



*A marriage of solar and parking at Envision Solar's innovative Solar Grove™ parking structure at the San Diego headquarters of Kyocera International Inc.*

# Where Desirability Meets Responsibility: **PARKING GOES GREEN**

**By Bill Adelson, AIA architect**

As industries address growing consumer awareness and concerns about global climate change, increasing costs of energy and depletion of fossil fuels, environmental regulations are beginning to intensify. Parking professionals are required to evaluate operational and design issues, including storm water runoff management, light pollution, urban heat island effect, energy use, litter and noise, while maintaining profitability.

## The buzz about 'green'

"Not only are changes to 'green' the parking industry necessary, they are feasible and affordable," advises Robert Noble, an architect and CEO of Envision Solar in San Diego, Calif. "Change begins with awareness," Noble continues, "and parking lots and parking structures lend themselves to a number of great solutions for owners interested in doing well by doing good—and that's exactly what needs to be done."

The Leadership in Energy and Environmental Design (LEED) standards, developed by the U.S. Green Building Council, set forth best practices for the commercial building industry. This program offers property owners criteria to act upon before government regulations begin to mandate changes. "Motives may seem simply altruistic but they represent good financial planning," notes Noble, a LEED-accredited architect. "Put practices into place now and a company can hedge against energy cost increases, meet the emerging codes of social responsibility and take advantage of existing federal tax incentives."

So how to begin? There are already several exciting examples of how the industry is implementing creative solutions, including the first LEED-certified parking structure owned by the City of Santa Monica (see July 2007 issue of *PARKING*), which incorporates a storm drain filtering system, recycled materials and solar modules. Not only is the facility more energy efficient than others of its size, it generates electricity. Google identified its parking area as a good source of power too and installed solar carports to supplement electricity created by its rooftop solar array.

As an architect, Noble has designed and built scores of commercial and residential buildings in his career. He encourages owners to approach projects with a comprehensive perspective and identify as many cost savings and environmentally friendly elements as possible. Parking lots provide an opportunity to incorporate exciting new materials and systems.

## A new vision for parking

Using concepts of biomimicry, imitating designs and system processes that occur in nature, Noble and his team of Tucker Sadler architects accepted an invitation to work with the San Diego headquarters of Kyocera International Inc. and create a sustainable parking solution using Kyocera's solar modules. The result was a single columned, architecturally stunning design called a Solar Tree™, which borrows from the natural concepts of photosynthesis, water filtration and shade to tackle issues of energy generation, stormwater runoff, light pollution and urban heat islands. These trees contain internally housed cabling and have integrated up-lights on the 'trunk' that reflect off the solar module backing. This provides ambient evening lighting that enhances security while minimizing light pollution. The Solar Grove™ is comprised of rows of the Solar Tree™, generating on-site renewable energy and demonstrating the property owner's environmental efforts.

Impervious parking lot surfaces collect oil, grease and automotive pollutants that are released into storm water when it rains. Bioswales, or trenches using organic and inorganic materials were designed as part of the Solar Grove™ to collect storm water runoff through curb gaps and filter the water. "By the time the runoff hits the drain, it's clean," explains Noble. The slope is intentionally gentle in order to maximize the time water spends in the swale, which aids in trapping pollutants and silt. Noble adds, "This mimics nature and functions much like a wetland ecosystem."

Issues of shade, or general lack thereof, in everyday parking lots were also addressed. Dark surfaces in urban areas absorb the sun's heat by day, increasing the surface temperature by as much as 10 percent. By night, the heat continues to radiate, contributing to higher temperatures in urban areas and causing what is known as the urban heat island effect. Parking lots are major contributors to this growing, scientifically proven trend. The architects behind Envision Solar and the Solar Grove™ designed the structures to keep the pavement cooler. By creating shade for 170 cars, the exposed asphalt is limited to the drive isles and heat is reduced. It's great news for owners as well since this shade simultaneously prolongs surface life and saves money on maintenance.

The Solar Grove™ produced about 431,000-kilowatt hours of electricity in its first year of operation—enough to power 68 single family homes in San Diego. This eliminated the need to generate the same amount of electricity through conventional (non renewable) methods, which would have released 338,905 pounds of carbon dioxide; 421 pounds of nitrous oxide; and 253 pounds of sulfur dioxide, based on Environmental

*Envision Solar's Solar Grove™ parking structure at the San Diego headquarters of Kyocera International Inc. features Solar Trees™, columns that contain solar panels, inspired by the photosynthesis process of real trees.*



Envision Solar's innovative Solar Grove™ parking structure at the San Diego headquarters of Kyocera International Inc. Note the curb gaps that allow storm water runoff to flow into the bioswales, which filter the water.



Protection Agency estimates. The project earned an AIA design award and later an SDG&E energy efficiency award, among others.

## Maintaining profitability

Historically, the high cost to produce solar and alternative energy technologies has kept it out of the mainstream. With an onslaught of more competition and increased production capacity, the cost of photovoltaic modules is dropping. Existing federal and some state incentives can enable renewable energy installation at little or no cost to the property owner. A 30 percent federal tax credit offsets project costs immediately upon installation and the federal government allows for five-year accelerated depreciation on the entire system. In addition, some states such as California offer production-based incentives and pay the system owner for power produced. By generating solar power in a parking lot, building owners can offset energy costs in adjacent buildings and reduce energy cost volatility over time. Shaded parking, especially 'green shade,' is an amenity that

customers are willing to pay for, especially when presented as a chance to offset their carbon footprint.

Photovoltaic shaded parking structures are changing the way people view and use their built environment. Parking owners have an opportunity to enhance visibility and boost the industry's environmental image by making sustainability a top priority. Noble knows that with the current cultural shift toward everyday environmentalism, parking professionals will not want to be left behind. "Through today's technology and innovation, there is nothing stopping property owners from transforming their parking lots into power plants," he says. *Visit Envision Solar in Booth 210 at the NPA Convention.* ↩