Ethylene production via gasification of wood - what are potential environmental hotspots

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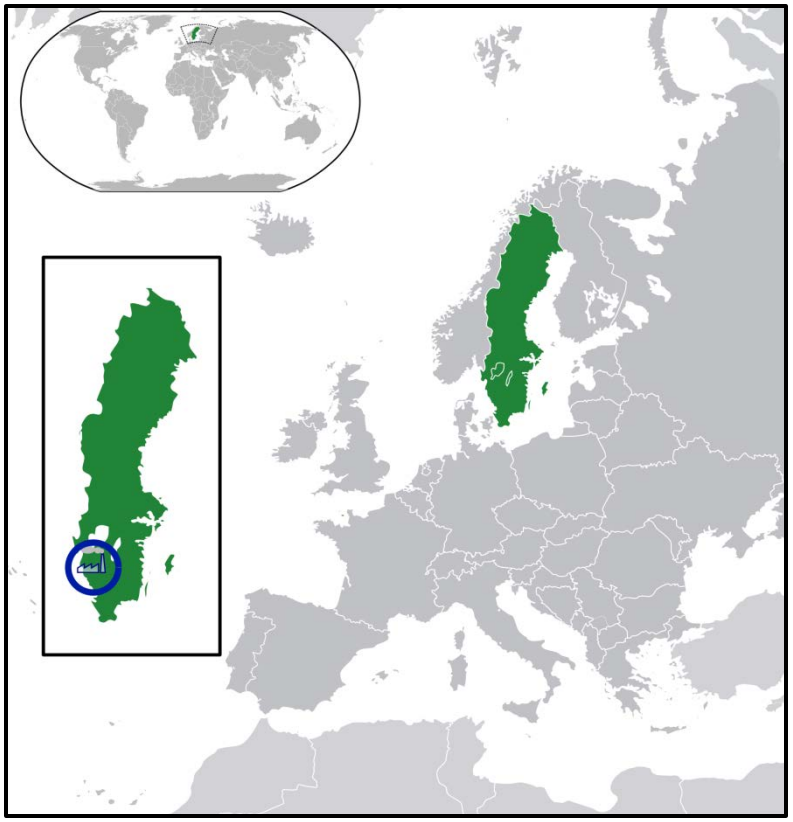
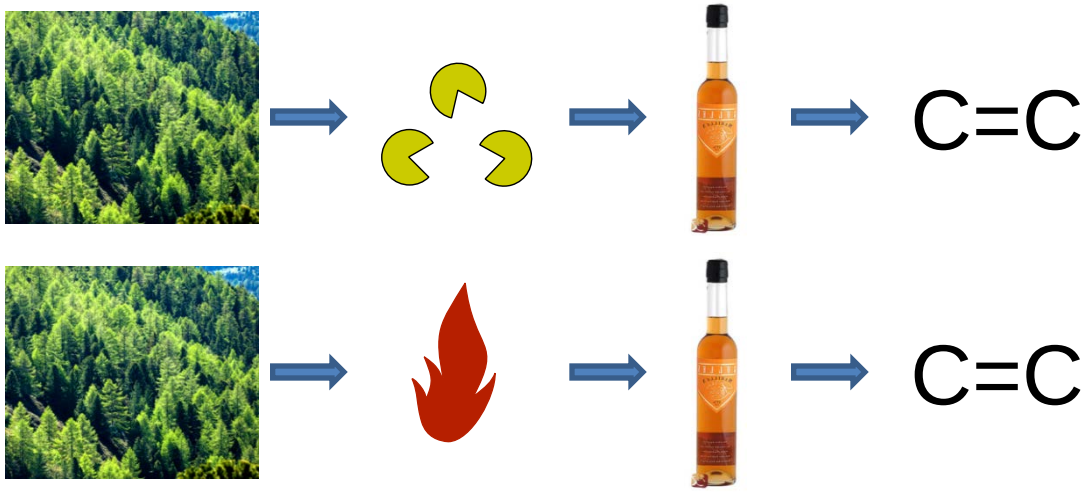
Context



- Sweden's **chemical cluster** - **full bio-mass** based production by 2030 (vision)
- biomass options incl. **local** resources - **wood**
- cluster's **major** product - **ethylene**

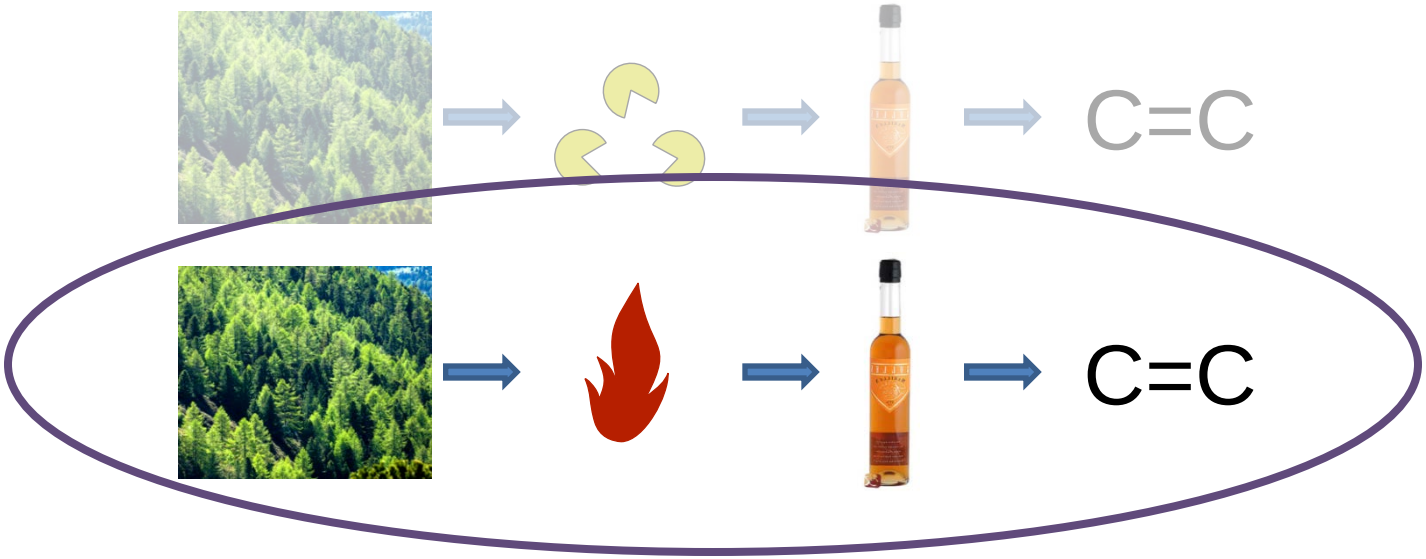
Context

- **two** major **routes** for **ethylene** production



Context

- **two** major **routes** for **ethylene** production



- **thermochemical** route - strong research base & several plants towards construction (100 MW gas gasification plant in Göteborg, Methanol plant Värmland (planed))

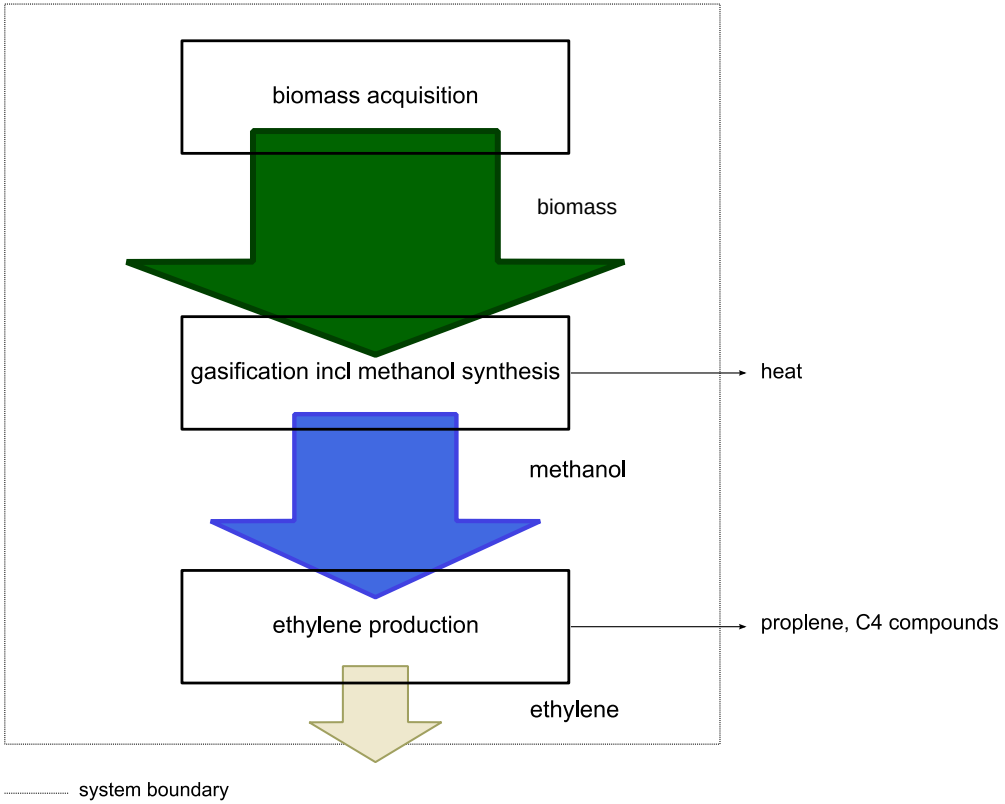
LCA of wood based ethylene - gasification

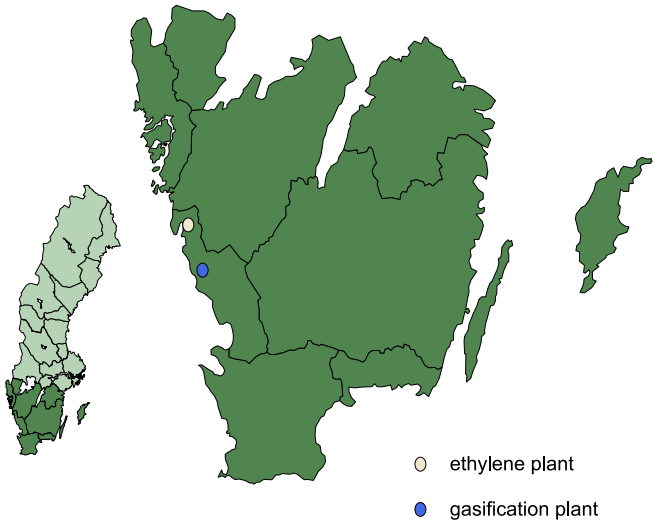
- assessment:

  - production of **50 000t ethylene** from wood via gasification (thermochemical)
  - **feedstock scenarios:**
    - **tops & branches** discussed as feedstock option
    - **mix** of different **woody** biomasses (tops & branches, pulpwood, sawmill chips, energy wood)
  - **potential** future **state**

- focus: **identification** of potential environmental **key contributors** - **development** opportunities

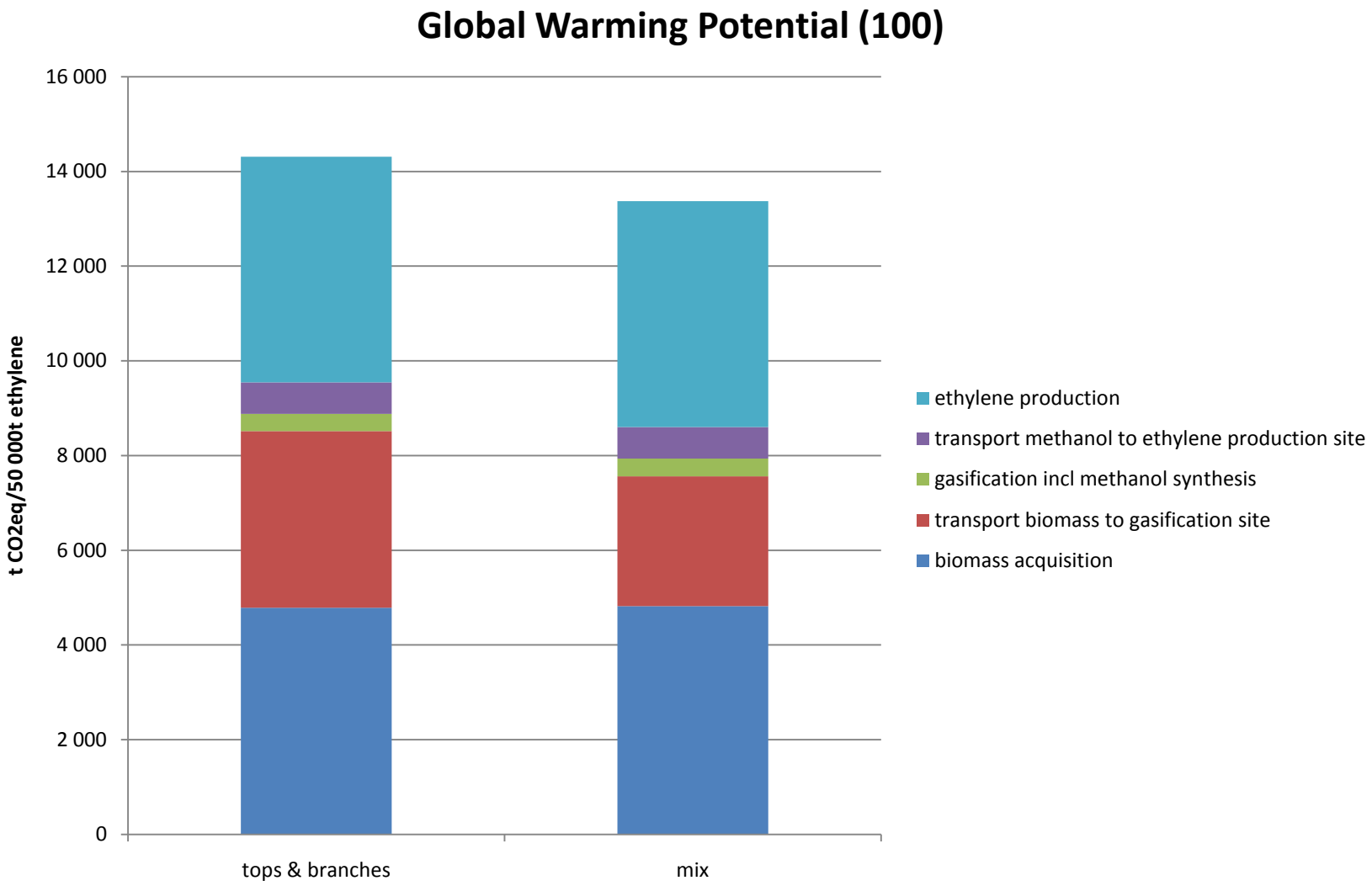
LCA of wood based ethylene - gasification



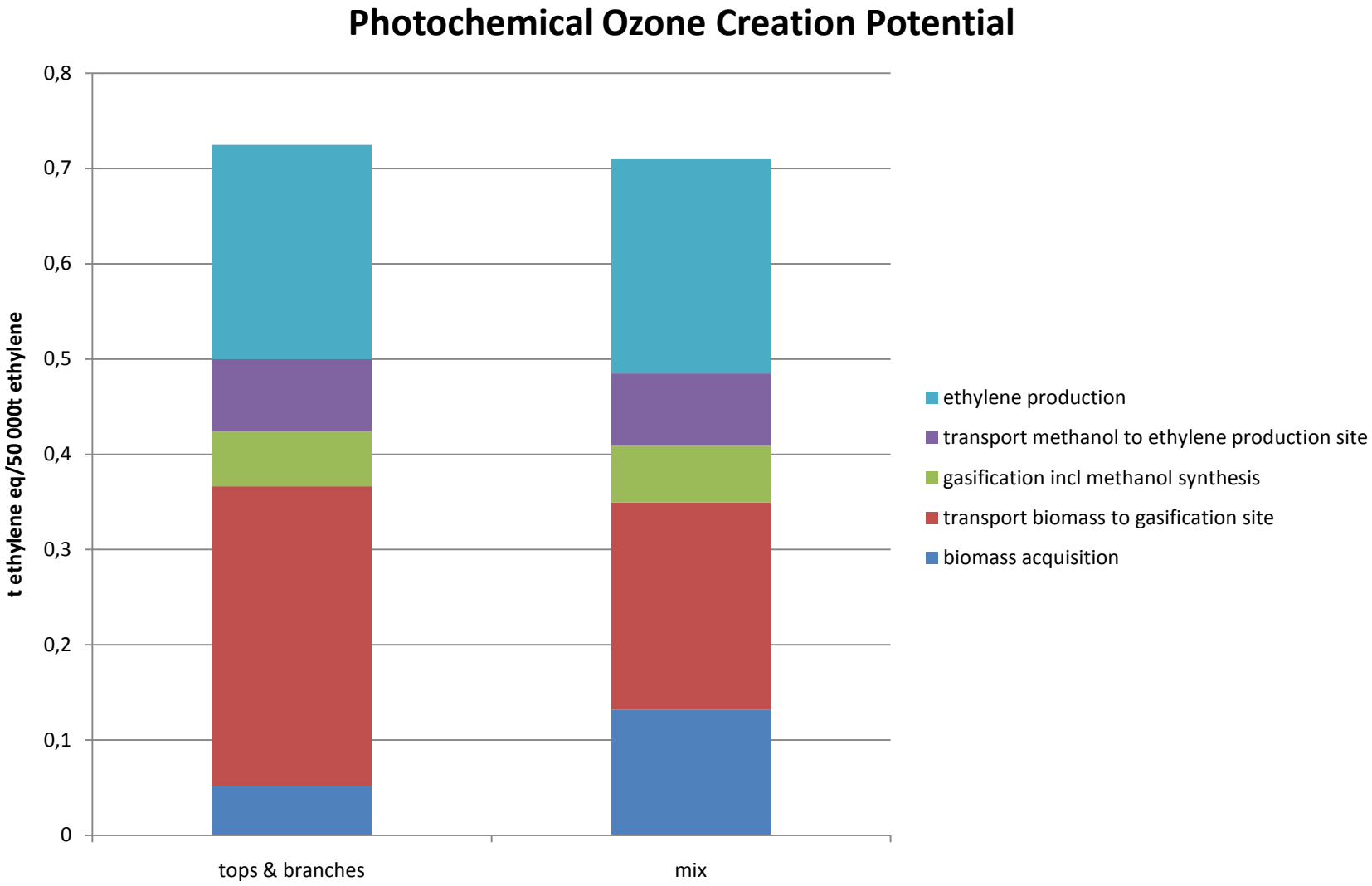


- Swedish data for biomass acquisition
- process simulation for methanol production
- literature data for ethylene production
- Swedish electricity mix
- partitioning on economic basis

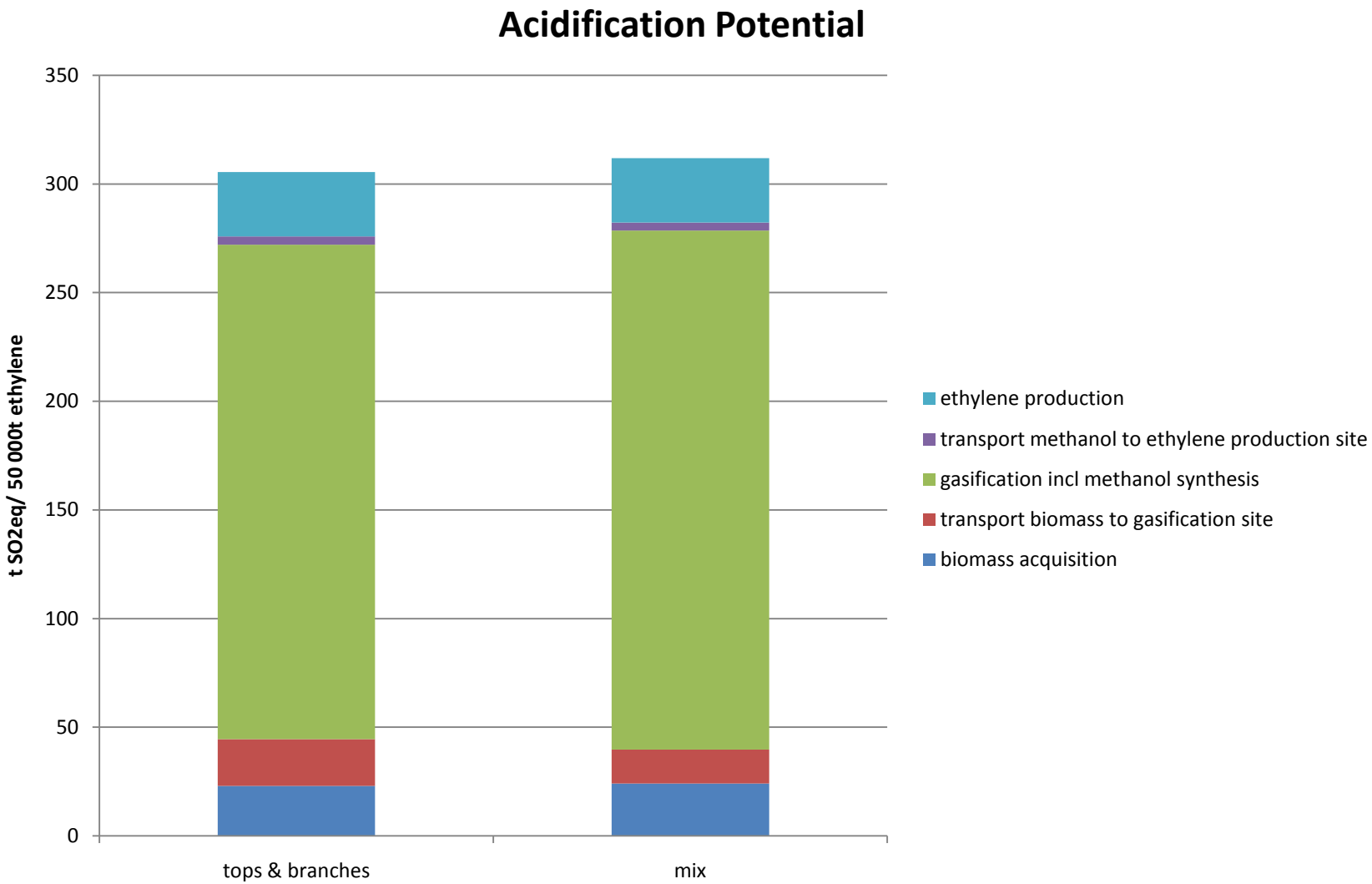
Preliminary Results



Preliminary Results



Preliminary Results



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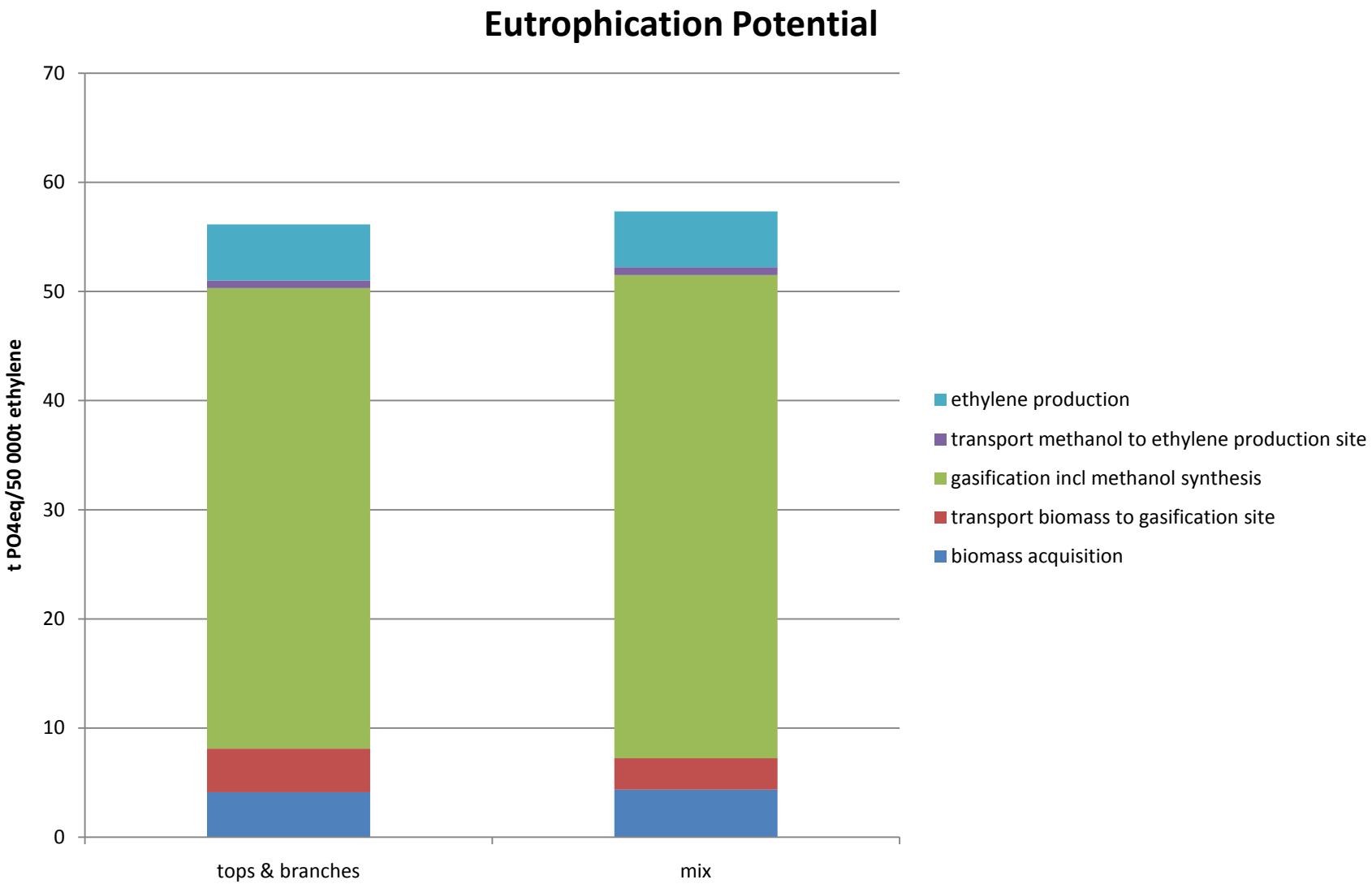

Concluding remarks

- **gasification** route **key contributors**:

  - **no considerable** difference between feedstock scenarios – also **applies** to **key contributors**

  - **key contributors vary** with assessed impact, gasification incl conversion to methanol & transport of biomass dominating

- potential improvement **options**:

  - use of **cleaner fuels**
  - **less distributed, close-by** feedstocks
  - NO_x removal options for gasification process?

Thank you!