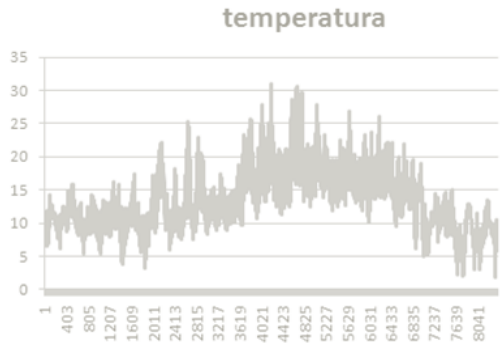
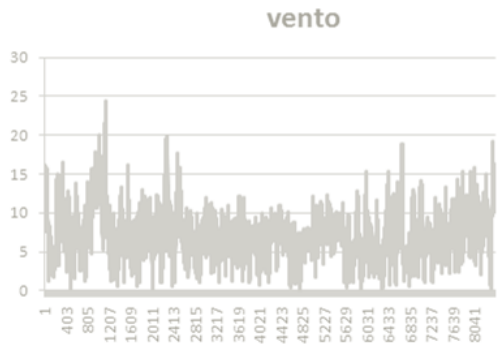
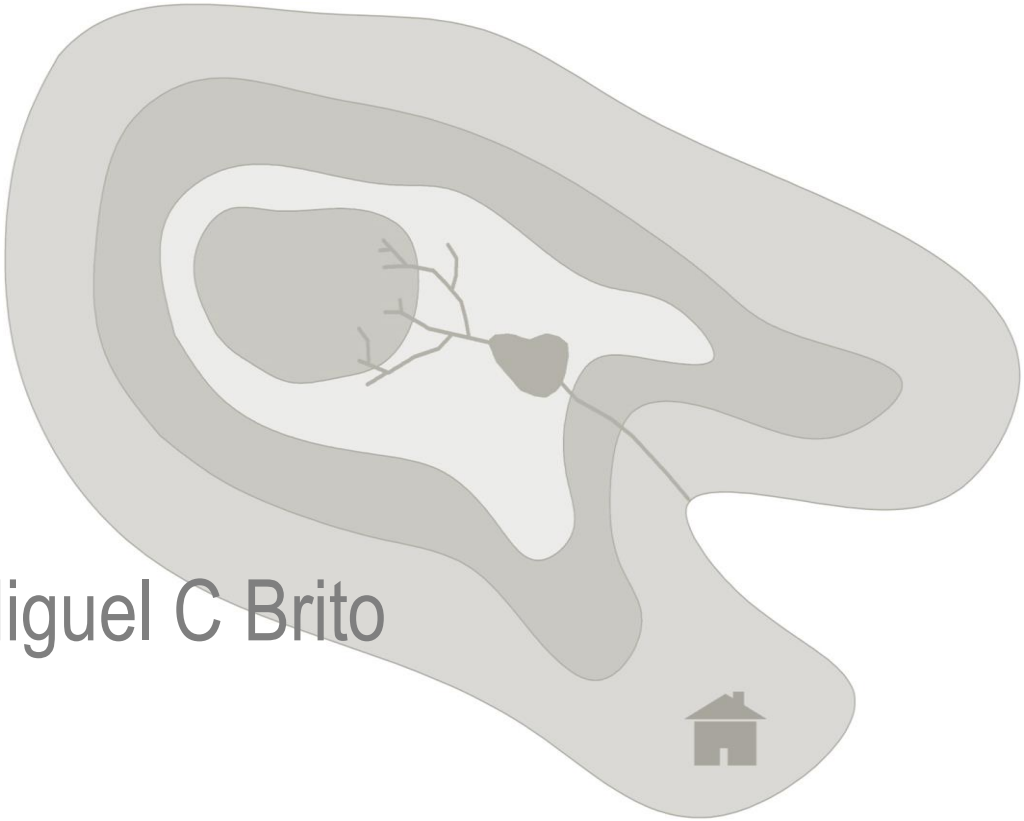
Energy systems

Final discussion







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HEAT

Compare costs and resources. Define appropriate mix.

Output: electricity demand for heat generation

Heat demand

1. Hot water
2. Thermal comfort

Different options for heat generation

1. Solar thermal
2. From electricity using heat pumps
3. From CHP (biomass and/or waste) + district heating
4. From biogas (local or centrallized)

Biomass and biofuels

Define area for natural forest (choice), urban areas (~500 hab/km^2 or 500m^2/person) and farming area (required for feeding the population ~800 a 1500m^2/pessoa)

Determine energy generation (annual, total and per capita) in the remaining area assuming different mobility scenarios.

Decide utilization of available area for growth of energetic cultures. Discuss impact for different mobility scenarios.

Output: available biomass for CHP for different mobility scenarios.

Energy balance - electricity

Scenario A

- No storage or demand management
- Net zero (define number of wind turbines) [include transmission losses!]
- Underwater import/export (0.15€/KWh transport costs)

Scenario B

- Scenario A
- + demand management

Scenario C

- Scenario B
- + storage [stored energy by the end of the year must be as in the beginning ±10%]
- - import/export

Energy balance - electricity

DISCUSS

- transition costs
- redundancy
- global warming

Scenario A

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Scenario B

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Scenario C

- Scenario B
- + storage [stored energy by the end of the year must be as in the beginning ±10%]
- - import/export