Renovation patterns of residential building stock

Summary

The main goal of the PhD research is to combine demographical and spatial data with buildings data in order to synthesize preconditions for carbon neutrality by 2050 in building sector.

Research field:	Building and civil engineering and architecture
Supervisor:	Prof. Dr. Targo Kalamees
Availability:	This position is available.
Offered by:	School of Engineering Department of Civil Engineering and Architecture
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

Current climate change mitigation goals for achieving carbon neutral economy by investing in renovations of energy performance of the inefficient buildings stock has large potential (buildings account of about 40% of total energy consumption) and therefore it has been main driver for strong energy policy development in last decade. While maximizing the overall energy conservation which is a useful and ultimately the main aim, there are also wider implications of the new energy policy which can be manifested by unwanted outcomes which in turn could be counterproductive for other sectoral goals and polices.
Researchers have already pointed out how the financial aids are used by the free-riders that have means to renovate without subsidies. Recent studies show that financial aids can be distributed unequally within regions and communities. It is plausible to assume that the accumulative advantage that is well known in evolution theory and systems dynamics theory also exist in distribution of financial aids for energy renovations. This means that some social groups and regions are gaining the advantage over the less capable ones and thus new energy policy might unintentionally contribute for social and regional polarisation.
The lack of integration of spatial and demographical data in renovation studies has resulted in rather simple and even biased understandings of actual renovation potential, especially in the context of accelerated urbanisation, growing regional disparities and population aging. It is obvious that there is no rationale to renovate current building stock entirely because of a substantial part of buildings that will be out of service within next decades. However, there is a knowledge gap of sound and robust methods of how to integrate such aspects as buildings location into new renovations strategies. Therefore, there is an urgent need for new methodological applications of spatial analysis to supplement the development of renovation strategies for achieving the goal of carbon neutrality within next three decades.

Research questions:

- How and why recent energy renovations have distributed between regions and communities?
- What kind of internal and external barriers beside owners' financial capabilities hinder the widespread adoption of energy renovations?
- How spatial and social preconditions are related to renovation potential in core and periphery regions and how the willingness to renovate affects renovation policies?
- To what extent the target of carbon neutrality of buildings in EU energy directives is feasible?
- How spatial and social context affects the assessment of carbon reduction potential in renovation strategies?
- What kind of preconditions are required for successful transformation into carbon neutral economy by 2050 in buildings sector?

Qualifications:

- MSc degree in buildings and spatial planning related field (regional planning, geography, land use planning, civil engineering)
- experience with mixing quantitative and qualitative research methods

- advanced skills in GIS analysis, iv) excellent command in English

To get more information or to apply online, visit https://taltech.glowbase.com/positions/33 or scan the the code on the left with your smartphone.