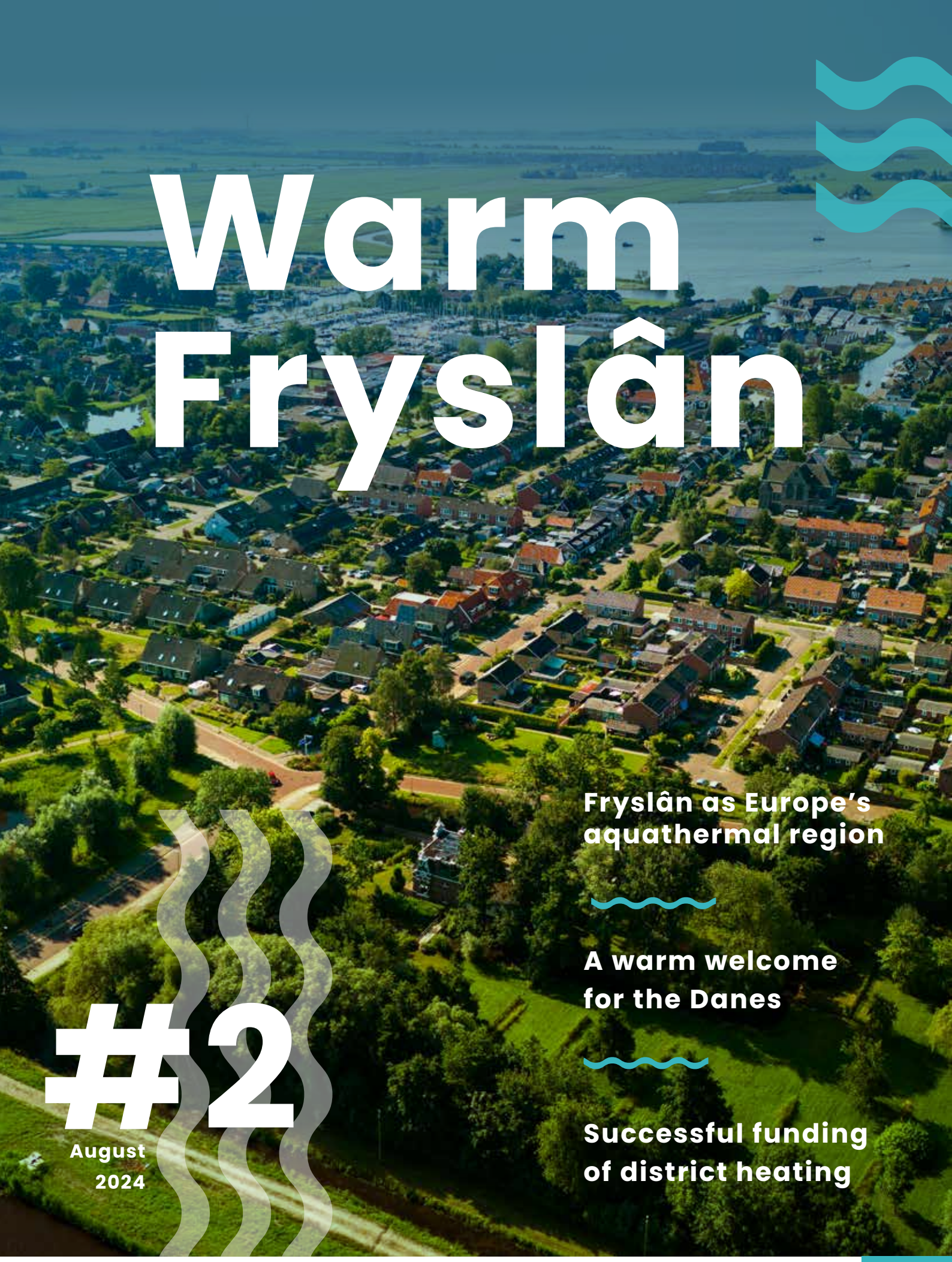
Warm Fryslân



Fryslân as Europe's aquathermal region

A warm welcome for the Danes

Successful funding of district heating

#2

August 2024

provinsje fryslân
provincie fryslân

Gemeente Súdwest-Fryslân

Contents

Colophon

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Affordable heat as a necessity of life

"Heat is one of the necessities of life. Heat is important for Fryslân's residents and for the liveability of our beautiful province"

Missy Wetterwaarmte is our *missy* (mission) for giving a boost to projects in our province that want to work with *waarmte* (heat) from *wetter* (water). We have our own community of practice that is helping us progress our projects step by step, by tackling practical bottlenecks.

Meanwhile, we are working hard on a Frisian model for district heating. Fryslân has more than 400 villages with beautiful historic centres and special histories, such as the many villages originally built on raised mounds and the landscape formed by water over the years. These places do not have the scale you often see in district heating in the Netherlands, but they have close-knit communities with a lot of strength underpinning them, plus the will to be responsible for their own energy supply. It is therefore crucial for us that the benefits of heat also reach the people in the villages and districts of our beautiful province.

We are taking a down-to-earth look at the context and the principles of district heating, trying to learn as much as possible from the countries around us, such as Denmark, Belgium, France and Germany. This means are standing apart from the rest in the world of heat, but that fits in well with the Frisian culture.

I strongly recommend fellow administrators to adopt the recommendations for legislation and funding, because I believe that our Frisian model can also be applied in other regions in the Netherlands.

Warm regards,

Sijbe Knol
Regional Minister, Fryslân Province

All of Workum sustainably free of natural gas

We started an Energy Working Group in 2022 from the local interest platform *Plaatselijk Belang Workum*. This was firstly with the aim of sustainably heating our swimming pool De Rolpeal with residual heat from Friesland Campina. We are now working out the details and we want to make all of Workum sustainably natural gas-free.

Bouwe Rijpma
Board member of *Plaatselijk Belang Workum* (Workum Local Interest Group)
Energy transition group

Workum

4265 people
in 1995 households.

Heating Solutions:
Saving energy, insulating, district heating

Heat Sources:
Solar energy, wind energy, aquathermal and geothermal energy, residual heat

How do you make such a beautiful town natural gas-free?
Over the past year, we played a ‘serious game’ with a varied group of Workum residents and the Energy workshop. It was a serious game in which we discovered together how we can provide energy and heat in Workum in the future. After all: where will our heat come from in the future? We already have residual heat. Do we want to get energy from water (aquathermal), the ground (geothermal), wind turbines or solar panels? And where should all of this be located in and around the town?

That is why we talked about preferring not to have wind turbines near our town. Maybe we could add a few turbines near the other wind turbines in the IJsselmeer. Based on our game, we are now making a heat plan for Workum together with the municipality.

What does that look like?
We have to heat our homes differently, more sustainably. The most obvious method is a district heating network in our streets. In Denmark, over 60% of homes are heated with district heating. It is feasible and affordable there, mainly because almost everyone in those villages and towns is connected to the network. So it can be done! We need to go for it together: district heating for all of Workum.

Now what?
I believe that district heating is possible. We are currently calculating how it would work, in collaboration with the municipality. Is it really possible? And is it affordable too? We are currently carrying out studies and then we will make a heating plan and possibly an implementation plan. We are going to explore how it can be done. We are also helping Workum’s residents save energy and insulate because that’s a ‘must’ anyway!

Do you have a call for action?
A good plan starts with good ideas. It’s difficult to start from scratch. So if you have an idea, get a group together and ask the municipality for help – because if you help us think things through now, you can help determine later what choices are made in your neighbourhood.

Tjeerd Osinga (left)
and **Goffe Venema** (right)
Project leaders
Eigen Warmte Balk

Balk

4255 people
in 1848 households.

Heating Solutions:
District heating for 1400 homes and 75 utility buildings and individual (all-electric) heat pumps for 525 homes

Heat Sources:
Aquathermal energy (from surface water, TES) from *the Luts*, combined with thermal storage and residual heat from AVK Plastics

Balk in lively conversation

Living and working without natural gas by 2030. That’s what the project *Eigen Warmte Balk* (Balk’s Own Heat) is working towards. It can be done with individual heat pumps for newer detached homes and through district heating for the 1,400 older homes. The district heating is fed by residual heat from AVK Plastics and aquathermal energy from *De Luts*, which flows through the village. Technical and financial studies have shown it’s possible, so it’s now up to Balk’s residents and the municipality to make *Eigen Warmte Balk* a success.

Backing is needed
“We’ll only be successful if we get enough backing and enough connections to the heating network,” says Goffe Venema (the project leader) enthusiastically. “That’s why we are always talking with the residents. We have a newsletter and a website, and we use all available social media. We also opened an information office in the centre of Balk in May 2023. In December, we distributed a door-to-door newspaper that was widely read and a lot of people say they know us from there.”

Even more conversations
In the meantime, over 300 Balk residents have stated an interest in *Eigen Warmte Balk*. “We’re seeing that individual conversations really are the best method of communication,” says Goffe. “That’s why at the start of the year we held fix-it promotions in cooperation with the *Energiebank* (Energy Bank) and Tûk Wenjen from the municipality of De Fryske Marren. We went door to door, offering residents free energy scans and small insulating measures such as radiator foil, sealing strips and letterbox brushes. During those visits, we saw how well a personal conversation works. We suddenly got seventy new registrations.”

“We’re seeing that individual conversations really are the best method of communication.”

Pupils as the youngest ambassadors
Eigen Warmte Balk is also trying to draw in more volunteers this way. “In early 2024, we were already getting that to work. We took part in a learning project about “Heat” at the local school. Over eighty primary school pupils visited our information office. They then made drawings, had debates, gave presentations and even made a real *Eigen Warmte Balk* song with a music video. That learning project is finished, but the pupils offered to help us make posters, flyers and clear animations for our website. We’re *grutsk* (proud) to have been able to attract such fantastic young ambassadors,” says Goffe Venema.

Aquathermal Energy in Baard

Energy cooperation is the driving force in local sustainability efforts

Michiel Oudega
Energy project leader
municipality of Leeuwarden

Baard

195 people
in 84 households.

Heating Solutions:
A district heating network with heat pumps for eight homes and a school

Heat Sources:
Aquathermal energy (TES) from the *Baarder Sleat*

It is no coincidence that Baard of all places, with around 200 inhabitants, was chosen to start working with aquathermal energy. The municipality of Leeuwarden identified how they can stop using natural gas step by step by 2050, starting with neighbourhoods that have a good chance of achieving that before 2030. A lot of preparatory work was done in Baard by the energy cooperative Grieneko. They are the driving force behind the project. Using a pilot in Baard, we are testing whether aquathermal energy could be a good and sustainable alternative to natural gas.

A strong network

“Grieneko is an active energy cooperative, with people who are constantly coming up with new ideas to do something sustainable in the neighbourhood. Grieneko is not solely for Baard but also serves Húns, Leons and Easterlittens. As an energy cooperative, they have realized quite a few sustainability projects already. Heating was the next challenge, so with a plan for aquathermal energy and a good network, we received funding from Interreg Waterwarmth to realize the project.

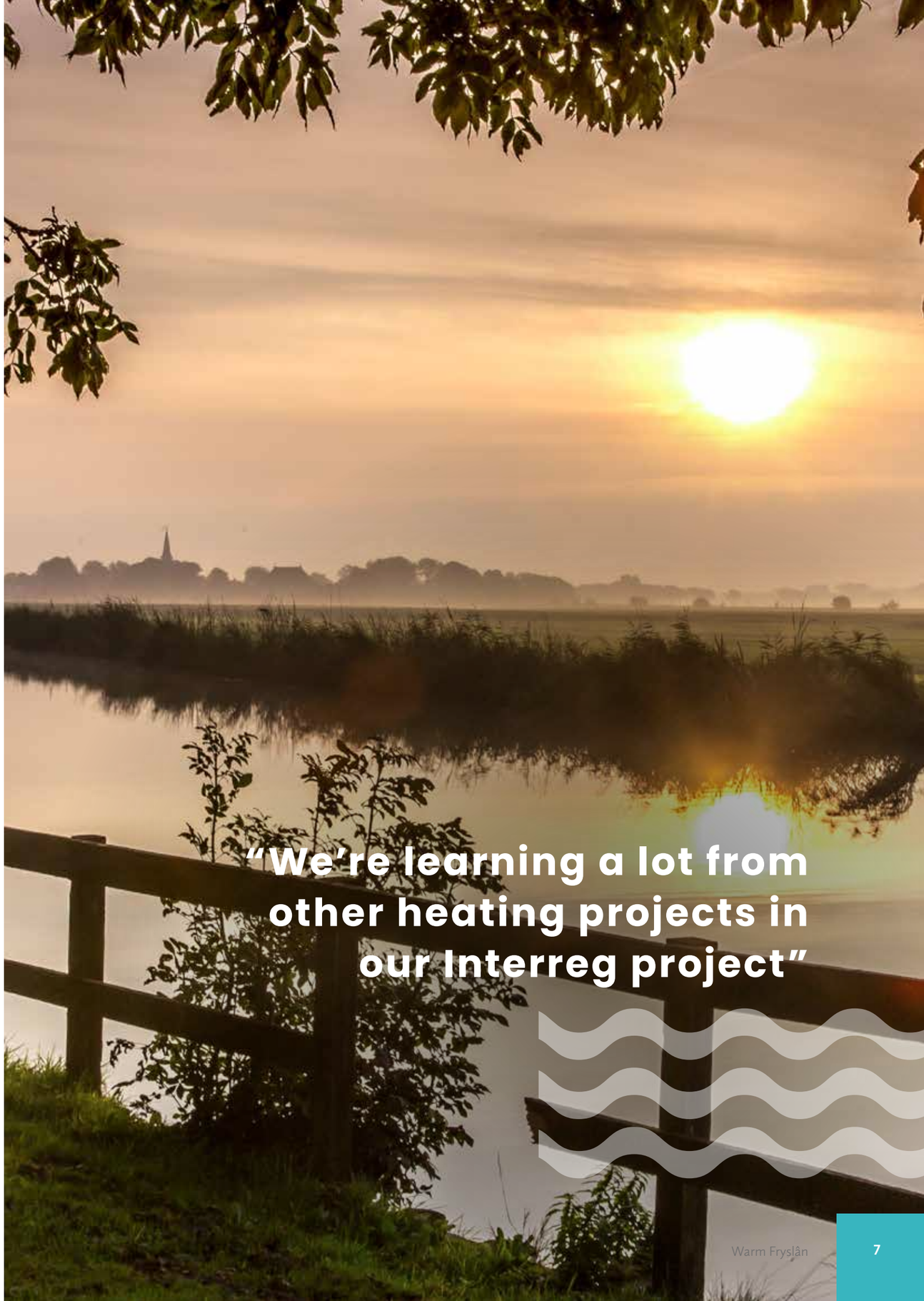
A look into the future

The plan was to heat the entire village using aquathermal energy, but that turned out to be a step too far at this point. Finally, we found eight homeowners and the school who were willing to participate in this project. We formed a project group consisting of a Grieneko representative, an energy advisor and various specialists from the municipality.

Moving forward together

Heat loss calculations were done for all the residents and the heat demand was mapped out. At the moment, the project design draft is as good as ready and we can start applying for the permits. We are now working on producing an information sheet with a declaration of intent for the homeowners and the school. Step by step, we’re getting closer to the actual implementation.

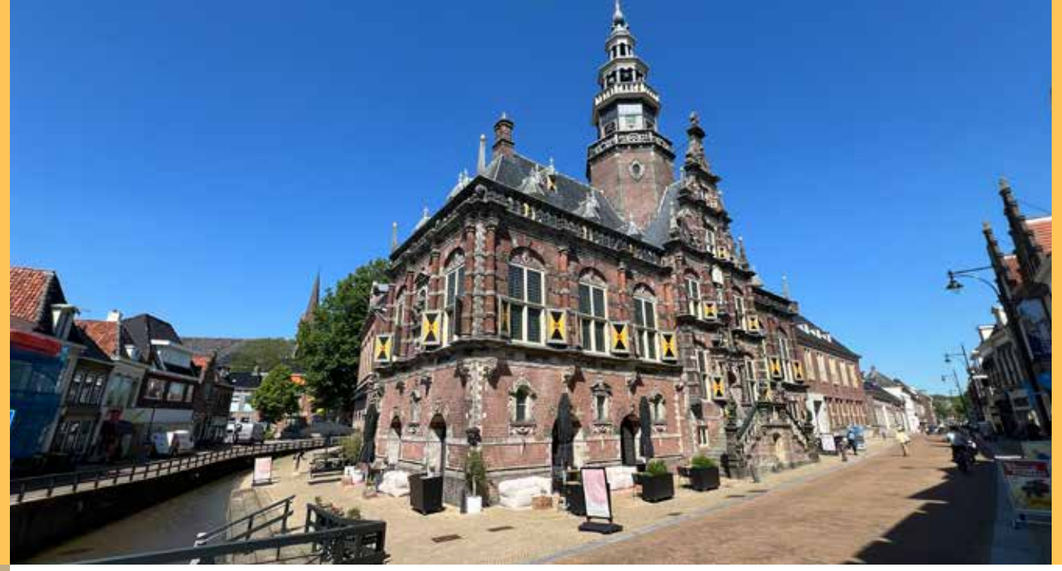
At the same time, though, there are still quite a few steps to take and a great deal to learn and discover! Fortunately, we can fall back on a close-knit network and we can learn a lot from other heating projects in and outside of the province and in our Interreg project.”

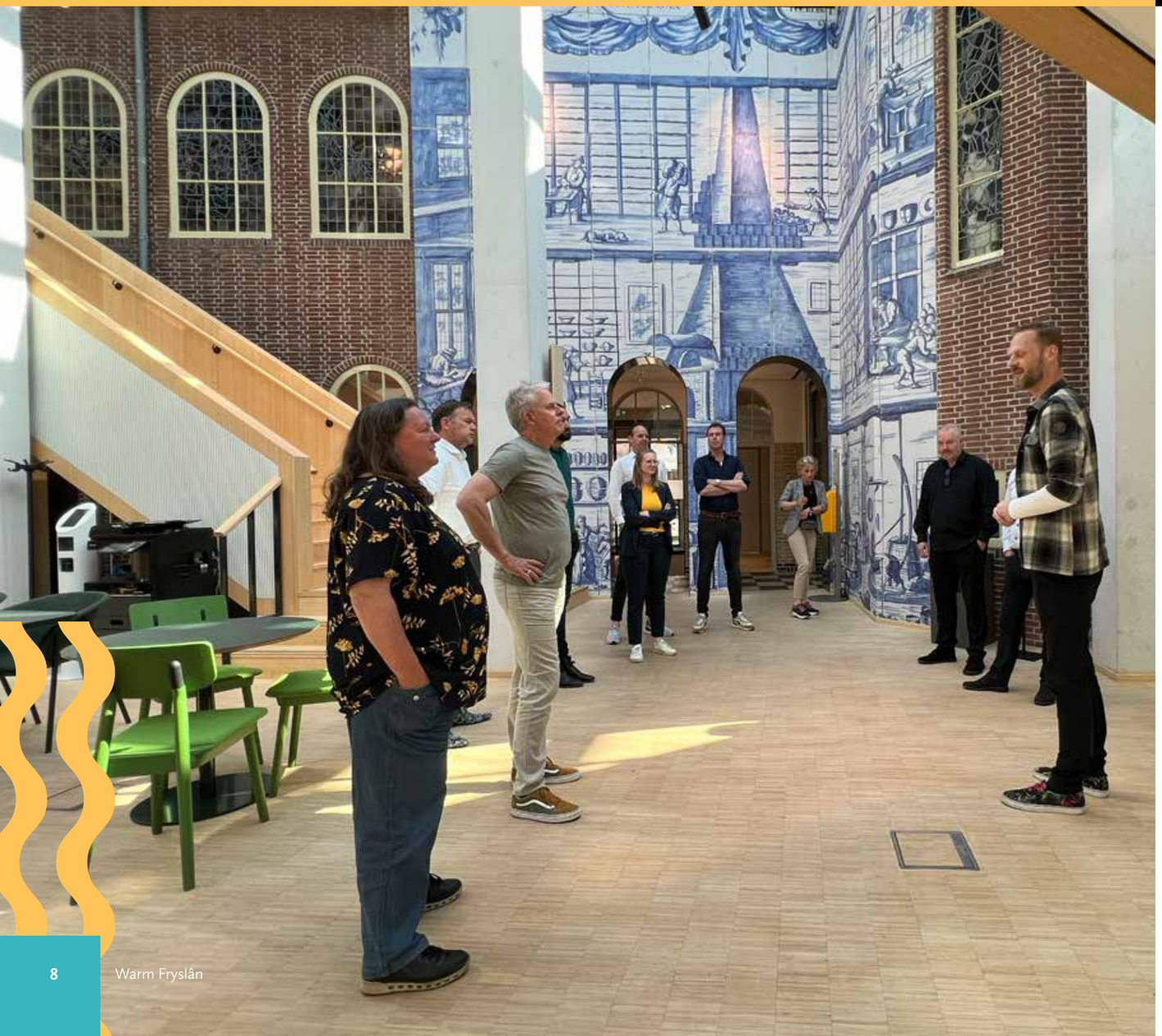


A warm welcome for the Danes:

Sharing knowledge to keep things affordable

By Michiel de Wit





A Danish delegation with expertise in heat and district heating visited the municipality of Súdwest-Fryslân. The visit was in the context of intensive cooperation between the Frisians, the consultancy firm Enber and the Danish Board of District Heating. They worked alongside numerous other partners in the 'Confidence' project in the culture and history centre 'De Tiid' in Bolsward. The project focuses on one of three themes: organization, funding and trust.

The project has acquired knowledge from Denmark as its way of achieving feasible and affordable collective heating solutions in the Frisian municipality and in the rest of the Netherlands. With the Danish insights and expertise, Súdwest-Fryslân wants to improve the affordability of district heating for Frisians. The Danes are experts where district heating is concerned: over 60 per cent of Danish households are now connected to district heating systems. There are various ideas and plans for district heating in the Frisian municipality, for instance in Heeg, Bolsward and Sneek. Through discussions with the Danes, the municipality is hoping to get input for these plans and for the progressing municipality's energy transition.

Into the depths

This cooperation resulted in various physical and digital meetings this year. The first 'deep dive session' was experienced as very educational and inspiring by both the Danes and the Frisians. In addition to the municipality of Súdwest-Fryslân, the Province of Fryslân, the consultancy firm Enber, the Bank Nederlandse Gemeenten, the Danish embassy and the Danish Board of District Heating were also represented during the three-day knowledge session.

During the deep dive session, knowledge and experience about the themes of organization, funding and trust were shared. Several outcomes are listed below that the municipality will take into account in further planning and subsequent sessions.

"Make a plan for the entire municipality. Determine the most promising towns or villages and start there"

On the map

Making a heating plan for the entire municipality lets us see at a glance which towns, villages or districts are suitable for a collective heating solution. And where individual solutions might be more suitable.

The most important factors in determining the areas are:
- the high energy density per m2
- the energy consumption
- the presence of a cheap source of heat

In Denmark, it is the task of the municipality to make a heating plan for the entire municipality. The local heating company then works out the project plans for each project.

One important lesson from the Danish experts is to ‘plan big, start small’. Meaning: make a plan for the entire municipality, but start with one or two projects.

Don’t aim immediately for 100% sustainable.

There are hundreds of affordable heating networks in Denmark, but in the Netherlands they still seem to be too expensive. In the current business cases for the various projects, the Frisian municipality is assuming 100% sustainable solutions, resulting in every project having an unprofitable top end. Opting for a strategy that uses e.g. 50% sustainable sources makes more projects financially feasible. In many places in Denmark, natural gas is the backup for the peak moments in the winter period. We have a perfect natural gas network in the Netherlands. Partly basing the heat for district heating on natural gas might make the business cases profitable. This lets us shift the focus onto building a network of district heating systems. This will make sustainable collective heating solutions possible sooner. We don’t need to be rid of the natural gas until 2050. That gives us a period for working towards fully sustainable energy.

In the coming period, the Frisians together with the Danish experts are going to investigate whether they can optimize the mix of sources: find out where the tipping point is in the business case and how they can choose the most sustainable, financially viable options.

“In Denmark, heating companies and housing corporations work together actively.”

See companies as potential customers

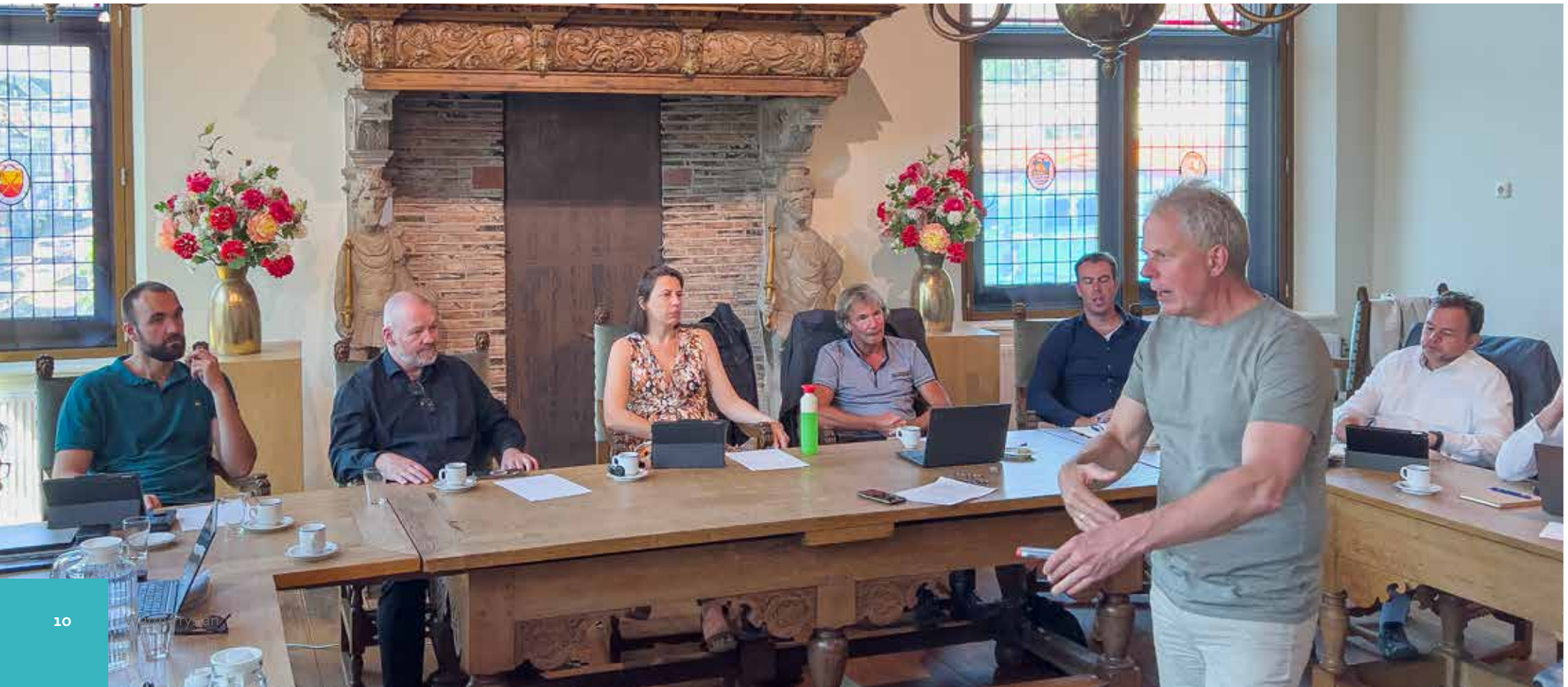
In Denmark, heating companies also supply companies with heat, not just residents. The focus of the municipality is mainly on residents. The Danish experts said that a municipal heating company should also focus on companies because they are major buyers. This can make heating cheaper for everyone in a certain area.

Increase trust among residents, politicians and financial institutions

Trust is very important, both for the surrounding area and for potential buyers of heating such as not only individual households but also housing corporations. In Denmark, heating companies and housing corporations work together actively. Various heating companies have a representative of a local housing corporation on the board of the heating company. Many boards of heating companies also have individual buyers of heating. “Plan big, start small.” That means that you do have to make a start. Making the first project successful means you are also building trust, especially among residents and local, regional and national politicians.

From facilitating to taking charge

What role should the local governmental authorities take when it comes to a huge task such as being energy-neutral by 2050? The Frisians also posed this question to the Danish experts. How do they view this issue from their various fields of expertise? The answer was unanimous: given the size of the task, the municipality has to take charge. Do this together with residents, companies and local partners, fully transparently. That way will let you create trust and local involvement.



“Plan big, start small”

Project CONFIDENCE & its partners

The partner group for this project is a strong combination of practical, research-oriented and network-oriented expertise in both the Netherlands and Denmark. The partners are committed to working on developing the heating transition and in particular improving the organization and funding of district heating in the Netherlands.

By Frouka Dooper

A brief overview of the participants and their involvement

The Danish Board of District Heating (DBDH) is a Danish group whose membership has an international mission to promote district heating for a sustainable transformation in the built-up environment. Members are heating companies, technical advisers and suppliers of technical district heating solutions. The DBDH publishes the magazine Hot|Cool and has a large international network. It has been working non-stop on the heating transition for years, including in the Netherlands. The Netherlands is a priority market for the DBDH.

The municipality of Súdwest-Fryslân (SWF) is the largest Dutch municipality by area at 908 km², with 89 town and village centres. Through pilot projects and the lessons learned from them, Súdwest-Fryslân is playing a part in the development of the heating transition at the local and national levels. They want to make the heating transition a reality, together with residents, initiators and partners. The municipality is looking for connections and examples in the Netherlands and Europe. The municipality is part of the Fryslân province and cooperates exceptionally closely with other municipalities.

Enber is a Dutch consultancy firm that assists municipalities using its specialist knowledge of funding a sustainable energy transition. They are working together with a group of municipalities in Fryslân to develop solutions. Enber also helps municipalities determine their strategies and roles when setting up heating companies and networks.

Province of Fryslân is a provincial authority in the north of the Netherlands that wants to have an active and supporting role in the green transition. They want to position Fryslân as a national and international knowledge hub for heating networks based on aquathermal energy. A nice match for a province with so much water. They are pushing for local district heating based on water sources.

"Aquathermal energy is a nice match for a province with so much water."

The Association of Dutch Municipalities (*Vereniging van Nederlandse Gemeenten, VNG*) supports municipalities and bridges the gap between the municipal and other governmental authorities in the Netherlands. It is one of the organizers of the FRC-II project, together with the Danish Energy Agency, the Danish Embassy in the Netherlands and the DBDH.

Bank Nederlandse Gemeenten (BNG) is the most important financial institution for semi-governmental authorities in the Netherlands. It has a leading role in transforming the financial structures of heating companies and networks, with the objective of making investments cheaper and feasible at the requisite scale.

The Embassy of Denmark in the Netherlands was asked by other partners to participate in the project. It is known for its active efforts to strengthen Dutch-Danish cooperation, especially where the heating transition is concerned. The embassy is a partner and joint organizer of the FRC (2021-2022) and FRC-II (2023) projects.

Project group during the first Deep-dive session in Fryslân

From left to right: Casper Boendermaker (BNG), Mikkel Vibæk Jensen (The Embassy of Denmark in the Netherlands), Michiel de Wit (SWF), Hanne Kortegaard Støchkel (DBDH), Johan Sølvhøj Heinesen (Egedal Utility), Duco Hartlief (SWF), Morten Duedahl (DBDH), Marie Louise Lemgart (Høje-Taastrup), Emiel Meijer (Enber), alderman Petra van den Akker (SWF), Andries Metz (Fryslân Province), Frouka Dooper (SWF), alderman Henk de Boer (SWF), Jens Andersen (Næstved Fjernvarme), Bernard Stornebrink (Enber), Joke Yedema (SWF), Jochem Jan Zijlstra (SWF), director Wietske Sikkes (SWF), alderman Michel Rietman (SWF)

Successfully funding district heating:

The keys to Feasibility

**By Emiel Meijer,
Senior Energy Finance Consultant**

Setting up district heating is an ambitious project and funding can be a big challenge, as the investments needed are large. There are major ongoing developments in the market, and there are considerable uncertainties.

Many initiatives include an unprofitable top end or a cost recovery fee, or have a gap in the business case. More money is needed, despite the connection costs contributed by building owners, investment subsidies (WIS, ISDE, SAH) and operating subsidies (SDE). It is a challenge for everyone to make a project fundable.

At the heart is the fact that volume risk (scaling up) and price risk are putting pressure on the funding of district heating.

Volume risk

There is uncertainty about the demand and supply of collective heat in the long term. Realization of connections often goes more slowly than anticipated and heat demand is decreasing thanks to climate change and insulation measures. Finally, the development of new sustainable sources (such as aquathermal energy) is also unpredictable in practice. The COP that was assumed may not be achieved in practice and the heat loss in the connections may be higher than anticipated.

Price risk

A new tariff system based on costs has been suggested in the proposed Collective Heat Act, but it does come with fluctuations in revenues, while the costs only move partially with it.

Accept the use of gas or biogas as a heat source in the replenishment period

When starting the construction, it is not fully known how the uptake scenario will progress. Nobody knows how many homes will be connected. That is why we should avoid costly investments in sustainable sources in this phase. In the first phase of scaling up, the district heating should still be heated with boilers fired with natural gas or biogas. Minimal investment is required for this. Do not invest in a sustainable source any sooner than realization of the desired scale. This has two benefits:

- It makes optimum use of the sustainable heat source. The average and peak heat demand can only be properly determined at this point. It avoids the need for additional investment or the risk of overinvestment.
- It reduces the negative cash flow during the scaling-up period. This negative cash flow demands some form of bridging funding, which puts pressure on the project returns.

Let go of 100% sustainable as a target at the start

The goal is to move towards a CO2-neutral society by 2050. You can view it as a path that has to be walked, rather than an assignment that you complete in a couple of years.

For example, after the uptake or scaling-up period finishes, start with the aim of achieving CO2 savings of 50% compared to the current level. This requires a lot less power from the system (e.g. aquathermal), which reduces the amount of investment needed.

Make a plan to increase the CO2 savings to 100% as we move towards 2050
Technical developments and the maturation of the market (e.g. aquathermal) usually lead to falling costs. This means that expansion and replacement investments become cheaper eventually.

Changing the size and the mix of the sustainable sources allows the energy demand for the entire day to be met. In addition to the technical benefits, this can also lead to higher SDE subsidies.

Challenge the funding parties
The business case for district heating usually has a term of 30 years, after which there is no residual value. The technical lifespan of the pipes is at least 40 years. Heating companies have high investments and start-up costs initially. On top of that, revenues are low due to the slow uptake scenario.

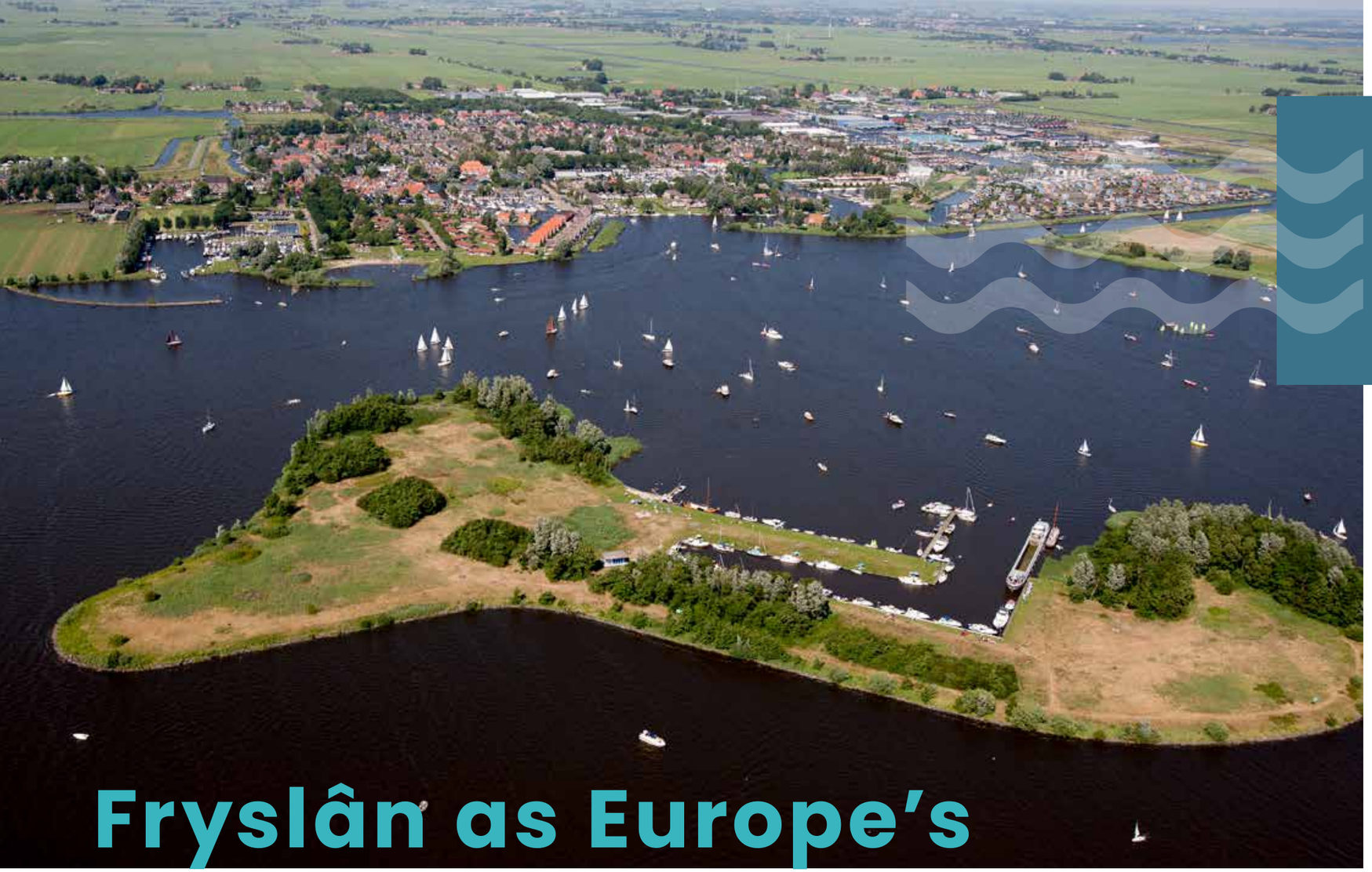
The ACM returns monitor shows that the returns are the highest from the 25th to the 45th year because district heating is often already partly written off in later years and there is a high connection percentage. This lets heat suppliers achieve positive returns. District heating needs to mature.

The current heating legislation does not specify a maximum term for the supply of heat. Be sure to use this. Challenge financiers to structure the infrastructure part for 40 years rather than 30. Lowering the repayment obligations increases the project's funding capacity.

Provide comfort
Project funding depends on the cash flows of the specific project. The funding parties cannot normally fall back on the equity or cash flows of their shareholders, for instance, which is why they lean heavily on the hard income and hard expenditure. Good quality contracts and well-substantiated data give the funding parties confidence. As does using proven and verified financial models. So ensure financiers are comfortable by collaborating with experienced parties.

Count yourself rich
Funding district heating is still a challenging process. Despite that, there are various factors and strategies that can improve feasibility. Apply enough phasing in the business case and calculate different scenarios based on current market data.

"District heating needs to mature"



Fryslân as Europe's aquathermal region

That is the ambition of *Missy Wetterwaarmte*, Frisian for the aquathermal energy programme. The goal of the programme is to accelerate district heating in Fryslân. With a special role for projects that choose aquathermal energy as one of the sources.

By Andries Metz

Missy Wetterwaarmte is a cooperation programme between the Province of Fryslân, Wetterskip Fryslân and the municipalities of Súdwest-Fryslân, De Fryske Marren, Leeuwarden and Terschelling. Underpinned by close administrative cooperation, an impulse is given to the Frisian heat transition and acceleration of the various heat projects in Fryslân. As part of the *Missy Wetterwaarmte*, two Interreg cooperative projects were started: Waterwarmth and AquaCOM. In these, projects are implemented at a European scale to learn from the project development and to develop standards for collective heat projects using aquathermal energy.

The programme was created because Fryslân is naturally a water-rich province and at the same time initiatives like WarmHeeg started asking for backing for their projects. That was reason enough to start a programme and see how far we can get with heating Fryslân using water. We sometimes joke that we are also increasing the chances of an *Elfstedentocht*, the great Frisian skating event, by cooling down the water.

True potential

The first studies into the potential showed that at least 60% of Fryslân could be heated using aquathermal energy. We now know that this was a bit of an exaggeration because our towns and villages are not directly on the water and the numerous nature areas have a significant impact on the amount of heat you can draw from the water. That is also why we are currently calculating the 'usable potential' of aquathermal energy in cooperation with the Belgian consultancy firm EXTRAQT. We can use this to give our villages a reliable picture of how much they can rely on heat from water.

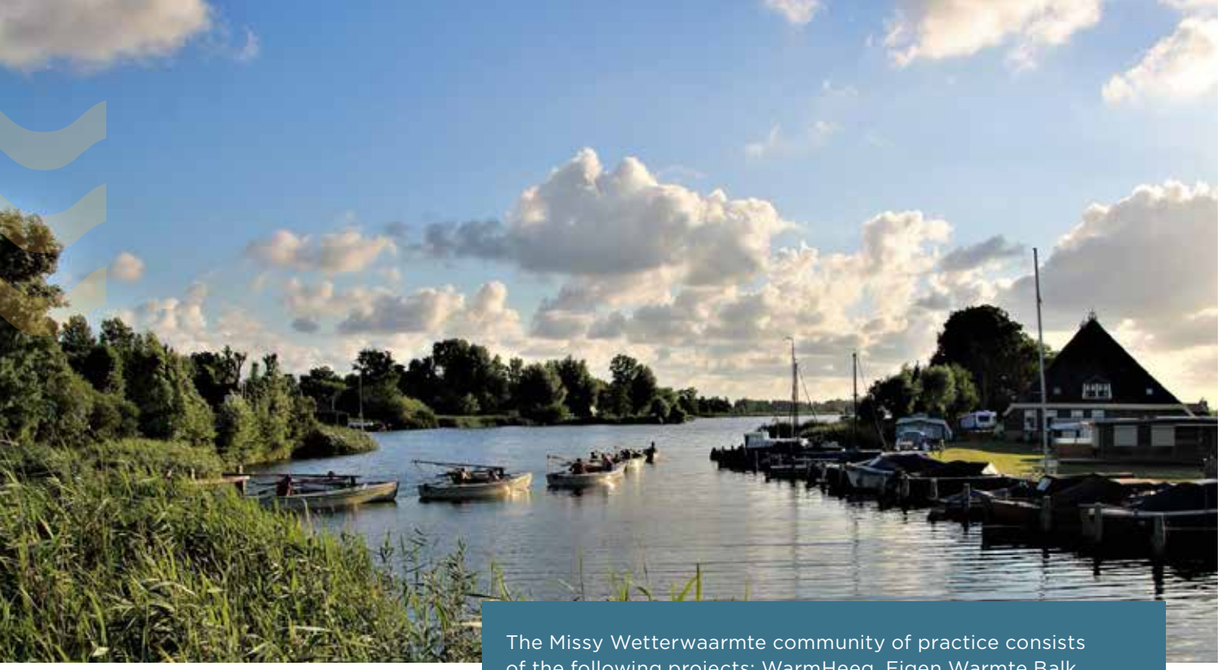
Distribute knowledge

We think it is important to be close to our projects, to let us eliminate bottlenecks quickly to keep the momentum going. That is why we have a project team in which the consultancy firms Waterprof, EXTRAQT and Ekwadraat united and became part of the mission. They are focusing on the community of practice that has united the 14 leading heat projects across Fryslân and organizes meetings 4x per year at which we address the issues of the projects, such as funding strategy, governance, project development and participation.

The knowledge we gain here and that the projects gain through their own project development is bundled and prepared for the next round of heating-related projects in Fryslân at the *Energiehuis* (Energy House) as a helpdesk for initiatives. At the same time, in our role as local authorities, we are looking at what part we can play in forming heat companies, and also at which bottlenecks we can remove from very practical things such as permits and development financing.

Align legislation

The community of practice is also the place where we can see that the current and upcoming legislation does not fit our projects. We see that many of our projects are ineligible for subsidy flows because they would be simply too small. You do not qualify for WIS subsidy



The Missy Wetterwaarmte community of practice consists of the following projects: WarmHeeg, Eigen Warmte Balk, WarmKoudum, Warm Tjerkwerd, Reahûs, Terherne, Baard, Gasvrij Bedrijventerrein Vlieland, Terschelling (port area), Proeftuin Anjum, Fûgellân, Workum and Heechterp.

until 1500 connections, for example. That boundary of 1500 brings more restrictions because the upcoming Collective Heat Act states that commercial parties are also allowed to engage in projects of a smaller scale. We do not see this happening in reality but the theoretical possibility makes those kinds of projects more likely to be flagged as projects with government support.

Current legislation, based on current district heating

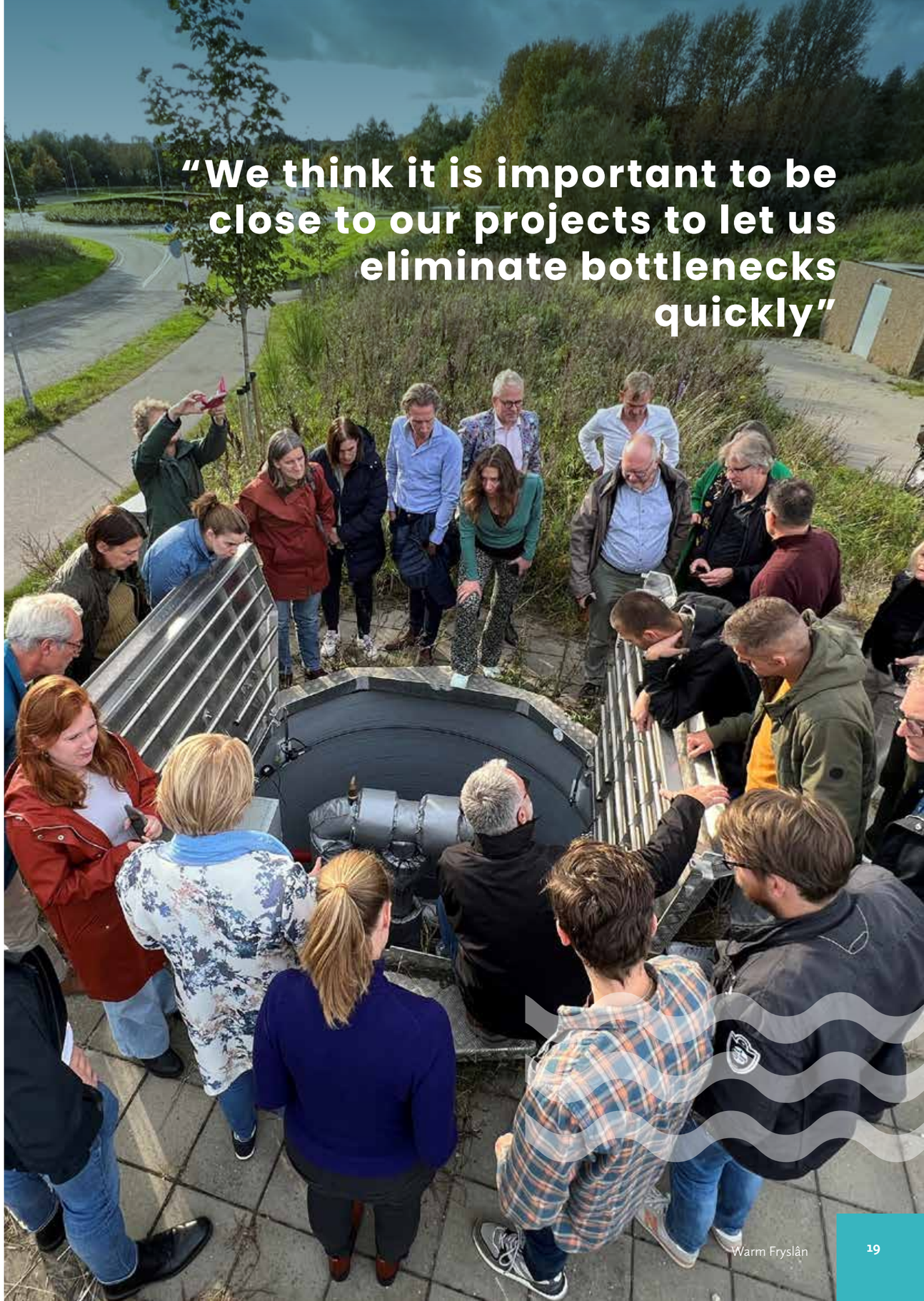
Another important point is the business case for district heating. In the Netherlands and within the contours of the legislation and subsidy flows, standard key figures are used to calculate the completion of a project. These are compiled based on existing projects, usually managed by commercial parties. In practice, this often means that a project has to be written off within a short period of 25 or 30 years and returns of 6% should be seen as ‘normal’, whereas our projects assume 40-50 years and zero returns, simply wishing to supply fellow villagers with affordable heat.

“We sometimes joke that we are also increasing the chances of an Elfstedentocht, the great Frisian skating event, by cooling down the water.”

That is why the practical knowledge and the common sense with which our projects are created deserve a place in the regulations and the promotion of sustainable heating in the Netherlands.

Mission team provinsje fryslân / provincie fryslân · Gemeente Súdwest-Fryslân · Wetterskip Fryslân · Gemeente Leeuwarden · Gemeente Terschelling · De Fryske Marren

Partners ekwadraat architects of the sustainable chain · EXTRAQT · waterprof

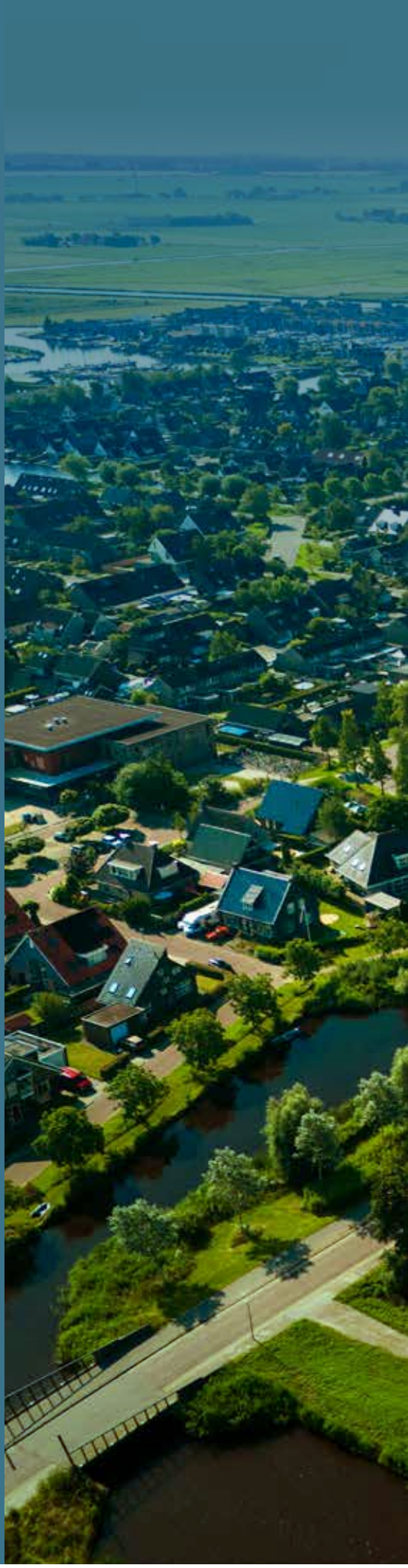


Missy Wetterwaarmte

“In Fryslân, we’re accelerating the heating transition through the broad application of collective district heating and aquathermal energy in the built-up environment. We are facilitating local initiatives and ownership.”

To fulfil our collective aim, our objectives are:

- To have 60,000 Frisian homes and 10,000 business premises connected to collective heating systems by 2030.
- To have five demonstration projects using aquathermal energy by 2025.
- To have a central helpdesk by 2025 that will help local initiatives further.
- To set up an active learning network for aquathermal energy of fifty organizations by 2025.



In the next Warm Fryslân:

- **National and international cooperation (interview with NPLW and the Danish Energy Agency)**
- **Deep Dive II, the insights gained**
- **Cooperation on governance (at the Frisian and European levels)**
- **The Frisian approach in “De Mienskip” (the community)**