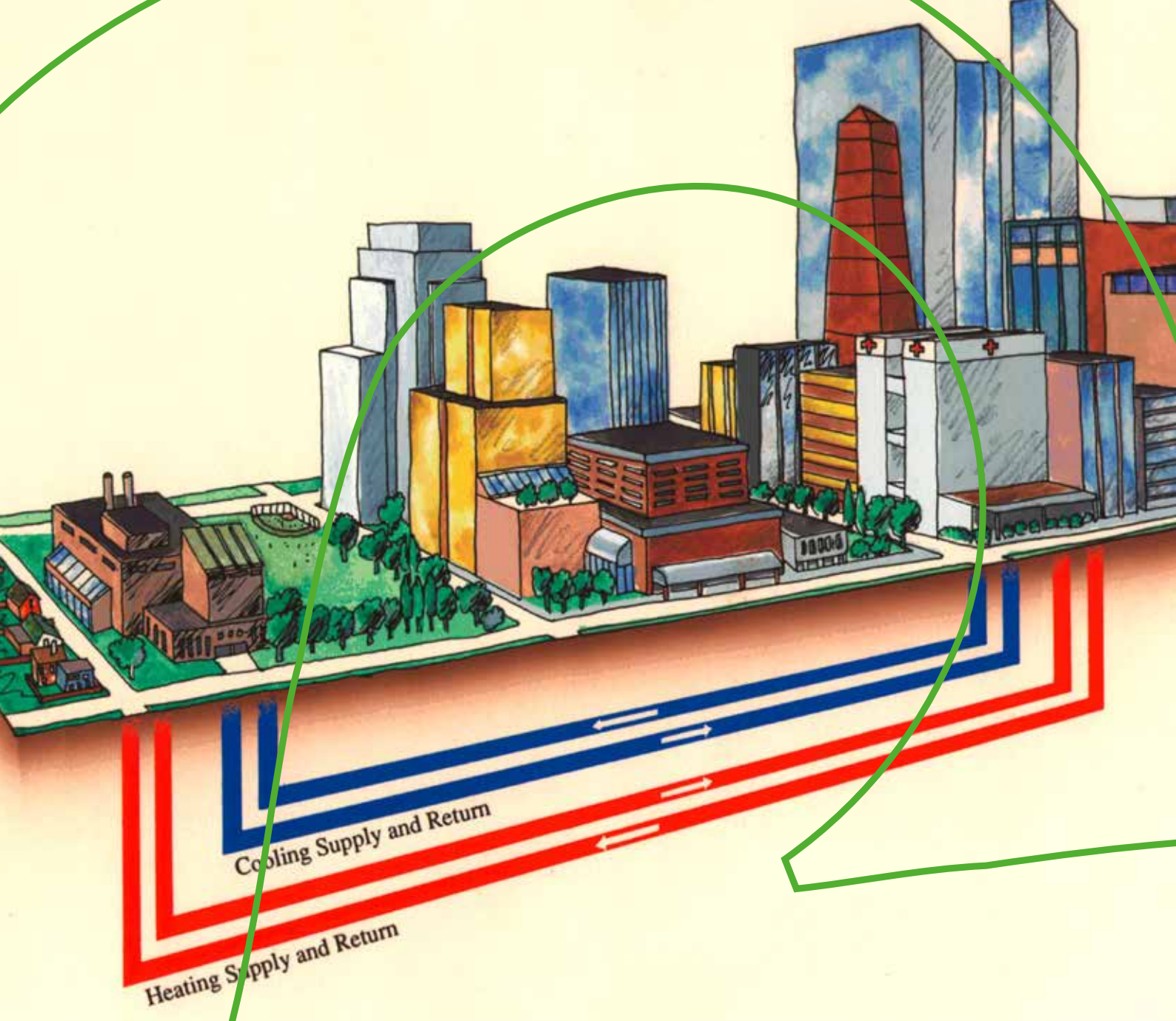




## Energy Efficient Pumps and Pump Solutions for District Energy

# ENERGY EFFICIENT PUMPS AND PUMP SOLUTIONS FOR DISTRICT ENERGY

District Energy: DE is the terminology used by the industry for the integration of District Heating and District Cooling.

Heating and cooling systems in total account for 46% of global energy use. Therefore, these two systems (DH & DC) represent a huge potential for further reducing CO<sub>2</sub> emissions.

In response, we at DESMI are proud to be heavily involved in this business sector for which we design, manufacture, supply and support energy efficient pumps and solutions.

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DESMI is a leading, international manufacturer of pumps and pump solutions. DESMI has produced pumps for District Heating for almost 90 years and we are specialists in providing energy efficient pump solutions with minimum maintenance requirements as well as a long life cycle.



# About DESMI

DESMI is a leading, international manufacturer of pumps and pump solutions.

We are one of the most experienced industrial companies in Denmark, established back in 1834 – as a foundry in Aalborg, in Northern Denmark.

Today we are a modern international group with a global presence. We take pride in being in full control of our product quality – with our own factories, R&D department as well as service workshop facilities.

DESMI has produced pumps since the 1870s. Today we are focusing on pump solutions for Marine & Offshore, Industry, Oil Spill Response, Defence & Fuel, District Energy and other utility applications.

We are specialists in providing energy efficient pump solutions with minimum maintenance requirements as well as a long life cycle.

Our manufacturing processes are in accordance with the ISO 9001 quality certification requirements as well as the specifications of our customers.

DESMI provides competitive pump solutions both

commercially as well as financially. This requires continuous investments into R&D and currently (2014) we are implementing a larger product development in order to increase our pumps' energy efficiencies even more.

We are also an active stakeholder in new, innovative research in what is called 4<sup>th</sup> Generation District Heating – by creating proven and more efficient technology for a more energy efficient solution.

In 2014 DESMI received the “Net Member Award” from the Danish Export Association. The award is given for quick implementation of an innovative business concept, big commitment in networks both nationally and internationally, and high growth in exports.



# District Heating

District Heating is an energy distribution network that transports heated water generated in a centralised utility through piping to residential homes and commercial buildings primarily in urban areas.

District Heating is clean, efficient and cost-effective due to its flexibility, scale of production and optimal heat generation conditions.

The heat is often obtained from a CHP (Combined Heat & Power) plant burning fossil fuels or increasingly also biomass a.o. District Heating plants can provide higher efficiencies and better pollution control than localised boilers.

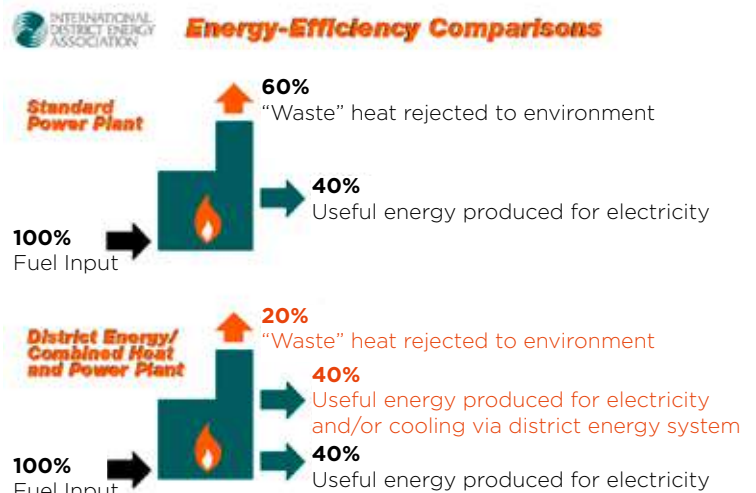
Between the CHP plant and the distribution network there is a transmission pipeline through which heated water is pumped further onto the distribution network and into the individual buildings. The cooled water is then pumped back to the plant for re-heating.

The fundamental idea of District Heating is to use energy that is already available and that otherwise would be wasted and cause pollution.

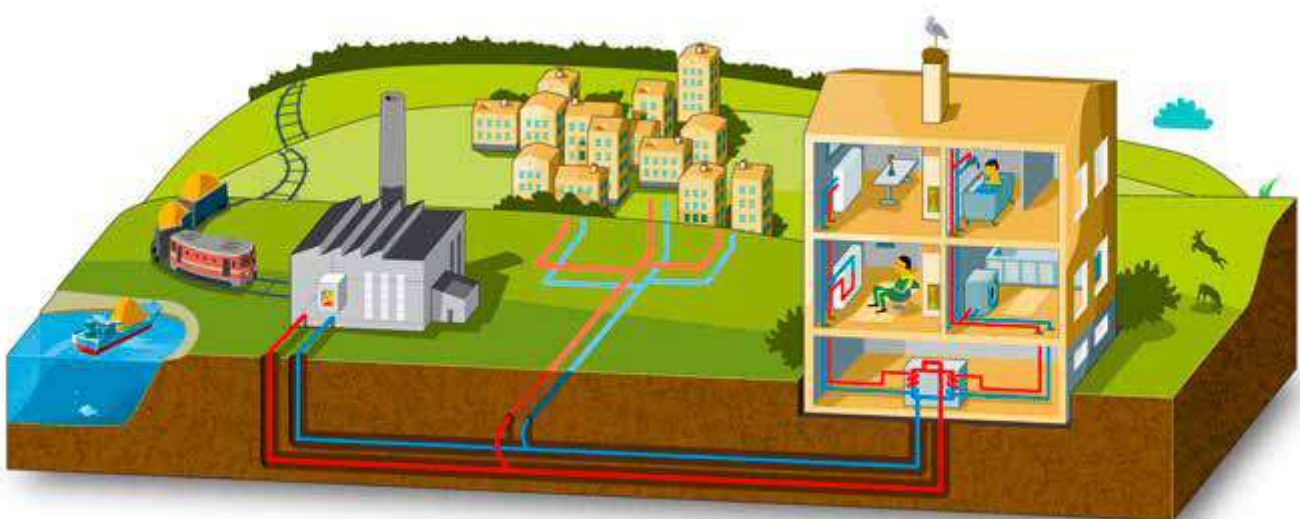
In order to reduce primary energy demand and CO<sub>2</sub> emissions, District Heat generation is often based

on heat recycled from mainly CHP Plants, which includes a variety of fuels such as renewables, natural gas and oil. Alternatively it could be surplus energy from Waste-to-Energy plants, other power plants or industries. The positive economic and environmental benefits are shown in the illustration below.

DESMI provides pumping solutions both for applications in CHP Plants (or other types of power/energy producing plants) as well as for the entire pipe network, including substations.



Source: IEA



Source: Kjell Thorsson/Fortum

# District Heating

## History of Danish District Heating

Denmark has unique experience with district heating, which is the reason why many foreign delegations visit Denmark, in order to learn from our competences as one of the most energy efficient countries world-wide.

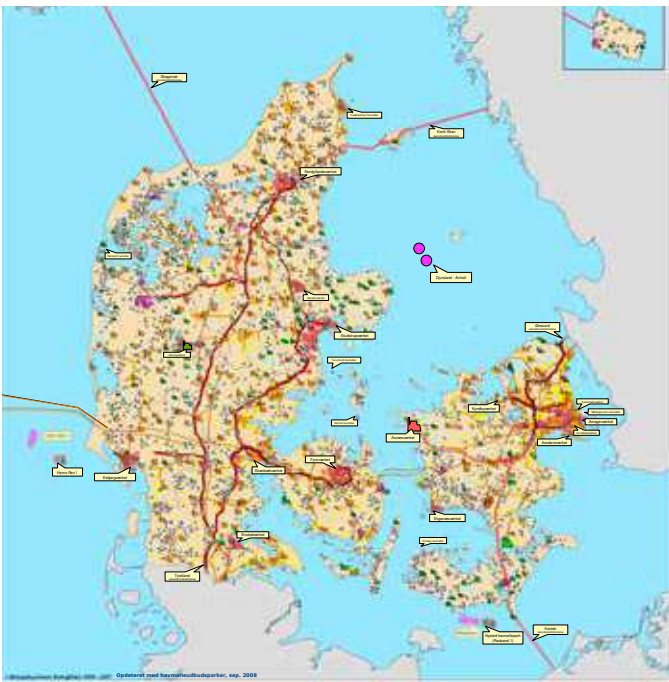
In 1903, the first waste incineration plant was inaugurated in Copenhagen. The same year, the district heating production was put into regular operation. The waste was loaded into silos and from there, in portions, loaded further into the ovens. In the shape of steam the heat was led through tunnels to the newly built municipal hospital to a children's home and to a poorhouse.

When the power stations in the large cities changed from diesel to steam heating in the 1930's, many of them were combined heat and power plants, since the earlier development had obliged the stations to deliver heat as well.

Already in the beginning of the 1960s, Denmark had more than 50 years of experience using district heating. This development was now strengthened by the fact that some Danish suppliers launched the idea of urban development with district heating based on a low supply temperature (up to some 90°C / 194°F). Hereby the district heating stations and the distribution network would become cheaper. Also on the operational side this led to savings since the demands on personnel etc. did not have to live up to the regulations for hot-water plants or power stations.

The significant development of the Danish district heating sector began when the energy crisis hit the Western countries in 1973/74. At that time, energy consumption per inhabitant was extremely high. The outcome of the crisis was, however, that it became necessary to save energy in Denmark, including energy for space heating. One reason for this was that Denmark at the time imported almost 100% of all fossil fuels required to generate heat.

Therefore, the Danish government was forced to devise methods for saving fuels in order to safeguard the interests of society and to reduce the consumers' heating bills.



MAP OF DENMARK'S HEAT SUPPLY  
Source: DBDH & Danish Energy Authority

The centralised form of heat supply grew steadily in the 1920s and 1930s, and gradually regular district heating substations appeared in connection with the development of large adjoining housing areas.

# District Heating - "Made in Denmark"

A number of initiatives were launched, including:

- Systematic planning of heat supply for all areas
- Biggest possible CHP generation on the basis of such planning
- Improved insulation of buildings
- Development of highly effective district heating pipe systems, pre-insulated pipes with high insulation properties and low installation costs
- Reduction of operating temperatures in district heating systems and a variable flow in the pipelines to secure the most economical operation in the overall production and distribution system.

## The world's largest

Today, the Copenhagen district heating system is one of the world's largest, supplying heat for a floor area of around 50 million square metres.

The transmission system connects four CHP plants, four waste incinerators (e.g. "Vestforbrænding") and more than 50 peak load boiler plants to more than

Another reason for using this concept is the reduction of heat loss from the network due to reduced temperatures outside peak hours. Furthermore, wear and tear of the pump system is



*Vestforbrænding - Waste-to-Energy Plant in Copenhagen*

reduced, resulting in extended service life.

So in conclusion - Denmark has unique experience within District Heating dating back more than 100 years - and DESMI has been around during this time assisting the power stations/CHP and District Heating networks with pumping solutions.

Today approx. 65% of total energy used for heating in Denmark originates from District Heating.



20 distribution companies in a one pool-operated system with a total heat production of around 30,000 TJ.

DESMI has supplied the majority of pumps used at "Vestforbrænding" as well as to the pumping station for Avedøre Power Station (picture above).

To deliver heat in abundant quantities 24 hours a day is a simple task, but to deliver the exact amount of heat needed at any given time to all consumers requires modern equipment and operational skills. It is, nevertheless, the way Danish district heating systems are operated today.

The primary reason for using this concept is the large potential for saving power for pumping. Often pump energy can be reduced to one third over the year, and the pay-back time on the installation is often less than two years.

DESMI is constantly developing and strengthening its competences and technologies within pump efficiencies and solutions. Currently DESMI is e.g. closely involved in the innovative "4th Generation District Heating Technologies and Systems (4DH)". (More information - page 9)

# DESMI Competences - District Heating

DESMI has unique pump manufacturing experience – more than 125 years in fact. Production of pump solutions for District Heating goes back approx. 90 years and we are still in the lead developing new technologies and solutions as e.g. related to 4<sup>th</sup> Generation District Heating among others.

In brief, DESMI's pump competences include pump solutions for CHP Plants, Transmission & Distribution Networks, Substations etc.

Pressure ratings up to 25 bar / 363 psi – temperatures up to max. 150° C / 302°F.

- We provide pump solutions, not just pumps.
- We adapt our pump solutions to specific customer requirements.
- We supply competitive solutions, technically as well as commercially.
- The pump designs are based on DESMI Proven Technology from many years of experience within District Heating.

- We provide energy efficient pumps, customised to customer needs.
- We supply flexible solutions also related to motor specifications as well as other accessories, such as frequency converters etc.
- Robust construction assists providing solutions for many different types of applications.

**Examples of DESMI pump capabilities inside CHP (and Waste-to-Energy) Plants etc.:**

Shunt pumps – for water circulation to/from the boiler, condensation pumps etc.

**DESMI pump capabilities in the District Heating Network:**

Pumps within the Transmission Pipeline System.

Pumps within the Distribution Network System.

Pumps for the Substations etc.



DESMI NSL



DESMI DSL



DESMI ESL



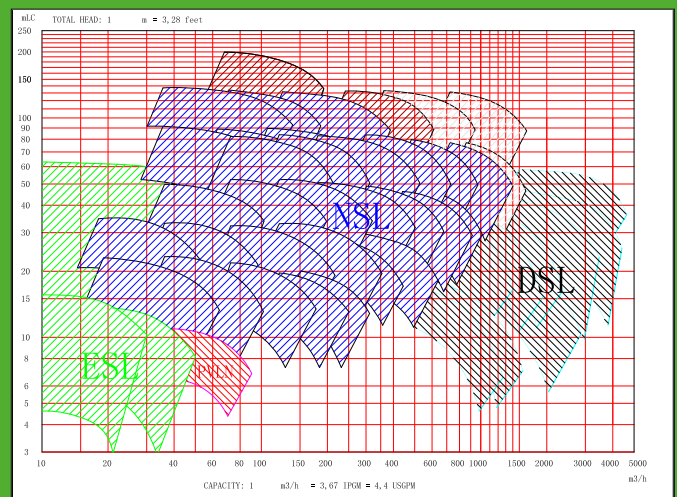
DESMI NSLV



DESMI NSLH

## The NSL, DSL and ESL pump concept:

- High efficiency
- Low NPSH values
- Easy installation/service
- Specific materials
- Compact design
- Standardised to modular design
- Outstanding hydraulic design performance
- Spacer-coupling options for easy maintenance
- Robust shaft design
- High efficiency impeller with low NPSH values
- Self-priming ability with a separate built-on priming pump
- Our NSL pumps are also available in horizontal configuration



# DESMI Competences - District Heating

DESMI's extraordinary experience as manufacturer and supplier of high quality pump solutions for district heating is an important resource for the innovative research programme "4<sup>th</sup> Generation District Heating Technologies and Systems", known as 4DH:

4DH is an international research centre supported by The Danish Council for Strategic Research. Such development is fundamental to the implementation of the Danish objective of being fossil fuel-free by 2050 as well as the European 2020 goals. Research period currently funded 2012-2018.

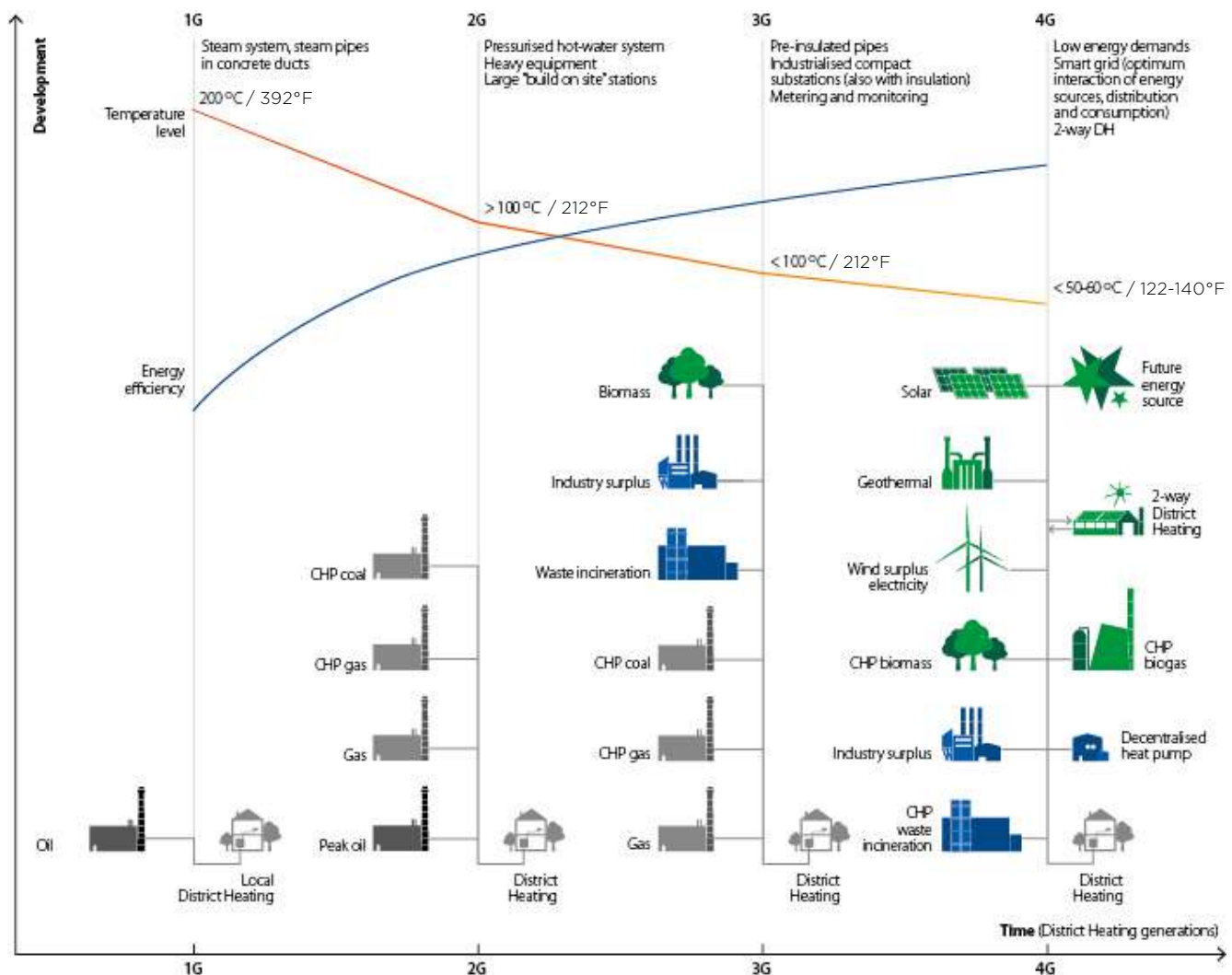
Stakeholders for this research include Aalborg University, Danish District Heating Association, leading Danish consulting engineers, leading district

heating utility companies in Denmark, and a handful of leading component/system manufacturers/suppliers, including DESMI a.o.

The research is about supply of heat through piping network as known from conventional District Heating - but utilising lower temperatures than ever seen before (< 50-60° C / 122-140°F).

Key parameters include: Low energy demands, reduced heat loss & optimum interaction energy source, distribution and consumption.

See also [www.4dh.dk](http://www.4dh.dk)



Source: Danfoss/4DH

DESMI has e.g. supplied pump solutions for these  
Power Plants around the world:



*The Helius CoRDe Ltd Plant, Scotland.*



*Space saving installation with vertical NSL pumps.*

## Combined Heat & Power Plants / Waste to Energy Plants / Incineration Plants:

| Country     | Details                                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Denmark     | Vestforbrænding, Waste-to-Energy Plant, Copenhagen.<br>Nordforbrænding, Waste-to-Energy Plant, Copenhagen.<br>AffaldVarme Aarhus. Waste-to-Energy Plant, Aarhus<br>Skanderborg-Hørning Biomass Boiler Plant.<br>Dronninglund Solar Heating Plant.<br>VEKS Combined Heat & Power Plant, Copenhagen. |
| Netherlands | WKC Almere Power plant, Nuon Energy (Vattenfall).                                                                                                                                                                                                                                                  |
| China       | Zunhua Power and Heating plant (160 km / 99 miles east of Beijing).                                                                                                                                                                                                                                |
| Mongolia    | Thermal Power Plant No. 2 – Ulaanbataar.                                                                                                                                                                                                                                                           |
| UK          | The Helius CoRDe Ltd Plant – Biomass Fueled. Rothes, Speyside - Scotland                                                                                                                                                                                                                           |
| Poland      | Envirotech. District Heating CHP Plant: Przedsiębiorstwo Energetyki Ciepłej Żyrardów (PEC Żyrardów).                                                                                                                                                                                               |

## A few references for District Heating Networks:

| Country         | Details                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Denmark         | CTR, Copenhagen Transmission Pipeline Company: “The Tunnel Projects” (transmission pipelines), i.e. 6 x NSL 300-415B m. 355 kW 4 pole motor & 3 x NSL 300-415 m. 160 kW 4 pol motor.<br>Aalborg District Heating, i.e. i.e. 2 x NSL 200-415, 55 kW motor & 2 x NSL 200-415, 110 kW motor.<br>VEKS (Western Copenhagen DH Company) – i.e. 2 x NSL 300-415, 315 kW motor. |
| China           | Harbin Daoli District Heating Project. NSL pumps.                                                                                                                                                                                                                                                                                                                       |
| Norway          | Lillestrøm District Heating Project, i.e. NSL300-525 pumps.                                                                                                                                                                                                                                                                                                             |
| Mongolia        | Ulaanbaatar District Heating Company - Booster Pumping Stations No.1, 2, 6 & 8: i.e. NSL 300-415/A12-J-L + 315 kW 4 pol ABB motor, PN25                                                                                                                                                                                                                                 |
| The Netherlands | Nuon Energy/Vattenfall. Several projects                                                                                                                                                                                                                                                                                                                                |
| Kazakhstan      | “VostokEnergoRemont” LLP. NSL-300 10 pcs. District Heating pump station,                                                                                                                                                                                                                                                                                                |

## Skanderborg-Hørning Biomass Boiler Plant, Denmark

Skanderborg-Hørning District Heating Co. supplies heat for a population of approx. 9.000.

The heat system consists of 300 km / 186 miles distribution pipes, six heating plants and five pumping stations.

The annual supply of energy is 275.000 MWh.

The wood chips production covers 140,000 MWh/year and replaces coal-fired heat from the Studstrup Power Plant. Wood chips heating is CO<sub>2</sub>-neutral and reduces the annual CO<sub>2</sub>-emissions by approx. 20,000 tonnes.

The project consists of two boilers of each 10 MW. 50-60,000 tonnes of wood chips from local forests are used on an annual basis. The boiler building has a floor area of 600 m<sup>2</sup>. Wood chips storage hall 5,000 m<sup>3</sup> and the hot water storage tank 4,000 m<sup>3</sup>.

DESMI has supplied approx. 70 different kind of pumps for the boiler stations. Among others are the NSL centrifugal pump & the ROTAN® gear pumps. The NSL has been sold in different sized from 100-215 to 200-415.

Most of the NSL pumps supplied are the vertical in-line pump design complete with electrical motor and in most cases with VFD drives for higher efficiency.

The main purpose of these pumps is to circulate the hot water in the DH pipe system.

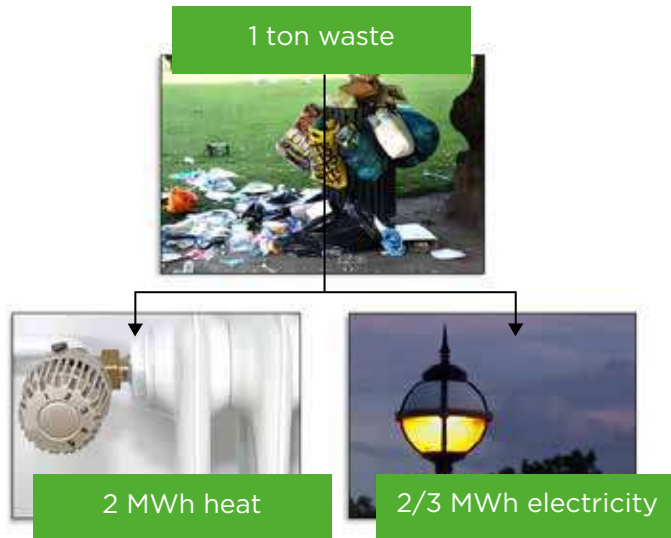
Also, two NSLH end suction pumps 125-330 B12 (stainless steel impeller) were supplied for the scrubber cleaning system. The purpose of this system is to cleanse the exhaust gas and use the excess heat from the combustion. The NSLH pumps circulates the scrubber water through nozzles in order to spray and cleanse the exhaust gas. The scrubber water picks up the heat from the gas. The pump pumps the scrubber water through a heat exchanger. This increases efficiency and keeps the exhaust clean.

The ROTAN® pumps supplied are a positive displacement gear pump design. The main purpose of this pump is to pump liquids with higher viscosity such as fuel oil to the boiler.



# Waste-to-Energy Plants (Incineration)

## Waste Management, Heat & Power Generation in One Solution

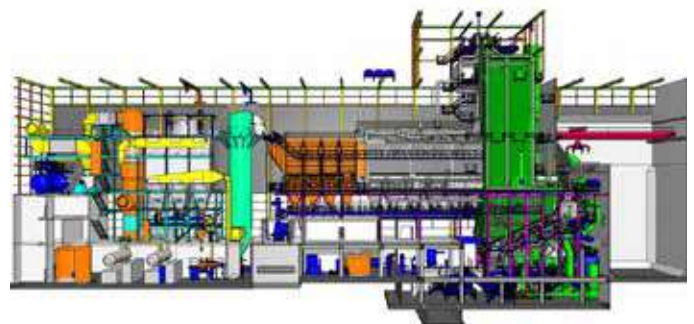


Energy recovery from waste is a very good idea: 1 ton of waste can be converted to 2 MWh heat and 2/3 MWh electricity.

In Denmark alone more than 3.5 million ton of waste is being incinerated every year. It is one of the popular ways to create heat and electricity and there is a strong trend to build a lot more Waste-to-Energy Plants around the world. Reason obviously being positive environmental as well as financial aspects.



*Vestforbrænding, Waste-to-Energy Plant, Copenhagen DESMI supplied many pumps to this facility: 12 x NSL 200-415B/A12 + 200 kW, 2 x NSL 200-415B + 200 kW, 2 x NSL 200-415B + 200 kW & 5 x NSL 125-330 + 110 kW*



*Nordforbrænding, Waste-to-Energy Plant, Copenhagen. Waste Incineration for 200,000 population.*

*Heat to District Heating: 460,000 MWh. Power Supply: 260,000 MWh  
DESMI have supplied many pumps for this plant: 7 x NSL 150-330 + (55-110 kW motor), 5 x NSL 200-265B + 18,5 kW & 5 x NSL 250-330B + 55 kW.*

# Harbin Daoli - District Heating, China – Case Story

Daoli is one of the seven districts of Harbin, the largest city in North East China with approx. 11 million inhabitants. It is known for its bitterly cold winters and is often called the “Ice City” – so therefore the city welcomed this district heating project, where ABB provided the turnkey supply, which included energy efficient pump solutions from DESMI.

The hot water produced by Harbin Hua Neng District Heating Co. Ltd. was used as primary heating resource. Water from the pre-insulated underground pipes was transferred to 156 self-operating heating exchanger units instead of the traditional boiler room and then directly fed into residential radiator installation, covering an area of 17.58 million square meters.

**When the installations were completed in 2007 the project was the largest district heating project to date in China.**

Under the contract, ABB provided 96.1 km of pre-insulated pipes, 378 frequency converters, more than 500 secondary network circulation pumps, 252 heat exchangers, 2000 instruments that are used to supervise and control the network and substations, as well as a SCADA system with more than 10,000 signals. ABB also helped the customer rebuild 42 turnkey substations and include them in the SCADA system.

- In total, more than 500 pumps supplied by DESMI.
- Coal saving 300,000 tons per year.
- CO<sub>2</sub> emissions decreased 500,000-550,000 tons per year.
- Heat supply 17.58 million m<sup>2</sup> for 1 million residents through 156 sets of automatic controlled heat exchanging stations.
- In cold winter with -25° C / -13° F external temperature, residences enjoy 18° C / 64° F spring room temperature;
- High efficiency, low noise, frequency control and individual pump solution from DESMI

Upon completion of the project Harbin's Vice Mayor added the following comments about the project: “Although northeast China's Heilongjiang Province experienced its strongest snowstorm in 56 years last winter, citizens in Harbin, the nation's northernmost provincial capital city, enjoyed a comfortable winter, sitting in warm homes and viewing the snow through their windows.

Thanks to a district heating project by the Harbin government, the Danish government and ABB, our people enjoyed a warm and comfortable winter,” said Wang Shihua, vice-mayor of Harbin. “As a key project in Harbin in the 11th Five-Year Plan, the district heating project not only improves the heating system in a cold city, but also makes a huge contribution to an environmentally friendly society.”



DESMI & ABB solution



Harbin - The “Ice city”

## An efficient and environmentally friendly utility service, District Cooling is simple and clean

District Cooling is an efficient and environmentally friendly utility service, which provides chilled water from a centralised cooling plant (or cold water from the sea) through a network of pipes to multiple residential, industrial and commercial buildings for air conditioning purposes.

District Cooling is simple and clean. It creates a cool, efficient indoor climate, without the need for bulky refrigeration equipment and noise in or near residences. The supply is assured year-round with minimal maintenance needed, which is reflected in reduced operating costs and lower investment requirements. Cooling water originates from either:

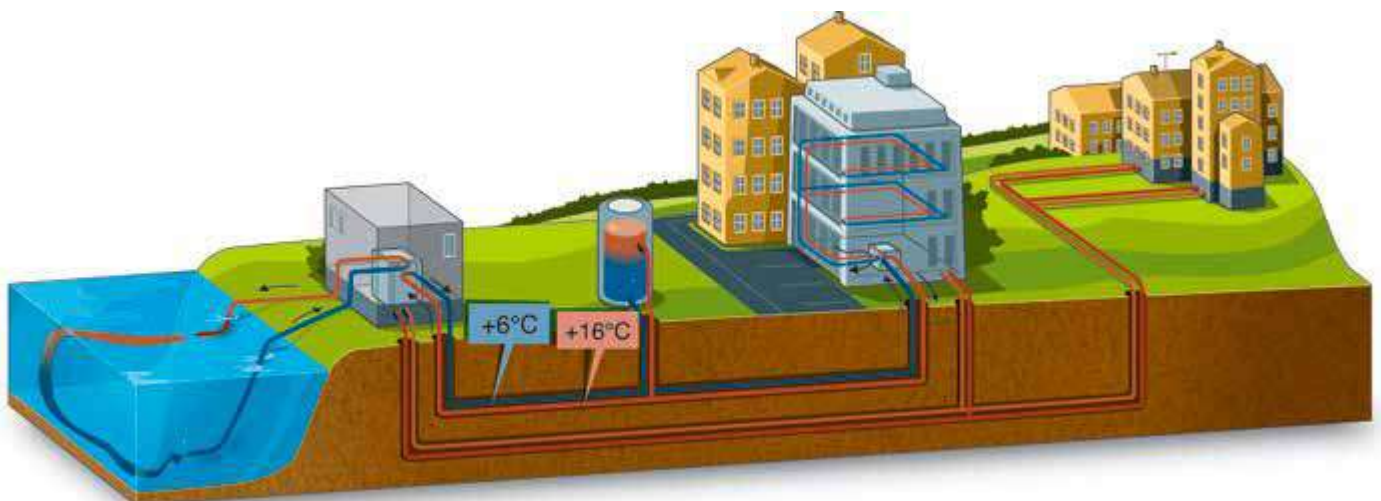
- Free cooling and pre-cooling (seawater)
- Absorption cooling (e.g. steam)
- Compressor-based cooling

The following are just a few of the numerous benefits of using District Cooling:

- Increased energy efficiency
- Better quality of cooling
- Reliability in the excess of 99.9%
- Reduction of noise by eliminating the need for chillers in buildings (i.e. roof tops)

- No mould growth due to effective humidity control
- Significantly reduced air pollution/decreased emissions of ozone-depleting refrigerants
- Minimum maintenance requirements, more privacy and security
- Better building aesthetics - no bulky outdoor equipment. Therefore, more consideration given to the built environment
- Freeing up of rooftops/outdoor space
- Average industrial equipment lifespan is 30 years versus 15 years for commercial equipment
- District Cooling systems consume far less energy than chillers
- Higher energy utilisation and reduced energy consumption
- Enables owners to conserve energy, improve operating efficiency and protect the environment while simultaneously lowering government spending by reducing electricity infrastructure
- Typical supply/return temperatures vary between 4-6/13-16 °C / 39-43 / 55-61° F

DESMI provides pumping solutions for both water intake (e.g. seawater), centralised cooling plants as well as the piping network.



Source: Kjell Thorsson/Fortum

## DESMI has unique pump manufacturing experience – more than 140 years in fact

Denmark is recognised for being a global leader within District Heating as well as District Cooling, due to extensive use in Denmark (today more than 60% of total energy used for heating originates from District Heating).

This has assisted us at DESMI in becoming a premier technology supplier in this field. Creation of pump solutions for District Heating goes back approx. 90 years and remain market leaders, developing new technologies and solutions e.g. 4<sup>th</sup> generation (low temperature) District Heating, among others.

Since District Cooling is built on similar philosophies as District Heating, it has been a natural progression for DESMI to develop pumping solutions for District Cooling.

- We provide energy efficient pumps and pump solutions.
- We adapt our pump solutions to specific customer requirements.
- We supply competitive solutions, technically as well as commercially.
- The pump designs are based on DESMI Proven Technology from many years of experience within District Energy.

- We supply flexible solutions also related to motor specifications as well as other accessories, such as frequency converters etc.
- Robust construction assists with providing solutions for many different types of application (long life cycle).
- DESMI is a medium sized manufacturer with a high level of production flexibility and full focus on customer solutions.
- Our pump solutions range from the medium to larger sized applications – where knowhow and flexibility to individual project requirements are essential.
- DESMI are a global company and are close to their clients/partners, we provide maximum understanding supported by effective after-sales service.
- DESMI's extensive experience with marine pumps means we are a leading supplier for seawater applications, which includes S.W. cooling (as we have our own foundry for such requirements).

In conclusion, DESMI's pump competences include solutions for District Cooling Plants, Transmission & Distribution Networks etc.

Pressure ratings up to 25 bar / 363 psi.



DESMI NSL



DESMI NSLV



DESMI DSL



DESMI ESL



DESMI NSLH

## Greater Copenhagen Utility district cooling plants at: “City square” & “Adelgade/Kgs. Nytorv”

HOFOR has the English name “Greater Copenhagen Utility”.

### District cooling concepts with HOFOR:

- In the winter months, production of cooling is by seawater, which is brought into the cooling system by a pipeline from the harbour. Production is totally free of CO<sub>2</sub> emission and is called free cooling.
- The seawater is not cold enough in the summer months to cover the whole cooling demand. Therefore, surplus heat is used to produce cooling as well. This method is called absorption cooling.
- A compressor cools the seawater (as support when peak demand is very high and the capacity of surplus cooling is too low). The main part of HOFOR's cooling production is based on “free cooling” and these compressors are only used in very high demand periods.

DESMI has supplied pumps for the “free cooling” part of HOFOR district cooling system. This method relies on a small amount of electricity to distribute the cooling to the customer.

Furthermore, it secures a reliable delivery of cooling to the customer versus a decentralised cooling set-

up. DESMI has extensive experience in seawater pumps due to supplying marine pumps for more than 100 years.

DESMI has supplied pumps for the two stations HOFOR has established (The first of its kind in Denmark).

### City Square Pumping Station:

- 3 x DSL 300-320C/D-F + 200 kW 4 pole motor (inline pumps in bronze + duplex impeller) – Duty point 1250 m<sup>3</sup>/h / 5503 gpm, 35 m / 115 ft.
- 1 x NSL 150-330/E02 + 75 kW 4 pole motor (inline pumps in bronze + duplex impeller) – Duty point 400 m<sup>3</sup>/h / 1761 gpm, 35 m / 114 ft.
- 1 x NSL 100-215/E02 + 4 kW 4 pole motor (inline pump in bronze + duplex impeller) – Duty point 50m<sup>3</sup>/h / 220 gpm, 14 m / 46 ft.

### Adelgade (Kgs. Nytorv) pumping station:

- 6 x NSLV 300-415/E02 + 160 kW 4 Pole motor (end suction pump in bronze + duplex impeller) with priming pump 114N – Duty point 625 m<sup>3</sup>/h / 2752 gpm, 36 m / 118 ft.



## District cooling Zuidoost Lob Amsterdam

Nuon, part of Vattenfall, is a leading energy company that generates electricity and produces gas, heating and cooling, which it supplies to approximately 2.2 million households, companies and organisations in the Netherlands.

In 2009 DESMI supplied some of our energy efficient pumps to Nuon for a district cooling project in the south area of Amsterdam. Capital Cooling from Sweden did the engineering.

The DESMI pumps supplied (NSL 300/525/A02-I complete with 630 kW 3 x 690 Volts 1800 rpm e-motors) are used to distribute lake water to the heat exchangers in the production plant.

In February 2010 the cooling plant was ready to start up the district cooling pumps and we were invited to be present at the commissioning – from where the photos shown were taken.

The Nieuwe Meer (from where the cooling water originates) is deep and the water in the lower layers of the lake is always cold (6-8°C / 43-46°F) making it a large, cold water reservoir.

Nuon (Vattenfall) utilises the cold water from the lake and brings it to buildings and datacentres (DESMI also supplied pump solutions to some of these) in the Zuidas region. This method of cooling is a natural and inexhaustible source and therefore very sustainable. It leads to a substantial reduction in CO<sub>2</sub> emissions, which DESMI is proud to be a part of.

The supply of very large pumps for a technically demanding project has given DESMI valuable experience and another very strong district cooling reference. Not at least because Amsterdam, with a population of 750,000 inhabitants in the city and 400,000 households is a very “green” community with high standards.

By 2020 a population of 100,000 will be connected to District Energy in Amsterdam. Total capacity of District Cooling to reach MW 120.



# Dubai Metro - District Cooling, UAE – Case Story



The Dubai Metro is the world's first district-cooled mass transit system, according to Stanley Consultants.

A distribution network provides centralised cooling via pre-insulated, buried steel piping to all Dubai Metro stations. Five district cooling plants were built specifically for the Dubai Metro, with the following installed capacities:

- Al Rigga 10,000 TR
- Al Barsha 7,500 TR
- Jumeirah Island 7,000 TR
- Jebel Ali Industrial 4,400 TR
- Al Rashidiya 7,500 TR

A total of 52 km / 32 miles of piping was needed for the district cooling network.

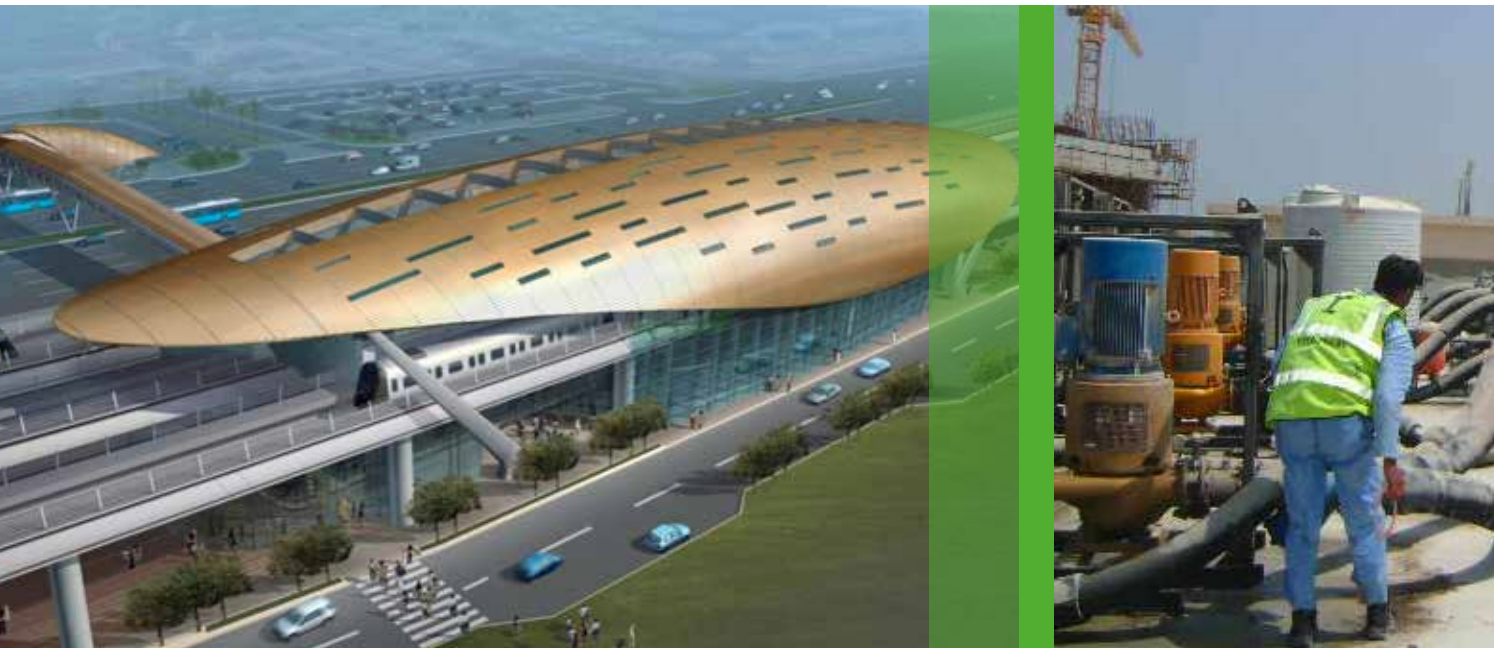
DESMI pumps were installed for air cooling purposes in some of Dubai's metro stations mentioned above.

*DESMI NSL125-330*

DESMI model NSL 125-330 with a capacity of 162 m<sup>3</sup>/h / 713 gpm at 35 mLC / 115 ft LC were chosen for the installation.

The pumps are mounted with 30 kW motors.

Stanley consultants, who designed the project, emphasised that district cooling was particularly suited to the Dubai Metro. Not only did it reduce the electromechanical areas inside the stations but it also reduced the total power consumed by 30 – 50%. This, in turn, reduced the total carbon footprint of the project. It also reduced the noise and vibration, as opposed to the alternate stand-alone solution of having roof-top air-cooled chillers and pumps.



*Dubai Metro*

# DESMI Pump Solutions - District Energy

## Vertical & Horizontal In-Line and End Suction Pumps



DESMI NSL



DESMI DSL



DESMI ESL



DESMI NSLV



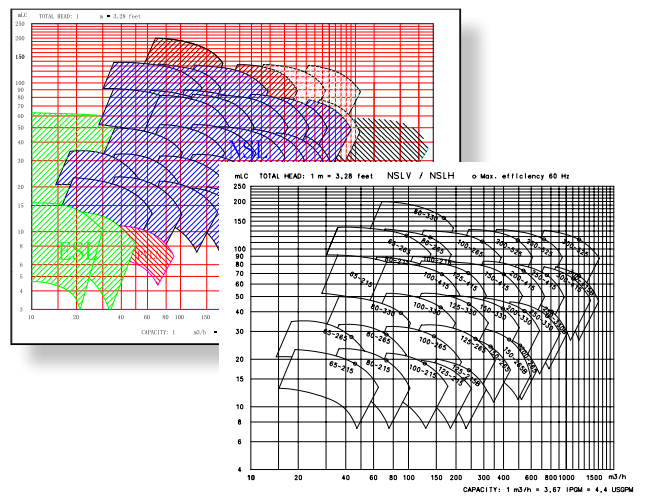
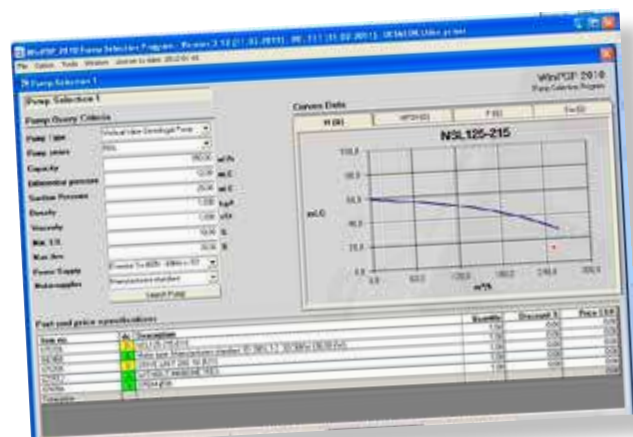
DESMI NSLH

## Pump selection program available for download

All centrifugal pumps can be selected by our DESMI Pump Selection Programme called WinPSP. The program is available for download from [www.desmi.com](http://www.desmi.com)

This program can be used by designers, operators, service providers and anybody who wants pump information.

Find curves for existing pumps, obtain GA drawings for initial designs and compare efficiency, motor power, NPSH and other data to select the right pump - Alternatively contact DESMI to obtain the required information.





Need more information or specifications? Contact us at [desmi@desmi.com](mailto:desmi@desmi.com) or read more about DESMI and DESMI's other products and solutions at [www.desmi.com](http://www.desmi.com)

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