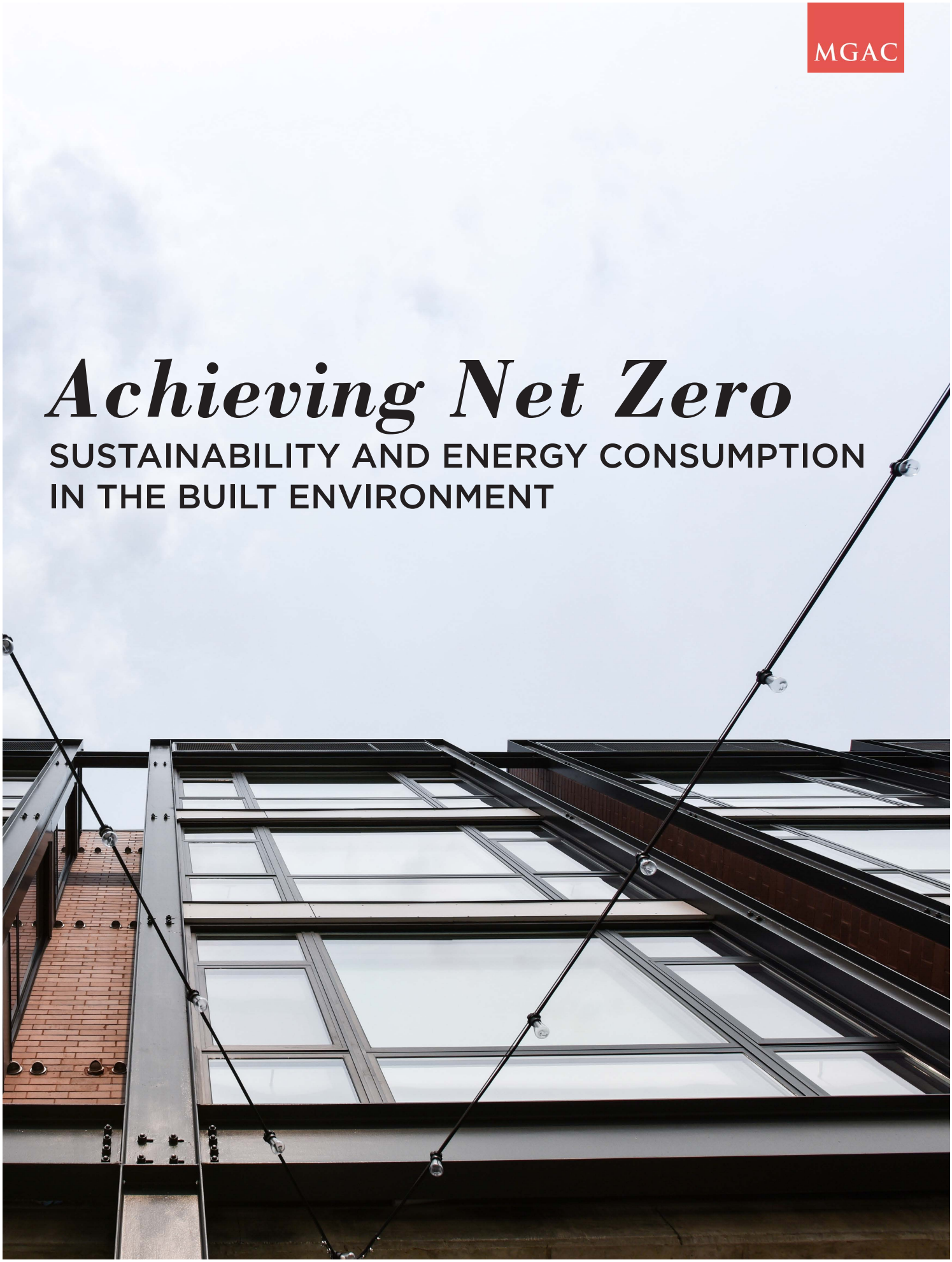
MGAC

Achieving Net Zero

SUSTAINABILITY AND ENERGY CONSUMPTION IN THE BUILT ENVIRONMENT



AMERICAN GEOPHYSICAL UNION
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SUSTAINABILITY, DEFINED

Today's most coveted energy certification is **Net Zero —meaning a building has achieved an annual balance between energy demand and energy creation**. Net Zero is achieved by reducing, reclaiming, absorbing, and generating energy through a variety of advanced architectural, design, engineering, and technological methods.

Unlike prior sustainability certifications, Net Zero certification is not done through energy modeling. The final certification process requires a full year of operation and is based on the actual performance of the building. Implementing the appropriate monitoring and metering systems to provide this performance data must be integrated into the project scope and verified as part of the project commissioning process.

MGAC had the privilege of working on a three-year project for the Net Zero and LEED Platinum renovation of the American Geophysical Union's Washington, DC headquarters. The building is slated to be the first and only Net Zero renovation project in the nation's capital with 100% onsite generation of renewable power.

The project is being completed on the heels of new and highly progressive legislation in DC regarding energy efficiency and sustainability requirements for future design and construction projects. Signed into effect on January 18th, the Clean Energy DC Omnibus Act calls for cutting DC's greenhouse gas emissions by 50% by 2032, putting the onus on property owners to carefully consider their energy consumption.

PROJECT CONSIDERATIONS

RENOVATION CONSIDERATION

Renovating an existing building has considerable environmental benefits over new construction, such as dramatically reducing the project's carbon footprint by utilizing the existing structure and other portions of the building, however renovations pose their own unique challenges.

Renovation projects present opportunities for unforeseen conditions and may require considerable modifications to the existing building structure to support onsite power generation, new MEP systems, and the upgrades needed for the building envelope. All of these items can be costly, and the overall delivery strategy and budget need to account for these potential unknowns.

There will also be certain physical constraints when dealing with an existing structure that will dictate the scope of the project. If the project scope is pursing onsite renewable energy generation, that physical area will determine how much power can be consumed within the building design.

Taking on the challenges of a renovation, including the potential limitations and constraints, can lead to benefits that far outweigh the challenges. It is our goal that every client understands those challenges and plan for them appropriately as there may be trade-offs as the final scope is defined for the project.

ASSEMBLING YOUR PROJECT TEAM

Selecting the right partners is critical on every project but, even more essential when trying to tackle complex projects. To select the right team, the competitive bid process needs to focus heavily on qualifications and finding the right fit. Typically, the final project scope is not fully understood at the time these RFPs are written. Therefore it's necessary to tailor a selection process to pick collaborative and creative partners that will work together to develop the best solution for the project and client.

The selection process may begin with a qualification process to identify potential bidders with the necessary experience and capabilities to deliver similar complex and technical projects. With the final list of bidders identified, a Request for Proposal ("RFP") is issued to the qualified bidders to solicit formal proposals from each bidder.

The final selection process includes the technical proposal review, financial proposal review, and interviews with the proposed team members from each bidder. This selection process will be similar for all vendors, consultants, and contractors, as we look to balance skills, fees, capabilities, and personalities to assemble the right partners for the project.

Unlike traditional design-bid-build projects, highly technical projects, including Net Zero projects, require an extraordinary amount of upfront analysis. To make that analysis meaningful, we need a construction partner engaged very early in the design phase to help facilitate the development of accurate cost models for the various options under consideration. This early engagement establishes "buy in" from the construction team, which is essential when decisions are made regarding design selections and how these decisions impact budget and schedule.

Depending on the final design, critical subcontractors may also be brought on in a "design assist" capacity to work side by side with the Architect and Engineer to develop the final construction documents (CDs). We've had considerable success with this approach as having this shared commitment to the design and incorporating ideas into the final CDs can save time as compared to the traditional process. Ultimately, the goal is to develop a complete solution that can be delivered on time and under budget.

PROJECT CONSIDERATIONS

PRE- DESIGN

With team members engaged, the initial pre-design effort will look at developing and defining the overall scope of the project. This will include investigating various solutions and technologies being considered for the project, as well as some of the limiting factors. For example, when working towards onsite renewable energy to achieve Net Zero goals, the total onsite generation will likely be limited to the size of the PV array—a fact that should be known from the onset of the project.

From there, the project team can perform engineering analyses to look at various other technologies around heating, cooling, power consumption, and more in an effort to develop the final direction of the project. All of this can be achieved before the designers put pen to paper in developing construction documents.

This is when the concepts are developed and vetted and the final project scope, budget, and schedule are established.

EXTERNAL FACTORS

Net Zero projects require close coordination and relationships with utilities, local jurisdictions, and other third parties.

Whether engaging in a Power Purchase Agreement ("PPA"), tapping into the sewer for heat rejection capabilities, or simply looking for grants and permit approvals, each of these local entities will be heavily involved in the project, and if not engaged collaboratively, could impact the overall project delivery.

In today's environment, delivering a Net Zero building is not commonplace and therefore, working collaboratively with these entities can be beneficial for all parties. Establishing these relationships early on in the process and maintaining them through design and construction is critical to meeting key milestones.

CONCLUSION

Since the inception of LEED and other sustainable design and construction certification processes, the industry has continuously aimed to go further. At one time, LEED certification for a project was the exception. Today, nearly every project would be LEED Certified or LEED Silver by designing to best practices. The trend of driving efficiency, performance, and sustainability is not going anywhere.

With the support of current and new legislation, the industry will need to adapt to these changes in design philosophy and embrace these principles as best practices. This includes changing how the commercial construction industry delivers projects.

From Net Zero to the introduction of WELL and Fitwel, the industry is evolving its designs and focusing on people, the environment, and looking to integrate them in a way that creates balance. Our collective curiosity keeps us asking —How can we do more? How can we become utility independent? How can we become carbon neutral? We all need to evolve and adapt. Part of this evolution is learning where we will go next.

As we continue to push the bar higher, the requirements for upfront planning will increase considerably. Early engineering and feasibility studies, including budget and schedule development, will become a necessity.

The success of a project that challenges traditional design and construction notions of energy consumption and facility performance relies on the right team of professionals unified around and working towards a common objective.

ABOUT MGAC

MGAC is a Washington, DC based owner's representation, project management, and cost consulting firm with a long track record of tackling some of the country's most challenging construction "what if's".

Regardless of the sector, scope or budget, our clients consistently push the boundaries of what is expected and what is possible.

MGAC's first push into sustainably-minded projects was in 2003, managing what would become the world's first LEED Certified Data Center. From that point forward, MGAC worked with multiple clients across North America to achieve LEED Certified, Silver, Gold and Platinum endorsements.

Over this 16-year period, the firm has experienced an interesting arc in needs and demands for energy performance and efficiency, working alongside clients in a variety of sectors spanning hospitality, educational, cultural, corporate/commercial real estate, and government.

MGAC is excited to continue pushing boundaries and breaking through ceilings as the industry continues to reach for new heights.

As the stakes for the planet's health continue to rise, and workforce expectations of a modern workplace evolve, "green" features and long-term sustainability are becoming increasingly important.