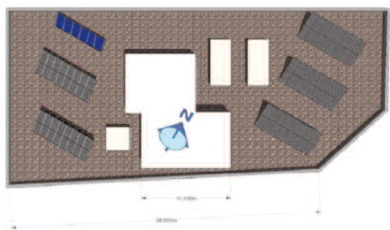


# MedClean Propre Limpio


**No. 107**
**Energy efficiency and renewable energy generation**
**Renewable energy (electricity) generation at CLABSA building**

<b>Company background</b>	Clavegueram de Barcelona S.A. (CLABSA), a company of the AGBAR Group, which main activity is the advance management of the sewer network of the city of Barcelona.
<b>Industrial sector</b>	Water Services. Wastewater and urban drainage management.
<b>Environmental considerations</b>	<p>Due to the work that people perform at their everyday working time, employees usually take a shower at the end of the day at the company's installations.</p> <p>In the company's building water is heated by electric means with 200 liter containers with 24 kW power each. That means there is a big consumption of energy and CO2 emissions also, both directly connected with water heating.</p> <p>At the same time is possible to generate energy with solar panels. Power companies are obliged to buy the generated energy by renewable means and pay an extra cost to help this kind of energy to develop and be competitive.</p>
<b>Background</b>	<p>The total amount of hours of sun in Spain makes it very interesting for the possibility to produce energy with solar panels. Clabsa building has a roof with more than 800 square meters and the company decided to use this opportunity to generate electricity and to sell it to power companies and also to generate hot water to be used at the company's showers.</p> <p>Both investments must be looked as an economic opportunity and also as an environmental item. This way, Clabsa becomes a small energy producer benefiting the community of an associated CO2 emission reduction.</p>
<b>Summary of actions</b>	78 solar panels (230 Wp each, 17,94 kWp in total) had been installed at the company's roof. The total surface occupied by the panels are 133,38 square meters and there are also 6 solar panels dedicated to warm water production with a total surface of 14,16 square meters and an accumulation capacity of 1.100 liters of water.

## Images of the installation



Hot water panels



Photovoltaic solar panels

## Balances

Year	Generated energy kWh	Income (from energy sale) €	Investment €	Solar panel maintenance €	Income-expenses (cumulated) €
0			-21.960		-21.960
1	22.961	10.364	-11.238	-1.036	-23.870
2	22.961	10.623	-11.238	-1.057	-25.542
3	22.961	10.889	-11.238	-1.078	-26.969
4	22.961	11.161	-11.238	-1.100	-28.146
5	22.961	11.440	-11.238	-1.122	-29.066
6	22.961	11.726	-11.238	-1.144	-29.722
7	22.961	12.019	-11.238	-1.167	-30.108
8	22.961	12.320	-11.238	-1.191	-30.217
9	22.961	12.628	-11.238	-1.214	-30.041
10	22.961	12.943	-11.238	-1.239	-29.575
11	21.813	12.064	0	-1.263	-18.234
12	21.813	12.919	0	-1.289	-6.604
13	21.813	13.242	0	-1.314	5.323
14	21.813	13.573	0	-1.341	17.555
15	21.813	13.912	0	-1.368	30.100
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25	20.664	16.871	0	-1.667	170.122

Internal investment payback

12.15 years

## Conclusions

The energy production of the photovoltaic solar panels is 22.000 kWh per year. That means 14,83 tons of CO<sub>2</sub> emissions reduction (taking as reference the Spanish energy generation mix)

The hot water panels brings the 75% of the company's hot water needs, and the calculated CO<sub>2</sub> emissions reduction is 5,76 tons (taking again as reference the Spanish energy generation mix)