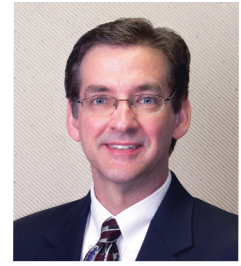


# The Synergy of Sustainability and Mitigation



By Barry Reid, LEED AP, Business Development Marketing Manager, Georgia-Pacific Gypsum

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**T**hose in the construction industry are fast learning that providing sustainably-built workplaces and homes is the smart thing to do socially, environmentally and economically.

The industry is emerging from “green building” into an era where sustainability is table stakes, what you need to do just to get in the game. There is a commitment to implementing and abiding by practices that consistently conserve and efficiently use our limited resources.

However, an important and relevant adjunct to sustainability is sometimes overlooked by architects, builders and developers – although never by insurers and regulators. By choosing the correct products and building practices, architects and builders can mitigate or even reduce the adverse effects on buildings from severe water damage as a result of wind-driven rain or flooding brought on by severe storms and natural disasters.

Often, in at-risk areas, sustainable or green building practices end up conflicting with efforts that address mitigation, namely risk reduction to the building envelope and its long-term durability and performance. But sustainability and mitigation are synergistic concepts, and don’t need to be an either/or proposition. At Georgia-Pacific Gypsum, we’re suggesting that these two important issues can be addressed simultaneously at all stages of the building process – from design through final construction.

This combined effort makes effective use of sustainable products and practices while also taking steps to mitigate or minimize weather-related problems that may occur during the construction process or post-occupancy. It can help make buildings more energy efficient with better indoor air quality, and prevent or reduce weather-related damage.

## Lessons Learned, Courtesy of Mother Nature

When sustainability and mitigation are not implemented, there can be unpleasant consequences.

Consider the story of a fictional general contractor – we’ll call him Fred. Working with a design team of architects, consultants and sub-contractors, Fred has followed U.S. Green Building Council (USGBC) LEED® guidelines in constructing a one-story suburban office center on a previously developed site.

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He was diligent in addressing the environmental and health impacts of the building in addition to reducing the building's overall energy use and water consumption. His team reused building materials from other local projects, selecting materials with high recycled content from regional sources.

They installed low-water-use toilets and urinals. They selected low-VOC (Volatile Organic Compounds) materials, and designed the building to be energy efficient, using both mechanical and natural ventilation strategies incorporated with natural light planning.

Among the benefits of Fred's design and construction practices were lower energy costs, thousands of gallons of water conserved and a healthy building where the workforce was proud to work. Unfortunately, Fred did not take into account any natural events that might adversely impact the use, disaster resistance, performance and recovery of the building. And indeed, something bad happened that Fred hadn't envisioned – a 100-year flood, bringing a torrent of water into the building that finally crested at the two-foot mark. Because the building's walls were constructed with conventional, paper-faced drywall (used for its recycled content), and the walls were insulated with water-absorbing insulation that was not moisture- or mold-resistant, Fred had to replace thousands of square feet of saturated materials – all of which got a permanent home in a landfill.

Because mitigation measures were not considered in the construction phase, Fred's well-intentioned sustainability efforts – that were an investment of an additional one to three percent of the building's cost – ended up being anything but sustainable.

On the other end of the spectrum, a builder – let's call her Jen – remodeled a Victorian home in an area that had recently been rezoned for office use in a coastal region recovering from a devastating hurricane. Jen was determined to closely follow regulations from the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) for building in special flood hazard areas.\*

Jen diligently followed mitigation guidelines, including the use of construction materials highly-resistant to flood damage throughout the structure. She employed dozens of mitigation measures. Her mantra was simple: keep the water out, construct assemblies that dry easily when wet and use moisture-forgiving building materials.

Unlike Fred, Jen didn't give much thought to operational efficiencies or "green" methods. Her structure was a fortress that would likely survive a flood, but it was built to minimum standards, which resulted in an inefficient building with high utility costs and marginal comfort for future occupants.

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**Non-paper faced drywall, such as our DensArmor Plus® interior panels, resist moisture and mold-growth.**

## Sustainability + Mitigation = Durability

These examples are fictional – but not unrealistic. Too often, building contractors and owners choose one or the other – sustainability or mitigation. A successful high-performance building should be built to last, but if sustainable practices and mitigation measures aren't selected and implemented together, the building may not last its normal lifetime.

Sustainability is more than LEED® ratings and green certifications. And mitigation is more than risk aversion. A building must be durable from both perspectives.

Products that are durable and weather-resistant are inherently sustainable, and they are at the center of Georgia-Pacific Gypsum's product offerings – especially our Dens™ Brand of gypsum panels which are moisture-forgiving due to fiberglass mats and treated cores. They're designed to mitigate the ill effects of exposure to water over the many stages of a building's lifecycle.

If you incur costly re-building due to a weather event, sustainability has been defeated. Homes and buildings should be designed and built to last, and building to sustainability and mitigation standards isn't difficult. Here are a couple of common examples that demonstrate the concept.

• **Flooding can ruin the interior of a house or building.** If you consider sustainability and mitigation at the beginning of the construction process, you'll create a structure that just might survive flooding. Rigid or closed cell insulation prevents infiltration of water; borate treated lumber framing is water-resistant; and non-paper faced drywall, such as DensArmor Plus® interior panels, resists moisture and mold-growth. With proper ventilation these construction materials allow for a drainable, dryable wall that resists mold growth. Even when the materials get wet, they will generally dry out without delaminating or developing mold - making mitigation a matter of time and "airing out" rather than replacing materials. (Note that in catastrophic situations, where polluted waters might sit for days inside structures, any type of gypsum panel and some other building materials would need to be evaluated for contamination by local building officials to determine if replacement is required.)

• **Wind-driven rain can also damage structures when it penetrates openings in soffits, under roofs and other openings such as vents.** Sustainability and mitigation are achieved with a tight enclosure that resists moisture. However, the products you use must resist moisture too, so any water that gets in dries out without damaging walls and ceilings.

The answer is to create walls that have minimal openings to non-absorbent surfaces such as non-paper-faced drywall. Consider spray foam insulation at the knee walls/ edge of the roof structure for your attic insulation strategies to stop wind-driven rain through the soffits.

Employing sustainability and mitigation together doesn't compromise the energy efficiency of a tightly built structure, but allows the "forgiveness" needed for the building products to dry out.

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**By choosing the correct products and building practices, architects and builders can mitigate or even reduce the adverse effects on buildings from severe water damage as a result of wind-driven rain or flooding brought on by severe storms and natural disasters.**

**Here are some additional tips to ensure that your projects properly blend sustainability and mitigation.**

Think and plan beyond green. With architects, contractors, owners and insurers at the table from the beginning, sustainability and mitigation are assured. A thorough, upfront assessment of the short- and long-term impact of every aspect of a building's design, construction, and materials used will lessen the economic, environmental and societal burdens that could occur later.

For instance, products that allow for draining, cleaning and drying are much better sustainability and mitigation choices than those that lead to tearing out and replacing in the wake of a severe weather event. Fiberglass mat panels – such as Dens™ Brand gypsum panels for use on exterior and interior surfaces of the building enclosure, behind tile in wet areas, in shafts and stairwells, and within a roofing system – can be used along with other water-resistant materials in wall cavities to provide a water management strategy that protects the value of the structure.

**Incorporate green when building to resist weather events.** Recurring costs like utility expenses and insurance premiums, as well as the long-term marketability of the structure, should all play a role in when and how you choose building products and processes.

**Construction projects need to be infused with common sense as well as regulatory realities.** A few pragmatic practices – like elevating structures in flood-prone regions and leaving the first floor for parking or entryways – can eliminate headaches later. The result will be well-designed and well-built structures that are durable, environmentally sound, economically relevant and socially significant.

In other words, with a bit of effort, you can achieve the synergy of sustainability and mitigation.



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