

# Energy Economics and Wellbeing

Antonio Caló, Ioannis Chamilos, Eva Pongrácz

FI-90014 University of Oulu, Thule Institute, NorTech Oulu, P.O.Box 7300,  
Department of Process and Environmental Engineering, Mass and Heat Transfer Process Laboratory, P.O.Box 4300

## Introduction

Wellbeing is commonly described in terms of health, comfort, and happiness [1]. As humans spend 80-90% of their life indoors, any policy regarding wellbeing and quality of life needs to take into consideration the built environment. At the same time, a comfortable built environment is an energy-intensive one, currently using 25% of the total world energy consumption and generating 20% of the GHGs emissions (See Figure 1). In this framework it is, therefore, necessary to find sustainable energy solutions to reduce the environmental impact while maintaining a comfortable atmosphere. Defining green cities, supporting waste-to-energy solutions and assessing the potential of decentralized energy solutions are, among others, two of the crucial elements needed to be addressed for the achievement of a sustainable development strategy in the North.

## Eco-cities

As a result of a rapid economic and technological growth, human settlements, and especially cities in the industrialized world, have substantially changed their face and the way they interact with their inhabitants and the natural environment. Fundamental principles and ideas together with the current available technologies can define eco-cities and unfold the path to a sustainable future [3]. The graphic depiction below (Figure 2) presents the concepts of an eco-city among major areas of activities.

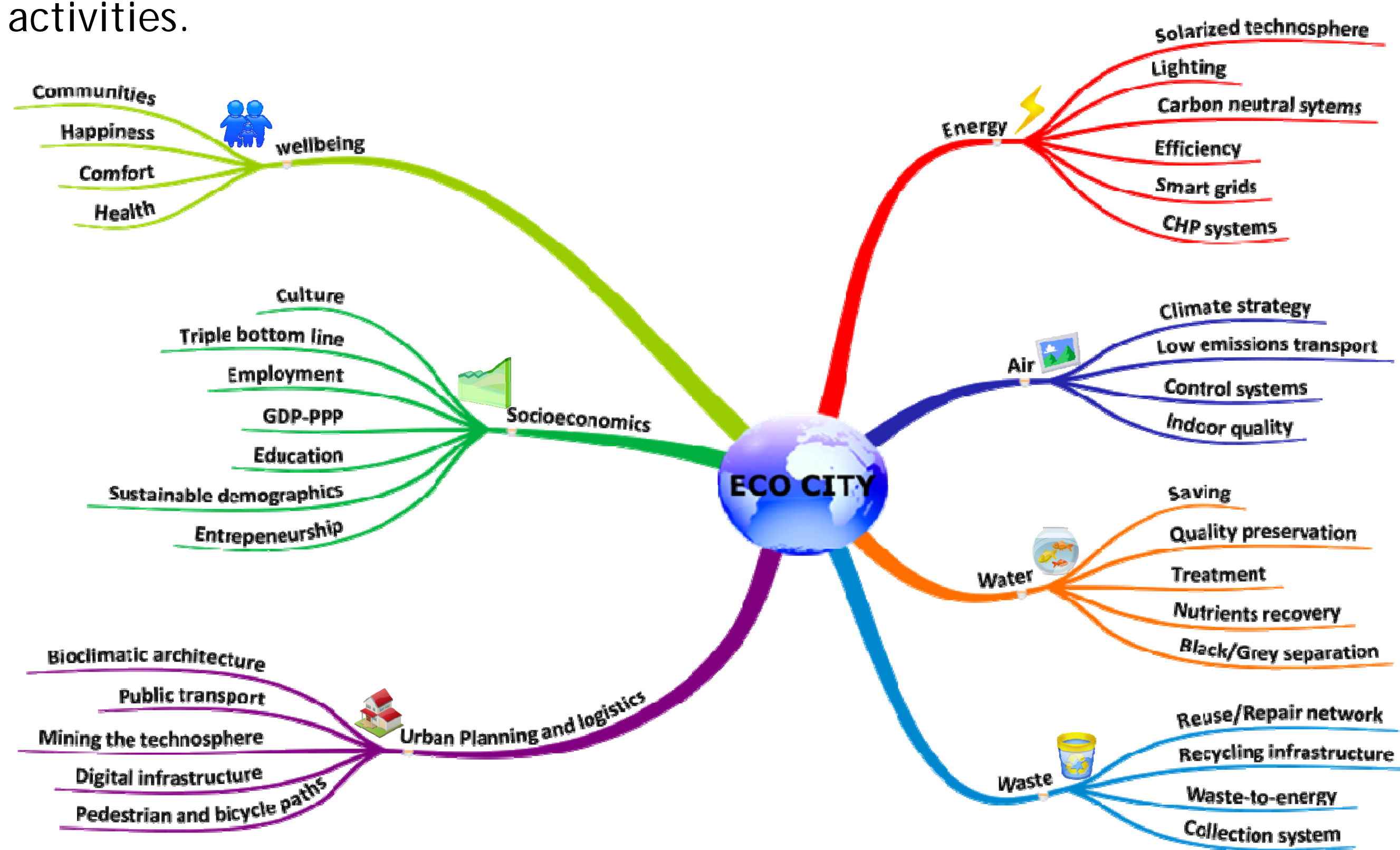


Figure 2 Mind-map of the core areas of interest which define an eco-city.

The vision of eco-city is one of a place in harmony with nature, creating opportunities for ecological citizenship and environmental stewardship. In this vision, the idea of efficiency and minimization of waste assume a critical role. A number of solutions are already in place, among them waste to energy solutions, smart energy management systems in buildings, city lighting and distributed energy production through smart power grids.

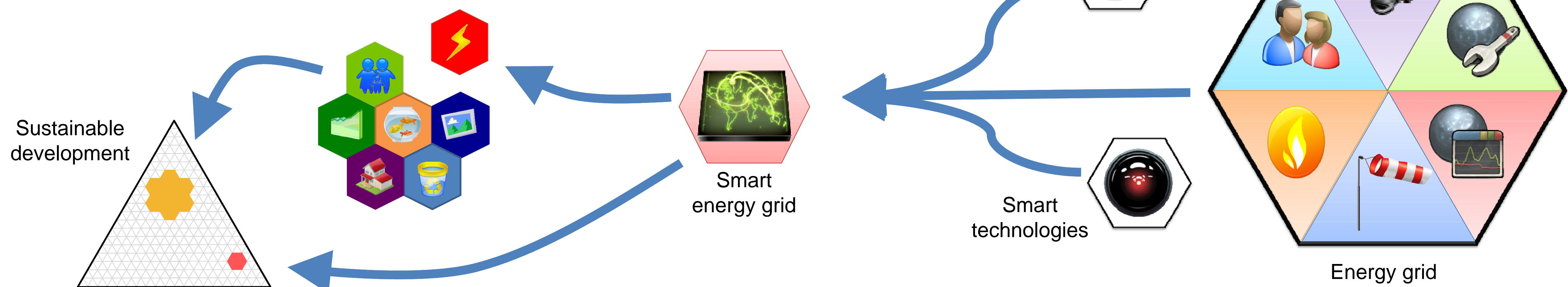


Figure 3 – The elements of sustainable energy and Eco-cities as part of the concept of sustainable development

The development of a smart energy grid system can play a significant role in developing an improved urban development idea based on the model of an eco-city and, at the same time, can provide an important driver in the process of rethinking the energy production and distribution systems. The interplay between the development of eco-cities and smart energy grids is therefore important for the development and conceptualization of these notions.

## Further research

The potential of these innovative concepts in Northern Periphery environmental conditions will be assessed. It will be particularly important to understand the possibilities, socio-economic impacts and benefits that a new way of thinking about energy production and distribution can offer. This will include evaluating the scalability and adaptability of current technologies to contribute, ultimately, to a sustainable energy development strategy in the region.

### References

- [1] Steemers K and Manchanda S (2010) Energy efficiency design and occupant well-being. Building and environment 45(2): 270-278.
- [2] World Resources Institute (2007) World Greenhouse Gas Emissions in 2005. [http://pdf.wri.org/world\\_greenhouse\\_gas\\_emissions\\_2005\\_chart.pdf](http://pdf.wri.org/world_greenhouse_gas_emissions_2005_chart.pdf). Last accessed October 18<sup>th</sup> 2010.
- [3] Roseland M (1997) Dimensions of the eco-city. Cities 14(4): 197-202

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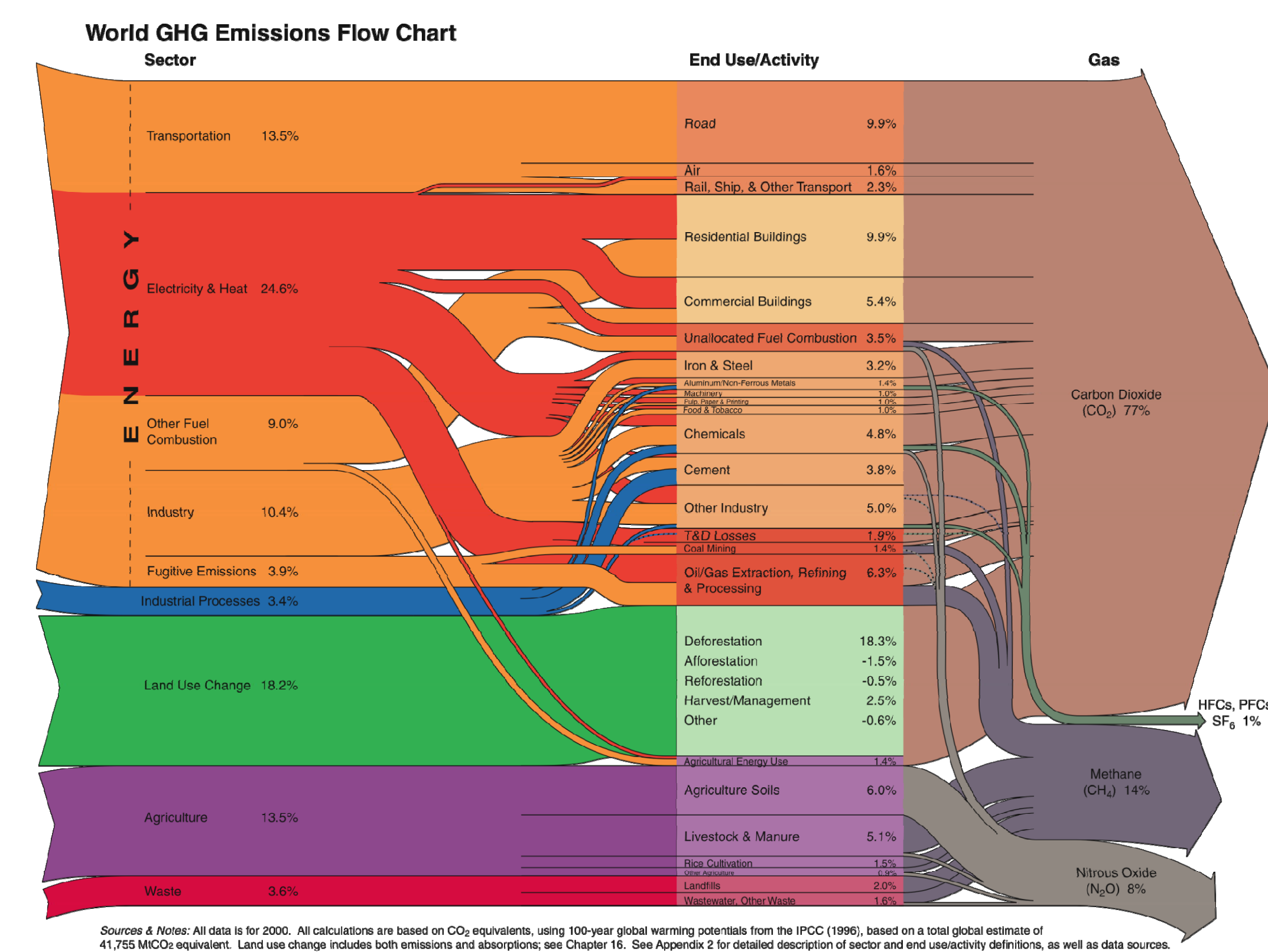


Figure 1 World GHGs emissions in CO<sub>2</sub> equivalents [2]

## Smart energy grids

Smart energy grids allow suppliers and consumers to have a two-way communication monitoring in real-time the grid condition (i.e. the electricity production, consumption and distribution). The advantages and the potential of developing of these kind of networks include:

- Dynamic energy grid control
- Anticipation and mitigation of power peaks or power quality
- Efficient response to changing grid conditions
- Support of renewable power sources with irregular power generation
- Development of energy saving policies
- Interactive and participatory role of consumers

The transition from a highly centralized energy network to a decentralized one is a transition that aims to rethink the energy industry business model: from growth through quantity to growth through quality. Enabling distributed power generation it is possible to effectively initiate a process of democratization of the energy market through participation.