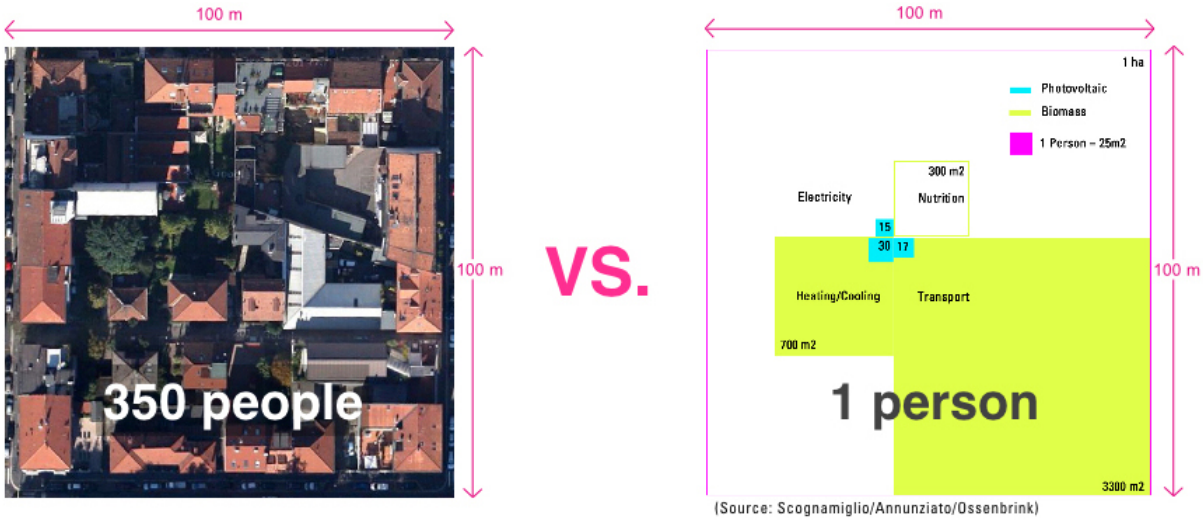
01. CHALLENGE

The Separation

Cities are on the rise—they are "our greatest invention", according to Edward Glaeser. They are generally regarded as having beneficial effects on the well-being of people, on economic growth as well as on resource efficiency. Yet cities have a dirty secret: from its very inception, urbanization is the result of a fundamental **separation** between places of consumption, located within the city limits, and places of production, where enough surpluses of raw materials and food are created to support city development. As advanced societies become increasingly dependent on the mass production of industrialized agriculture and vast mining operations, the places of production and extraction are being gradually relocated in remote areas of the planet, often outside the control of environmental agencies and away from public scrutiny. Today, the impact of cities on places elsewhere, be it hinterlands or places far away —the so-called city footprint —is reaching extraordinary proportions and causing a drastic reduction of bio-diversity, air and water pollution, and depletion of natural resources.

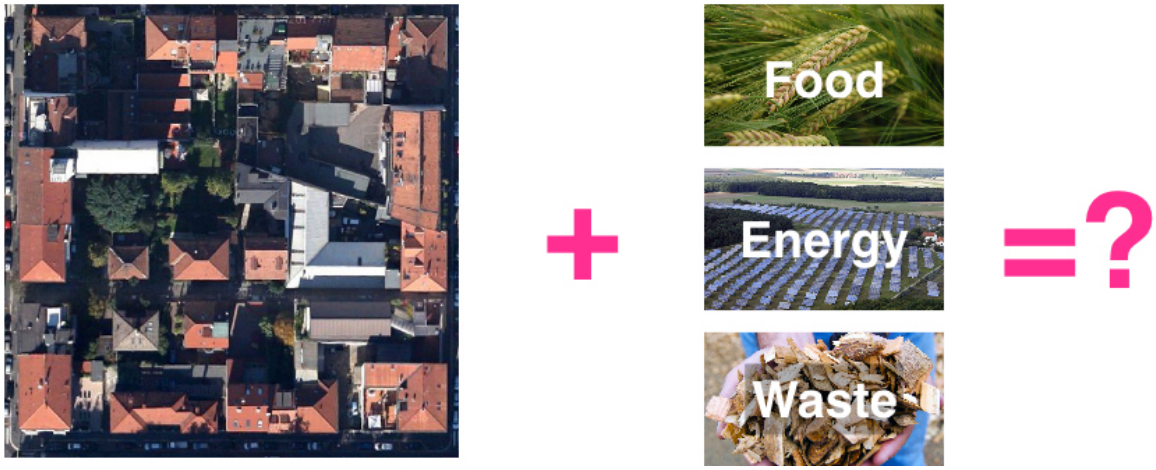


(Source: Scognamiglio/Annunziato/Ossenbrink)

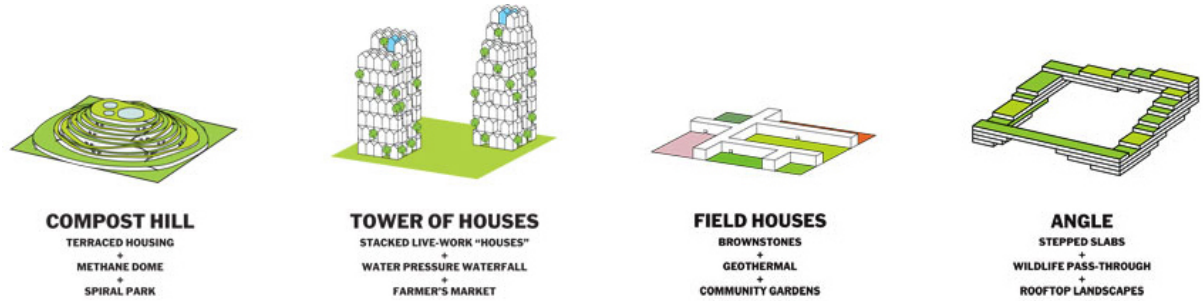
The nZEB Challenge

Over the next few years, all new construction will have to be nearly Zero Energy Building (Directive 2010/31/EU); however, because of the specific scales of energy production, the size of a traditional building lot in the city is not sufficiently large to achieve the Zero Energy mandate. Similarly, current levels of food production and waste processing practices cannot sustain population densities of contemporary cities like Milan without devastating consequences for the environment. In short, the new energy paradigm calls into question the very premise of the historic city —that is, its high **density**.

02. WHAT WE DO



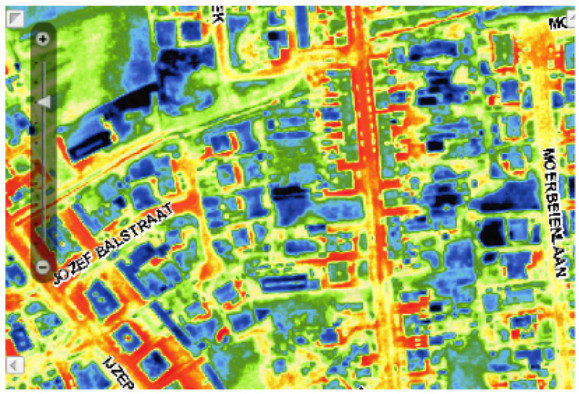
The FEW Program
The studio envisions the transformation of contemporary cities under the combined pressures of climate change and new nZEB targets. We challenge students to rethink existing living models by integrating **Farming, Energy** production and **Waste** management systems into the city of the 21st century. Energy infrastructures, together with farming and other productive activities once removed from urban life, are gradually gaining currency as credible complement to traditional development in revitalizing declining post-industrial cities—form Berlin to Buffalo and Detroit—by using empty lots to grow vegetables and to produce energy.



New hybrid typologies by Work AC

Hybrid Typologies
The Studio explores the architectural implications of combining traditional residential typologies, single or multi-family housing, with a FEW component. Waste management and sewage treatment, air and water filtration, energy and heat generation, food production and processing are no longer seen as engineering annoyances to be hidden away or disregarded, but powerful generators of a new architectural language. **Hybrid** forms of aggregation and synergetic opportunities will emerge from the logics of the FEW, promoting novel adjacencies, circulation patterns and spatial configurations —and ultimately generating new forms of living. The project will explore the spatial, programmatic, and formal implications at the scale of the individual building – and the potential for industrial processes of production and disposal of food, energy and waste to propel the next architectural revolution.

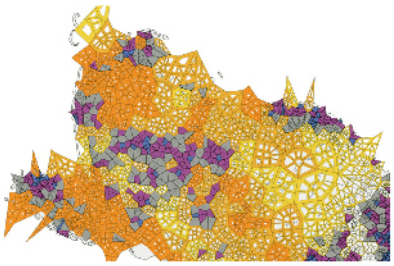
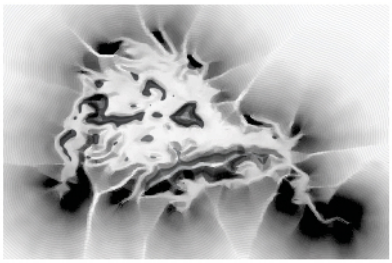
03. HOW WE DO IT



Invisible Forces
In one of his seminal writings, Buckminster Fuller declares: "[...] Forms are inherently visible and no longer can 'form follow functions', because the significant functions are invisible." Climate change poses an intrinsically multi-scale and cross-disciplinary challenge—one that is difficult to even comprehend, since it unfolds at a slow pace and involves many interrelated scales. Today, digital design tools allow us to detect, measure and visualise the energy forces transforming our environment —forces that were largely invisible to the architect's eye until two decades ago. The studio recognizes the emergence of these "invisible forces" in shaping our environment. Students will use environmental analysis tools that provide critical insights into these invisible functions by widening the architect's gaze in areas of knowledge outside the spectrum of visible light.

Energy Form-Finding
There are obvious advantages in giving form to these invisible forces, as they play an increasingly larger role in the built environment. Architects typically resort to highly technical solutions for compliance with ever stricter energy codes— 'green gadgets' that come in the form of sophisticated mechanical systems, super-insulation materials or expensive glass treatment. The studio attempts to recast the on-going debate on sustainability in the built environment from a preeminently architectural position. Students are encouraged to find a specific, measurable relationship between **geometry**—the traditional domain of the architect—and **performance**, particularly in the area of energy efficiency and sustainable use of materials in buildings. Formal solutions that directly address these invisible forces at a structural level can dramatically improve the performance of buildings by reducing heating and cooling loads, fostering daylighting and natural ventilation, and generally lowering energy demand.

04. SPECS


Mapping
In *Occupation*, Frei Otto suggests that forces have a specific field —a domain or territory —and that space can be organized based on the forces acting on it. In other words, each force—but also resource, such as water or nutrients in a field—has a spatial dimension to it.
By means of extracting, transporting and storing resources, the industrial revolution has disrupted the original relationship force to territory, replacing it with new, more complex relations. The Studio uses environmental analysis and parametric design strategies in order to re-establish a correlation between forces and territory.

Tooling
The Studio is predicated on the support of digital consultants, teaching advanced computational skills to students with little or no experience in algorithmic design. Students will be provided with digital simulation tools that predict the environmental performance associated to a particular building form, such as airflow, daylighting and sun radiation levels. This is part of the **Digital Track** initiative at the school that gives students digital tools throughout the curriculum.

Schedule
The work is divided in two phases: during the semester, you will do research and arrive to a first design proposal for your building. This phase typically ends at 1/200 scale. After the Final review, you will work for 2 additional months to complete your project and discuss your thesis in July. In exceptional cases, we will give you 2 additional months to graduate in September.

Independent research
In the first half of the semester, students are encouraged to do research individually, but allowed to work in groups of 2 to 3 people as well. After mid-term review, students will work **independently** to develop individual proposals at the architectural scale.

Site
You will have to choose a site on the planet that presents a climate-related crisis, a disturbed landscape, or otherwise extreme environmental conditions. You will define your own program and design brief.