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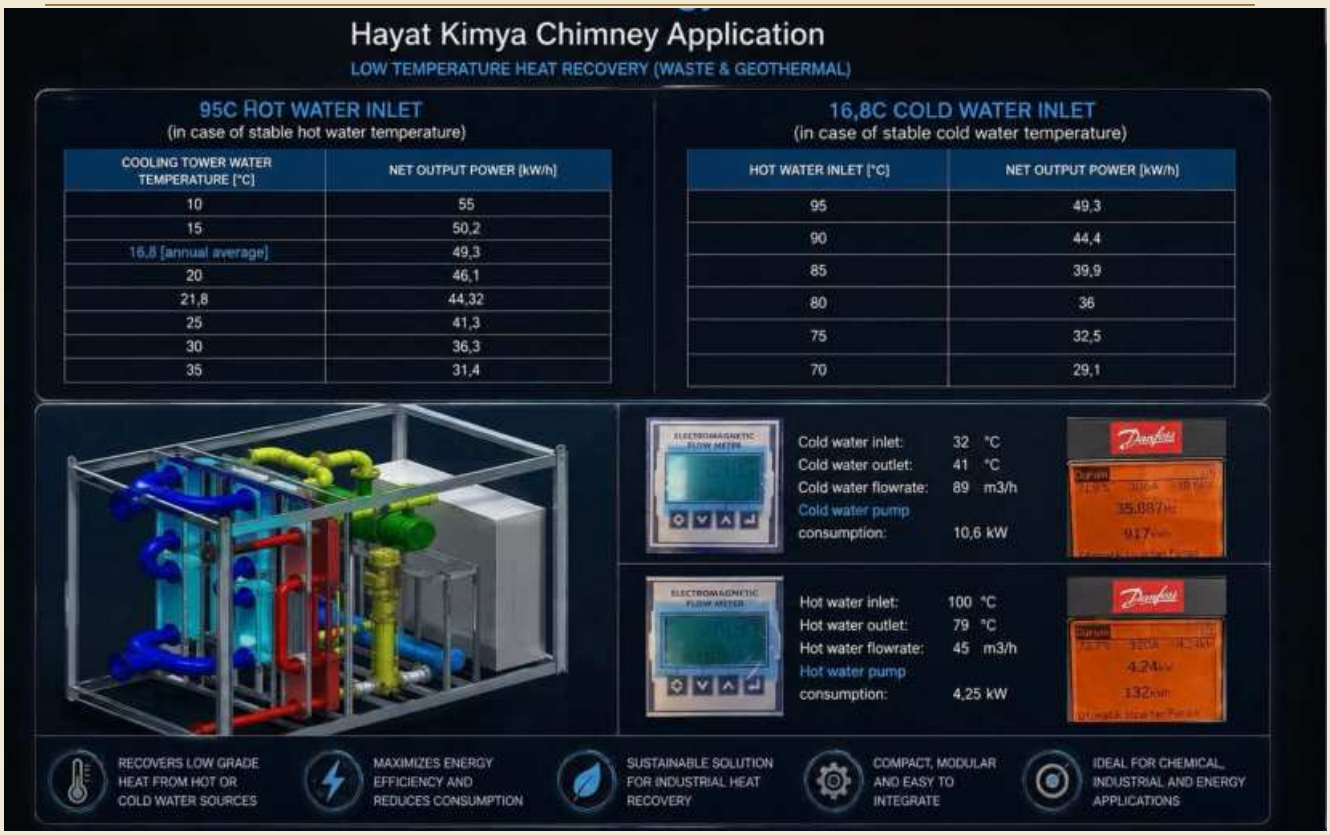
A DELAWARE LIMITED LIABILITY COMPANY · 18 COUNTRIES · 25 CENTRES

HAYAT KIMYA / AFJET
PILOT INSTALLATIONS

Technical Report

Configuration, operating principle, measured performance and design envelopes of the two pilot installations of the Group in the Republic of Türkiye

21 August 2026



SECTION ONE

Purpose and scope of this report

This report describes the two pilot installations operated by the Group, both situated in the Republic of Türkiye, and sets out their configuration, their operating principle, the performance measured on each of them and the design envelope within which each is expected to perform.

The two installations were selected, and are presented together, because they demonstrate the two thermal regimes which are relevant to an industrial decarbonisation programme. The first, at the Hayat Kimya facility, recovers heat from the flue gas of an industrial process, and it is that application which the Group proposes for immediate deployment. The second, at the AFJET geothermal field, recovers heat from the reinjection circuit of an existing and already licensed geothermal plant, without any new drilling, and it demonstrates that the same machine, unchanged, produces electricity from a low grade water stream at temperatures which the geothermal industry has historically treated as spent.

Every figure in this report is drawn from the monitoring record of the installations, retained at hourly resolution, or from the design documentation of the equipment. No figure is estimated, and where an installation has not performed as designed the reason is stated.

SECTION TWO

Operating principle

Both installations employ the same Organic Rankine Cycle architecture. An organic working fluid, chosen for a boiling point below that of water, is vaporised in an evaporator by the thermal stream of the host facility. The vapour expands through a turbine, which drives the generator, and is then condensed and returned to the evaporator by a circulating pump, in a closed thermodynamic loop.

The working fluid never enters the process of the host, and the stream of the host never enters the machine. The two circuits meet only across the wall of a heat exchanger, and heat passes between them by conduction alone. The installation therefore adds no emission, no effluent and no process risk to the host facility: it intercepts energy which the facility is already rejecting, and returns it as electricity.

The distinguishing property of this platform is the temperature at which it becomes viable. It operates from a source temperature of 55 degrees Celsius, where conventional systems of this class require seventy degrees or more. That single property is what converts the low grade thermal streams of an industrial economy, ordinarily dismissed as waste, into a generating asset.

The two installations differ in one respect only, namely the manner in which heat is rejected. The Hayat Kimya unit condenses against a cooling tower circuit, and its output is therefore governed by the wet bulb temperature of the ambient air. The AFJET unit condenses against an air cooled condenser, and its output is governed by the dry bulb temperature of the ambient air. That difference alone accounts for the different shape of the two performance curves given in sections four and five.

SECTION THREE

The two installations at a glance

Parameter	Installation 1	Installation 2
Site	Hayat Kimya, Çerkezköy, Tekirdağ	AFJET, Afyonkarahisar

Parameter	Installation 1	Installation 2
Country	Republic of Türkiye	Republic of Türkiye
Application	Industrial waste heat, flue gas	Geothermal reinjection loop
Installed electrical power	75 kWe	15 kWe
Net electrical power, design point	49 kW	12 kW
Heat source	Exhaust gas	Reinjection water
Source temperature, in and out	95 to 80 °C	72 to 66 °C
Source flow rate	Industrial flue gas stream	25 m³/h
Thermal power input	Industrial exhaust stream	175 kWt
Net thermal efficiency, design	5.34 to 3.40 per cent by condition	7.2 per cent
Cooling method	Cooling tower circuit	Air cooled condenser
Module dimensions	2200 x 3500 x 3000 mm	1250 x 2500 x 2000 mm
Module weight	4,500 kg	1,950 kg
Site annual average ambient	16.8 °C	10 °C
Monitoring	Continuous SCADA, hourly logging	Continuous SCADA production tracking
In operation since	July 2024	December 2025

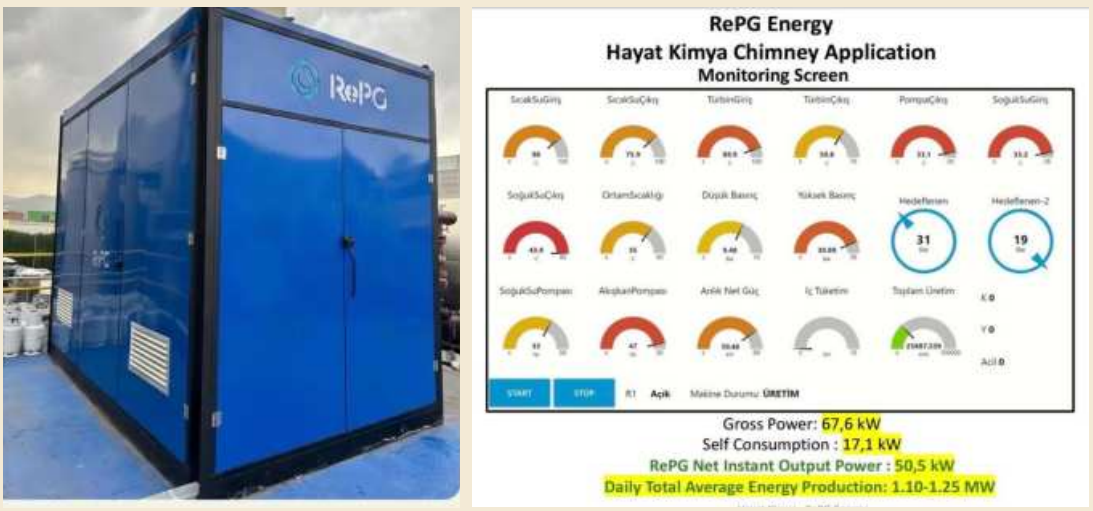
Both units are factory built and containerised, connected to the existing thermal stream of the host and to its electrical system, and require no dedicated operator: the plant is monitored remotely and the control system stages the machine automatically according to the availability of the source.

SECTION FOUR

Installation one: Hayat Kimya, Çerkezköy

4.1 Configuration

The installation intercepts the flue gas of the industrial process of the host facility, entering at 95 degrees Celsius and leaving at 80 degrees. The platform is rated at 75 kWe installed, for a net electrical output of 49 kW at the design point. Heat is rejected to the cooling tower circuit of the host. The unit measures 2200 by 3500 by 3000 millimetres and weighs 4,500 kilograms. It entered service in July 2024.



Pilot installation one · the containerised 75 kWe module in service at the Hayat Kimya facility, Çerkezköy

4.2 Measured operating parameters

The values below are drawn from the hourly record of the installation over its first period of continuous service, from July 2024 to January 2025, comprising 4,248 recorded hours of operation at an availability of 97.5 per cent. They describe the machine as it ran, and not as it was specified.

Measured parameter	Mean value	Range recorded
Hot side inlet temperature	**99.5 °C**	51.7 to 121.9 °C
Hot side outlet temperature	**79.5 °C**	46.1 to 119.3 °C
Hot side temperature drop	**20.0 °C**	across the evaporator
Turbine inlet temperature	**93.1 °C**	35.7 to 102.1 °C
Turbine outlet temperature	**58.9 °C**	18.3 to 83.7 °C
Cooling circuit inlet temperature	**29.9 °C**	13.1 to 41.5 °C
Cooling circuit outlet temperature	**38.8 °C**	13.7 to 48.5 °C
Cooling circuit temperature rise	**8.9 °C**	across the condenser
High side pressure	**28.2 bar**	5.8 to 33.7 bar
Low side pressure	**8.1 bar**	3.4 to 10.5 bar
Ambient air temperature	**28.5 °C**	12.3 to 45.9 °C
Net electrical output	**48.4 kW**	peak hourly 58.1 kW

Over that period the installation generated 205.5 MWh of net electrical energy at a mean net output of 48.4 kW, against a design point of 49 kW. The mean temperature drop across the evaporator was 20.0 degrees Celsius on the hot side, and the mean temperature rise across the condenser 8.9 degrees on the cooling circuit. The highest hourly output recorded was 58.1 kW.

4.3 Design performance envelope

The installation condenses against a cooling tower circuit. Its net electrical output is therefore a function of the wet bulb temperature of the ambient air, and of the temperature of the cooling tower water which results from it. The following values are the design performance of the platform at this site.

Wet bulb temperature (°C)	Cooling tower water temperature (°C)	Net thermal efficiency (%)	Net electrical output (kW)	Condition
5	10	5.96	**55.0**	
10	15	5.44	**50.2**	
11.8	16.8	5.34	**49.3**	*Regional annual average*
15	20	4.99	**46.1**	
16.8	21.8	4.80	**44.3**	*Site annual average*
20	25	4.47	**41.3**	
25	30	3.93	**36.3**	
30	35	3.40	**31.4**	*High summer conditions*

At the annual average wet bulb temperature of the site, 16.8 degrees Celsius, the design net output is 44.3 kW. At 30 degrees, corresponding to the conditions of high summer, it is 31.4 kW. The machine is therefore expected to vary by a factor of nearly two across the year, and does so predictably.

4.4 Monthly operating record, July 2024 to August 2026

The following is the complete monthly record of the installation, drawn from the hourly log. Where a month is marked as not logged, no telemetry was recorded for that month.

Month	Hours	Net kW	Uptime %	Month	Hours	Net kW	Uptime %
July 2024	349	**47.9**	97.7	August 2025	255	**27.9**	67.1
August 2024	744	**48.1**	99.6	September 2025	-	**not logged**	-
September 2024	720	**46.6**	99.4	October 2025	234	**32.1**	93.6
October 2024	744	**47.7**	98.7	November 2025	438	**28.0**	99.5
November 2024	720	**50.8**	94.0	December 2025	-	**not logged**	-
December 2024	335	**51.7**	92.5	January 2026	-	**not logged**	-
January 2025	744	**47.6**	98.0	February 2026	204	**24.3**	97.1
February 2025	521	**44.9**	76.2	March 2026	551	**23.5**	91.8
March 2025	683	**50.1**	97.4	April 2026	8	**0.0**	0.0
April 2025	641	**47.4**	84.2	May 2026	-	**not logged**	-
May 2025	698	**43.1**	86.8	June 2026	26	**18.8**	65.4
June 2025	716	**39.8**	84.6	July 2026	171	**18.0**	1.2
July 2025	744	**34.2**	82.0	August 2026	145	**24.2**	67.6

Across the whole logged period the installation generated approximately 396 MWh of net electrical energy.

4.5 The cooling heat exchanger event of 2025 and 2026

The record above shows a decline in output through 2025, interruptions in service and periods in which no data was logged. The Group sets out the cause without reservation, because the record would otherwise invite a wrong inference.

The chemical mixtures employed by the host facility in its own production process changed over the course of the year. Those mixtures attacked the four cooling heat exchangers of the installation, which form the interface between the machine and the cooling circuit of the host. All four units were perforated by chemical corrosion and rendered unusable. While replacements were procured and fitted, the installation was taken out of service for periods, and was for a time operated at approximately half capacity on smaller temporary exchangers. That is what the reduced monthly averages from the spring of 2025 onwards represent.

Three points follow. First, the cause was external to the machine: the corrosion originated in the chemistry of the host process, and not in the design, the manufacture or the operation of the unit. Second, the damage was confined to the heat exchangers at the interface; the turbine, the generator, the circulating pump and the working fluid circuit were unaffected throughout, and no component of the power block required replacement. Third, the replacement of the exchangers has been completed and the installation is fully operational and back online.

At present, in the ambient conditions of high summer, the installation operates in the region of 30 kW. As the design envelope at 4.3 shows, the net output of this machine at a wet bulb temperature of thirty degrees Celsius is 31.4 kW. The present output is

therefore the designed behaviour of the installation under the conditions now prevailing, and not a residual effect of the corrosion event. Output will rise as seasonal temperatures fall, along the curve given.

The Group draws one engineering conclusion from the event, and records it here rather than leaving it to be discovered. Where a host process employs aggressive chemistry, the material specification of the interface exchangers must be matched to that chemistry at the design stage. This is a specification question at the interface, not a limitation of the cycle, and it is now part of the site survey the Group conducts before any deployment.

SECTION FIVE

Installation two: AFJET, Afyonkarahisar

5.1 Configuration

The installation is connected to the reinjection circuit of an existing geothermal plant. Hot water enters at 72 degrees Celsius and is returned at 66 degrees, at a flow rate of 25 cubic metres per hour, corresponding to a thermal input of 175 kilowatts. The platform is rated at 15 kWe installed for a net output of 12.7 kW measured all in, that is after the internal consumption of the machine, 2.2 kW, and the consumption of the air cooled condenser, 2.4 kW, have been deducted from a gross output of 17.3 kW. The resulting net thermal efficiency is 7.2 per cent. The unit measures 1250 by 2500 by 2000 millimetres and weighs 1,950 kilograms.

No well was drilled for this installation, no mining or subsurface title was sought and no new environmental authorisation was required. The machine was installed downstream of infrastructure which was already permitted and already operating. This is the configuration of principal interest to any jurisdiction which possesses existing wells, whether geothermal or hydrocarbon, producing hot water which is at present a disposal cost rather than an asset.

Pilot installation two · the 15 kWe module on the reinjection circuit of the AFJET geothermal field, Afyonkarahisar

5.2 Design performance envelope

The installation condenses against an air cooled condenser. Its net electrical output is therefore a function of the dry bulb ambient air temperature, at a geothermal inlet of 72 degrees Celsius. The following values are the design performance of the platform at this site, whose annual average ambient temperature is 10 degrees Celsius.

Ambient air temperature (°C)	Net electrical output (kW)
-10	**12.80**

Ambient air temperature (°C)	Net electrical output (kW)
-5	**12.15**
0	**11.45**
5	**10.74**
10	**10.10**
15	**9.54**
20	**8.87**
25	**7.82**
30	**6.91**
35	**5.97**

The installation is monitored by the same production tracking system as the first, with continuous acquisition of hot and cold side temperatures, turbine inlet and outlet temperatures, high and low side pressures, instantaneous net power and cumulative energy.

The same platform at larger scale · a 150 kWe geothermal installation delivering 100 kW net from geothermal water at 120 to 90 °C

SECTION SIX

Production, availability and avoided emissions

Across the whole logged period, from 17 July 2024 to 21 August 2026, the Hayat Kimya installation generated approximately 396 MWh of net electrical energy. That energy was consumed on site by the host facility, displacing an equivalent quantity of purchased or self generated power.

During its first period of continuous service the installation recorded an availability of 97.5 per cent of logged hours, at a mean net output of 48.4 kW against a design point of 49 kW. Availability fell in the subsequent period for the reason set out at 4.5, and has been restored.

Applying the emission factor of 0.44 tonnes of carbon dioxide per megawatt hour which the Group uses in its own assessments, the production recorded at this single installation corresponds to approximately 174 tonnes of carbon dioxide not emitted. The Group notes that the value of a deployment of this kind is not confined to carbon accounting: the energy recovered is energy the host facility does not have to buy or to generate, and in an industrial economy dependent upon diesel generation that displacement is the primary benefit.

SECTION SEVEN

Monitoring and data acquisition

Both installations are monitored continuously and without a dedicated operator on site. The following are acquired and logged: hot side inlet and outlet temperatures, turbine inlet and outlet temperatures, cooling circuit inlet and outlet temperatures, pump inlet temperature, ambient temperature, high and low side pressures, instantaneous net electrical power, cumulative generated energy, machine state and alarm status.

The record is retained at hourly resolution and is available for the whole life of each installation. Every figure in this report is drawn from that record or from the design documentation of the equipment. The Group considers this the proper basis on which an installation of this kind should be assessed, and it is the basis on which it assesses its own.

SECTION EIGHT

Certification of the equipment

The equipment carries product level test evidence issued by Interturk Uluslararasi Belgelendirme Ltd. Sti. of Izmir under file INT-26-124RES-01, and the engineering centre holds accredited management system certification issued by IQR International Certification Services under IAS accreditation, IAS being a full signatory of the IAF Multilateral Recognition Arrangement, which is the mechanism by which accredited certificates are recognised across borders.

Instrument	Standard or reference	Status
Machine Safety and Design Analysis Report	TS EN ISO 12100:2010	All articles conform
Electrical Safety Test Report	TS EN 60204-1:2018	All points passed
Electromagnetic Compatibility Test Report	EN IEC 61000-6-2:2019 and 61000-6-4:2019	Pass
Attestation of Compliance	Directives 2006/42/EC, 2014/35/EU, 2014/30/EU	Issued 4 May 2026
ISO 9001:2015 · Quality	IQR International, IAS accredited	In force
ISO 14001:2015 · Environment	IQR International, IAS accredited	In force
ISO 45001:2018 · Occupational safety	IQR International, IAS accredited	In force

The technology platform is protected by 36 registered patents and 10 patent applications in progress, together with 22 trademark registrations and 5 design registrations. The patents granted are registered in the Republic of Türkiye, and international applications have been filed under the Patent Cooperation Treaty.

SECTION NINE

Conclusions

The platform has been demonstrated in continuous industrial service. Over 4,248 hours of its first period of operation the Hayat Kimya installation delivered a mean net output of 48.4 kW against a design point of 49 kW, at an availability of 97.5 per cent, and it has generated approximately 396 MWh over the whole period of record.

Its behaviour is predictable and documented. Output varies with ambient conditions along a published curve, and the present summer output of approximately 30 kW corresponds to the design value of 31.4 kW at the prevailing wet bulb temperature.

One failure has occurred, it has been explained, and it was external in origin: aggressive host process chemistry perforated the interface heat exchangers. No component of the power block was affected, the exchangers have been replaced and

Site Information

AFYONKARAHISAR	Ocak	Şubat	Mart	Nisan	Mayıs	Haziran	Temmuz	Ağustos	Eylül	Ekim	Kasım	Aralık	Yıllık
	Ölçüm Periyodu (1929 - 2024)												
Ortalama Sıcaklık (°C)	0,4	1,8	5,3	10,4	15,0	19,0	22,2	22,2	17,9	12,5	7,0	2,5	11.3

the installation is back in service. The lesson has been incorporated into the site survey which now precedes any deployment.

The AFJET installation demonstrates the same platform generating from a water stream at 72 degrees Celsius, on existing and already permitted infrastructure, with no drilling and no new authorisation.

The Group considers that these two installations, taken together with the monitoring record from which this report is drawn, constitute an adequate technical basis on which an industrial deployment may be assessed.

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