

# Using SWAT in a coupled modeling framework for the development of renewable gases in the heating market

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## Summary of the „SustainableGAS“ Project

About 50 % of the heat supply in the Federal Republic of Germany is based on the use of fossil natural gas. In order to significantly increase the share of renewable gas in the heating market, the potential to replace fossil gas must be estimated under the constraint to avoid adverse impacts on the environment. One scope of the project “SustainableGAS” is to assess the impact of an increased cultivation of energy crops on water, nutrient and energy fluxes within hydrological catchments. We apply the eco-hydrological model SWAT in a novel model coupling concept with an agent-based model, to assess such mechanisms in a bidirectional manner.

The outputs of the SWAT model are employed as drivers for the agent-based model at predefined (annual) time steps under various development scenarios; taking into account the impacts on ecosystem services, agents (e.g. farmers, policy makers) will take decisions on environmental regulations and agricultural practice, which will be used for an adapted parameterization of the SWAT model for the next model time step. The scenarios are analyzed to determine preferred pathways to support a sustainable transition of energy systems.

Supported by:

Federal Ministry  
for Economic Affairs  
and Energy

AnyLogic

SOURCE: <https://www.bauverband-mv.de>

