



ABBY-NET E³-Systems Research Project Update 2019:

#4: Change in heating and cooling demand due to climate change in Alberta and Bavaria and its influence on local energy systems

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Project summary

This research project investigates the impact of climate change on heating and cooling demand in Alberta and Bavaria. The two regions, characterized by fundamentally different energy systems, are currently transitioning their portfolios of energy supply and will be similarly affected by rising temperatures. The time horizon for this study reaches to the year 2070, assuming the high-GHG scenario (RCP8.5) with a continued increase in average temperature and temperature extremes. First, the heating and cooling demand in both regions is calculated according to the Heating and Cooling Degree Days method. Current heating and cooling demand are compared to energy consumption data. Statistical trends observed in this data are then used in regression analyses and extrapolated to project future energy use. To conclude this project, possible effects of projected changes in heating and cooling demand on energy systems in both regions will be covered, specifically regarding the differences in energy sources used for heating (natural gas, oil) and cooling (electricity).

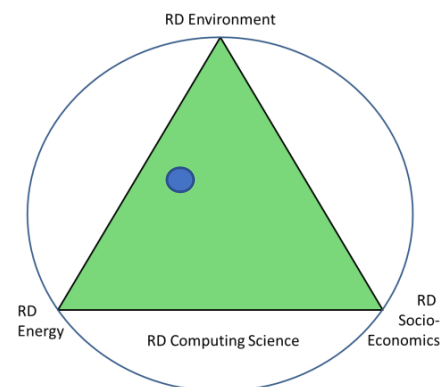
Progress to date

Heating and Cooling Degree Days based on observed climate data as well as on climate model projections have been calculated for both study regions. Furthermore, energy consumption data for Alberta and Bavaria has been analysed. The next step will be the extrapolation of projected energy use based on the trends observed in the actual data from 1990-2016. To conclude, a comparison of both regions will be conducted regarding their current and possible future energy structures.

Contribution to E3-system and Implications

With this project, an estimate of the impact of climate change on energy systems in Alberta and Bavaria will be made. Energy transition in general may especially influence the regional energy supply portfolio, which will then be used for heating and cooling. This project can be described as an exploratory approach, which can enable future research in the field.

This project is mainly located between the disciplines of Energy and Environment, however, future research may possibly also include the Socio-Economics, e.g. in the form of a change in user behavior regarding heating and cooling.



Geographic location

Selected cities in both Alberta and Bavaria.

Final Outcomes

Master thesis with the working title: 'Projected change in heating and cooling demand due to climate change in Alberta and Bavaria and its influence on local energy systems – a comparative study'. Upon successful completion, the study findings shall be summarized in a co-authored research article to be submitted to an international journal.