Modeling decentralized energy systems

A tool for analyzing, researching and modeling energy efficiency, sustainability, and flexibility of biogas chains operating as load balancer within decentralized smart energy systems.

Promoter: Prof. Henk Moll
Supervisors: Rene Benders, Wim van Gemert

PhD. Researcher: Frank Pierie MSc. BEng.
E-mail: f.pierie@pl.hanze.nl
Web: www.hanzegroningen.eu
Web: www.rug.nl

The map based user interface
The graphical user interface, based on Google maps, will be transparent and understandable. It will indicate local biomass availability, transport distances, local demand and more. On this map biogas production chains can be constructed through the use of building blocks e.g. substrate source, digester, upgrader etc.

Dynamic model
The chain of building blocks created on the map will be dynamically modeled with open Modelica. The use of cloud computing will make multiple scenarios and multiple variables per scenario possible. Modelica can theoretically house an infinite amount of blocks.

Methodology
The method, used in Modelica is based on Dynamic Flow Analysis and Life Cycle Analysis, capable of calculating the Energy Returned on Invested, Carbon footprint, sustainable impact and economical cost of every building block.

Interested? Please grab a handout!
Feedback or remarks? Please let me know!
f.pierie@pl.hanze.nl

PhD. Researcher: Frank Pierie MSc. BEng.
Promoter: Prof. Henk Moll
Supervisors: Rene Benders, Wim van Gemert

This project is made possible by The Northern Netherlands Provinces Alliance, the Dutch ministry of economic affairs agriculture and Innovation, the Province Groningen and the Municipality of Groningen and is supported by Energy Valley

Source picture: www.flexigas.nl
EU BC&E conference, Copenhagen, 2013