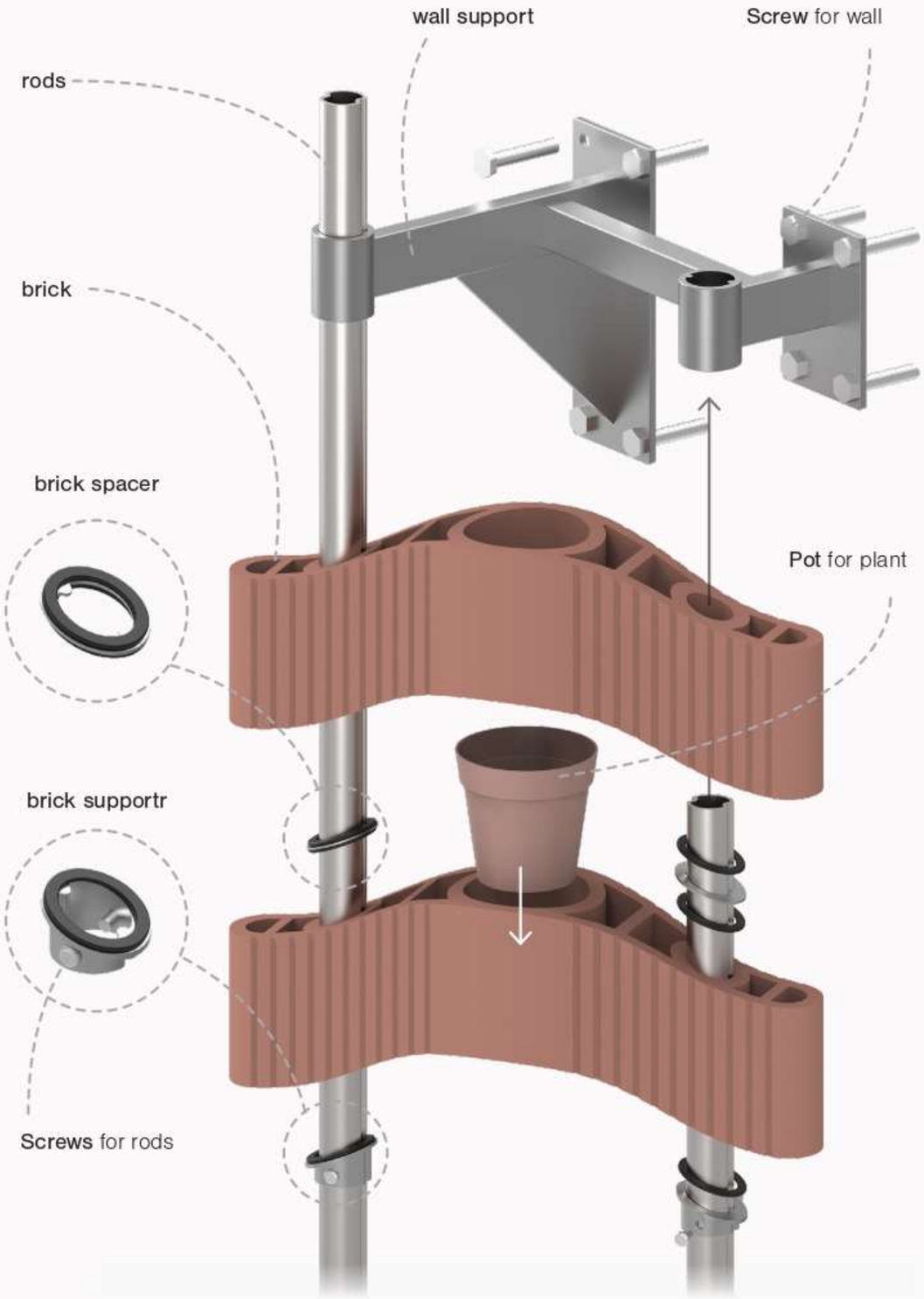
2.3 Structure

Assembly

The assembly of components is fast and uncomplicated and is designed to avoid errors. Everything is designed in such a way that as few parts as possible will be required, and in the event of a breakdown, each part can be replaced in a quick way. The assembly order is always the same, but the number and location of the components will vary, as the product is adaptable to different building facades.

Assembly Order

1. First, the bottom wall supporter is mounted on the wall and the metal rods are inserted into the appropriate gaps.
2. Afterwards, the bricks are passed to the metal rods one by one.
3. Metal brick supports are screwed between bricks to support them (one support can support maximum 3 bricks), thus preventing from moving on the metal bar. Between the two bricks, supportive rubber gap-creating rings are added.
4. After the assembly of the bricks is completed, the upper wall support is placed and fixed to the wall and the assembly is completed.



A quick restoration,
with little inconvenience to your routine.
Make your building greener in a month.
BREASE. Breathing the city.
Did you know that your condominium is entitled to a 110% Superbonus?
Download our digital catalog and discover how.
www.brease.it

Tired of paying sky-high energy bills?
Tired of using air conditioning?
Want to save on your electricity bill and make your building greener?
Need help convincing your condo?
Call us
BREASE.
Breathing the city.

BREASE
Breathing the city