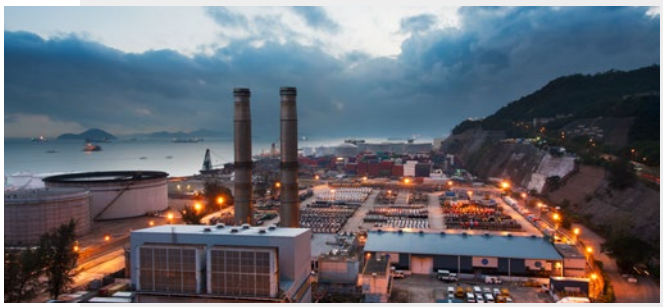
PRO PROGRESS |-----FOR-----| PROCESS

PRO DISTRICT HEATING



MITSUBISHI ELECTRIC

Mitsubishi Electric

leads the ecological transition

The ecological transition we are experiencing, that is the migration from an energy mix centered on the consumption of fossil fuels to one with low or zero carbon emissions, is an epochal transition for our planet. So far, many anthropic processes have simply wasted excess heat.

Electrification completely changes this energy paradigm by making heat recovery extremely cost-effective, as it reduces energy supply costs.

How to lead the way towards green transition?
Transition to a Low Carbon Economy is a fact.
Now it's time to find and apply new solutions, starting with the installation of heat pumps to reduce primary energy consumption.

Time for change is now!
Efficiency, reliability and high ROI are the goals to achieve.

Mitsubishi Electric is the world's leading manufacturer of heat pumps and offers a very wide range of solutions for heat management, providing many pre- and after-sales advantages such as:

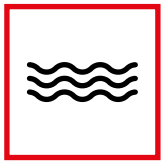
- **Plant design support and energy analysis simulations.**
- Possibility to **set different plant optimisation targets** (max ROI, min CAPEX, etc.).
- **100% factory-tested products before delivery** with possibility of performing FAT-attended performance tests in our Eurovent and AHRI-certified Testing Centers.
- **Highly industrialised production** with standardized and optimized processes.
- **High product quality** thanks to ongoing investments in research and development, several patents deposited and the use of lean production principles.
- **Control and optimisation** of the plant.

Guide to decarbonization with Heat Pumps

The first step is the choice of heat sources, evaluating all available solutions for each plant. Each one has its advantages: ease of sourcing, simpler use, energy efficiency, lower investment, shorter ROI, compatibility with local regulations, reduced environmental impact.

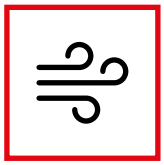
Whatever heat source is selected: air or water, natural or industrial, Mitsubishi Electric can offer the optimal system solution.

Natural sources are often the first choice when available and when help to preserve the environment.



Lake, river or sea:
a good choice as these sources provide good efficiencies but maintenance is affected by water quality.

Ground source, well and thermal water:
generally all excellent solutions for high efficiency, with little maintenance but often have limited availability.



Air:
Always available, very abundant and with little maintenance. COP is good for most of the year and is low only at very low outdoor temperatures.

There are many anthropic processes that can become a useful heat source.

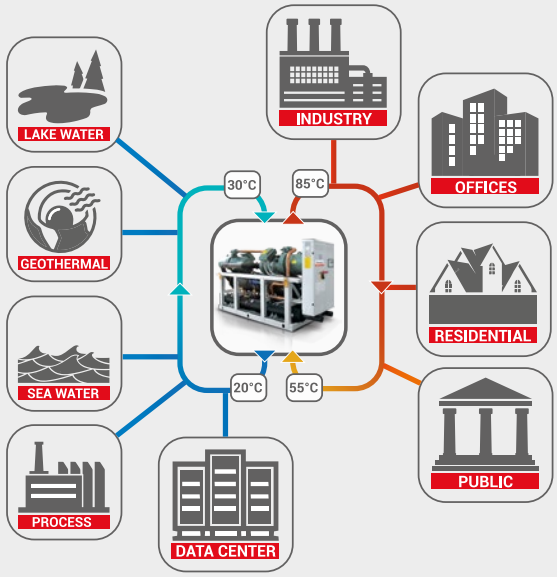
Data centers
Heat recovery from data centers is becoming increasingly common. Mitsubishi Electric is at home in providing heat recovery solutions both to data centers owners (thus compliant to most stringent IT specs) and to Energy companies.

Industrial processes
Several industrial processes generate heat that is simply lost in the environment. Instead, it can be recovered for district heating plants or to heat neighbouring buildings, thus reducing energy bills.

Waste water
A variable source, sometimes ignored, that can provide good efficiency. Heat pumps allow it to be integrated with other sources for optimal solutions.

Mitsubishi Electric Heat Pumps can be coupled with all these sources.

Discover the technologies developed by Mitsubishi Electric to promote electrification and reduce energy costs.



Characteristics and relative evaluation* of various environmental and waste heat sources for the operation of large-scale heat pumps

The different heat sources entail pros and cons.
The efficiency of the heat pump unit increases as the heat source temperature increases, reducing the operating costs.
On the other hand, investment costs vary depending on difficulty of access to the energy source and on the resulting infrastructure required, e.g. the distance between heating plant and heat source.
Finally, the availability of the heat source could be year-round or can face seasonal fluctuations.

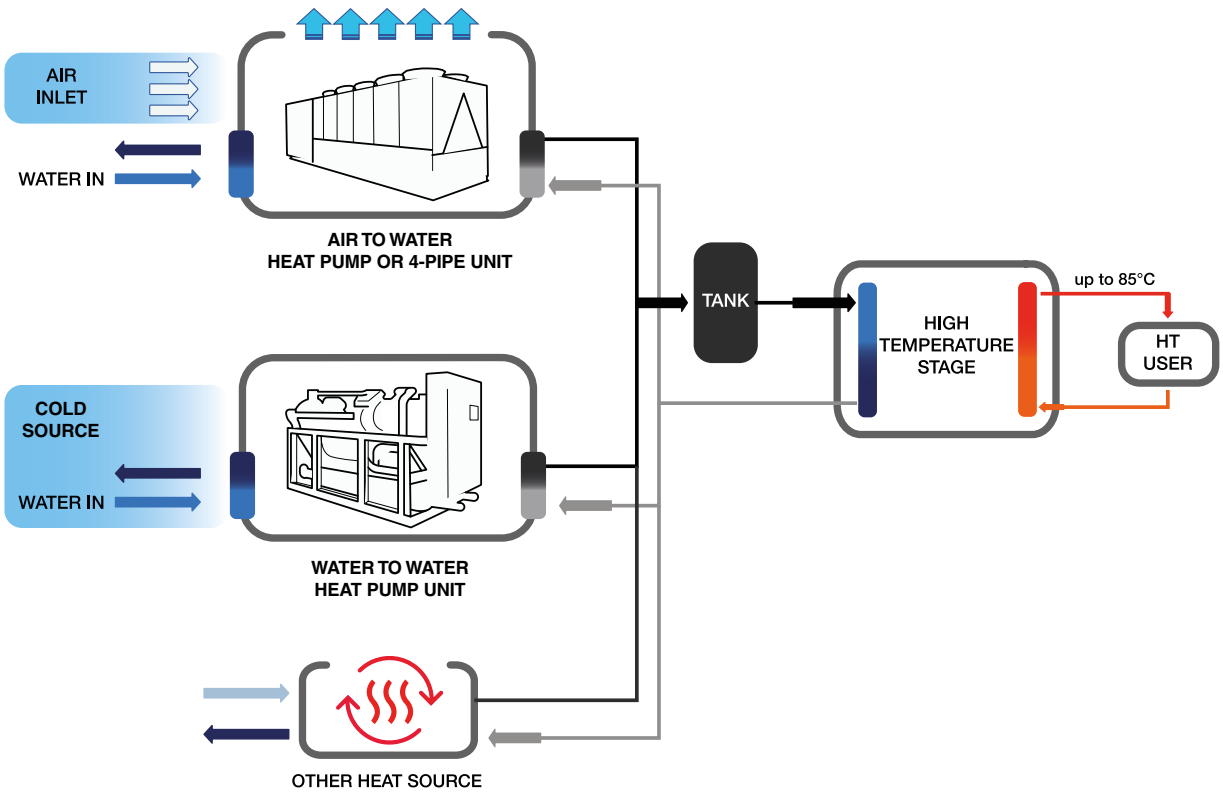
Enviromental and waste heat source	COP	Investment costs	Seasonal availability	Source temperature
Ambient air	--	+	-	-10 — 30°C
Near-surface geothermal energy	+	0	+	5 — 15°C
Medium-deep and deep geothermal energy	+	--	+	15°C (no upper limit)
Mine water	+	0	+	10 — 40°C
Thermal energy from water bodies (river, lakes, seas)	0	+	0	4 — 25°C
Waste water and sewage treatment plants	+	+	+	10 — 17°C
Industrial waste heat	+	+	+	20 — 100°C
Waste heat from data centers	+	+	+	20 — 60°C

SOURCE: “The roll-out of large-scale heat pumps in Germany” by Agora Energiewende

Exclusive **Mitsubishi Electric** Solutions

Whatever is the source, plants can be single- or double-stage:

- Single-stage system if the high- temperature heat pump can extract heat directly from the source, via an intermediate heat exchanger.
- Double-stage system when the available temperature levels or the heat capacities involved require an additional heating boost. It may also be necessary when the heat source is the air.



Many products for many solutions

Depending on the characteristics of the plant, different heat pump units can be used and combined to obtain the required temperatures and capacities.

Water or air source heat pumps basically help in transferring heat from two sources at different temperatures.

Both sources must be able to provide and receive the exchanged heat.

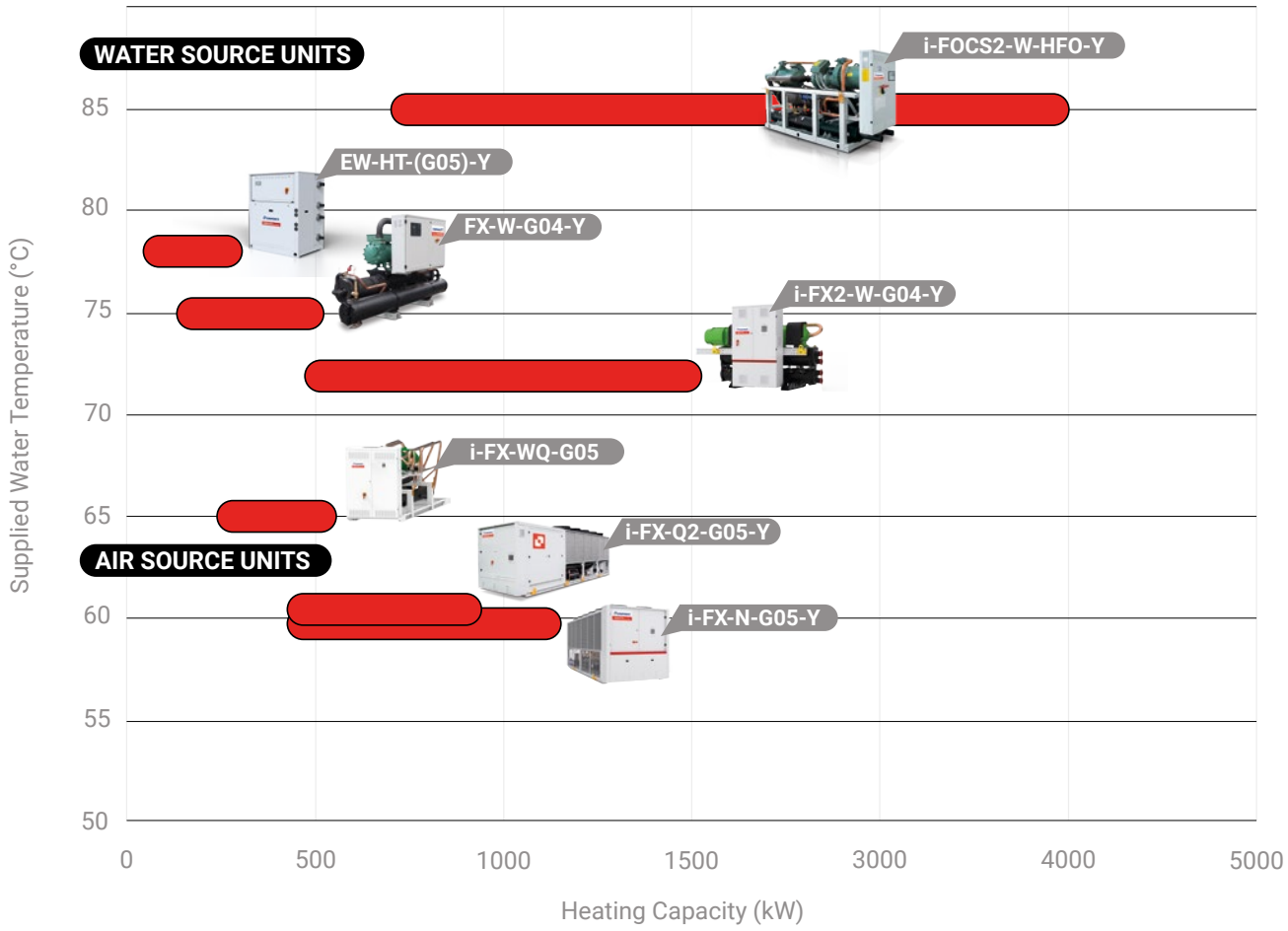
Another technology that can greatly help in heat recovery is the family of INTEGRA polyvalent units, which, thanks to the use of two independent hydronic circuits installed in the same unit, allows for the simultaneous production of cooling and heating even when the loads are unbalanced.

ClimaPRO+

Control and optimization system

In addition to heat pumps and polyvalent units, Mitsubishi Electric also supplies the brain of the system: ClimaPRO+, a highly customizable system for plant supervision, control and optimization.

The goal is to have the possibility of maximising the energy efficiency of your plant, monitoring the system and containing the related operating costs.


WATER SOURCE UNITS
AIR SOURCE UNITS
i-FOCS2-W-HFO-Y
EW-HT-(G05)-Y
FX-W-G04-Y
i-FX2-W-G04-Y
i-FX-WQ-G05
i-FX-Q2-G05-Y
i-FX-N-G05-Y
Supplied Water Temperature (°C)
85
80
75
70
65
60
55
50
0
500
1000
1500
3000
4000
5000
Heating Capacity (kW)


MITSUBISHI ELECTRIC OFFICES

Tallaght's district heating

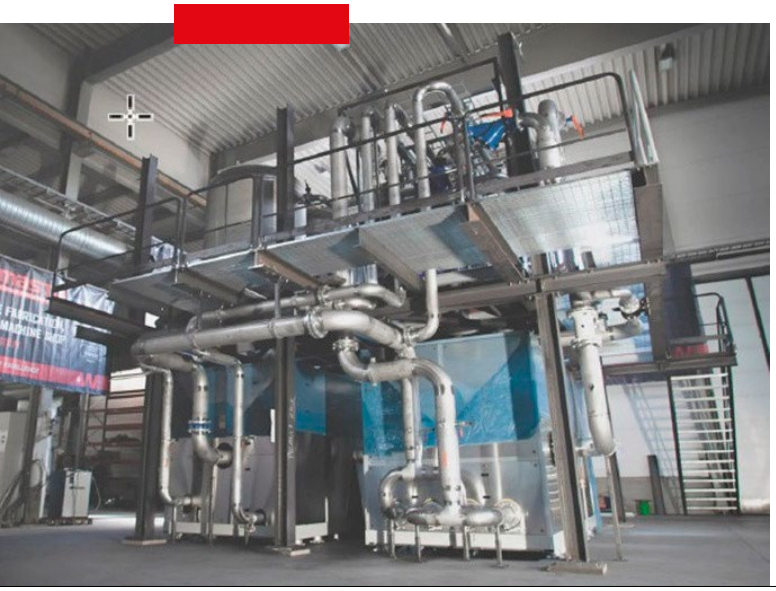
Dublin - Ireland

PROJECT

Tallaght District Heating, Ireland's first low-carbon district heating network, is a perfect example of a new sustainable approach to heating management. The network is 1.5km long and heats 32,800m2 of public buildings with target to add 133 rental apartments and more public buildings in the following years.

CHALLENGE
Recovering heat waste from a data center through a plug-in solution that allows continuous operation to the servers providing a valuable energy source to the heating network.

SOLUTION
2 large Mitsubishi Electric heat pumps provide 3000kW of heating capacity and, also thanks to the use of low GWP HFO refrigerant R1234ze, represent a reliable, efficient, fully sustainable and long term solution.



MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

Head Office:
Via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy
Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

www.melcohit.com