

CASE STUDY 2

Valuing Water as a source of thermal energy in the energy transition



Key driver for valuing water

Dunea recognizes that the value of water is rising not only because of changes in supply and demand (for example scarcity because of climate change and urbanization) but also because water interacts more and more with other sectors such as food, nature, energy, and raw materials. These sectors create new applications for water based on its (physical) properties and therefore change the market and value of water.

The rising value of water calls for Dunea to take on a new approach and a broader scope than just supplying drinking water. The company believes that broadening of its scope is necessary because the interconnections of water with the other sectors, including the energy sector, require an integrated approach involved in the rethinking of public spaces.

In 2017, Dunea along with the partners of the Value4water initiative commissioned a study 'Water companies of the future to forecast developments in the western Netherlands by 2050. The study led Dunea to bring into scope the implications for freshwater management that are expected to

Dunea is a drinking water company operating in South Holland, serving to 17 municipalities and approximately 1.3 million customers. Dunea's sustainability values reflect in the company's vision of producing high-quality products and services in harmony with nature. The company's strategy is to work on future proofing in a world that is urbanizing, digitizing and must become more sustainable.

arise in the future. Their initiative on valuing water is therefore in line with their strategy for future- proofing.

Thermal energy from drinking water as a unique combination of water and energy

Along with other partners, Dunea has been investigating if the water in the drinking water network can be used to recover thermal energy and contribute to the transition to sustainable heating and cooling of buildings.

The drinking water distribution network is an already existent infrastructure through which drinking water flows, with the objective of supplying safe and reliable drinking water to customers. Without impacting its primary objective, the water network can be used to exchange heat (or cold) with the surrounding surface. This network can therefore also be seen as a transport network for renewable thermal energy. This renewable energy source can be used for the heating and cooling of buildings and houses in close proximity of the drinking water mains. This clean energy source can play an important role in the Dutch (and international) energy transition by providing one of

Along with waterboard Rijnland, Dunea is an initiator of Value4water, an initiative that is working on the future- proofing of drinking water, sanitation and water management in Western Holland. The initiative conducts research looking into the future and innovates in a partnership-based approach to address the water-related challenges that are expected to arise.

the sustainable alternatives for natural gas, which is currently the main source of energy for heating buildings in the Netherlands.

This concept called "Aquathermal" energy is being researched collectively as part of the consortium called WarmingUp. The WarmingUp collective brings together thirty-eight players from the heating value chain to work together on applying knowledge of the heating systems to derive reliable, sustainable and affordable heat transition.

With respect to Aquathermal energy, the collective is researching:

- The technical potential and the sensitivity of the potential to extract heat from water networks.
- Smart techniques and integrated designs that make heat extraction and management cost-effective.
- Design and operational guidelines for players who intend to apply aquathermal energy.
- Determine the potential for it to be applied as a full-fledged energy-transition strategic option locally, regionally and nationally.

Dunea has been conducting a pilot project to apply this concept at the Mall of the Netherlands, where cool water from the mains is used to cool the shops in the mall.

Results and Outcomes

The multiple uses of water, including as a source of renewable thermal energy, adds to the overall value of water. This value can be measured as a sum of its value in different uses. In this case for example, it can be measured as:

Value of water = Societal value of safe and reliable drinking water + thermal units supplied by water or cost savings on account of heating/cooling compared to the conventional systems

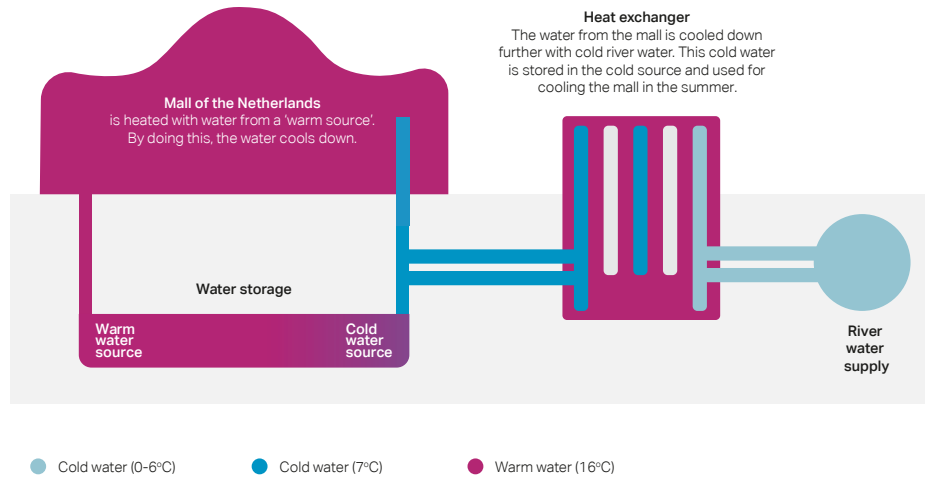
From Dunea's perspective,

- the value of water translates to the company's market potential that it can extract from the use of the innovative and integrated approach of aquathermal energy.
- In addition, application of aquathermal energy has a positive influence on water quality. Due to climate change, as urban areas experience more and more heat stress, the heating of sub-surface and water mains have a negative impact on water quality. This impact is reduced if the heat is extracted by the surface surrounding the water network.

Next steps and lessons learnt

The new value of water, for example water as a source for thermal energy creates new, unknown markets and asks (water)companies to rethink their role and key tasks.

Developing new businesses requires dedicated resources and a more commercial viewpoint compared to the traditional business of reliably supplying safe drinking water (which



Benefits for Dunea

Keep costs in control	Increase our stakes in the subsurface
Future source of revenues when water consumption declines	Control on energy from drinkingwater
Financial benefits in joint realisation and maintenance	Prevent heating of drinkingwater
Contribution to local energy transition and sustainable living	Reliable and affordable heating (and cooling)

is typically seen as a more public task for a utility). Dunea has set up a subsidiary company called Dunea warmte en koude (heating & cooling) to accommodate activities in the field of sustainable heating and cooling.

Dunea warmte en koude is conducting further research and pilot projects to apply aquathermal energy. The key questions for them to address are:

- Investigating what opportunities

and threats this new value of water brings to their business.

- Assess its potential application.
- Develop new leads into successful projects.
- Further develop the governance model, technology and business model.

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