Universidade de São Paulo

Escola Superior de Agricultura “Luiz de Queiroz”

Departamento de Engenharia de Biossistemas

LEB 244 – Aula 4
Diagrama de Linguagem Energética

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O que é um diagrama?

Um diagrama é uma representação visual estruturada e simplificada de um determinado conceito, idéia, processo.

como vc representaria:

1. Uma floresta plantada
2. Uma cidade
3. Um ecossistema

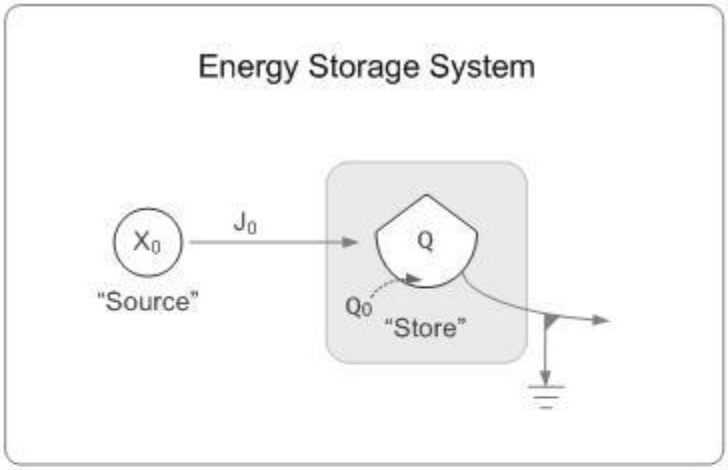
Howard T. Odum

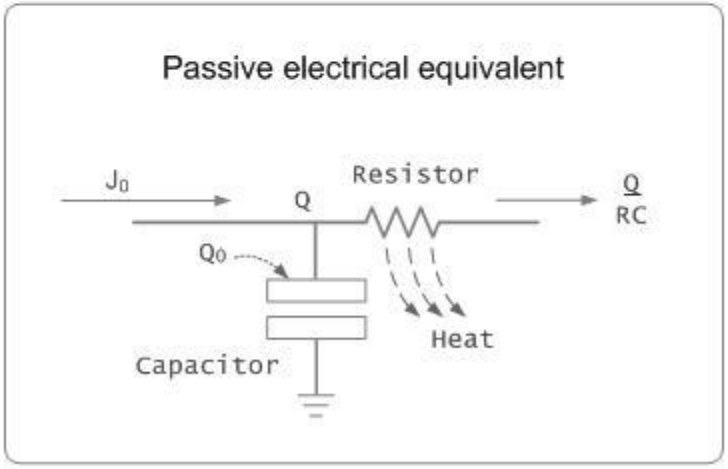


1924-2002

- Ecological modeling
- Ecological engineering
- Ecological economics
- General systems theory

Analogia ecológica da Lei de Ohm

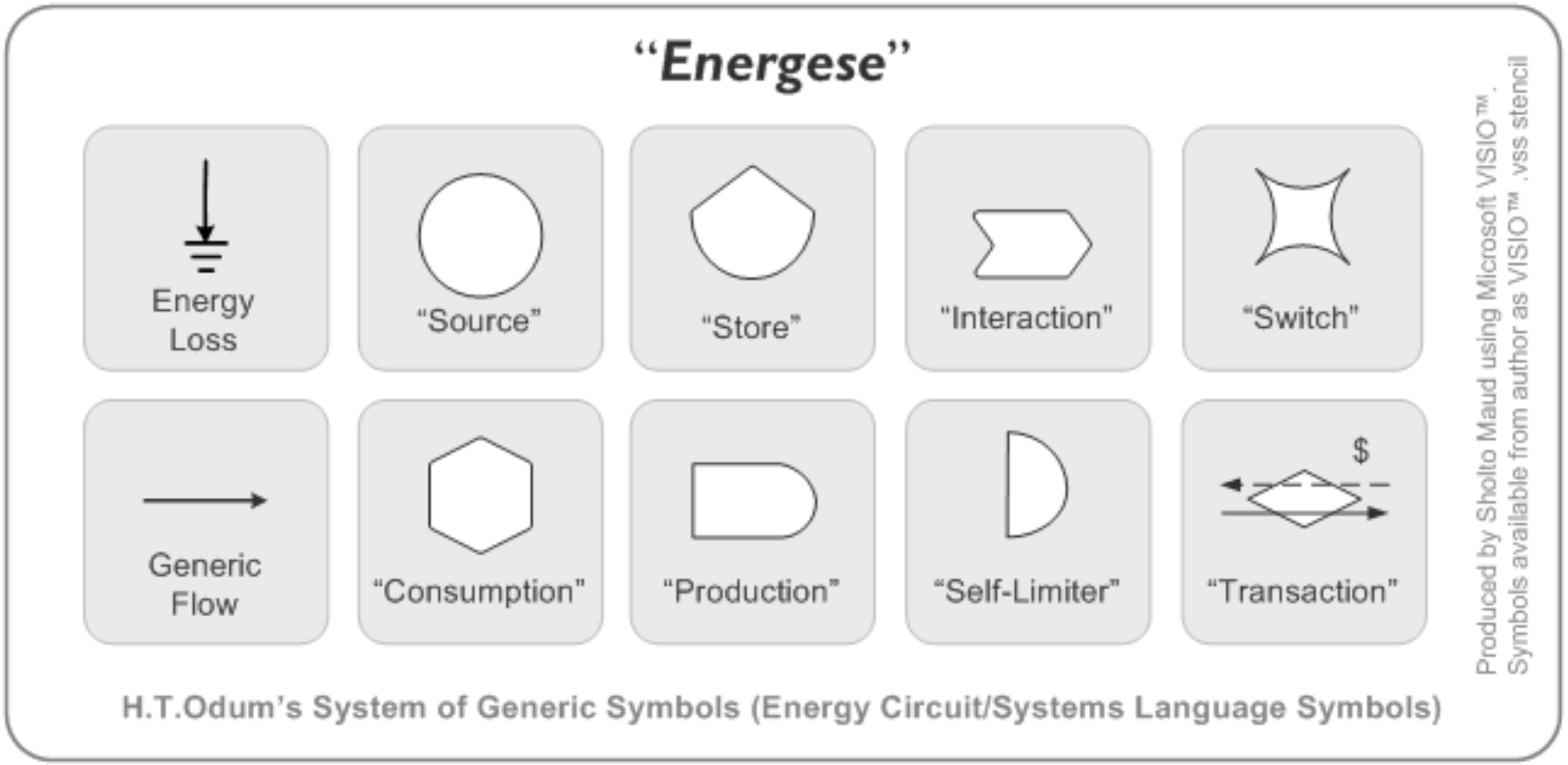




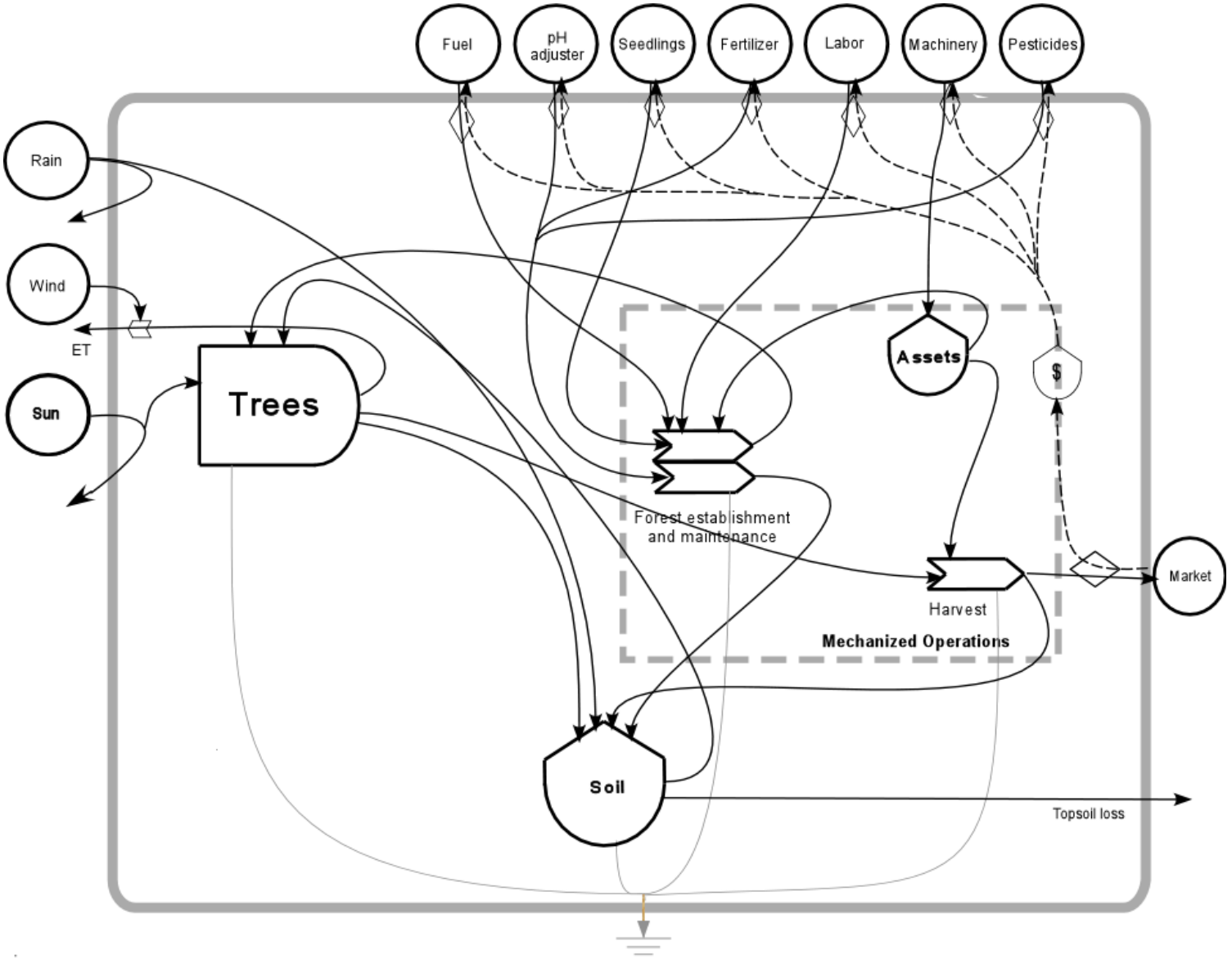
Adapted from H.T.Odum (1994) Fig. 3-8, p. 35

Fluxo (J) é proporcional à força termodinâmica (X) com a condutividade (C)

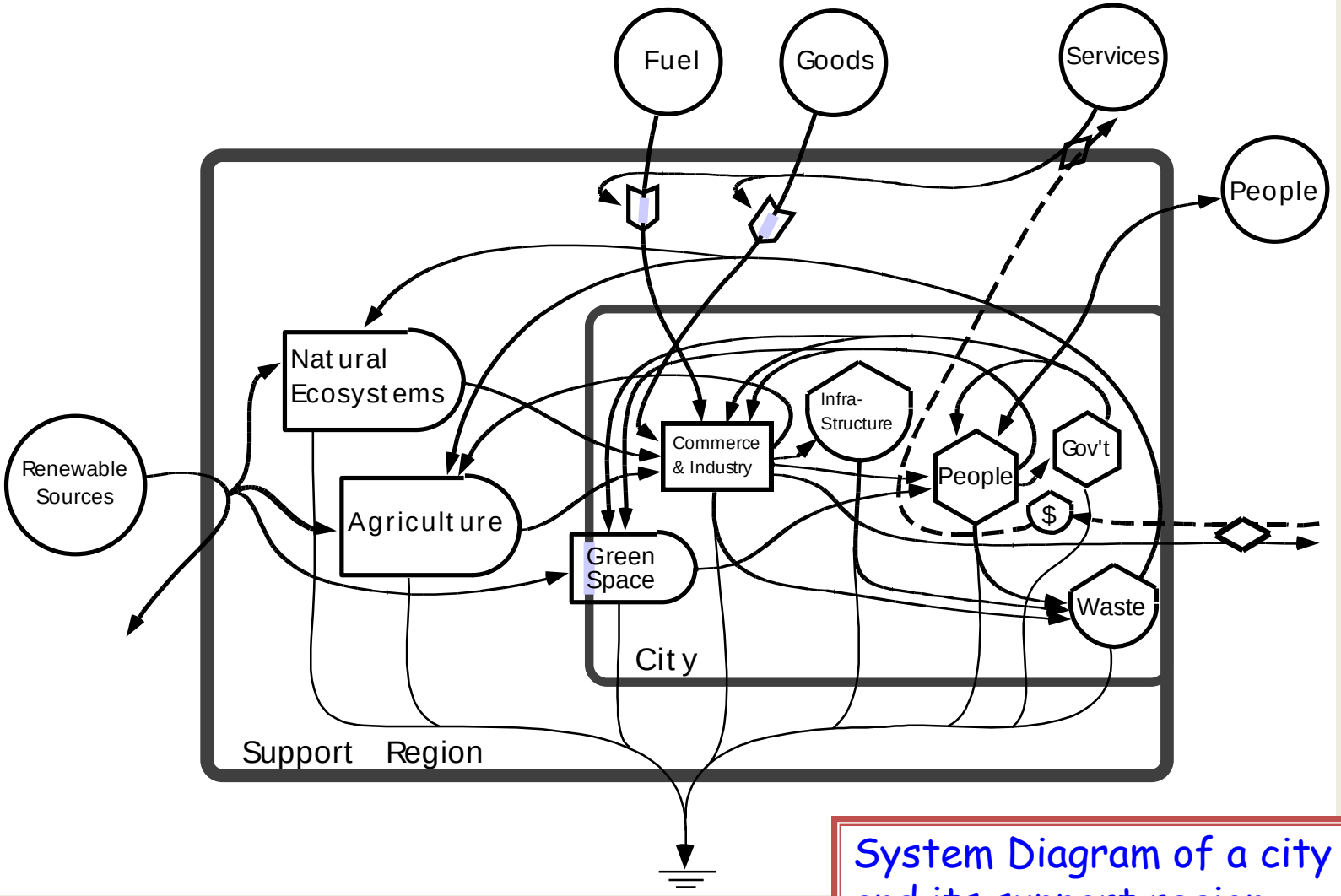
Linguagem energética



Floresta plantada

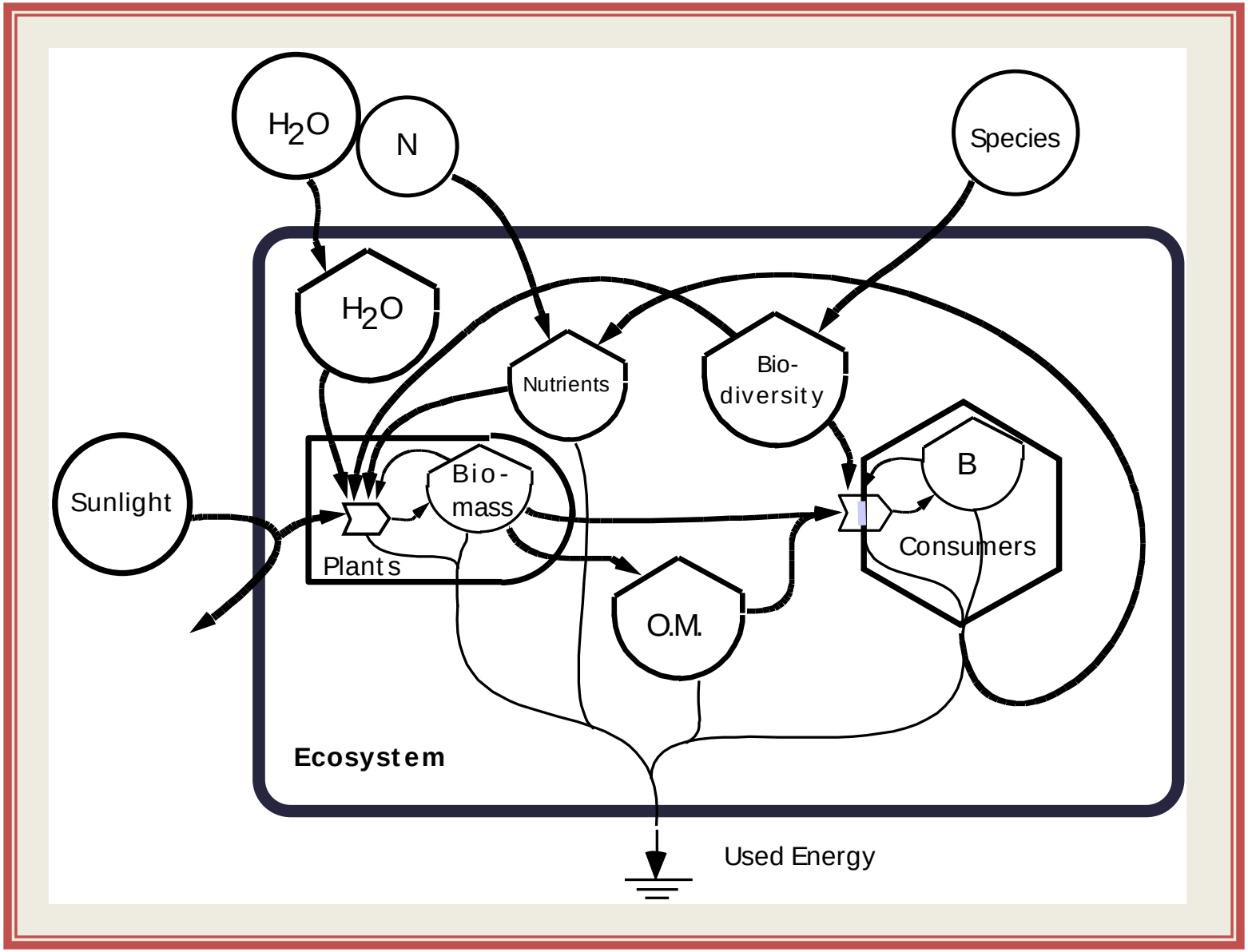


Cidade

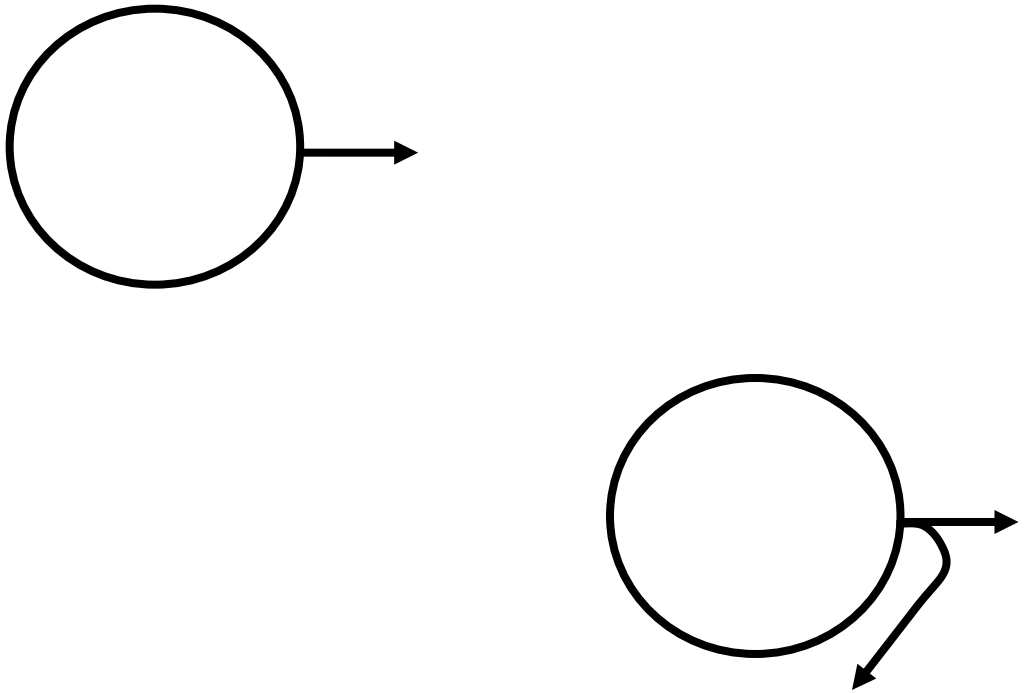


System Diagram of a city and its support region

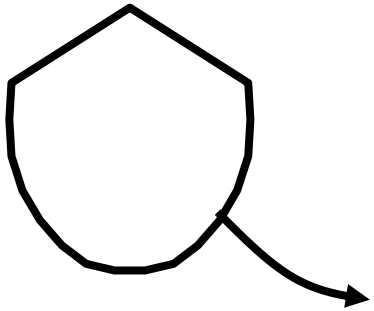
Ecossistema



Fonte externa

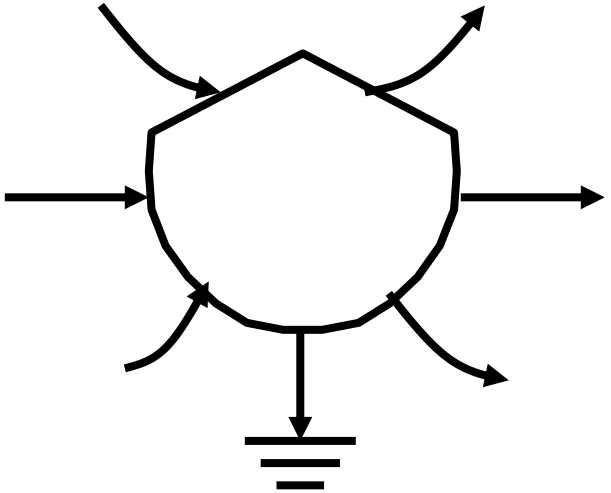


Estoque

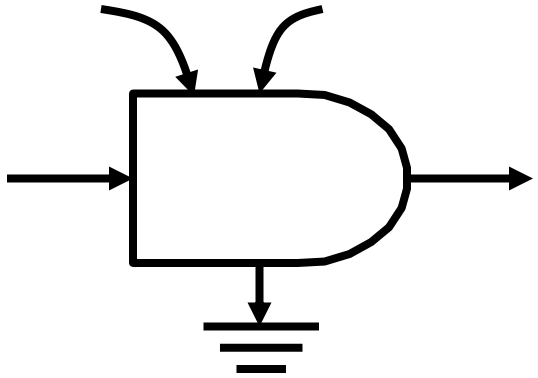


Fonte externa
não renovável

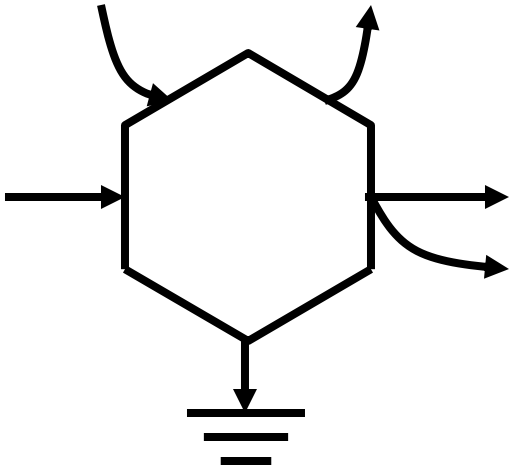
Estoque interno



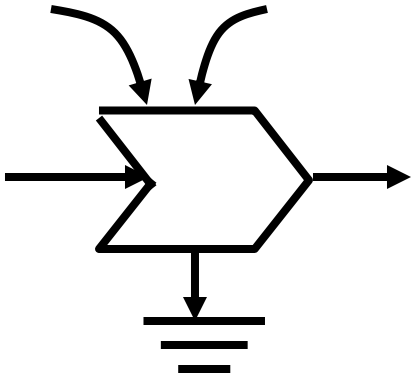
Produtor primário



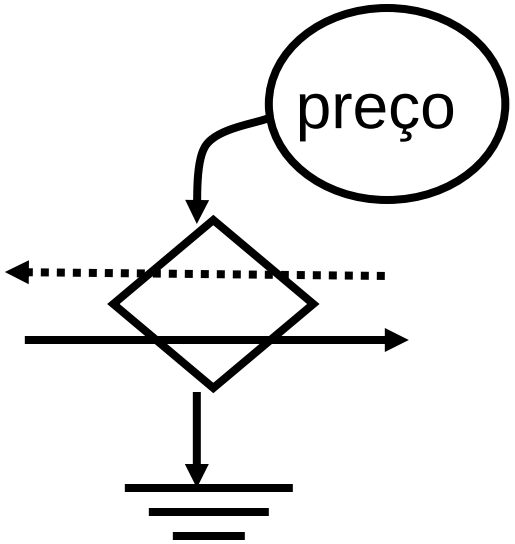
Consumidor



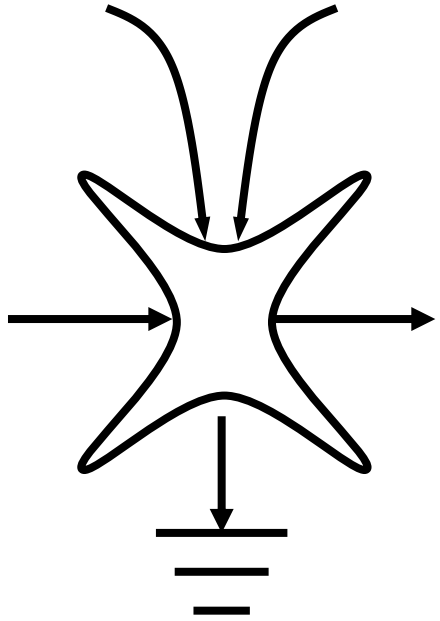
Interação



Transação



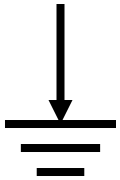
Interruptor



Fluxo de Energia

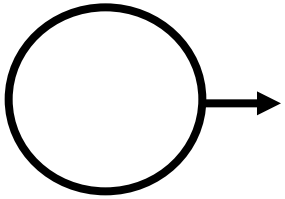


Sumidouro de Energia

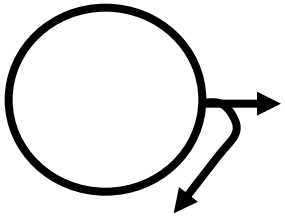


Sistema ou subsistema

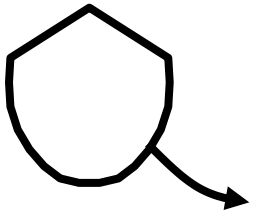




Fonte externa ilimitada



Fonte externa renovável limitada



Fonte externa não renovável limitada

Símbolos com conexões

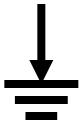


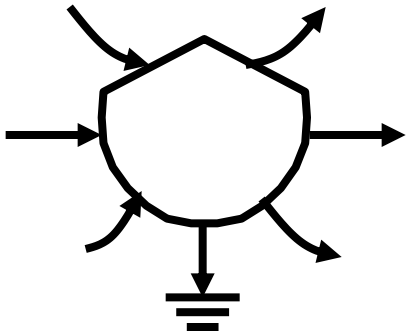
Sistema ou subsistema

Fluxo de Energia

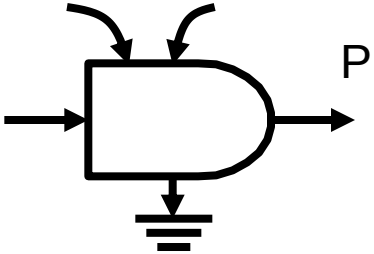


Sumidouro de Energia

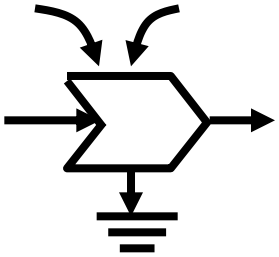




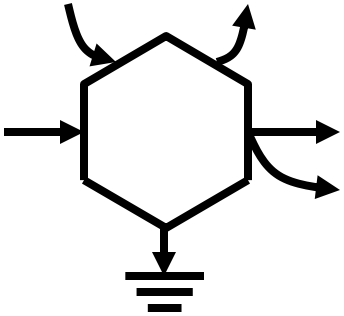
Estoque interno



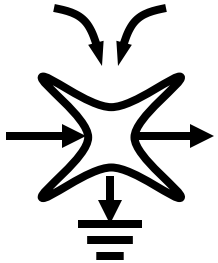
Produtor



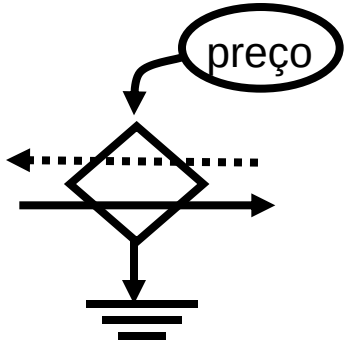
Interação



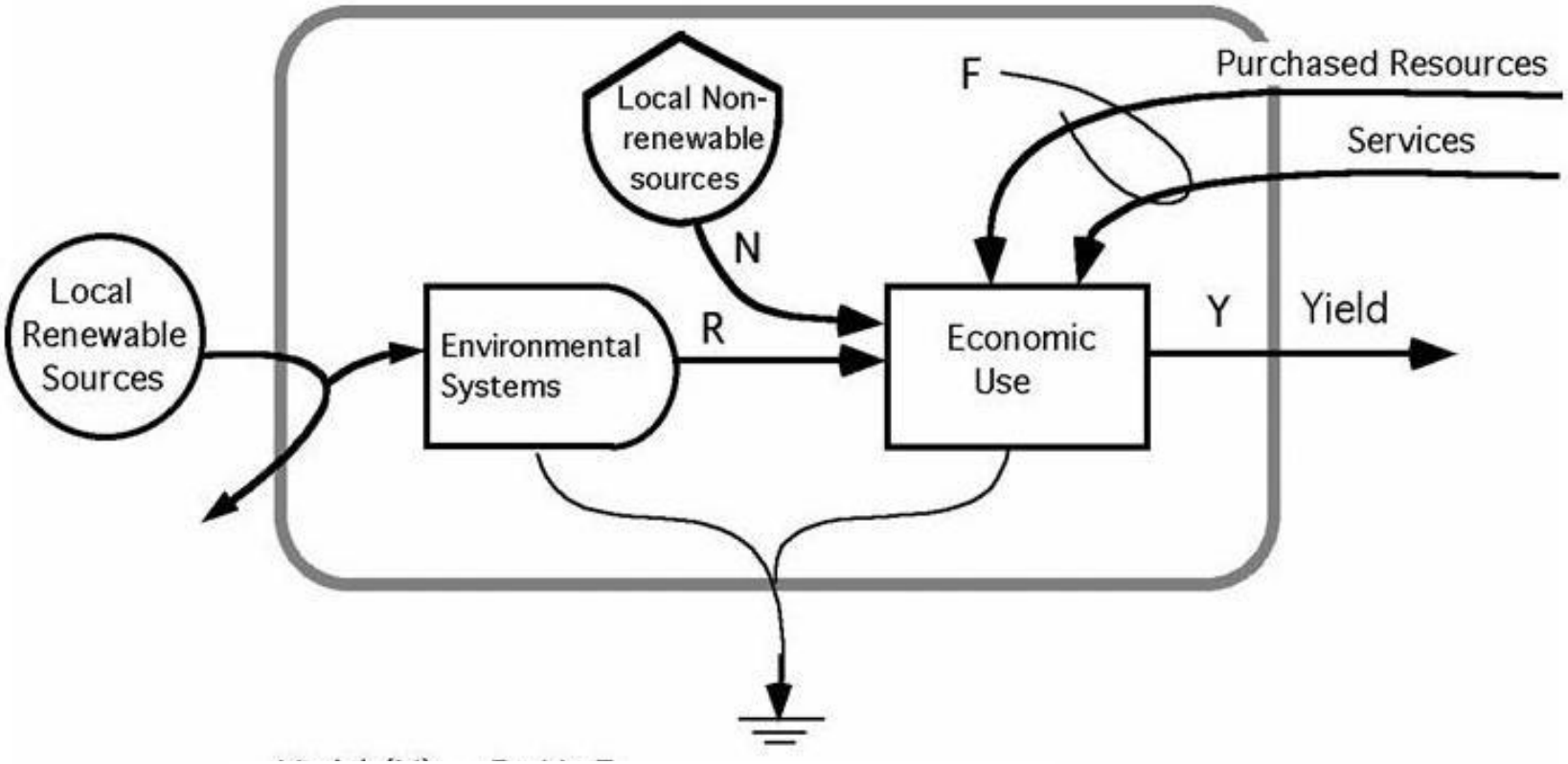
Consumidor



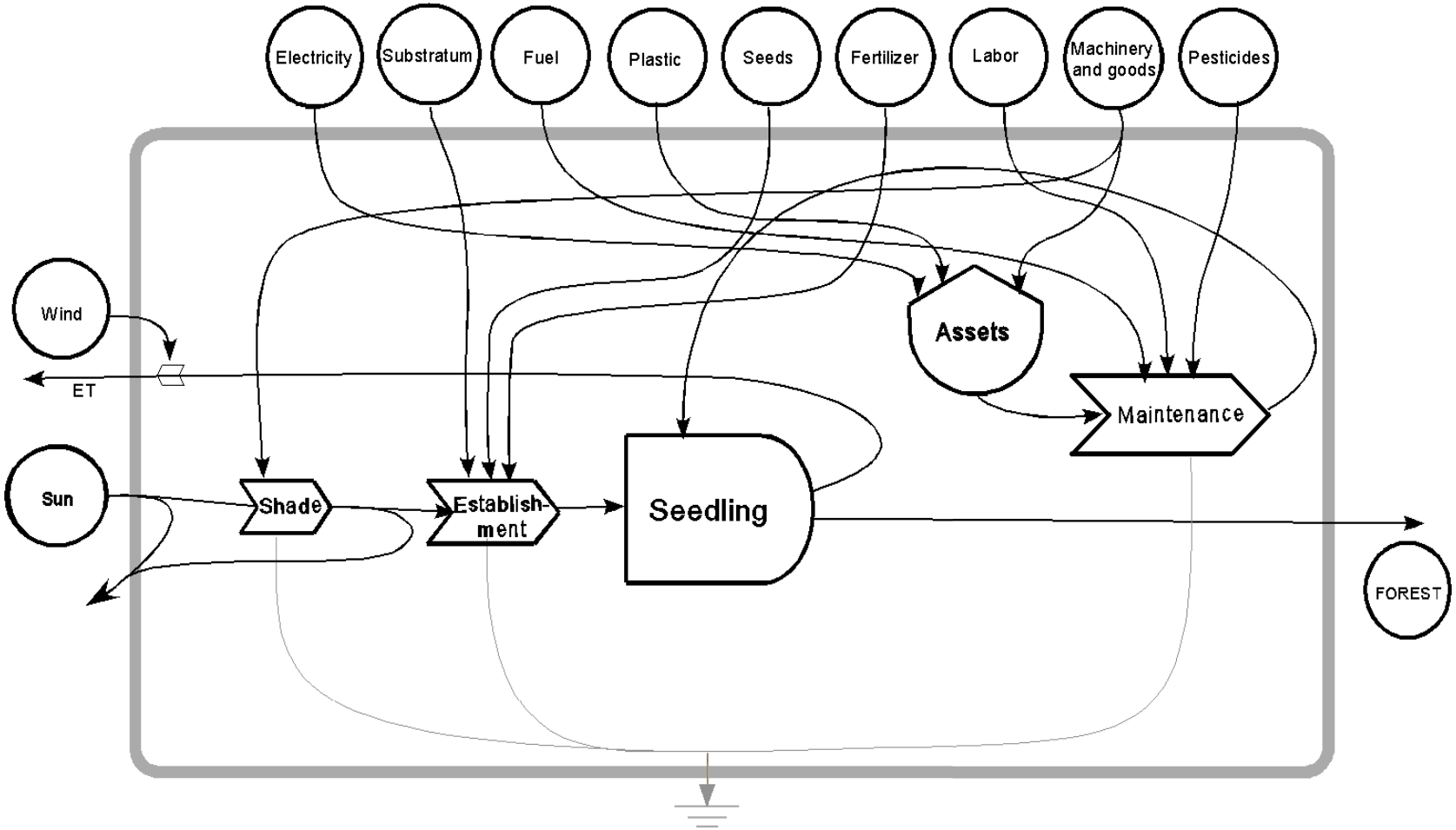
Interruptor



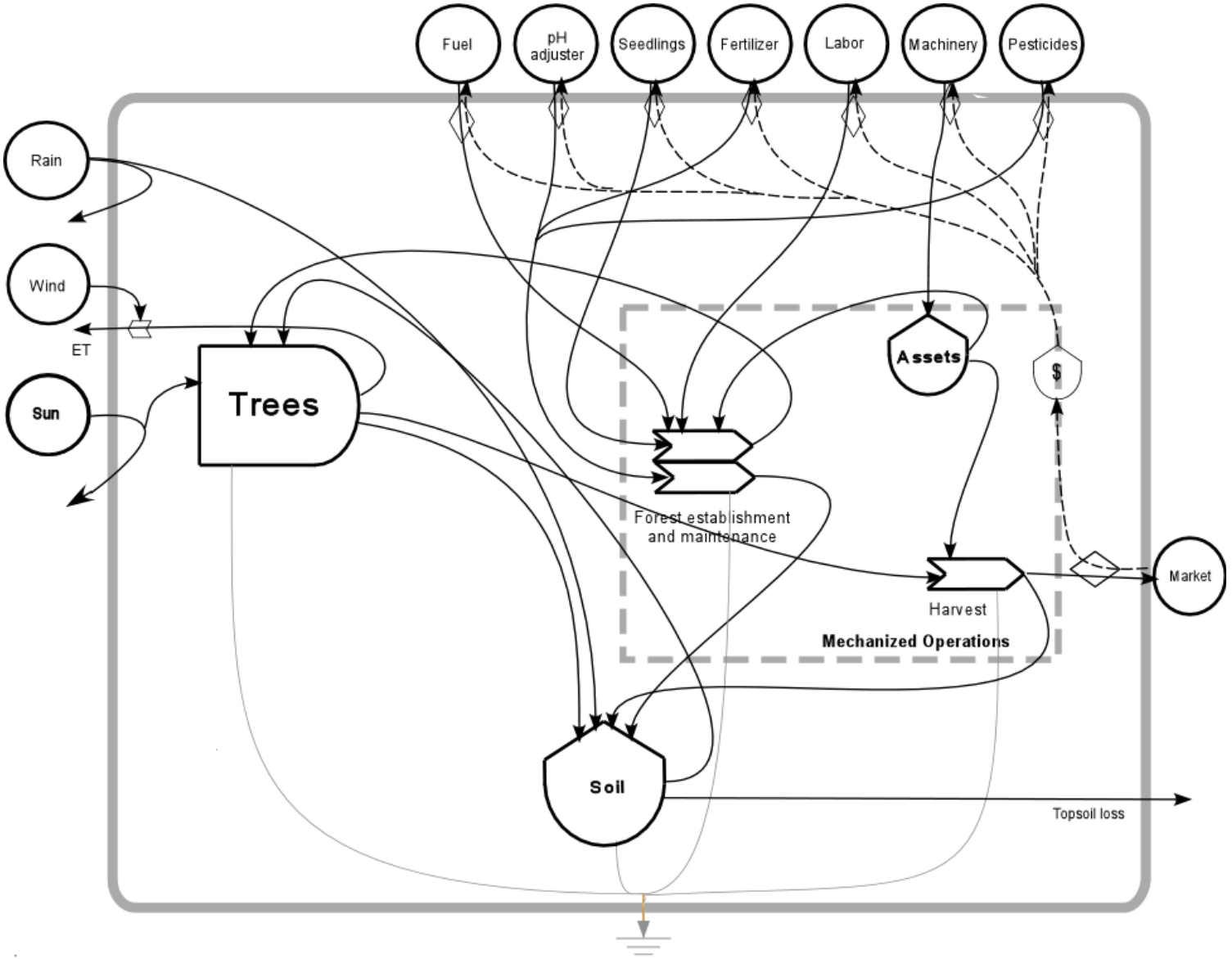
Transação


Local Non-renewable sources
F
Purchased Resources
Services
N
Local Renewable Sources
Environmental Systems
R
Economic Use
Y
Yield

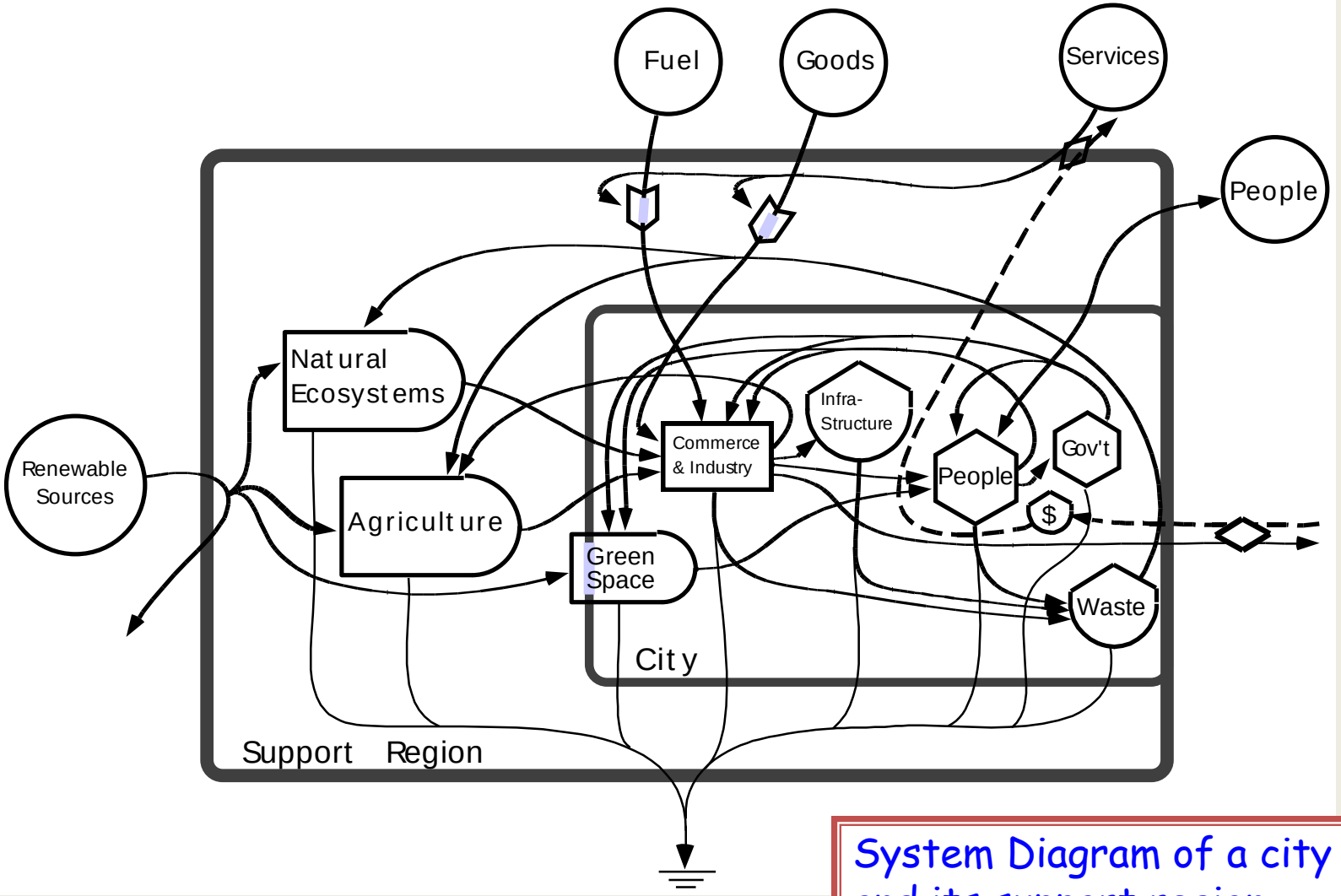
Produção de mudas



Produção de eucalipto

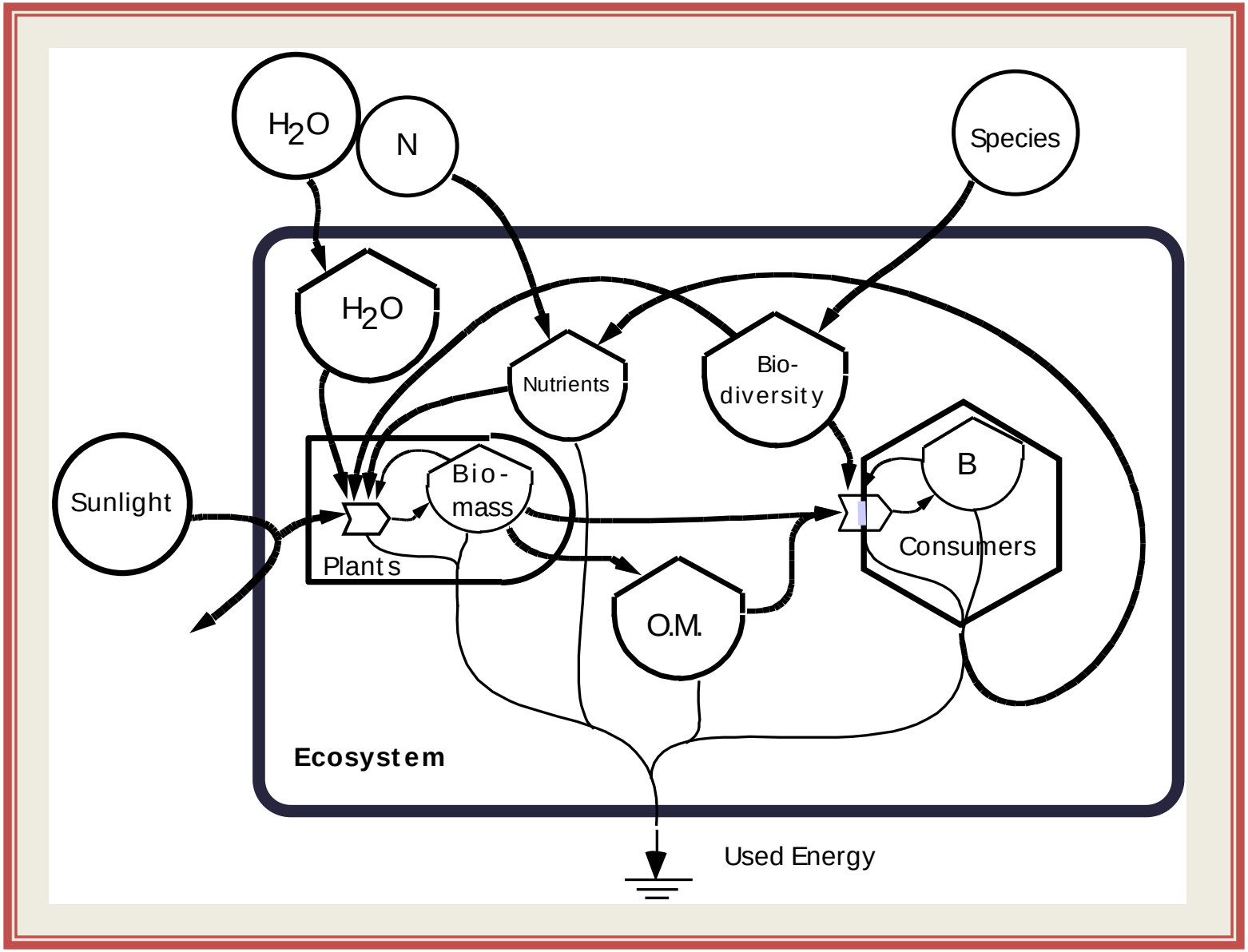


Cidade



System Diagram of a city and its support region

Ecossistema



Exercício

Desenhe o diagrama de um sistema de produção.