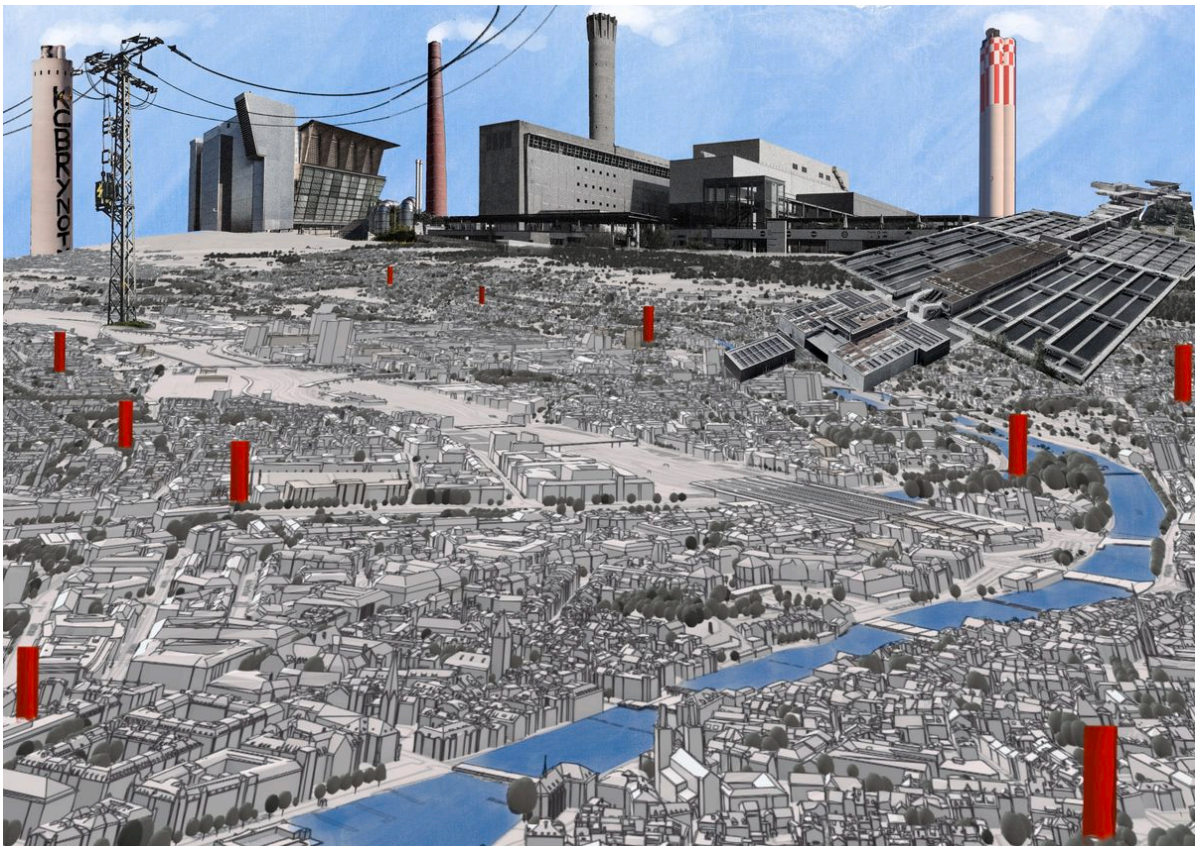
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ARCHITECTURE OF TERRITORY
Chair of Architecture
and Territorial Planning
Professor Milica Topalović

Kraftwerk Schweiz
Spring 2024

District Heating

The Potential of Heating Zurich Locally

Nour Ben M’barek and Catia Marcotullio

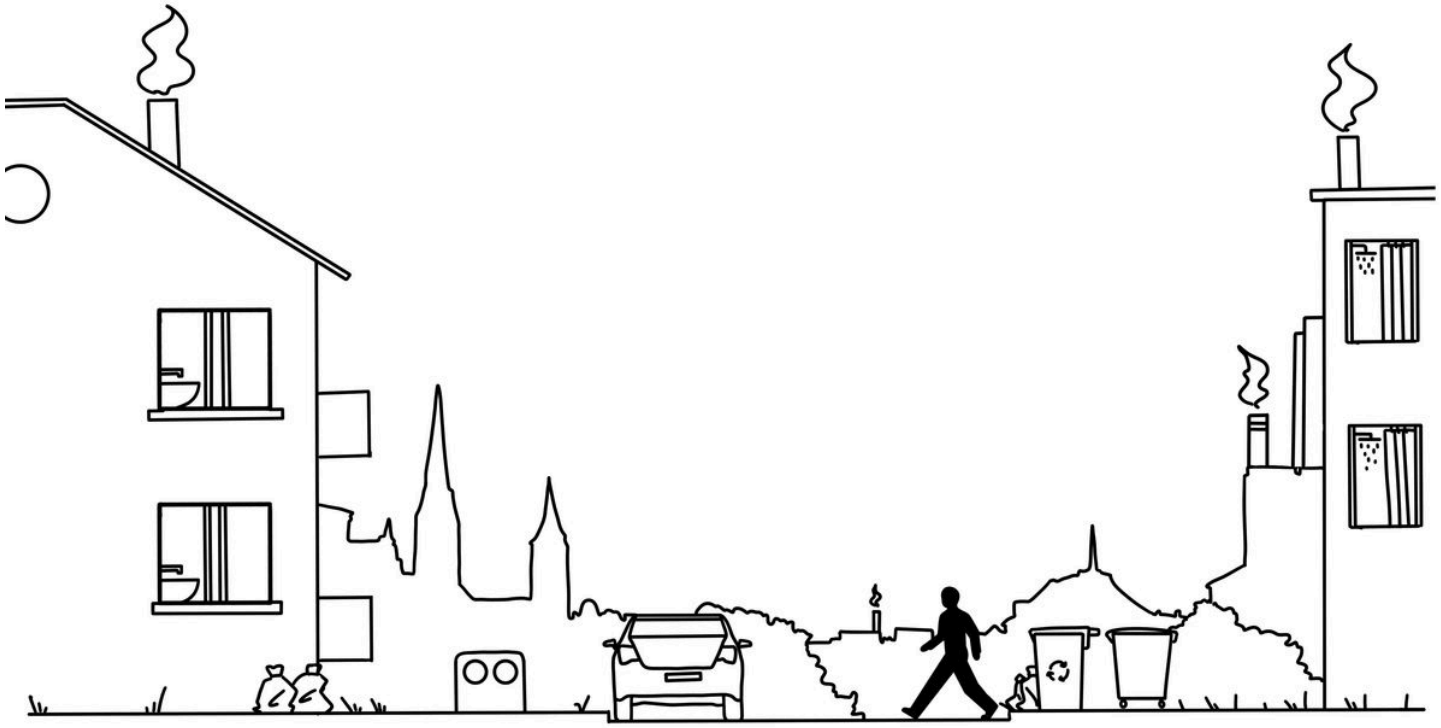


The city of Zurich is in the midst of an energy revolution. It wants to move away from oil and gas and rely on district heating. But where does the energy come from that is fed into the underground pipes in the form of heat and supplies the city of Zurich all year round? We have long assumed that there are three main sources of heat: heat from the Hagenholz and Aubrugg incineration plants, which burn waste and wood. And heat from the Werdhölzli sewage treatment plant, which burns sewage sludge.

In reality, the situation is much more complex. The energy companies erz, ewz and energie360°, together with the city of Zurich, manage the district heating network, which relies on more than three sources to guarantee Zurich's supply. The district heating infrastructure continues to expand. More and more houses are being connected to the network. In political terms, will it become a public good available to all residents? Like the Internet or the SBB?

In our work, we get to the bottom of these questions. From the (in)visibility of the district heating infrastructure to questions of public service, sources and their deficits.
We want to know how deficits in the energy transition can be solved. Without making the infrastructure invisible, but to develop awareness and pride in the city for this rather unknown heating system.

Introduction: Hotspot Zurich



Many people do not know what district heating is. The infrastructure remains invisible while the hustle and bustle of everyday life in the city takes its course. Waste is one of the strongest sources of heat, which ensures the heat supply of the city of Zurich and feeds the growing district heating network. Hardly anyone realises that there are other sources of heat in addition to the invisible infrastructure. The waste itself is not able to cover the entire heat requirement. On our trip, we took a close look at the infrastructure and the corresponding heat sources. The fact is that there is more hidden behind the waste.

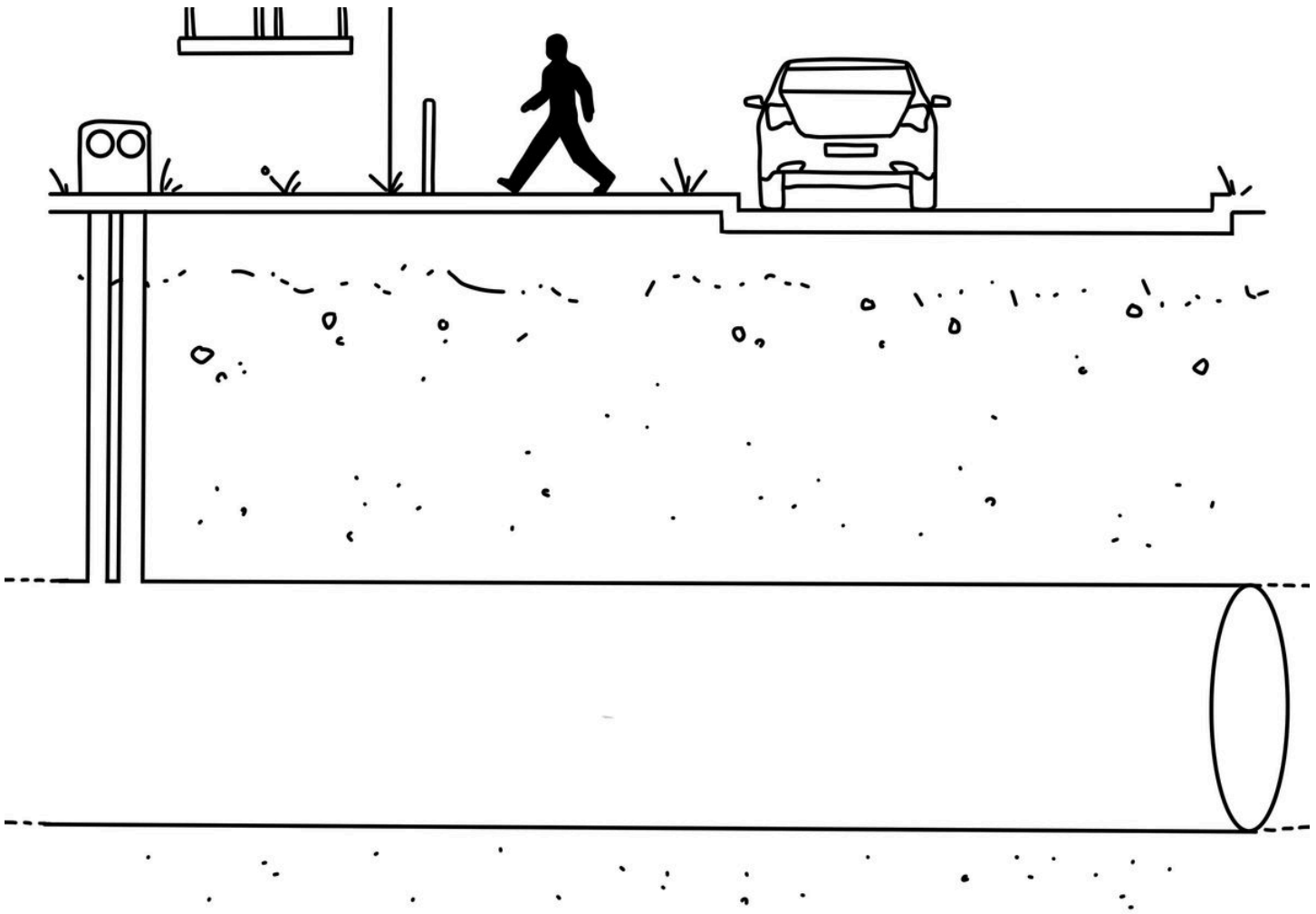
“And our job is actually to dispose of the waste that tumbles out of society in an environmentally friendly way.”
Christoph Leitzinger, Waste Technician ERZ



Hotspot Zurich. Source: Interview partners Andreas Jud and Christoph Leitzinger, 2024.

https://youtu.be/GyznRbtkuhI

The (In)Visibility of District Heating Infrastructure



In the 19th century, district heating infrastructure objects in the city were designed architecturally. Over time, the design of the objects was greatly simplified so that passers-by no longer recognised them. In the city, the objects are very scattered. They become less conspicuous and lose their presence in the cityscape, tending more and more towards invisibility. Whether in the centre or on the periphery, you need a keen eye to see them.



The Visible Infrastructure of District Heating

- Energy centres of district heating
- Hot water tanks/chimneys
- Uses with year-round waste heat potential



Chimney at Strickhofstrasse 101, Irchel Campus. Source: Own Picture, 2024.



Ventilation Box at Neunbrunnenstrasse, Oerlikon. Source: Own Picture, 2024.



Energy Centre at Aargauerstrasse. Source: Own Picture, 2024



Data Centre Equinix at Letzigraben 75. Source: Own Picture, 2024.

There is a visible district heating infrastructure in the city. This includes the Hagenholz and Aubrugg incineration plants. The Werdhölzli wastewater treatment plant is also part of it. In addition to these plants, which we got to know quite early on in the Atlas phase, there are other visible elements that are localised on the map. These can be found hidden in the forest, like the chimney on the Irchel site.

Inconspicuous on the pavement in Neunbrunnenstrasse: a district heating ventilation box.

Or at the side of the road, like the energy centre of ewz, an important energy company in the city of Zurich.

In neighbourhoods, mostly very local in the form of data centres.



The Invisible Infrastructure of District Heating

– Existing district heating pipes ····· District Heating pipes in review ■ Lake thermics pumping stations

The invisible infrastructure, on the other hand, is underground and not officially accessible to the public. It is only directly visible, for example, when construction work is carried out and the streets are torn up to lay the pipes.
In the map it becomes clear that the district heating network extends underground across the territory and covers almost the entire area of the city.



Laying Pipes In the Ground. Source: Stadt Zürich, 2022. [https://www.stadt-zuerich.ch/energie/de/index/heizen-kuehlen/fernwaerme.html]



In the Underground. Source: Tagesanzeiger, 2020. [https://www.tagesanzeiger.ch/milliardenprojekt-fernwaerme-so-treibt-zuerich-den-ausbau-voran-600003489948]



Pipes In the Lake. Source: powernewz.ch, 2022. [https://www.powernewz.ch/rubriken/waerme-und-kaelteversorgung/seewasserverbund-bahnhofstrasse/]



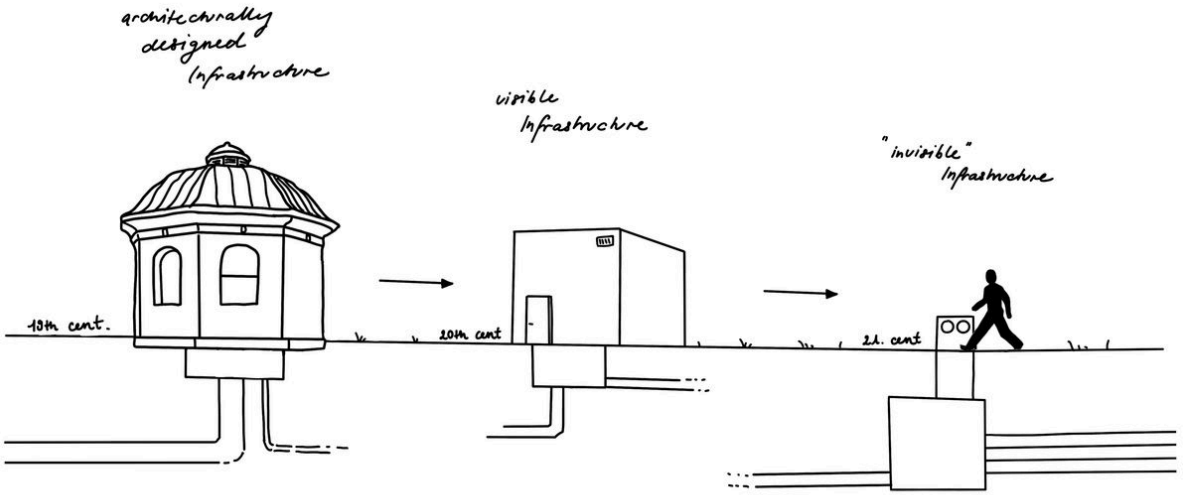
Artefact Restaurant Pumpstation: Source: Own Picture, 2024.

Pipes are laid in the ground: There are red pipes for the heat flow, which contains the heated water. This is transported to the residential buildings via the district heating network. The blue pipes transport the cooled water back to the systems after heating so that the cycle can start all over again. This is also referred to as a cold return flow.

There are tunnels underground that are only accessible to district heating experts and inspection tours.

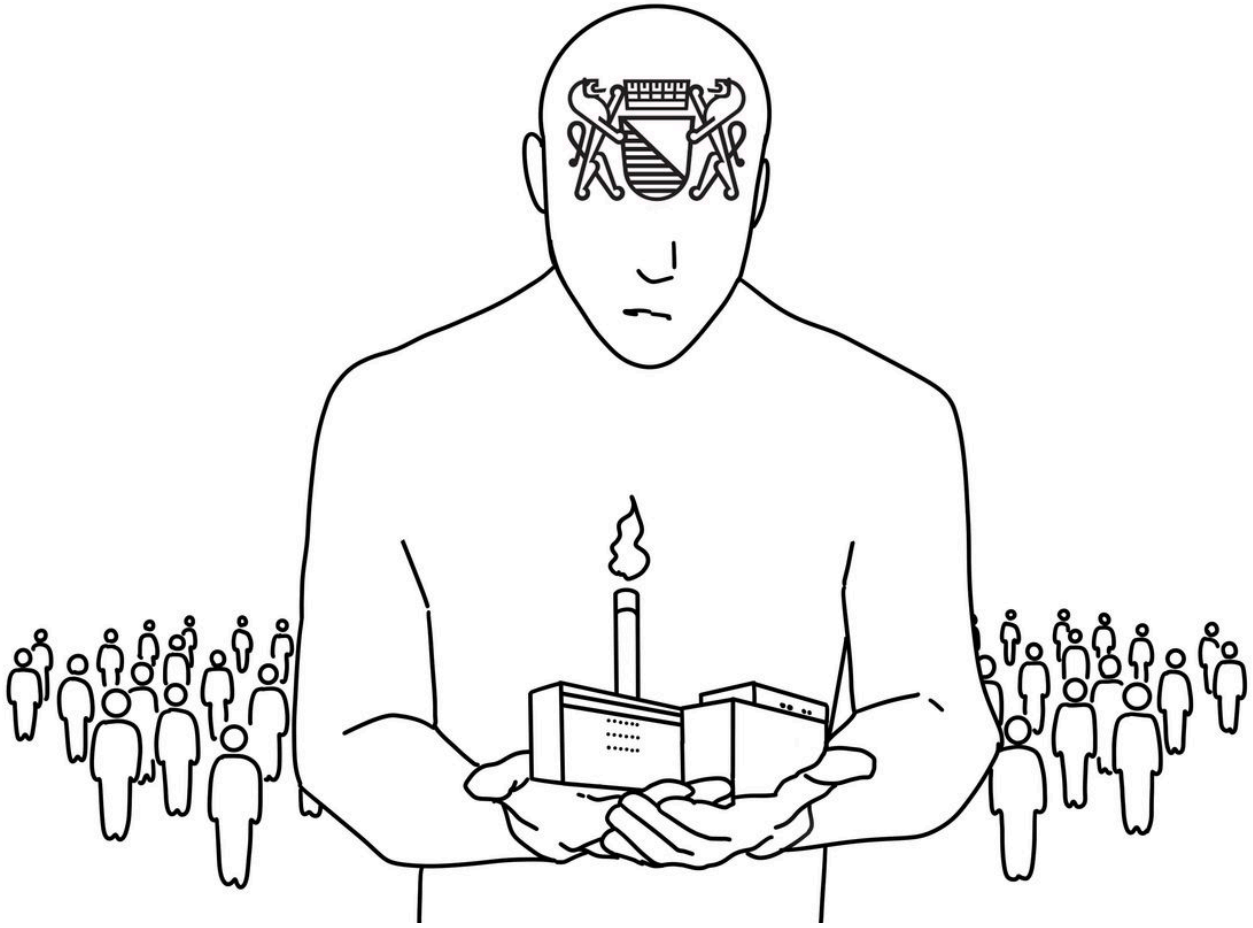
Heat is also extracted from the lake: Pipes are located under water.

The pumping stations for the lake thermal energy: they are invisible, but above one station there is a restaurant called Pumpstation. An object that marks the position and is considered an artefact, but has no direct access to the pumping station itself.



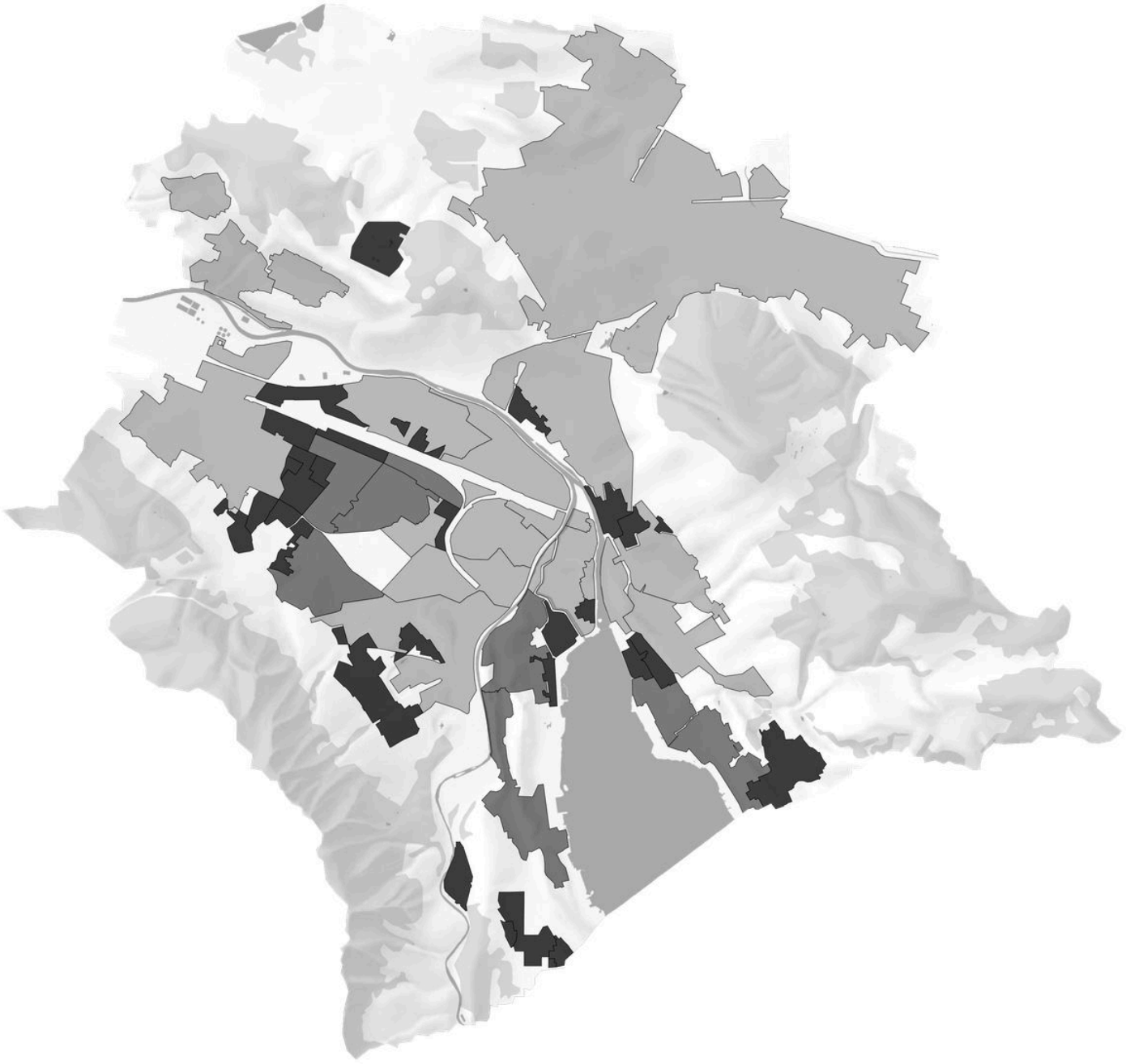
The Disappearance of the Infrastructure. Source: Own sketch, 2024.

The Benefits and Limits of District Heating as Service Public



From a territorial perspective, the public district heating network accounts for a large proportion and many areas are automatically connected as the infrastructure continues to expand. There is the perception that district heating is becoming a Service Public because the network is growing and many people are being offered a connection. Nevertheless, it’s not a Service Public because families have to raise a lot of money for the connection, which is around 50,000 Swiss francs on average.
If one cannot afford it, one has to rely on oil or gas for heating.

How the Ownership Structures Work



Ownership Structures of District Heating. Source: Stadt Zürich Energieplanung, 2024.

Public network of district heating

Communal networks with territorial mandate

Private energy communities

Zurich has different ownership structures when it comes to district heating. There is the public district heating network, energy networks with an area mandate and private energy networks. The public district heating network covers the largest area in the city and supplies important areas such as the railway station. The city is now also planning to take over the district heating supply in the ETH Centre university area. The city's main consideration is energy policy.

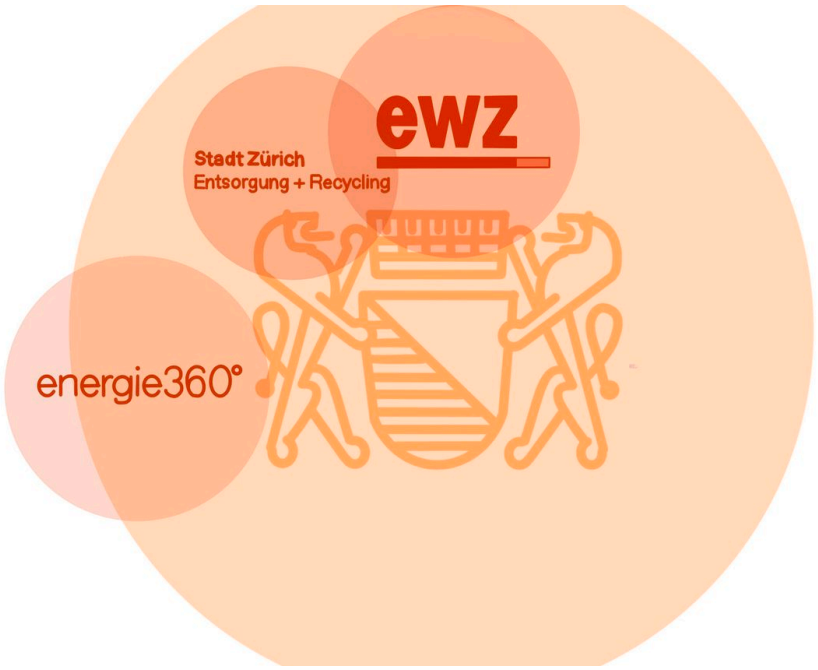


Diagram Of Ownership Structure. Source: Stadt Zürich, 2024. [https://www.stadt-zuerich.ch/energie/de/index/heizen-kuehlen/fernwaerme/waerme-zuerich.html]

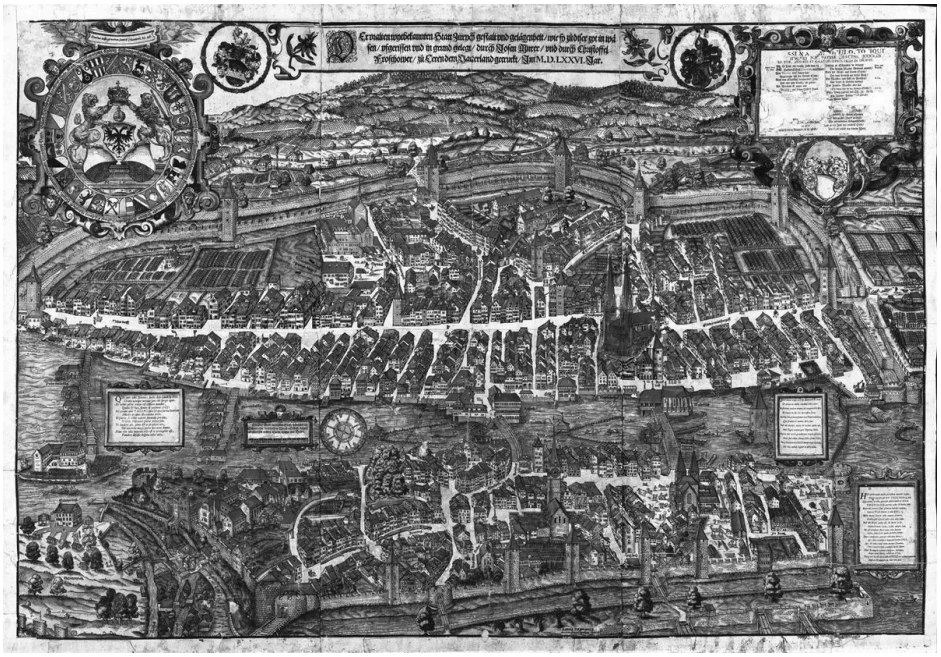
The city of Zurich owns practically every energy company. This means that ewz and erz are one hundred per cent owned by the city. Energie360° is a private energy company, but ninety-six per cent of it is owned by the city.
In terms of areas, it is important to know that the city of Zurich, together with erz, is responsible for the public district heating supply. The city is also responsible for the energy networks with an area mandate. However, it is authorised to hand over responsibility for the heat supply for a specific area to an energy company such as ewz. The areas with private energy networks are managed by ewz or energie360°. The private energy networks focus strongly on the economic aspects of the district heating business. Climate targets are not of great importance to them. The tariffs for district heating are not yet the same in the private energy networks either. In future, the companies would like to standardise the tariffs in order to minimise competition between the networks.
Everyone has the right to obtain a district heating connection with the energy networks or thermal networks. However, there is no mandatory connection obligation as with public supply areas. You can still choose an alternative.
In future, erz and energie360° will merge to ewz in order to improve the organisation and coordination between the companies.

“That can be very different. Perhaps the difference is that with thermal and public networks, everyone has the right to an offer for a connection. In other words, if someone is willing to connect, you have to make them an offer. Compared to other cities, such as Winterthur, we are not obliged to connect. You still have the option of choosing a different solution. In the case of private associations, it is the case that where companies are not obliged to connect someone. Here, economic interests are more in the foreground. This can also be the ewz, an energy company that operates private networks […]”
Louis Frei, Project Manager Energy Planning

How did these networks, as they are distributed throughout the city today, come about?

“The thermal grids have been expanded where the sources are available.”
Louis Frei, Project Manager Energy Planning

From Waste Management to Heating Production



Murerplan. Historical Image from 1576. Source: Baugeschichtliches Archiv, 2023. [https://baz.e-pics.ethz.ch/catalog/BAZ/r/402239/viewmode=infoview/qsr=murerplan]

FROM 1500: WASTE PROBLEMS

How did erz and the district heating supply in Zurich develop? The origins of the entire infrastructure development go back a long way, to the 16th century. This is when the first waste problems arose in the city. This is because the urban structures are quite dense, with many people living in a heap. People don’t know how to deal with the amount of waste. They are suffocating in their own waste. This is also reported by an Englishman who travelled to Zurich and was shocked by this precarious situation. In turn, the people of Zurich are outraged by the Englishman and his critical report, saying that they will move heaven and hell to solve the waste problem. They copied many techniques from the English. They adopted these principles and realised that it had three advantages for the city: firstly, they were able to reduce the volume. Secondly, the weight was also reduced. Thirdly, an awareness of hygiene emerged among the population.



Postcard Limmatquai. Historical Image from ca. 1900. Source: Baugeschichtliches Archiv, 2023. [https://baz.e-pics.ethz.ch/main/thumbnailview/qsr=limmat%20postkarte%201900]

FROM 1850: FIRST DRAINAGE SYSTEMS

The first sewers were built near the Limmat around 1850. These form the basis for the establishment of a collection system and a well thought-out drainage system. Around 1890, rubbish collection is established, not only in the city but also in the suburbs.



Waste Disposal Centre Josefstrasse. Historical Image from 1907. Source: Baugeschichtliches Archiv, 2023. [https://baz.e-pics.ethz.ch/catalog/BAZ/r/193235/viewmode=infoview/qsr=kehrichtverbrennung%20josefstrasse]

1904: FIRST INCINERATION PLANT

The Josefsanlage, the first in Switzerland, begins operation in 1904. The Werdhölzli wastewater treatment plant follows later. Instead of horses, the first cars are used to transport waste. In 1928, the first district heating network is built in Josefstrasse, which supplies the main railway station and the Sihlpost.



Ochsner Bin. Historical Image from 1927. Source: Baugeschichtliches Archiv, 2023. [https://baz.e-pics.ethz.ch/catalog/BAZ/r/285874/viewmode=infoview/qsr=Ochsner%20k%C3%BCbel]

FROM 1950: DEVELOPMENT TO ERZ

The Ochnser bucket was introduced in 1927 for waste collection. The infrastructure is further expanded from 1950. Urban drainage and waste collection, which previously functioned separately, become ERZ.



Josefs Plant. Source: Limmattalerzeitung, 2021. [https://www.limmattalerzeitung.ch/limmattal/zuerich/energiewende-die-aelteste-kva-der-schweiz-stellt-die-kehrichtverbrennung-ein-ld.2106332]

FROM 2000: MODERNISATIONS

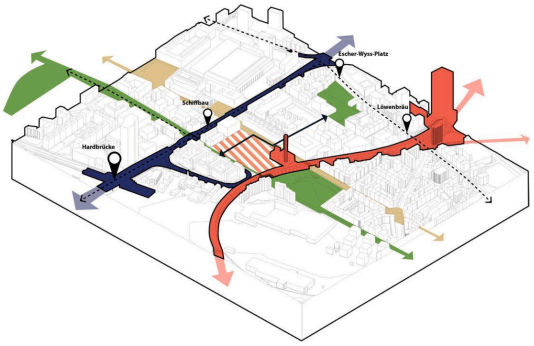
The plants are still in operation and are being technologically modernised. The Josefs plant will be disconnected from the grid in 2021 after more than one hundred and twenty years of operation.



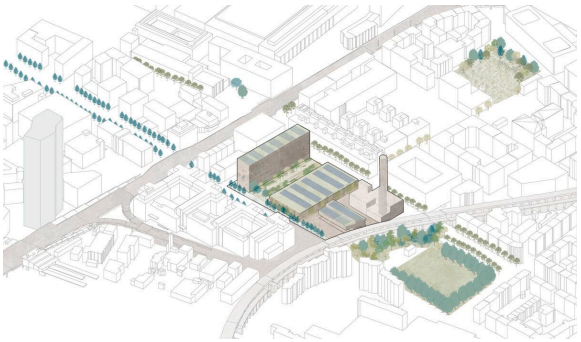
Today's Josefs Plant. Source: Own Picture, 2024.

2021: REBUILDING JOSEFS PLANT

Today, the Josefsanlage is used as an energy centre. There are two gas boilers that run on fossil fuels and supply energy to the Zurich-West area in district five. In 2022, the decision is made to bring the hot water from Hagenholz directly to the Zurich-West neighbourhood via a new connecting pipeline.



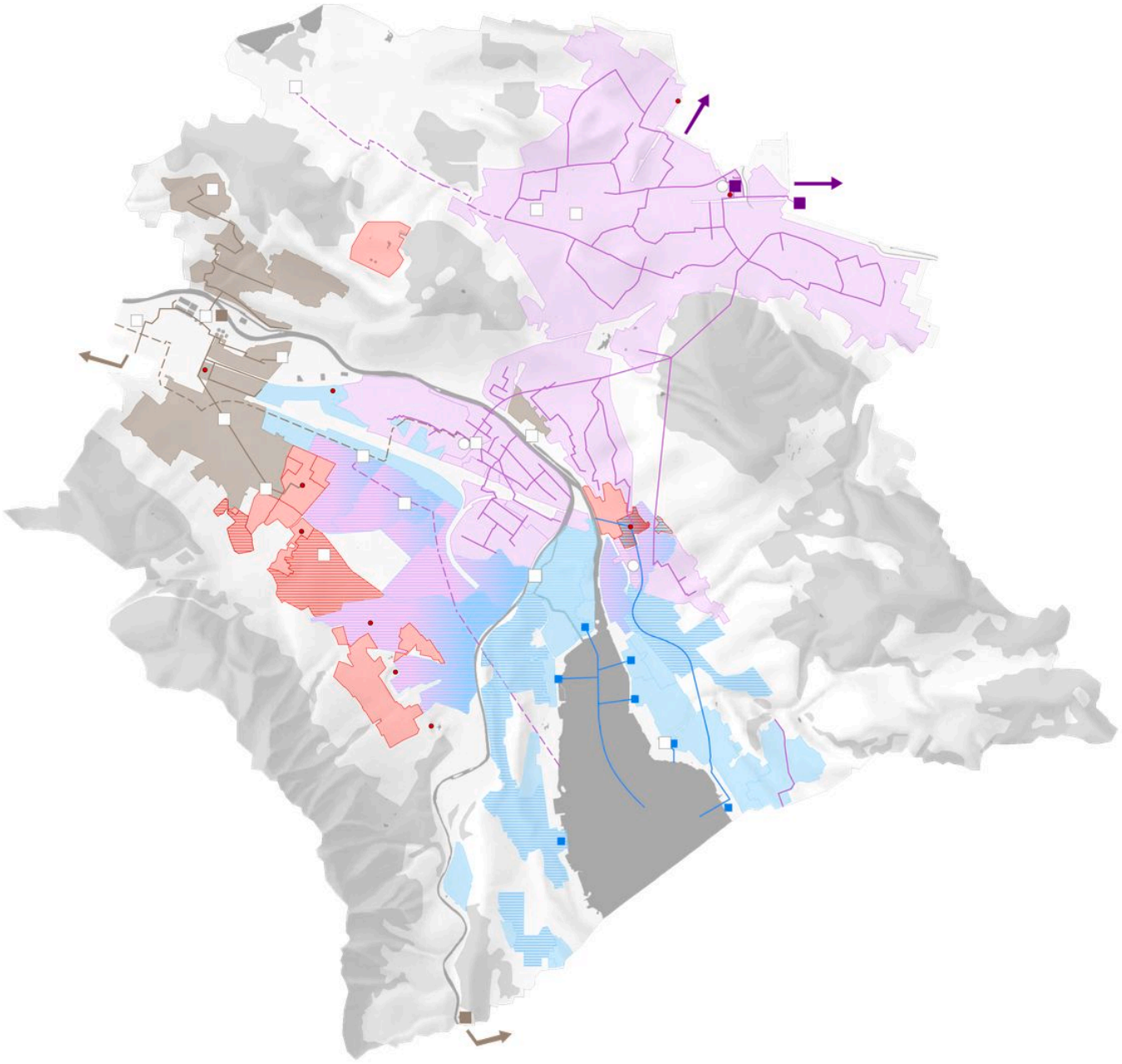
Development Planning Josef-Areal, Zurich West.
Source: weberbrunner architekten, 2020.
[https://weberbrunner.eu/project/entwicklungsplanung-josef-areal-zurich-west/]



Development Planning Josef-Areal, Zurich West.
Source: weberbrunner architekten, 2020.
[https://weberbrunner.eu/project/entwicklungsplanung-josef-areal-zurich-west/]

TODAY: FURTHER DEVELOPMENTS

The Josefsareal is extensive. The energy centre takes up 4’000 square metres. The entire Josefsareal covers an area of 20’000 square metres. The aim is to utilise the open spaces in a multifunctional way. The motto is: living, sport and meeting places for young and old. In other words, there will be a health centre with flats for the elderly, an indoor swimming pool, a work yard and a neighbourhood park with various meeting spaces.



Today's Heating Infrastructure. Source: Dokumente und Karten-Stadt Zürich, 2024.

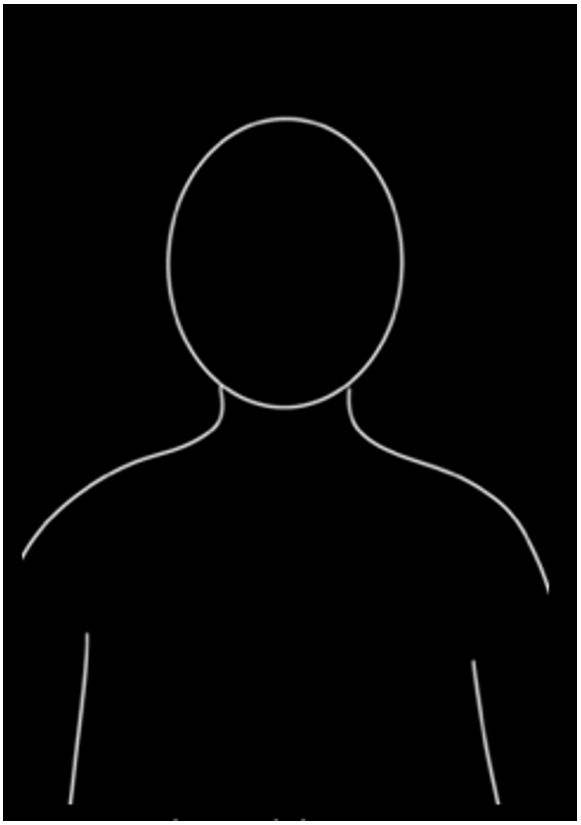
- Areas with waste and wood heat
- Areas in review
- District heating pipes
- District heating pipes in review
- Heat power plants
- Areas with waste water heat
- Areas in review
- District heating pipes
- District heating pipes in review
- Waste water plants
- Areas with lake thermal heat
- Lake thermal areas in review
- Lake thermal pipes
- Lake water pumping station
- Areas with industrial heat
- Industrial heat areas in review
- Uses with year-round waste heat potential
- Energy centres district heating
- Hot water tanks
- Heat supply to neighbouring municipalities
- Heat supply to neighbouring municipalities
- Areas with mixed heat sources

Today's heating infrastructure is a complex network, in which different levels overlap. Be it at the level of infrastructure, heat sources or actors.

The Actors Behind District Heating



Andreas Jud
Head Of Operations ERZ



Christoph Leitzinger
Waste Technician ERZ



Louis Frei
Energy Planning Project Manager



Daniel Locher
Inhabitant Glattpark



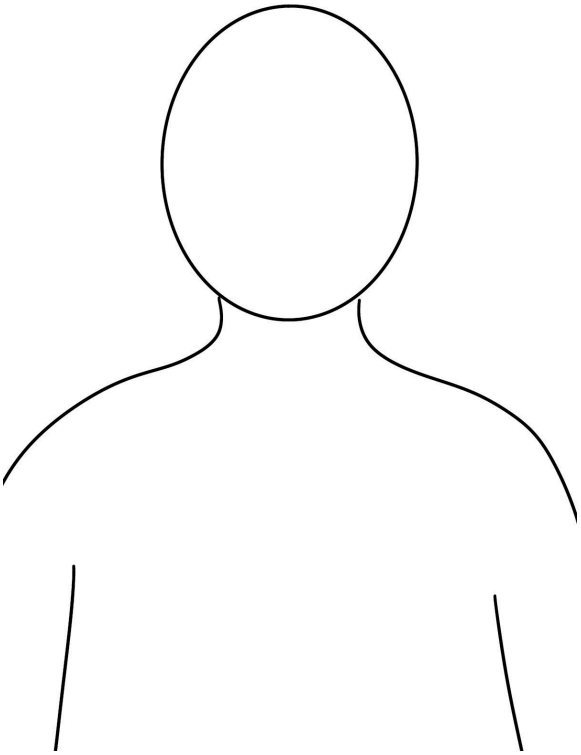
Pascal Leumann
Managing Director Of Energy Planning



Louis Frei
Energy Planning Project Manager



Pascal Leumann
Managing Director Of Energy Planning



Christoph Leitzinger
Waste Technician ERZ

ANDREAS JUD, HEAD OF OPERATIONS ERZ

“No, I am in an area where there is nothing like this. If I was in an area like that, I would do it because it is just convenient. You have got someone else to look after your heating. You do not need oil, you do not need a chemical fan. In a heat pump, you need a technician to check the tightness and so on. Remotely, we provide the customer with a heat exchanger, a pump in the basement and that’s it. That’s the huge advantage. The convenience. The disadvantage is the initial investment. It costs much more than an oil or gas boiler. But it lasts at least 60 years. But personally, I would just go for the convenience. If there is something wrong, someone else has to look.”

CHRISTOPH LEITZINGER, WASTE TECHNICIAN ERZ

“That is the convenience. Yes. The advantage is that they have more space in their homes. That is an obvious added value for every private individual. You no longer have an oil tank in the house. There is a pipe coming out. Inside with hot water and another pipe comes out with colder water. But they no longer have an oil tank.”

LOUIS FREI, ENERGY PLANNING PROJECT MANAGER

“The advantage of the waste incineration plant is that the waste heat is available. It is a source that is available in this sense. You have a high-temperature network. You can transport the heat at a high level to different areas. The disadvantage compared to the lake is that you can’t produce cold. As already mentioned, it is always the local conditions that determine the advantages of a system. Why exactly is it more expensive? For production. You have to compress the heat. You need large rooms for large machines that produce the whole thing. In a waste incineration plant, the heat comes from the waste products. You don’t have to produce more heat, it’s already there. Exactly, it is a waste product. From waste incineration.”

DANIEL LOCHER, INHABITANT GLATTPARK

“Yes, as I said, it’s a lot of money, but there are also a lot of houses that can be heated with it, so I think the 330 million is a good investment.”

PASCAL LEUMANN, MANAGING DIRECTOR OF ENERGY PLANNING

“The advantage of the grid is that we can generate a lot of heat. Due to very diverse energy sources. Refuse, wood, heat pumps, synthetic fuels. That’s a big advantage in the future. In my view, we need to expand the grid. Different generation capacities are based on different technologies. If the technology prevails against each other, we can continue to operate with the same grid. That’s a big advantage of this system. Without having to replace everything.”

All the people we met were in favour of district heating and made it clear to us that there are more advantages than disadvantages. District heating itself has a high level of acceptance, both socially and politically. The future looks promising for the further expansion of the network.

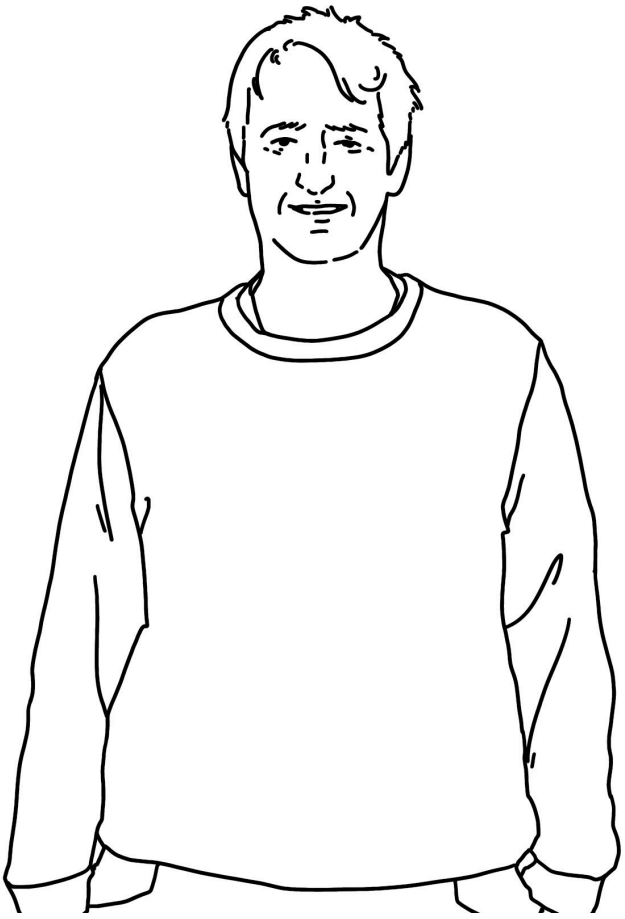


Pascal Leumann
Managing Director Of Energy Planning

“At the moment, heat supply is not a compulsory connection. According to the Planning and Building Act, the municipality could impose connection obligations. For district heating, there is an article in cantonal law that could be applied. At the moment, you can decide for yourself how you want to heat a house. But you have to be careful.

There is an energy law that stipulates that heating must be renewable. Areas like here with the large houses, which have a high heat output and do not use oil and gas, have practically no alternative. We are close to the public service and if you build the whole infrastructure in the city, it goes in that direction.

But this is also a political process. There is a motion that says there will be a standardised tariff. Then we will be close to the public service. That has not been decided yet. It is possible that it will go in that direction.”



Daniel Locher
Inhabitant Glattpark

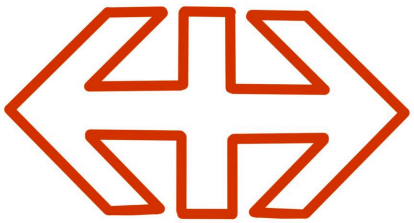
„The way we heat at home, the whole neighbourhood is really heated with district heating, both the hot water and the heating. It's also very close and that makes sense. The advantage is certainly that you do not actually have anything to do with the heating when you're connected to the system.
The hot water is actually simply delivered directly to the house, and if there is a problem or something, it is actually regulated by the district heating system. In other words, you don't have to suddenly replace anything or anything like that, it is simply all included in the price you pay."

The Definition of Service Public

"Service Public comprises a politically defined basic supply of infrastructure goods and services, which should be available to all sections of the population and regions of the country according to the same principles, in good quality and at reasonable prices."
Swiss Confederation



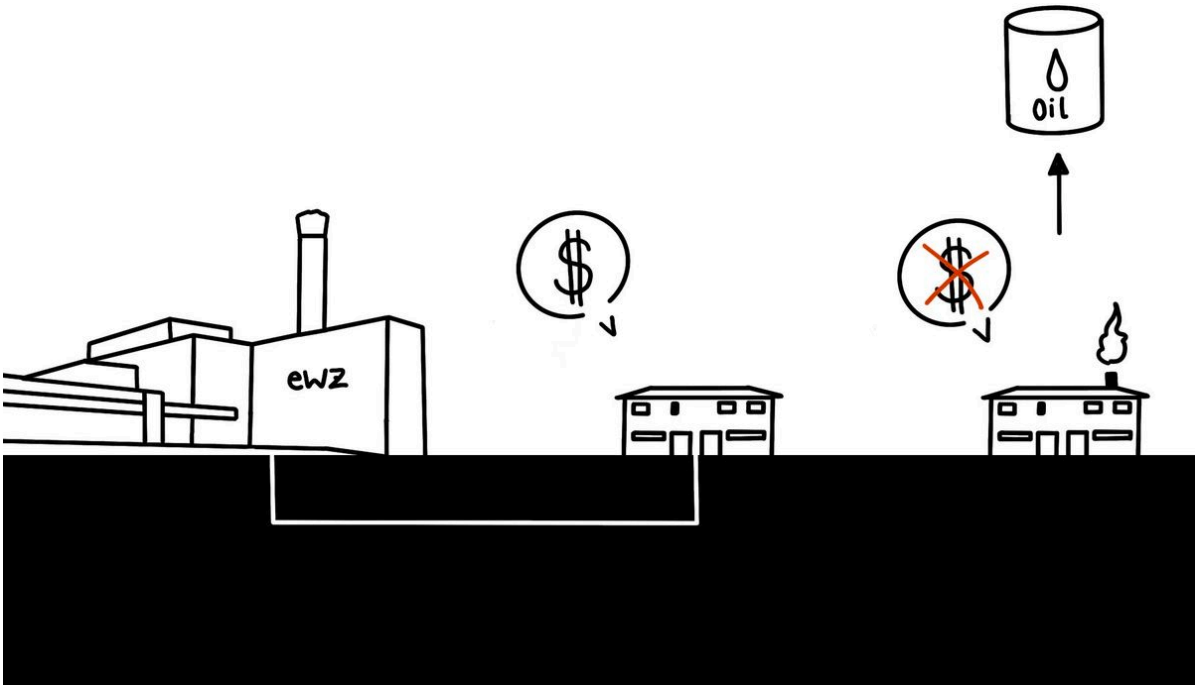








“However, we have now changed the pricing model a little, you pay a little more for the connections and a little less for the energy.”
Andreas Jud, Head Of Operations ERZ



Not Everyone Can Afford a Connection. Source: Own sketch, 2024.

Even if the grid is expanded further, the question of financing the grid connection remains. Families who cannot afford it will either stick with oil and gas. However, there is also the option of obtaining subsidies from the city of Zurich. The subsidies depend heavily on the area and the property conditions. They are calculated on the basis of these factors.

The tariff is made up of the energy price, the performance price and the connection fee. The labour price primarily covers energy costs that arise from consumption. The performance price is defined according to the required output and finances the fixed operating costs of the district heating infrastructure. The connection fee is paid once as soon as the connection has been built. It ultimately accounts for one third of the total connection costs. The remaining amount is amortised over the term of the contract.
The service price for the infrastructure is more important than the labour price for energy consumption. Infrastructure costs for the district heating network are therefore better reflected.

But fact is besides the prices that oil and gas are still very present in the city and it covers more than 80 per cent of the heat supply.

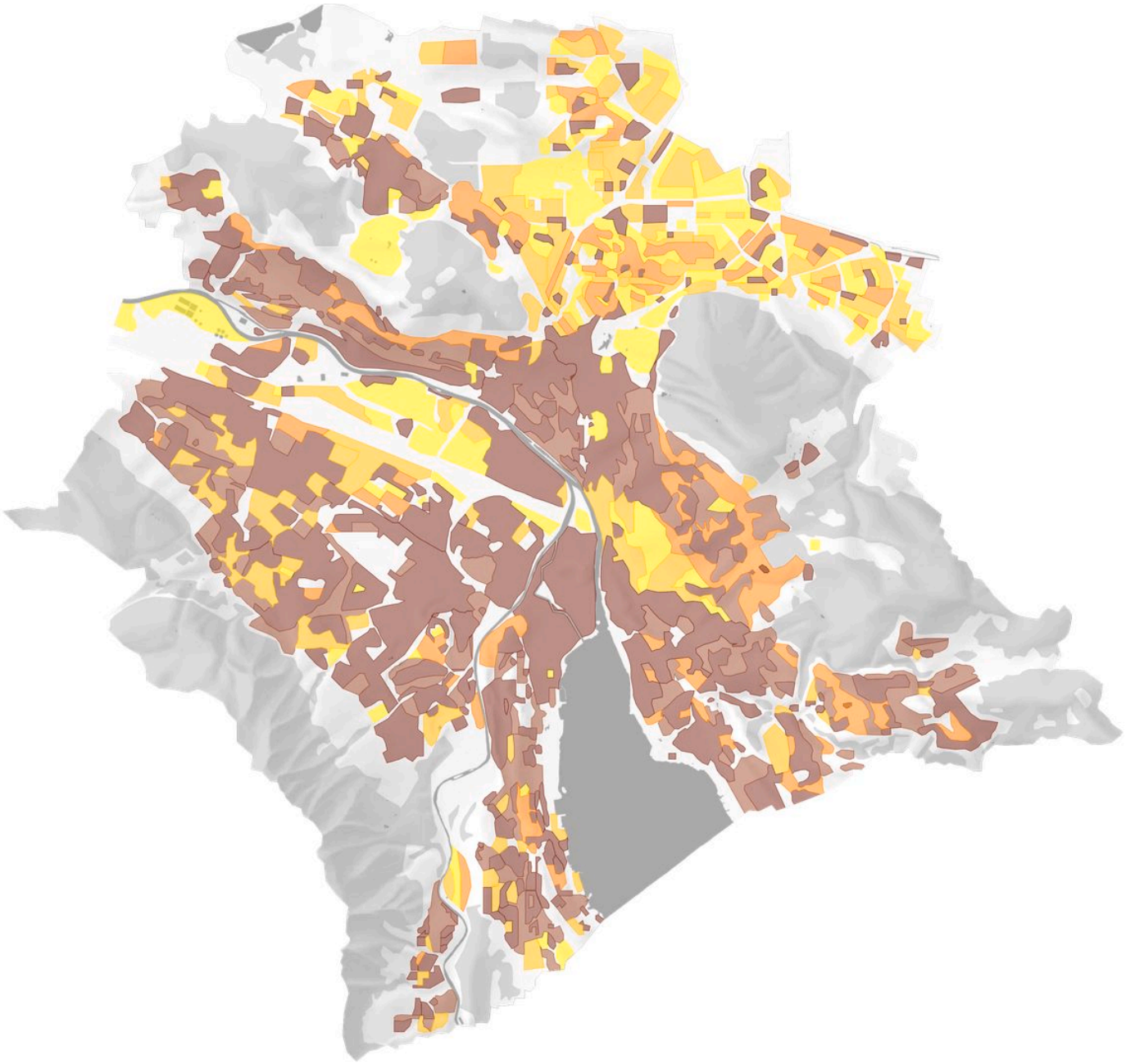
No Point In Maintaining the Gas Network



Louis Frei
Energy Planning Project Manager

“In this sense, we have secured the heat supply with the fossil-fuelled heating systems. In the city, it is mainly gas. There are not too many oil heating systems. There are gas heating systems, especially in the city centre. This has to do with the fact that we have dense structures. And gas is a simple medium for ensuring the heat supply.”

“District heating has become very attractive because it is not as volatile in terms of price as oil and gas are at the moment.”



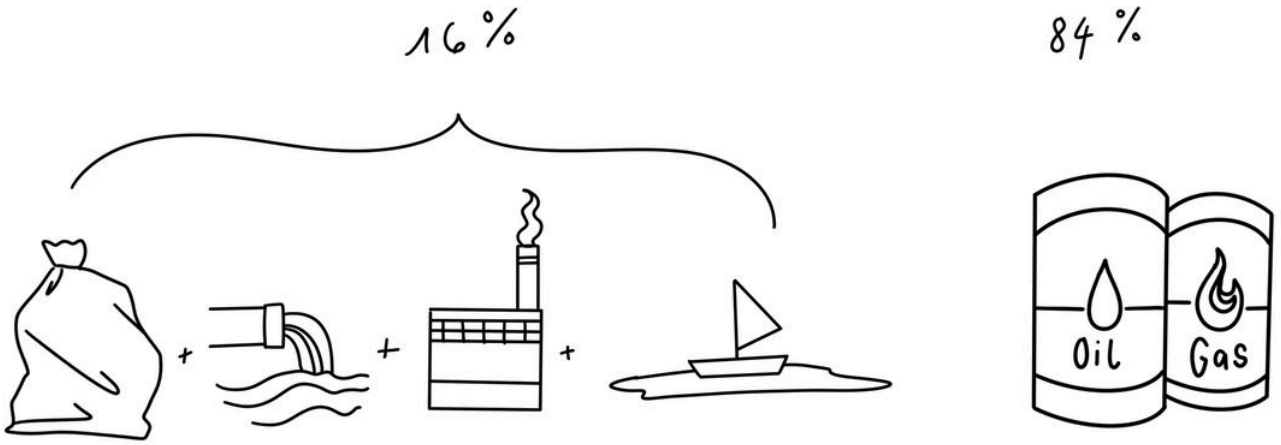
Proportion of Fossil Fuel Heating. Source: Stadt Zürich Energieplanung, 2024.

Very high
High
Middle
Low
Very low

The proportion of fossil fuels like oil or gas is highest in city centres. This is because urban structures have a higher density and it is much easier to heat everything with gas in these areas. Gas is a very practical medium for heating so many homes at once. They are planning to withdraw the gas network so that the focus can be placed entirely on district heating expansion. Economically, it makes no sense to maintain two systems at the same time. The district heating tariff was recently decoupled from the oil price because it led to high revenue fluctuations for district heating.
To summarise, gas is still very present.

“And the idea is actually to decarbonise it. […] It is felt that it makes no economic sense to maintain two systems. In the medium to long term, the gas grid will have to be decommissioned and thermal grids put into operation.”
Louis Frei, Project Manager Energy Planning

Four Sources: Why 100% Heat Coverage Is Not Achieved



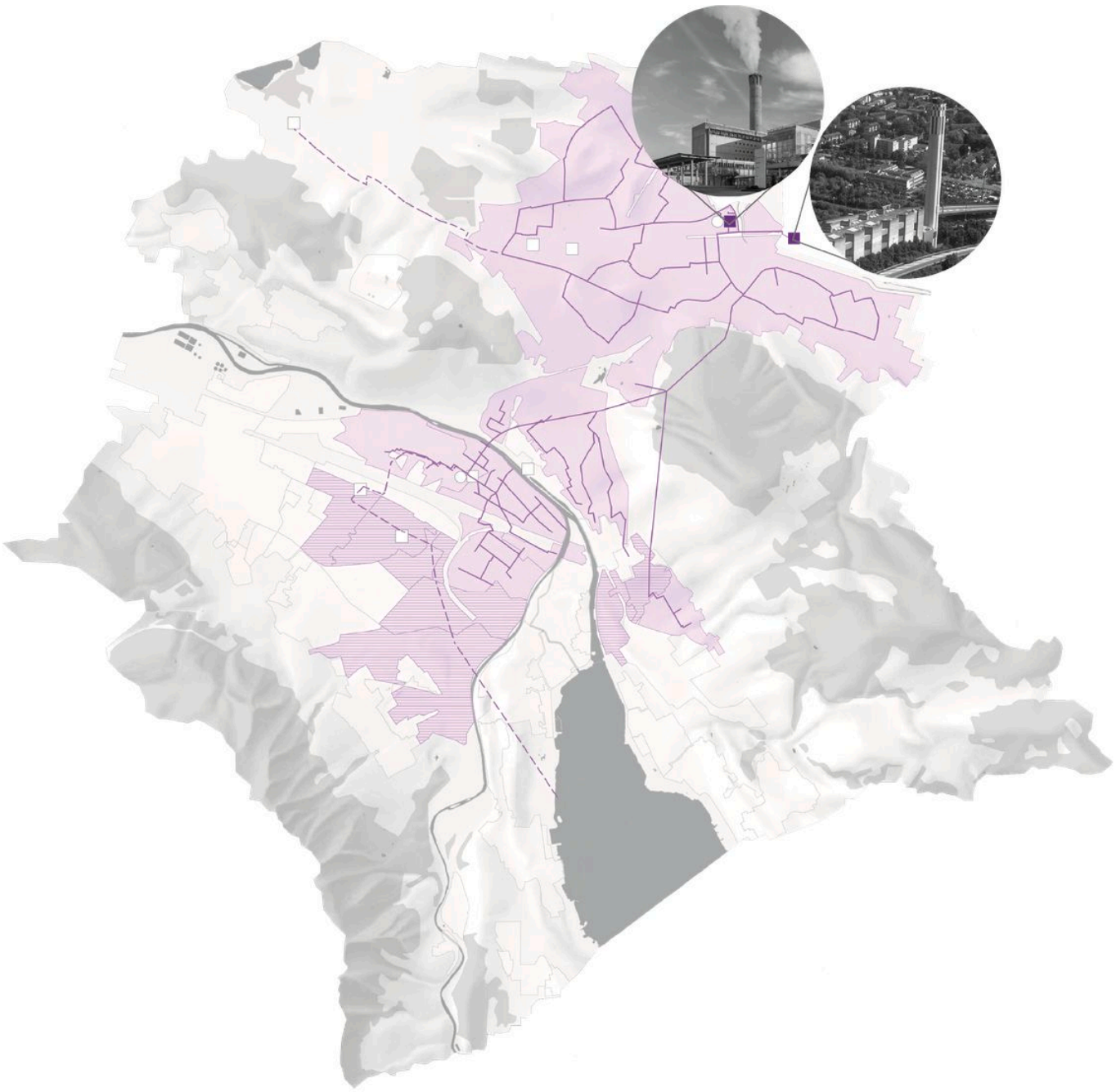
The city relies on several sources to ensure its heat supply. Technologies are being improved to produce even more heat from the same amount of resources. The third combustion line at the Hagenholz plant is an example of this. But there are shortcomings. It is not possible to supply the entire city with heat.

Waste and Wood: Highest Heat Production But No Storage Capacity



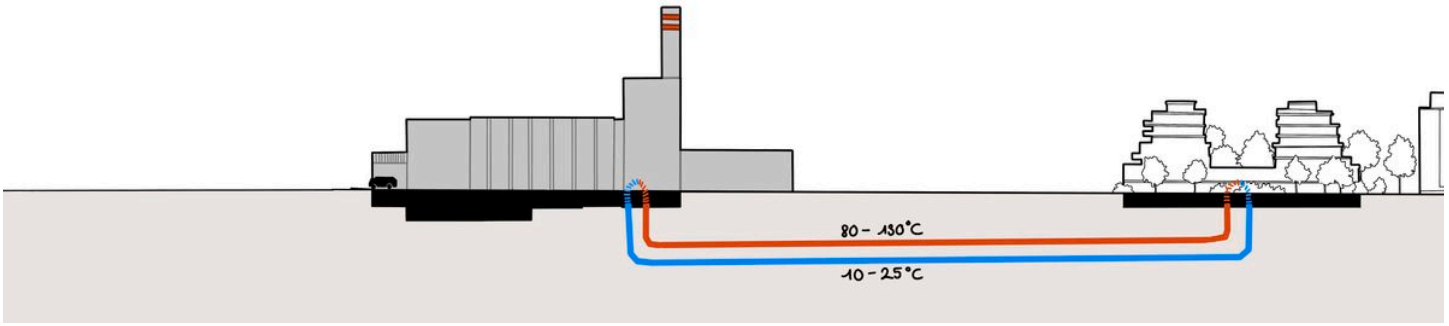
No Storage Capacities in Summer. Source: Own Collage, 2024.

The heat generated in the waste incineration plant in summer cannot be transferred to the winter because there are no storage facilities. It is released into the environment.



Heat from Incineration Plants Hagenholz and Aubrugg. Source: Stadt Zürich Energieplanung, 2024.

The heat source of waste and wood incineration is one of the most powerful because it is able to supply a large area. The Hagenholz waste incineration plant is shown on the left and the Aubrugg wood utilisation plant on the right.



Sectional Diagram of Waste Heat Cycle. Source: Own drawing, 2024. [https://www.thermische-netze.ch/]

The cycle is visualised with two flows: A heat flow that lies in a temperature range of 80 to 130°C and flows from the system to the residential buildings. A cold return flow, which flows from the homes back to the plant at temperatures between 10 and 25°C. It is a high-temperature process.

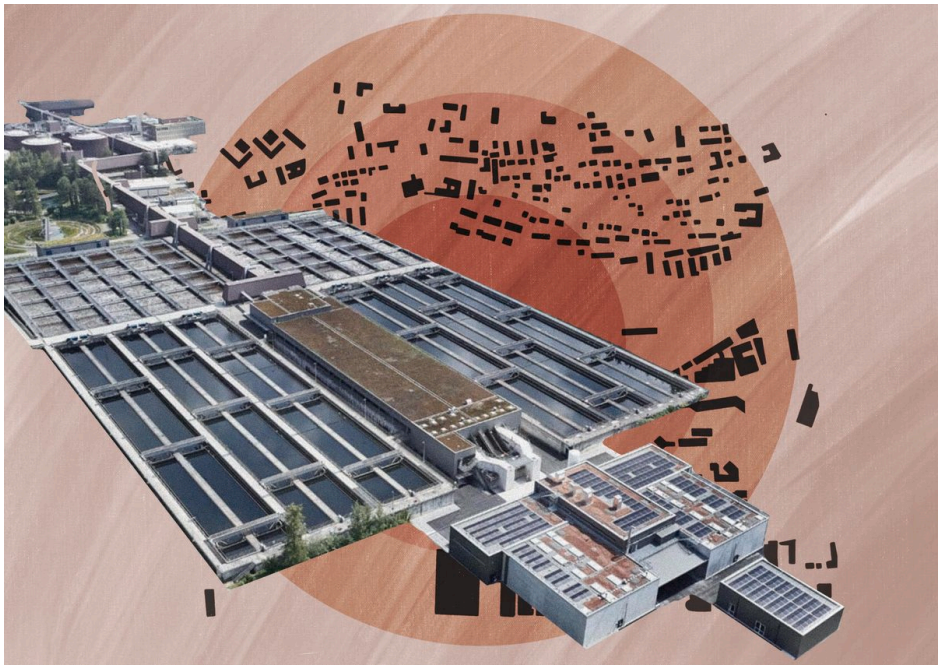
“But larger and really good ones that work on a large industrial scale and then dissipate this heat. You also need to have customers.”
Christoph Leitzinger, Waste Technician ERZ



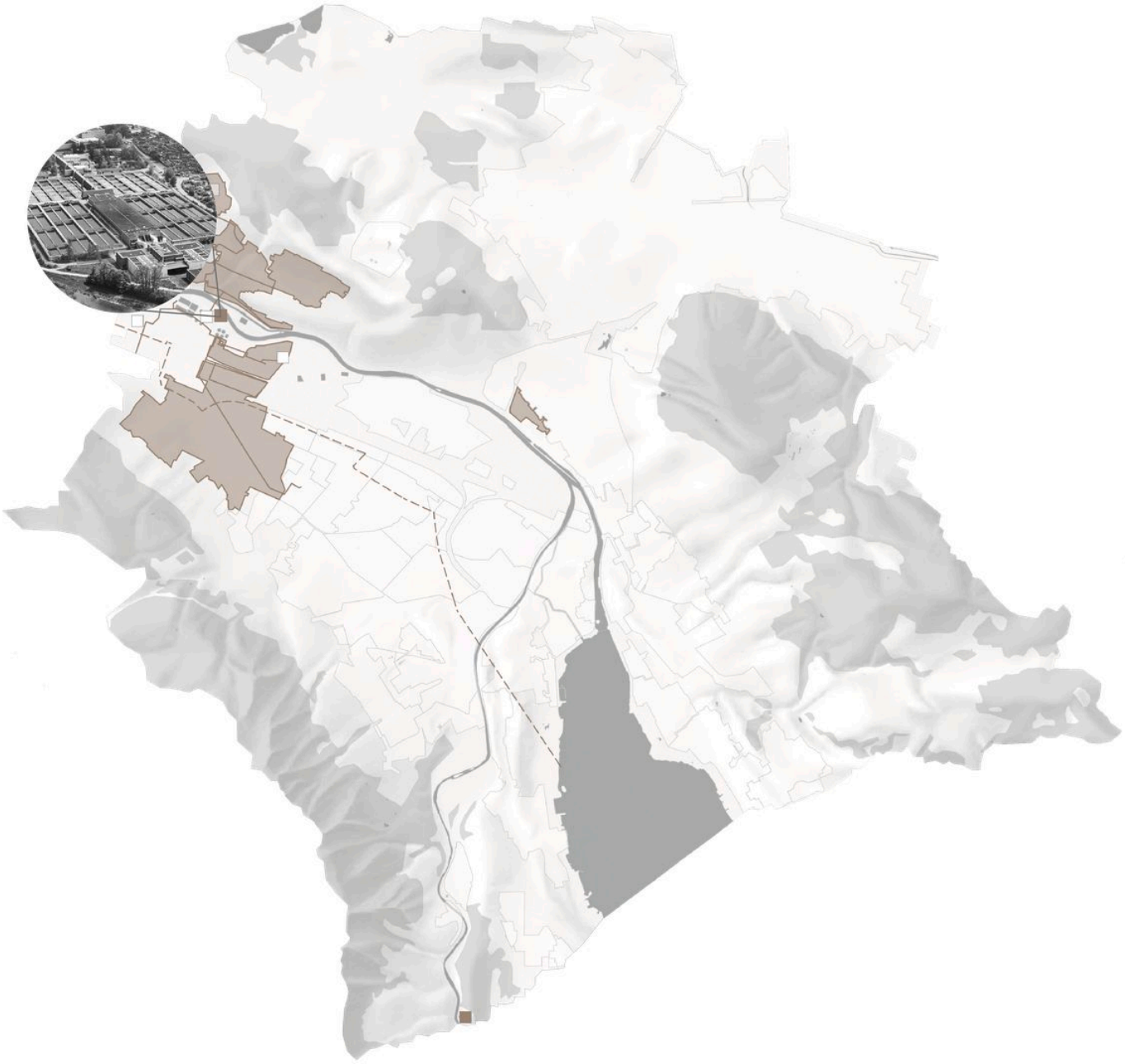
Andreas Jud
Head Of Operations ERZ

“In summer you have too much heat, from the waste incineration. Exactly. If you could save the heat from waste incineration over the summer into the winter, that’s about 120 gigawatt hours. Something like that. It’s quite a lot.”

Waste Water: Great Potential But the Heat Is Limited Within the Territory



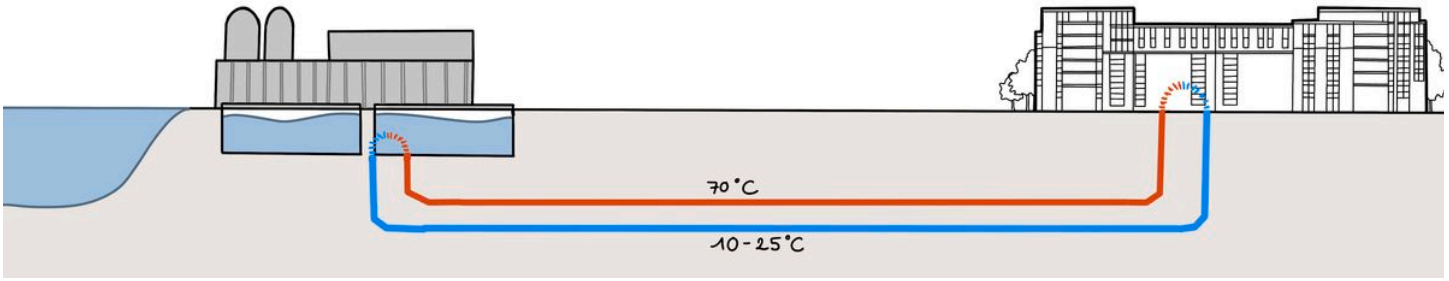
Waste Water Heat Is Limited Within the Territory. Source: Own Collage, 2024.



Heat from Waste Water Plant Werdhölzli. Source: Stadt Zürich Energieplanung, 2024.

Areas with waste water heat
Areas in review
District heating pipes
District heating pipes in review
Waste water plants

The Werdhölzli plant is also one of the more powerful sources. The heat is generated by burning the sewage sludge from wastewater treatment. However, the heat produced is not as strong as from Hagenholz. In addition, Werdhölzli and its area of influence cannot be expanded. In other words, it is limited due to its location.



Sectional Diagram of Waste Water Heat Cycle. Source: Own drawing, 2024. [https://www.stadt-zuerich.ch/ted/de/index/entsorgung_recycling/publikationen_broschueren/werdhoelzli.html]

It works in the same way as with the waste cycle. The only difference is that the temperatures are lower. This is referred to as a low-temperature process.



Louis Frei
Energy Planning Project Manager

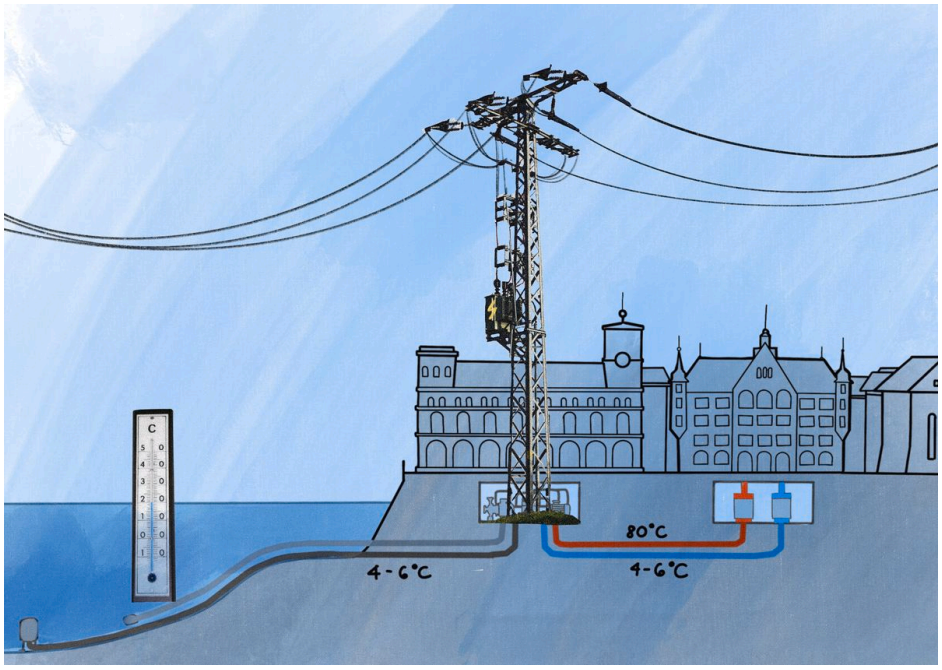
“In any case, on the one hand it is certain that the network can be built. That is certainly a major challenge. And of course the entire decarbonisation of these grids. So how can you break the peak loads with these possibilities that I have already mentioned? And in terms of efficiency, how can these systems be linked together in the long term so that the heat demand can also be utilised differently from these sources in different areas? So that means creating an intelligent system.”



Andreas Jud
Head Of Operations ERZ

“Wastewater treatment. They can’t just let the warm water into the Limmat. They have to cool it down first. This heat is now also utilised. And there really is potential there to utilise waste heat in this way. Instead of simply releasing it into the environment, right?”

Lake Water Heat: Lake Thermics Need a Lot of Electricity



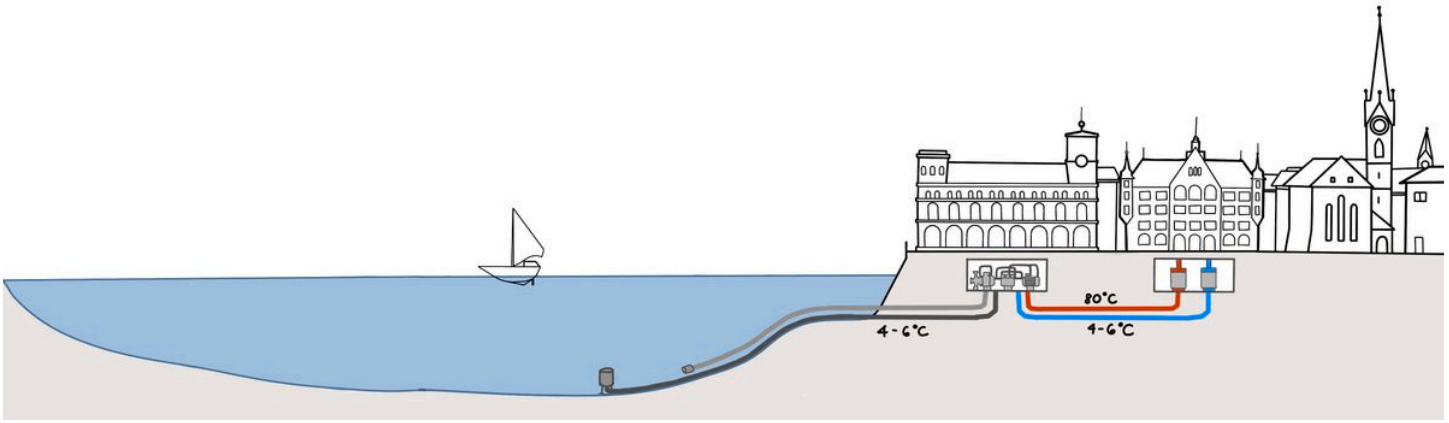
High Electricity Consumption. Source: Own Collage, 2024.



Heat from Lake Thermics. Source: Stadt Zürich Energieplanung, 2024.

Areas with lake thermal heat
Lake thermal areas in review
Lake thermal pipes
Lake thermal pumping station

The lake thermal energy is weaker than the first two sources in terms of the heat it produces. The pipes are under water and are not visible.



Sectional Diagram of Lake Water Heat Cycle. Source: Own drawing, 2024. [https://www.ewz.ch/de/geschaeftskunden/immobilien/referenzen-projekte/seewasserverbunde-zuerichsee.html]

The cycle continues. In addition, a heat pump is used here to bring the lake water from four to six degrees Celsius to eighty degrees Celsius for heating. It is important that the water is not returned to the lake warmer than when it was taken out. The whole thing requires a lot of electricity to operate.



Pascal Leumann
Managing Director Of Energy Planning

“Another source is lake water. There is a great deal of network planning here. Cool City uses lake water as an energy source. The water is cooled and produced with large heat pumps for district heating.”



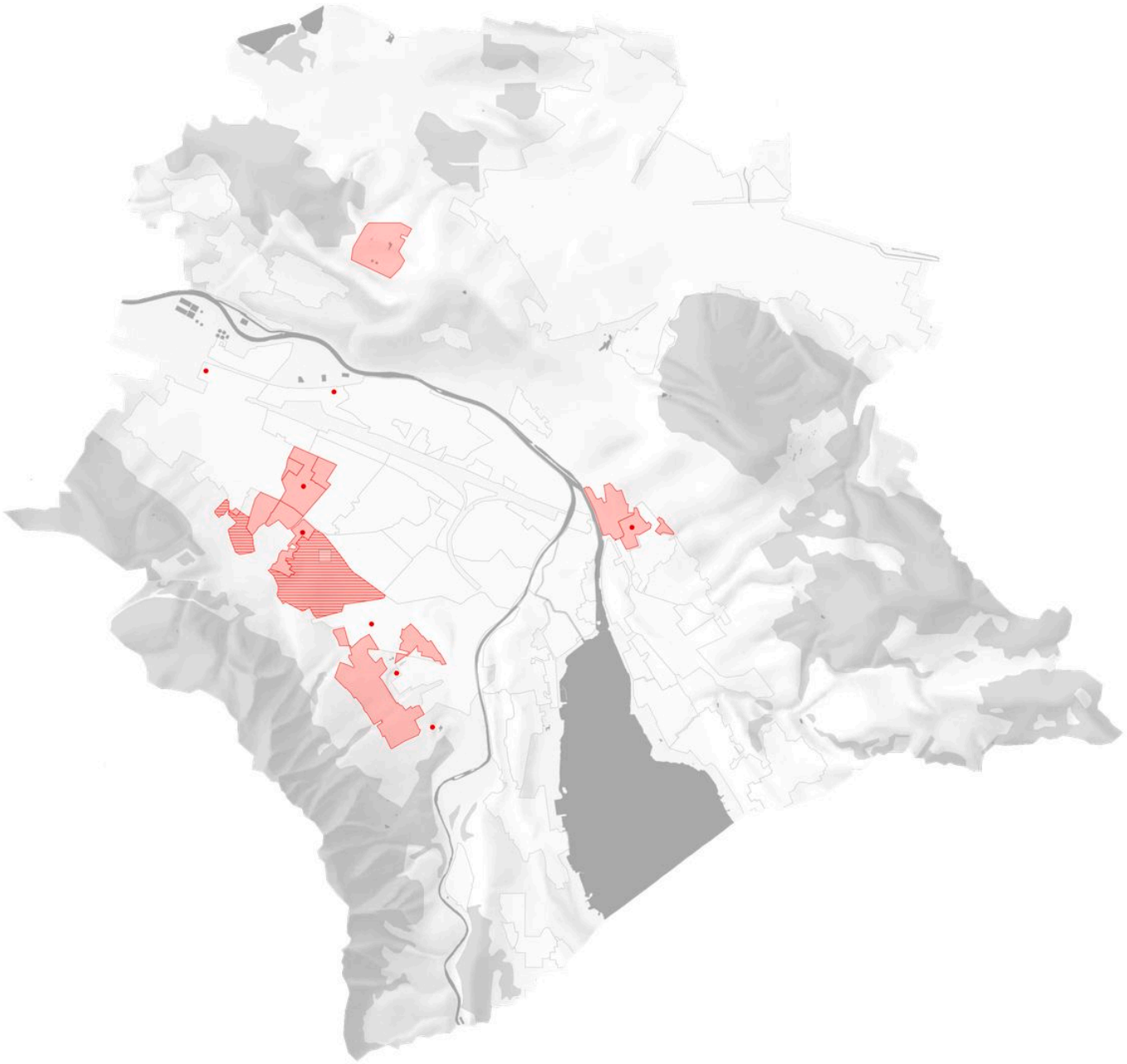
Louis Frei
Energy Planning Project Manager

“Actually the localised environmental heat. That you use lake water, that you use Limmat water or river water. That we can utilise the environmental conditions that are available in the most effective way possible.”

Industrial Heat: It Only Works Site-Specifically



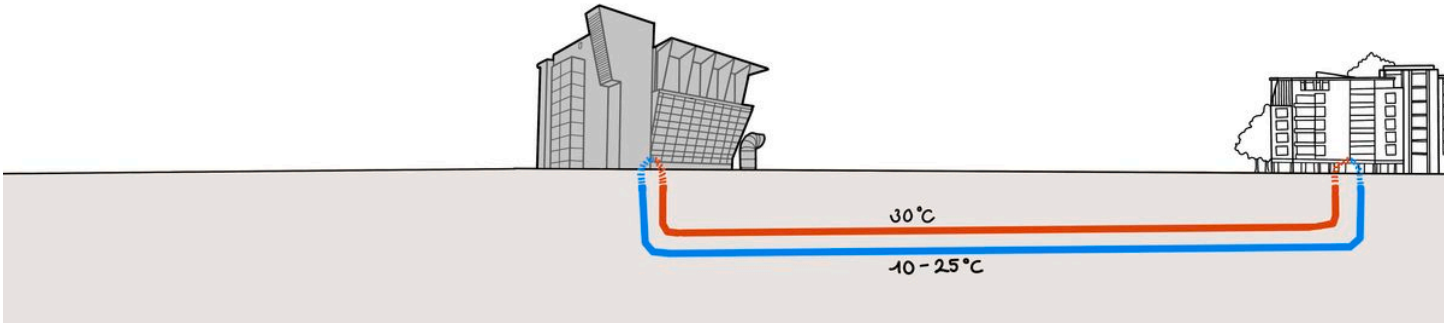
It Only Works Site-Specifically. Source: Own Collage, 2024.



Heat from Uses With Year-Round Industrial Heat Potential. Source: Stadt Zürich Energieplanung, 2024.

- Areas with industrial heat
- Industrial heat areas in review
- Uses with year-round industrial heat potential

The lowest waste heat that is generated comes from data centres, for example. This is utilised on a site-specific basis, which can work very well locally. Nevertheless, you are very limited to the location. There are no opportunities to expand this.



Sectional Diagram of Industrial Heat Cycle. Source: Own drawing, 2024. [https://www.energie-experten.ch/de/wissen/detail/aus-abwaerme-strom-erzeugen.html]

In this case, the heat produced has the lowest temperatures. The waste heat potential is not yet fully known, but research into what this source could be is ongoing.



Louis Frei
Energy Planning Project Manager

“There are also data centres in the Zurich area that now want to ensure this supply over long distances. So there are large data centres in Dielsdorf whose heat is then brought to Regensdorf. I believe that this is the most sensible use in terms of logic. To be able to utilise heat for the heat supply that actually exists and would otherwise escape into the environment.”



Andreas Jud
Head Of Operations ERZ

“Yes, the future of Zurich district heating is very bright, I would say. There was also the referendum, which was very well supported. It really makes sense. We already have 17 per cent of the city’s district heating here. But ewz now also has large networks. So we are easily heading towards 25 per cent and we want to expand even further. That’s a good story. Anergy grids can also be used for cooling in summer. It will certainly increase, but not to 100 per cent coverage of the city. It depends on whether you are by a lake or a river, whether you’re allowed to drill, whatever. Is it a Minergie building, is it a new-build neighbourhood, etc.? But it is still being greatly expanded […]”

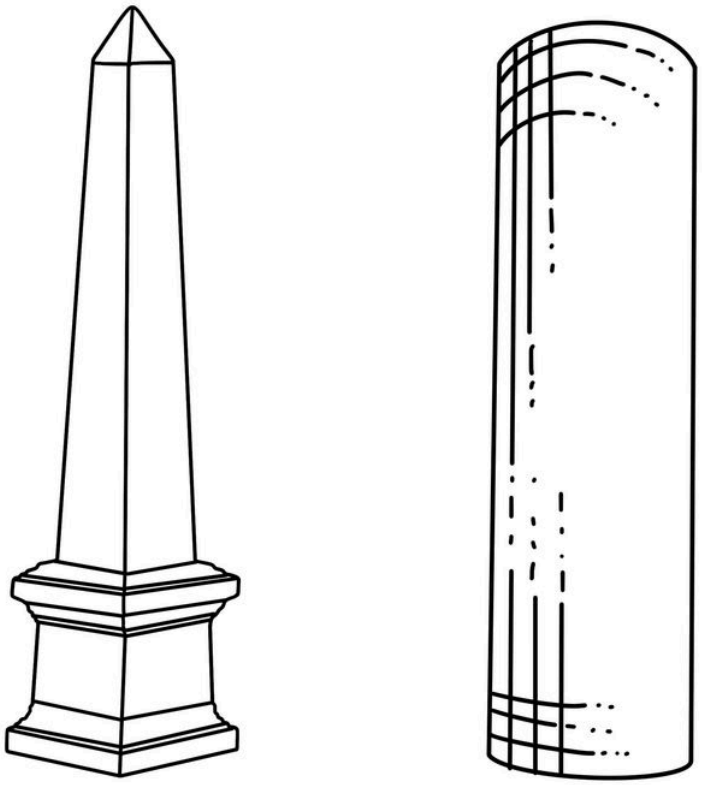
Conclusions

The following conclusions emerge from our research:

The visibility of the district heating infrastructure should be promoted in the city.
We cannot speak of a Service Public because not every family can afford a connection.
It is impossible to supply the city with one hundred per cent heat from the four sources:
This is because there is no storage capacity for waste to transfer heat from summer to winter.
The waste water is very limited and cannot be expanded.
Lake thermal energy requires a lot of electricity for the heat pumps.
The industrial heat only works on a site-specific basis.

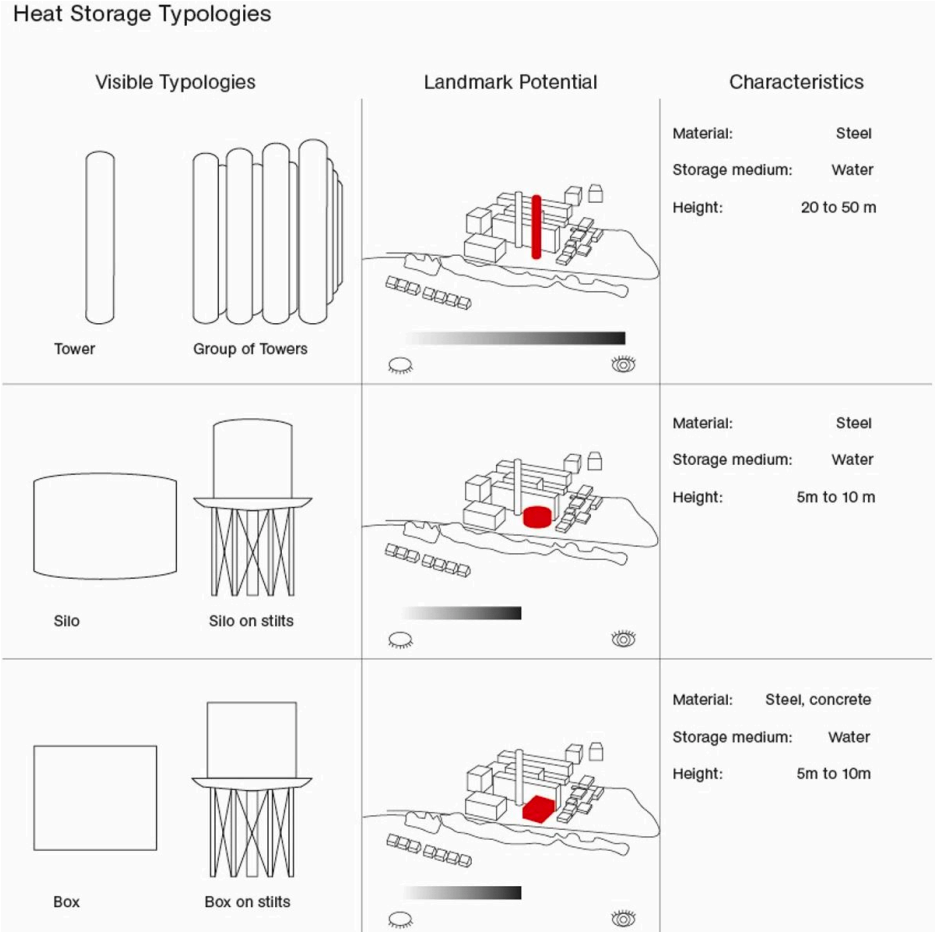
What interests us the most are the questions about the (in)visibility of district heating infrastructure and the missing storage facilities for transferring the produced heat from summer to winter. Those two issues lead us to form our vision for Zurich in the energy transition.

Our Vision For the Energy Transition



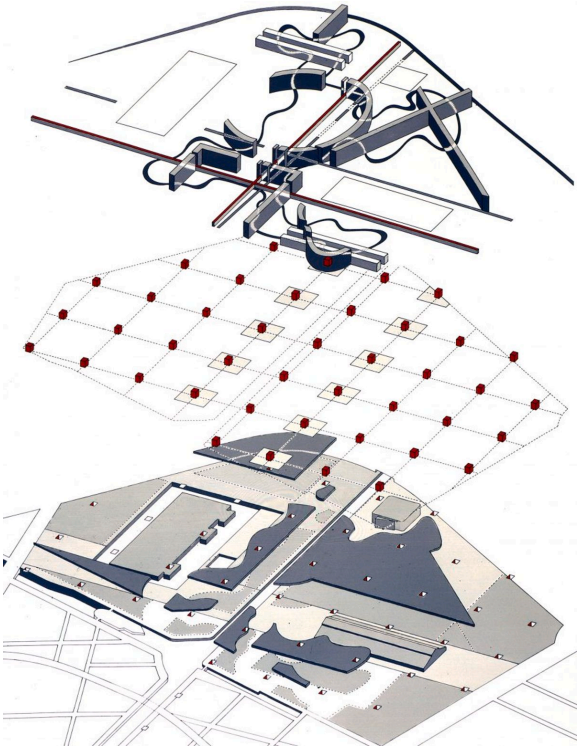
Our vision addresses the issues of the invisibility of the district heating infrastructure and the lack of storage capacity to transfer the heat produced in the summer to the winter for heating. For the city of Zurich, we intend to create a landmark for district heating that its residents can be proud of.

During our research, we realised that district heating is used very intelligently and in a targeted manner so that no heat is lost. It is a precious commodity. Our vision addresses the problems of invisibility and the lack of heat storage. Our intention is to promote the visibility of the district heating infrastructure in the city and to store the heat that cannot be transferred from summer to winter. The placement of the storage facilities in the city should give district heating and its infrastructure a new identity. We cannot solve the issue of Service Public because it is too complex. However, by visualising these storage facilities, we want to create a landmark for district heating in Zurich.

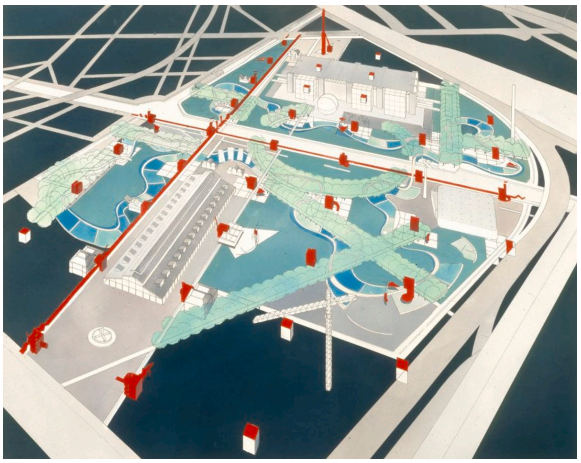


Analysis of Typologies and Landmark Potential

We have looked at various storage typologies and analysed their visibility in the environment. There are several forms. Normally, these storage objects are placed on the ground without a basic structure. Depending on the environment, they may be placed on a supporting structure. This analysis helps us to determine that the tower typology creates the strongest impact in the environment in terms of visibility.



Parc de la Villette from Bernard Tschumi. Source: dezeen Magazine, 2022. [https://www.dezeen.com/2022/05/05/parc-de-la-villette-deconstructivism-bernard-tschumi/]

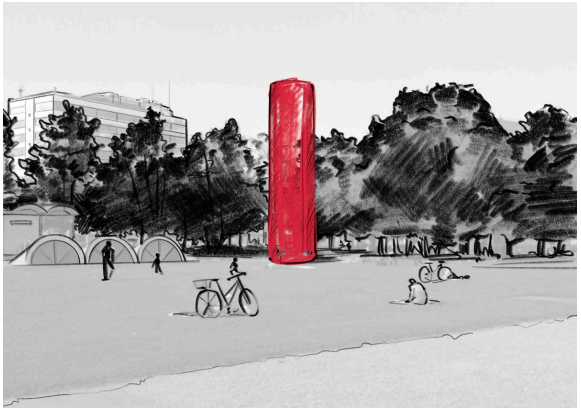


Parc de la Villette from Bernard Tschumi. Source: dezeen Magazine, 2022. [https://www.dezeen.com/2022/05/05/parc-de-la-villette-deconstructivism-bernard-tschumi/]



Parc de la Villette from Bernard Tschumi "Follies". Source: dezeen Magazine, 2022. [https://www.dezeen.com/2022/05/05/parc-de-la-villette-deconstructivism-bernard-tschumi/]

Bernard Tschumi’s pictures of the Parc de la Villette inspired our vision. The red objects in the landscape are called “follies” and work as visual markers.



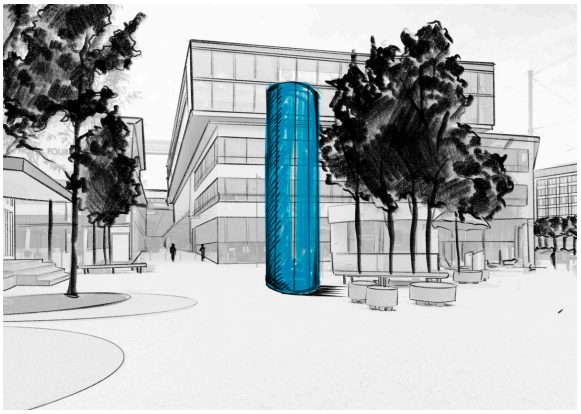
Industrial Heat Storage. Fritschiwiese Zurich. Source: Own drawing, 2024.



Waste Heat Storage. Max-Bill Platz. Source: Own drawing, 2024.



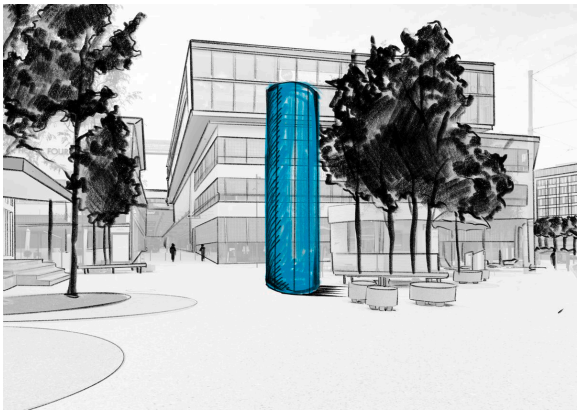
Waste Water Heat Storage. Lindenplatz. Source: Own drawing, 2024.



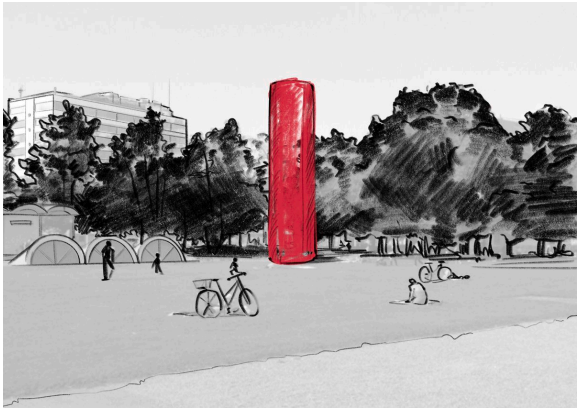
Lake Water Heat Storage. Sihlcity. Source: Own drawing, 2024.



Waste Water Heat Storage. Lindenplatz. Source: Own drawing, 2024.



Lake Water Heat Storage. Sihlcity. Source: Own drawing, 2024.



Industrial Heat Storage. Fritschiwiese Zurich. Source: Own drawing, 2024.

ACKNOWLEDGEMENTS

We would like to thank our interview partners who actively supported us during the process and without whom we would not have been able to make important findings:

Andreas Jud, Christoph Leitzinger, Louis Frei, Daniel Locher and Pascal Leumann

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