



PROJECT COM2HEAT (MOOI322012)

Progress report

Project information

Reporting period	March 1, 2023 – February 29, 2024
Project coordinator	TNO
Contact person	Hadi Dashtaki Hesari
E-mail	hadi.dashtakihesari@tno.nl
Project total budget	€ 5.441.101
Start date	01 March 2023
End date	29 February 2026

This report provides an overview of the active results during the reporting period. More detailed explanations about each result and their status are available in the attached traffic light reports.

Overall, the project has made significant progress in several areas, including defining system requirements, exploring prototype component specifications, basic design of prototype components, and investigating customized training and knowledge transfer methods aligned with market needs. Despite encountering challenges such as the withdrawal of a project partner (CPT Tank Well) and some activity delays, the project has achieved major milestones. More importantly, all three Go/no-Go decision points have received approval to proceed with further development toward project objectives. Given the diverse consortium partners involved, collaboration among them remains vital for overcoming challenges and ensuring project success.

Date of progress report: April 9, 2024

Grant provider

This project is being carried out with a Top Sector Energy subsidy from the Ministry of Economic Affairs and Climate, implemented by the Netherlands Enterprise Agency. The specific subsidy for COM2HEAT concerns the MOOI subsidy round 2022.

Public project summary

Cause

The Netherlands has the ambition to accelerate the transition away from natural gas for heating the built environment. An important responsibility is to keep the energy transition affordable for large groups in the Netherlands and to strengthen energy-related economic activities. Collective heat networks integrated with various sustainable sources, such as solar heat and geothermal energy, in combination with heat storage, provide a reliable, affordable and large-scale solution for 5-7 million homes and buildings. However, costs can be substantially reduced in terms of construction, installation, maintenance, electricity for pumps and heat loss reduction by using composite material instead of metals. Composite material has been used in the process industry for decades. The advantages of composite are that it is resistant to corrosion and precipitation, is 4 to 5x lighter than steel with up to 4x lower ecological costs and production takes place locally. At national level, billions can be saved in this way on direct costs and emission-related costs. However, not all components are available in composite, which means that rapid implementation is not yet possible.

Purpose of the project

The aim of this project is to develop and disseminate knowledge and an ecosystem for the design, production, installation and operation of collective heating systems built entirely of composite material. The system aspects of this project are cross-company and sector-wide. Stakeholders from the value chain work together in this unique consortium; the end users, the design and service companies, the composite manufacturing companies and academics. A top-down framework of system requirements will be developed and then the essential subsystems and components will be developed with necessary new manufacturing technology. The composite subsystems are functionally tested and then integrated in Rijswijk and Schiebroek to test the physical interfaces and perform system flow tests. The ambition is to raise the subsystems and the integrated system to a TRL level of at least 6 and possibly 7 (ready for scaling up). The test system in Rijswijk is also suitable for the education and training modules that are also included in this project for vocational training and knowledge dissemination. developed in and outside the sector.

Results

In this project, knowledge is going to be developed for the design, construction and maintenance of collective heat production and distribution networks made entirely of composite material to substantially reduce CAPEX and OPEX. The project consortium consists of partners from the entire value chain: end users/heat companies, project developers/designers, installation/service companies and production/manufacturing companies and partners who develop training modules for technical training. Heat companies and consumers benefit from the substantial cost reduction of the infrastructure to keep the heat supply affordable. The market for collective heat production and distribution systems offers the composite manufacturing industry in the Netherlands a unique opportunity to supply components in the Netherlands and internationally. Sufficient people with the right expertise is a precondition for scaling up. In this project, training material is developed for professional education/training for the use of composite material in the heating sector. Companies benefit from this in order to meet a growing need for technical professionals.

Activities list

WP	Activities	Lead
1. Preconditions and system requirements	1.1 Total heat system	Enertrans
	1.2 Component requirements (in network and heat sources)	ECW
	1.3 Specifications prototype systems in Schiebroek and Rijswijk	WEP
2. Product design and development manufacturing technology for essential subsystems	2.1 Piping and Connections	Compipe
	2.1.1 Main pipes and connections heat work	Compipe
	2.1.2 Composite coil tubing and connections for interfacing between components	EScom
	2.2 Geoheat system	TNO
	2.2.1 Well design - case study	WEP
	2.2.2 Sand screen	HP Well Screen
	2.2.3 Casing	Huisman Geo
	2.2.4 Wellhead	ACP Technology
	2.2.5 Degasser	CPT
2.2.6 Heat exchanger	Danfoss	
2.3 Solar thermal system	EScom	
3. System integration at Rijswijk and Schiebroek location and execution of test program	3.1 Installation plan, HSE, RIE for location Schiebroek	Enertrans
	3.2 Installation plan, HSE, RIE for location Rijswijk (RSCG)	TNO
	3.3 Test plan with circulation heating network Schiebroek	Enertrans
	3.4 Test plan with sealing, flow performance and integrity tests in Rijswijk	TNO
	3.5 Realization and release for testing + execution of tests Schiebroek	Enertrans
	3.6 Realization and release for testing + execution of tests Rijswijk	TNO
4. System design, routing design models and scale up	4.1 Analysis of the available design and routing models	EScom
	4.2 Expansion of the existing models for the design of composite heating systems	Erasmus
	4.3 Validation of the model with data from test locations	Erasmus
	4.4 Outlook further upscaling region, network, connection	Enertrans
5. Training, knowledge assurance	5.1 Exploring the demand for (new) skills (phase I)	TNO
	5.2 Develop educational activities for practical learning (Phase II).	TNO
	5.3 Implementation in practice (Phase III).	ROC

Location(s) where the project is carried out (city, country):

The models, subsystems and components are developed, built and tested by the various companies themselves. The developments within the consortium are well coordinated to guarantee that the interfaces and connections are developed in such a way that the subsystems can be connected to each other. There are two locations in the Netherlands in mind for the system setups; one in Rijswijk and one in Schiebroek.

At the location of the Rijswijk Center of Sustainable Geo-energy, the subsystems will be installed and linked together. This initially performs pressure and circulation tests to check the interfaces and connections. This prototype setup will consist of a well with composite pipes and filters, a wellhead, a gas separator, and (solar) heat exchanger panels. At a later stage, it will be examined whether the validated system can be used for part of the heat supply of the RCSG building. Finally, it is examined whether and how the heating system can be connected to a heat storage system. A prototype location will also be realized in Schiebroek for demonstrating composite heat exchanger panels and heat pipes.

MOOI mission to which the project is submitted

MOOI-missie	Innovatiethema
B – Gebouwde omgeving	2 - Duurzame collectieve warmtevoorziening op basis van volledig elektrisch, hybride of met een zeer laag, laag of midden temperatuur warmtenet voor woonwijken, bedrijventerreinen, kantoor- of winkelgebieden)

Public publications about the project

An article by TW.nl titled “Nieuwe leidingen voor warmtenetten: geen staal maar composieten”, accesible via this link: [Nieuwe leidingen voor warmtenetten: geen staal maar composieten - TW.nl](#)

Spin off within and outside the sector

No spin-off has yet emerged within or outside the sector.