Biomass transport for energy

Analysing costs, energy and CO_2 emissions of the main forest wood and manure transport chains in Switzerland

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Background:

Promoting the use of new renewables, including biomass, is key to decarbonizing the energy sector. Biomass in Switzerland could double its contribution by 2050. Forest wood and manure still have a large unused sustainable potential.

Goals:

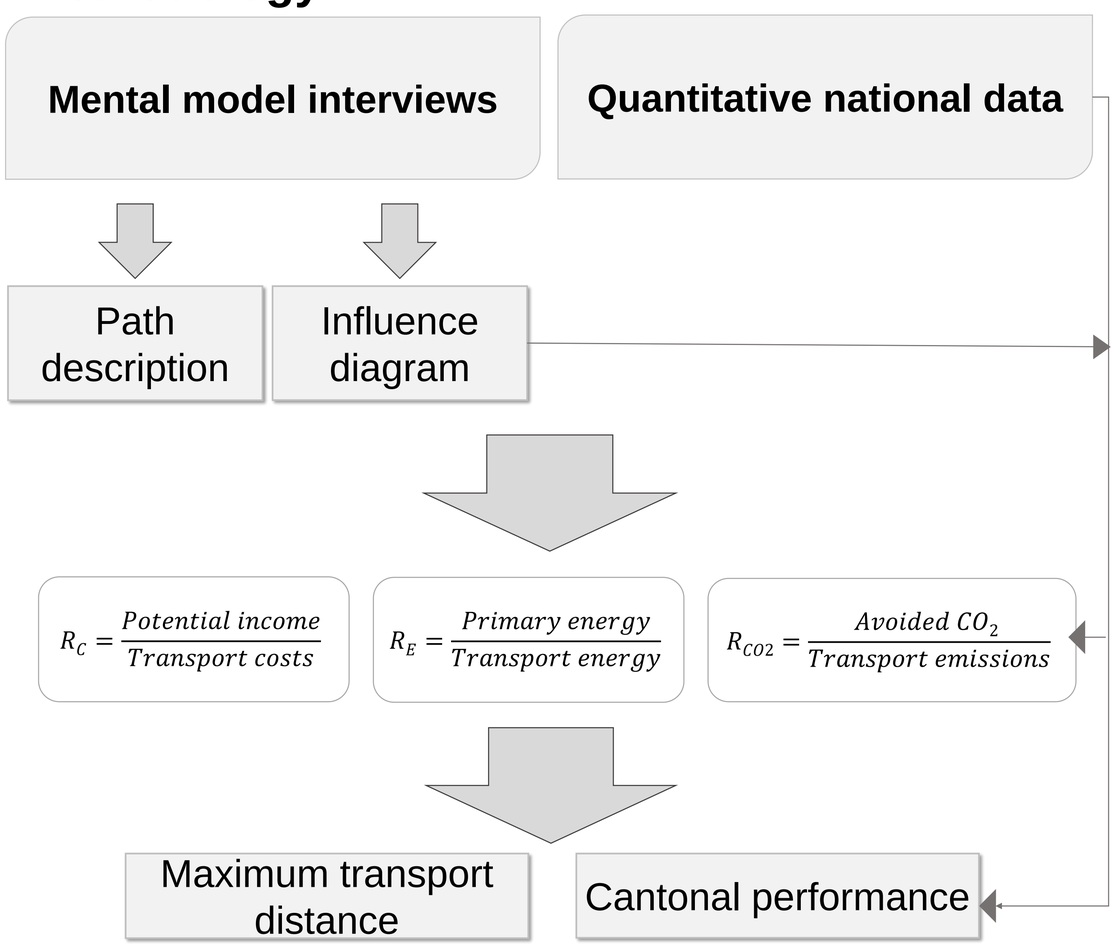
1. Identify the main forest wood and manure transport chains in Switzerland

2. Calculate their costs (in Swiss francs CHF), energy requirements, and eq-CO_2 emissions per tonne of dry mass (t_{DM})

3. Calculate threshold transport distances

4. Evaluate and compare the performance of transport between Swiss cantons

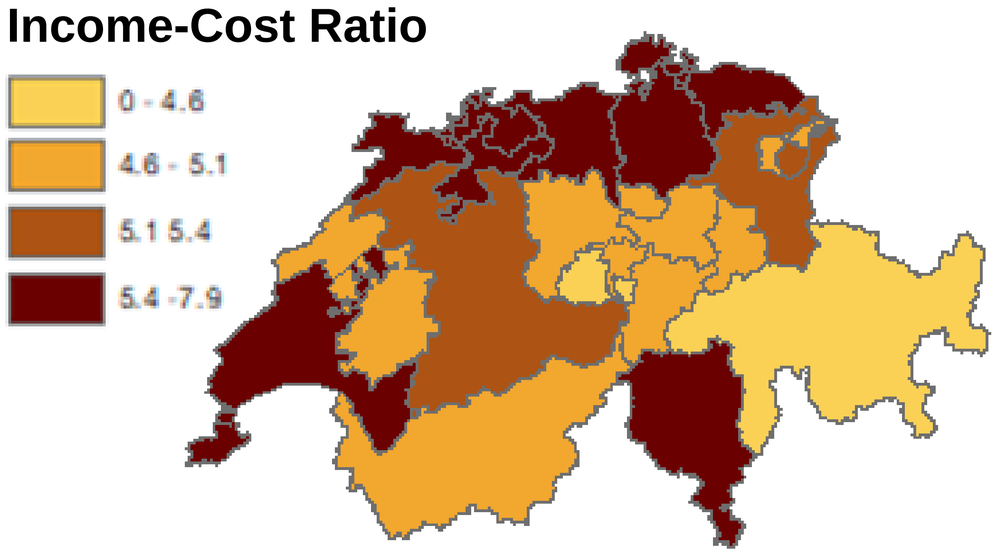
Methodology:



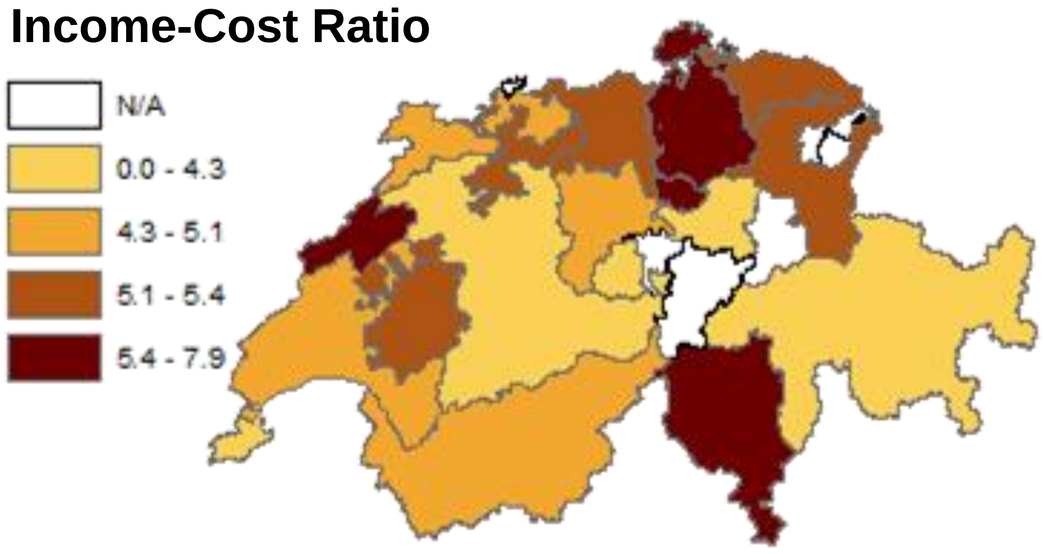
Main results:

- All transport chains expect one take place locally (<30 km) on roads
- The performance of these paths varies significantly, as the efficiency ratios range from 370 : 1 to 2 : 1
- Costs are the first barrier to biomass transport.
- This leads to threshold distances between 3 and 500 km when considering costs, 360 and 8000 km considering energy, and 145 and 5000 km considering eq-CO_2 emissions.
- Differences in feedstock type and category directly impact the cantonal performance.

Income-Cost Ratio



Income-Cost Ratio



Cantonal upscaling of the forest wood (left) and manure (right) income-cost ratio

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https://www.wsl.ch/en/projects/biomass-transport-for-energy-in-switzerland-1.html