

wættërwaarmte

Warm Fryslân



Danish Inspiration
for a

Frisian

Approach

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“Collective heat is the key to a sustainable future,” says alderman Evert Stellingwerf. And Leeuwarden is leading the way!”



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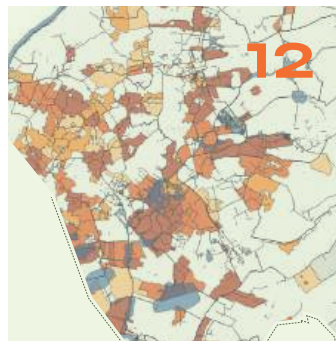
Heat from Balk?
The Eigen Warmte
Balk project is
about to get started.



Balk is
almost
ready
to go!



From pilot projects to practice:
Leeuwarden continues with
collective heating.



Friesland holds a golden
opportunity: aquathermics
can meet 33% of its heat
demand.



Trust is the key to success.
What can we learn from
the Danish model?

Colophon

Warm Fryslân edition 3, April 2025

Editorial team Wetterwaarmte, Municipality of Súdwest-Fryslân, Fresh Currents (Maurice Schut, Maaike Jonker, Elise de Jong)

Design Fresh Currents (Maurice Schut, Kenny Venekamp, Sybrand Klompstra) Photography Fresh Currents (Bart Lindenhovius)

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Every day, the sun heats Friesland's waters. Imagine we could harness that heat in a smart and efficient way? That's the exact aim of the Wetterwaarmte (aquathermal energy) project. We're accelerating the transition to sustainable heating through aquathermal energy: extracting heat from water. This isn't fantasy, but real projects that prepare Friesland for a fossil-free future. Innovative, feasible, and Friesland at its best.

In Friesland, water is a way of life. We sail on it, we swim in it, and we drink it. But we can do more; water can also heat our homes. By exploiting the technology of aquathermal energy, we can capture and store solar heat from surface water, and use it to heat buildings and homes. This process leaves the landscape untouched while making smart use of a dynamic resource.

Turning potential into reality

The technology exists and offers immense possibilities. Despite this, aquathermal energy is still an untapped resource that we have to develop together. The Wetterwaarmte Project is making this vision a reality. We're removing barriers, bringing stakeholders together, and accelerating progress. Our projects have already demonstrated how Frisian villages and towns can generate their own local, sustainable heat.

Let's keep Friesland warm together

The Wetterwaarmte Project is more than just an innovative idea; we're a movement. We're collaborating with governments, cooperatives, businesses, and educational institutions to make aquathermal energy a major success in Friesland. Our ambition? To have tens of thousands of homes and businesses connected to heat networks powered by aquathermal energy by 2030. After all, we believe Friesland is not only rich in water, it is also rich in heat.

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Millions invested in heating up Balk

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“After all, this transition is about more than just technology; it is fundamentally a social shift, where affordability and public engagement play a crucial role.”



wetter
waarmte

This is where the ripple begins

We're setting an example for the rest of the Netherlands.



Evert Stellingwerf
Councillor at the Municipality of Leeuwarden

The transition to sustainable energy is one of the great tests of our time. Shifting from fossil fuels to sustainable heating is associated with various challenges, from pressure on our electricity grid and spatial planning to securing public support.

In Leeuwarden, we have access to unique and promising energy sources such as geothermal and aquathermal energy. These technologies allow us to reduce our reliance on natural gas and significantly cut CO₂ emissions, while respecting our beautiful natural surroundings and Friesland's waterways at the same time. Moreover, these collective heat sources can help ease grid congestion.

Together with our residents, businesses, and knowledge institutions, we're working on fully harnessing the potential of sustainable heating. We've already launched several collective heating pilots and projects in Leeuwarden. These address both the technical possibilities and the impact on our environment, as well as the importance of collaboration in the community. After all, this transition is about more than just technology; it is fundamentally a social shift, where affordability and public engagement

play a crucial role. We must move forward together to create a sustainable future, both for ourselves and for future generations.

The reality can be challenging, of course, but by working together, we can make steady progress. By investing in collective heating solutions and diverse sustainable heat sources, we can heat our homes, schools, and businesses using innovative and sustainable methods, and even supply heat for industrial processes. This requires us, as a local government, to take a more active role. Even though we're still in the exploratory phase, we're already stepping in to support initiatives in various areas. Our participation in public-private projects and support for grassroots initiatives demonstrates our commitment to the heat transition.

I firmly believe that collective heating solutions using geothermal and aquathermal energy will play an essential role in our hybrid energy system of the future. These technologies not only help us achieve our climate goals, they also contribute to a healthier, more liveable environment for us all. Through our projects, we have the opportunity to set an example for the rest of the Netherlands.

Let's seize this moment, roll up our sleeves, and make Leeuwarden and Friesland even more sustainable and beautiful!

Kind regards

Evert Stellingwerf
Councillor at the Municipality of Leeuwarden

Balk is almost ready to go!



Goffe Venema
Eigen Warmte Balk

Balk Heating Network Makes Significant Progress and Tackles Challenges

The proactive approach in Balk to establish a district heating network has not gone unnoticed. The Eigen Warmte Balk project, an initiative by Energie Coöperatie Gaasterland (ECG), recently became only the second project in the Netherlands to secure a one million euro loan from the Dutch Heating Development Fund. This confirms that the project is on track and has a strong chance of success. However, it's important that enough Balk residents express an interest in connecting to the heating network during 2025.

"We're making great progress," says project leader Goffe Venema. "In December 2024, we completed the preliminary design. It provides a clear plan on how we can convert 1,400 older terraced and corner houses in Balk from natural gas to district heating. AVK Plastics, the company supplying the residual heat, is also investing in the thermal energy storage system required for the system. This result is a real win-win situation for our project and AVK Plastics."

Beyond technical advancements, communication is a key priority. "Keeping residents informed and engaged is essential," Goffe explains. "Given this, we're publishing a community newsletter in early 2025. We're also developing an informational animated video, and will host another village meeting on 9 April. The more Balk residents sign up for the heating network this year, the better it will be for the project's development and funding."



2021

Project starts with signing letter of intent

2022

Kick-off meeting of Eigen Warmte Balk

March 2023

Multi-year subsidy granted by the municipality of De Fryske Marren

November 2024

Major breakthrough – €1,000,000 granted by the Heat Development Fund



DE FRYSCHE MARREN

Local Cooperation

According to Goffe, Eigen Warmte Balk has reached this stage largely thanks to multi-year subsidies from the municipality of De Fryske Marren. The loan allocated by the Heating Development Fund at the end of 2024 has secured further development of the project. "Support from local partners is also crucial," Goffe adds. "AVK Plastics is making a significant investment, and Dynhus is helping fund our information centre. The housing association is also playing an active role in communicating with tenants. We need their interest regardless of their commitment." The municipality, one of the project's key partners, has commissioned the Danish firm PlanEnergi to further optimise the heating network for Balk. "We're using their insights to refine the design," explains Goffe. "The preliminary design should be ready by the end of 2025."

Challenges and National Developments

Although progress has been overwhelmingly positive, challenges remain. "The business case is viable but nerve-racking," Goffe admits. "On a national level, we can expect various changes. The Heat Network Investment Subsidy (WIS), for example, has been available for two years now. The Collective Heating Act is expected to come into effect in early 2026, linked to a National Guarantee Fund for heating networks.

The question is whether sufficient consideration is being given to heating projects for villages, as most district

heating networks are currently being developed in urban areas where homes are closer together. "In Balk, our situation is very different," Goffe explains. "As a result, we need a longer pipe network, which makes it more expensive and has a negative impact on our business case. Despite these challenges, we're ahead of the curve nationally in developing a village-based heating network. In fact, only the Warm Heeg energy cooperative is doing better."

Working Together for a Sustainable Future

Goffe is pleased that Frisian heating projects are joining forces under the provincial Wetterwaarmte aquathermal energy programme. "This collaboration is essential to drive the heat transition forward in rural areas." In the meantime, Balk is pushing ahead with its heating network. "There's no stopping us now. We're moving in the right direction. For homes in the heart of our village, there's no affordable alternative to replace natural gas. If we were to stop, it would mean that residents of the oldest homes, potentially those with lower incomes, would remain exposed to high and unstable gas prices. That's simply not an option. In any case, all those involved and a large percentage of the community support this project. Together, we're going to make the heating network a reality!"

More info?

Check out www.eigenwarmtebalk.frl or follow the project on LinkedIn, Instagram, or Facebook.



Project leaders

Eigen Warmte Balk
Tjeerd Osinga en
Goffe Venema

Heat sources:

aquathermics (TEO) from the Luts, combined with an ATES system and residual heat from AVK Plastics

Number of residents:

4255

Number of homes:

1848

Heat solution

Heat network for 1400 homes and 75 utility buildings and individual heat pumps (all-electric) for 525 homes



End of 2024

Preliminary design of the heating network completed

2025

House-to-house newsletter informs all residents



End of 2025

Draft design completed

2030

End goal:
Balk free of natural gas

Leeuwarden's Path to Sustainable Heating



Michiel de Boer
Policy Coordinator for Energy Transition
Municipality of Leeuwarden

Heat Transition in Leeuwarden

- 2019** First vision on sustainable heating published
- 2020** Start of broader energy policy with the Leeuwarden Energy Agenda
- 2021** Adoption of the Heat Transition Vision
- 2021** Start of geothermal project in Leeuwarden
- 2022** First drilling for geothermal project carried out
- 2024** Restart of geothermal project in collaboration with Ennatuurlijk
- 2024** Start of district heating cooperation in Heechterp: letter of intent signed
- 2026/2027** Expected start of heat supply through the geothermal project

Like many other municipalities, Leeuwarden has a history of active engagement with sustainability, the energy transition, and specifically, the heat transition. In 2019, the municipality published its first vision on sustainable heating in the form of the “Heat Guide: On the Road to Sustainable Heating.” This document outlined the future of Leeuwarden’s heating supply, envisaging a heat network as an open and flexible system.

This system was designed to both accommodate future heating demands and provide space for new providers and consumers. At the time, there were no regulations allowing third-party access to existing heat networks. However, there was a possibility to change this in the future with amendments to the Heat Act.

Broader Energy Policy and Focus on Collective Systems

In 2020, the municipality of Leeuwarden introduced a broader energy policy; the Leeuwarden Energy Agenda. This was followed in 2021 by the Heat Transition Vision. Both documents emphasised the importance of collective heating systems, particularly through geothermal energy.

This approach was considered promising for large parts of the city, given their location along the proposed heat network. However, the project found itself facing various challenges. The initial geothermal drilling proved difficult, and disappointing results meant further research was required before considering a second drilling attempt. Plans for the second drilling were halted when Minister Jetten unexpectedly introduced new conditions in his infamous letter, and the geothermal project was put on hold.

Accelerated Action by the Municipality

Although the geo-consortium of parties involved in the project paused its activities, the municipality decided to accelerate its efforts. A study, launched to determine which organisation could take on the public majority interest, indicated that the municipality of Leeuwarden itself was best suited for this role. This meant more than just participation; it required the municipality to respond to the question of how it could take an active role in guiding the implementation of collective heating systems. The study also provided a set of conditions and principles that now form the basis of the municipality's approach to managing these projects.

24 apartment blocks

Project managers

Housing association Elkien

Heechterp

One of the first projects launched under these principles is in the Heechterp neighbourhood. Here, a large-scale redevelopment is planned, replacing 24 blocks of flats with new, sustainable flats. In collaboration with housing corporation Elkien, the municipality sought a suitable partner to develop a collective heating system. This search led to a partnership with Bouwgroep Dijkstra Draisma, with whom a letter of intent (LOI) was signed in January 2024.

The plan includes connecting all new buildings in Heechterp to the heating network, while also offering existing residents in houses that will not be demolished the opportunity to participate. Affordability and sustainability are central to this initiative. The solution has to be both sustainable and attractively priced. A 30% discount on the fixed charge has therefore been agreed, alongside an additional 5% discount on the rates set by the ACM. The involvement of the Elkien housing association, which manages a large number of homes, will ensure that the project is financially viable, with investment and overall costs kept at competitive levels compared to alternatives.

The plan is to establish a joint heating company, with the Municipality of Leeuwarden and Bouwgroep Dijkstra Draisma each holding a 50% stake. Both parties share the ambition to pass on any positive financial returns to end users through lower tariffs. The final details are currently being worked out, so that the plan can be submitted to the municipal council for approval in early 2025.





Geothermal energy

The geothermal project in Leeuwarden has been restarted. This unique project, located in the south of the city, will generate sustainable heat by extracting geothermal energy from approximately three kilometres underground. This heat will then be distributed via a heat network to part of Leeuwarden, so this geothermal project has the potential to play a major role in making heating in the city sustainable.

After a period of inactivity due to uncertainties surrounding new regulations, discussions with heat supplier Ennatuurlijk have paved the way for progress. The Municipality of Leeuwarden and Ennatuurlijk have agreed on a public-private partnership to jointly operate the heat network. This decision was formalised in an addendum to earlier agreements regarding the heat network in the southwest of the city. Residents will receive a non-binding offer to connect to the network.

In the coming months, new plans will be drawn up for further drilling and network installation. If the drilling is successful, a start can be made on laying approximately 11 kilometres of pipelines. Initially, the network will provide contracted commercial customers with sustainable heat. If all goes according to plan, heat supplies will commence by late 2026 or early 2027.

If municipal involvement in a joint heating company becomes necessary, this will be presented to the municipal council for approval. This geothermal project offers us a unique opportunity to provide the city's residents with affordable, sustainable heat.

New construction

Heating solution:
collective heating system

Middelsee

A similar approach is being taken in Middelsee, with the key difference that this project only concerns new housing, and no housing associations are involved. The focus is on developing a collective heating system for flats, terraced houses, semi-detached houses, and buildings such as a supermarket and a school.

An initial feasibility study has been conducted, alongside a technical assessment. The results are promising, so the details of the project are being further elaborated. This includes determining the balance between public and private investment.

A Flexible Approach for Each Project

Each heat network project in Leeuwarden differs in terms of scale, technical setup, and specific role for the municipality. These projects demonstrate the municipality's commitment to the heat transition. Although we're still in an exploratory phase, we're actively working towards realising these initiatives. By maintaining a flexible approach, we can offer tailored support and guidance for each project to ensure that every neighbourhood and district receives a sustainable heating solution that meets the needs of both residents and businesses.

Michiel de Wit -
Process Manager
at the Municipal
Energy Company



Sacha de Haan -
Project Manager for
Aquathermics and
Collective Heating at the
Province of Fryslân

The First Frisian Energy Company

The urgency of the energy transition has never been clearer. Climate change, rising energy costs, and the need for energy security demand action. As municipalities, we can no longer afford to wait, so the municipality of Súdwest-Fryslân is establishing its own municipal heating company.

Fortunately, we don't have to reinvent the wheel, as there have been successful district heating networks in Denmark for more than sixty years. The approach there, based on collaboration and social responsibility, aligns perfectly with the 'Fryske Mienskip' (Frisian community spirit).

We have made a conscious choice to prioritise local ownership, guided by our own principles. In 2019, we collected input from a citizens' forum, and these core values now shape our company. If they are reassessed at any point in the future, any revised principles will continue to guide our approach.

Self-determination:

"We want to maintain control over our own future."

Collective responsibility:

"We're in this together, side by side."

Fairness:

"We make sure benefits and costs are shared fairly."

Future-proof approach:

"We're building a sustainable, stable future."

Sustainable energy is a great concept, but only if it's affordable for everyone. The objective underlying our municipal heating company is to ensure that all households in Súdwest-Fryslân can live comfortably without facing skyrocketing energy bills. At the same time, we want to make the heat transition as easy as possible for our residents. Not everyone has the time or financial resources to navigate this shift alone, which is why we're doing it together. A public heating company which fairly distributes both the benefits and burdens allows us to ensure that no one is left behind in this transition.

Establishing a municipal heating company is no small task. It requires investment, political support, and strategic decision-making. Concerns about feasibility and risks are valid and merit serious consideration. That's why we're working closely with experts, stakeholders, and international partners to make this initiative a success.

The benefits far outweigh the challenges. Investing in local energy infrastructure is an investment in our local economy. By keeping energy revenues within the region, we stimulate job creation, support businesses, and strengthen our communities. At the same time, we reduce our dependence on external energy markets. As a result, our residents can rely on affordable, sustainable heating that maximises the use of local heat sources instead of relying on imported gas. With this initiative, we are taking the first steps towards energy independence in Súdwest-Fryslân.

We urge other municipalities to seize this opportunity, and take proactive steps instead of waiting for the market to solve energy security and affordability issues by itself. Establishing a municipal heating company is a bold move, but a necessary one.

The energy transition is already underway. Will we allow others to decide our future, or should we take control ourselves? Are we going to build a sustainable, fair, and economically stable society together?

In Súdwest-Fryslân, we've already made our decision and we invite others to do the same. Together, we can create a future where heat is a public good, and where sustainability, affordability, and local prosperity go hand in hand.

The Hidden Energy of Friesland

Mapping the potential and usable aquathermal energy in Friesland

To accelerate the adoption of aquathermal energy, a detailed assessment of its potential in the province of Friesland was conducted. Previous studies concluded that at least 60% of the province could be heated using aquathermal energy.

However, these studies lacked sufficient detail. In particular, they did not establish a direct match between different water bodies and consumers at a very local level. In many areas, there are substantial aquathermal energy sources but few consumers nearby, while in other locations, there is high demand but limited aquathermal energy available. To determine the potential and usable aquathermal energy available, the consultancy firm EXTRAQT conducted a new potential aquathermal energy study that takes into account local balances between supply and demand. If potential aquathermal energy locations are better mapped, promising locations can be efficiently prioritised and progress more smoothly towards the installation phase.

Simulating a dynamic aquathermal energy source

This study first assessed the potential aquathermal energy at the level of individual water bodies before allocating it to consumers. A realistic assessment of this potential was carried out using a dynamic method. This approach takes into account various time-specific and location-specific parameters, including local regeneration, local variations in water depth, mixing effects within water bodies,

fluctuating thermal profiles, localised impact effects, and cumulative impact effects.

The study also looked at local effects in water bodies. This is because the simulations take into account the fact that consumers preferably extract heat from the closest available location, which can quickly lead to critical bottlenecks. The study was carried out as far as possible according to the guidelines set out in the Cold Discharge Framework 2.0, developed at the national level and adopted locally by the Water Board (Wetterskip). In other words, the local effects in the simulations were assessed against the restrictions set out in the framework, in order to determine the maximum permissible potential aquathermal energy. Although the current framework lacks concrete guidance on accounting for the cumulative effects of multiple installations, it is crucial to consider the interplay between different heat extractions by consumers from interconnected water bodies. The simulations were therefore conducted with this factor in mind.

Excess of potential aquathermal energy

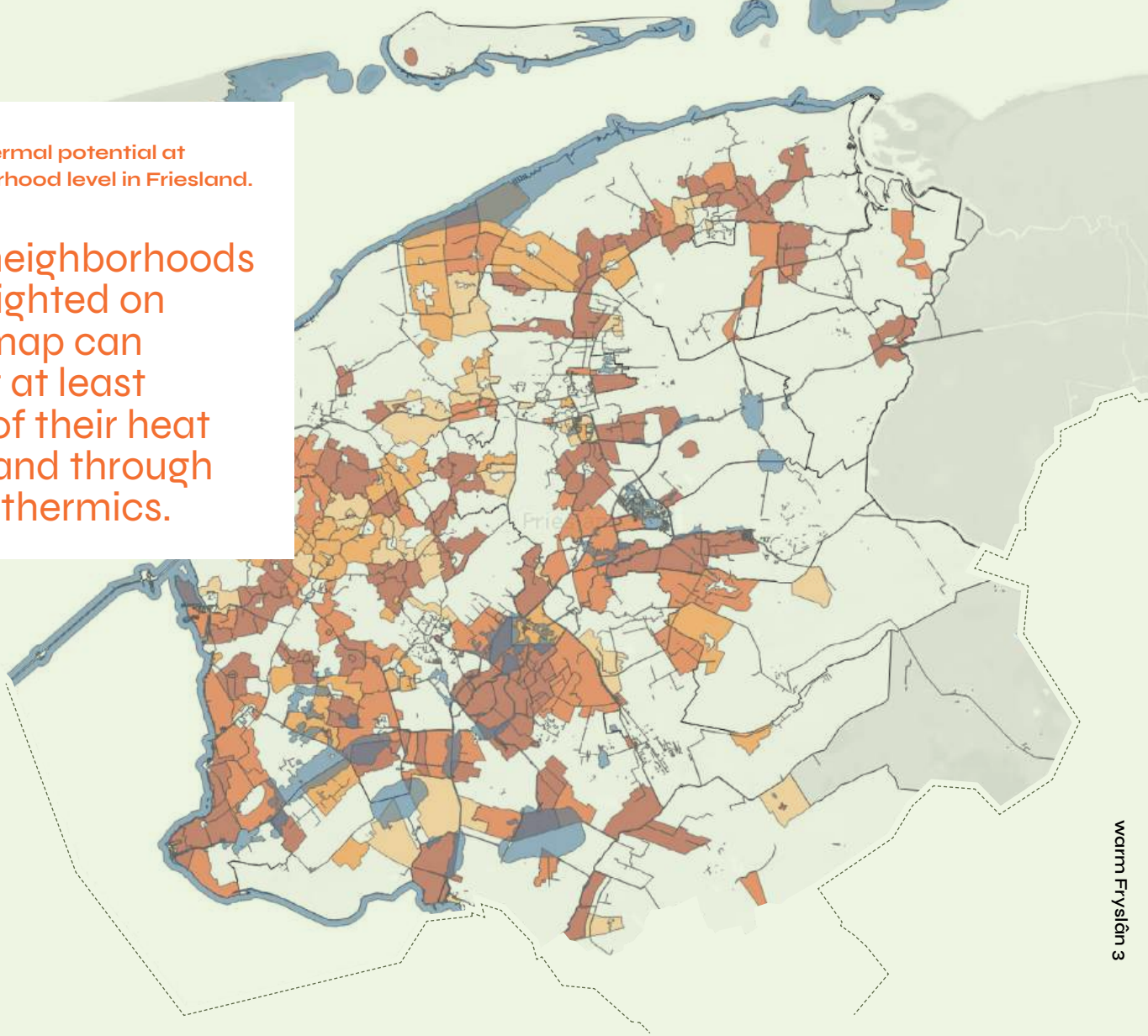
The simulations indicate that Friesland has an abundance of potential aquathermal energy. In fact, it exceeds the province's total heat needs.

Article: Heat Friesland 3.0

Friesland is clearly a water-rich province with significant aquathermal potential. The total potential aquathermal energy at source is estimated to be approximately 350% of the total provincial heat demand. However, much of the heat demand is concentrated in dense urban areas where the local potential aquathermal energy is often limited. On

Aquathermal potential at neighborhood level in Friesland.

The neighborhoods highlighted on this map can meet at least 75% of their heat demand through aquathermics.



warm Fryslân 3

the other hand, there is substantial potential aquathermal energy in areas with relatively few consumers. As a result, it is crucial to establish a clear connection between supply and demand to determine a realistic and feasible level of aquathermal energy usage.

Converting potential at source into usable potential

To determine the usable potential, the locally available source potential was allocated to nearby consumers, up to the available limit. In areas with high demand, prioritisation is necessary as not all consumers can be served. This study addressed this with a distribution model that considers various parameters, including proximity to water, heat demand density, energy poverty index, infrastructure constraints (e.g., railways, roads, pipelines), individual or district heating connections, and so on. Using the broadest possible distribution model (allowing maximum connection opportunities), the study revealed how much of the required heat can realistically be supplied by aquathermal energy. The results indicate that aquathermal energy can cover 33% of the total heat demand in the province. This contrasts sharply with the theoretical 350% source potential previously mentioned.

The findings highlight that many consumers are clustered in areas where the source potential is relatively low. They also underscore the significant role that aquathermal energy can play in Friesland's energy transition. In fact, one-third of the province's heat demand could be met directly by aquathermal energy, without the need for additional integration with underground thermal energy storage (TES).

From potential aquathermal energy map to implementation

From mid-2025, the potential aquathermal energy maps from this study will be publicly available. An online viewer will enable users to analyse aquathermal heat availability down to the neighbourhood level. Additionally, the source potential per water body will be shown. This information will be very valuable for various applications, particularly in developing source strategies for sustainable neighbourhood heating. The potential aquathermal energy map will serve as a foundation for accelerating the energy transition through aquathermal energy, and the province can continue to count on our collaboration in this effort.



“It ljocht skynt op de weagen,

Harmen Wind

“The light shines on the waves, the world grows warm.”

Photo: Bart Lindenhovius – Just after sunrise, Afsluitdijk, IJsselmeer

A wide-angle photograph of a sunset over a frozen body of water. The sun is a bright, glowing orb on the left side of the horizon, casting a long, shimmering reflection across the ice. The sky is a gradient of soft colors, from pale blue at the top to warm orange and pink near the horizon. The water is covered in a layer of broken ice floes, reflecting the sunset light. In the lower-left foreground, a concrete pier or breakwater structure is partially visible, its edges also covered in ice. The overall mood is serene and cold, contrasting the warmth of the sunset with the chill of the frozen water.

de wrâld wurdt waarm”

deep dive

project confidence





Danish Inspiration for a Frisian Approach



Michiel de Wit
Process Manager
at the Municipal
Energy Company



Sacha de Haan
Project Manager for
Aquathermics and
Collective Heating at
the Province of Fryslân

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How can Frisian municipalities successfully shape the heat transition? Project Confidence seeks answers by drawing on Danish expertise and translating these insights into the Dutch context. In collaboration with the Danish Board of District Heating, the Municipality of Súdwest-Fryslân, Enber, and other partners, the project is developing an approach to collective heating.

Denmark is a global leader in district heating. The latest figures from the end of 2024 show that 1.8 million Danish households, some 3.7 million residents, had access to green heat. In the Netherlands, however, many district heating projects have struggled, with major players such as Eneco and Vattenfall putting them on hold. District heating is nevertheless essential for a socially and financially viable heat transition.

Friesland aims to follow Denmark's lead, so that we, too, can enjoy affordable, sustainable heat in the future. How do we build the confidence to adopt this approach?



Historic City Hall of Bolsward

Confidence in Governance, the Community, and Citizens

The heat transition is a major challenge that requires organisation, investment, and, above all, confidence; the latter is at the heart of Project Confidence. Through a series of deep-dive sessions, Dutch and Danish specialists explored solutions together. Some key topics included establishing municipal heating companies, developing a robust financial model, and building confidence in governance, community, and citizens.

Organisational Models

In the Netherlands, uncertainty surrounds the implementation of the heat transition. The hurdles include ongoing debates about legal structures, namely whether heating systems should be private, public-private, or cooperative ventures.

One of the key lessons from this project is that a successful heat transition begins with strong municipal leadership and a phased approach. The most promising areas should be developed first, with quick wins funding the expansion to less viable regions. This keeps profits within the community, and helps finance the next phase of development. A key first step here is identifying heat demand and available residual heat sources.

Jens Andersen, director of heating company Næstved Fjernvarme:

“A masterplan is essential. Start in neighbourhoods that have high heat demand and room for expansion. Make bold plans, but start small.”

Municipal heating companies need stability and long-term financing to make forward-looking investments. This provides clarity for residents, housing corporations, grid operators, energy producers, and construction firms about where and when heating networks will be implemented. The municipality can then coordinate plans and ensure the transition is fully integrated.

Johan Sølvhøj, director of heating company Egedal Fjernvarme:

“The strength of the Danish model lies in public control and economies of scale. Local ownership keeps tariffs low and ensures that profits stay in the region. The Netherlands can learn from this.”

There is also still much to learn about how to successfully install heating networks in the Dutch context. This includes understanding different heat sources, storage solutions, Dutch regulations, and the construction process itself. By taking action, we can gain these insights, so that the same mistakes are not repeated in future projects.

Financial Lessons

In Denmark, communities of all sizes have successfully financed their own public heating companies. Examples include Søndersø, with just 1,400 residents, and at the other end of the scale, Copenhagen, where 98% of its 638,000 inhabitants receive heat from district heating.

The Netherlands, however, takes a static approach. Many projects rely on a single, often electric, source in which energy storage plays a minor role. As a result, they remain



Cultural Centre 'De Tijd', Bolsward



CONFIDENCE-partners

dependent on electricity prices, are unable to operate in balancing markets, and cannot alleviate grid congestion.

Our focus also tends to be on technical design, with financial calculations based primarily on maximum capital expenditure (CAPEX) and operational costs (OPEX).

Revenue projections are often based on the rates set by the Dutch Authority for Consumers and Markets (ACM) and subsidies, with the assumption that a government body, possibly still unidentified, will fully guarantee financing. Financial insight and expertise are frequently lacking, even though they are essential for a successful business case. Another hurdle is that the Dutch approach tends to insist on 100% renewable energy from the outset, which can drive up costs to the point where projects become unfeasible.

—
Bernard Stornebrink,
Senior Energy Finance Specialist
at Enber:

“Sønder Felding operates a fully stocked heat storage tank, has reduced grid congestion, and earned €50,000 in a single week. This demonstrates the synergy between infrastructure, financial planning, and entrepreneurship.”

The Danish perspective is different. Their focus is on electricity purchase prices, and they enjoy greater flexibility by using large storage buffers and multiple heat sources. When electricity prices are low, they run their electric heating systems and fill their storage tanks. When prices rise, they use the stored heat.

They are also not bound to a rule of using 100% renewable energy. Instead, they ensure that sustainable sources cover most needs, while keeping a gas boiler as a backup for the coldest days.

Building Confidence

With so many failed projects across the Netherlands, how can municipalities invest in district heating? A successful heat transition has to be technically and financially feasible, and win the engagement and confidence of all those involved. It is also important to spend time on these stakeholders, and listen to their concerns.

This begins with a transparent, step-by-step approach, involving local councils, residents, and businesses in decision-making.

—
Marie-Louise Lemgart,
Energy Consultant at the
Municipality of Høje-Taastrup:

“Confidence is built by involving municipalities, businesses, and residents from the very beginning. Clarity about costs and benefits is essential.”

For councillors, this means regular information sessions, face-to-face discussions, and a clear decision-making timeline. This enables them to assume ownership of the process and address concerns promptly. Danish heating companies operate with full transparency, which helps cement public confidence. We intend to adopt this principle in Friesland's municipal heating company. Partnerships with local businesses will explore the potential of residual heat and its integration into the heating network.

The focus is currently shifting from pilot projects to a comprehensive municipal heating plan, in which we build a shared vision that strengthens confidence in district heating. Together, we can provide affordable sustainable heat for Friesland with the support of the community.



Jasper de Vries
Energy Transition Advisor

Against the current

Becoming climate neutral one step at a time

Aquathermal energy is considered an increasingly important resource in Friesland's energy supply, particularly for heating buildings. Although this is a very positive development offering all kinds of opportunities, we must carefully consider the potential long-term effects on our water and soil systems.

For this reason, a low-temperature heat network ($< 25^{\circ}\text{C}$) is preferable to a medium-temperature network (55 to 70°C), especially given the minimum 50-year lifespan of such networks. A medium-temperature network is less suitable for aquathermal energy and other low-temperature sources and storage methods because it places a greater burden on the water system due to the following factors:

- More energy has to be extracted, due to heat losses during transport underground.
- Upgrading to accompany these higher source temperatures reduces generation efficiency, which has to be compensated.
- Large-scale implementation is required to create a viable business case, which in turn means that significant localised heat will be extracted at a central location of demand.
- Using other sustainable heat sources becomes more complicated, which reduces the diverse use of such sources and increases pressure on the selected source.

From a water quality perspective, it is preferable to minimise disruption to surface water, particularly at critical times of the year. For this reason, it is better to distribute heat extraction over different locations and times. Additionally, it can be useful if existing and new underground energy systems for heating buildings can be integrated into the heat network, as it enables summer cooling without discharging excess heat into surface water. This helps reduce pressure on surface water extraction.

If heat from a low-temperature network is upgraded within individual buildings by heat pumps to the level required for central heating, the electricity required by these heat pumps is more evenly distributed, and the integration of locally generated solar power is easier. Smart integration can also help alleviate grid congestion.

Moreover, the Energy Performance of Buildings Directive (EPBD) and building regulations have stipulated for a number of years that all heating systems in new-build and major renovation projects must be designed to operate at the lowest possible temperatures. This means that over the lifespan of a newly developed heat network, the demand for high temperatures will decrease significantly or even disappear altogether. To avoid heat distribution capacity being linked with higher temperatures than necessary and the associated transport losses and efficiency reductions when upgrading, it is advisable to opt for low-temperature or even source-temperature heat



From Standby to Action

networks from the outset. Buildings that still require higher temperatures can be fitted with individual heat pumps for this purpose. This allows for solutions tailored to each individual building, and as insulation and heating systems are upgraded in the future, the demand on aquathermal sources will decline more rapidly.

A common argument against source-temperature heat networks is that higher temperatures are necessary to heat buildings to a comfortable level. This is mostly raised in relation to older, poorly insulated homes or neighbourhoods. However, in many of these cases, the existing heating systems are already outdated and due for replacement, or could in any case be replaced without premature write-offs of existing infrastructure. Upgrading to new low-temperature heating systems at this stage is therefore both practical and cost-effective. Properly designed low-temperature heating systems can deliver sufficient capacity without compromising comfort; on the contrary, they can even enhance it.

A heat pump connected to a stable source, such as a source-temperature network, will not experience major temperature fluctuations on the evaporator. This allows a stable supply of both heating and hot water to a building. Adding buffer capacity in homes can further optimise the system by smoothing out demand peaks, improving heat pump efficiency, and allowing the buffer tank to be heated at the most favourable times.

Furthermore, if insulation measures are later added to a home, the required heating system temperatures can be lowered even further, reducing the electricity consumption of the heat pump. This limits the impact of individual home upgrades on the heat network, because while more energy is extracted from the network, higher heat pump efficiency (COP) stabilises (in part) the overall demand due to reduced power requirements.

In summary, every home in the Dutch climate is suitable for a heat pump, provided it is properly selected and sized. Heat pumps perform best with a stable heat source and distribution system.

This approach allows us to accelerate the energy transition, as it eliminates the need to first upgrade insulation in every home before proceeding to the next stage. It also avoids inefficient interim solutions that would otherwise be necessary simply because a small number of properties are not yet ready for the transition. Another advantage of low-temperature or source-temperature heat networks is that alternative, more cost-effective materials can be used, reducing the costs of underground infrastructure installation.

Reahûs Caught in the Heatwave



Andries Metz
Project Lead Aquathermics and
District Heating – Province of Fryslân

Students Warm Friesland Up to Aquathermal Energy

In the Frisian village of Reahûs, things have been bubbling for a while. Nine bright minds from the University of Twente are spending ten weeks working on Heatwave, a hands-on project focused on the heat transition in Fryslân. The goal? A groundbreaking solution that blends technology, economics, and social impact. Could this “heatwave” change our province for good?

“We take the students out of their ivory tower and drop them right into the Frisian clay,” says Thomas Hoppe, Professor of Sustainability of Rural-Urban Systems at the University of Twente. “After more than six months of theory, they finally get to put it into practice.”

That action is urgently needed is clear to all. And according to Arnold Burger, director at TheEarlybirds and Buurtwarmtewijzer, students play a key role in that transition. “They look at problems differently than we do – they spot opportunities we tend to miss.”

Over the coming weeks, the students – all enrolled in the master’s programme Environmental & Energy Management – will focus on aquathermics. “It’s a sprint – the ultimate race to gather as many ideas as possible, brainstorm, test, design, and improve,” says Friso Visser, founder of the creative brainstorming method Brain Fuel. “All with one clear mission: how do we prepare Reahûs for the future?”

A Sprint Toward Solutions

“Because the world is on fire and flooding at the same time. That doesn’t just require new thinkers, it requires new ways of working. Heatwave brings both together: sharp minds, creative solutions, and immediate applicability.”

**“The world is on fire
and flooding at the
same time.”**



Hoppe nods: "That's what makes this project so interesting. The students don't just look at it from a technical or economic perspective – they also focus on the social side of the story."

Because how do you get the residents of Reahûs on board? How do you make it practically feasible? In other words: real-world challenges.

More Than Just Theory

But the students aren't backing down. On the contrary – this is their chance to bridge the gap between theory and practice. "They're putting in even more hours than expected," says Hoppe. "That says it all."

And it's not just the students who are excited. Hoppe, Burger, and Visser are equally proud. For the University of Twente, it's a great opportunity to strengthen ties with local partners, municipalities, and the province. And for Brain Fuel, it's a perfect fit with their mission to solve 10,000 problems in 10 years.

"And of course, because Andries Metz, project manager for aquathermics and collective heating at the Province of Fryslân, asked us," laughs Burger. "We wouldn't want to disappoint him. Plus, it's a compact and well-defined challenge. We'll know a lot more in just a few weeks."

From Experiment to Flagship Project

The students are quietly working toward a final report full of recommendations. But if it's up to De Vries, that won't be the end of it. "We've only just begun. With this kind of drive, we can achieve so much." Burger agrees: "Every time I'm out on the road, I'm reminded of just how many opportunities the energy transition holds. Heatwave is exactly the kind of project that can turn those opportunities into results."

"Once the results are in, it's time to make noise," says Hoppe. "By drawing media attention to Heatwave, putting it on the province's agenda, and involving other educational institutions, we might even turn it into an annual event. That would be amazing!"

Heatwave is just the beginning. And once this wave starts rolling across our province, there's no stopping it.

heat
wave

Fair and Affordable Heating:
A Frisian Message to Policymakers

Bringing the Heat Transition out of the Cold

The potential of heating networks in our rural areas is greater than expected, according to research conducted with experts from Denmark and the Frisian working group Wetterwaarmte. The Municipality of Súdwest-Fryslân is already leading the way, aiming to connect 60% of the homes in its area to a heating network. A new municipal energy company is currently being set up to initiate this transition in collaboration with local communities.

Frisian heat map

Friesland is developing its own heat map, as the national Start Analysis by the Netherlands Environmental Assessment Agency (PBL) does not adequately reflect the needs of rural municipalities. For example, while the Start Analysis suggests that only 5% of Súdwest-Fryslân's homes could connect to a heating network, our research indicates a much higher potential, at least 60%. Together with our Danish partners, we are exploring innovative solutions for affordable heating, such as heat buffering and using low-cost electricity during generation peaks. This helps cut costs, and reduces grid congestion at the same time by making smart use of available energy.

Friesland is rich in own heat sources. It would like to use them in a way that ensures financial benefits flow back to its residents and their energy bills are minimised. Collective heating supply appears to be the most effective way to achieve this.

Heating Networks: A Hot Topic

Heating networks provide greater local control over energy pricing and help keep costs down. For residents, this results in lower and more predictable energy bills, as well as reduced initial investment costs. The social costs are also lower thanks to a more flexible energy system which can alleviate grid congestion and help to balance supply and demand. Individual heat pumps alone are unable to offer these advantages. Another very important benefit from a planning perspective is that collective heating solutions are easier to integrate into Friesland's landscape and historic towns and villages. Now that's something which warms our hearts!

Knocking on Doors with the Best Offer

This is no easy task, of course. It is something we are not accustomed to in the Netherlands; we are worried about over-complexity, and heating networks have a poor public image. Nevertheless, we need to show Frisians that, for many communities, this is the right solution. To do this, we must first sort out affordability and financing issues. After all, if a municipal energy company or energy cooperative presents an offer, it will only succeed if the proposal is both attractive and credible.

Creating the Right Conditions for Heating Network Success

Currently, there is no long-term national policy or framework to support the large-scale, affordable rollout of heating networks, especially in rural areas. The Danish experience shows that well-organised, collective heating networks are the cheapest and most reliable solution for sustainable heating. What works in Denmark can obviously work in Friesland and the rest of the Netherlands too!

A Frisian Appeal to the Netherlands:

1 A Level Playing Field for Alternative Heating Solutions

Heating networks are financially disadvantaged due to the uneven distribution of infrastructure costs. For example, residents on a heating network contribute to costs caused by heat pumps. It is impossible to justify this to residents. A fairer cost distribution for grid infrastructure is therefore necessary and just.

2 National Loan Guarantees

Local government guarantees are financially unsustainable in the long term. We are in favour of a permanent national guarantee scheme that supports investment in collective heating solutions.

3 Targeted Support for Local Heat Sources

Heat sources such as aquathermal energy and residual heat often go unused due to inadequate policy support and inappropriate subsidy schemes like the SDE++. More targeted funding, research, and financial instruments, such as grants or revolving funds, are needed to unlock the potential of these heat sources.

4 Encouraging Knowledge Sharing and Standardisation

Small-scale heating networks need dedicated knowledge-sharing platforms, standard approaches, and technical support, as advocated in the Heating Offer of the Warmtealliantie (Heating Alliance).

5 Enable Data Sharing with Grid Operators

Grid operators possess the most accurate data on household energy use, but are currently not allowed to share it with municipalities. This poses an unnecessary obstacle to the heat transition.

6 Access to Low-Interest Financing

Implementing these measures will make securing low-cost financing easier, particularly if it is nationally coordinated. In this respect, as more heating networks with robust business cases emerge, collective financial safeguards can be established, increasing investor confidence and public support.

If the national government and relevant ministry can swiftly clarify the preconditions and funding for heating networks, Friesland (and the rest of the Netherlands) can move forward without delay.

Why a Public Heating Company is Essential

A public heating company can provide a stable foundation for a reliable and affordable heating system.

Advantages of this model:

- Safeguards affordability and transparency, as prices are based on cost rather than profit;
- Guarantees local control, ensuring the heat transition aligns with regional needs and opportunities;
- Provides long-term security, which is crucial for investment in infrastructure and heat sources;
- Facilitates financing and guarantees, as demonstrated by the Warm Heeg project, where a municipal guarantee was essential for securing funding. However, providing guarantees for multiple districts in the future presents a major financial challenge for municipalities, and is unsustainable in the long run. National structural support is needed to make such projects financially viable.

Friesland Pushes Forward



Andries Metz
Project Lead Aquathermics and
District Heating – Province of Fryslân

Harnessing Heat from Water: An Opportunity for the Future

Friesland's villages are evolving. Everywhere you look, people are working toward a sustainable future and striving to answer the crucial question; how do we keep our homes warm without relying on natural gas? Through the *Wetterwaarmte* programme, we're supporting projects that tackle this challenge with hands-on guidance and technical expertise. The first successes are already visible, but now is the time to push forward.

In Baard, Balk, Koudum, Terherne, and Anjum, the search for solutions is in full swing. The urgency of the task is clear, but so are the challenges. The technology exists and public support is growing, and now we need to take the next step.

Staying Resolute and Picking Up Speed

Friesland is at a turning point. The foundations have been laid, the first contracts are being signed, and the first residents are beginning to believe in a future without natural gas. However, the work is far from done. On the contrary; now is the time to persevere, make bold choices, and maintain momentum.

What Needs to Happen?

Streamline Permits

Anyone working with aquathermal energy faces the same regulatory and environmental hurdles. In Koudum, for example, authorities still need to determine where water can be extracted and discharged, while in Baard, permit approval has been separated from the tendering process to save time. Experience shows that these procedures can be made far more efficient.

Action: Develop a standardised approach to the permit process so that future projects can move forward more quickly and avoid running into the same obstacles repeatedly.

Secure Funding

Projects in Balk and Baard are waiting for the right grants. Koudum is looking to partner with Energie Samen, while Anjum has some funding but not enough. It's the same story everywhere; grants help, but only if they are reliable and structured from the outset.

Action: The national government should establish a long-term funding programme for aquathermal energy and small-scale collective heating solutions. This would prevent villages from having to rely on one-off grants and temporary funding pools.

More Technical Support

Each municipality conducts its own feasibility studies, simulations, and technical analyses. In Balk, they need to determine whether discharging into the Luts or another canal is more efficient, while in Terherne, they are exploring a floating heat buffer. The knowledge gained in these projects shouldn't be buried in individual case files.

Action: Create a shared knowledge platform in which technical insights acquired during projects can be shared, which would prevent duplicate research and enable new initiatives to build on existing expertise.

Enhance Community Engagement

A public meeting has been scheduled for 9 April in Balk, while commitments from residents are being collected in Baard. In Terherne, calculations are being made to determine the minimum number of participants needed for success. Every project experiments with different forms of community involvement, but we need to share these lessons more broadly.

Action: Use the engagement strategies tested in villages like Balk and Baard as a blueprint for future projects, ensuring that residents are involved earlier and more effectively.

The Time Has Come


Friesland Must Seize This Opportunity

What's happening here is bigger than any individual project. This is not just a collection of isolated experiments, it's a large-scale movement toward a fossil-free heating system. If we want these projects to succeed and be replicated, we must act now. That means we have to:

- Accelerate the permit process, moving beyond project-by-project negotiations.
- Establish stable funding structures, so villages are not dependent on fragmented subsidies.
- Share technical expertise, so innovations can be implemented more widely and efficiently.
- Learn from community engagement initiatives, so residents can be involved more quickly and effectively.

The momentum exists. The energy is palpable. The first villages have shown the potential for success.

Now is the time for Friesland to take the lead; not by commissioning yet another study or launching yet another pilot, but by executing the current projects as effectively as possible and embedding them into a broader strategy.



The time to put
Wetterwaarmte
on the map in
Friesland has
arrived.

Taking the plunge

In the next edition of Warm Fryslân, we look back on Confidence'25 and the insights this event has delivered. We also look ahead to the future with Confidence 2.0: how will the collaboration between Fryslân and Denmark continue to evolve?

We'll go on a working visit to Denmark, explore the heat planning map and the baseline analysis, and examine how Fryslân continues to lead the way in sustainable heating programmes. Once again, this edition is packed with insights, real-world examples, and strategic questions surrounding the energy transition in Fryslân.



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