

# Underground water pipes: Another way for cities to keep cool

July 25 2019, by Amélie Bottollier-Depois

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Components of systems known as district cooling networks argue the technology could provide a planet-friendly alternative to air conditioning

As Paris swelters in record-breaking heat, visitors to some of the French capital's iconic landmarks are being kept cool without even knowing it by a labyrinthine network of underground water pipes.

With [climate change](#) making hot weather periods more likely each year, proponents of systems known as "district [cooling](#) networks" argue the technology could provide a planet-friendly alternative to [air conditioning](#) when the mercury soars.

With around 80 kilometres (50 miles) of cooling pipes snaking beneath the French capital, a number of energy firms pump ultra-cooled water from large storage tanks to underground sub-stations and up into the buildings of around 700 clients.

Among them are some of Paris's must-see locales: the Louvre, the National Assembly, the Hotel de Ville and the Galeries Lafayette superstore.

The technology requires electricity to run and the water it uses comes from both groundwater and from the Seine river.

But providers insist it is far more efficient and less polluting than air conditioning.

Jean-Sebastian Mascrez, operations manager at Climespace, a district cooling network firm, says it provides "four megawatts of cooling for each megawatt of electricity used"—twice as efficient as conventional air conditioning.

The International Energy Agency (IEA) last year warned of the vicious warming cycle created by air conditioning: the hotter temperatures get, the more people fire up their AC, producing yet more greenhouse gases that lead to more warming.

There are currently around 1.6 billion air conditioning units on Earth. But that number is set to explode to 5.6 billion by 2050—one for every two humans on the planet.

"That means that every second we're selling 10 AC units over the next 30 years," Lily Riahi, from the United Nations Environment Programme, told AFP.

"That's what business as usual is looking like, and we would consume the equivalent power consumption of all of China and India today by 2050."

Simply eliminating the greenhouse gases emitted by air conditioning units would avoid around 0.5 degrees Celsius of global warming, Riahi said.

"We need to rethink how we keep ourselves cool and district energy is a very good option especially in dense cities."



The system, operated by private firm Idex, uses geothermal energy to transform groundwater—which sits at a stable 15C all year round—to churn out both hot and cold water

## **"Century of global warming"**

At Boulogne-Billancourt, west of the capital, six kilometres of cooling pipes weave their way through a plant on the site of a former Renault factory.

The system, operated by private firm Idex, uses geothermal energy to transform groundwater—which sits at a stable 15C (59 Fahrenheit) all year round—to churn out both hot and cold water.

The hot water, at 80C, is used for heating and showers, while the cold water, a chilly 4C, is used in the cooling network that winds its way beneath Paris.

The set-up cost was eye-watering at 65 million euros (\$73 million), but for Guillaume Planchot, president of industry group Via Seva, the initial investment is well worth it.

"This century, which is unfortunately the century of global warming, is going to throw up these types of systems," he told AFP.

He added that district cooling networks were a no-brainer compared to the "climate time bombs" that are air conditioning units.

## **Efficiency questions**

Yet there are drawbacks to district cooling networks. Due to the



infrastructure cost, they are only really viable in urban settings, according to Riahi.

Jon Dulac, an IEA analyst, said many cooling systems in their current form are "no more efficient than just having a chiller or and air conditioner in a building."

"Theoretically and in some of the best practices, they can be much more efficient, but it is highly dependent on how they are designed," he told AFP.

For David Canal, from the French energy provider Ademe, a key part of the networks' success rests on a change in our own behaviour.

"We need to reduce our needs," he said, including using air conditioning purely for "comfort."

Riahi also called for natural solutions to urban heatwaves, including greening city spaces and constructing buildings in a way that produces more shade, both of which has a proven cooling effect.

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