

Background

With an available annual generation of waste of about 40 PJ of manure, 53 PJ of households waste and 23 PJ of crop residuals, The Netherlands has the capacity to considerably increase its renewable energy share, without competing with food or feed.

To optimally identify the economic potential for bio-energy production from those resources, the transportation distances have to be minimized, and the capacity of the new bio-energy production plants should be optimized with regard to the economy of scale.

Method

Two geographically explicit models have been coupled:

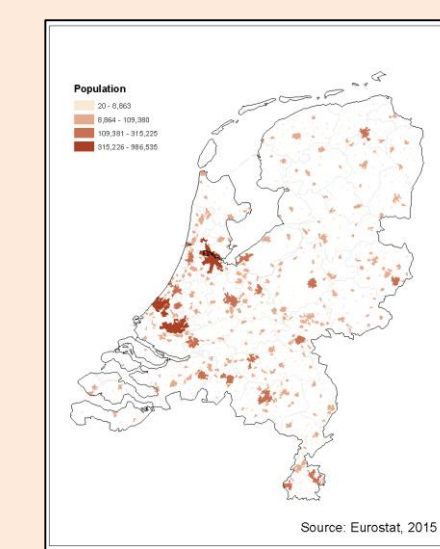
- The BeWhere model identifies the optimal localization, size and technology of the bioenergy production plant in The Netherlands.
- The LOCAgistic tool zooms in one area, given the localization, technology and capacity of the plant and will determine the local impact on the land use and the emission of the feedstock supplied to the plant as well as the production cost..

Techno-economic parameters of potential conversion site

- Set up cost
- Production cost
- Production efficiency
- Emissions

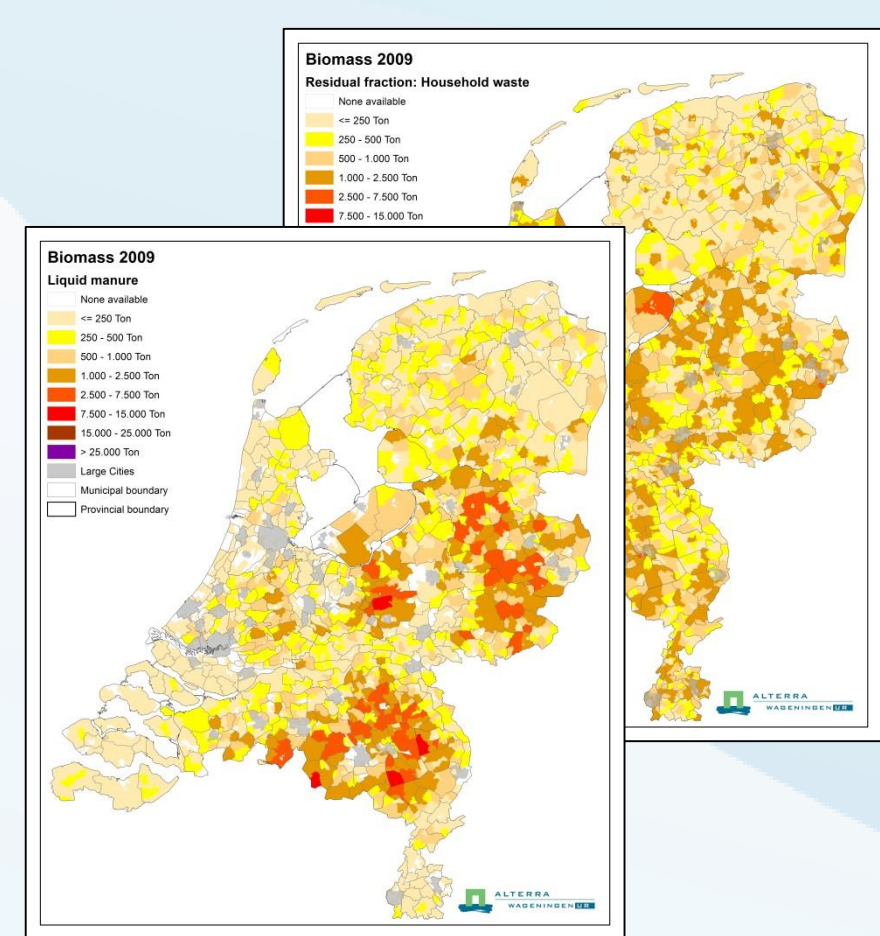
Energy demand

The energy demand is derived based on the population map and the national transportation fuel, power and heat consumption.



Infrastructure

- Existing conversion sites
- Road, rail network
- Power stations
- Power lines
- Distribution costs



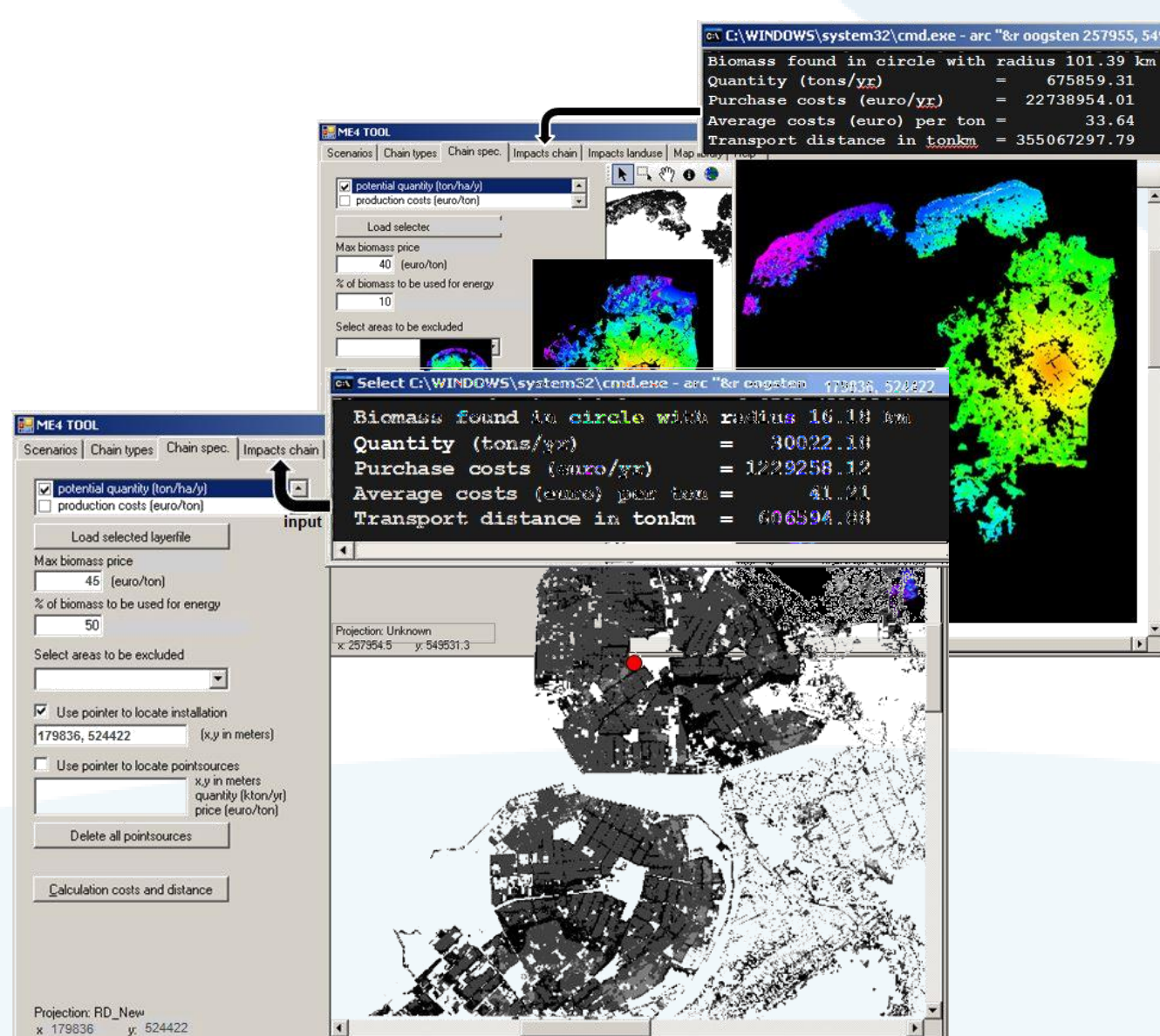
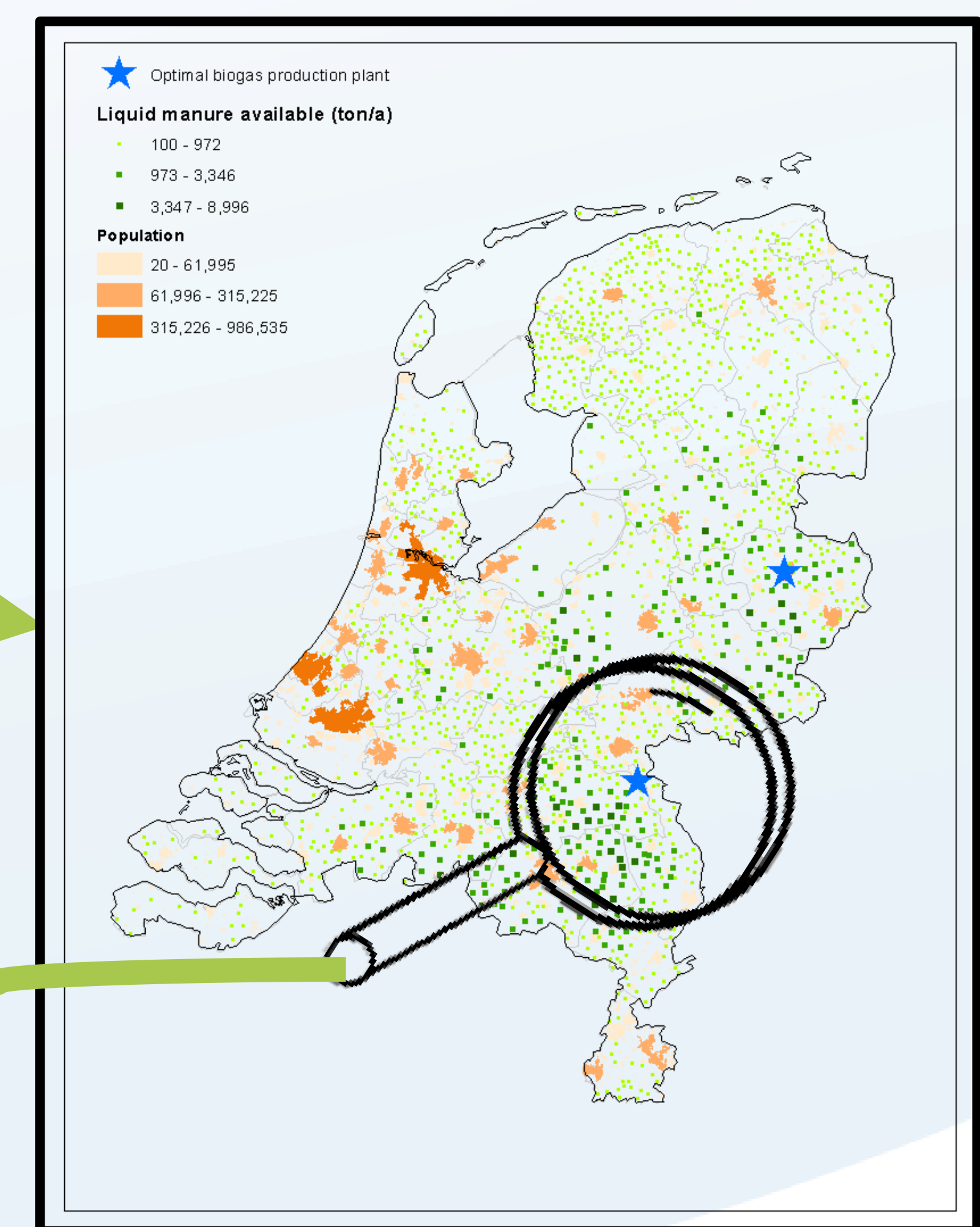
Policy parameters

- Carbon tax
- Fossil fuel cost
- Subsidies

feedback loop
If results not realistic

LOCAgistic

The LOCAgistic tool minimizes the cost for the supply of the Feedstock to a specific plant, and identifies the cost of production, impact on the land use and emissions.



Conclusion

The preliminary results show that The Netherlands can increase its renewable energy share by 10-15% compared to the 2010 share in the power and heat production from waste and crop residuals as well as decreasing the emissions by 2-5% in the same sector regarding the costs of feedstocks, competitive fossil fuel based commodity prices or the policy applied.

Applying this approach for The Netherlands, or any other country, increases the robustness of the results with respect to plant set up and biomass use and distribution, as well as emission avoided. This tool presents a valuable approach for policy makers.

More information

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