

# Cities as 'natural resources processing systems': The energy case

**Eduardo Oliveira Fernandes**  
*President of AdEPorto*



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1. Energy and Sustainability
2. Cities can not be sustainable
3. Cities as energy systems
  - i. Case study of Parque Expo'98 – Lisbon
  - ii. Case study of Porto – 2007 - ...
4. Conclusion



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## **1. Energy and Sustainability**

2. Cities can not be sustainable

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# Sustainability – a three fold unreachable value





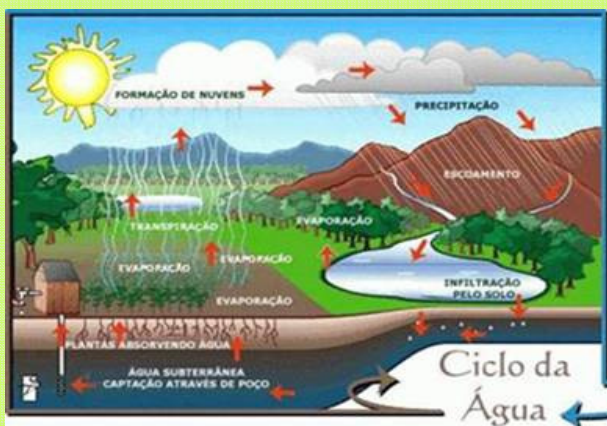
«The ability to meet the needs of present generations without compromising the possibilities of future generations»

(Brundtland Report, 1987)

- The global environment as a condition for survival
- **CO<sub>2</sub> abatement: #1 priority**

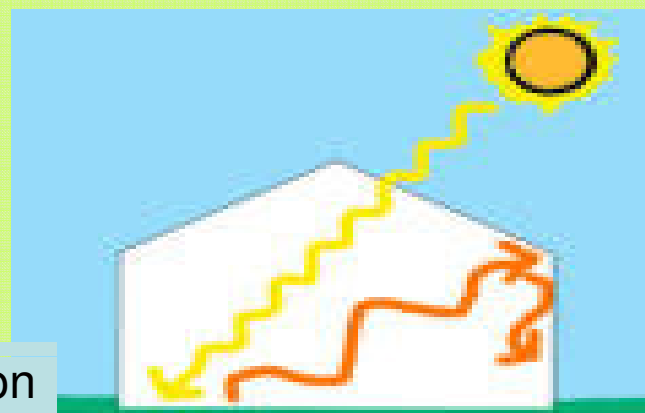
# Global environment: a matter of cycles of natural resources

## Closed cycles

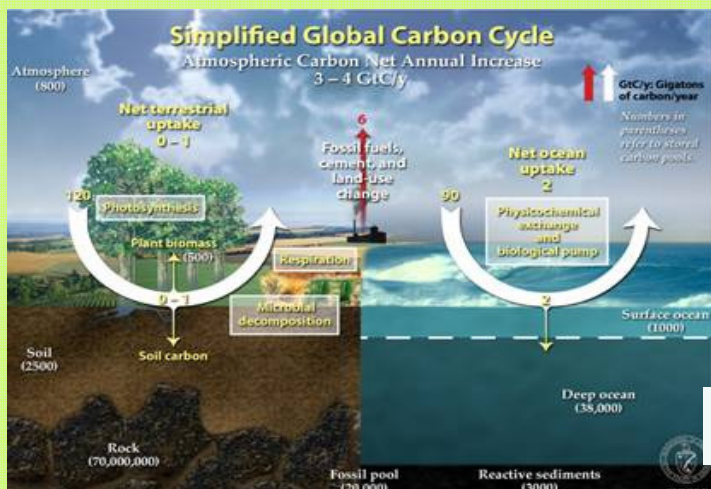


Water

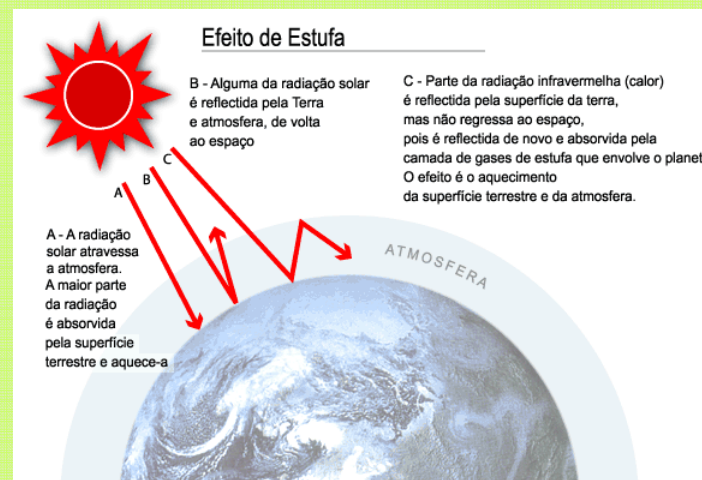
## Open cycle



Radiation



Carbon





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# The combustion paradigm



Energy Management Agency

Intelligent Energy  Europe



# Energy: the pressing factor of global environment

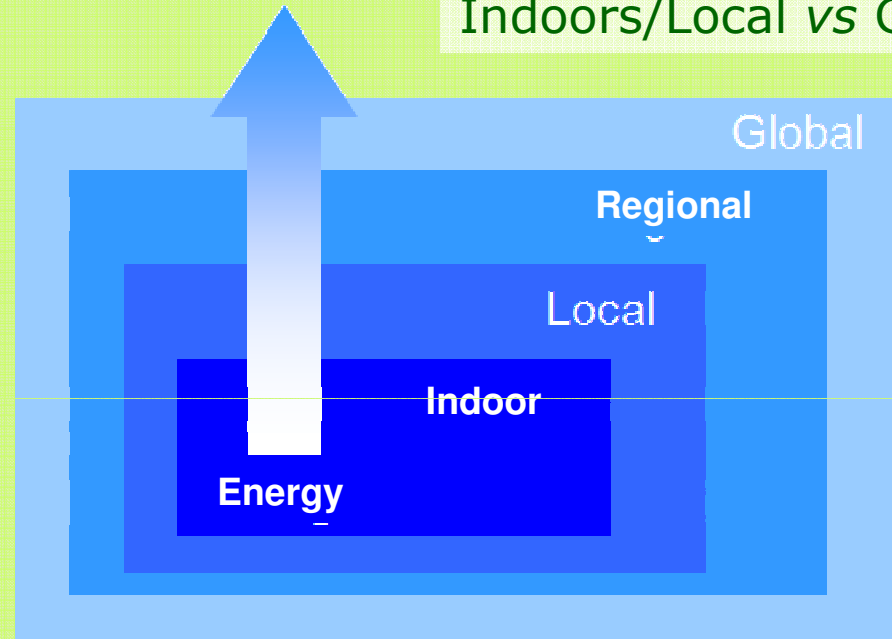
Indoors/Local vs Global

**Global**  
Climate Change  
Biodiversity

**Regional**  
Atmospheric pollution  
Urban planning

**Local**  
Microclimate  
Morphology

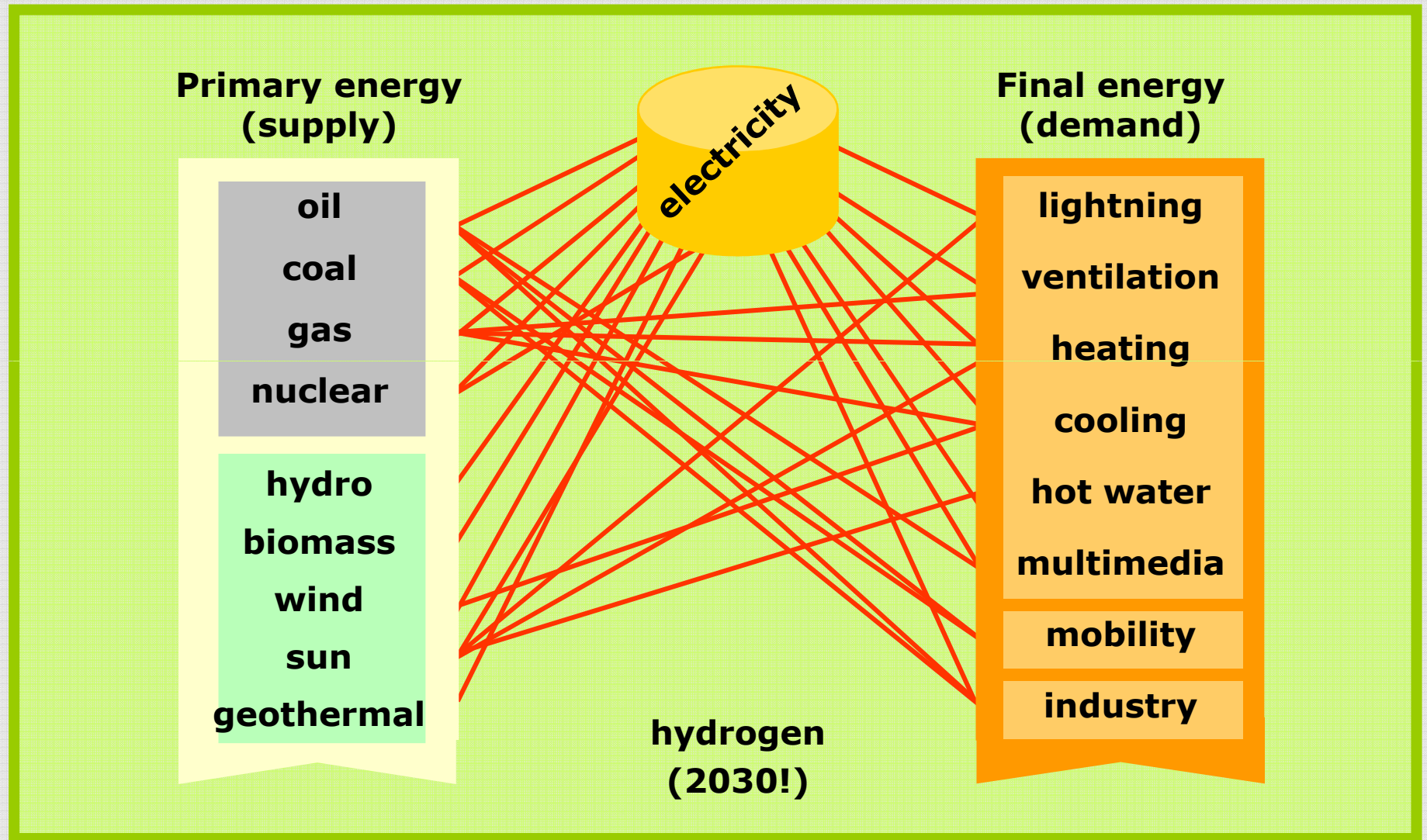
**Indoors**  
Indoor air quality  
Comfort  
Energy saving



<b><u>Problem</u></b>	<b>Global warming/Climate change</b>
<b><u>Leitmotiv</u></b>	<b>'Think globally; act locally'</b>
<b><u>Case</u></b>	<b>Energy vs CO<sub>2</sub> emissions</b>



# Energy: from natural source to service



**Past:** **'Centralized' paradigm**

**Future:** **New energy paradigm**

Liberalization      Decentralization

Diversification      Demand management

Energy Efficiency

Environmental suitability

The alternative to the 'fossil' is not form of energy 'A' or 'B', but rather a mix of all, including the efficiency!