

Biomethane –feedstocks and potential as transportation fuel in Southern Finland

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INTRODUCTION

The need to replace fossil fuels in transport sector stimulates the screening for alternative fuels and their production capacities. The objective was to study the amounts and locations of different types of waste based biomasses and sustainable produced energy crops, available for biogas production and to evaluate biomethane production for vehicle fuel in Southern Finland (Fig 1).

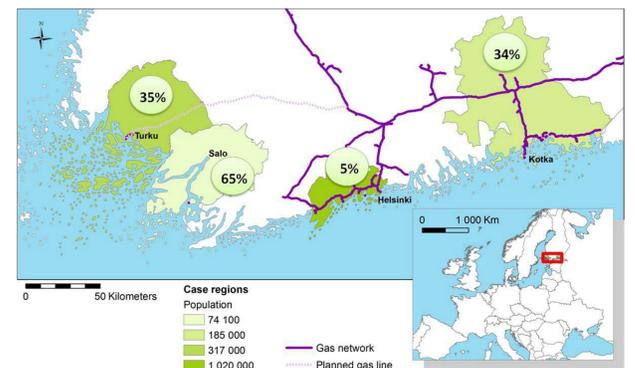


Fig. 1. Study regions and share of passenger car fuel consumption that could be replaced with biomethane

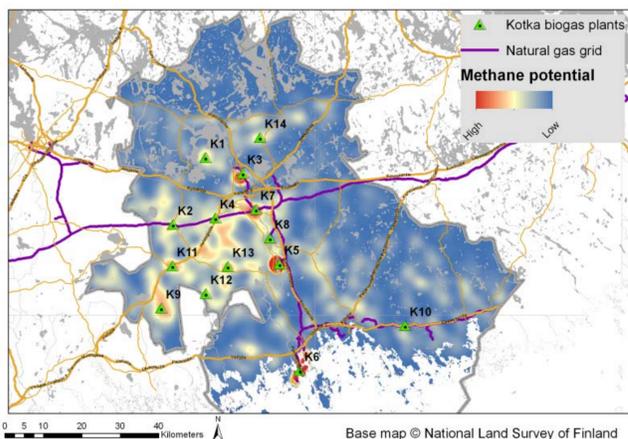


Fig. 2. Example of spatial distribution of CH_4 potential in Kymenlaakso region and proposed location of potential biogas plants

MATERIALS AND METHODS

- Feedstock: available biowaste, sludge, manure, agroresidues and energy crops
- To show the regional distribution of methane potential every feedstock was plotted onto the map with attributes indicating the amount and type of its biomethane potential
- Kernel density estimation of biomass sources: for finding areas with relatively high concentrations of biomass (Fig 2)

RESULTS AND DISCUSSION

The total theoretical energy potential is over 3 TWh/a of which silage and other agricultural materials account for 35-98% in study regions (Fig 3). In GIS-based biomass mapping biogas plants were cited in hotspots of biomethane production potential. In total over 50 large scale biogas plants were cited with total 2.2 TWh/a of energy production. From 5 to 65% of passenger car fuel consumption could be replaced with biomethane in case regions (Fig.1). On average about 4% of passenger cars fuel consumption in Finland could be replaced with biomethane produced in study regions indicating that development of sustainable cultivation methods for grass feedstock should be promoted to achieve economical possibilities to produce renewable fuel.

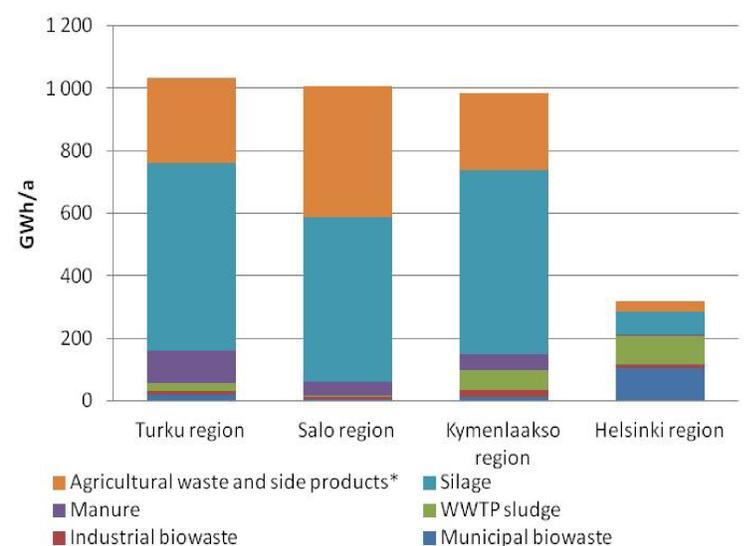


Fig 3. Theoretical biomethane potential in study regions

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