MMIP 4

Sustainable heat and cold in the built environment (including greenhouse horticulture)

This MMIP contributes to national ambitions of a carbon neutral built environment in 2050. The built environment consists of housing construction, utility construction and greenhouse horticulture.

The mission of this MMIP is aimed at developing an attractive alternative to natural gas, with the intermediate objectives in 2030 being:

- 1.5 million existing homes disconnected from fossil natural gas;
- 15% of non-residential and public buildings disconnected from fossil natural gas;
- making heat demand in greenhouse horticulture more sustainable through geothermal energy, seasonal storage and low temperature heat sources (1 Mton CO2 savings in 2030).

Together, these targets should enable CO2 savings of 3.5 Mton by 2030. By 2050, the built environment must be completely carbon neutral and no longer using fossil fuels to heat buildings.

Relationship with the Dutch Climate Agreement

The Built Environment "Sector Table" has helped form to the main features of the Climate Agreement, and pays a great deal of attention to the task of realizing a carbon neutral built environment. Most of the energy consumption in the built environment is heat; currently about 40% of energy demand. The biggest challenges involved with national ambitions are those in making the Dutch heat demand sustainable. There are two routes to achieve this goal:

- Renovation concepts based on extensive insulation in combination with electrification, by means of compact heat pumps, ventilation systems and compact heat storage. This is an individual way of sustainable heating;
- The development of collective district heating networks with sustainable heat sources such as geothermal, biomass and low temperature sources in combination with seasonal storage of heat.

MMIP 3 contributes to the industrialization and upscaling of renovation concepts. MMIP 4 focuses on the development of individual heat production and storage systems and on large-scale collective heat networks in combination with sustainable sources and large-scale heat storage. The aim of this program is to develop a range of competitive and attractive natural gas-free options for end users in residential construction, non-residential construction and greenhouse horticulture. This range includes the development of a new generation of appliances and systems for heating, cooling and domestic hot water in existing buildings. In terms of size, comfort (sound, thermal), suitability and affordability, these systems must be

geared to the users in such a way that they transfer from natural-gas based systems to alternative, more sustainable systems. They must also be developed in conjunction with renovation concepts. Heat pumps are important in neighbourhoods that are focussed on electrification as a sustainable solution. Heat pumps can supply space heating and domestic hot water in combination with collective low temperature sources and contribute to the transition towards sustainable heating.

In addition to these building-based solutions, MMIP 4 also focuses on developing a range of natural gas-free, collective heating systems at district and regional level. These collective solutions are especially necessary for homes in (inner) urban areas, for non-residential/public buildings and greenhouse horticulture. Large-scale heat storage is also necessary for these collective heating systems in order to solve problems of mismatch between heat availability and demand in the short and long term. Storage and buffering of heat is also important to limit the size, costs and space of grids and installations, to make more efficient use of the installed capacity and shave peaks in the heat demand.

Unlocking new, sustainable heat sources is necessary to meet the rapidly growing demand for sustainable heat. MMIP 4 mainly focuses on geothermal energy, low-temperature heat sources such as surface water, solar thermal systems and sustainable waste heat from data centres and industrial processes. Utilising multiple types of heat sources with a variety of temperature levels requires new insights into the design of district heating system and a smart control of supply, demand and storage. In order to be able to work at low temperatures, systems must be optimised over the entire chain, which includes new insulation renovations for homes. The innovations required are strongly interconnected in both social and technical manners.

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