LESSONS FROM 10 YEARS POLICY DESIGN IN THE ENERGY EFFICIENCY SECTOR

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Energy efficiency

Renewable energy sources
Multi family buildings: Latvia

- 85% of population lives in this building stock
- Most of it is built more than 40 years ago
- High energy consumption
- Apartments owned by inhabitants
- On average 30 apartments per building
- At least 75% of apartment owners have to agree to take loan for renovation and energy efficiency improvements

https://businessnetwork.lv/ievads/izvads/daudzdzivokli-majo-energoefektivitates-programma-52883
Intention → Action
Energy efficiency goals

Cumulative number of projects

Goal 2008-2013
Goal 2014-2020
Goals vs actual situation

- Submitted projects
- Goal 2008-2013
- Goal 2014-2020
Goals vs actual situation

Cumulative number of projects

- Submitted projects
- Finished projects
- Goal 2008-2013
- Goal 2014-2020
The goal of this study

To take closer look on the behavior of the real system and by means of the system dynamics model carry out analysis of the structure and behavior of the system to understand why energy efficiency goals set by the government were not met.
Previous research and models


Underlying theory: Attitude-behaviour-context model (Stern and Oskamp)

- Income, education, size of household
- Energy price, size of housing, status of owner/renter, available technologies, costs and complexity of EE measures
- To pollute is bad
- Latvia has to be emissions neutral by 2050; Climate change has irreversible impact on the planet, humans and ecosystems.
- To know how to insulate attic, to know that boiler is the major energy consumer.
- Remember to switch light off, remember to reduce room temperature when house is not used
- Insulation of building, change of boiler, reduced operation of air conditioner
Policy tools 2008-2020

- EU funds for energy efficiency projects as 50% subsidy:
  - 1st round 2008-2013
  - 2nd round 2016-2020

- Information campaign based on locally organised workshops and seminars by team of 2-3 persons
Wealth and energy efficiency

The diagram shows the number of insulated buildings in different regions, measured on the y-axis, against the territory development level index on the x-axis. The regions included are Kurzeme, Vidzeme, Zemgale, Latgale, Riga region, and Riga city.
Funding discontinuity

![Graph showing funding discontinuity over the years 2008 to 2020. The y-axis represents buildings/year, ranging from 0 to 600. The x-axis represents years from 2008 to 2020. The graph shows a decrease in funding from 2008-2012, followed by a peak in 2014, a dip in 2016, and a steady increase from 2018 onwards.]
Funding discontinuity
Funding discontinuity
Penalty-reward scheme

![Graph showing real estate tax (EUR/m²/year) vs energy consumption.

- 1st year tax rate, EUR/m²/year
- 3rd year tax rate, EUR/m²/year
- 10th year tax rate, EUR/m²/year

Energy consumption set by the building code vs actual energy consumption.
With sustainable funding scheme
Energy Service Companies

![Graph showing the number of insulated buildings over time with different lines representing projects in first 3 years, projects in remaining contract period, total finished contracts, and total implemented projects.](graph.png)
Energy Service Companies

Number of insulated buildings

- 2008: Projects in first 3 years, Total finished contracts, Total implemented projects
- 2010: Projects in remaining contract period
- 2012: Projects in remaining contract period
- 2014: Projects in remaining contract period
- 2016: Projects in remaining contract period
- 2018: Projects in remaining contract period
- 2020: Projects in remaining contract period

Number of insulated buildings

- 2008: Projects in first 3 years, Total finished contracts, Total implemented projects
- 2010: Projects in remaining contract period
- 2012: Projects in remaining contract period
- 2014: Projects in remaining contract period
- 2016: Projects in remaining contract period
- 2018: Projects in remaining contract period
- 2020: Projects in remaining contract period
Energy Service Companies

- Total implemented projects with reinvestment fund
- Total implemented projects without reinvestment fund
Construction quality

![Graph showing construction quality trends from 2008 to 2020. The graph compares the capacity of unexperienced and experienced construction companies, as well as the fraction of successfully finished projects and the perceived fraction of successfully finished projects.](image)
Construction quality

![Construction quality graph]

- Capacity of unexperienced construction companies
- Capacity of experienced construction companies
- Fraction of successful recently finished projects
- Perceived fraction of successfully finished projects
Word of mouth effect

[Graph showing the trend of Word of mouth effect from 2008 to 2020, comparing Actual policy tools and Sustainable funding scheme.]
Information dissemination

![Graph showing the informed building area (not being informed before) in thou. m²/year from 2008 to 2020. The graph includes three scenarios: No information campaign, Actual policy tools, and Strong information campaign. The graph shows a decline in the informed area over time.](image-url)
Trust and insider

- Municipality
- Housing maintenance company
- Insider (trustful apartment owner living in the building)
Goals, actual and desired behaviour

![Graph showing cumulative number of projects from 2009 to 2023. The graph compares submitted, finished, and goal project numbers. A green line indicates the number of projects if the system is sustainable.](image-url)
CONCLUSIONS
Lessons from 10 years policy design in the residential energy efficiency sector show that today’s problems arise from yesterdays solutions:

• Policy tools based on rational choice models are oversimplified since decision making is much more complex

• Lack of long term policy planning documents has led to discontinuing financial support that has caused a chain of negative side effects, such as
  • misbalance between supply and demand of construction services causing oscillation of price, pay-back time, net benefits, quality of construction works,
  • addiction to financial support which is based on EU funding,
  • word-of-mouth effect.

• This has led to the situation that government was not able to reach goals set by itself.

• System Dynamics model developed 10 years ago based on experts opinions has proved to be great tool to forecast and explain causes of behavior of the system and different policy interventions.
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