

HAWK

Faculty of
Resource Management

Göttingen

Energy Research at HAWK

Project ideas and project support

for H2020 energy work programme 2018 - 2020

Prof. Dr.-Ing. Stefan Holler
HAWK, University of Applied Sciences and Arts, Göttingen

Brokerage Event
November 16th 2017, Brussels

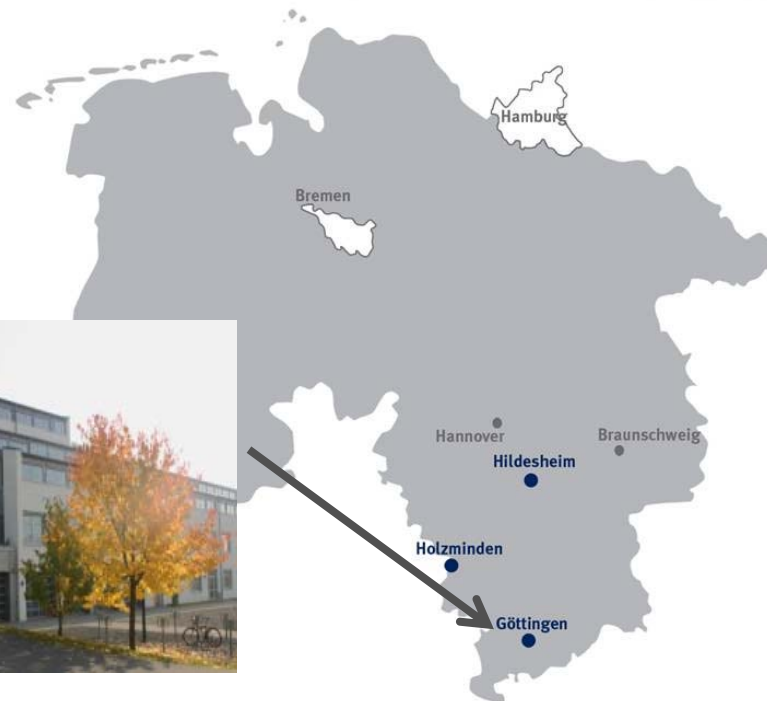
HAWK HOCHSCHULE FÜR ANGEWANDTE WISSENSCHAFT UND KUNST
Hildesheim/Holzminde/Göttingen
University of Applied Sciences and Arts

www.hawk-hhg.de/ressourcen

University of Applied Sciences and Arts

Hildesheim/Holzminden/Göttingen

- ca. 5700 Students
- ca. 176 Professors
- 3 Locations
- 23 Bachelor-Study programs
- 13 Master-Study programs



Faculty of Resource Management in Göttingen

NEUTec Sustainable Energy- and Environmental Technologies

Applied research and development

- District Energy systems (incl. DHC)
 - Thermohydraulic modelling and simulation
 - Transformation strategies for DH systems
 - Low temperature DH and waste heat recovery
- Bioenergy
 - Flexibilisation of biogas energy systems
 - Thermal Conversion Processes (incl. biocoal)
 - Industrial wastewater technology
- Life Cycle Assessment
- Energy Management Systems



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**Project Idea:
Modelling of energy systems**

Objectives for an innovative simulation of district heating systems

- ? **What** must be done to handle thermal and hydraulic limitations caused by reduced temperature difference between supply and return?
- ? **Where** are the optimal locations in the system for technical actions to compensate hydraulic limitations?
- ? **When** are different price models reasonable?
- ? **Who** cannot cope lower supply temperatures?

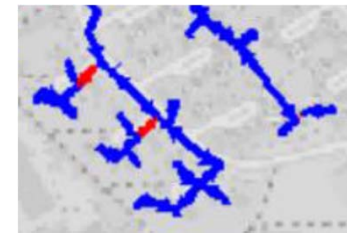
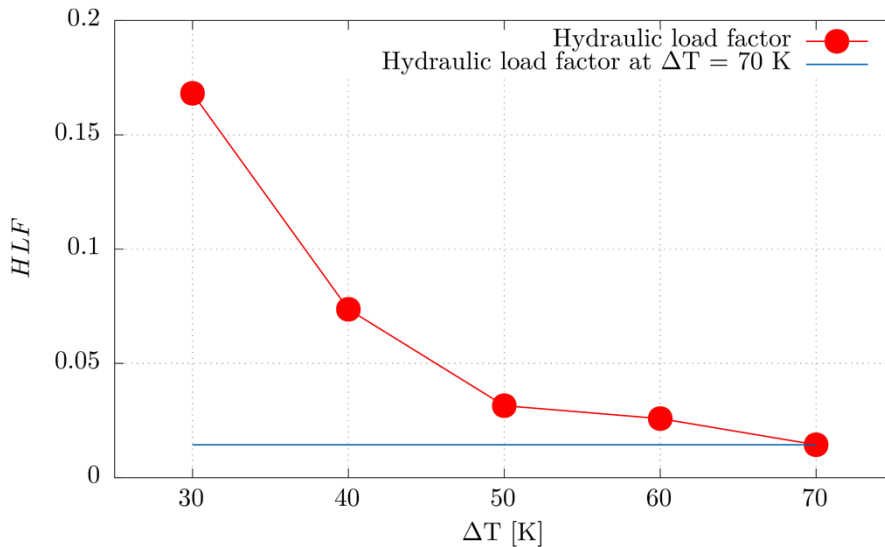
Open-source algorithms calculating district heating networks

Main focus: Tools helping to transform DHS into DHS of 4th generation

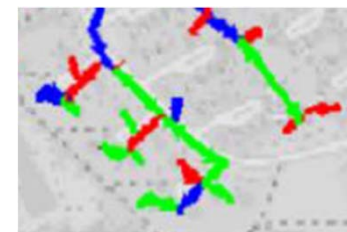
- Open-source and open-data technology
- Implementation of different modules into core algorithm
 - Heat pump, power-to-heat
 - Storages
 - Renewable Energy
- Utilisation of Qgis and gis-tools
- Calculation of district heating systems over time period
- Public documentation
- Technical flexibility

Key figures to determine quantity and quality of bottlenecks in existing district heating systems

- Hydraulic load factor (HLF) as benchmark helps to characterise bottlenecks
- Technical options are analysed by HLF
- First step to key figures for weighting bottlenecks in terms of relevance



$\Delta T = 70\text{K}$



$\Delta T = 30\text{K}$

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**Project Idea:
Wastewater – energy source for biogas production**

Wastewater - energy source for biogas production I

What is the problem?

- Industries in the paper and food sector produce organically polluted wastewater
- The waste water has to be cleaned locally or in a municipal wastewater treatment plant
- High energy costs for aerobic cleaning

Solution:

- Integration of an anaerobic cleaning step in the process of wastewater treatment
- Reduction of energy costs, production of biogas

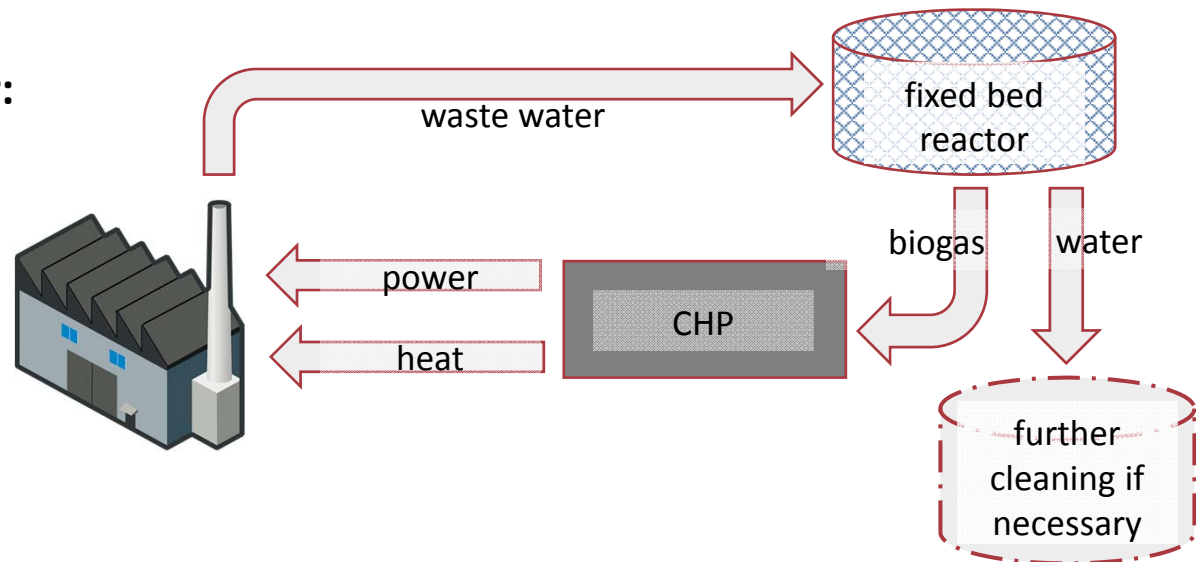
Wastewater - energy source for biogas production II

How are we doing it:

- Fixed bed anaerobic reactor
- Due to the use of the fixed bed a short retention time of less than 24 h is possible
- Cleaning results depend on the composition of the effluent
- Good results e.g. in beverage industry have been detected

HAWK as a partner for:

- capability studies,
- potential studies
- ...



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Project Support: Life Cycle Assessment

Life Cycle Assessment (LCA)

Topics:

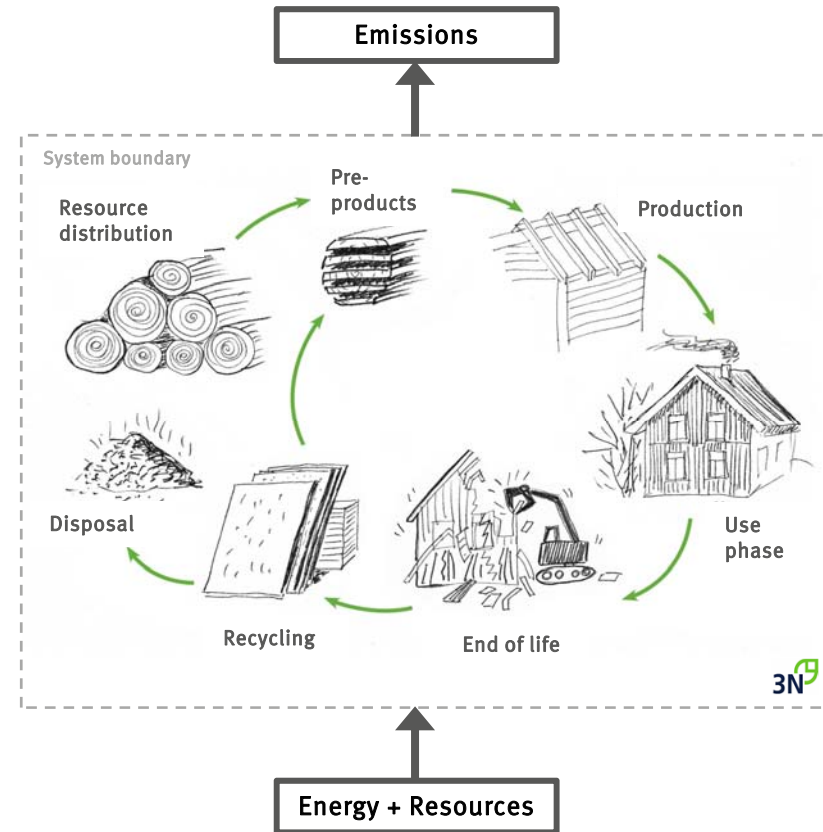
- Renewable energy
- Bioeconomy
- (waste-)Biomass
- Agriculture
- Product LCA

Methodology:

- Professional software GaBi + GaBi and ecoinvent Databases
- LCA according ISO 14040

Research Interest:

- Every Topic where environmental impacts should be evaluated



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**Project Idea:
Energy Management**

Energy Audits for SME

What is the problem?

- Currently available instruments for energy consulting and energy audits are rarely used by small and medium enterprises (SMEs), today.
- Tools are too complicated to apply or too expensive for SME.

Solution:

- An easy to use software tool which is specially designed according to the needs of SME will allow energy consultants to provide a low-budget but high-quality energy efficiency consulting.

How are we doing it?

- Regional company networks for energy efficiency
- Integrated study program
- Development and roll-out



Thank you

HAWK
Prof. Dr.-Ing. Stefan Holler
Faculty of Resource Management
Büsgenweg 1a
37077 Göttingen
Germany

Email: stefan.holler@hawk-hhg.de