Green Light Concept Project Synopsis

Team

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April 21, 2012. Belo Horizonte – MG - Brazil

Synopsis

The Green Light Concept (GLC) consists in integrated systems applied on a forty family residential apartment complex as a solution to reduce energy use and minimize waste through green solutions and energy efficient products. All the calculation of energy, water and other consumptions was based in IBGE data of 2010. It incorporates the following technologies:

- Rain Water Harvesting
- Thermal Flooring
- Solar Energy
- Insulation
- Onsite Sewage Treatment
- Biomass Boiler
- Onsite Electrical Generation

Rainwater Harvesting: A typical four-person Brazilian family spends 24,000 liters of water per month. This system takes water after the first 10 minutes of rain when concentrated impurities and dirt on the roof are washed away, leaving pure water. With this timed pipeline system we can separate and store this pure water in a substation for later use. The average of annual precipitation is 1800 mm, which represents 150 mm per month, and the constructed building area that is able to collect water is around 800 m^2. Using this data, we estimate an economy of 15% of water by Rain-water Pickup. Furthermore, we increase discharge pressure and we add automation systems that lastly can save 50% of water.

Thermal Carpeting: All bathrooms in the building will have a system based on *Rewatt* project by José Magalhães. This is a carpet that uses the hot water that falls in it to heat the cooler water in the same bathing. It saves 50% of the energy that would be used in the bathing. It can save 30kW per month in a common family's home.

Solar Energy: Another system is composed of photovoltaic panel systems (PV). It can have a structure similar to tree leaves which is capable of capturing sunlight more efficiently with less area of photovoltaic cells. The PV will be installed on the building's roof and in some places of the parking area.

In addition, the building will use the traditional plates, disposed on the walls, that would be angled to collect more sun's radiation.

Insulation: The building's walls will increase thermal insulation in order to control the temperature inside and energy can be produced from the temperature difference between inner and outer.

Onsite Sewage Treatment: Specialists appoint that the biggest Brazilian health problem is due to sewage lack of treatment. Only 10% of produced sewage is treated in Brazil, making our country the fourth in the ranking of the biggest polluters. According to statistics, 30% of mortality in Brazil is correlated to sewage non-treated. In this system, the sewage produced passes through an anaerobic section, then in an aerobic one. After this, it will pass a filter submerged in an aerobic environment, and then a secondary clarifier and an “air lift” system are activated if the concentration of solids becomes higher anywhere in the reactor.

Biomass Boiler: This sixth system consists in a biomass boiler that will receive all the organic solid dirt from the sewage and the organic trash from the apartments. Its combustion will generate energy and gas to families use.

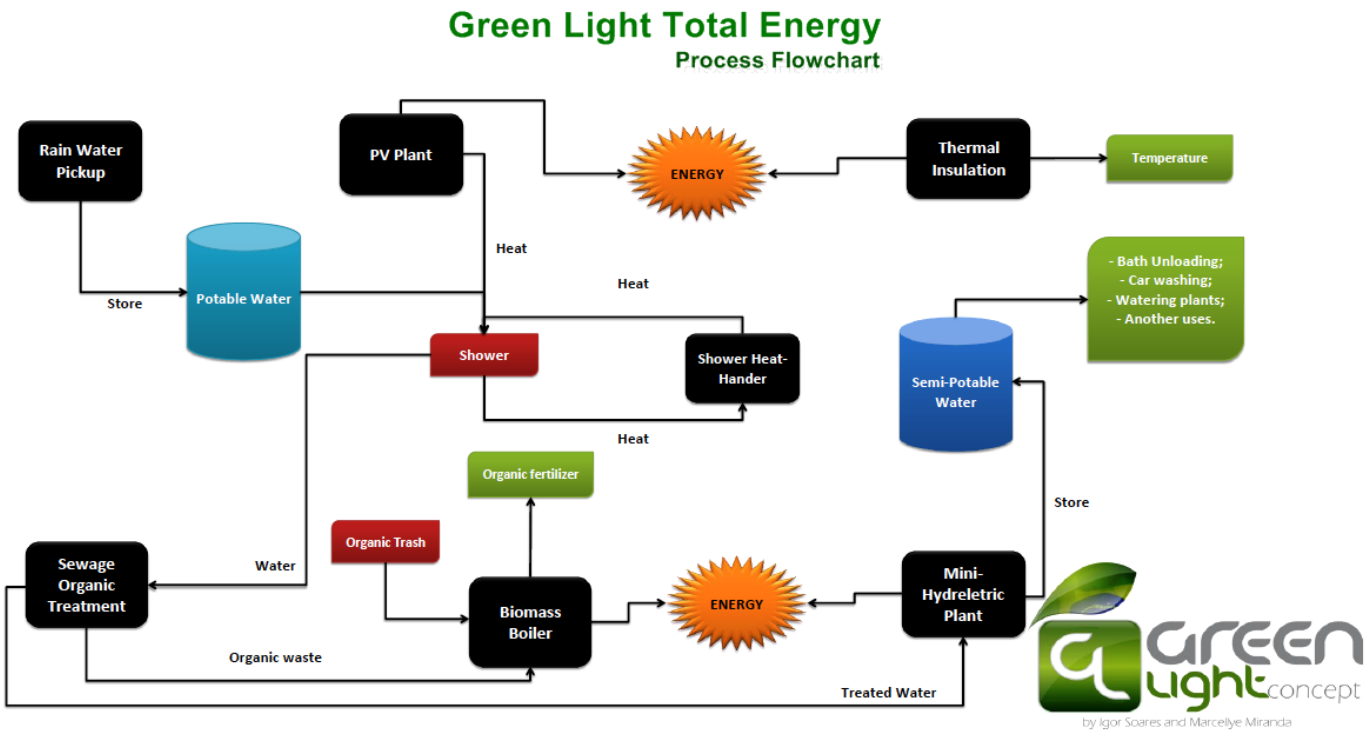
Onsite Electrical Generation: The last system was our creation. It is based on how hydroelectric plant works. The water treated before will move a helix, a kind of water mill, and by a pulley system it will trigger an alternator, which produces energy.

All the energy produced can be stored in NiMH batteries, which don't have any toxic components, so they don’t need special discard.

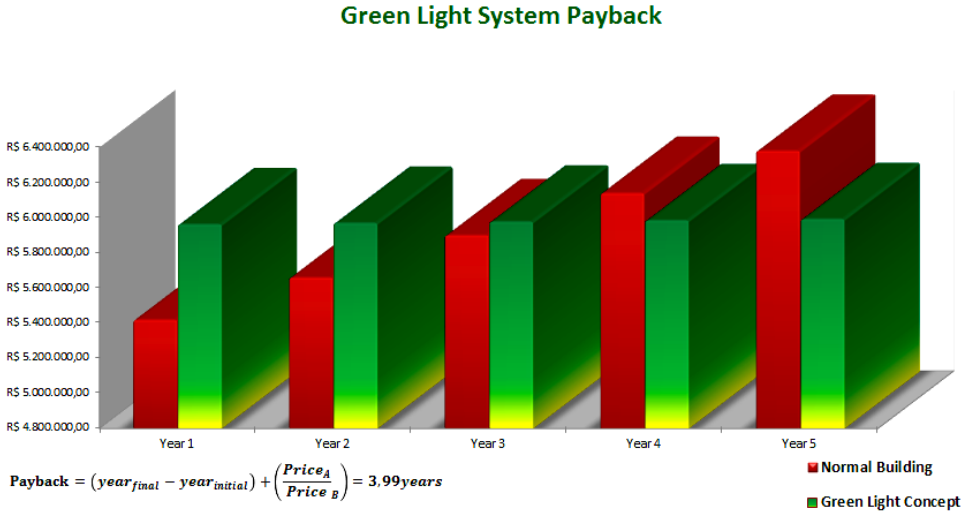
GLC will use many Schneider solutions, including: Home Automation products, electric dashboards, Building Management Systems - HVAC, HMI – Industrial automation products for control of our central plant, electrical generation equipment, electrical panel-boards and switchboards, Xantrex invertors for connection of the PV systems, and finally the one that most caught our attention, EV-link, a charging station for electric cars which will encourage residents to use hybrid cars by the convenience of recharging batteries and using clean energy, reducing consumption of fossil fuels and cooperating with a better use of our natural resources and maintaining a cleaner and less polluted environment. Therefore Schneider Electric products are instrumental in GLC both in reducing energy usage and in ensuring reliable, green electricity for the tenants.

The building will also include the waste sorting of inorganic rejects, which is not yet so widespread and accomplished here yet, hoping for its correct disposal and treatment!

We made a project that aims more than 100% of electrical energy and 60% of water autonomy. This project can make a difference in people's life, offer people a different way to see the world and our resources making these people be results of a big change. In other words, we didn't only create a green product, but the most important, we are proposing a path to start **thinking** green. We want the Green Light Concept to be a new way of life that means comfort, efficiency, security, sustainability; namely, **GREEN**.



Picture 1 – Flowchart representing the sequential steps of the process of generating and saving energy and water proposed by Green Light Concept.



	Initial Cost (Start up)	Annual Cost (Manutention + Bill's)
Green Light Concept System	R$ 562.500,00	R$ 7.400,00
Building with Insulation	R$ 5.400.000,00	-
Normal Residential System	R$ 19.200,00	R$ 240.400,00
Normal Building	R$ 5.400.000,00	-

You save money and we save energie	
Green Light Concept Energy Save	*100%*
Green Light Concept Water Save	*65%*
Green Light Concept Annual Money Save	*R$ 233.000,00*

	Year 1	Year 2	Year 3	Year 4	Year 5
Normal Building	R$ 5.419.200,00	R$ 5.659.600,00	R$ 5.900.000,00	R$ 6.140.400,00	R$ 6.380.800,00
Green Light Concept	R$ 5.962.500,00	R$ 5.969.900,00	R$ 5.977.300,00	R$ 5.984.700,00	R$ 5.992.100,00
Calculation Method (IC = Initial Cost / AC = Annual Cost)	IC+ 1x(AC)	IC+ 2x(AC)	IC+ 3x(AC)	IC+ 4x(AC)	IC+ 5x(AC)

green light concept
by Igor Soares and Marcellye Miranda

Picture 2 – Graph presenting the Green Light Concept system financial payback, and the calculated results projection.

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5. Hidraulis Estações de Tratamento (Hidraulis Treatment Stations)
6. Sindicato da Indústria da Construção Civil no Estado de Minas Gerais - Sinduscon-MG (Construction Industry Union of Minas Gerais State – Sinduscon-MG)
7. Alfamec Soluções Ambientais (Alfamec Environmental Solutions)
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