

IMPLEMENTATION OF A SUSTAINABLE COOLING SYSTEM SUCCEEDED THROUGH SOCIAL FACTORS

SUPPLYING COLD FROM THE PUBLIC DRINKING WATER INFRASTRUCTURE BY GREAT TEAM EFFORT

Dutch water company and Blood Bank combining forces in a new, sustainable and profitable source for cooling

As world-wide proclaimed, energy gained from fossil materials is not inexhaustible, certainly not to the extent of which we are using energy right now. For example, regarding to the use of and demand for cold, this is increasing for our buildings and will not be less with warming up the earth. It is time for us to search for and implement cooling technologies working on alternative energy sources to make the transition to a more sustainable world. In Amsterdam we do this in a very special way, that has a lot of potential to be scale up.

In October 2017, pioneers Waternet and Blood Bank Sanquin implemented an innovative cooling in one of Sanquin's building (location Plesmanlaan) in Amsterdam, involving cold from the public drinking water infrastructure. Cold is extracted from the public drinking water for the use of cooling this building and for the use of cooling in pharmaceutical processes, necessary for making medicines. The use of the system achieves CO₂ savings of about 1100 tons a year, which is over 2% of Waternet's current climate footprint. A CO₂ saving of 8% applies to Sanquin. The technology extracting thermal energy from water, combines the use of already widely-known techniques such as a heat exchanger and an ATEs (aquifer thermal energy storage) system, however it is not yet abundantly used in cooling processes and on this scale.

With the implementation of such a system, a win-win situation was created, because by extracting cold, the temperature of the drinking water that returns to the drinking water pipeline infrastructure rises. So, less energy is needed for nearby residents to heat domestic water.

If it was already a widely-known technique and moreover a favorable business case, why is it not widely accepted yet? The implementation of this technology in the Waternet-Sanquin project was so successful, because next to favorable technical conditions, crucial social barriers were overcome. Are you involved in a similar technical project and are you questioning how you could bring the project to a success? For you as an innovator, I set up a checklist to reveal your potential for successful implementation and to show you how to bridge the gap between the sustainable technique and you.

For now, let's zoom in on the social aspects. There are 4 crucial questions, concerning social aspects, that must be considered and are requisite to be answered to enable you to implement the system as successfully as Waternet and Sanquin did.



1. Am I willing to make this work and do I truly believe in the success of this project?

What you should ask yourself first is: do I have the intrinsic motivation to make this project succeed? Are you willing to put effort in convincing the rest of your organization of the success? Just like in the case of Waternet and Sanquin, endless motivation and knowledge should be transferred and shared. Close contact and good communication, by for example regularly meeting for coffee to discuss the process, the lessons learned along the way and points of improvement is vital for effective collaboration and for the project to succeed.



2. Do my organization and I have a long-term vision?

An important lesson learned from the Waternet-Sanquin success story, is that a short-term vision, of even about 10 years for example, is insufficient when wanting to implement the sustainable cooling technology. This technology does not have a payback period of 10 years, so financially you should have a much longer vision.

In the case of Waternet and Sanquin, a calculation of the Total Cost of Ownership (T.C.O.) had been made, for a period of 30 years which is the minimum expected lifetime of the technology. Taken into account, were the growth of Sanquin's production, the need to use traditional cooling and also the increase in electrical infrastructure. By choosing an integral approach and including it in the T.C.O. calculation, the organization was convinced to invest.

As a project leader, to make the project succeed you must ensure that the innovation is accepted by the organization. In the Waternet-Sanquin project, project leaders from both companies planned a presentation for their directors, to inform and convince them of the success of the technology and the inclusion of an integrated approach in their Total Cost of Ownership calculation. The resulting enthusiasm of the board was decisive for the implementation of the system.

3. Are both my partners and I open, clear and trustworthy?

Trust should be built from the beginning, to circumvent collisions and disagreements and to enhance collaboration and a smooth process. Having a shared vision of the goal and being open and honest about ambitions of the project enhances effectiveness. Both Waternet and Sanquin decided and agreed on being open towards each other anytime, from the beginning of the project onwards.



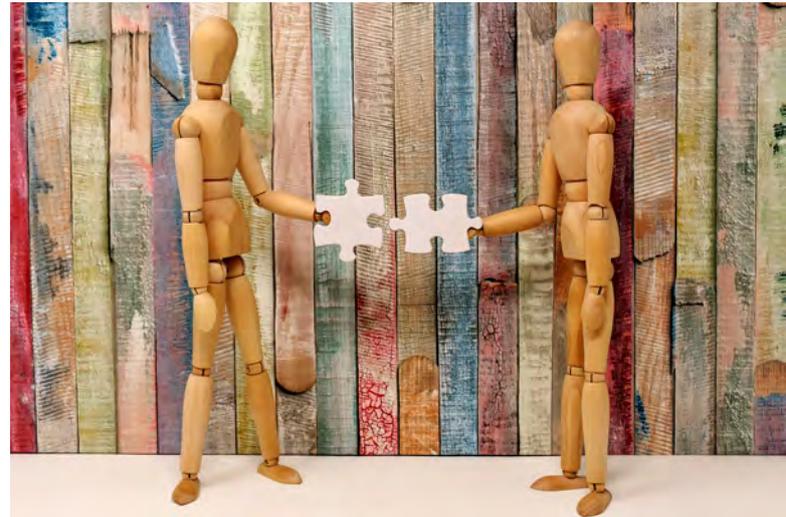
4. Do we use an integrated approach for our collaboration?

Do we integrate the different parties' needs, interests and values? All involved parties should be willing to look beyond obvious, often only financial, advantages in a business case. All involved parties should include [each other's and their own] environmental and social values as well as economic values. Looking back at the Waternet-Sanquin project, the will of the involved parties to acknowledge social and environmental factors besides financial factors, and the courage to include and emphasize accompanied positive influences on social and environmental level, made the project to a real success.

“To dare or not to dare...”

Essential for the success of the Waternet-Sanquin project, were the willingness of persons from both organizations to make the project succeed, to collaborate, to be open and honest with each other from the beginning and to have the courage to not stop believing in the success of the project, despite of the long-term vision. Besides, both organizations would not have agreed on implementation of the system, if trust was not built and if ambitions were not shared from the beginning.

So, do you dare to take a step ahead towards the implementation of this sustainable and proven to work technology? Do you dare to overcome classic social barriers, and show, just like Waternet and Sanquin did, how this results in contributing to a cleaner, more sustainable and futureproof world? Then tick the boxes of the checklist and deep dive into this interesting technology. And remember: in the end, success is made by the team.



Are you implementing 'cold from drinking water' too? Keep us posted via city-zen@amsterdamsmartcity.com or upload your project on www.amsterdamsmartcity.com.

This article was written by **Pien Esmeijer, BSc Science, Business and Innovation student** at the VU University in Amsterdam, on the occasion of her graduate internship and thesis. The graduate internship was done at Amsterdam Smart City, on behalf of the international consortium City-zen.

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CHECKLIST

Practical conditions.

- 1 **The location of issue should be located close to a main drinking water pipeline with a diameter of about 500 mm, and there should be enough space for the installation of the heat exchanger.**
A large diameter should ensure enough capacity and supply.
- Is my demand big enough to create a feasible business model?**
For every case, this calculation will be different. But overall, it should be kept in mind that the demand of cold should be big enough to create a valuable, profitable business case.
- Do I have an ATES at my disposal?**
Because of the great difficulty of matching demand and supply, both geographically and in terms of time, an energy storage system such as an ATES should be installed. This ATES could be your own, or for example an ATES could be shared with other parties. When not having one already, think about unused ATES systems close by. An ATES should be balanced, and more than one user could contribute to this.
- Am I already planning on building or renovating?**
A natural replacement or construction moment, could be the perfect time to start investing in a smart cooling system. Double investment costs are saved.

It starts at you.

- 2 **I have the intrinsic motivation to make this project succeed. I am courageous and willing to make this work and I believe in the success of the project.**
I am also willing to put effort in convincing the rest of the organization of the success and transfer my motivation and share my knowledge.
- My organization and I have a long-term vision, of about 10 years.**
It is not a technology that will be payed back within 8-10 years.

Share your vision and values.

- 3 **Both my partners and I are open, clear and honest towards each other about our ambitions and our ambitions match.**
Trust should be built from the beginning, to circumvent collisions and disagreements and to enhance collaboration and a smooth process.
- We use an integrated approach for our collaboration, integrating our different needs, interests and values.**
All involved parties are willing to look beyond obvious advantages in a business case, and include [each other's and their own] environmental and social values as well as economic values.
- At the start of the pilot project, the goal should be clear.**
The type of upscaling that best fits the technology is replication. Having a clear vision of the type and potential of replication improves goal orientation and enhances effectivity.

