An attractive heat distribution network for a just energy transition

Essay • 26 January 2023 • Annelies Huygen

When installing heat networks, most of the emphasis is placed on cheap technical solutions. But what should actually be prioritized is a heating network that is geared towards creating a pleasant situation for citizens and their neighbourhoods, both in the near and distant future. That's how you'll entice people to connect to the network.

Translation by Kayleigh Herber, Cachet Translations

"Good morning Madam. We are visiting on behalf of the city council. May we come in for a moment?"

"Yes, come in."

"As you may know, we are working on creating a heat network here. Your neighbourhood is also aiming to cut down on the use of natural gas."

"So I've heard. I have not yet delved into the matter."

"You will receive a generous subsidy when switching to this new network, and your connection costs will be reimbursed."

"That's nice. Can you also tell me where that sustainable heat comes from?"

"It is residual heatfrom factories in your province. They are still using fossil resources for the time being."

"But that's not sustainable, is it?"

"Yes, however, the factories currently discharge this heat into the air or into the water. If you use that instead of natural gas, your area will become a lot more sustainable."

"So we, as citizens, should get rid of natural gas, while the factories are allowed to continue with fossil fuels?"

"No, the factories will also be urged to become more sustainable. You will then receive sustainable residual heat. We don't know when or how, but it will eventually be taken care of."

"The heat does not come from nearby my house. Who pays for the transport of said heat?"

"Essentially, you will be paying for it, but fortunately there are generous subsidies to reduce costs. In any case, it will not cost you more mone than you are currently paying."

"Hmmm. We collect residual fossil heat at our own expense. That will set me back as much as the natural gas we use now. Maybe I prefer a heat pump. I have a share in a wind farm, so I can use that sustainable energy."

"Well, ma'am, that is a complicated situation. You are obliged to connect to the heat network, unless you have a more sustainable alternative."

"But sustainable electricity from wind is more sustainable, isn't it?"

"No, unfortunately we don't calculate it that way. Residual heat counts as 100% sustainable, because if it's not used, it will be thrown away. Electricity is only partially sustainable. A lot of electricity in the Netherlands is generated using fossil fuels. After all, we have to connect as many people as possible to the heating network, otherwise it is not profitable. Heat companies also have to earn money. If every resident just chooses their own specific alternatives, the heating network will not lead to the predicted advantages."

"I will think about it, but to be honest, it doesn't sound very attractive."

If all goes according to plan, city officials will be having many of these conversations. After all, the number of connections to a heat network must increase rapidly to be profitable both in monetary gains, as well as environmental gains

Heat distribution is not quite the talk of the town

The lack of enthusiasm of residents quite the obstacle to overcome. The Netherlands Environmental Assessment Agency (PBL) has found that widespread heating networks are not very popular: residents think it is too expensive, they distrust heating companies and they do not want to be tied to a monopolist. Moreover, groups of citizens do not want residual heat from fossil production processes or waste plants, because those companies do not fit in with the idea of a circular society. For example, on the 10th of November 2022 there was a protest on the Malieveld in The Hague against the so-called "grease pipe", the Warmtelinq from Rotterdam to The Hague and Leiden.

A just heat transition requires that citizens get the best possible heat network. A heat network that meets their needs. After all, it is about their houses, their investments, their bills and their neighbourhoods. Many do not get a say and are obliged to use the heat network, for example tenants. Moreover, the heat networks area heavily subsidised, which the money for which has ultimately – for a large part – been provided by taxes paid by the citizens.

This means that citizens have a fundamental influence on the heat transition from its inception, and yet they are not asked for support until afterwards. They also need insight into prices and costs of heat, so that they know which rates are reasonable and that the subsidies are well spent. It also means that their wishes and objections are taken seriously. Only then will we get attractive and sustainable heat networks, to which people are happy to connect.

Prices and costs for heat

Energy tariffs are a crucial stumbling block. Before the war in Ukraine, these were on average 30% to 50% higher than in neighbouring countries of The Netherlands. These differences (excluding the energy price cap installed by the Dutch government) are now much larger. Costs rose by more than 80%, while elsewhere they rose only slightly. Transparency is lacking; it is unclear why the price differences are so large. Citizens may expect a thorough investigation into the rising costs of heating in the Netherlands, compared to those in other countries. Where do these price differences come from? No such investigation has taken place as of yet. As a result, we run the risk of heat networks in the Netherlands being unnecessarily expensive. Fortunately, there are some plans to move to cost-based rates. The accompanying accounting rules and transparency are a step in the right direction.

‘No natural gas’ is outdated

In addition, innovation in the Netherlands lags behind. Our policy is still aimed at replacing natural gas with a heat network, while the rest of the energy supply in the district remains the same. A glance across the country's borders shows that this stance is outdated. It is better to tackle the entire energy consumption in the area at the same time: heating, cooling and electricity. The council should do so with an emphasis on saving energy, as advocated by the European Union. After insulation, cooling becomes increasingly important, especially with European summers getting warmer. It is expensive and stressful for consumers if they first get a heat network, then start insulating and then have to organize cooling again, which also consumes a lot of energy.

Electricity, (residual) heat and cooling are closely linked. Smart, integrated energy systems are now on the rise internationally, with many including options to reuse locally generated heat (for example from a swimming pool). Consumers produce their own energy using solar panels and collectors. They can share it, store it and use it again. More than a hundred such neighbourhoods are now being developed in Europe. The net energy consumption in those neighbourhoods can drop dramatically, with some neighbourhoods even produce more than they use. According to modern literature, these are now the best power systems in many ways; they are also attractive to consumers. This is what we should be aiming for.

Municipalities are now more or less obliged to choose the heating network with the lowest (social) costs, according to standardized calculations. But that is not the same as a heat network that is best for citizens and their neighbourhoods. They may have other desires and needs, such as increased comfort, cooling capacity or the wish to not - albeit indirectly - remain dependent on fossil fuels, or even the possibility to exert more influence on the process of generating and using energy.

Why are The Netherlands lagging behind?

Why is it that heat (re)distribution is not very attractive to consumers here? This can also be explained through policy making. Procedural justice requires consumers, as a group, to play a decisive role in arrangements for their own provisions. But in the Climate Agreement at the Built Environment-table, energy companies and their representatives were allocated five seats, and the construction and real estate sector, banks and the technology sector also got to enjoy their set at the table. The latter are all commercial parties that earn money from citizens. The citizens themselves had to make do with a mere two seats. Innovative companies, such as the IT-sector that can actually develop the much-needed smart energy systems, were completely absent. Given the composition of these committees, it should not come as a surprise that both the innovation aspect as well as the interests of citizens are not always leading topics in these conversations.

How to proceed?

The goals of the Climate Agreement, namely 500,000 additional heat connections in 2030, will probably not be achieved. In recent years, only 15,000 to 20,000 connections were realized, much less than the required 50,000 extra per year.

This is bittersweet: it can harm the transition in the short term. But it also gives us the opportunity to reflect and immediately apply the most sustainable energy systems.
A broad build-up of the required knowledge and expertise, also in the field of innovative heat networks, is a necessary step. Many municipalities, which - just like in other countries - are in charge of this process, are working on this. Transferring knowledge from abroad is essential here. Many advanced systems have now been developed in countries such as Sweden, Denmark and Germany.

There is much to learn from them concerning costs and rates.
The goal should not be creating natural gas-free neighbourhoods, but low energy consumption neighbourhoods. More instruments are needed to calculate the total future energy consumption of neighbourhoods for insulation, electricity, heating and cooling, and to establish a sustainable relationship with all possible local sources, such as solar panels and collectors and local residual heat or geothermal energy. Sustainable, integrated energy systems can be designed using this as their base.

It also creates time to change energy laws so that consumers can share electricity and heat, store it together or sell it to each other. This suits these modern systems. Energy cooperatives can, also by law, be given ample opportunity to develop these new systems.
We can hasten this process tackling the easiest neighbourhoods first. High-temperature heat networks are still possible if there is a good source of residual heat close to a residential area. The costs and rates would be low. Modern energy systems can be developed in neighbourhoods that are already well insulated. In other neighbourhoods, we need to speed up the insulation so that they can also enjoy these modern systems later on.

Furthermore, citizens' representatives should get at least half of the seats in all bodies that make important decisions about the provision of citizens and their neighbourhoods. After all, it's about their houses and their money.
Ultimately, this can lead to the following conversation:
"Good morning, madam, We are visiting on behalf of the city council. May we come in?"

"Yes, come in."

"You may have already heard, but the council will be building a heating network in the area. It will allow you to heat your home sustainably."

"I haven't really looked into that yet."

"Together we will create more sustainable neighbourhoods. Net energy consumption will be halved within six years. This will be achieved by combining insulation and heat networks."

"Where does that heat come from?"

"This heat network is flexible, with different sources. Heat comes from local sources, such as solar collectors, the supermarket, the swimming pool and schools, as well as from excess electricity generated from solar panels, wind and other local sources. Heat- and solar and heat panels will be installed on rooftops of homes and flats and the network will allow for joint storage of electricity and heat. Your house is from the 1960s. Have you insulated anything yet?"

"No, this house has been in the family for a long time and we have not had the opportunity to do so until now."

"I understand. Do you have a boiler? How old is it?"

"Let me look that up. This one is eight years old right now."

"Then I'm sure your boiler will continue to work for a while. We have a fully integrated plan. We can help you arrange the insulation. It will help you save on energy bill. You can also collectively buy solar panels with your neighbours. Part of the expenses will be subsidized and you can take out a loan for the residual costs. Your energy bill will be lower, which will make repaying the money much easier. If your house is sufficiently insulated, we will connect it to the heating network. This network can also cool your home summer. You can also exchange energy with your neighbours if there are surpluses."

"I can't quite oversee all this yet. But in the summer it does get hot here, so if I can do something about it…"

"Madam, it is also complicated. If you feel something for this, the first step is advice from the energy coach. He will inspect the house and explain what your options are. If you do not wish to be connected to the heat network, you can use a heat pump. A connection to the heat network is usually a lot cheaper, but it is your own choice."

"Thank you. I will definitely discuss with the others who live here."

This essay was originally written in Dutch and has been translated by Kayleigh Herber, Cachet Translations.

The Just Energy Essays

This essay is part of the series 'The Just Energy Essays'. From January 2023 until the beginning of March 2023, weekly essays were be published on the Dutch energy news website Energeia, each one with a new perspective exploring just energy transitions. The essays have been penned by philosophers, engineers, lawyers, sociologists, political scientists, development researchers, researchers who focus on the influence of gender, and more. This series has been developed in collaboration with the Urban Futures Studio, a subsidiary of Utrecht University. For more information on this series, please contact dr. Jesse Hoffman.

Seminar

In a contribution to a broader perspective and insight into the design of a just energy transition, we have asked various researchers to write an essay on this topic. The essays come from philosophers, engineers, lawyers, sociologists, political scientists, development researchers, researchers who focus on the influence of gender, and more. Over a series of weeks these essays were be published on Energeia. On March 7, 2023, a seminar was held on shaping a just energy transition.