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Alexandar RANGUELOV
Business Development Director

159, blvd. Tsar Boris III; 1618 Sofia, Bulgaria

LYON 7/28/2021

Mr RANGUELOV

Please find attached the measurement sheets on the electrical distribution of the SOFIA WAST WATER SATATION Step before and after the installation of the GWS device (Device for channeling the electrical flow by electromagnetic field also called "magnetoresistance). We remain at your disposal for any further information, and please accept, Sir, our best regards.

The data analysis is carried out by two independent research offices:

Aftim consulting  expert in energy quality electrical

Eqinov : Professional qualification for carrying out OPQIBI energy audits

eqinov

Eqinov
Vincent WEHRLIN

Eqinov - Energy efficiency project manager

AFTIME CONSULTING

AFTIME CONSULTING
Marc COMMENGE
ITC thermography expert Level I APSAD
certified trainer Q19 Expert in energy quality
Electrical ability B1T

photon group

PHOTONGROUP
Mr NUGUET FREDERICK
Phone :+336 637 440 31
Email :f.nuguet@photongroup.fr
VASIL BATEV : BULGARIE

# Summary

## Foreword

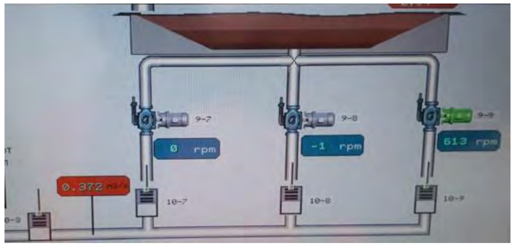
The purpose of this mission was to verify the performance of the "GWS" device marketed by PHOTONGROUP on improving the electrical flow as well as reducing the reactance of the circuit tested.

It also had the role of quantifying the electrical energy consumed without and with the GWS device over a period predefined by the two parties.

Company Veolia
Site name Sofia Waste water station - Kubratovo - Strategic location
Location Kubratovo - outside Sofia
GWS Capacity installed 100 KVA
Date of installation 08.10.2020
Operational planning for the test GWS will be installed on a pump station inside Sofia waste water station.
The pump is with 67 KW power and is installed in a group together with 2 other same pumps.The pump has a power of 67 KW and is installed in a group with two other identical pumps.
The group of pumps were shutdown for maintenance until 15 Nov. 2020
Measuring device installed SCADA
Box installation diagram The box was installed directly to the coper bars inside of the control box of the pump. The box is connected to the coper bars via a fusebox for every phase and the cables of the box are shortened with the same length as the cables before the fuses. Please refer to ther pictures

<u>Goal</u>

Observe a minimum gain of 5% 10% in the energy performance index on the general departure
Evaluate the relevance of the GWS BY PHOTONGROUP system over a reference period




PHOTONGROUP
Campus VEOLIA 25 Avenue Lionel Terray 69330 MEYZIEU France Web: www.photongroup.eu Mail : contact@photongroup.fr - Phone: +339 59 22 25
44S ociété par actions simplifiée au capital de 200 000 € - Siret : 79014621100012Numéro TVA : FR78790146211 - Code NAF : 4669A

## Reference

Reference périod January 01/01/2020 TO 3/09/2020 AND 01/01/2021 TO 3/09/2021

Data and influencing data factors used

Référence treated water du 01/01/20 au 3/09/20 : 3 213 000 M3 treated 62 048 KWh

Référence treated water du 0/01/21 au 3/09/21 : 2 574 521 M3 treated 44 170 KWh

Average consumption KWh per M3 water treated 2020 : 0,019 for 2021 : 0,017 KWh/M3 ECONOMY 10,53%

| Comsumption of the period 2020 without GWS and 2021 with GWS 1/1/2020 TO 3/9/2020 AND 1/1/2021 TO 3/9/2021 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2020 | | | 2021 | | | consumption gap | |
| KWh | WATER | KWh Meduim | KWh | WATER | KWh Meduim | KWh | M3 |
| 62 048 | 3 213 000 | 40 | 44 170 | 2 574 521 | 26 | | |
| AVERAGE CONSUMPTION KWh PER M3 OF TREATED WATER | | | | | | ENERGY SAVER | |
| 0,019311562 | | KWh/M3 | 0,017156648 | | KWh/M3 | 11,16% | |

Hourly electricity consumption of the 3 pumps according to the flow rate(1/1/2021 - 3/9/2021)

2020 : y = 0,02255x - 6,38103 $R^2$ = 0,82438

2021 : y = 0,0216x - 6,9548 $R^2$ = 0,9152

Improvement of R2 : 11,02%

| | 2020 | 2021 | difference |
|---|---|---|---|
| P MIN | 16,1 | 6,6 | 59,01% |
| P MEDUIM | 36 | 28,9 | 19,72% |
| P MAX | 171 | 152 | 11,11% |

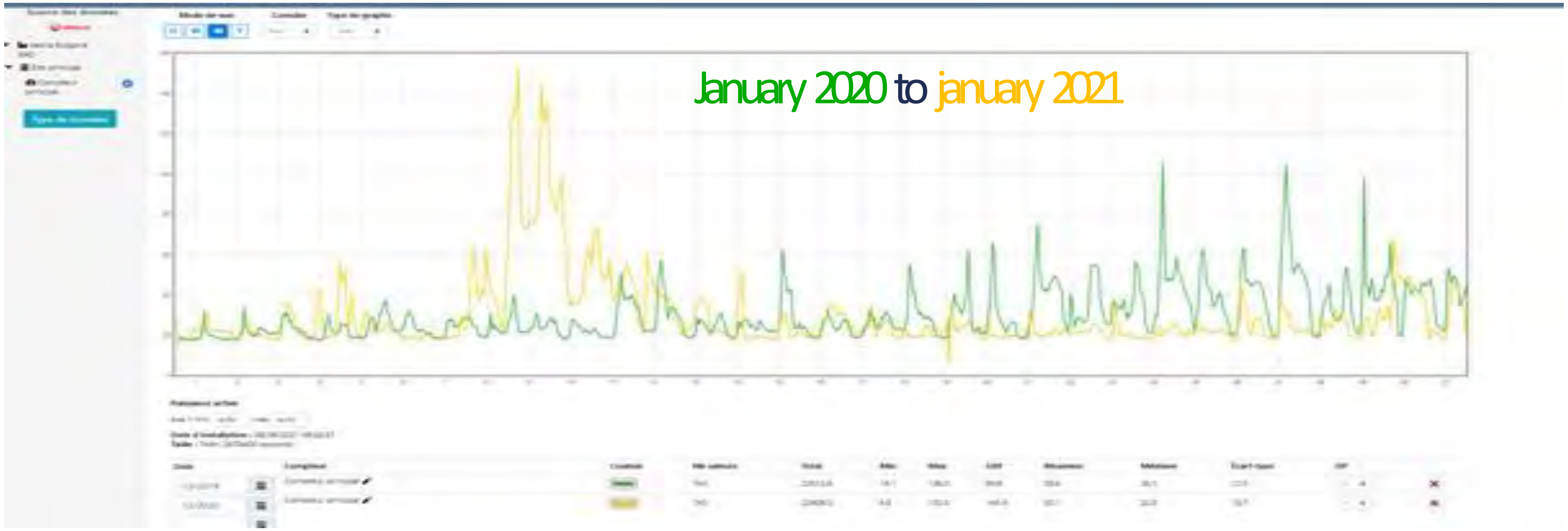
We can see on all the comparative graphs before and after a drop in consatante power calls after the installation of the GWS.

## Method of analysis and synthesis retained

1/ The first analysis is made on the comparison of the measurement data on the power in KWh and M3 of water. Period applied from 1/1/2020 to 3/9/2020 and from 1/1/2021 to 3/9/2021.
minimum power and maximum power
comparison of graphs between 2020 and 2021
comparison of consumption before after reduced to CONSUMPTION PER CUBE METER OF AVERAGE WATER

2 / The second analysis is made on:
For the verification of the improvement of the energy performance, I used an IPMVP approach, that is to say by the use of a reference model applied over the monitoring period. This model then makes it possible to minimize the impact of influencing factors, here the pumped flow. In this case it is a simple model incorporating only one influencing factor. It already gives a rather satisfactory $R^2$ (0.83). When relevant, we can integrate several influencing factors to neutralize them in the before / after analysis (production, outside temperature, flow, etc.).

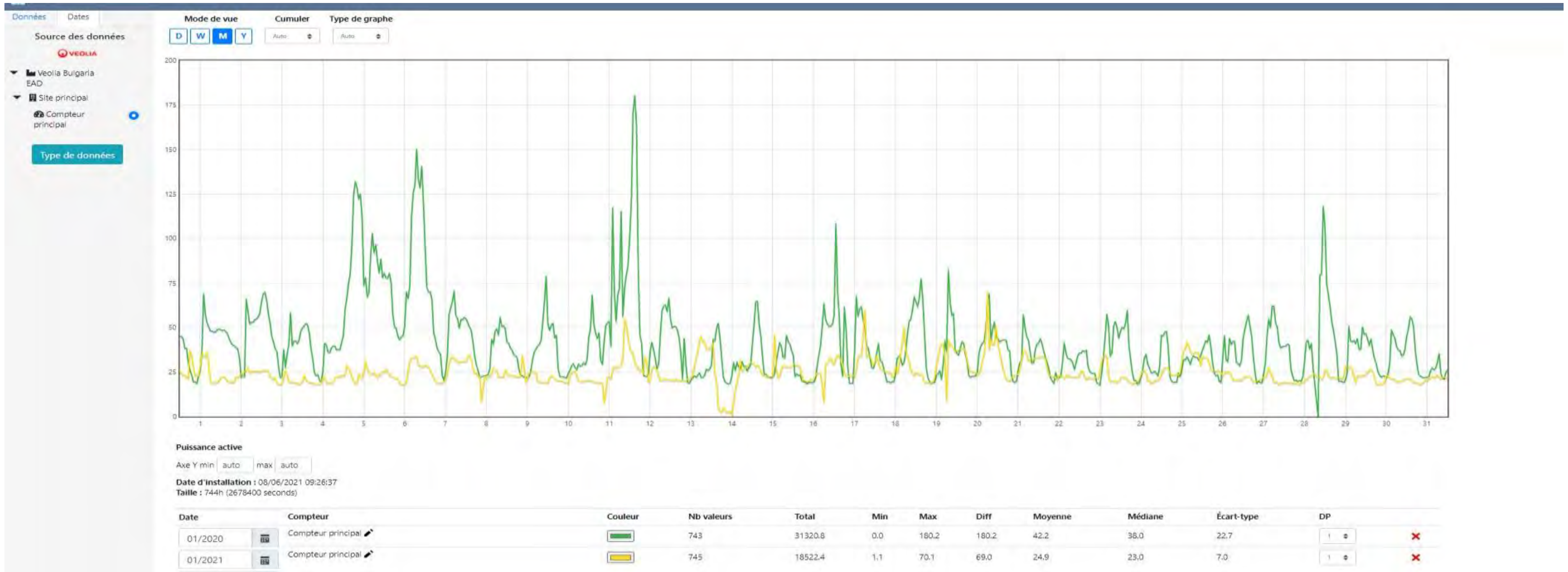
Graph of load curves before and after the GWS in green without the GWS system in yellow with the GWS




Comparative table with consumption in kwh and M3 of water: average cumulative consumption and difference between the reference period from January 2020 and January 2021

| JANUARY consumption of the period 2020 without GWS and 2021 with GWS<br>1/1/2020 TO 1/31/2020 AND 1/1/2021 TO 1/31/2021 | | | | | | | |
|---|---|---|---|---|---|---|---|
| JANUARY 2020 | | | JANUARY 2021 | | | consumption gap | |
| KWh | WATER | KWh Meduim | KWh | WATER | KWh Meduim | KWh | M3 |
| 22 670 | 1 227 742 | 30 | 22 385 | 1 244 585 | 30 | | |
| AVERAGE CONSUMPTION KWh PER M3 OF TREATED WATER | | | | | | | |
| 0,018464708 | | KWh/M3 | 0,017986135 | | KWh/M3 | 2,59% | |

Graph of load curves before and after the GWS in green without the GWS system in yellow with the GWS




Comparative table with consumption in kwh and M3 of water: average cumulative consumption and difference between the reference period from February 2020 and February 2021

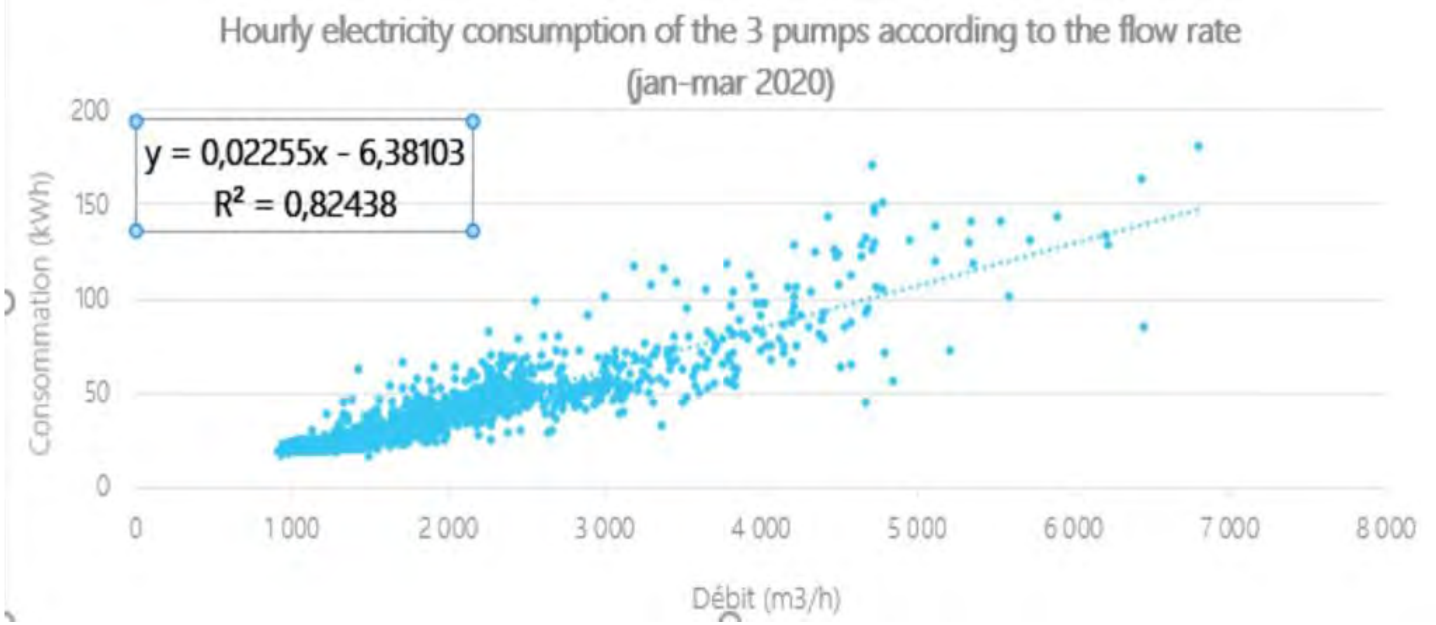
| FEBRUARY comsumption of the period 2020 without GWS and 2021 with GWS 2/1/2020 TO 2/28/2020 AND 2/1/2021 TO 2/28/2021 | | | | | | | |
|---|---|---|---|---|---|---|---|
| FEBRUARY 2020 | | | FEBRUARY 2021 | | | consumption gap | |
| KWh | WATER | KWh Meduim | KWh | WATER | KWh Meduim | KWh | M3 |
| 28 907 | 1 482 683 | 43 | 16 930 | 1 022 224 | 25 | | |
| AVERAGE CONSUMPTION KWh PER M3 OF TREATED WATER | | | | | | | |
| 0,019496117 | | KWh/M3 | 0,016562237 | | KWh/M3 | 15,05% | |

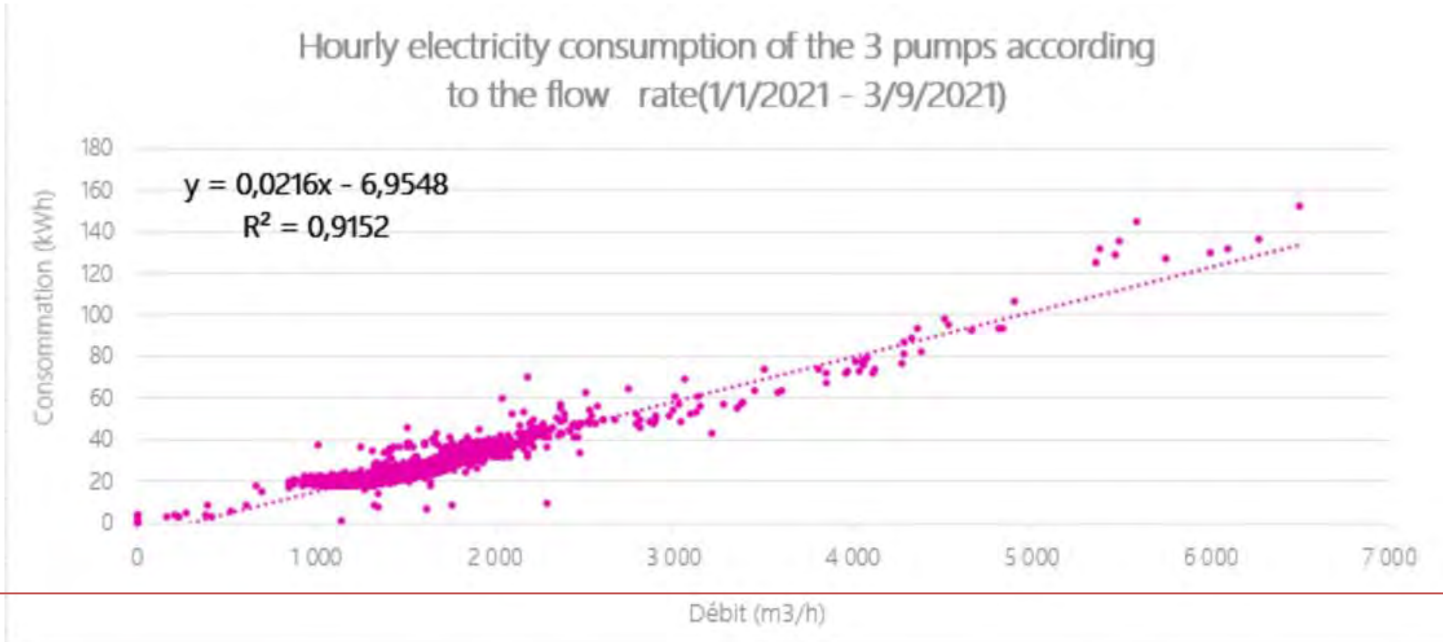
Graph of load curves before and after the GWS in green without the GWS system in yellow with the GWS


Comparative table with consumption in kwh and M3 of water: average cumulative consumption and difference between the reference period from January 2020 to March 2020 and January 2021 to March 2021

| MARCH comsumption of the period 2020 without GWS and 2021 with GWS<br>3/1/2020 TO 3/9/2020 AND 3/1/2021 TO 3/9/2021 | | | | | | | |
|---|---|---|---|---|---|---|---|
| MARCH 2020 | | | MARCH 2021 | | | consumption gap | |
| KWh | WATER | KWh Meduim | KWh | WATER | KWh Meduim | KWh | M3 |
| 10 472 | 502 575 | 48 | 4 855 | 307 712 | 22 | | |
| AVERAGE CONSUMPTION KWh PER M3 OF TREATED WATER | | | | | | | |
| 0,020835875 | | KWh/M3 | 0,015776314 | | KWh/M3 | 24,28% | |

## Hourly electricity consumption of the 3 pumps according to the flow 2020 AND 2021



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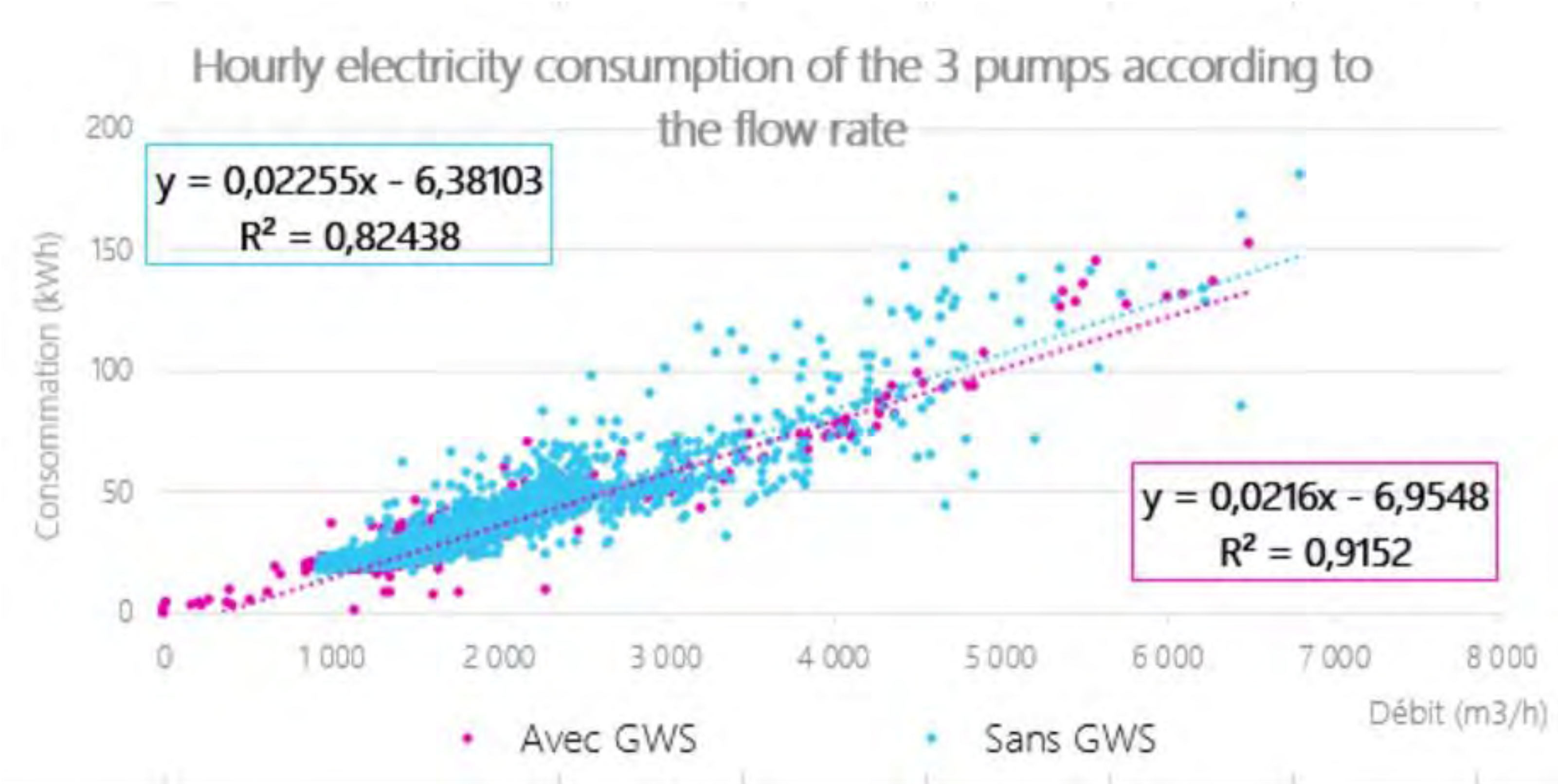


| Start of the effect of the GWS in January 2021 on the general start of the 3 pumps | | |
|---|---|---|
| **Review of the follow-up period (01/01/2021 au 11/03/2021)** | | |
| Cumulated real consumption | kWh | 44 170 |
| Cumulative reference consumption | kWh | 47 839 |
| Economy | kWh | 3 669 |
| Economy | % | 7,7% |

## Conclusion

# RESULTS before / after installation of the GWS Globallwatsystem Minimum and maximum power measurements

By taking into account the various influencing factors and the measures carried out and provided on the Step between January to March 2020 and 2021, the report made by AFTIME cunsulting and the EQINOV research office,

**The savings in consumption provided by the installation of the GWS device is 10.08% *.**

*As a reminder:

For the verification of the improvement of energy performance, On an IPMVP approach, that is to say by the use of a reference model applied over the monitoring period. This model then makes it possible to minimize the impact of influencing factors, here the pumped flow. In this case, it is a simple model integrating a single influencing factor. There is an improvement in $R^2$ with a saving of 7.7%

We see a decrease in kWh consumption of 11.06%

Hourly electricity consumption of the 3 pumps according to the flow rate(1/1/2021 - 3/9/2021)
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