



# Is your neighbour stealing your heat?



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## 1. Background

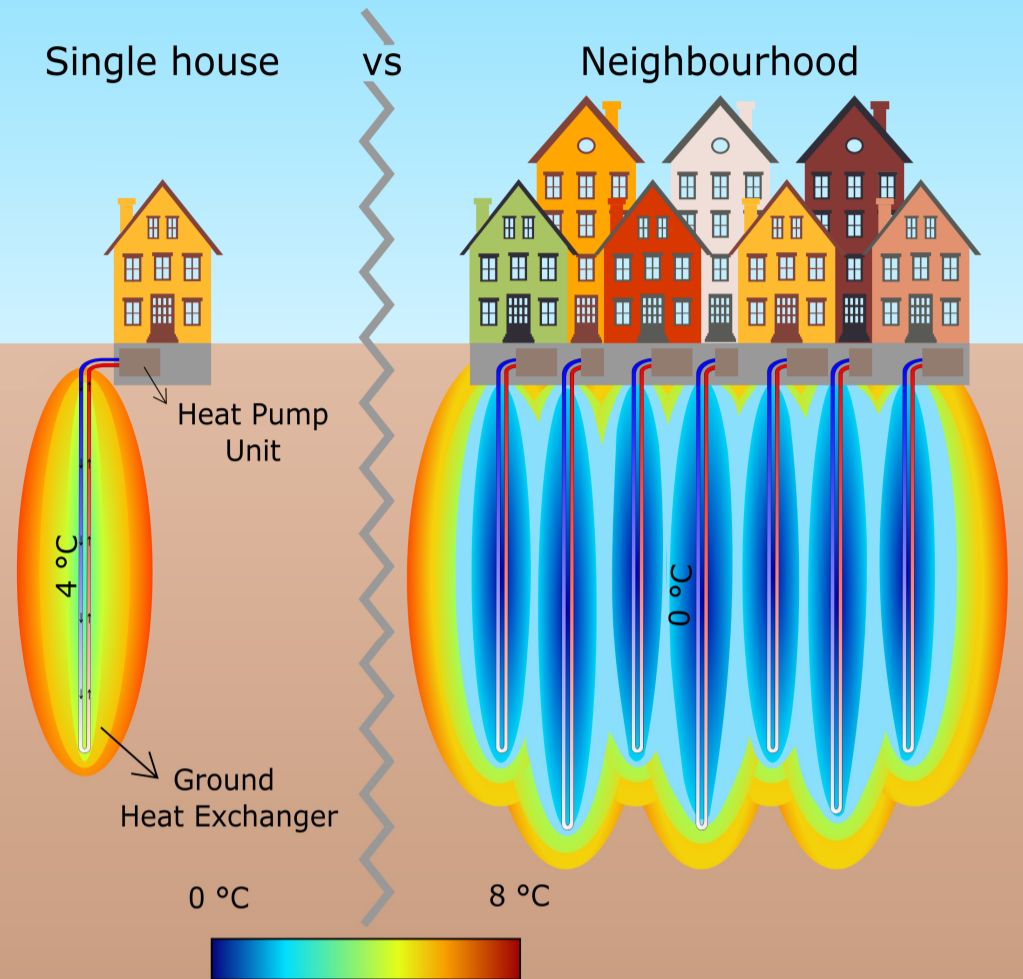
1 out of 5 Swedish houses use **ground source heat pumps (GSHPs)** for space heating.

GSHPs extract heat from the underground through a pipe and then make the heat available for domestic use through a heat pump unit. In this way part of the heat provided to the buildings is **geothermal, renewable energy**. The rest is **electricity**.

The exact share between geothermal energy and electricity depends on the underground temperature: **the warmer the underground**, the higher the geothermal energy share and **the lower the electricity needed**.

When GSHPs extract much heat from the underground, the underground temperature decreases, therefore the geothermal energy available decreases as well and more electricity is needed.

The temperature decrease is even higher in densely populated neighbourhoods where more heat is extracted from the underground. **Therefore, houses in densely populated neighbourhoods consume more electricity for space heating.**



## 2. Goal of this study

A house in a neighbourhood consumes more electricity for space heating than a single house (house not surrounded by other buildings). In this study we answer the question: does the increased electricity consumption lead to a **significantly increased electricity cost?**

## 3. Methodology

We have simulated two scenarios:

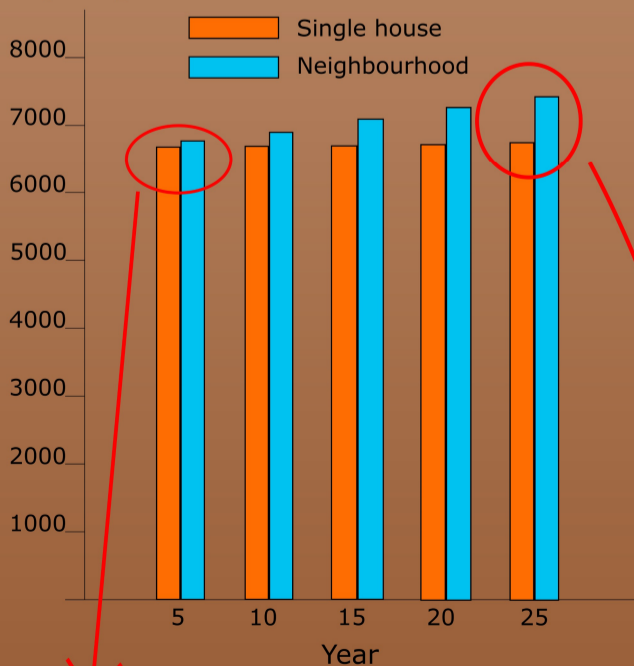
1. a single house
2. the same house in a neighbourhood.

We have calculated the electricity consumption of the GSHP of the house in the two scenarios and therefore the electricity cost.

## 4. Results

Annual cost of electricity used for space heating

Cost [SEK ]



No significant difference between a single house and a house in a "young neighbourhood"

A house in a "old neighbourhood" spends 10% more than a single house.

## 5. Conclusions

- The GSHP of your house consumes more electricity if surrounded by several buildings equipped with the same system.
- The extra electricity consumed is negligible during the first years of operation of the systems.
- The electricity consumed after 25 years of operation increased of 10% in our scenario.
- Such an increase in the expense for electricity does not undermine the profitability of the system.
- **No, your neighbour does not steal your heat.** Everyone has the right to use free geothermal energy, but the more buildings use it, the less is available to each single building. This needs to be compensated by an extra use of electricity and therefore higher costs.

### Reference

Fasci, M.L, et al. - Performance of ground source heat pumps in densely populated areas. World Geothermal Congress 2020+1, Reykjavik, Iceland, 2021



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