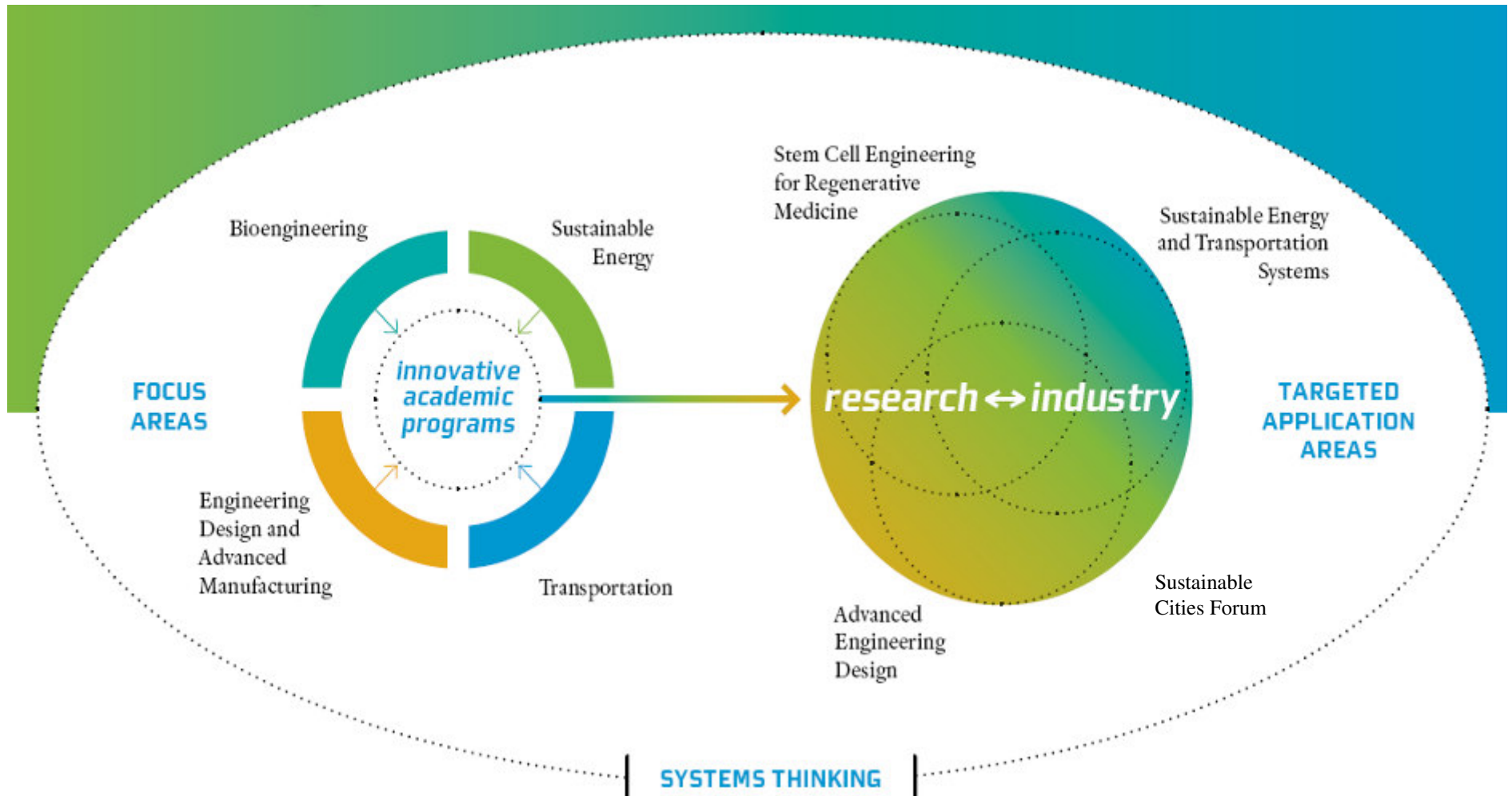


Urban metabolism

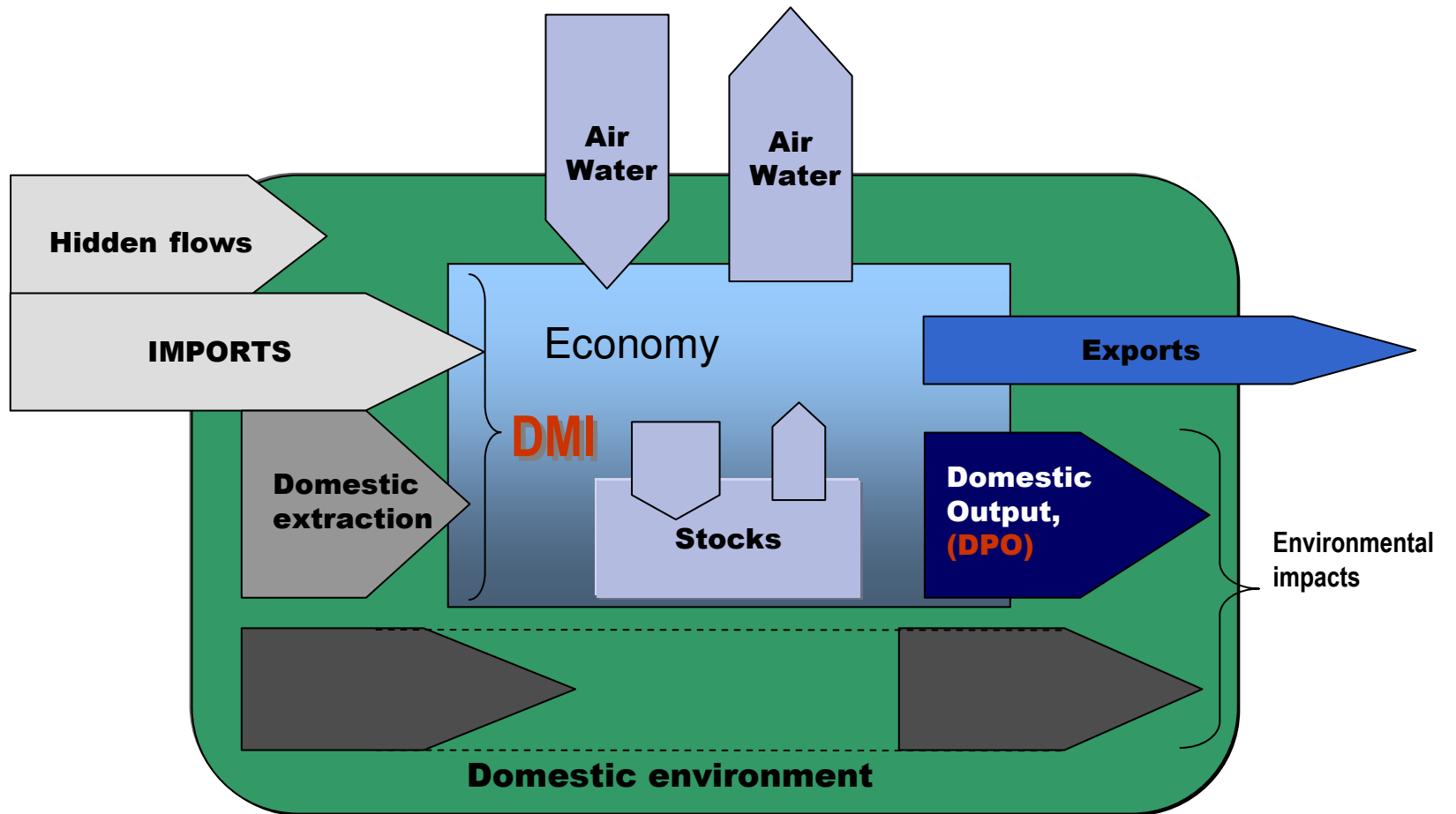
Paulo Ferrão



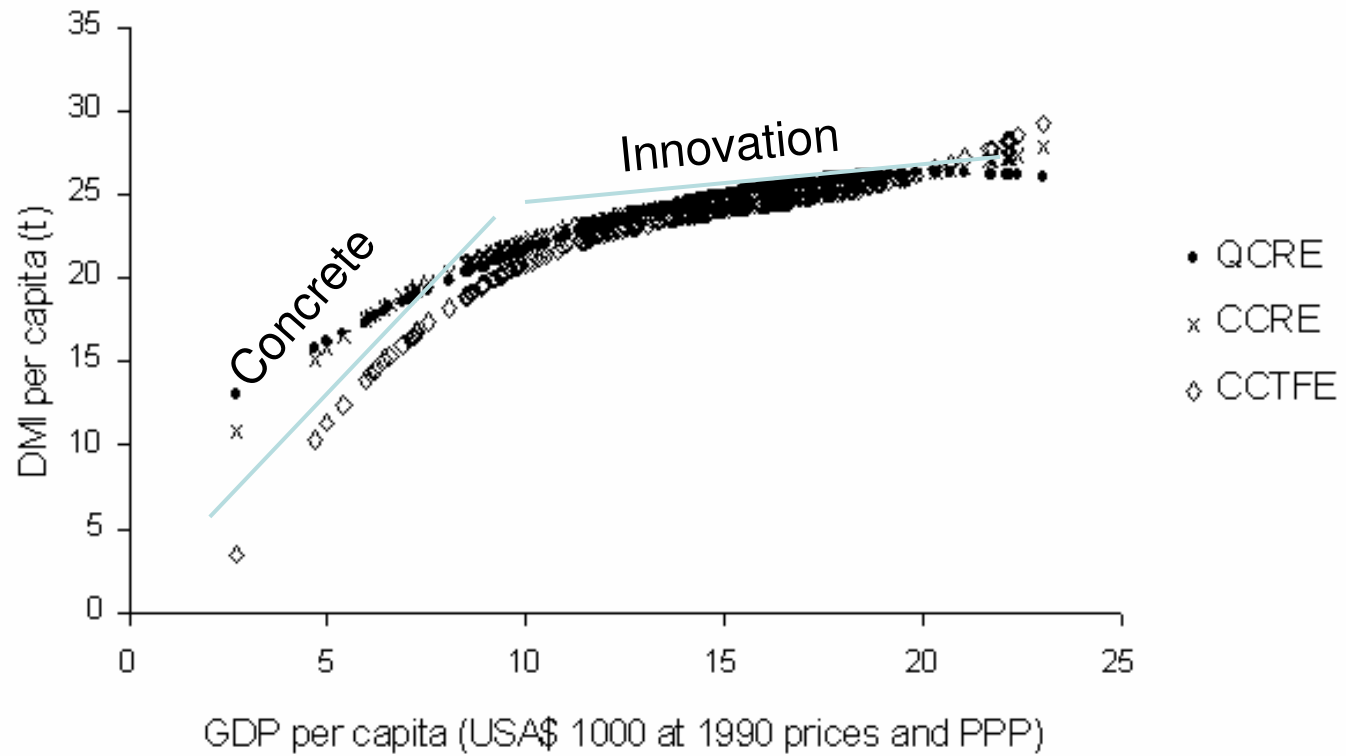
Our knowledge-creation model



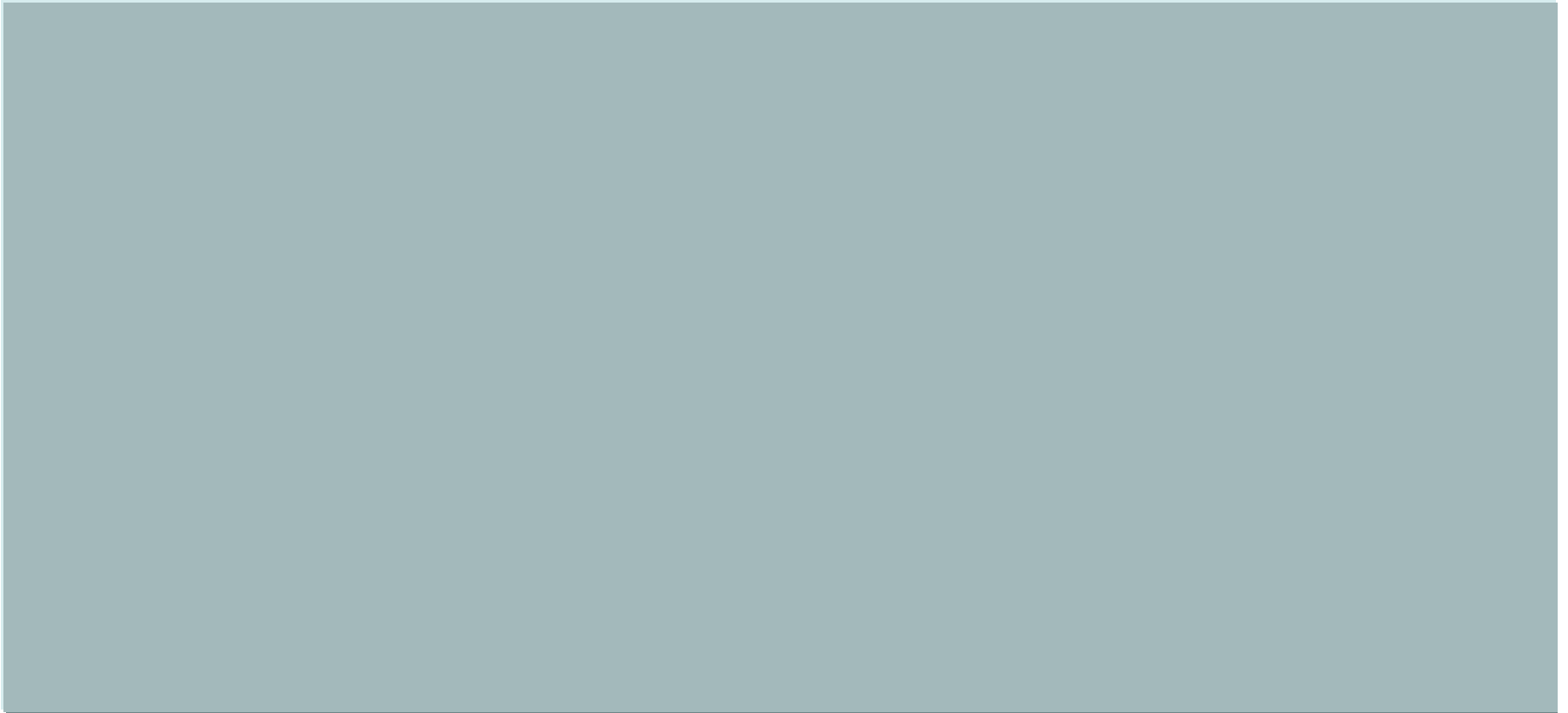
THE ECONOMY METABOLISM



A NEW KUZNETS CURVE ?



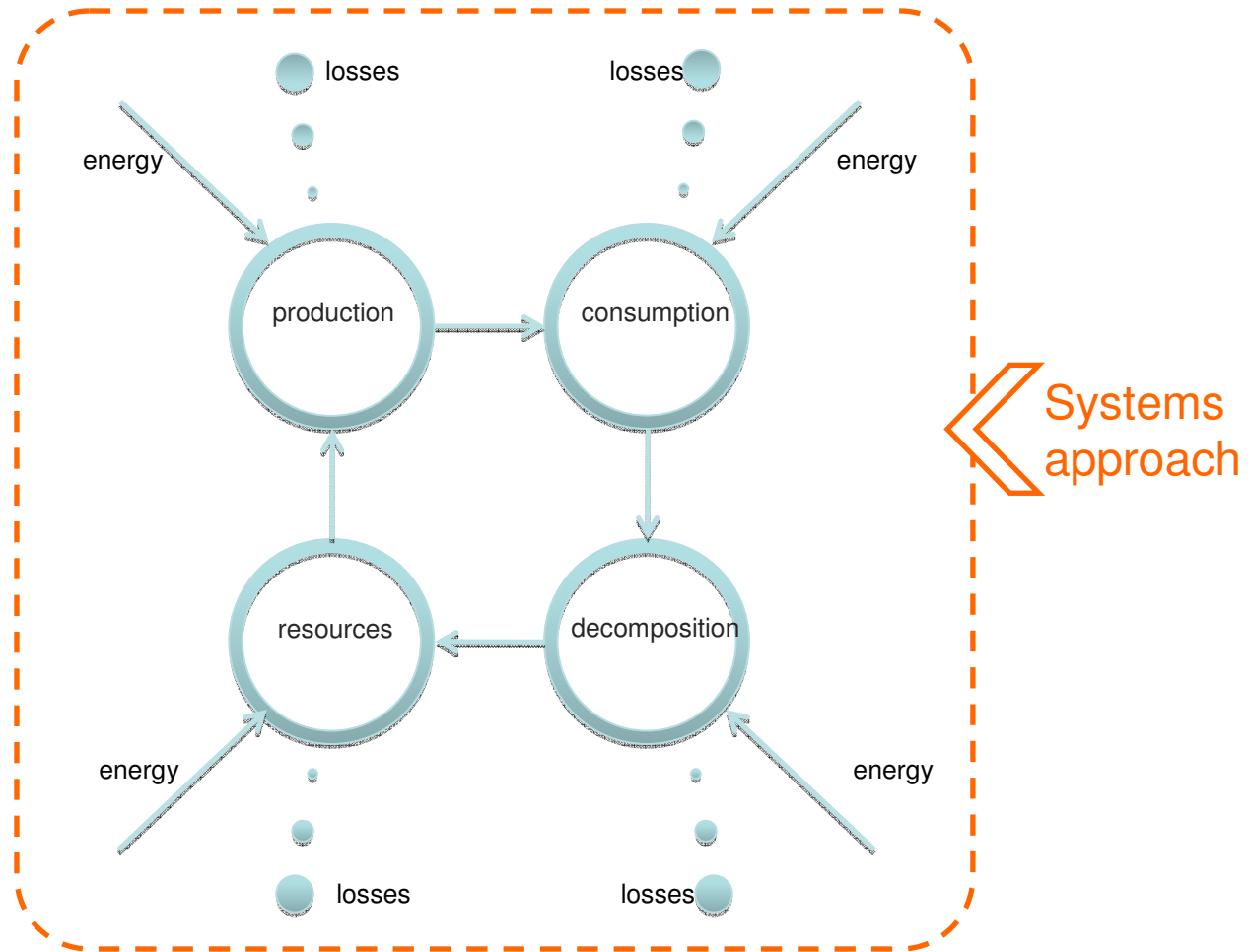
CONSEQUENCES: ECOLOGICAL FOOTPRINT



Available in: <http://www.footprintnetwork.org>

ECOSYSTEM METAPHOR IN INDUSTRIAL ECOLOGY

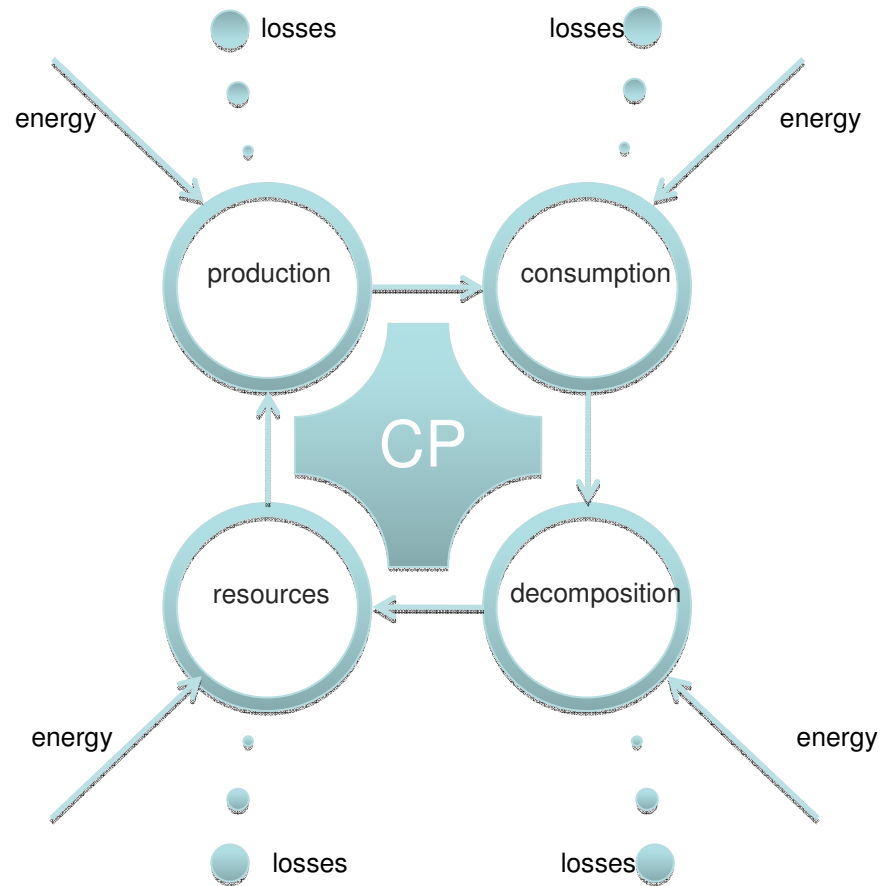
Systemic approach to understand and improve systems in a global perspective



Agenda 21: Chapter 4 – CHANGING CONSUMPTION PATTERNS

Action is needed to meet the following broad objectives:

- (a) To promote patterns of consumption and production that reduce environmental stress and will meet the basic needs of humanity
- (b) To develop a better understanding of the role of consumption and how to bring about more sustainable consumption patterns

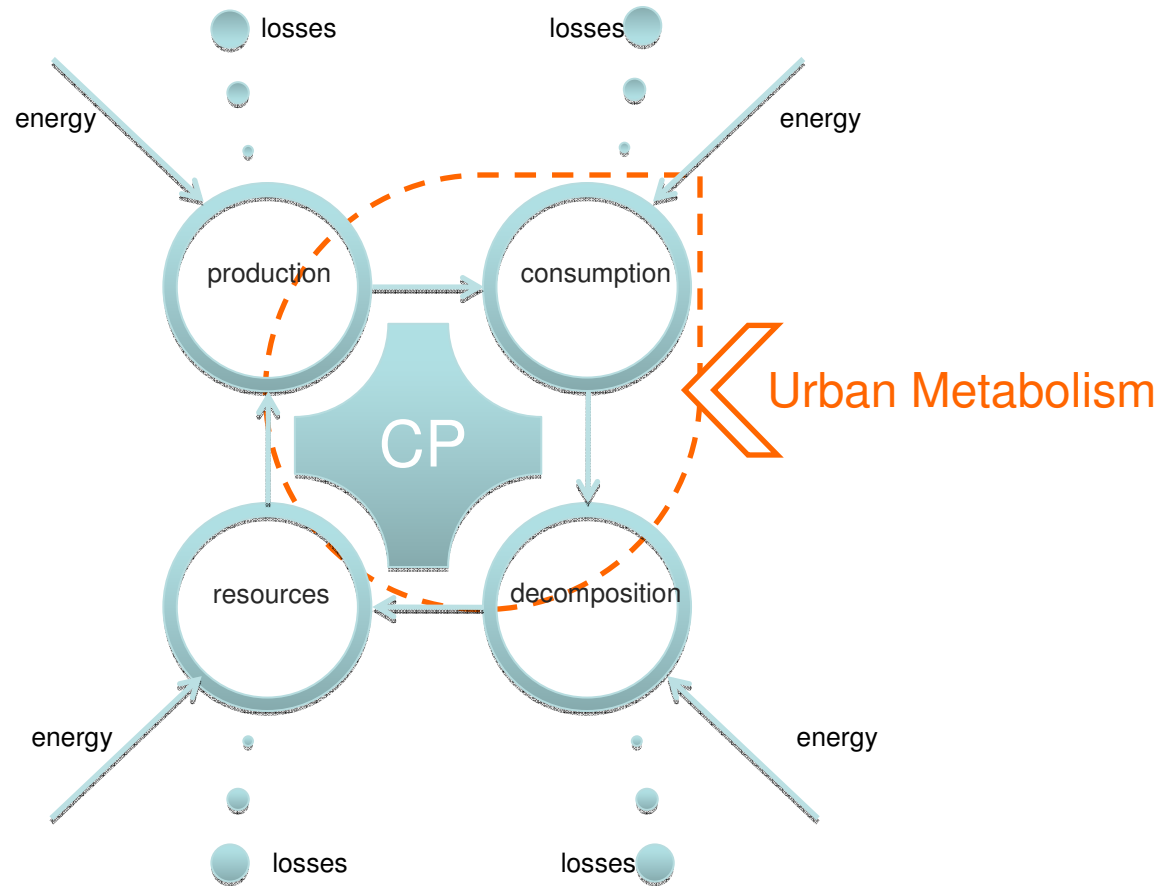


URBAN METABOLISM FRAMEWORK

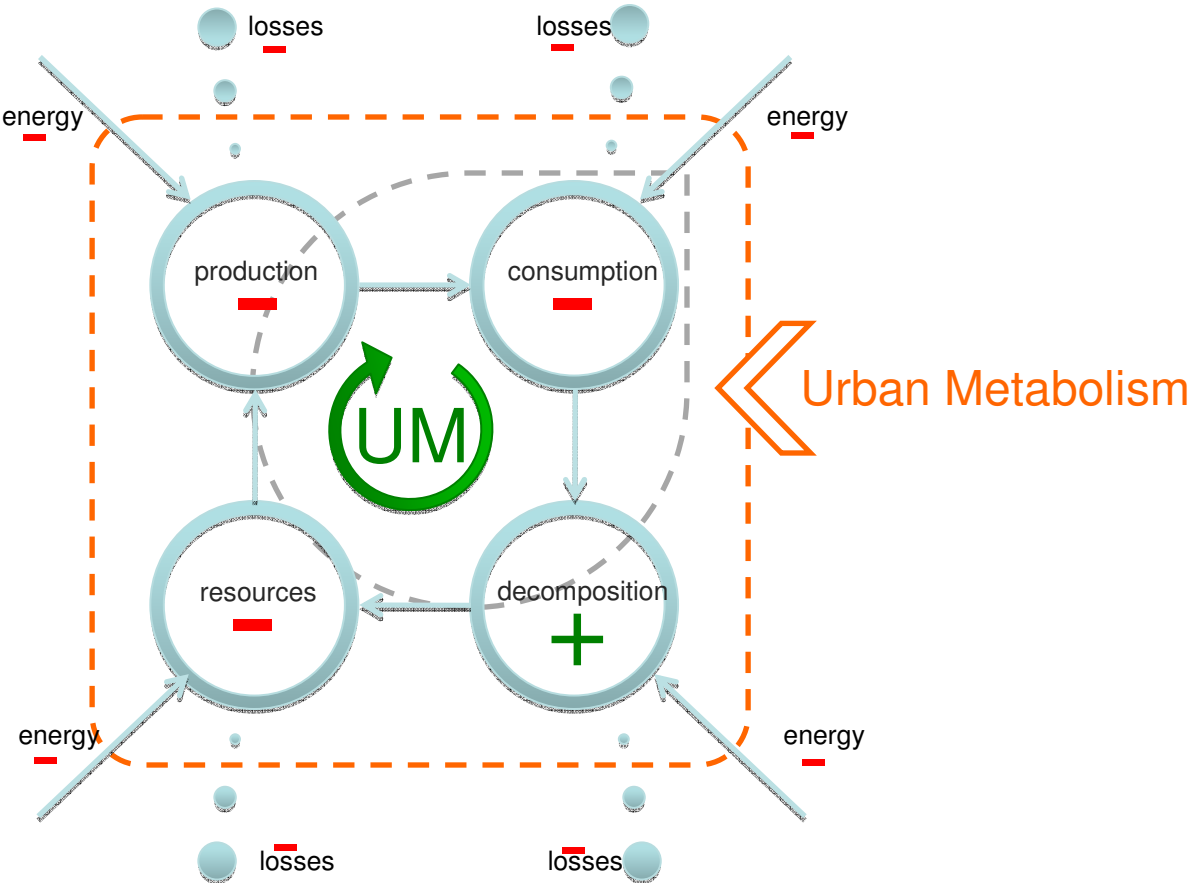
Urban Areas concentrate the largest part of Consumption Activities

Hinterland responsible for most of Resources Extraction, Production and Decomposition activities

Urban Metabolism deals mainly with the overall fluxes of energy and materials (water included) in and out of the urban region

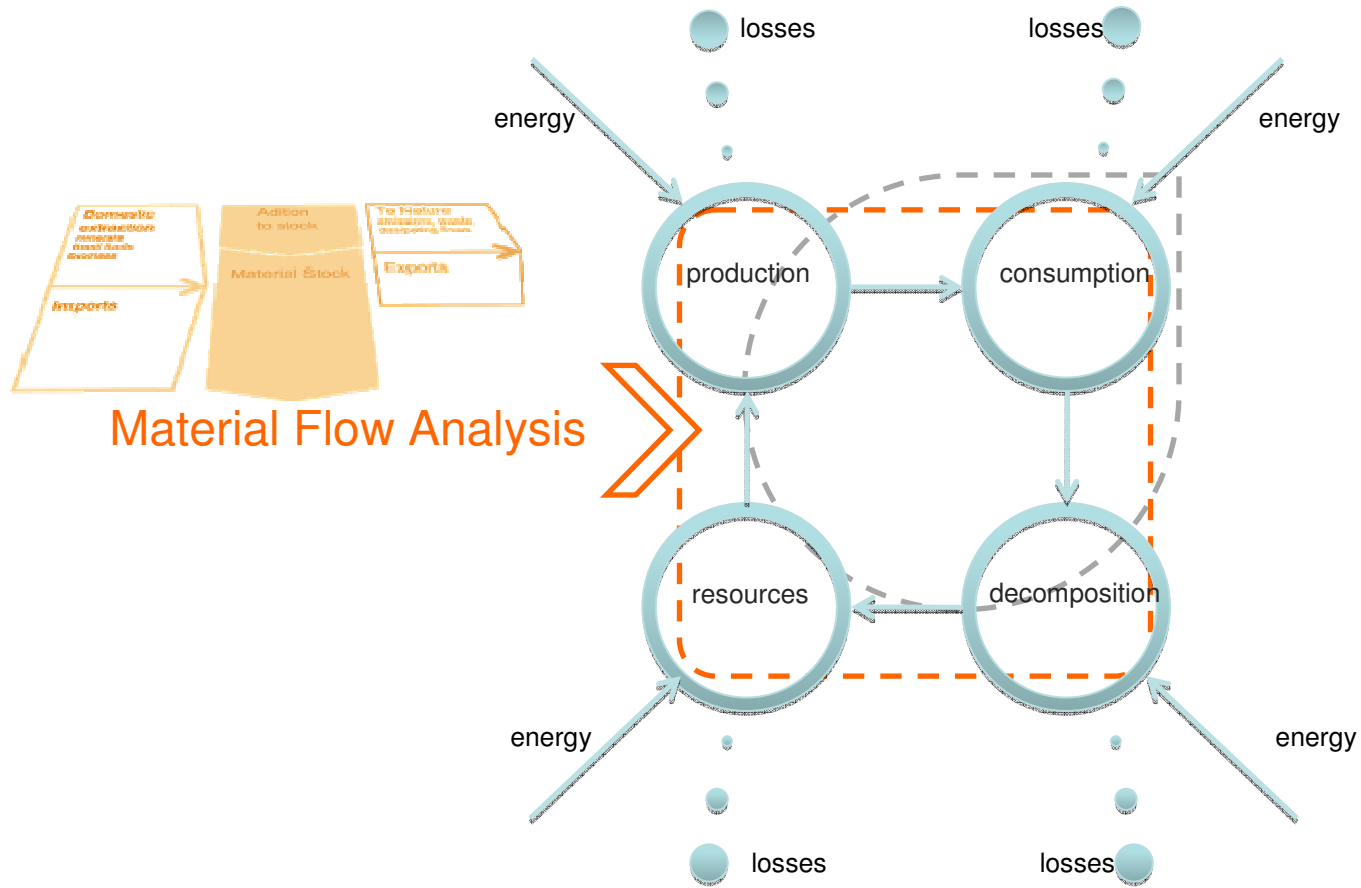


THEORETHICAL APPROACH TO SCP IN URBAN AREAS

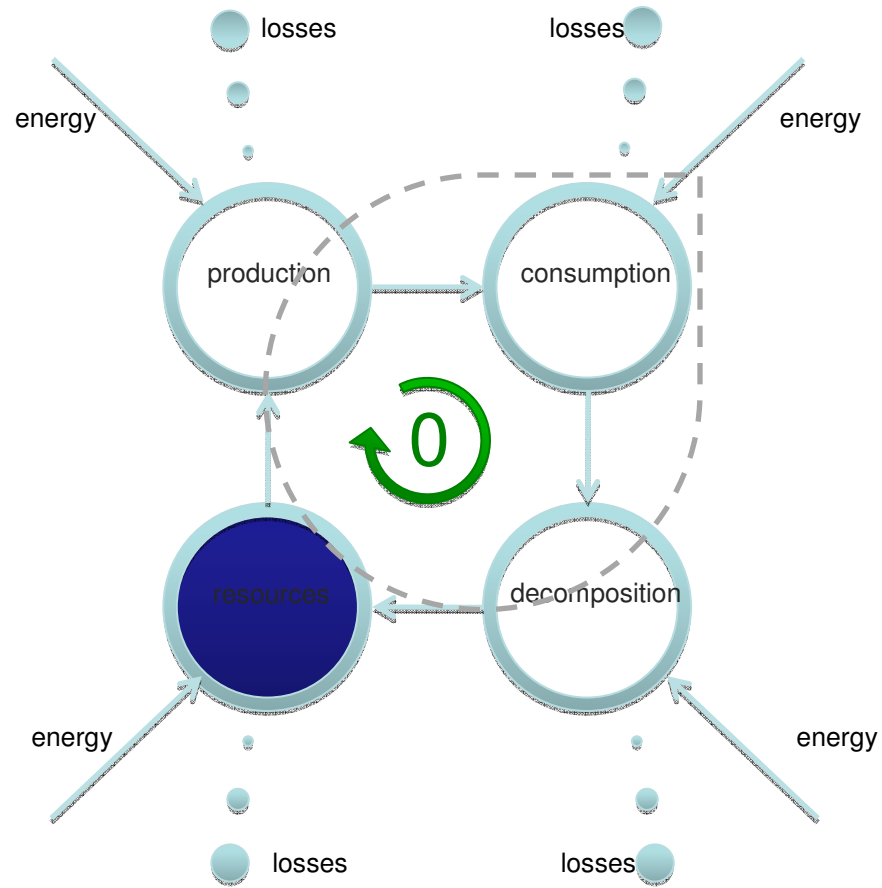


KEY CONCEPT: MATERIAL FLOW ANALYSIS

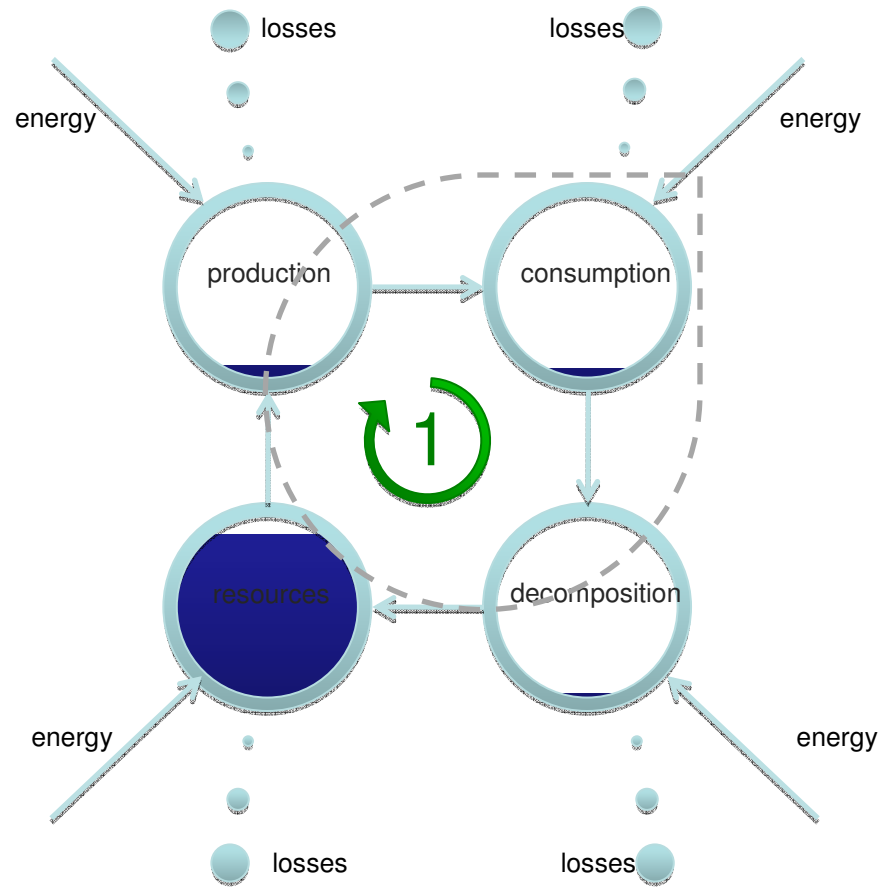
The main tool to analyze flows is MFA
Starting point to describe the Urban Metabolism



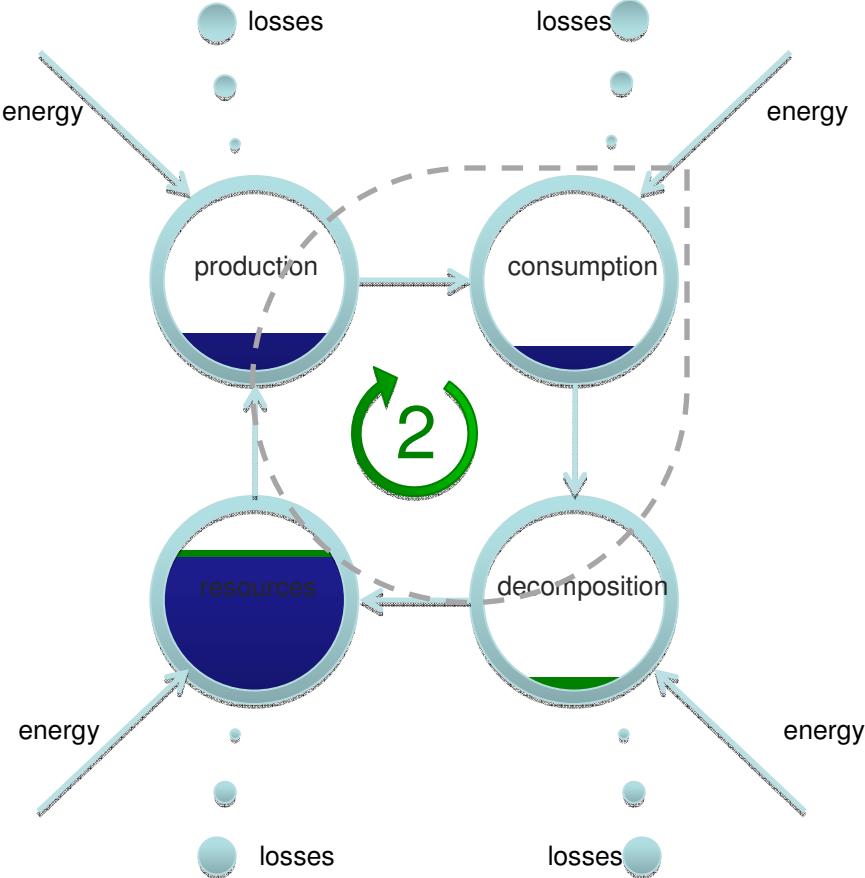
KEY CONCEPT: EVOLUTION OF THE SYSTEM



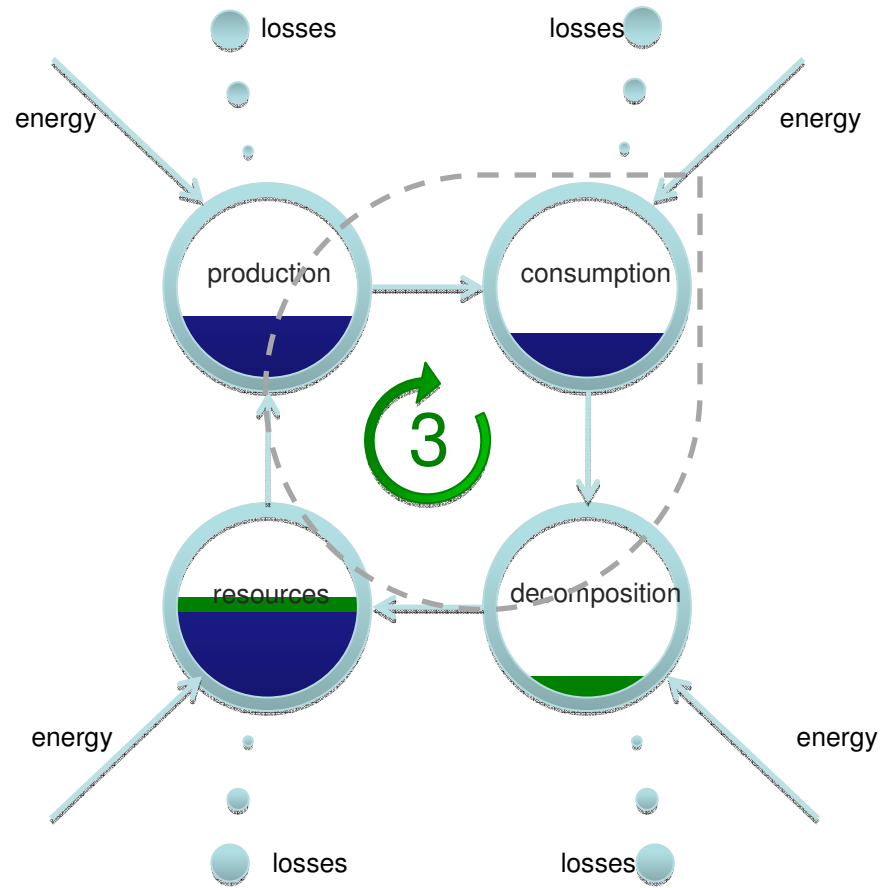
KEY CONCEPT: EVOLUTION OF THE SYSTEM



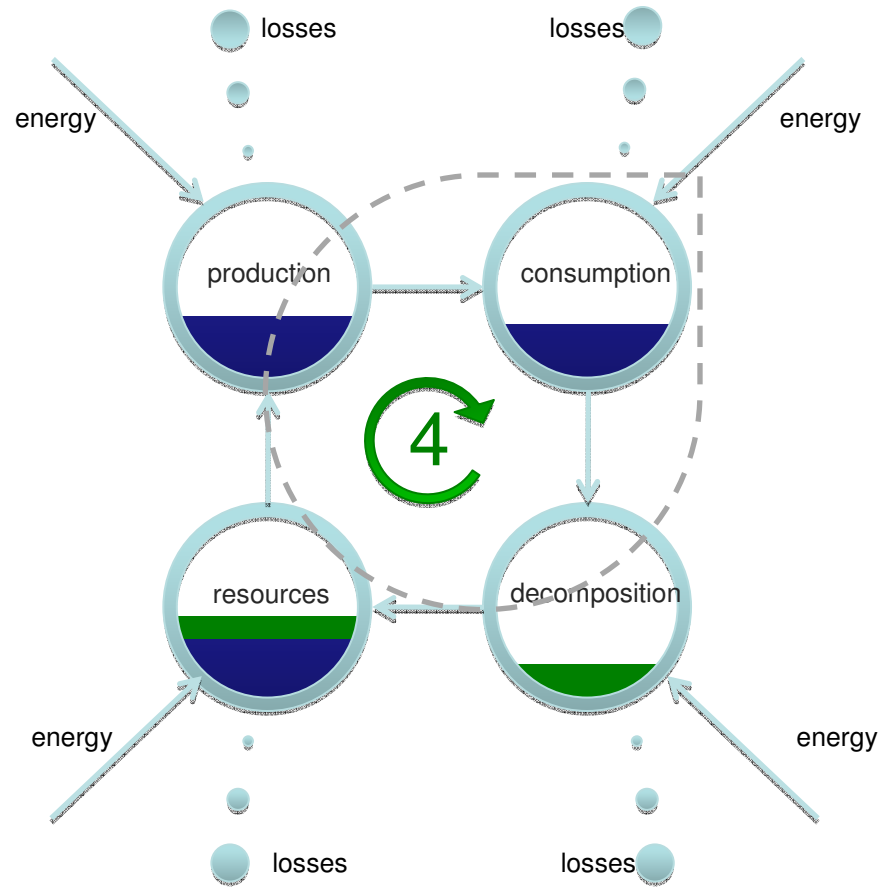
KEY CONCEPT: EVOLUTION OF THE SYSTEM



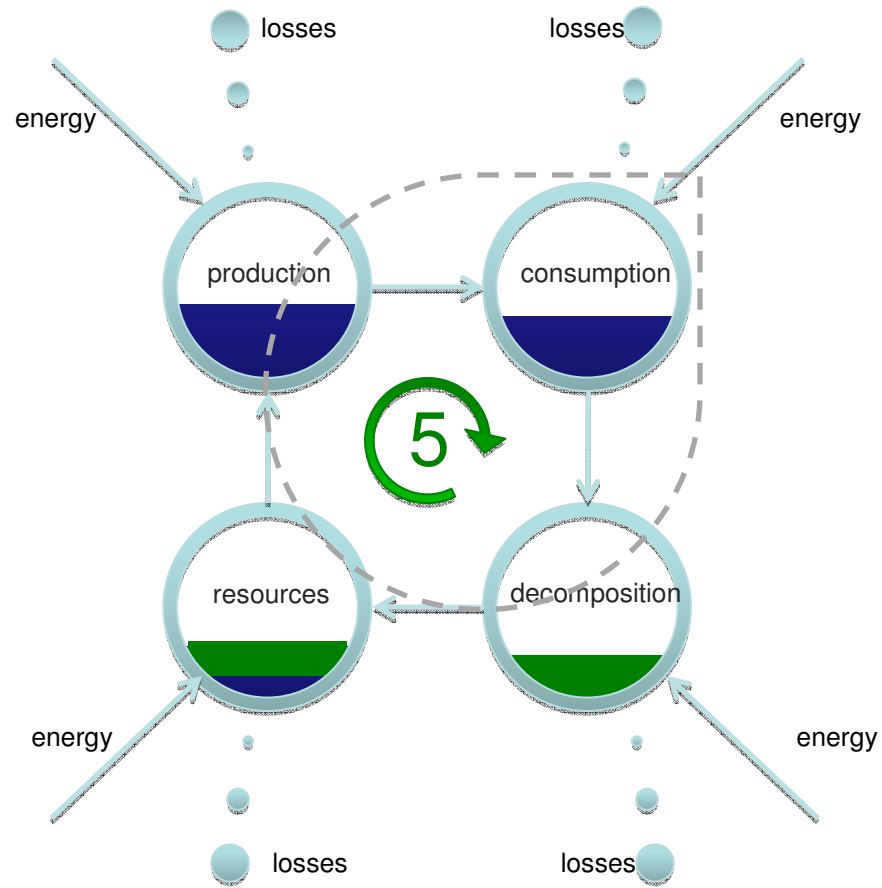
KEY CONCEPT: EVOLUTION OF THE SYSTEM

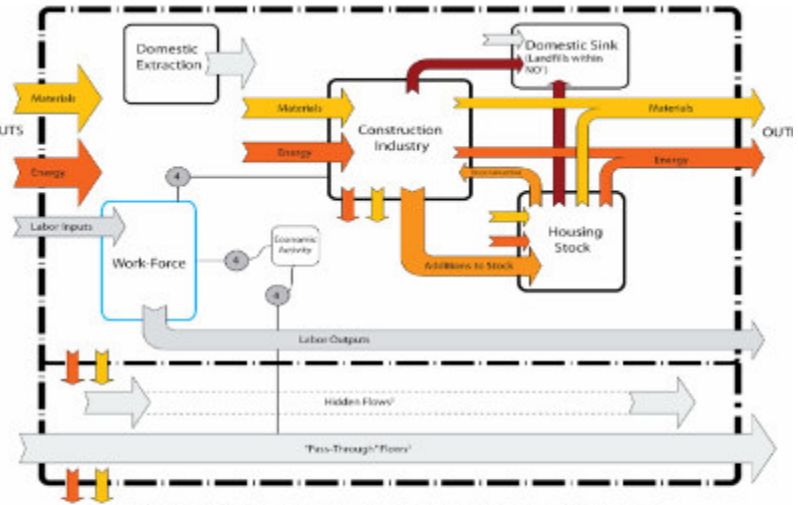


KEY CONCEPT: EVOLUTION OF THE SYSTEM

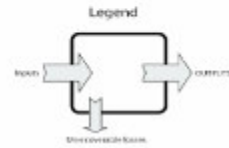


KEY CONCEPT: EVOLUTION OF THE SYSTEM



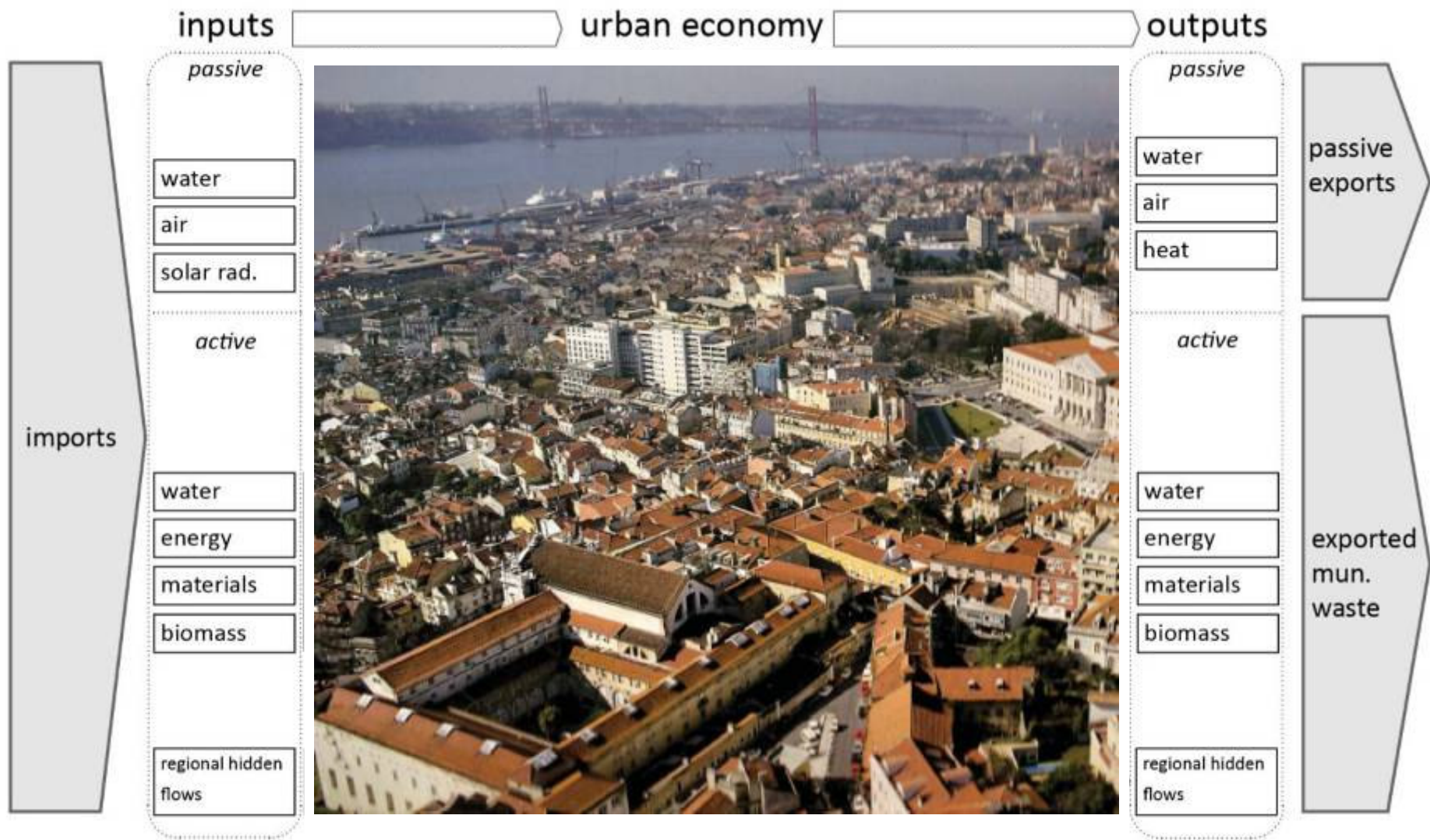


Flow of Materials, Energy and Labor within the System Boundary of New Orleans



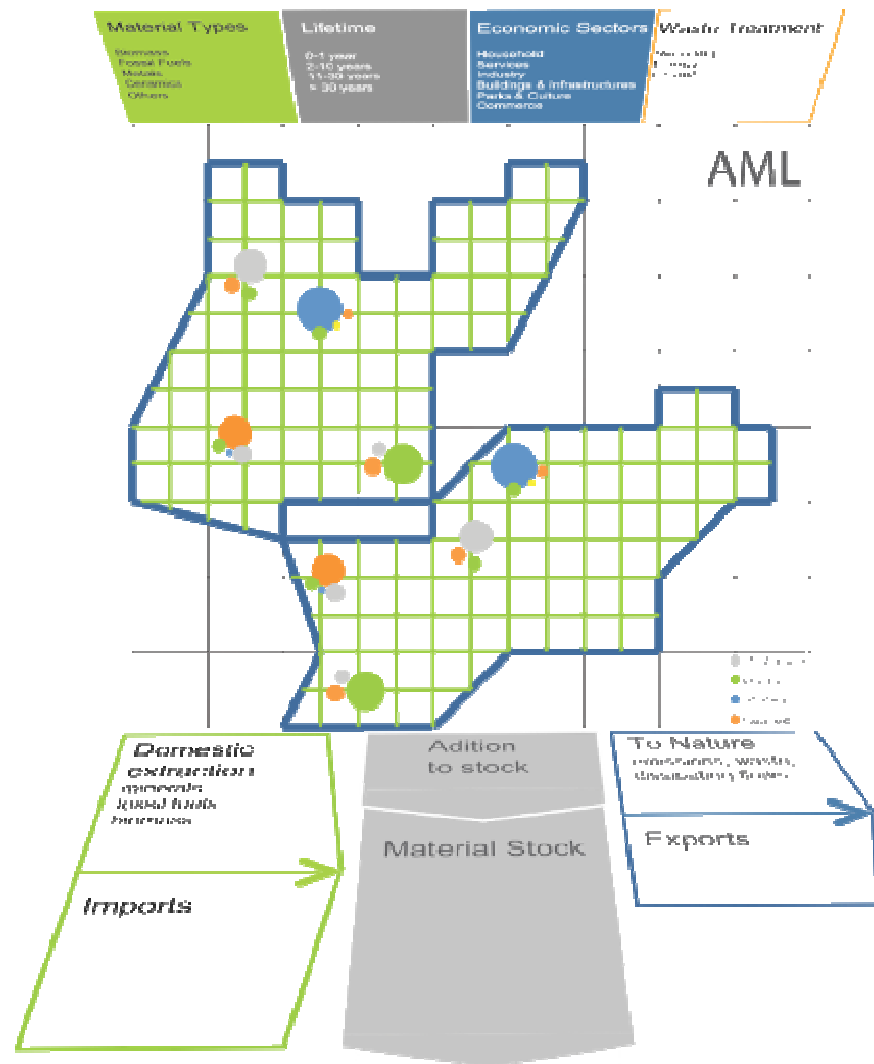
- Notes:
1. NO is New Orleans
 2. "Pass-Through" flows refer to the large volume of material which passes through the city of New Orleans.
 3. "Hidden Flows" are materials that are produced in the course of producing materials for construction but do not actually enter the construction industry.
 4. Theoretical relationship between a prior component.



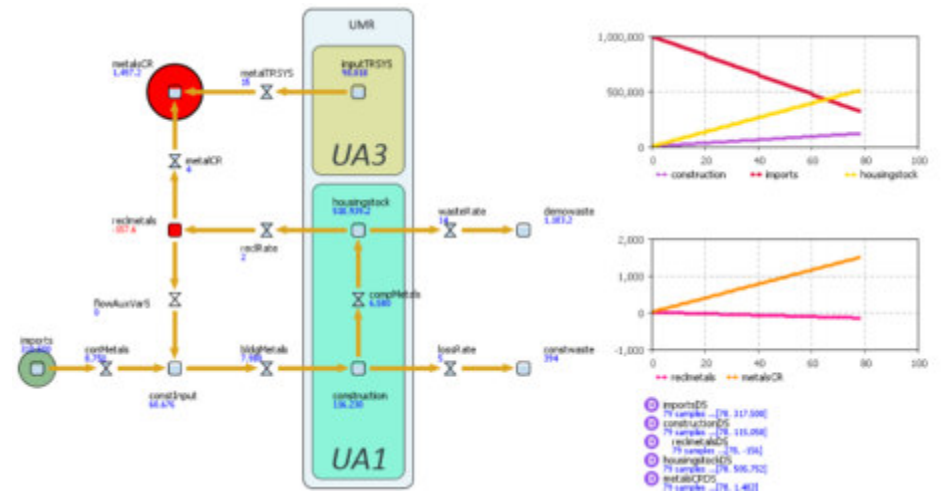


LISBON MATERIAL MATRIX

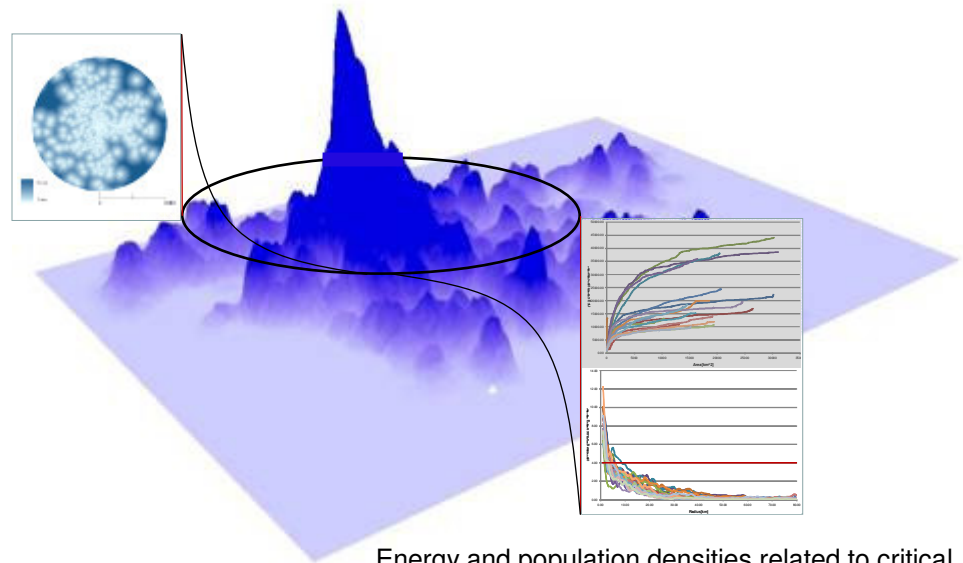
Extended MFA of AML



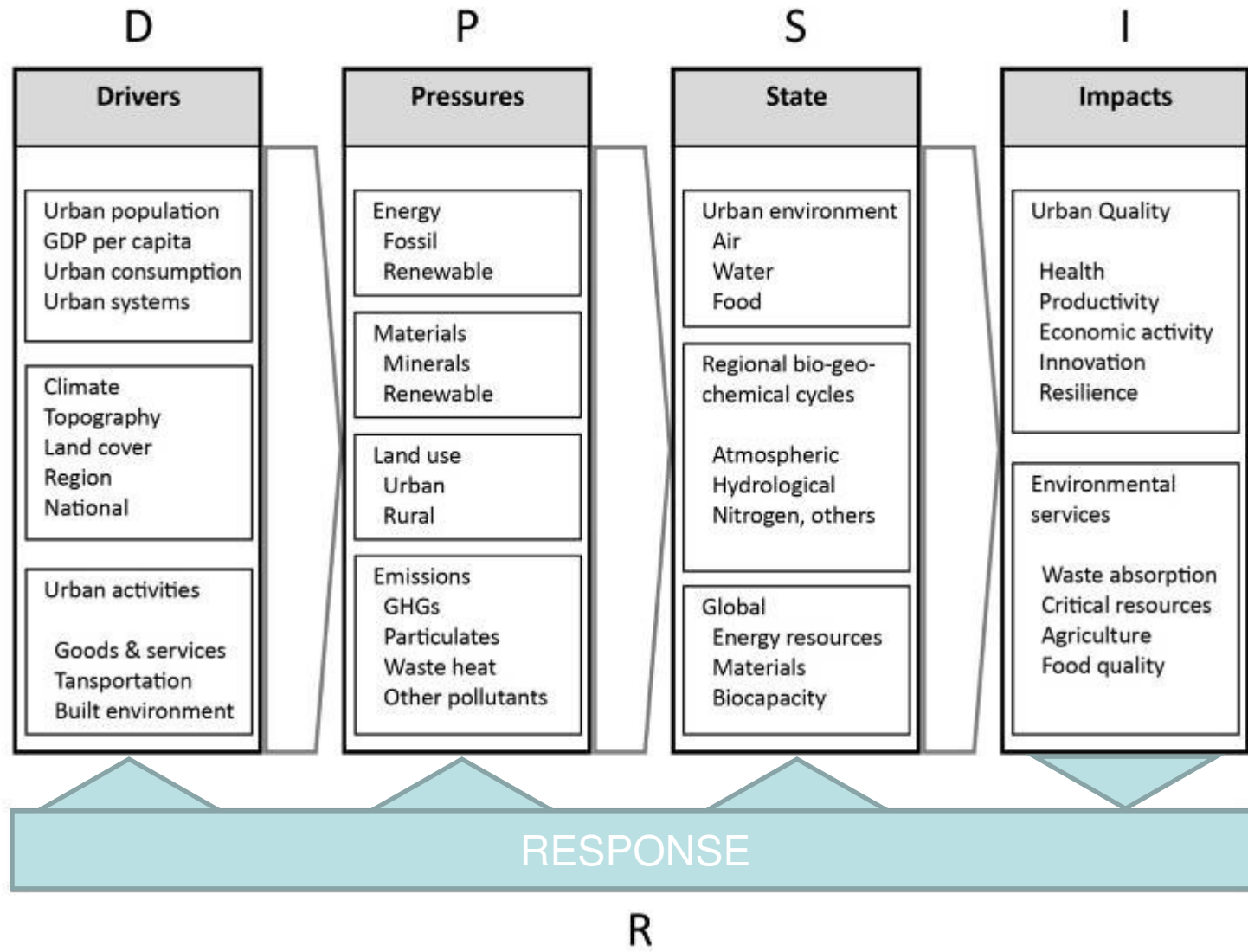
Urban Resource Flow Dynamics

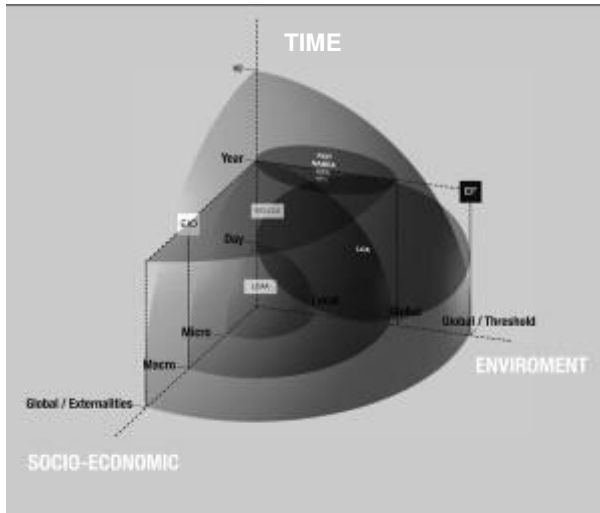


Urban Service Densities



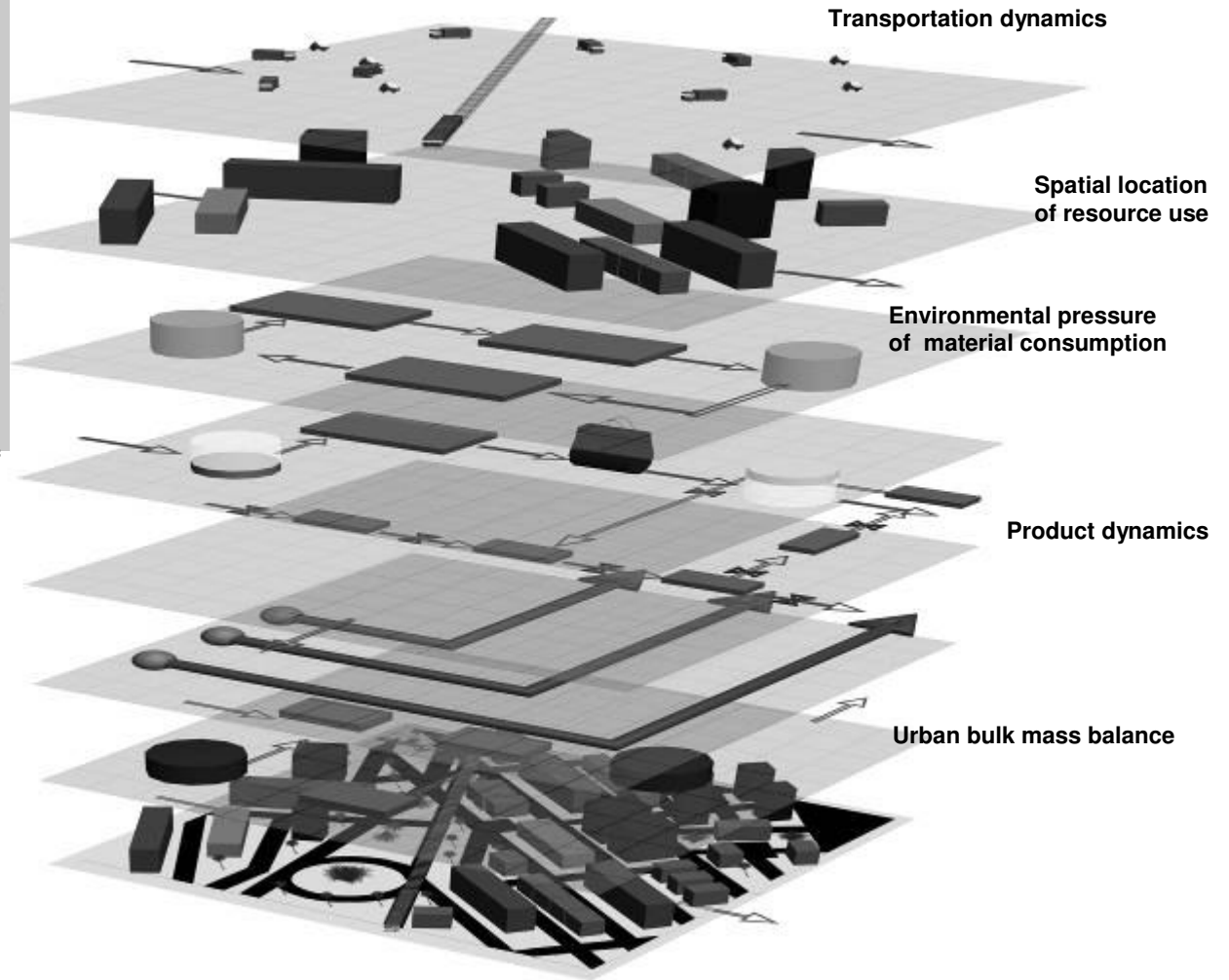
INFORMATION - D.P.S.I.R FOR POLICY MAKING





Material intensity of economic sectors

Urban materials flow analysis



Our approach: developing new interdisciplinary models