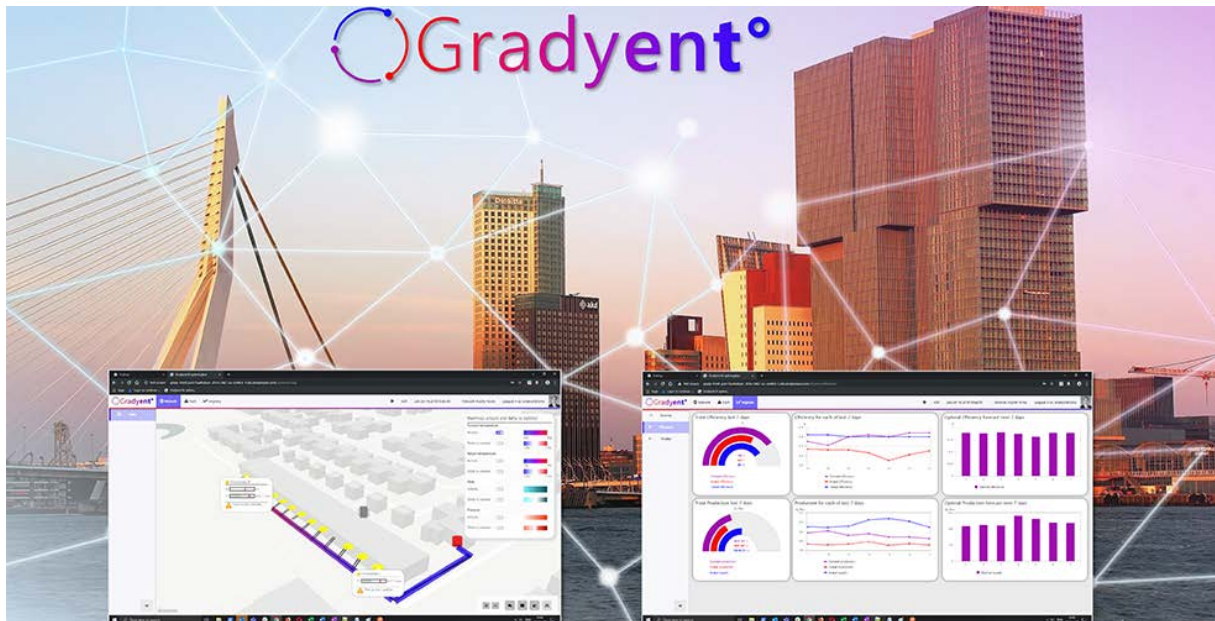




Openbaar eindverslag DEI + pilotproject DEI319003



Optimizing District Energy Networks with AI (ODEN-AI)

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Een DEI+ pilotproject voor de Topsector Energie van:

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Openbaar eindrapport

Improving the efficiency of district heating networks is urgently needed to support the sustainability transition by reducing heat losses and enabling more sustainable sources. Optimization of these networks is challenging due to the complex nature of operations and (historically) lack of sufficient data and effective optimization methods.

In this project a new approach to optimization using Artificial Intelligence (AI) was developed and demonstrated at a pilot site called Puerto Verde, owned by network operator Kelvin BV. Starting from a careful analysis of Puerto Verde and other networks, an initial solution design was prepared. This included a set of live dashboards that network operators require to effectively optimize their network in real-time.

Then using historical datasets from the pilot site, a variety of AI optimization modules were developed. These modules execute sequentially to step-by-step find the optimal mode of operation of a network given present and future conditions. A hardware bridge was also developed to capture the specific sensor data from the pilot site in real-time. This bridge was then successfully installed at Puerto Verde.

The results from optimization indicate that a reduction of heat losses up to 20% at this pilot site could be realized by lowering the temperatures in the network dynamically (i.e. varying in time) by up to 10°C. This exceeded the original estimates of the consortium. Discussions are ongoing to demonstrate the developed technology in a full-scale Demo at a large Dutch heat network, for which initial results are promising. Also further development will be needed to incorporate the soon-to-be-available data from smart heat meters that will become available in the Netherlands as well as across the EU due to newly adopted legislation. These new data streams will enable further efficiency gains due to higher accuracy of the optimization.

As a result of this pilot, a start-up called Gradyent was founded which will commercialize the developed technology, also internationally. Recently, Gradyent BV raised 1.9M in venture capital for a Series A round, for which several international press releases were shared by the respective investors of that round. In the Netherlands, Energiq shared their release at (<https://www.energiq.nl/ai-startup-gradyent-haalt-investerings-op/>), in Finland Helen Ventures shared their release at (<https://www.helenventures.fi/stories/ai-powered-gradyent-secures-investment>) and in Belgium Capricorn shared their release at (<https://capricorn.be/gradyent/>). In addition, from Gradyent side several LinkedIn posts were shared, and several media including NRC and Sprout have followed up with requests for interviews which are yet to be published.

The findings from this project are regularly being disseminated. Selected examples are:

- Gradyent BV started a website at www.gradyent.ai where the developed technology and benefits are presented commercially
- Gradyent CEO Herve Huisman has presented at several industry events and (in COVID-19 times) webinars on Gradyent, including “Renewable Heating and Cooling from the Dutch perspective” by o.a, Energie Nederland on December 3rd 2019, the AGFW “Upgrade DH” webinar on Wednesday may 13th and the “Digital Heat” webinar from Euroheat/DHC+ on May 20th 2020.
- Gradyent CTO Robert Vrancken co-hosted a webinar with another AI scale-up from The Hague called Dutch Analytics for the The Hague Tech AI community on May 28th, 2020. It was attended by over 100 unique visitors and prompted several audience questions and offline follow-ups specifically for Gradyent.