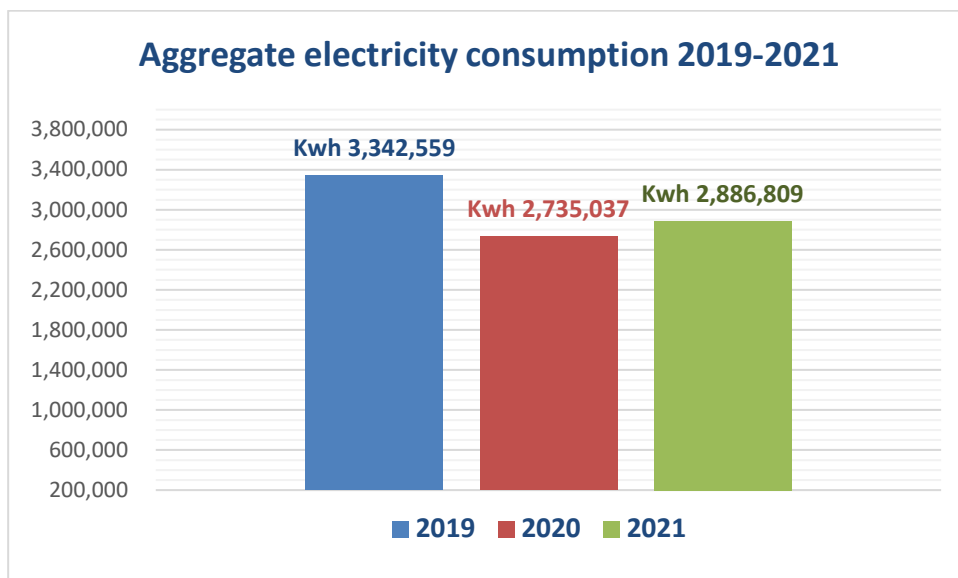


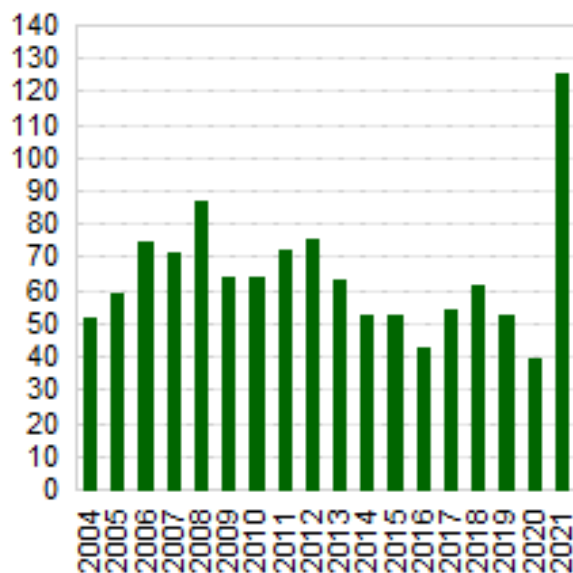
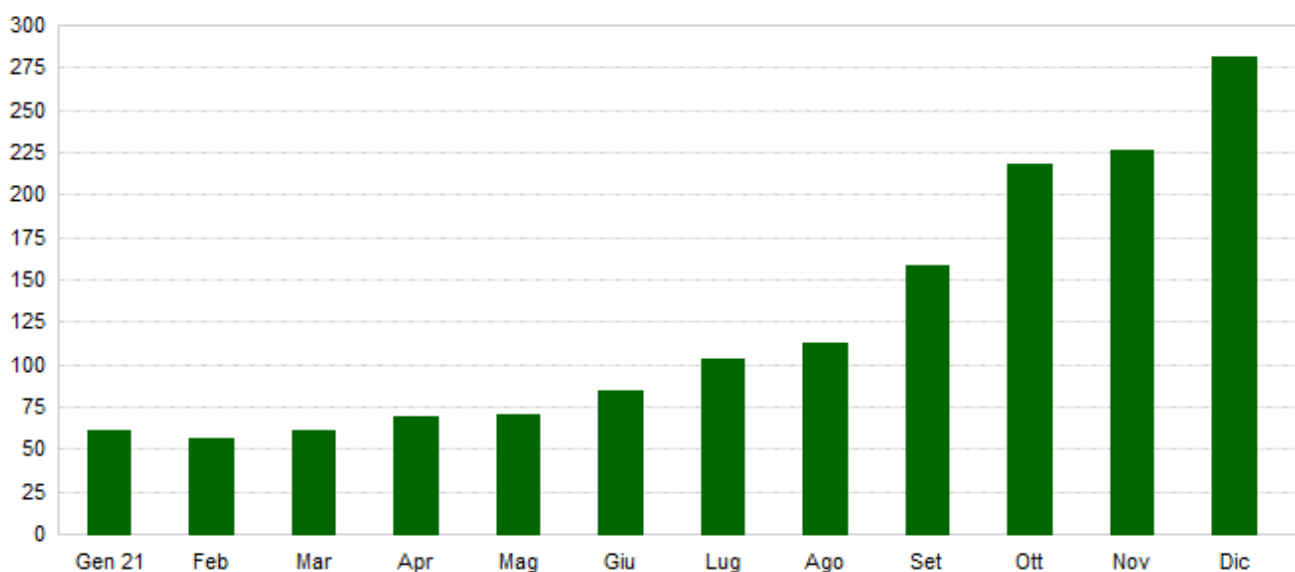
## EUI ENERGY REPORT 2021

After the resuming of in-presence academic activities in 2021, over the course of the year the overall electrical consumption in the EUI premises (including EUI residences at PAB and PDM) resulted in a total of 2.886.809 Kwh\*, which, compared to recorded data for 2020 (2.735.037 Kwh)\*, shows an increase of **+5,5%** in absolute terms, but a significant reduction of **- 13.63%** on 2019 (3.342.559 Kwh): It has been mentioned already several times that 2020 cannot be taken as a benchmark year due to the exceptional circumstances in which we operated. If we compare electricity consumption with the pre-pandemic era (considering 2021 as an almost “normal” year, although with some unavoidable limitations), the energy efficiency performance has exceeded the most optimistic expectations:



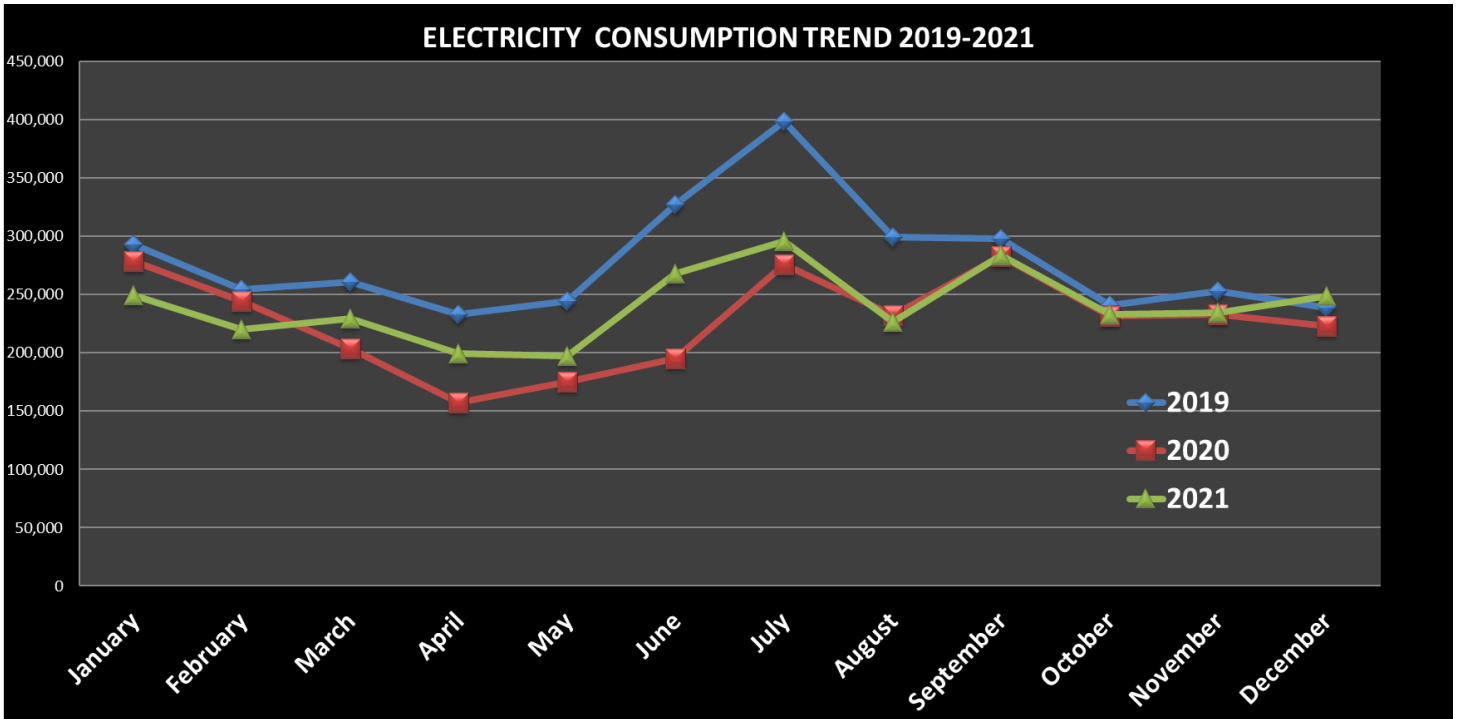
The reduction of aggregate consumption was however counterbalanced by a substantial increase in the relevant expenditure: the budget highlighted an increase of **+69.32%** on 2020 (compared to +5.5% on consumption) and **+24.12%** on 2019 (compared to -13.63% on consumption !). This is mainly due to the exceptional and unexpected rise of electricity market price following the Covid-19 economic crisis: starting Q4 2021 (see graph below) the monthly price for energy established by the Authority (PUN) started to grow abnormally, finally registering an average of **+222.35%\*\*** on annual basis compared to 2020 and **+139.79%\*\*** to 2019 (125.46 €/Mwh vs. 38.92 €/Mwh in 2020 and 52.32 €/Mwh in 2019).

**prezzo d'acquisto (€/MWh)**



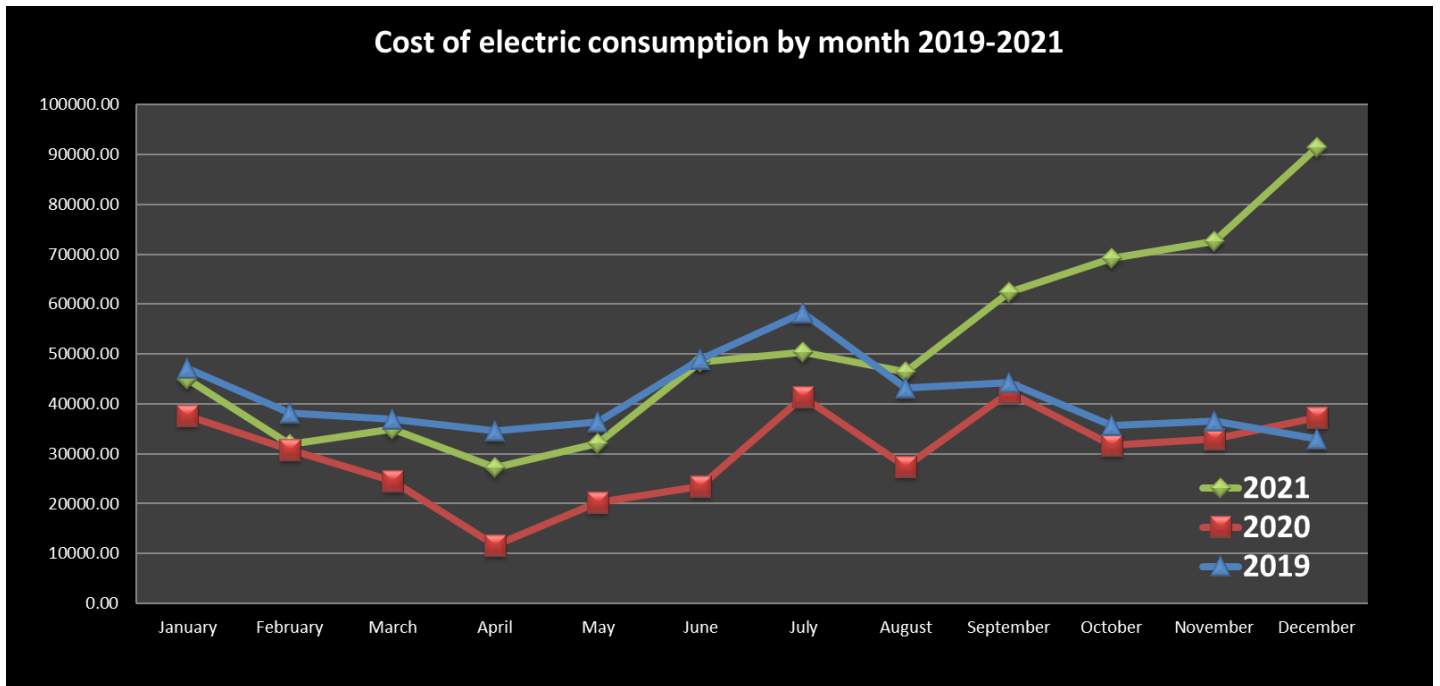
(\*data source: EDISON monthly invoices Jan-Dec 2020-2021, available for consultation at S:\Filing Plan\LO.01 Infrastructure and maintenance\01 Maintenance\Utilities\ENERGIA ELETTRICA).

(\*\*data source: <http://www.mercatoelettrico.org/It/Statistiche/ME/DatiSintesi.aspx>)

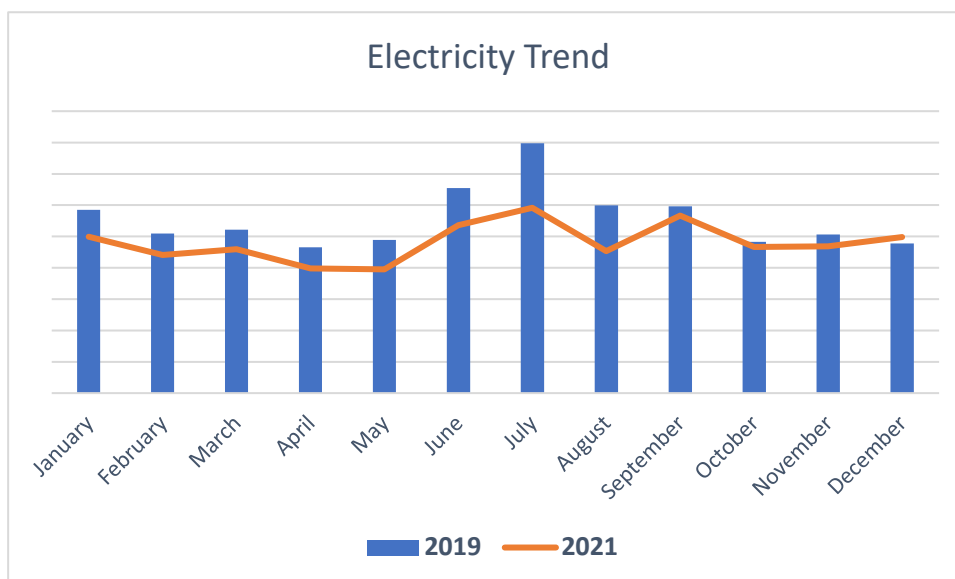


The chart above puts in evidence that the aggregate electricity consumption in 2021 (green line) decreased in every month compared to 2019 (blue line) with the sole exception of December, and that it is almost entirely overlapping the 2020 trend (red line) except for the lockdown period Feb-Jun.

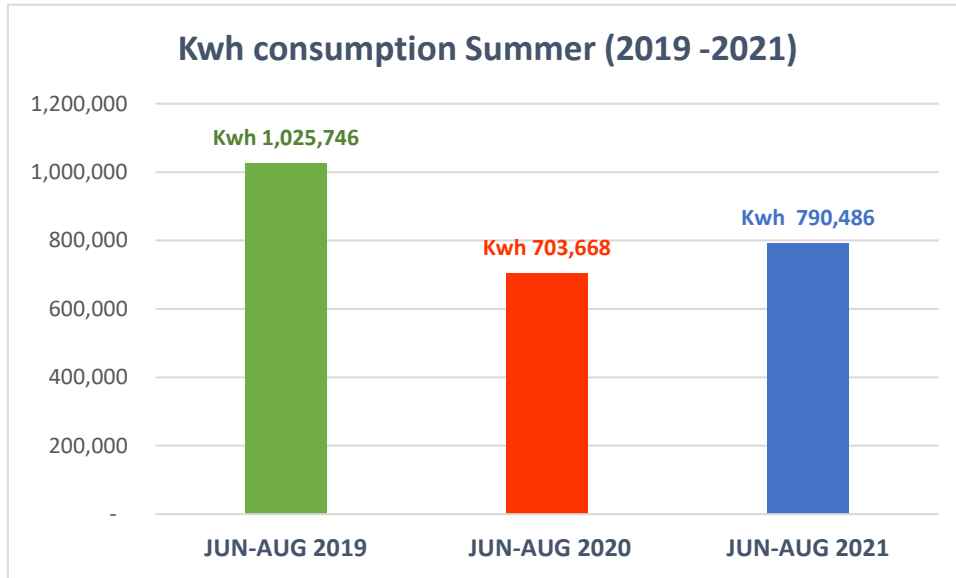
The situation is completely reversed from the financial side:



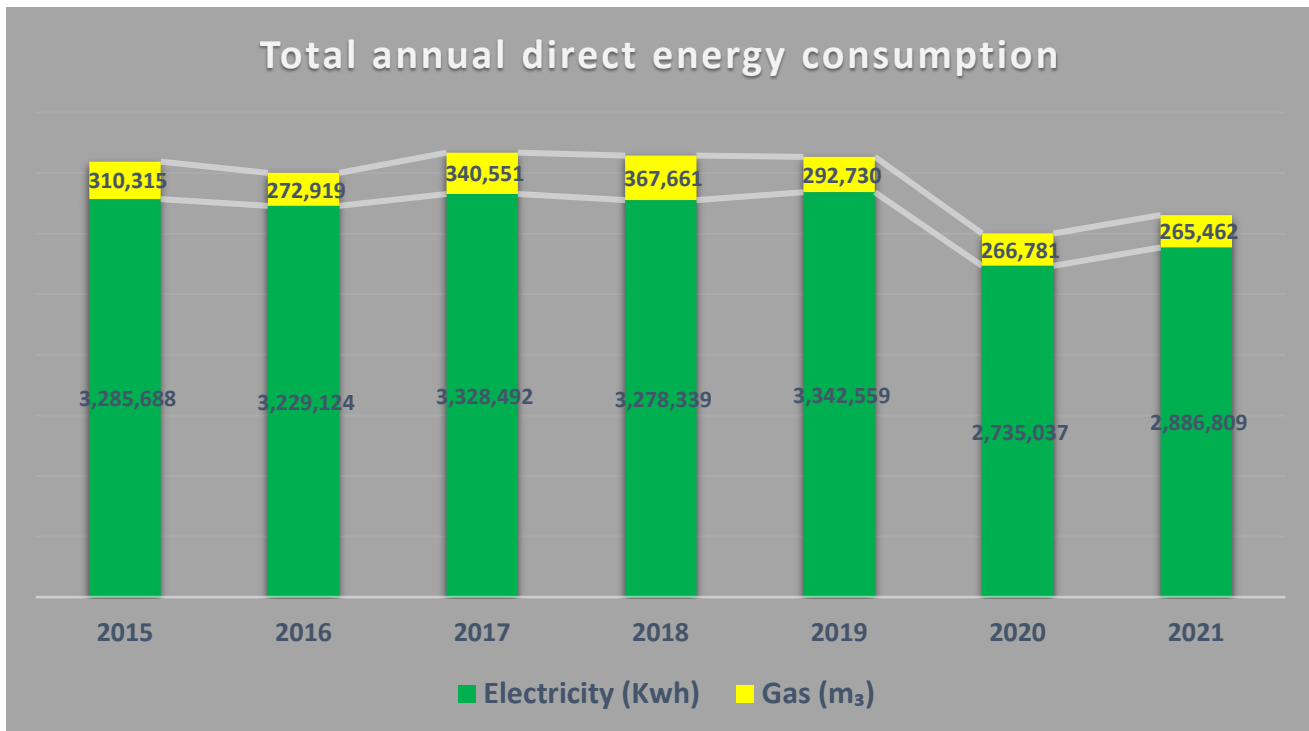
The cost for the power supply in 2021 (green line), although clearly above the 2020 trend (red line) was well below 2019 (blue line) in Q1, Q2 and Q3, with a significant and sudden jump in Q4 (corresponding to the rise of the PUN price). Thanks to the energy saving measures put in place on the EUI Campus (remote control of heating/cooling units and optimization of operating hours, use of LED bulbs, installation of motion sensors....) the financial impact of the price increase was definitely moderated by the limitations on energy consumption (Comparing 2021 to 2019 it is worth recalling that the cost increase of +24.12% corresponded to a consumption reduction of -13.63%).



The optimization of resources is even more evident if we look at the period of maximum effort due to air conditioning extensive usage (JUN-AUG), where the good result of -31.34% in 2020 was almost confirmed in 2021 (- 22.94%)

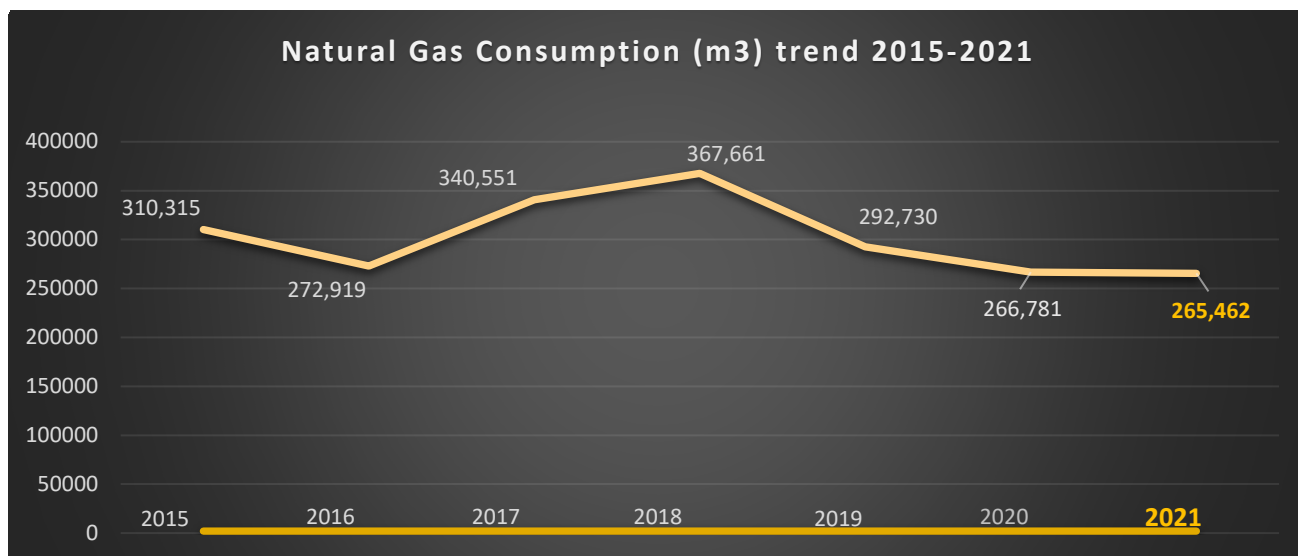


Looking at the comparative analysis of aggregate direct energy consumption (natural gas + electricity) over the period 2015-2021:



We observe that, regardless of actual values, the incidence of both Kwh and m<sub>3</sub> , dramatically dropped down in 2020 (for the already mentioned reasons) maintains in 2021 this lowering tendency compared with previous years.

For 2021 the EUI registered the lowest result in terms of gas consumption over the past 7 years (265,462 m<sub>3</sub>)<sup>3</sup>, thus confirming the decreasing trend begun in 2019:



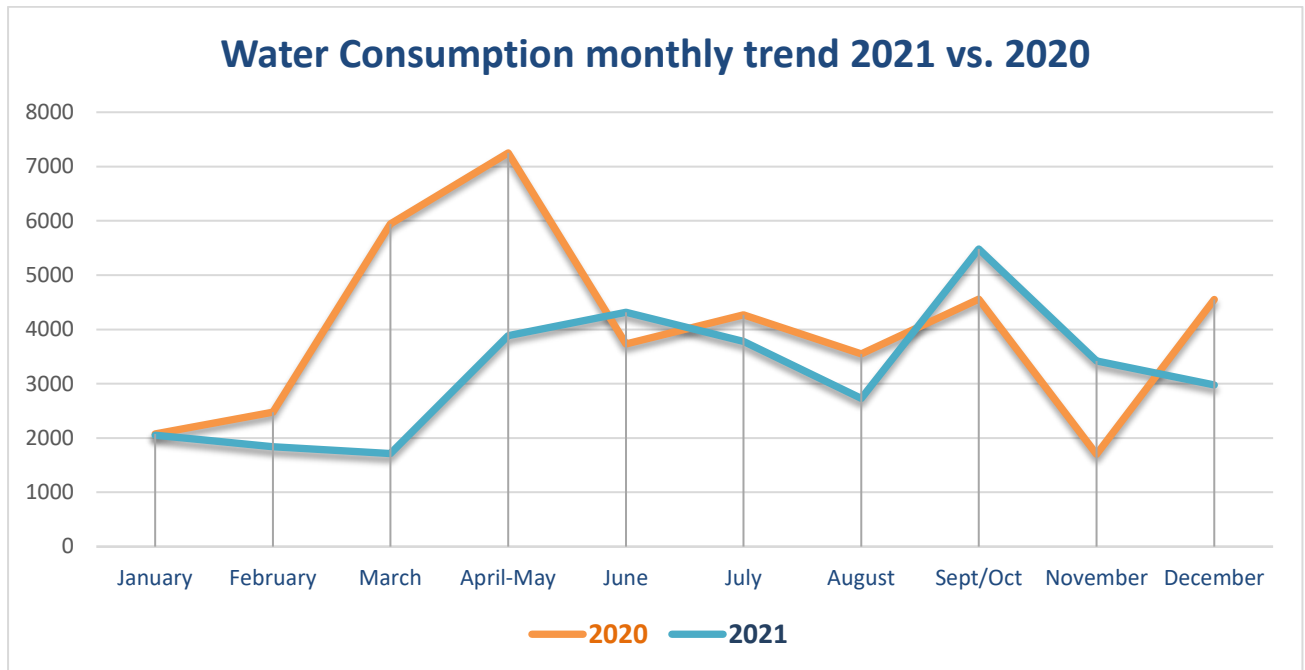
Going into details, the total difference with 2019 amounts to -9.31% (-27.253m<sub>3</sub>)<sup>3</sup>, and the final result is even improving the performance of 2020 (-0.49%), thus confirming the savings registered with electricity consumption (which is however more impacting than gas consumption, being this latter mainly concentrated only over the winter months).

It appears evident from all available data that, if 2020 cannot be considered a benchmark year for the assessment of energy saving provisions (both electricity and gas), 2021 already represents a more reliable standard, although still not 100% comparable with pre-pandemic activities. This said, 2022 might definitely disclose whether the energy efficiency policy of the EUI has ultimately reached a balanced effectiveness, to be still improved with the implementation of an environmental management system.

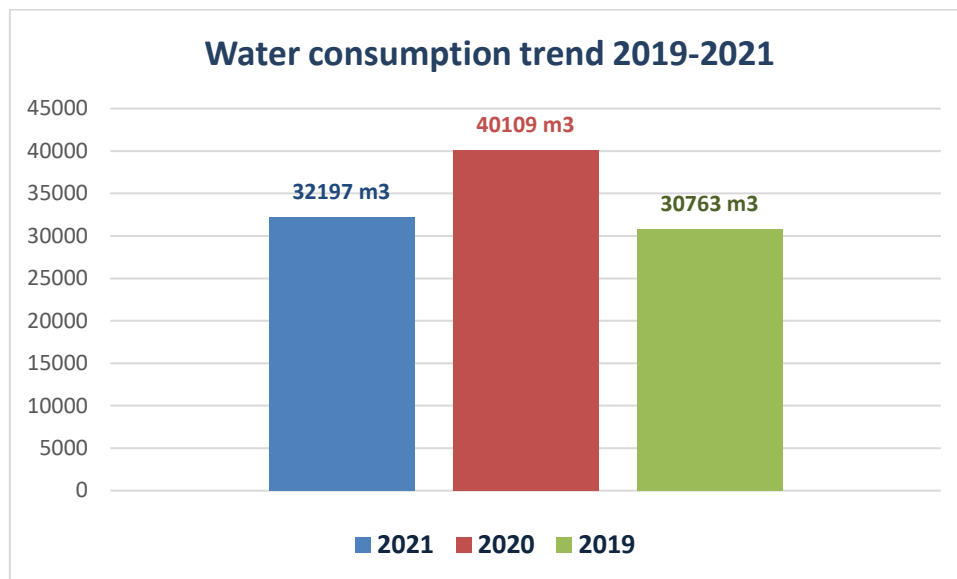
<sup>(3)</sup>data source: monthly reading of gas meters recorded in excel files and matched with monthly invoices by gas suppliers (S:\Filing Plan\LO.01 Infrastructure and maintenance\01 Maintenance\Utilities\GAS))

As water consumption represents one of the biggest issues for the REFS, in terms of utilities management, in 2021 the technical unit was able to implement a special project dedicated to the installation of automated water meters across the EUI campus in order to gather real-time information on water consumption and

eventually detect leakages and other disruptions. Water meters are operational since Q2 2021, and the improvement in consumption is outlined in the graph below:



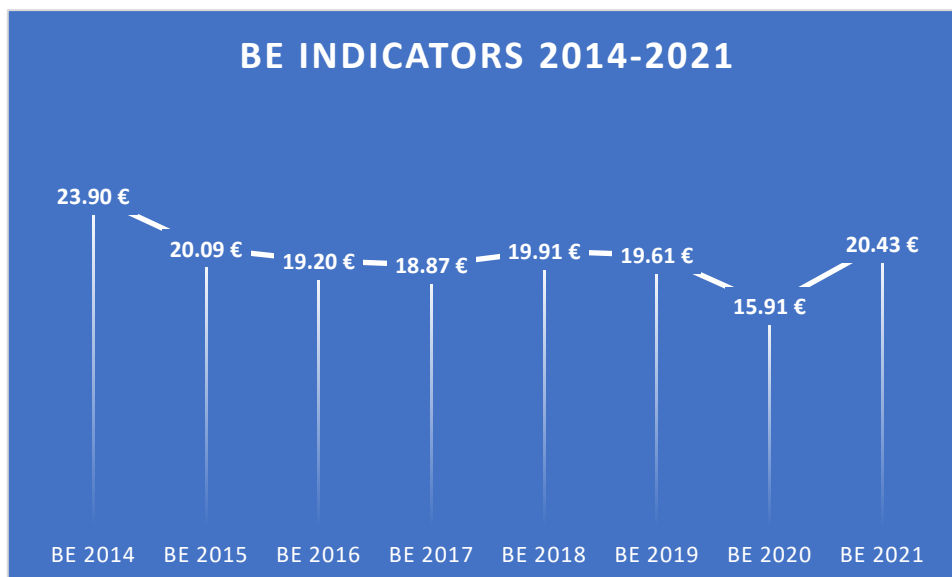
The aggregate volume of water consumed in 2021 amounts to 32197 m<sub>3</sub>\* which is a definitely better result than 2020 (40.109 m<sub>3</sub>) and almost in line with 2019 (30763 m<sub>3</sub>): on annual scale the decrease corresponds to -19.72% (-7.012 m<sub>3</sub>) on the previous year.



\*data source: monthly reading of water meters recorded in excel files and matched with monthly invoices by water suppliers (S:\Filing Plan\LO.01 Infrastructure and maintenance\01 Maintenance\Utilities\ACQUA)

In general, comparing the 2021 energy/gas/water consumption with the previous year's, we can highlight a comparable good result for all utilities (water, gas and electricity, especially taking into consideration the resuming of most EUI activities after the limitations entailed by the pandemic in 2020 (and that is the reason why, for a more

reliable analysis, we had to compare data with 2019): the overall consumption expenditure, depending on already mentioned factors related to the rise of electricity costs, has considerably increased, hence the building efficiency value (BE) registers much higher values for this year (20.43 €/sqm)\*:



\*the value is obtained by dividing the 2021 overall utilities cost (electricity, water, natural gas, gas oil) for the total sqm surface of the EUI.

In terms of sustainability, the EUI 2021 carbon footprint on utilities consumption and the comparative analysis with 2020 can be illustrated in the tables below<sup>3</sup>:

Electricity +5.5%



**Electricity 2020 (2,735,037 Kwh)**

Pollutant	emissions (Kg)
Carbon monoxide (CO)	600.614077
Carbon dioxide (CO2)	2,078,282.21
Nitrogen oxides (Nox)	4,588.30
particulates	955.07
Sulphur oxides (Sox)	13,302.12

**Electricity 2021 (2,886,809 Kwh)**

Pollutant	emissions (Kg)
Carbon monoxide (CO)	633.9432
Carbon dioxide (CO2)	2,193,609.77
Nitrogen oxides (Nox)	4,842.91
particulates	1008.07
Sulphur oxides (Sox)	14,040.28



Natural gas - 0.49%



**Natural Gas 2020 (266,781 m<sub>3</sub> )**

Pollutant	emissions (Kg)
Carbon monoxide (CO)	85.37
Carbon dioxide (CO <sub>2</sub> )	517,303.7
Nitrogen oxides (Nox)	458.19
particulates	133.39
VOC emissions	91.63

**Natural Gas 2021 (265,462 m<sub>3</sub> )**

Pollutant	emissions (Kg)
Carbon monoxide (CO)	84.95
Carbon dioxide (CO <sub>2</sub> )	514,746.08
Nitrogen oxides (Nox)	455.93
particulates	132.73
VOC emissions	91.18

<sup>3</sup>conversion factors according to ANPA, Banca dati I-LCA ver. 2.0, 2000 – Rapporto ETH-ESU, 1996



**Carbon Footprint (utilities) Overall result\***

	2020	2021
Carbon monoxide (CO)	685.99	718.89
<b>Carbon dioxide (CO<sub>2</sub>)</b>	<b>2,595,585.95</b>	<b>2,708,356.85</b>
Nitrogen oxides (Nox)	5,046.50	5,298.84
particulates	1,088.46	1,140.80
VOC emissions	13,393.76	14,131.46

\*Expressed in Kgs



**CO<sub>2</sub> +4.34%**