

Energy Planning from the Zero Level

Study of urban metabolism in the metropolis of Lisbon from a natural infrastructure

The development and well-being of contemporary societies indicates a growing energy consumption.

The dependence of EU countries on imported energy, the scarcity of energy resources and the need to limit climate change, has led the European Council of 17 June 2010 to define energy efficiency as a major goal of the new strategy for sustainable growth (Directive 2012/27/EU, European Parliament and Council, 2012).

Energy planning from the zero level studies the morphogenesis of the Lisbon Metropolitan Area by identifying typologies of urban tissues over time, and different urban metabolisms that are associated with these patterns of organization.

Complex networks of flows of energy and matter circulate to form those patterns. Over time, during urban development, the output of toxic waste has increased, as well as polluting gas emissions, which intensify climate change. The magnitude and nature of these flows represent the impact of urban development in the environment (Bettini 1998).

The morphogenesis of the Lisbon metropolis shows:

In primary levels of evolution, it appears that the metabolism of the tissue types have lower energy consumption. This is due to the urban ecological processes which happen naturally.

Currently, scattered and isolated urban tissues arise from large changes in environmental pre-existing conditions. They appear to be isolated and monofunctional pieces in a fragmented puzzle, where the main means of connection are the major road infrastructures that privilege the use of the private car.

The urban metabolism of these forms has been associated with the high consumption of polluting energies. This work studies the energy balance between urban growth and preservation of the natural infrastructure, seeking to the relation of the morphology of lots, buildings, and roads to energy efficiency.

ENERGY PLANNING FROM THE ZERO LEVEL

Study of urban metabolism in metropolis of Lisbon from a natural infrastructure

Index

1. POINT 1 is a conceptual introduction of the paper.

1.1 . Urban Metabolism

Urban Metabolism is the model that analyses the energy flows in the city. Its use is related to the understanding of the urban territory as a living organism with vital functions which work on the basis of a complex system that consumes, accumulates and evacuates matter and energy in various forms.

For Girardet, urban metabolism is the process of converting nature in the city. In his studies of industrial ecology, the author distinguishes circular metabolism from linear metabolism saying that:

- Circular metabolism is very close to the natural functioning of the territory. Almost no waste is generated because everything is reusable.
- Linear metabolism misappropriates natural resources and generates waste, creating negative environmental impacts as it functions.

1.2. Organic dynamics of the urban metabolism

Cannigia's morphological study understands that urban development happens through movements of contractions and expansion.

In contraction, there is sedimentation of the existing tissues by overlaying new time layers. The process is one of complexification from simpler substrates. Its energetic consumption can be compared, in cellular biology, to anabolic reactions.

In expansion, like in anabolic reactions, there is a big energetic consumption and cellular multiplication.

The balance of the metabolism depends on the organic movement (dynamics) of contraction and expansion being circular.

1.3 Urban metabolism and typologies

The metropolization that took place during the process of industrialization of the cities and the migration of the population had as main morphological consequence the fragmentation of the urban tissue and the appearance of urban voids.

The types or urban tissues identified throughout the urban development of the metropolis are generated by growth processes linked to degeneration rather than to permanence and transformation. This means that the movements of expansion are not followed by movements of contraction.

The new urban tissues are linked to a global network of long-distance transport and cutting-edge technology, and they separate from natural the infrastructure where they are implanted, and from the consolidation and consumption of what existed before.

Energy Planning from zero level proposes look to Metropolis of Lisbon from initial states of formation, searching which urban fabrics's formal changes has originated linear metabolisms.

2. The changing metabolism of metropolis of Lisbon

Point 2 is a description of urban growing of metropolis of Lisbon by the identifying of typologies of urban fabrics over time and the different urban metabolisms that are associated with these patterns of organization.

That point is divided in four (2.1, 2.2, 2.3, 2.4)

Each point is a growth phase of the metropolis of Lisbon that shows the transformation of urban metabolism compared to urban fabric types that arise.

3. Comparison with others European metropolises

Urban metabolisms, metropolization and rivers

4. Rethinking a importance of the river in Urban metabolism of Lisbon metropolis

From the river:

Some notes to integrate different types of urban fabrics like one all?

Circular metabolism and integration of natural infrastructure in formal design. The zero level.

5. Conclusion

"Energy planning from level zero" studies the urban metabolism of Lisbon from a natural infrastructure, the river.

What's river importance in energy planning today?