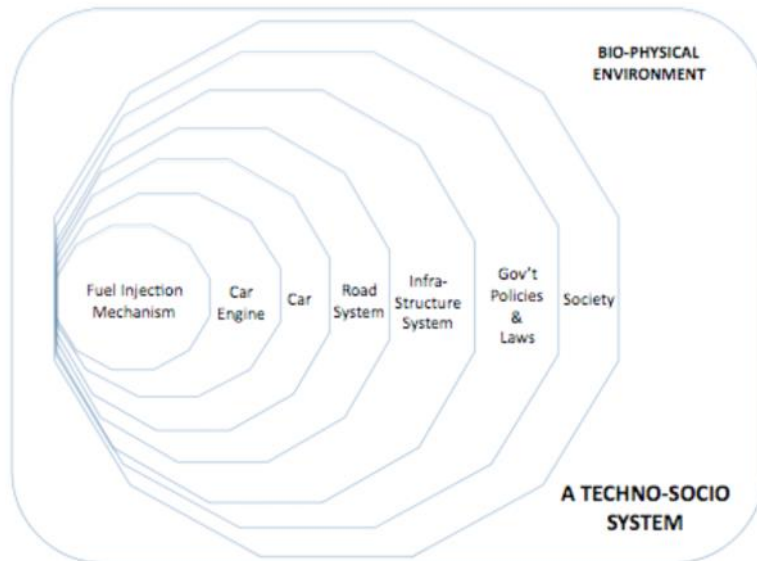# Module 3 Lesson 5 — Built & Natural Systems

3.5.2 Examples

A Large-scale system made up of seven smaller systems

Take-away messages:

1) Traditional engineering activities often take place at core of techno-socio systems

2) Categorizing a system (or subsystem) as simple/complex can guide which analysis tools are best for a particular situation

3) Systems thinking should be considered in all engineering decisions

Decisions made at one scale of the system can have different consequences at a different scale

3.5.3 Bio vs Techno

- Human-created systems seen as mimicking ecosystems

Biosphere	Technosphere
• Environment	• Market
• Organism	• Company
• Natural Product	• Industrial Product
• Natural Selection	• Competition
• Ecosystem	• Eco-Industrial Park
• Ecological Niche	• Market Niche
• Anabolism / Catabolism	• Manufacturing / Waste Management
• Mutation and Selection	
• Succession	• Design for Environment
• Adaptation	• Economic Growth
• Food Web	• Innovation
	• Product Life Cycle

Source: http://en.wikipedia.org/wiki/Industrial_ecology

3.5.4 Urban Ecology

- Urban areas are defined by people and our artifacts
- The artifacts support species other than humans!

- Cities can nurture biodiversity
  - The physical landscape of the urban area is boundary-rich (i.e. lots of different types of land areas in a city)
    - Number of boundaries compounded when considering differences in scale

- Considering human use of space, there are lots of opportunities for natural ecology to thrive (e.g. boulevards, industrial areas, ...)

- Urban Ecology
  - Study of ecology within cities
  - also study " of "