

Luxembourg, 01/09/2024

Environmental and Social Data Sheet

Overview

Project Name:	MIJNWATER SUSTAINABLE HEATING AND COOLING
Project Number:	2022-0937
Country:	Netherlands
Project Description:	Investment programme for the expansion of a fifth generation district heating and cooling network system supplied by underground waters from closed coal mines in the Province of Limburg (NL).
EIA required:	Multiple Schemes Annex II – On-going
Project included in Carbon Footprint Exercise ¹ :	NO

Environmental and Social Assessment

Environmental Assessment

The Project will support the Promoter's investment programme in the municipality of Heerlen (Mijnwater, Province of Limburg, the Netherlands) to expand their existing 5th generation sustainable district heating and cooling system with new drillings and network extensions.

It consists in the drilling of five hot wells (690-735 m depth) and four cold wells (250-270 m depth), as well as the lay-out of 61.6 kms of network.

The hot and cold wells part of the Project will be drilled in the existing mining concession Oranje Nassau (ON) for which Mijnwater has a licence and where five wells² are already in operation since 2008, exploiting heat and cold sources at different depths from coal mines which have been filled with water since their closure in the 1970s. The new wells will be located in the vicinity of existing wells. This form of energy is considered geothermal energy as the water in the coal mine reservoirs naturally regenerate from the hydrodynamics of the surrounding groundwater basins.

Water flows in closed circuits in the district heating and cooling network at very low temperatures close to ambient. At surface, the geothermal water only flows in the upstream-most level of the network before being reinjected back into the wells as appropriate to maintain the right temperatures in both the hot and cold reservoirs. At customers' level, decentralised heating and cooling plants (with electrical heat pumps) complement the energy supplied from the network by boosting or lowering-down temperatures based on customers' demand. Energy exchanges also take place between customers, allowing returned or waste energy to fulfil neighbouring hot or cold demand.

¹ Only projects that meet the scope of the Carbon Footprint Exercise, as defined in the EIB Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: 20 000 tonnes CO₂e/year absolute (gross) or 20 000 tonnes CO₂e/year relative (net) – both increases and savings

² Two hot wells, two cold wells and one intermediary well.



Luxembourg, 01/09/2024

As the Project includes components subject to the EIA Directive and forming part of a wider programme, the Project falls under the Strategic Environmental Impact Assessment Directive 2001/42/EC, requiring an environmental assessment of the programme. This assessment was prepared as part of the Promoter's geothermal extraction plan, covering the existing Mijnwater system and the first new deep well of the Project, HH3a. The plan was reviewed by the competent authorities and their technical advisors and a consent for implementation subsequently granted on the 23rd of May 2023³, which was published and opened for public consultation and comments for six weeks.

In the course of 2023, the Promoter further updated its geothermal extraction plan to include the rest of the components part of the project scope. This process is still on-going, as further evidence was requested by the competent authorities, in particular concerning the Promoter's seismicity risk assessments.

The five deep geothermal wells in the Project each fall within Annex II⁴ of the Environmental Impact Assessment (EIA) Directive 2011/92/EC amended by Directive 2014/52/EU, thus requiring the competent authority to decide whether an EIA is required or not. The first well to be drilled (HH3a) was screened-out from undertaking an EIA on the 31st of May 2022. The four other deep wells to be drilled will go through an EIA screening process later in the investment phase.

The geothermal wells also fall under the Water Framework Directive 2000/60/EC as transposed into corresponding legislative acts in the Netherlands⁵. The corresponding assessments are respectively part of the environmental assessment in the context of the SEA and EIA processes for the deep wells and of the environmental permitting for the shallow wells.

The existing Mijnwater system, including the first well HH3a, is located in the vicinity of Natura 2000 sites⁶. Based on nitrogen deposition tests, the competent authorities concluded that HH3a and the first backbone section to be implemented would not have any cumulative impact on nature conservation importance sites. Potable water reservoirs are not expected to be impacted either by the additional drilling HH3a, the nearest of such reservoirs being at 3.3 kms from the Project site.

Based on their technical characteristics and their location in urban areas outside protected nature sites including Natura 2 000 sites, the other main project components, the network and the shallow wells⁷, are not expected to affect any environmentally sensitive or protected areas nor to fall under the EIA Directive Annex I nor Annex II requirements, and will in any case be at least subject to building and environmental permitting as required by the local regulations.

Overall, the environmental impacts of the Project are expected to be minor and related mainly to noise, vibration, dust, and traffic disruption, and mostly temporary during the construction, which are expected to be mitigated through appropriate site organisation and construction management.

³ The original consent from the competent authorities was issued on the 03rd of November 2022. However, as the Promoter amended their plans, requesting the possibility to increase the injection temperature maximum thresholds into the deep wells from 30 degC to 50 degC, this was subsequently reviewed by the competent authorities and the consent decision amended accordingly.

⁴ Annex II(3)(a) of the EIA Directive (applying to geothermal wells deeper than 300-500 m).

⁵ Mining Act for the deep wells and Water Management Act for the shallow wells.

⁶ In particular, Brunsummerheide 2.1 km to the east, parts of Geleenbeek valley area 2.1-3 km to the south and west at 2.1-3 km fragments, Kunderberg 5 km to the south and Geuldal 8.5 km to the southwest.

⁷ The network is characterised by water flowing at temperatures close to ambient, with pipe diameters typically less than 800 mm. The shallow wells are to be drilled to less than 300 m depth.



Luxembourg, 01/09/2024

The drilling locations were selected in accordance with the Dutch Mining Law to minimize environmental disturbances and based on reservoir studies⁸ and customers' points at surface. The first well to be drilled (HH3a) will be located within an industrial area, as alternative locations would have been in forestry land with a high landscape value. There will be no hydraulic stimulation involved and only submersible pumps will be installed to support the geothermal water production.

The specific impacts related to geothermal drilling, such as aquifer contamination, air emissions or potential blow-outs are also expected to be limited with appropriate mitigation measures. The site will be managed with applied measures such as noise reduction and continuous monitoring during drilling.

During operations, the Project is not expected to impact underground aquifers as the wells will be designed with cemented double-casing down to 160 meters depth and as the geothermal subsurface system will operate as a closed loop, mitigating subsurface system imbalances. If necessary, mine water will only be discharged to surrounding sewers, which will require permitting from the competent authorities. The mine water will be kept under pressure in the wells and upstream network sections to avoid any potential gas release into the atmosphere. The Promoter also analysed the possible risks of mine water leakages, which were determined to have low toxic values and relatively low corrosion potential, thus presenting negligible risk to people and the environment.

Concerning potential risks of induced seismicity and soil subsidence, the Project is located in a zone which presents a small inherent risk of natural seismic activity, with a tectonically-active basement at 7 km depth. Historically, magnitudes spanning 0 to 2 have been recorded in Heerlen, with most events epicentres being located at a depth of 4 km or more.

The geothermal system will operate at shallower levels and as a closed-loop, with return water being re-injected into the exploited reservoir, thus minimizing subsidence or seismic risk through volumes balancing. The reinjection process is also subject to SodM regulations, which limit injection pressures to avoid stressing the reservoir.

Seismic risk assessments are to be undertaken within a nationally-recognized framework, to ensure those risks are minimal and/or mitigated through real-time monitoring.

The potential causes of induced seismicity risk investigated by the Promoter's consultants concerned shear failures due to stress changes at faults located nearby wells and vertical fault connections with deeper tectonically-active zones. These risks also exist due to the natural hydrodynamics occurring within the mines (with or without Mijnwater) and it was analysed that Mijnwater operations could slightly increase such events probabilities of occurrence. The effect of the Project operations can be mitigated to some degree through the smart planning of hot and cold zones in the system as indicated earlier. Based on the geothermal extraction plan covering the existing wells and the first new well to be drilled HH3a, the competent authorities and their advisors overall concluded that there is a risk of induced seismicity and subsidence associated with the operations, but not much higher than due to natural hydrodynamics and expected to occur at relatively low magnitudes. The Promoter recently submitted an updated extraction plan covering the full project scope to the competent authorities, which is currently being reviewed.

⁸ To limit interferences between wells and avoid unstable coal layers as well as suspected gas pockets (based on dated mining maps), but also to optimise the number of wells and the utilisation of the coal mine water thermal capacity.



Luxembourg, 01/09/2024

It is notable that since the start of the Mijwater exploitation in 2008, there was no record of induced seismicity nor of alleged significant earthquakes due to natural hydrodynamics of the mines by the KNMI national seismic monitoring network database.

The geothermal system will in any case be designed, implemented, operated, controlled, treated, maintained and regularly reported to the competent authorities⁹, in line with the obligations pertaining to the project permits.

A seismic risk management plan, including a monitoring plan, is also in place as part of the permitting requirements. Soil levels variations are monitored by a satellite system by a specialised company. Groundwater level and associated parameters are also measured at each well location. Seismicity is monitored real-time through the KNMI national seismic monitoring network (10 km away from Mijwater locations), which subjects any potential event to a traffic-light system, where actions should be taken shall an event exceeds certain thresholds. Mijwater has also put in place a local seismicity monitoring network last year to complement these existing monitoring measures.

The Project authorisations also include a number of other monitoring requirements to ensure that the Project will be operated under the required safety standards, which the Promoter needs to comply with, such as the monitoring of the effect of geothermal production and injection on the stability of the shallow mine tunnels, a monitoring action plan and a well integrity management system. Water quality and well integrity will also be regularly reported to the competent authorities.

The Project will enable the substitution of natural gas heating and of individual cooling options through the densification and expansion of its existing efficient sustainable network, while increasing the supply capacity with sustainable heating and cooling sources¹⁰ to fulfil the customer's demand increase through additional connections to be realised as part of the Project. The Project will thus generate environmental benefits by reducing emissions of greenhouse gas and air pollutants from heat/cold generation.

Being supplied by 100% renewable sources, the network is categorised as efficient per the Energy Efficiency Directive 2012/27/EU (as amended by (EU) 2018/2002) definition of an efficient DH system.

The estimated annual absolute emissions of the Project in a standard year of operation are 6 kT CO₂eq and the estimated emissions savings are 10 kT CO₂eq/year, through the substitution of natural gas and individual electrical chillers by geothermal sources and decentralised electrical heat pumps heating and cooling, which will reduce the intensity of emission of greenhouse gases and other air pollutants due to heating and cooling.

The absolute emissions include the emissions related to the electricity consumption to operate the decentralised heating and cooling plants and, to a minor extent, to the estimated leakage rate due to the use of HFC by the heat pumps in the plants located at the customers' buildings.

The baseline comprises emissions related to new connections which could be supplied by individual air heat pumps instead for small customers (electricity consumption) while continuing with industrial gas boilers for large customers, as well as by the electricity consumption of individual cooling options.

⁹ In particular the Promoter needs to operate within specifically authorised ranges of production/injection flow rates, temperature, pressure, groundwater levels and water salinity, which will be controlled by the competent authorities.

¹⁰ Through the drilling of five deep (hot) wells to ca. 700 m depth and four shallow (cold) wells to ca. 250 m depth and the installation of the additional decentralised heating and cooling plants.



Luxembourg, 01/09/2024

The Project has been assessed for Paris alignment and is considered to be aligned both against low carbon resilience goals against the policies set out in the Climate Bank Roadmap and in the EIB Energy Lending Policy (development of energy efficient district heating and cooling networks and heating and cooling technologies using electricity and renewable sources).

The Project's physical climate risk has been assessed as low as it is located away from forestry areas and main rivers, based on the Promoter's information.

EIB Paris Alignment for Counterparties (PATH) Framework

- The counterparty Enexis Holding NV (the Project's Borrower and one of the two shareholders of Mijnwater) is in scope and screened in to the PATH framework, because it is considered high emitting and high vulnerability.
- In the context of another recent operation financed by the Bank¹¹, the counterparty has agreed to develop its decarbonisation plan and publicly disclose a new alignment plan by no later than the end of 2025.

Social Assessment, where applicable

The Promoter and its contractors follow the national regulations and industrial standards for the design, engineering and operations of its assets. In addition to procedures to meet regulatory requirements, the Promoter has safety, health, emergency, quality control and risk management systems in place, which are applied to new projects and ongoing operations. The safety and reliability of the installations are also supported by inspection and maintenance programmes.

Working hours on the drilling site are also subject to local regulations and public health and public access to the site will be restricted.

Public Consultation and Stakeholder Engagement

As per the Dutch environmental legislation, the strategic environmental impact assessment studies covering the cumulative impacts of the Promoter's future programme are being subject to public consultation as part of the SEA process.

During the implementation of the DH networks, anyone, including local residents, would also be able to contact the Promoter as information cardboards with Promoter's contact information are displayed at the construction sites.

Other Environmental and Social Aspects

Based on site visits and cumulative experience and knowledge built on its existing system, the Promoter is deemed to have the experience and capacity to implement the necessary mitigating measures at design, construction and operational stages, in line with EIB environmental and social standards and requirements.

¹¹ ENEXIS ELECTRICITY NETWORK UPGRADE AND EXPANSION, signed on 20.12.2023.

Luxembourg, 01/09/2024

Conclusions and Recommendations

Based on the information available at this stage, the Project is expected to have minor negative residual impacts and thus is acceptable for Bank financing from an environmental and social perspective, subject to conditions to be included in the Finance Contract. In particular, the Promoter undertakes:

- to implement components after the required planning/construction or other permits have been issued by the competent authorities and to provide such authorisations to the Bank;
- to implement components requiring an Environmental Impact Assessment ("EIA")/Appropriate Assessment ("AA")/Strategic Environmental Impact Assessment (SEA) after these processes have been finalised and approved by the competent authority, including public consultations, and approved by the competent authority and to provide the corresponding documentation, including consultation documents to the Bank;
- to implement components subject to EIA screening decision after such decisions have been issued by the competent authorities and to provide these decisions to the Bank;
- to ensure that project components that may have an effect on a Natura 2000 site will undergo an analysis (or screening) to determine whether the scheme requires an AA. Shall an AA be deemed necessary, such assessment is to be carried out in line with Article 6(3) of the Habitats Directive;
- to take into account and implement conditions expressed in any screening-out decision or EIA/AA/SEA consent granted by the competent authority;
- to provide to the Bank reports (such as Quick-Scan, Location-Specific or consultants' reports) and any official decisions/comments from the competent authorities relating to seismicity/subsidence risks;
- to immediately inform the Bank should any materially adverse event occur during implementation or operation, which would prevent the Project to perform as planned, in particular with regards to environmental and social matters, geothermal resource characterisation (including induced seismicity or other events related to the subsurface).

The Borrower undertakes:

- to, no later than the end of 2025, publish on its website a PATH-compliant Decarbonisation Plan which is, to the reasonable satisfaction of the Bank, in line with the EIG Group PATH Framework (<https://www.eib.org/en/publications/the-eibgroup-path-framework>), while being understood that (i) disclosure in line with the Corporate Sustainability Reporting Directive will meet such requirement and (ii) instead of an actual quantitative emission target, a narrative on climate ambitions and a reasoning for why no target can be set, is acceptable;
- not to engage in incompatible activities, as defined in the EIB Group PATH Framework (<https://www.eib.org/en/publications/the-eib-group-path-framework>).