Life Cycle Assessment of Energy Wood Chip Supply in Switzerland

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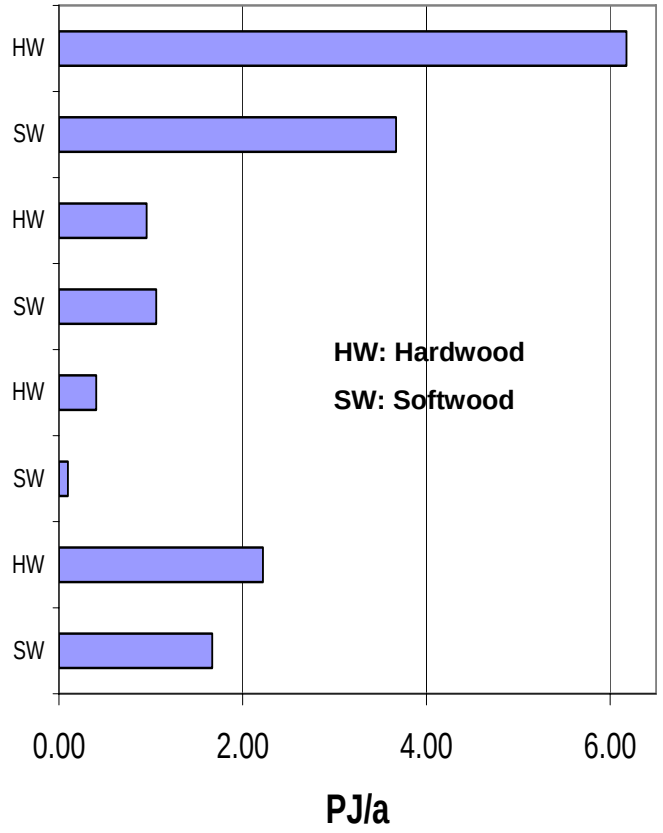
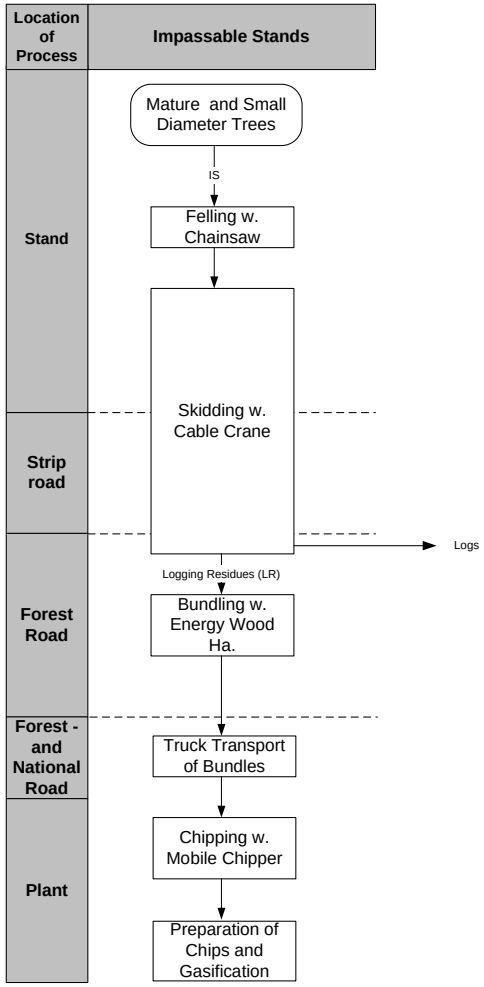
Goals

- Getting insight in environmental burdens associated with the supply of energy wood chips.
- Establishing a consistent link between Wood chip potential – supply chain design – employed equipment – environmental burdens.
- Comparison of energy-wood chips from passable and impassable stands vs. crude oil
- Providing inventory data for a comparison of synthetic biofuels and fossil fuels

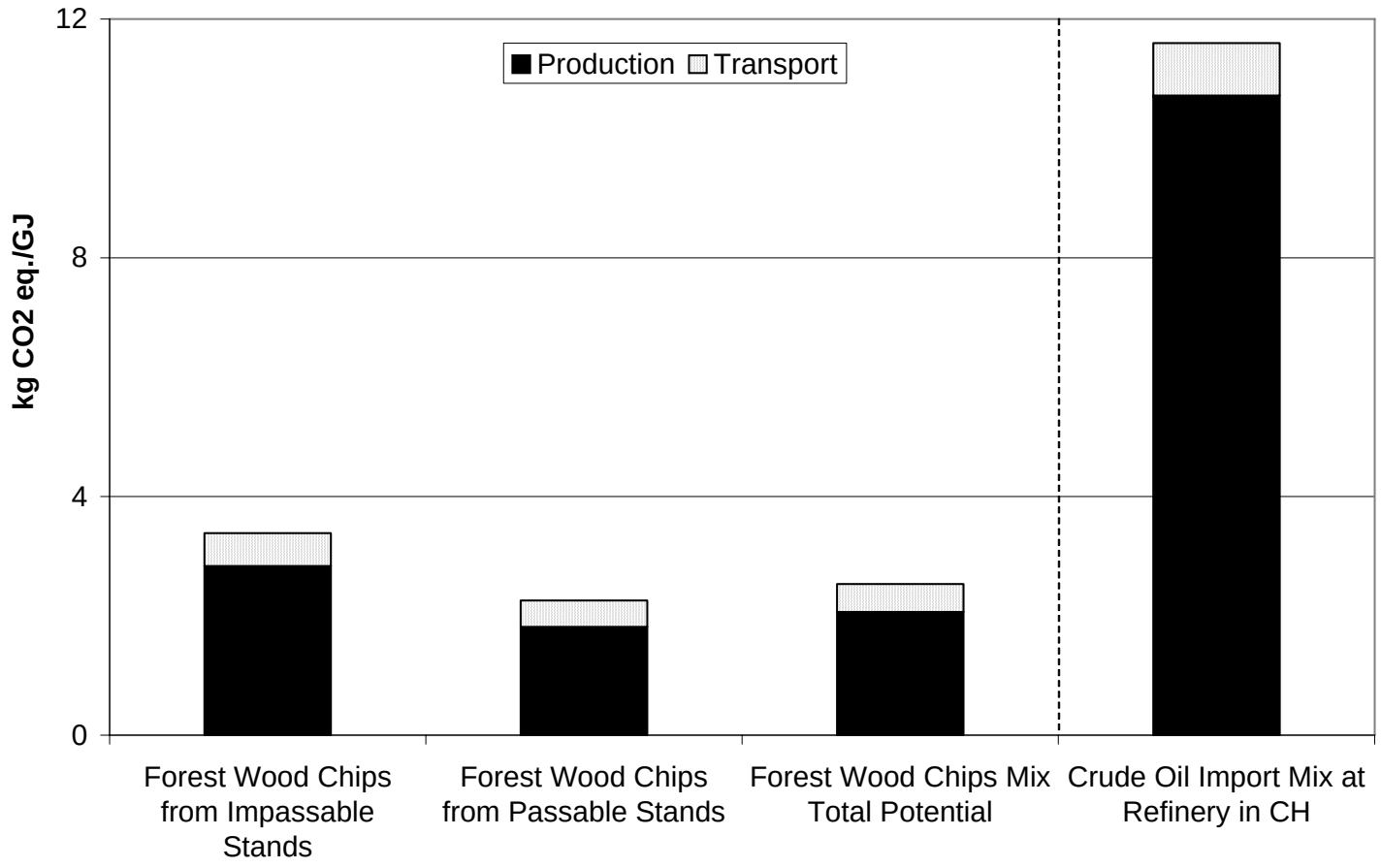
Forest Wood Chip Classification



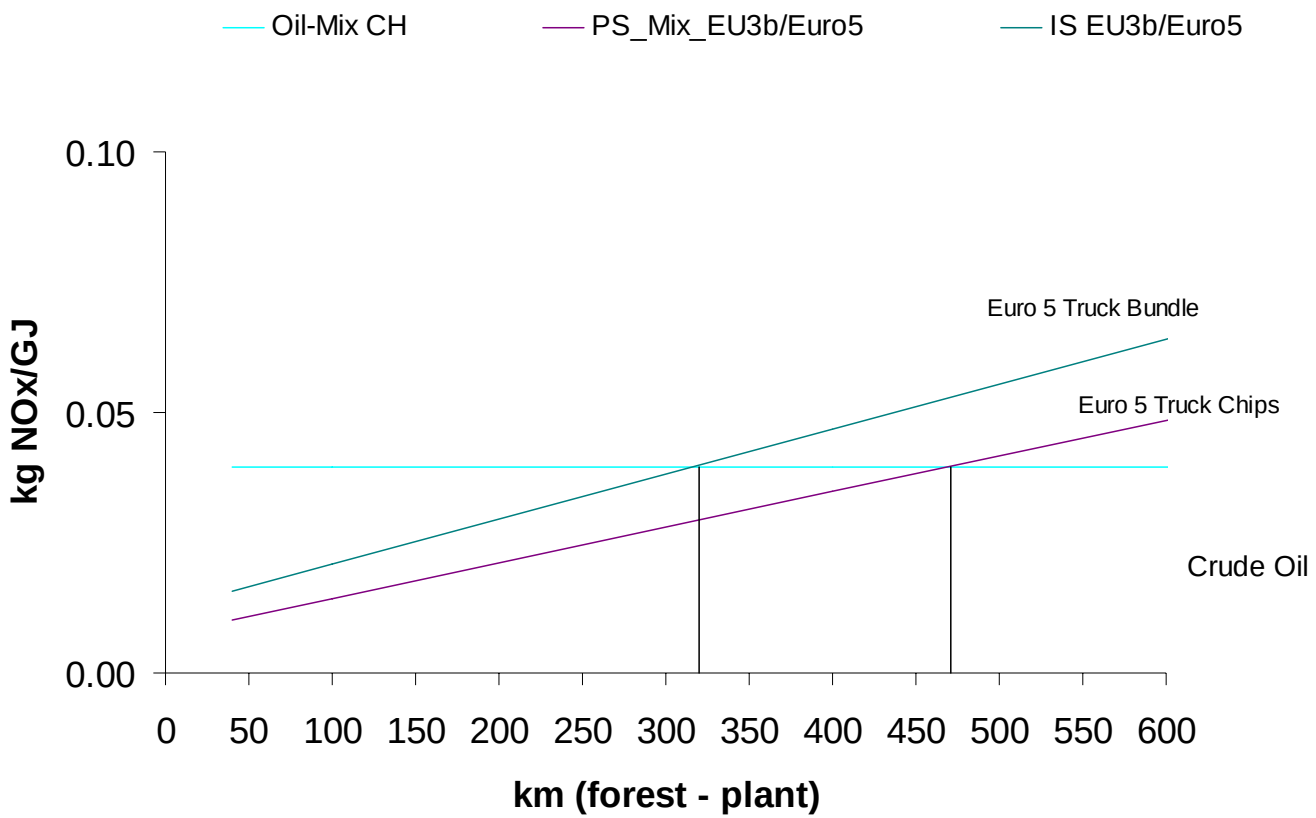
Harvesting Chain/Equipment Impassable Stands



Climate Change Emissions of Forest Chip Supply Chains



Sensitivity Analysis: Transport Distance (NO_x)



Some Conclusions

Comparison with Supply of Crude Oil

- Environmental performance of forest wood chips transported within Switzerland is considerably better than the current Swiss crude oil mix.
- Production is more important than transport (assuming a distance of 20 km).
- However transport over long distance results in a considerable decrease of the difference between wood chip chains and crude oil.
- Forest wood chips derived from **IM**passable stands show worse environmental performance than wood chips from passable stands.

Outlook

Next steps:

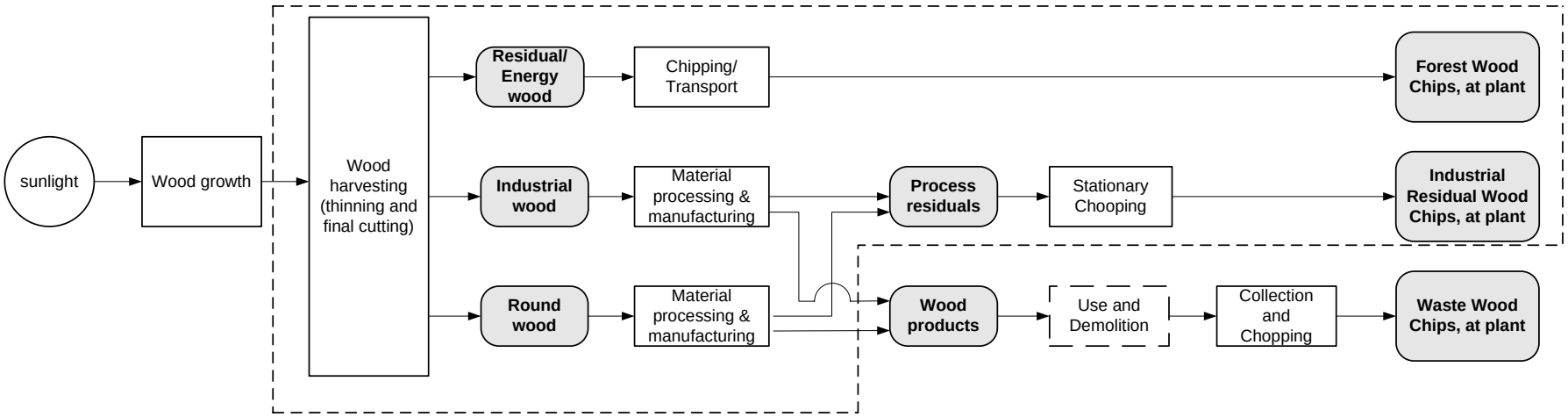
- Refining forest wood chip chain models and uncertainty assessment
- Defining and modelling a set of cases for Methanation and Fischer-Tropsch Biomass-conversion processes.
  - Plant size
  - Plant location (e.g. FT@ Swiss refineries)
  - Gas cleaning (Semesterarbeit)
- Uncertainty assessment
- Comparing the env. performance of synthetic biofuel passenger car transport and conventional fossil diesel & petrol car transport.
- Estimating the emission mitigation potential of synthetic biofuels for the future passenger car fleet (2015).

Reserve

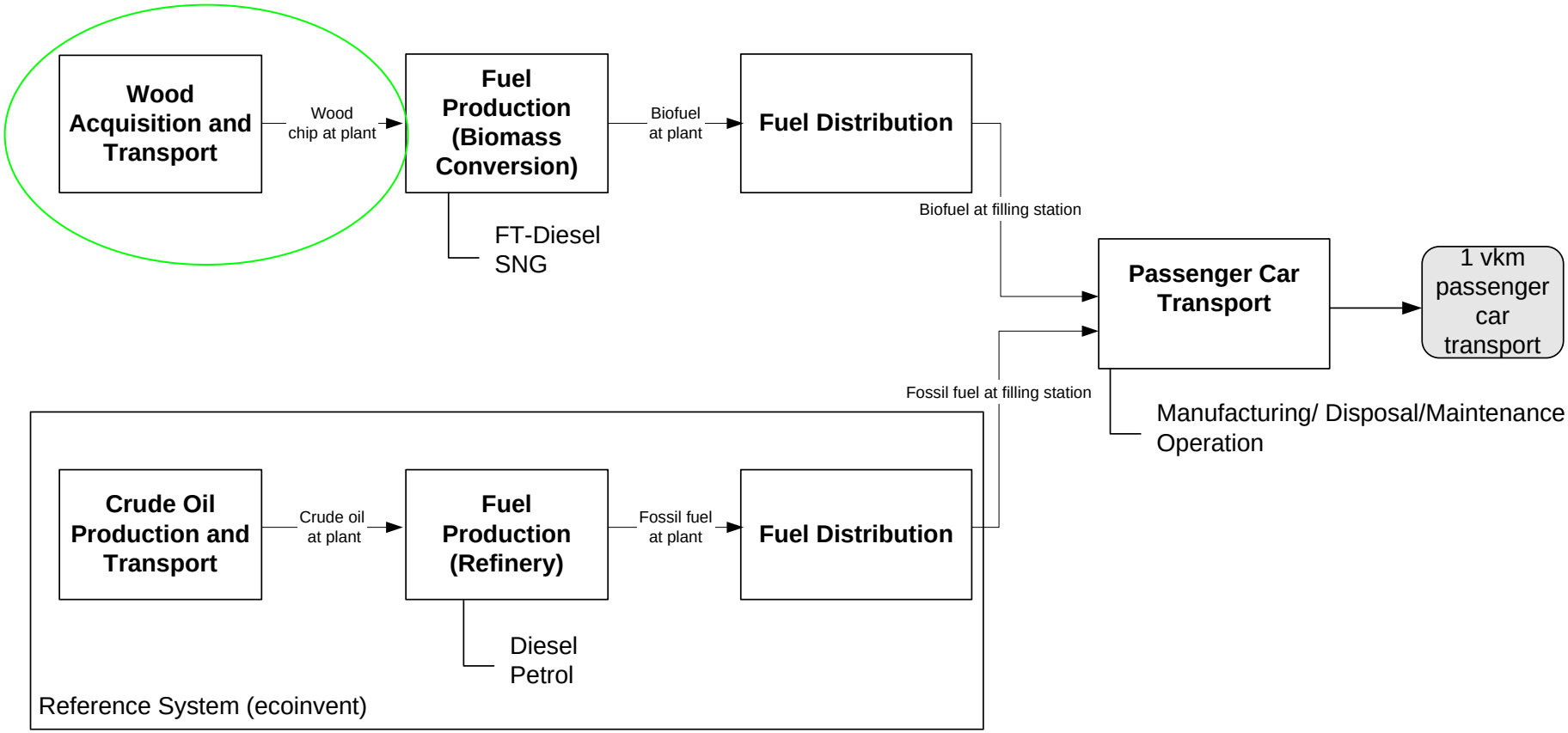
System Boundaries & Functional Unit

Functional Unit: Supply of 1 MJ Energy Wood Chips at Plant

Environmental Burdens: NO_x, PM2.5, Climate Change, (UBP)



Scope of Research



Sensitivity Analysis: Transport Distance (CC)