MAKE US GREENER

An Integral Sustainability Collaboration

The concept of "Green Building" embodies buildings with high considerations of sustainability by minimizing resource consumption and reducing life cycle costs while promoting health and well-being for the building's occupants.

The study of the World Green Building Council (WGBC) „Building the Business Case: Health, Wellbeing and Productivity in Green Offices" shows that greater productivity and better environmental performance can be guaranteed in offices that implement sustainability principles.

In 2012, Panama Green Building Council decided to expand their operations into a larger and greener office. Therefore, the "Make Us Greener Project" was presented to the members of the Panama GBC to invite them to support this initiative. The response to our invitation was a great success, since in less than 30 minutes of having sent the statement we began to receive proposals for donations of sustainable products (paints, efficient lighting, etc.) for the project. Since then, 18 members supported with technology, products or work labor reaching a value that exceeds $ 35,000.00 USD.

The Make Us Greener Project aimed to move Panama GBC's operations into a green office, in line with its mission, vision and philosophy.

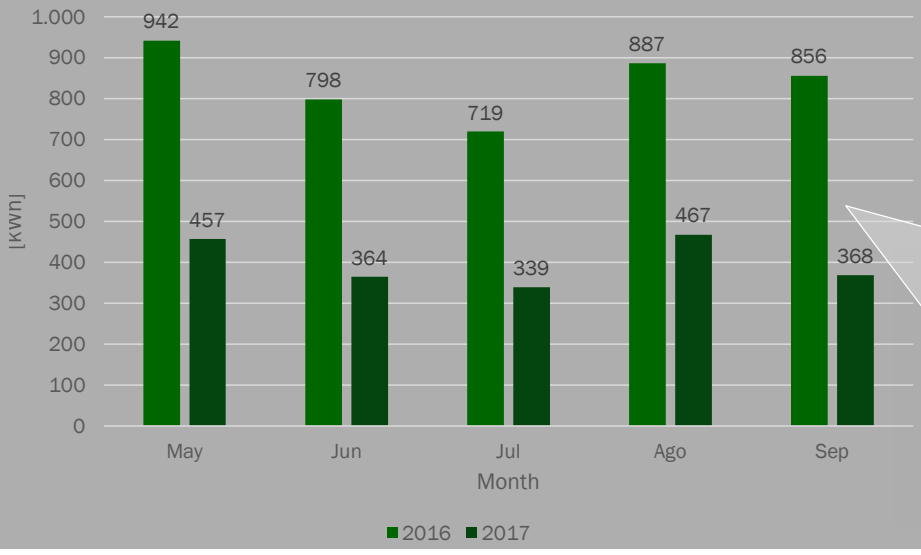
The project had specific objectives:

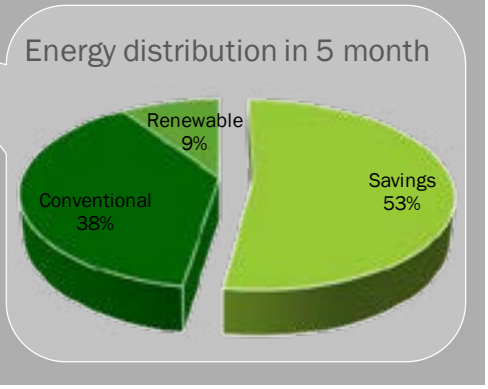
- To create a case study to promote the benefits of sustainable constructions, especially for regional and local office projects.
- To develop an operative showroom to promote (through „green tours") sustainable construction principles to professio nals, members and student audiences.
- To apply for the LEED Commercial Inter iors certification (Leadership in Energy and Environmental Design).

The office is located within the Clayton area. This area was planned and built by the U.S. military as part of the infrastructure required to run and protect the Panama Canal. Most of the buildings in Clayton were designed in consideration of bioclimatic principles, which allow occupants to enjoy generous access to daylight, views of nature, natural ventilation (if desired) and adequate infrastructure with access to public transportation. Hence, the location and the building layout provided an excellent starting point to achieve the set objectives.

Natural lighting reduces anxiety and stress, it also increases productivity and creates a healthier working environment. Additionally, occupancy and movement sensors were installed for the LED lighting inside the Panama GBC office, which maintain an optimum level of illumination for the occupants.

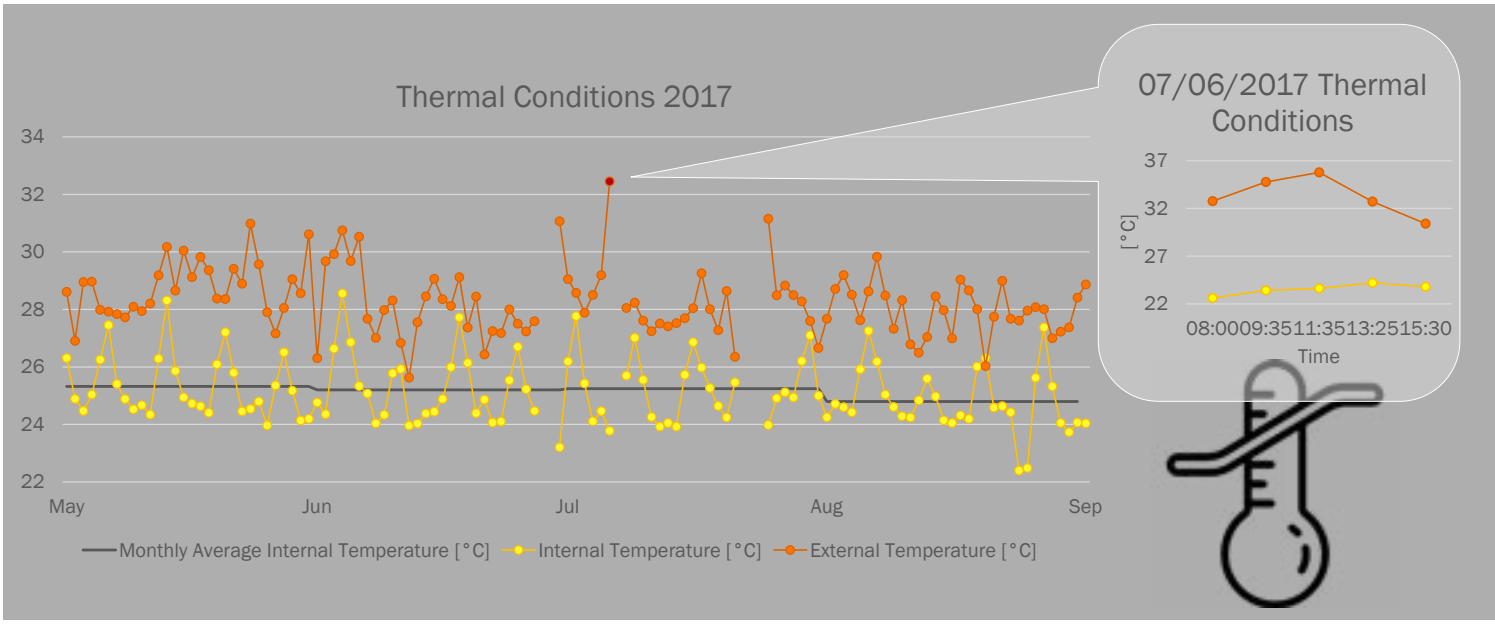
Even for the painting inside the office the health of the occupants was taken into account. The paint used is zero Volatile Organic Compounds (VOC) on the walls and ceiling. The paint used in the doors was low VOC meaning that they meet rigorous standards related to the emission of toxic substances in the interior. Intending to be a regional case study on health, wellbeing and productivity in green offices, the Panama GBC office implemented a smart web based service platform EQUS (see illustration 1) to regulate, monitor and record real time data such as inside temperature, CO2 concentrations and relative humidity amongst each other.





The reveal of the operating performance indicates significant improvements in the reduction of energy consumption and creating a healthier working environment. The Make Us Greener Project has already shown tangible results such as annual energy savings rising 7800 kWh annually ($1482 USD approximately) compared to an office in very similar conditions (orientation, design, occupancy, location, amongst others).

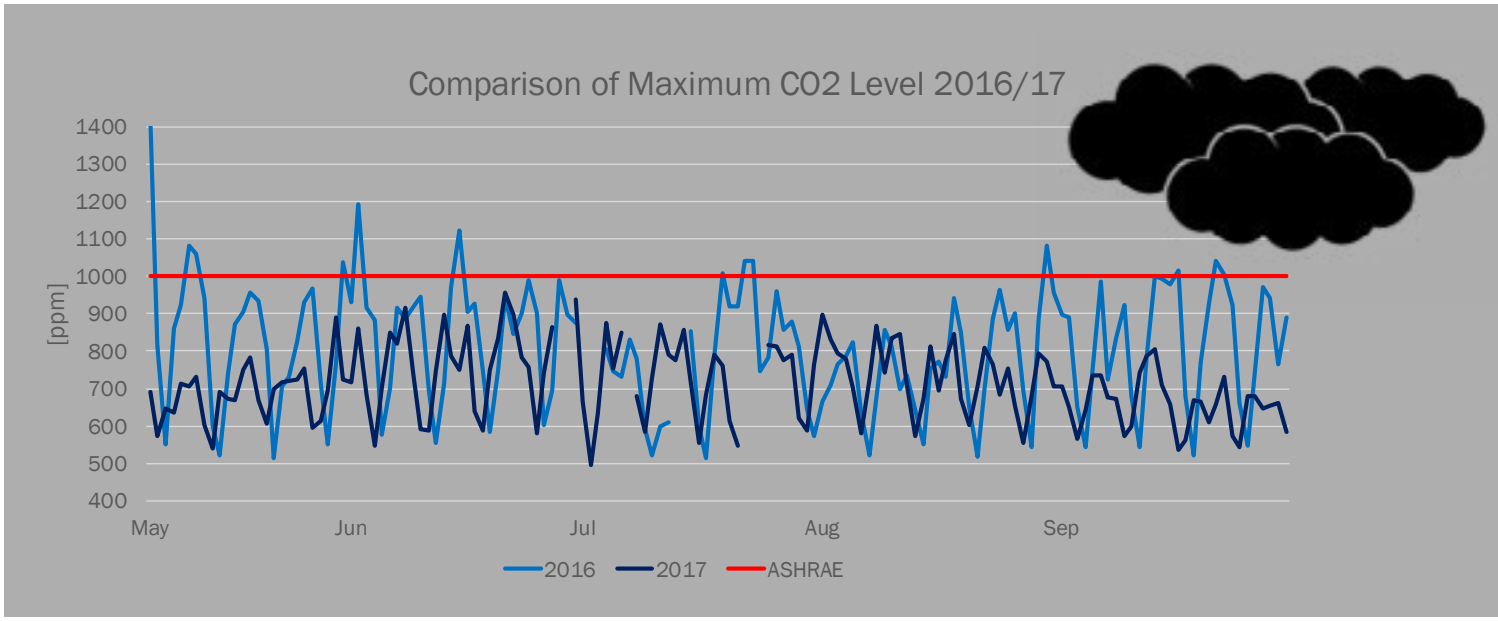
nearly 50% which already accumulates a total of 2.200kWh for a period of 5 months.
Aligned with lower energy consumption thanks to the new air conditioning system, the records provide evidence of a more balanced temperature level around 24 ° C regardless of extreme outside temperatures (sometimes exceeding 32 ° C).



One of the reasons for saving is the solar panel plant installed in October 2013, which produces on average about 21% of the energy consumed in a year (up to 31% of consumption in summer).

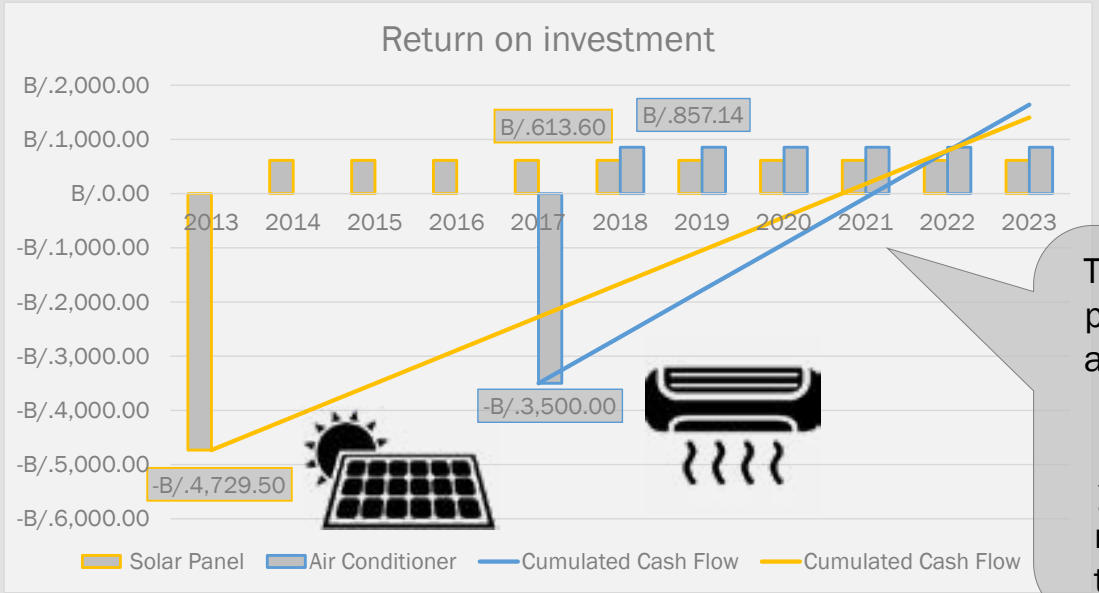
Viewing the energy consumption reports for 2016 and 2017, Panama GBC achieved significant success by installing a new air conditioning system. Since the replacement of the former unit in April 2017, the monthly consumption was reduced by

In addition, an automated fresh air intake gate and a MERV-10 filter were installed as components of the new air conditioning unit. The CO2 concentration data show lower maximum levels (comply with ASHRAE) compared to those evidenced in 2016 with the old unit.



The MERV-10 filter drastically reduces the passage of pollen particles, mold spores and any other contaminants that may affect the health of the office occupants. The system works with an automated fresh air gate and which in turn is connected to the CO2 measurement system of the office. If the CO2 level increases considerably (close to the upper range established by the ASHRAE standard) inside the office, the gate opens allowing fresh air to pass from outside to the air conditioning unit. The data from the CO2 measurement system verify the function of the damper. In 2017, the maximum concentration always met international standards, such as ASHRAE. In addition, the maximum concentration level recommended by ASHRAE (1000 ppm) was exceeded several times during the year with the previous AC unit. With the new AC unit, constant results have been achieved below 900 ppm almost every day.

Only the results concerning relative humidity measurements should be analyzed in more detail. International standards suggest a maximum relative humidity level of 65% in office buildings. Thanks to the automated monitoring system, Panama GBC could reveal the exceptions of a higher humidity percentage and allow technicians to make the required adjustments.



The **solar panels** pay of in **7 years** after installation and the **air conditioner 4 years** after the replacement of the old system!

(*)The costs for the solar panels include technology cost, installation and inverter DC/AC.
The air conditioner includes technology cost.

The knowledge and participation of the occupants are essential in this type of initiatives. Subsequently, Panama GBC through a survey evaluated the office facilities satisfaction of its employees. In the survey, the office receives results in the Excellent or Very Good ranges compared to standard offices in the market.

In general, the results confirm a great contribution to the initial objectives of the DTHV project. Green buildings not only have a positive impact on their occupants, but also reduce the costs of the building's life cycle, as the preliminary results of the Project clearly indicate.

We are optimistic that the Panama GBC office with this continuous process of observation and adaptation, will guarantee continual operation improvement in terms of efficiency, comfort, productivity and welfare of its occupants.

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