

BUILDING THE FUTURE

Large construction projects increasingly are turning to sustainable design to conserve energy and water, reduce their carbon footprint, and protect the environment.



If you search Google’s news archive for “sustainable design,” you’ll see an interesting chart. Prior to 1980, it’s rarely mentioned, and media coverage doesn’t begin to pick up until the mid-1990s. But in the new century, the chart climbs like the steps of a Mayan pyramid.

Today, construction projects increasingly are designed to conserve energy and water, reduce carbon footprints, and protect the environment. In the face of dwindling energy resources and the threat of disruptive climate change, sustainable design is no longer just part of the conversation. For Bechtel, it’s a critical component of projects ranging from railways and airports to power plants and aluminum smelters.

“The world is changing rapidly, and our customers are demanding sustainability,” says Gary Seshagiri, a leader in the company’s sustainable engineering, procurement, and construction (Sustainable EPC) efforts. “At Bechtel, we’ve always faced challenges used them to create new opportunities. Because our projects are large scale and widespread, we have an opportunity to



help shape a more sustainable tomorrow for people—all over the world!”

In 2006, Bechtel set the tone for its innovative sustainable design with the construction of a state-of-the-art headset manufacturing plant for Plantronics near Shanghai, China. It was the first industrial facility in China to receive Leadership in Energy and Environmental Design (LEED®) certifications—Gold and Silver

ratings—from the U.S. Green Building Council. The plant features high-efficiency ventilation systems and high-performance glazing to minimize heat loss and reduce the power necessary for lighting. To conserve water, rain is harvested from roofs and paved areas, and then stored for irrigation and fire protection.

In 2007, Bechtel completed an aluminum smelter in a remote area of eastern Iceland. There, too,





sustainability helped lift the project above the ordinary. In an innovative move, the facility was designed so that heat which would ordinarily be wasted is used to warm buildings and clear roads in winter.

The project received Iceland's highest honor for environmental excellence for generating minimal landfill waste—a big advantage in an island nation with limited landfill space—and discharging no polluted

water during construction.

The principles of sustainable design can go beyond actual construction techniques. In Washington state, for example, sustainable elements are woven throughout a project to construct a massive plant that will treat hazardous waste left over from almost a half-century of plutonium production. The ongoing efforts begin with “green purchasing,” which includes procuring recycled

materials and waste from industrial processes for use in construction.

More stats: In 2009, the project recycled 500 tons of nonregulated waste, cut the number of disposal containers almost in half, and used vanpools to ferry employees to and from the site, replacing more than 600 cars.

One of the most important benefits of sustainable design is reducing carbon emissions, and nowhere is that more evident than at the power plant that Bechtel is building for Duke Energy in Edward-sport, Indiana. The Edwardsport plant is the first fruit of Bechtel and GE's alliance to develop a lower-cost standardized design for integrated gasification combined-cycle (IGCC) plants. The plant will use the IGCC “cleaner coal” technology

to dramatically reduce the amount of carbon dioxide emitted into the atmosphere.

Sustainable design can also produce big gains in energy conservation on infrastructure projects—roads, rail networks, airports, and the like. Take, for example, the New Doha International Airport in the desert nation of Qatar. To help keep the passenger terminal cool in the summer, high-performance glazing



will help insulate the walls, and inward-angled curtainwall facades from the roof to the ground level will provide shade. In addition, carbon dioxide sensors will monitor the occupancy of the terminal, enabling the

heating and air-conditioning systems to reduce flow to unoccupied areas.

The New Doha airport is designed around an oasis theme, but water is a scarce commodity in Qatar. The

airport will irrigate its lush green landscaping with effluent from an on-site wastewater treatment plant.

Another ambitious example of sustainable design is unfolding in Bechtel's newest London project, where

Bechtel is responsible for construction of an underground tunnel and six stations on the Crossrail project—a new railway that will connect the city to its eastern and western suburbs. All of the new stations will meet requirements of the UK’s major standards groups for environmental design. That means using energy-efficient materials and low- or zero-carbon technologies during construction—such as lighter trains with regenerative braking, intelligent lighting systems, and energy-efficient escalators.

Sustainability is also a focus at Los Alamos National Laboratory and Lawrence Livermore National Laboratory, the U.S. defense and research institutions co-managed by Bechtel. Los Alamos, in New Mexico, has won numerous government awards for its efforts in pollution reduction, environmental stewardship, and sustainable building. In addition, the lab produced an oft-referenced *Sustainable Design Guide* that describes the issues and design process for energy-efficient buildings and the added value that sustainable design can provide in architecture, facility construction, operation, and maintenance. The laboratory’s Chemical and Metallurgical Research Replacement facility is also registered for LEED certification.

At Lawrence Livermore in California, innovative sustainable design and site planning for a water conservation test bed to harvest and reuse stormwater won a U.S. Department of Energy (DOE) “best in class” award for environmental stewardship. The site has three buildings certified under LEED for Existing Buildings, including Gold level for the TeraScale Simulation supercomputing facility.

Bechtel also is walking the talk. The company has more than 60 LEED-accredited professionals and in 2009, its employees in Washington, D.C., moved into a newly redesigned office that received LEED Platinum certification.

Just a generation ago, sustainable design was considered futuristic. Today, companies like Bechtel are proving that when it comes to sustainability, the future is now.

