

HIGH PERFORMANCE BUILDING

Reaching toward net zero

Collaborating to create sustainable
building solutions

DOW





At every stage of the construction process — from design and product specification to application and testing — it is essential that all partners across the construction value chain collaborate and share knowledge to create custom solutions based on each project's need.

Creating a sustainable future

Distinctive and remarkable buildings with shimmering screens of glass and steel are being built around the world by commercial construction companies. While each building is unique, often reflecting the inspired vision of the architect, they likely have one thing in common—they are being built smarter. Sustainable building, with its commitment to reducing energy consumption and improving energy management, is causing the commercial construction industry to change its practices and rethink its approach to the future. But as Buckminster Fuller, architect, futurist, inventor and visionary, famously said, “The best way to predict the future is to design it.” And Dow has begun to do just that.

Governments across the globe are setting targets for reducing carbon emissions and retrofitting existing buildings for better energy performance, and the new benchmark of sustainable construction is creating a net zero energy building that produces all renewable energy on site and draws no more power from the grid than it gives back. Whether a retrofit or new construction, making commercial buildings more energy- and resource-efficient represents an enormous opportunity to save money.

By combining superior technology with global experience, it is possible to create sustainable solutions that enhance each building's architectural beauty with enduring performance. While traditional building materials and sub-systems were once based on criteria largely independent of one another, modern high-performance commercial buildings employ increasingly complex and diverse technologies in their construction, operation and maintenance. An integrated “whole-building” approach is now the model for commercial construction, and that holistic approach drives Dow's High Performance Building Solutions as we collaborate with our customers to develop new commercial construction technologies that take buildings closer and closer to true net zero.

Dow High Performance Building Solutions delivers the advanced silicon technology innovation necessary to help create a high-performance building: one that is energy-efficient, cost-effective, safe, flexible, aesthetically pleasing, and, most importantly, sustainable.

[Read on to see how we are working with teams across the world to help invent the future and bring ideas and inspiration to life.](#)

“I think it is imperative that you bring people in early to create a building like this.”

— Greg Goldfinch of Goldfinch Brothers



Bullitt Center – Seattle, Washington, USA

Dow products and expertise have helped designers, fabricators and builders put this six-story, 50,000 square-foot building on its way to becoming the world’s most energy-efficient commercial building.

Bringing it to life: A living building collaboration

Seattle’s Bullitt Center, a six-story heavy timber building, is predicted to be the world’s most energy-efficient commercial building. Home of the environmentally-focused Bullitt Foundation and other like-minded tenants, the Bullitt Center has been designed to last 250 years and to achieve the highest benchmark of building sustainability – Living Building Challenge (LBC) certification. The LBC certification is a performance-based certification program created by the International Living Future Institute that requires buildings to be evaluated after one year of occupancy prior to certification. The buildings are measured against criteria that include meeting 100% of energy demands with on-site renewable energy generation and 100% of water needs by on-site rainwater collection.

Meeting such high standards, however, is no easy task. Many parts must come together and many needs must be fulfilled for this project to be a success. Greg Goldfinch of Goldfinch Brothers in Everett, Washington, a glass and glazing firm working on the project, reasons that collaboration is extremely important in such situations. “I think it is imperative that you bring people in early to create a building like this,” Goldfinch explains. “Having had a long-standing relationship with Dow and using many Dow products on past projects, it was natural to use them on this project.”

Dow High Performance Building Solutions works with innovative developers and architects all over the world to not only deliver quality products, expertise and direction, but to collaborate on solutions to future challenges as well. Goldfinch looks at the Bullitt Center and sees the future of sustainable commercial construction. “I’m excited to see [Dow] having a great interest in these types of projects. With their vast amount of resources, research and development, and global reach, I think they are a great partner.” A partnership like this is especially important in the world of high performance building where requirements, regulations and goals continue to grow, change and develop. “[These changes] are going to happen faster than we realize,” states Goldfinch. “It is important that we look forward, look ahead, and find products that are effective and affordable to make these things happen.”





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— Charles Peres, Bouygues subsidiary DV Construction's project director for the Challenger renovation project

Challenger – Paris, France

The Bouygues Construction Group Headquarters becomes a sustainable showcase, cutting energy consumption by 90 percent.

Leading by example: Redefining performance through innovation

Challenger, the twenty-five-year-old Bouygues Construction Group headquarters in the greater Parisian metropolitan area of Saint-Quentin-en-Yvelines, is undergoing a transformation that will see it become a showcase of sustainable building renovation. The transformation of its head office is emblematic of the Group's commitment to a sustainable construction policy. When the renovation is complete in 2014, the building will produce energy through its photovoltaic panels and geothermal heating systems, effectively reducing the building's energy consumption by 90 percent.

Sheathed in glass and white aluminum, Challenger's light-filled environment was designed by Pritzker Prize-winning architect Kevin Roche to encourage interaction and communication. Its name expresses the desire of founder Francis Bouygues that the structure's design inspire employees to their best efforts. The Challenger renovation aims to achieve two important global green building certifications, LEED and BREEAM, as well as HQE, the highest certification for environmental quality in building design in France.

Charles Peres, Bouygues subsidiary DV Construction's project director for the Challenger renovation project, began working with Dow's High Performance Building technical and design teams to document the building's sustainability goals. “We were in touch with Dow for documentation purposes and we found that they were responsive and obviously environmentally minded,” Peres said.

The replacement of Challenger's glass façade by the Kyotec Group was crucial to meeting the building's high-performance environmental renovation requirements. “As a builder, achieving high levels of performance consists in meeting clients' requirements,” Peres stated. “What we expect from suppliers like [Dow] is definitely ongoing innovation. I am convinced that only innovation will bring a higher level of performance, and it will mainly come from suppliers, industrial companies, and builders.”



“Our experience with 1 Bligh Street demonstrates [Dow’s] commitment to developing new products that are sustainable and environmentally friendly.”

— G. James Glass & Aluminium



1 Bligh – Sydney, Australia

The sustainability of this next generation in premium grade office space begins within its naturally ventilated atrium that soars the full height of the building and extends all the way out to its highly efficient double-skinned glass façade.

Going beyond green: A highly sustainable high-rise

With the inauguration of the Sydney Opera House in 1973, locals recognized that world-class architecture could transform the city into a destination. The Central Sydney Planning Committee requires that developers hold competitions for major buildings and encourages local architects to partner with the winners. 1 Bligh Street, designed by the team of Ingenhoven Architects from Düsseldorf, Germany, and Sydney-based Architectus, is the result of the 2006 design competition run by major property group DEXUS in conjunction with the Sydney City Council. This distinctive, unmistakably modern building has been certified by the Green Building Council of Australia as the country’s first 6-Star Green Star-rated high-rise.

After considering a number of building designs, the architects adopted an elliptical plan, with its long side facing toward Sydney Harbour. The transparent elliptical shape gives each office space floor-to-ceiling panoramic views, and the twenty-nine-story tower combines striking architecture with world-class sustainability. Its double-skinned glass façade, an

Australian high-rise first, is equipped with external louvers that significantly reduce the heat load on the façade, lowering the building’s cooling and energy requirements while providing fifty percent of its ventilation.

Dow’s High Performance Building team collaborated early in the design of the project with G. James Glass & Aluminium Pty Ltd, a major supplier of Australian-made curtain walling. With over 30 years of façade experience, the company engineered, fabricated and installed the tower’s ground-breaking double skin external facade. G. James Glass & Aluminium Pty Ltd relied on Dow for technical expertise and a broad range of high-quality high performance products from reliable local sources.

G. James Glass & Aluminium Pty Ltd also looks to Dow’s continued innovation in sustainable commercial construction. “Our experience with 1 Bligh Street demonstrates Dow’s commitment to developing new products that are cost-effective, sustainable and environmentally friendly,” said a G. James Glass & Aluminium Pty Ltd. representative.





“As a national project, we are able to take advantage of everybody’s strengths and work together.”

— Shuichi Yamaguchi of
Mitsubishi Estate Co., LTD.

Grand Front Osaka – Osaka, Japan

From concept to construction, this group of four buildings illustrates the positive impact that collaboration between government, designers, contractors and suppliers can have throughout the commercial building process.

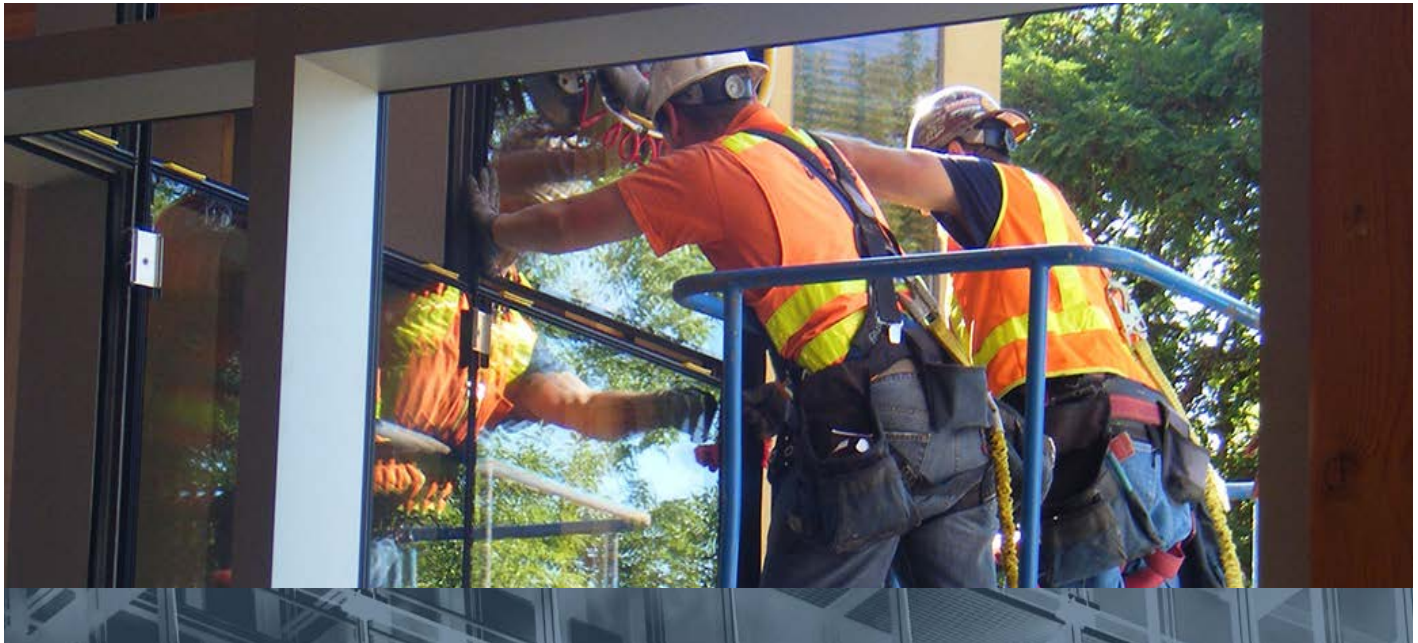
Connecting a community: Transforming a city together

Located in one of Japan’s biggest cities, the Umekita Phase 1 Development Area project, also called the Grand Front Osaka building project, targets the huge growth potential for the Kansai region and promises to be key to the area’s global competitive strength and connectivity. Consisting of four major buildings that include office buildings and businesses, as well as hotels and dwellings for sale, this massive complex aims to be a sustainable and collaborative model for the entire country.

According to project leader Shuichi Yamaguchi of Mitsubishi Estate Co., Ltd., Osaka Branch, following both local and national government regulations and goals for these buildings will help Grand Front Osaka make the first step towards building a city that is good both to its people and the environment. From an environmental standpoint, the building will incorporate the natural environment as much as possible and make use of several eco-friendly energy sources, including a natural ventilation system. A vast green area will be cordoned off, including the rooftop, to help achieve Net Zero Energy Building (ZEB) status as well as a CASBEE Class S rating, the highest possible rating under the CASBEE system.

These types of goals cannot be realized by a few individuals alone. “Bringing together all the technology that Japan has to offer is probably the most important thing,” Yamaguchi says. “That means beginning with the developer, the architect, the builder and the materials supplier, and ending with information and communication. As a national project, we are able to take advantage of everybody’s strengths and work together.” Japan’s Dow Corning Toray Co., Ltd. has been a part of this process. “As a developer, any solutions for eco, green and sustainability are always open. We are happy if we can achieve high-level green building with the alignment between material supplier, applicator, designer and developer,” Yamaguchi explains. “Our businesses can’t exist without everybody’s assiduous research. Even after the city is developed, this collaboration is still something that I believe we should continue to emphasize.”

Yamaguchi believes that the project will have a positive impact on the people living, working and interacting within the complex, as well as those outside its bounds. Grand Front Osaka is an excellent model of sustainability and collaboration that will continue to bring people together across Japan and the world.



Delivering high performance sustainable building solutions

As businesses and governments around the world try to balance the aesthetics and functionality of commercial buildings with economic and environmental sustainability goals, the high performance building market continues to shift. This shift brings significant opportunities, and Dow is ready to meet those opportunities with a whole-building focus, technical knowledge, experience and global commercial capability.

Building upon Dow's strong history as a silicon-based technology pioneer, construction industry innovator and developer of high-performance solutions for virtually every industry around the globe, the High Performance Building Solutions team is bringing together proven materials and innovative technologies from across the company to help customers find solutions to their sustainable design and performance challenges.

A recent Global Silicones Council life cycle assessment study confirmed that silicone products can significantly reduce the carbon footprint of commercial construction. The study established that use of silicone products can help save, on average, nine times the amount of greenhouse gases required to manufacture them¹.

In addition to the key elements of energy efficiency and green materials, High Performance Building Solutions takes an even

broader approach to sustainability by considering needs for innovative design, architectural beauty and enduring performance as well. Solutions that contribute to safety, security, comfort and productivity of the building's occupants are as important as solutions that reduce energy usage, CO₂ emissions, construction costs and operating costs.

Dow's High Performance Building team is creating an innovation portfolio designed to deliver these solutions. Whether it is by providing cutting-edge technology, guidance and product testing in London, helping to renovate an existing building for improved sustainability in France, or working with project teams in Japan and Australia, Dow can meet the varying needs of its customers with reliable, custom and innovative solutions.

We invite current and future customers, building material and system manufacturers, architects, designers, and engineers, contractors and installers, building owners and energy service companies to collaborate with us to help make truly sustainable building a reality.

Continue your experience and learn more about the ways that Dow can assist you in your high performance building needs by visiting our Reaching Toward Net Zero Web page at dow.com/NetZero.

Visit our reaching toward Net Zero web page

Find high performance building resources, updates on these case studies, and contact information for your local Dow representative.

dow.com/NetZero



¹Bernd Brandt, et al., Silicon-Chemistry Carbon Balance - An assessment of Greenhouse Gas Emissions and Reductions, http://www.siliconescarbonbalance.com/pdf/SIL_nutshell_en.pdf. Global Silicones Council

For more information

Learn more about Dow's full range of High Performance Building solutions by visiting us online at [dow.com/highperformancebuilding](https://www.dow.com/highperformancebuilding).

Dow has sales offices, manufacturing sites and science and technology laboratories around the globe. Find local contact information at [dow.com/contactus](https://www.dow.com/contactus).



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Form No. 63-1237-01-0621 S2D