Socio-technical design in the next generation of thermal energy systems in the built environment

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Project Purpose

To support the transition from natural gas-based to natural gas-free heat supply of neighbourhoods in the Netherlands while addressing energy poverty and consumer vulnerability .

Modelling questions in current case study

Key performance indicators (KPIs):
- Natural gas consumed
- Expenses

Modelling questions:
a. How do different characteristics of households influence the KPIs?
b. How do external factors influence the KPIs?
c. What are promising combinations of technology and insulation levels?
d. How would changes influence the cost of heat?

Research Approach

Steps

Literature Review
- DH networks
- Energy poverty and consumer vulnerability

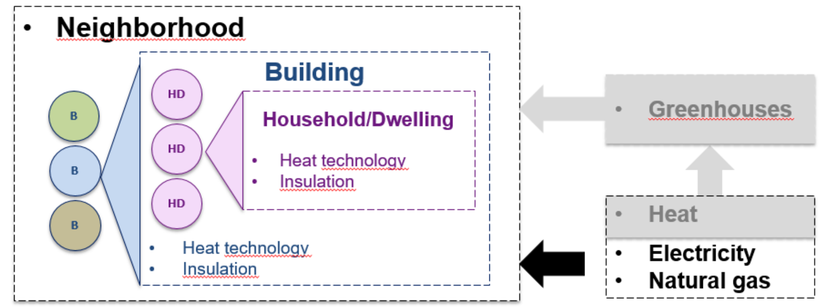
Case Study Selection
- Greenhouses/Westland
- TBA

Optimization

Agent-based modelling

Scope of current modelling work

Focus on households' investment decisions	Account for decentralized and small heat technologies
Assume fixed demand and standard operation	Assume fixed decision rules of households

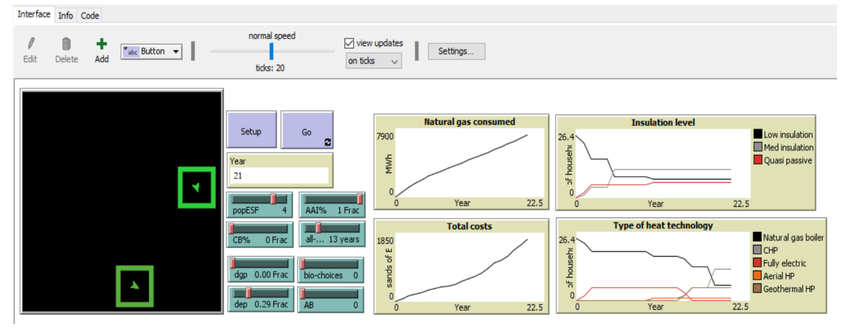


Extended abstract accepted in ABMUS 2018:

The 3rd international Workshop on Agent-based Modelling of Urban Systems

Stockholm, Sweden July 14 and 15, 2018

"Agent-based modelling of a neighbourhood's transition towards gas-free heating"



Conclusions

- Model serves as a tool to discuss problem and research.
- We observe how differences in households characteristics and external factors influence the transition.
- Starting application of the model through work with partners.
- Planning expansion of the model.