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## **PannErgy Plc**

**QUARTERLY PRODUCTION REPORT**

**for the period of Q4 of 2019**

**15. January 2020**

**Introduction:**

PannErgy Nyrt. publishes a production report on a quarterly basis describing green energy production and use. The Company's report gives account of the condition of its key geothermal energy production systems, the experience related to their operation, and the data on green heat sold in the reporting period.

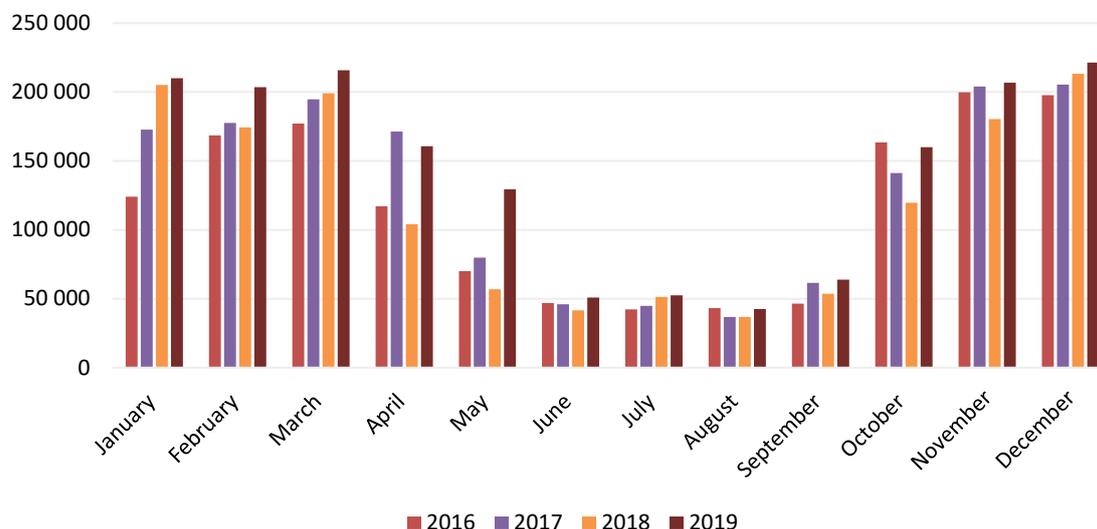


Figure 1

**Consolidated quantity of heat sold (GJ)**

The chart illustrates the aggregate amount of heat sold by the Miskolc, Győr, Szentlőrinc and Berekfüdő projects, in a monthly breakdown.

	2016	2017	2018	2019	2019 plan	2020 plan*
January	124 060	172 758	205 199	209 999		
February	168 574	177 533	174 300	203 484		
March	177 177	194 634	199 090	215 693		
<b>Q1</b>	<b>469 812</b>	<b>544 925</b>	<b>578 589</b>	<b>629 176</b>	<b>627 988</b>	<b>633 308</b>
April	117 075	171 294	104 033	160 548		
May	69 990	79 700	56 758	129 300		
June	46 866	45 936	41 641	50 780		
<b>Q2</b>	<b>233 931</b>	<b>296 930</b>	<b>202 432</b>	<b>340 628</b>	<b>266 304</b>	<b>270 980</b>
July	42 193	44 865	51 247	52 406		
August	43 294	36 709	36 794	42 415		
September	46 429	61 502	53 650	63 731		
<b>Q3</b>	<b>131 916</b>	<b>143 076</b>	<b>141 691</b>	<b>158 552</b>	<b>145 550</b>	<b>150 541</b>
October	163 409	141 270	119 652	159 888		
November	199 716	204 045	180 263	206 686		
December	197 650	205 251	213 267	221 248		
<b>Q4</b>	<b>560 775</b>	<b>550 566</b>	<b>513 182</b>	<b>587 822</b>	<b>590 266</b>	<b>603 237</b>
<b>TOTAL</b>	<b>1 396 434</b>	<b>1 535 497</b>	<b>1 435 894</b>	<b>1 716 178</b>	<b>1 630 108</b>	<b>1 658 066</b>

Figure 2

Consolidated quantity of heat sold, in GJ, in a table.

(\*under annual review)

A comparison of the 2019 Q4 heat sales figures to those of the corresponding period of 2018 shows a year-on-year improvement in the utilisation of capacities at the Győr and Miskolc Geothermal Projects.

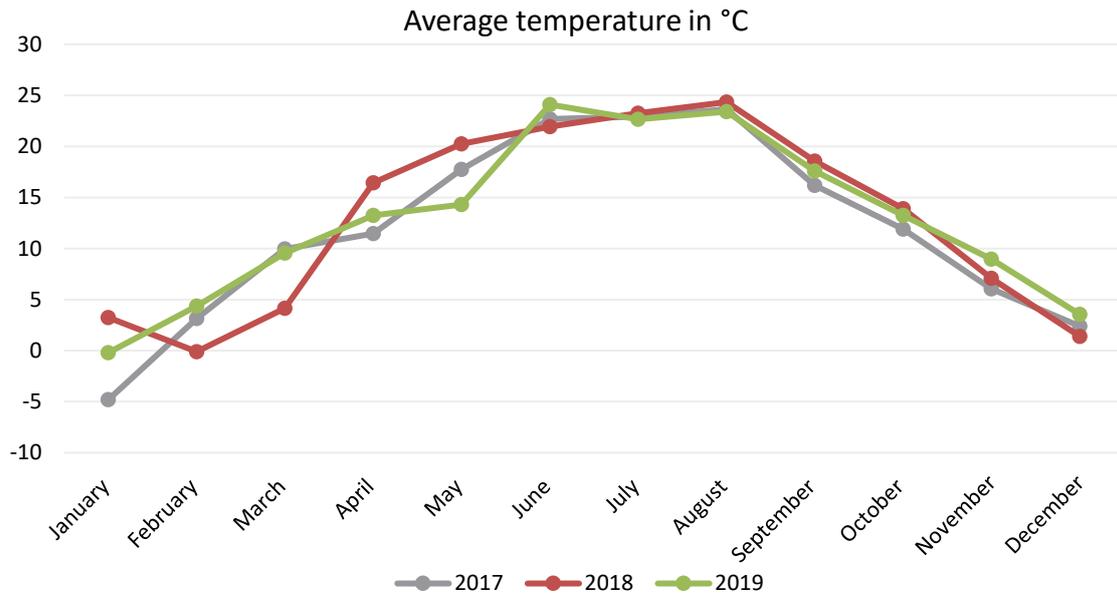


Figure 3  
Average temperatures in 2017-2019

The 2–8 °C ambient temperature range is ideal for day-to-day geothermal heat sales during the heating season, especially when the difference between the daily minimum and maximum temperatures is as small as possible. The monthly average of the average daily temperatures in the period under review were practically the same as in the corresponding period of 2018, but temperature changes within any of the months or days in the reporting period were more favourable. Similarly to the base period, the 2019/2020 district heating season did not begin in September. The amount of heat sold in 2019 Q4 was up 14% compared to the base period, which means that the quarterly target has been achieved.

### Miskolc Geothermal Project

(Miskolci Geotermia Zrt., Kuala Kft.)

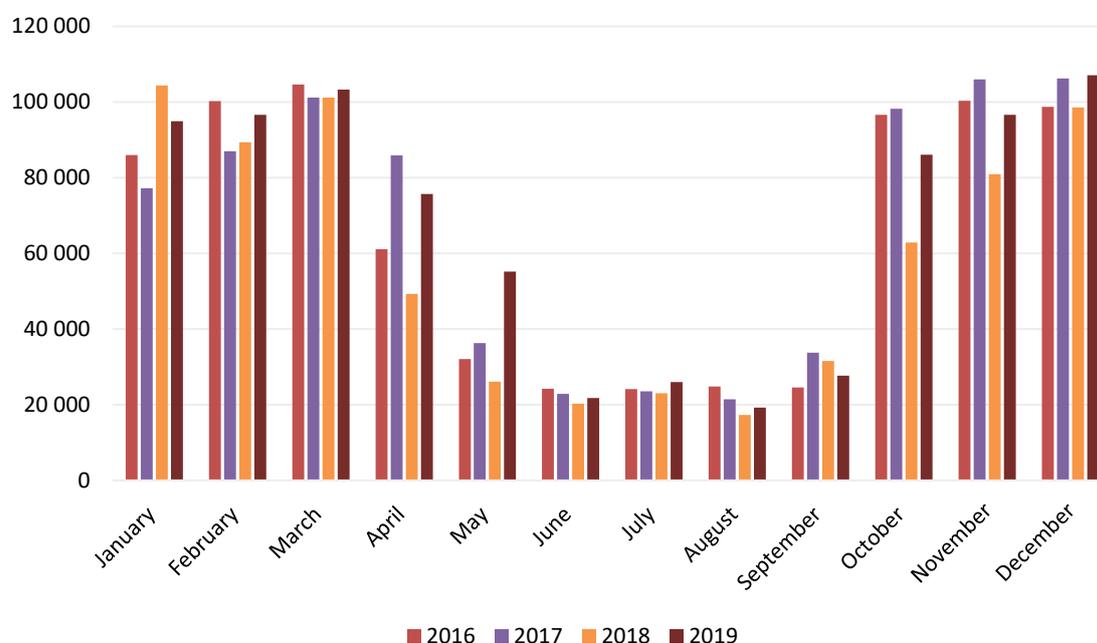


Figure 4  
The amount of heat sold at Miskolc, in GJ

The Geothermal System of Miskolc sold a total of 289,778 GJ thermal energy in 2019 Q4, showing a 20%-increase in comparison to heat sales data in 2018 Q4. The growth is attributed mainly to the performance in October and November which could be attained due to the previously mentioned more favourable weather conditions, the minor technical problems in the base period, and the improvements in the utilisation of available capacities.

### Győr Geothermal Project

(DD Energy Kft., Arrabona Koncessziós Kft.)

The Geothermal System of Győr sold a total of 291,089 GJ thermal energy during 2019 Q4, up 11% year-on-year. Similarly to operations in Miskolc, the growth was determined mainly by the October and November performance in Győr as well, primarily due to the already mentioned weather conditions and the third productive well that has already started its regular operation.

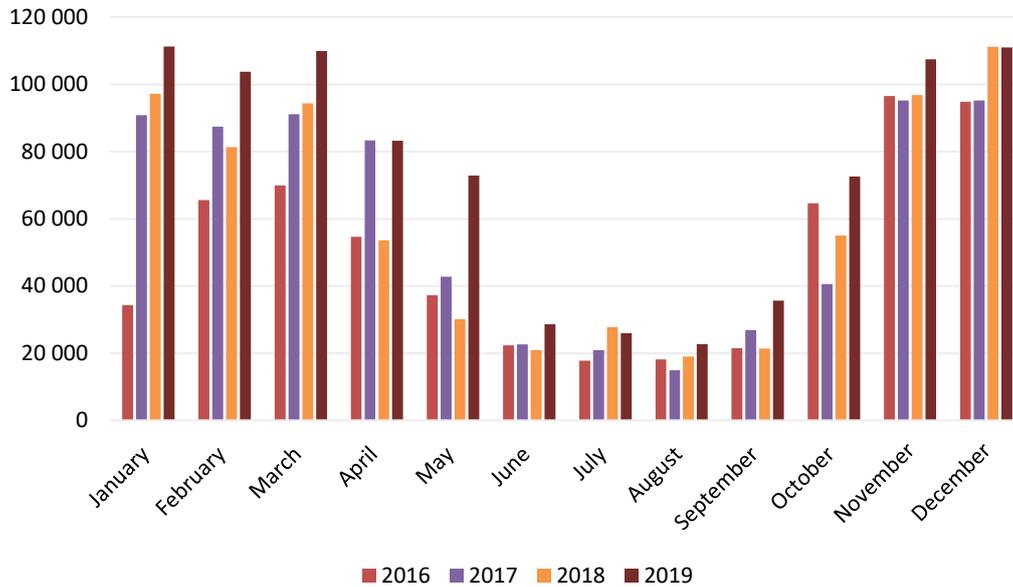


Figure 5 Amount of heat sold in Győr (GJ)

#### Geothermal Heating Facility of Szentlőrinc (Szentlőrinci Geotermia Zrt.)

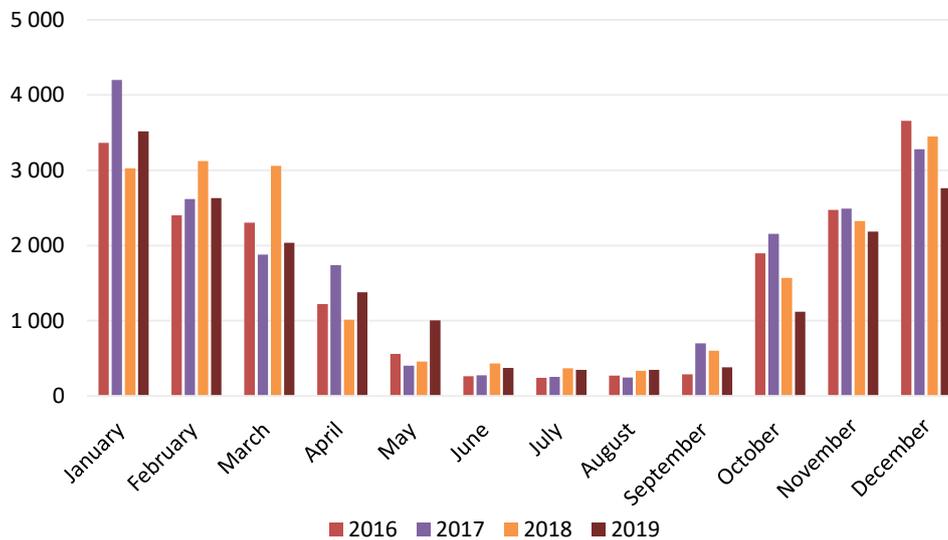


Figure 6 Amount of heat sold in Szentlőrinc (GJ)

In Szentlőrinc, the weather was warmer in the reporting period. The amount of heat sold was 6,067 GJ. The Geothermal Facility of Szentlőrinc can fully meet the local district heating system's demand for heat on its own, therefore the weather sensitivity of the geothermal heat input is significantly higher than that of district heating systems with a complex heat resource. This impact was the reason for the 17% decrease in heat input during the reporting period.

### Climate change

Hungary has set the objective of reducing its greenhouse gas emissions by at least 40% below 1990 levels by 2030, while the rate of renewable energy in gross final energy consumption will be at least 21%. PannErgy Group runs its renewable energy projects in strict accordance with the national ambition to make the district heating sector greener and more competitive. Through its geothermal projects, the Company supports Hungary's climate policy and the objectives laid down in the National Energy Strategy 2030 document by promoting sustainability.

The Pannergy Group's projects contributed to the efforts made to preserve a more liveable environment by the CO<sub>2</sub> emission cuts shown in Figure 7. The reduction amounted to 34,098 tons, while the total aggregate amount of greenhouse gas emission saved by the PannErgy Group so far amounts to 450,408 tons.

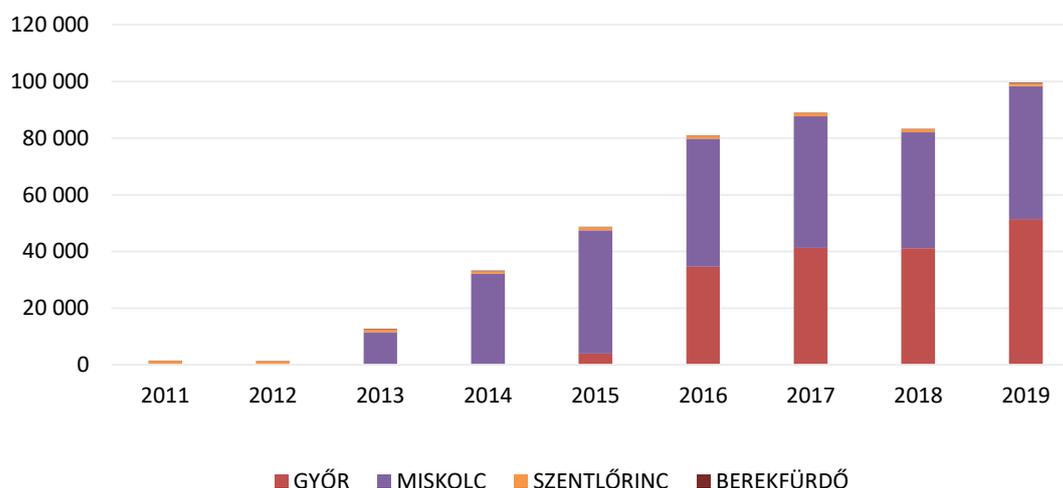


Figure 7 The amount of greenhouse CO<sub>2</sub> not released into atmosphere thanks to the PannErgy Group's projects

One of the evident effects of climate change in Hungary appears in the form of frequent volatile and extreme changes in weather conditions, including ambient temperatures, and a rise of the average temperature of the winter months from the historically cold, stable sub-zero range to markedly over the freezing point. These changes are not expected to have an adverse impact on the output of geothermal heat generation; indeed, perspectives of input into district heating systems are favourable as an average over multiple years. The reason for this is—as is noted in this report—the fact that daily geothermal heat sales are ideal in the 2-8 C temperature range during the heating season. At the same time, the potential decrease in the demand for heat during the transitional seasons may be compensated, indeed, overcompensated by the growth in the potential of the increasingly mild winter months.

The demand for energy in the large district heating systems supplied by the PannErgy Group is far greater than the amount of geothermal energy that can be fed into those systems. Accordingly, any change in the demand for heat in those heating systems stemming from the climate change has no perceivable effect on PannErgy Group, and the Company does not expect any trend-like effects in the future either.

PannErgy aims to utilise its substantial uncommitted available thermal capacities – in addition to the capacities being utilised now –, which is expected to further reduce sensitivity to ambient temperature changes. The most important possible areas for utilising the available uncommitted thermal capacities include:

- Implementation of energy efficiency and optimisation projects with existing customers;
- Cold energy projects – for the utilisation of the so-called “summer” heat;
- Connection of new customers indirectly through district heating systems or directly to the geothermal systems on the primary or the secondary (return) sides.

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