Carbon sequestration potential of *Miscanthus* application as biofuel source in Sweden

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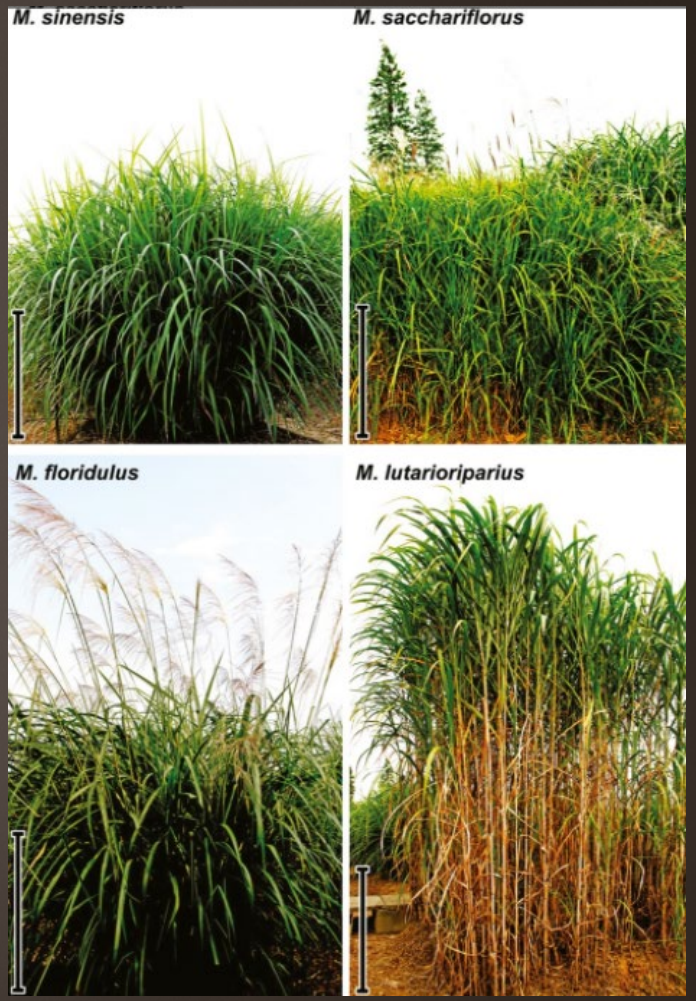
Why energy crops?

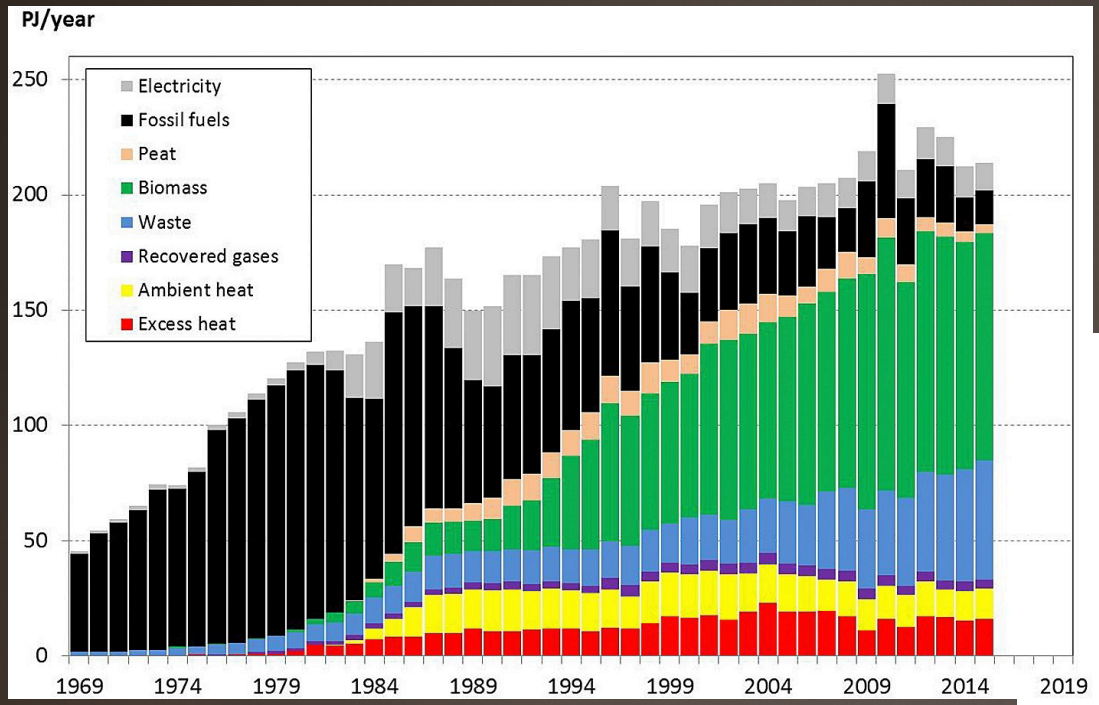
- No net emissions of GHGs by 2045
- Increasing biomass contribution in energy sector
- Producing energy crops

Miscanthus

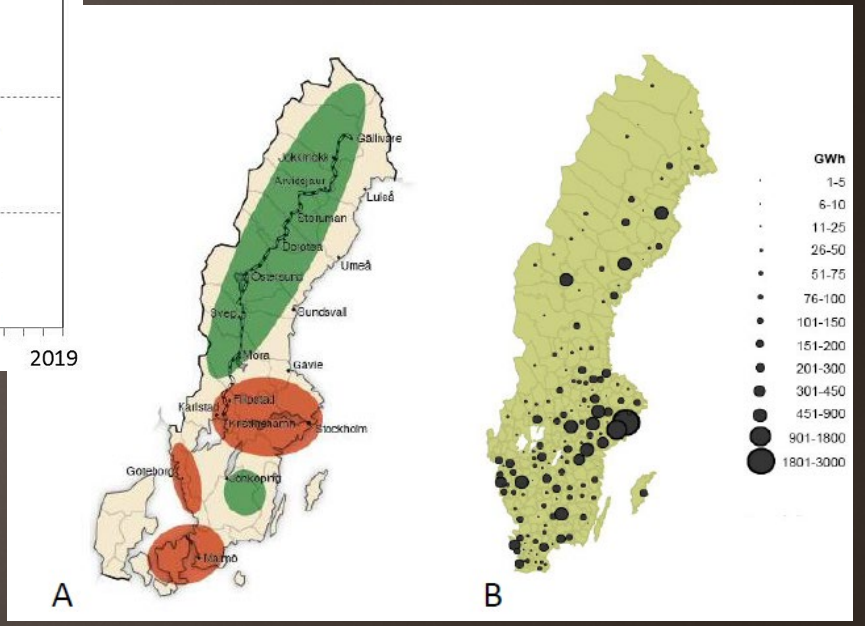
- Efficient in land use
- Cost-effient fuel source
- Native in Sweden
- Suitable with conditions in central and southern parts



Biomass in energy sector



Biomass contribution, **46%**, in district heating (Werner 2017)



Risks of deficits of local forest-based fuels (de Jong et al. 2012)

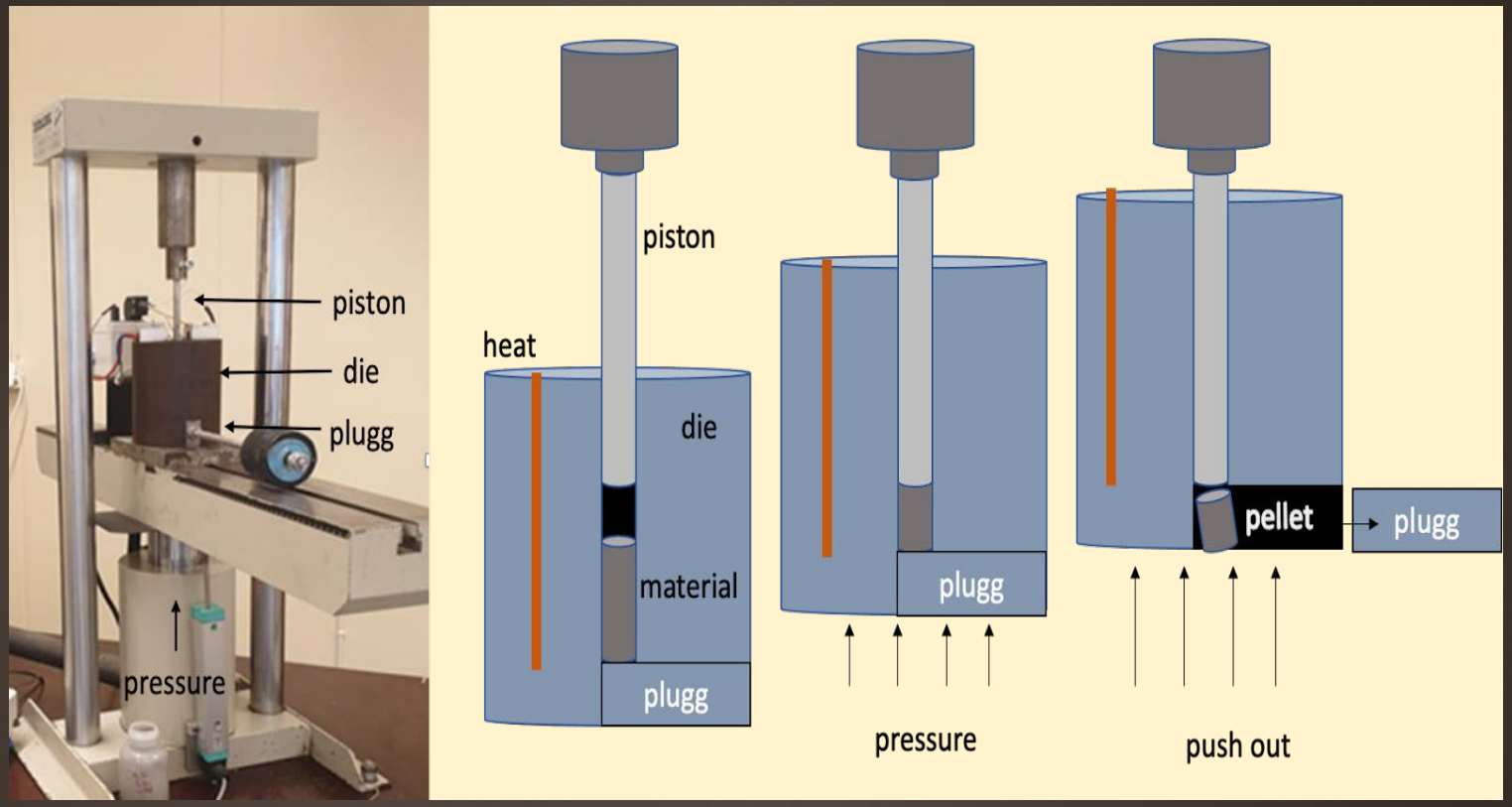
Aim

Investigate circumstances in which blended biofuel pellets from *Miscanthus* and wood residues can meet environmental sustainability and preferred biofuel properties.

Project stages

- Feedstock preparation (shipped from Hokkaido University)
- Engineering pelletizing process (*Miscanthus*)
- Generating blended pellets (over 100 pellets)
- Measuring properties of pellets
- Climate and energy impact

Three sub-processes of pelletization



Mohammadi et al. 2022. Effects of wood ash on physicochemical and morphological characteristics of sludge-derived hydrochar pellets relevant to soil and energy applications (Biomass and Bioenergy).

Running experiments

- Mix *Miscanthus* biomass with pine sawdust at different ratios of 0%, 25%, 50% and 75%, and produce pellets
- Determine quality of blended biofuel pellets, by evaluating physical, mechanical and combustion properties

100% Pine sawdust

100% Miscanthus

Initial results

- Optimized MC is 6% in the blended pellet process
- Development of bellended biofuel pellet increase bioenergy contribution
- *Miscanthus* cultivation results in soil organic carbon sequestration by over one ton carbon ha^{-1} yr^{-1}
- 300 000 – 500 000 ha of abandoned agricultural land in Sweden, up to 1.8 Megaton CO_2 yr^{-1}

Thank You!

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