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The Kyocera Solar Grove™ consists of 25 Solar Trees™ with 1,400 Kyocera KC187GS solar photovoltaic (PV) modules interspersed with 200 translucent KC88CGS modules offering improved daylighting and aesthetic appeal from both above and below the structures.

Story by Bob Hetherington

This is the first in a series of what I hope will become a library of alternative energy solution articles based on my visits and observations of the latest developments in the Southern California area.

I showed up for a tour of the Kyocera parking lot on a warm sunny San Diego day. That really doesn't sound that exciting does it? But wait a minute ... this looks more like a futuristic movie set than a parking lot because it is filled with what have been coined Solar Trees™ by Envision Solar, the company responsible for the design and installation of this project.

The solar trees are lined up in the parking lot giving it that futuristic, cool and airy look and feel. Not only do they provide a nice shady spot to park your vehicle, but they are generating a substantial amount of electricity in the process.

The upper surface of each tree is covered with 64 Kyocera PV Modules generating 17.0 kW of electricity while shading 8 vehicles underneath. The design also features a grouping of translucent PV panels in the middle which provides a naturally lit area underneath which seems to provide enough light to keep the plants alive in the median.

Speaking of those plants, they are sitting in bio-swales containing porous, organic material that filters pollutants

from parking lot run-off before sending it on its way into the sewage system. Nice touch I think!

Bob Noble of Envision Solar was kind enough to give us the grand tour of the project and talk about how he was able to pull together the concept and team required to carry out a project of this nature. He calls the project an example of biomimicry which is a new concept to me ... but one that I grasped whole heartedly as soon as I heard it. I found this definition if you need it: Biomimicry is a new discipline that studies nature's best ideas and then imitates these designs and processes to solve human problems.

As it turns out, Bob has been passionate about the environment and alternative energy for about as long as I have ... which is a long and sometimes frustrating time. Finally however we agree that we are seeing an explosion of support for concepts and solutions such as this one. Bob's former job as was CEO of Tucker Sadler Architects of San Diego and it was this company that was approached by Kyocera to bid on the design and project management of the project. Needless to say they won the bid and proceeded to conceive and design the Solar Grove™. It took about 2 years from start to finish.

But Bob took this opportunity one important step further. He modularized the trees so that they can be manufactured and planted in any parking lot in an efficient and economical way. As you can see ... this is an extremely simple and elegant solution and I think it shows an excellent combination of design and function.

Speaking of function ... let's have a look at the technical side of this project. Inside the Kyocera Building Lobby are two flat panel screens proudly displaying the live numbers to anyone inquisitive enough to have a look. In summary, the Kyocera Solar Grove™ consists of 25 Solar Trees™ with 1,400 Kyocera KC187GS solar photovoltaic (PV) modules interspersed with 200 translucent KC88CGS modules offering improved daylighting and aesthetic appeal from both above and below the structures. The PV modules are mounted in Unirac Sun Frames supported on single column galvanized steel structures with integrated up-lighting and poured concrete bases secured in "bio-swale" trenches. A typical Solar Grove™ of 25 Solar Trees™ provides shade for 170 cars, and generates an average of 431,000 kilowatt-hours annually. This is enough energy to power 68 single family homes in San Diego and is equivalent to burning 4500 tons of coal. Here are some specs:

SYSTEM SIZE:

235 kW AC CEC

279 kW DC

SYSTEM CONFIGURATION:

Utility Configuration:

Grid Connected

Solar Modules:

1400 KC-187GS

200 KC-88CGS

Inverters:

2 SMA American Sunny Central SC125U

Batteries:

None

Charge Controllers:

None

POTENTIAL LEED POINTS:

15-17

OK, nice ... but what about the cost benefits? A Solar Grove pays for itself in a number of different ways:

- Avoided cost of monthly electricity bills
- Federal tax credits
- Five-year accelerated depreciation
- State incentives, such as the production incentives outlined in the California Solar Initiative. See www.dsireusa.org for a listing of incentives in your state.
- Many owners are able to create an additional source of revenue from shaded parking.

Envision Solar claims that a Solar Grove™ can pay for itself in as little as five years, with positive cash-flows from the very first day of operation. Of course the pricing of a Solar Grove™ varies according to the size, existing site conditions, and the energy usage profile of the user — but Envision Solar will conduct a rigorous financial analysis to help decision-makers through the process.

Bottom line from my point of view ... this solution is a no brainer. I would go out of my way to park in a shopping mall lot covered with these trees for example. I think a mall developer would pay the capital cost back pretty quickly by attracting shoppers to this kind of responsible application of architecture and technology. Just sit back and give a thought to how much power could be generated and how many paint jobs saved if we covered every large parking lot with these gems. And maybe take this one step further and put a nice little group of outlets into the base of the tree so I could plug my electric car into it for direct solar recharging while shopping or at work. Now we are getting somewhere.

Thanks to Bob Noble and Theresa Bagg of Envision Solar for a great tour and also for developing and marketing a practical solution to add to our energy future.

If you have an Alternative Energy project or product solution in the San Diego area that you would like us to have a look at please send me an email at news@earthtoys.com.

ROBERT NOBLE AIA, LEED™ AP Chairman and Chief Executive Officer Mr. Noble, as an environmental designer, architect, industrial designer and environmental technology entrepreneur, has been the recipient of numerous regional and national awards for his industrial and architectural designs, technology innovations, and business development activities. During his six year tenure as Partner and CEO of Tucker Sadler Architects of San Diego, the size and revenues of the firm quadrupled, and Tucker Sadler became a regional leader in sustainable design and advocacy. During his career, he has led project and technology collaborations with numerous major U.S. companies and international partners in Japan, Sweden and Taiwan. Mr Noble's technology development, industrial design and architectural experience spans a full spectrum of project types, including master planning, residential, theatrical, commercial, retail, industrial, high-rise and mid-rise office buildings, manufactured housing, health-care, sustainable materials, sustainable design and renewable energy projects.

Mr. Noble has written a number of articles regarding sustainable design, USBGC LEED™ Certification, emergency shelter for disaster relief, renewable energy and many other subjects. He has been a highly committed and vocal advocate of environmentally responsible manufacturing, design and planning, and low-cost, emergency and affordable housing for over 20 years.

He holds a Masters Degree from Harvard University Graduate School of Design and attended Cambridge University Graduate Department of Architecture, Harvard University Graduate School of Business Administration and the University of California at San Diego and Berkeley (AB Architecture)