

TVP SOLAR IS STARTING CONSTRUCTION OF ONE OF THE LARGEST SOLAR THERMAL FIELDS IN THE WORLD FOR DISTRICT HEATING

November 2022



Carbon-free heating serving 2,500 households, fourth largest district heating plant in the world

Beginning of November, construction started for a 37 MW solar district heating plant in Groningen, Netherlands.

The 48,000 m² solar field will supply 25 GWh per year and connect to the district heating grid which is operated by the utility WarmteStad.

This 23M€ project was made possible by private developers coming together to build a first ever infrastructure investment based on Solar Thermal.

Size of the solar field:

48,000 m², 37MW

Type of collectors:

MT-POWER v4

Size of storage tank:

6,000 m³

Annual solar share:

25%

Project CAPEX:

€ 23 million

Turnkey solar field supplier:

TVP Solar

Local project developers:

Solarfields and K3

The 48,000 m² of Solar high Vacuum Flat panels will provide clean carbon-free heating for 10,000 citizens of the city of Groningen, all year around, covering as much as 25% of their heating needs, at competitive price, for 30 years and with zero emissions.

For the first time, a solar thermal plant will produce and actually **inject directly into the network** heat at the required temperatures from 69°C to 93°C, even **during the rough winter times** with sub-zero climate and low solar irradiance.

The solar plant will also demonstrate unrivaled performance, achieving a yearly average solar/thermal efficiency of 52%. This allows **minimal land occupation** (12 hectares) per unit energy produced, maximizing the land use efficiency.

"We expect this solar thermal project to contribute to 25% of our demand for district heating. Clean heat from the sun is the cheapest source Warmtestad purchases to generate thermal energy and this will allow to stabilize heat bill to our 10,000 end-users in the long term"

- Dick Takkebos, director at Warmtestad

The solar thermal plant supports the ambition of the municipality of Groningen to be energy neutral by 2035.



Dorkwerd project showcases a new type of infrastructure investment assets

In Groningen (NL), an extraordinary combination of modern private infrastructure finance and innovative technology solutions have come together to make this project possible, leading the way for a new type of infrastructure investment assets worldwide.

Solar PV developer **Solarfields**, supported by the land and landscaping developer **K3**, joined forces with the technology provider **TVP Solar** (Switzerland), to shape one of the largest ever private investments in solar thermal plants.

"We have a strong value proposition for our clients entering in a long term Heat Purchase Agreement: 1. ZERO upfront CAPEX; 2. ZERO O&M risks and costs; 3. ZERO CO2 emissions related to solar energy; 4. Clean heat from the sun CHEAPER than polluting natural gas"

- Piero Abbate, CEO TVP Solar

Solarfields has collected all typical PV investment's best practices to build a **strong investment asset**, this time dedicated to large scale solar thermal plant for district heating application.

"This project gives us, as developer of renewable infrastructure (typically in PV and wind) the opportunity to diversify our portfolio and risks while increasing our average return"

- Jan Martijn Buruma, director at Solarfields

The 12 hectares solar thermal park which will soon include 24,000 solar panels



To make this 23M€ investment possible, a combination of factors has happened:

1)Stable cash flow

A long term (30y) HPA - Heat Purchase Agreement with the city's district heating operator Warmtestad was established to provide security of a stable cash flow.

2)Ensuring profitability

Solarfields, as the owner of the solar heat plant, will receive a feed-in tariff by the national subsidy scheme called SDE+ (it supports produced energy during 15 years in a wide range of renewable technologies including solar thermal.), ensuring profitability of the investment.

3)Most effective technology on the market

The innovative high performance solar thermal technology owned by TVP Solar, which grants the best combination of cost/output/durability on the market, was chosen as it was the only possible solution to achieve suitable returns, also in a low irradiance place such as the Netherlands.

4)Performance guarantee

Made available by TVP Solar, as EPC and O&M operator, to cover operational risks for 15 years

5)Financial packaging

Project's bankability was secured with significant debt financing from Triodos Bank.

"This project shows that we can combine environmental protection, the conversion of unusable land and landfills, with a sustainable infrastructure to generate renewable energy having good return for the investors and the local community"

-Vivian Van de Kamp, director at K3

Once the Dorkwerd project is built and operational (expected October 2023), it will demonstrate a first-of-a-kind, fully marketable renewable heat asset based on solar thermal which will offer project developers a new and viable option to build valuable portfolios, alternative and complementary to traditional renewable assets.

For more information, please contact:

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