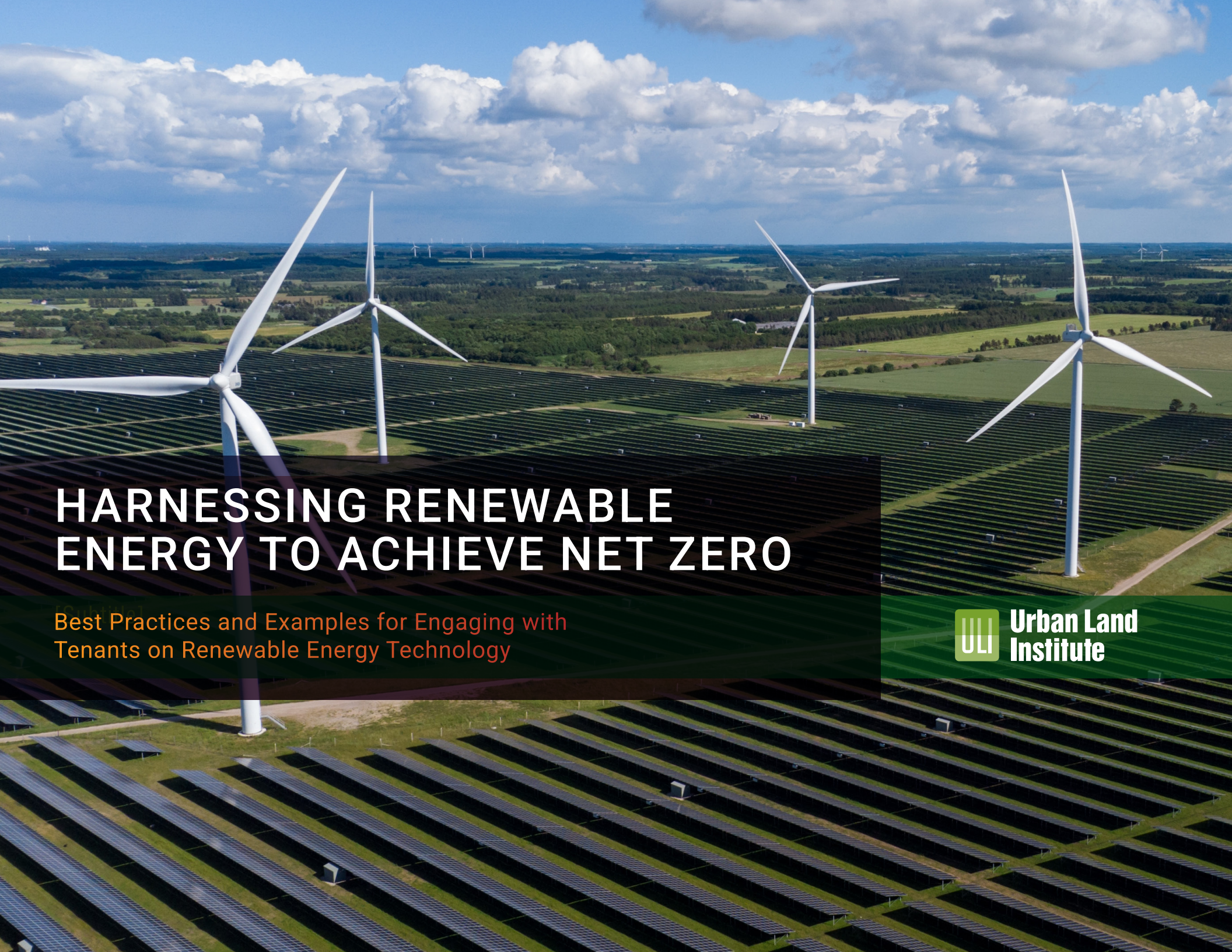

HARNESSING RENEWABLE ENERGY TO ACHIEVE NET ZERO

[Subtitle]

Best Practices and Examples for Engaging with Tenants on Renewable Energy Technology

Urban Land Institute

ABOUT ULI

The Urban Land Institute is a global, member-driven organization comprising more than 48,000 real estate and urban development professionals. ULI is dedicated to advancing its mission of shaping the future of the built environment for transformative impact in communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 84 countries. More information is available at uli.org.

ABOUT THE ULI RANDALL LEWIS CENTER

The ULI Randall Lewis Center for Sustainability in Real Estate envisions a net zero, resilient, healthy, and inclusive world where every person, community, and business thrives. To achieve our vision, the Center accelerates action for sustainability in real estate and cities by cultivating leadership and knowledge, catalyzing adoption of sustainability practices across the real estate value chain, helping solve land use and real estate challenges, and advancing policy solutions. The Center pursues these goals through its four main programs—Decarbonization, Urban Resilience, Healthy Places, and Greenprint—working closely with ULI members and partners to produce publications on cutting-edge issues, host global convenings, provide community technical assistance, and organize leadership networks.

Discover transformative practices for real estate and land use at uli.org/sustainability. Connect with the Center at sustainability@uli.org.

ABOUT THIS REPORT

Harnessing Renewable Energy to Achieve Net Zero is the fifth installment of the *Working toward Net Zero: Tenant Engagement* primer series. The four prior publications focused on green leases, data sharing, tenant fit-outs, and behavior change. This primer highlights strategies for renewable technology adoption and deployment and how owners can encourage tenants to support the net zero transition along with real-world project profiles that exemplify renewable technology strategies in action.

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Recommended bibliographic listing:
Urban Land Institute. *Harnessing Renewable Energy to Achieve Net Zero*. Washington, DC: Urban Land Institute, 2025.

INTRODUCTION

For the first time since 2020, building sector emissions have plateaued even as construction surges. This is due in part to a nearly 5 percent jump in renewable energy use. With energy demand on the rise and renewable technologies maturing, building owners and tenants are positioned to lead decarbonization efforts by integrating renewables at the asset and portfolio levels.

Renewable energy has long been acknowledged as a potential solution to the ongoing climate crisis. According to the 2023 Intergovernmental Panel on Climate Change, demand-side mitigation strategies such as renewable energy have the potential to reduce building sector greenhouse gas emissions by up to 66 percent by 2050. Renewable energy sources—including bioenergy, solar, wind, geothermal, and hydropower—can provide over 90 percent of the necessary reductions in energy-related carbon emissions by replacing fossil fuel combustion.

Twenty-seven percent of operational emissions in buildings can be attributed to occupants. Owner-occupiers are rare in commercial buildings, making building tenants an essential partner in reducing whole-building energy use. Alignment between owners and tenants on renewable energy goals is essential to achieving sustainability targets, leveraging shared incentives, and meeting regulatory compliance standards for both parties. Plus, tenants are increasingly prioritizing sustainability as a key factor in their leasing decisions across asset types, and building owners are striving to futureproof their portfolios and achieve buy-in for their environmental goals. As a result, owner and tenant collaboration on decarbonization strategies can not only support net zero goals but can also help build stronger, longer-lasting business relationships.

> "Solar is key to decarbonization, but success depends on landlord and tenant collaboration. We take a landlord-led approach to funding, installing, and maintaining solar panels, giving customers access to clean, cost-effective energy without upfront costs. This approach reduces carbon footprints, enhances energy resilience, and delivers long-term value for businesses."
>
> – James Wakelin, Head of Sustainability and Debt, Indurent

RESOURCES

This primer explores practical and collaborative strategies for enhancing tenant-owner engagement around harnessing renewable energy via on-site solar, off-site renewable power generation, battery storage, and grid interactivity. It is part of ULI's *Working toward Net Zero* series that highlights best practices for tenant engagement in decarbonization.

The following are the other primers in the series:

- ***Taking Green Leases to Net Zero*** covers how leases can incorporate green or net zero leasing language to create transparency between owners and tenants on shared incentives and responsibilities for sustainability and/or energy efficiency measures in a building.
- ***Sharing Data to Achieve Net Zero*** discusses how data sharing between tenants and owners can be leveraged to benchmark progress and strategize future whole-building emissions reductions. This is especially underscored by increasing pressure from investors and governmental requirements to report whole-building data.

New solar array installed in 2024 at 1909 K Street. (Courtesy of Tower Companies)

- ***Fitting Out Spaces for Net Zero*** highlights the opportunity for reducing energy use, lowering embodied carbon, and repurposing materials during tenant fit-outs. Commercial building interiors can be fitted out every three to 10 years as new tenants enter the space, making tenant-owner alignment on sustainability priorities essential.
- ***Behavior Change to Achieve Net Zero*** emphasizes the importance of human behavior change in reducing carbon emissions. This report shares strategies such as incentives, gamification, and green nudges to shift tenant and owner norms toward energy efficiency and sustainability efforts.

FURTHER RESOURCES

ULI resources:

- *Renewable Energy Strategies for Real Estate* (Urban Land Institute, 2021)
- *Off-Site Renewable Energy Buyer's Guide for Real Estate* (Urban Land Institute, 2022)
- *Get Smart: The Business Case for Grid-Interactive, Efficient Buildings* (Urban Land Institute, 2023)

Other useful resources:

- *An Exploration of Solar Access: How Can Tenants Benefit from Solar Financing Policies?* (Kleinman Center for Energy Policy, 2024)
- "Utility Allowances, Energy-Efficiency, and Renewables in Affordable Housing" (National Housing Law Project, N.D.)
- "Renewables" (International Energy Agency, 2024)
- "100% Clean Electricity by 2035 Study" (National Renewable Energy Lab, 2022)

RENEWABLES ARE KEY TO GETTING TO NET ZERO

Renewable energy can directly decarbonize. It produces little to no greenhouse gas and can directly replace fossil fuels including coal, gas, and oil, which currently account for 75 percent of global greenhouse gas emissions. Although global demand for renewable energy is rising, renewables have yet to match fossil fuel demand due to challenges including upfront costs, fossil fuel subsidies, and ongoing social and political resistance.

Promisingly, in October 2024, the International Energy Agency announced that the market for renewable technologies is set to rise from $700 billion in 2023 to over $2 trillion by 2035, matching the current value of the global oil market. Recent growth trends support this prediction. Between 2021 and 2022, staggering growth in solar photovoltaics and wind energy prevented the emission of 465 million metric tons of carbon dioxide. Then, in 2023, renewable capacity increased by nearly 50 percent year-over-year.

For real estate owners/developers, renewables offer advantages such as enhanced asset value, reduced vacancy rates, lower energy costs, and operational expenses. They can also improve energy resilience. The amalgamation of these accrued benefits can result in a higher net operating income.

Commercial tenants, in turn, are placing greater emphasis on leasing buildings that support their corporate targets. Renewables allow tenants to save on Scope 2 emissions (see the table What Are Scope 1, 2, and 3 Emissions?) by reducing use of and reliance on fossil-fuel based grid power. Tenants are keen on renewable strategies that not only reduce utility costs but also ensure a stable power supply for occupants. Reliable power is essential for ensuring prime productivity for employees and creating a comfortable and temperate environment in the building.

WHAT ARE SCOPE 1, 2, AND 3 EMISSIONS?

Scope	Definition	Example
Scope 1	Direct greenhouse gas emissions from sources owned or controlled by the organization	Emissions from burning natural gas in a building's boiler or furnace for heating
Scope 2	Indirect greenhouse gas emissions, such as through an organization's purchase of electricity, steam, heat, or cooling	Emissions from electricity purchased from the grid to power lighting, elevators, or air conditioning in a building
Scope 3	Includes all indirect emissions across a company's value chain: upstream from activities such as commuting and transport, and downstream from activities such as product use and disposal	Emissions from the production and transportation of building materials (such as steel or concrete), waste disposal, and employees commuting to work

Greenhouse gas emissions are gases released into the atmosphere that trap heat, creating what is known as the greenhouse effect. These gases include carbon dioxide (CO_2)—primarily produced by burning fossil fuels such as coal, oil, and natural gas—which is a major contributor to climate change. Other significant greenhouse gases include methane, nitrous oxide, and fluorinated gases. While some emissions come from natural sources such as volcanic eruptions or the decomposition of organic matter, the majority are caused by anthropogenic activities, including fossil fuel combustion, agriculture, and deforestation. Source: McKinsey & Company

ADDRESSING THE SPLIT INCENTIVE

Despite these benefits, commercial building challenges, including misalignment between tenants and owners, continue to hinder renewable investment from both sides. “Split incentive” issues arise when either the owner or the tenant pays for renewable installations (i.e., solar array) while the other party reaps the benefits (i.e., reduced utility bills). A lack of shared incentives and responsibilities can discourage owners and tenants from undertaking renewable projects.

Overcoming the split incentive barrier is imperative to reaching net zero targets and increasing business profitability, especially as electricity demand continues to grow in the building sector.

Addressing the split incentive by aligning tenants and owners is crucial to effectively deploying renewable energy in commercial, residential, and multitenant buildings. The project profiles in this primer showcase a range of practical strategies for renewables that address the split incentive problem, detailed in the table Benefits of Renewable Energy for Tenants and Owners.

WHAT IS A “SPLIT INCENTIVE”?

Definition: Split incentives are when the party paying for a product or service, such as a renewable upgrade, is not the receiver of the benefits, which instead go to another party. This misalignment discourages investment in upgrades, even if they are cost effective overall.

Example: In commercial buildings, property owners often bear the cost of energy efficiency or decarbonization upgrades, while tenants reap many of the benefits, such as reduced utility bills. This disconnect creates a disincentive for owners to invest, while tenants, especially those with short-term leases, often lack the authority or motivation to initiate improvements.

BENEFITS OF RENEWABLE ENERGY FOR TENANTS AND OWNERS

POTENTIAL

BENEFITS FOR TENANTS

- Meet corporate emissions targets by reducing Scope 2 emissions and offsetting fossil fuel energy consumption with renewable sources
- Lower utility bills by using less electricity or receiving credits for renewable energy; tenants are also less exposed to future increases in utility rates
- Demonstrate a commitment to environmental responsibility, which can enhance appeal to customers and strengthen brand reputation
- Improve access to stable power supply for building occupants through on-site renewables and/or battery storage, which can mitigate regional energy shortages or disruption

POTENTIAL

BENEFITS FOR OWNERS

- Increase property value due to reduced energy costs, resilience to power fluctuations, and sustainable features that alleviate energy, environmental, and health concerns
- Lower vacancies and increase tenant retention and attraction as tenants increasingly prefer sustainable buildings with lower utility costs
- Increase net operating income through higher rents and lower operational costs
- Gain green certifications, rebates, or tax credits for renewable integration; for example, in the United States, this could include qualifying for Energy Star certification or for solar rebates

Xintandi Plaza, Shanghai. (Courtesy of Shui On Land)

RENEWABLE ENERGY STRATEGIES

With these benefits and challenges in mind, building owners and tenants can explore a range of practical renewable strategies including on-site solar, off-site renewables, battery storage, and grid interactivity. Explore below how tenants and owners can collaborate and maximize mutual value.

Strategy	Description	Project Profiles
On-Site Solar	On-site solar systems are directly installed onto a building or project site.	• Tower Companies • Aberdeen • Indurent
Off-Site Renewables • *Special feature: Community Solar*	Off-site renewable energy is produced at a location different from the building site without requiring on-site installations.	• Shui On Land • *Featured profile: Iberdrola*
Battery Storage	Battery storage is a renewable energy strategy that uses battery technology to store electricity.	• Prologis
Grid Interactivity	Grid interactivity is the capability of a building to dynamically communicate and interact with the electric grid using advanced technologies, controls, and energy resources.	• Jamestown • AvalonBay • Babcock Ranch

ON-SITE SOLAR

On-site solar power systems, such as rooftop solar or ground-mounted arrays, are directly installed on the building or surrounding project site. The on-site system generates electricity, offsetting the energy that would have been purchased from the local utility, creating reduced energy costs and mitigating financial risks associated with fluctuating electricity prices. On-site solar can increase property values for owners, and both tenants and owners can save up to 50 percent on their energy costs through several billing strategies (see the table On-site Solar Billing Strategies).

In some U.S. states, owners who purchase their own on-site solar can leverage investment tax credits (ITCs), a tax credit that reduces the federal income tax liability of owners for a percentage of the cost of solar system installation. Owners can also sell renewable energy certificates (RECs). Each REC is created when a renewable system produces one megawatt-hour of electricity. Selling these certificates gives owners extra income and helps companies meet their sustainability goals. In this way, tax credits and REC sales assist owners in recouping installation and operational expenses. In some cases, upfront installation and maintenance costs are covered by PPAs or a green leasing addendum, lessening or even eliminating the payback period. Meanwhile, tenants reap the benefit of reduced utility bills.

Owners can also generate revenue by selling excess energy produced by on-site solar. Merchant PPAs and export PPAs are contracts between the owner and electric utility where the building owner with on-site solar can sell excess electricity to the grid. Under a merchant PPA, owners sell surplus power at market rates, allowing them to benefit from price fluctuations but exposing them to market risk. Export PPAs are a contract, often with fixed or variable pricing, for the sale of excess solar generation, offering more predictable revenue streams. Both models allow building owners to monetize electricity not used on site, reduce reliance on utility power, and achieve positive cash-flow results.

ON-SITE SOLAR BILLING STRATEGIES	
Billing Strategy	**Definition**
Net Metering	Net metering is a billing system that credits on-site solar users for the excess electricity from on-site generation they add to the grid. During the day, on-site solar often generates more electricity than a building uses; this surplus is exported to the grid, and customers get solar credits. At night or during low-sunlight periods in the winter, the building draws electricity from the grid. Net metering allows customers to apply their solar credits to offset these grid charges, so they only pay for their "net" energy use. Typically, the owner is responsible for setting up the system and credits are shared or allocated to tenants.
Submetering	Submetering in a net-metered building is the installation of additional submeters to track energy usage and production for specific tenants or units. Submetering allows for more accurate billing and cost allocation in multitenant properties. The main utility meter records the net energy flow between the property and the grid, as per standard net metering, while excess solar generation is credited to the building. These credits can then be allocated to individual tenants based on data from submetering.
Pro-rata	Pro-rata billing in a net metered building means that owners charge tenants for electricity based on their proportional share, such as by square footage or estimated usage of the building's total energy consumption. The savings from on-site generation are reflected in the lower whole-building bill, which is then allocated to each tenant based on their proportional share.
Shared Solar Programs	On-site shared solar programs are subscription model arrangements where a solar array is installed on a multitenant property (typically by the owner or a third-party provider) and the electricity is shared among the tenants. Tenants typically subscribe to the solar power system and pay a specific percentage or amount of electricity it generates. In return, each subscriber receives a bill credit reflecting the energy generation attributed to their subscription.
On-site Power Purchase Agreements (PPAs)	On-site PPAs are contracts between a customer and a third-party renewable developer in which a renewable energy system is installed directly on the property or surrounding site. The system is owned, operated, and maintained by the renewable developer, not the property owner or tenant. The customer agrees to purchase all or most of the electricity generated at a fixed price per kilowatt-hour (kWh), which is generally lower than the utility's rate for the duration of the contract. The customer may be either the owner or the tenant. In owner PPAs, the owner is the customer and can pass energy savings to tenants via the lease. In tenant PPAs, the tenant is the customer and captures energy savings directly. However, tenant PPAs can be more complex to structure. Tenants typically need lease provisions that allow for system installation and use, and their lease term must align with the length of the PPA. The system supplies electricity directly to the site, and any excess may be exported to the grid.

PROJECT PROFILE

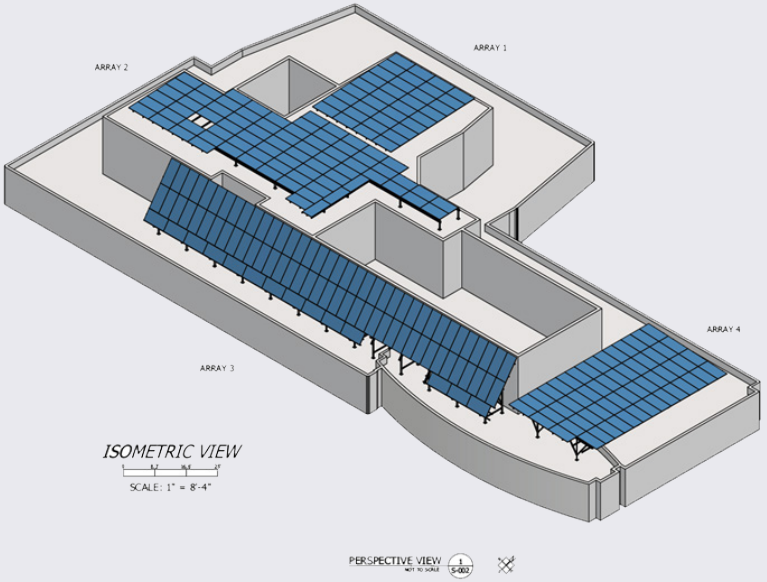
TOWER COMPANIES

Tower Companies, a real estate development company based in Maryland, promotes their Millennium Building as a prime example of sustainable development. The building's on-site solar array was installed in 2014, one of the first on a Washington, D.C., office building, and initially generated 30,000 kWh annually. As of late 2024, a retrofit and expansion of the system, including new racking and panel technology, produces about 165,000 kWh annually. Post-retrofit, the Millennium Building is projected to produce about 6 percent of the building's total annual energy use. However, on sunny days with low HVAC use, it is predicted to provide closer to 35 percent of the building's daily energy use, significantly offsetting the electricity imported from the grid.

Tenant engagement via billing strategy is a key component of Tower Companies' successful integration of on-site solar. Tenants are billed for energy on a pro-rata basis via net metering and can benefit from reduced electric bills, which are especially valuable in a region with rising electricity costs.

While local utility costs have increased over the past several years, the "utility burden," or the amount the building pays in utility costs per square foot, has not increased for the Millennium Building. This is because the building uses less energy per square foot, also known as energy use intensity (EUI), due to on-site solar production and other energy efficiency strategies. The Millennium Building has successfully reduced its EUI by 50 percent through these strategies over the past 12 years, keeping utility costs per square foot stable for its tenants.

This strategy has cost benefits for Tower Companies as well. Aside from saving on direct energy costs through net metering, Tower has also been able to sell RECs produced by the solar array, earning $400 per Megawatt-hour (MWh) in Washington, D.C. Combined with investment tax credits and depreciation benefits, Tower was able to recoup their costs in a very reasonable timeframe, making on-site solar one of the most effective sustainability projects in the portfolio.



Solar rendering of 1909 K Street. (Courtesy of Tower Companies)

PROJECT PROFILE

ABERDEEN (Project developed and managed by SYZYGY CONSULTING)

Aberdeen, an asset management and investment firm, advised by Syzygy, successfully integrated on-site solar arrays across two tenant-occupied industrial buildings in Leicester, United Kingdom, in 2021. The first building, leased to Boden, features a 997.2kWp solar array, which has generated 573.7 tonnes of avoided carbon emissions and delivered 51.1 percent energy cost savings to Boden since installation. The second building, leased to DPD, has a 461.6kWp solar array, which has resulted in 128.2 tonnes of avoided carbon emissions and achieved a 41.1 percent return on investment to date.

Both projects leverage an owner PPA agreement, where Aberdeen, as building owner, sells solar-generated energy to its tenants at a discounted rate below grid prices through dual metering systems. Generation meters record energy produced while export meters track surplus electricity sent to the grid, ensuring tenants pay only for actual consumption. Through export PPAs, Aberdeen was able to sell 21.7 and 60.6 percent of power generation from each building, increasing annual revenue.

This tenant/owner arrangement requires the leases to be varied, also known as "deed of variation," to modify existing Full Repairing and Insuring (FRI) leases (see the table Breakdown of Full Repairing and Insuring Leases for On-site Solar at Aberdeen).

FRI leases are lease agreements between owner and tenant that shift some property responsibilities to the tenant. Under Aberdeen's FRI lease, modified by deeds of variation, Aberdeen retains operational and maintenance responsibility for the solar installations while Syzygy provides asset management services. The tenants contribute around GBP£5,000 per year toward operation and maintenance costs through their lease arrangements and benefit from below-market electricity pricing that never exceeds delivered grid energy costs.

The partnership between Syzygy, Aberdeen, and tenants highlights the important role that both owners and tenants play in successful on-site solar operations. By using owner PPAs, FRI leases, and export PPAs, both the owner and tenants can share in the financial benefits of on-site solar.

BREAKDOWN OF FULL REPAIRING AND INSURING LEASES FOR ON-SITE SOLAR AT ABERDEEN

FRI Lease Stakeholder	Responsibility	Benefits
Owner (Aberdeen)	Solar installation ownership and maintenance; asset management via Syzygy	Revenue from tenant energy sales and grid exports through PPAs, as well as green on-site renewable energy
Tenant	Annual maintenance contribution (~£5,000); cannot remove, alter, or damage equipment	Discounted electricity; carbon-neutral electricity supply

Aberdeen building in Leicester, United Kingdom. (Courtesy of Syzygy Consulting)

PROJECT PROFILE

INDURENT

Indurent, a leading developer, owner, and operator of industrial and logistics space across the United Kingdom, has increased its solar capacity by 20 percent to date with its on-site solar operations. A key component of the organization's wider decarbonization strategy, Indurent's solar portfolio flagship projects include the Imex Business Centre, Broadway Central, and Total Park Middlewich, which host solar arrays of 122 kWp, 202 kWp, and 300 kWp, respectively.

To ensure optimal system performance, Indurent works with its customers—which is how it refers to its tenants—to access and analyze their energy data, enabling right-sized solar installation that directly support operational needs. This approach not only increases the effectiveness of each system but also fosters stronger collaboration between landlord and customer around shared renewables goals.

Indurent also offers hybrid energy pricing for its customers, tailored to customer preferences. Billing can either go through an owner PPA, where Indurent sells energy to the customer typically at a lower rate than grid electricity, or a rental approach, where the customer rents the solar system for a fixed fee and receives all utility cost reductions. Customers would prefer a rental approach when they want predictable, fixed costs with simpler contracts while they may prefer PPAs to ensure minimal upfront costs and guaranteed savings.

Billing strategies aren't the only way Indurent maximizes its relationship with customers to support on-site solar. For its build-to-suit warehouses, Indurent starts collaborating with customers in the design phase to appropriately size on-site solar system for specific tenant energy requirements. This approach ensures seamless integration of solar systems, operational efficiency, and a consistent customer experience. The company reinforces its customer relationship with a hybrid customer engagement strategy, combining face-to-face meetings, video calls, leaflets, and a recurring annual sustainability survey to take a pulse of its decarbonization efforts. This strategy not only builds relationships with customers, but also helps identify new opportunities (solar deployment, green lease clauses, etc.) and improves transparency.

Solar array on an Indurent building. (Courtesy of Indurent)

OFF-SITE RENEWABLES

Off-site renewables refer to the renewable energy generated at a location different from the building site, such as an offshore wind farm. Off-site renewables offer a scalable option for building occupiers to access renewable energy without requiring on-site installations. Common examples include wind, solar, hydro, geothermal, and tidal.

Off-site systems typically provide medium- to long-term fixed pricing on their renewable electricity, alleviating unpredictable energy costs for tenants. There are several contracting options between owner, tenant, and energy provider available with various degrees of commitment, availability, and implementation. (Read more: *Off-Site Renewable Energy Buyer's Guide for Real Estate Energy*.)

For the most part, off-site renewables are delivered through the utility grid. For example, an off-site solar farm directly feeds green power to a building through the grid, offsetting fossil fuel consumption. Building owners could then leverage a PPA to purchase energy from the power generator and then charge their tenants a separate, ideally lower, rate.

In many U.S. markets, another option to leverage off-site renewable energy is through traditional utility green tariffs. Traditional utility green tariffs are optional programs offered by utilities in regulated electricity markets (markets in which the utility owns and operates all electricity), that allow commercial and industrial customers to purchase a specific amount of electricity from renewable energy projects through a special rate. Many utilities offer customers the option to add renewable energy purchases to their standard rates, typically in the form of RECs. While these are relatively low-cost options, most utilities offer different packages at different subscription levels, such as 50 or 100 percent renewable coverage of a building's usage. Utility green tariffs offer even more benefits for owners and tenants alike. The process is generally easy to sign up for and if utility bills are shared with the building owner, the building owner can then claim Scope 3 emissions reductions through the tenants' Scope 2 reductions. (See the What Are Scope 1, 2, and 3 Emissions? table.)

Lastly, not all off-site renewable energy is physically delivered. Virtual PPAs (VPPAs) are contracts between the customer and the power generator, but the actual power does not physically flow from the generator to the buyer. Rather, the contract is financially settled, and the VPPA is entirely independent of the physical supply. Instead of scheduling the power to flow, the generator and customer sell or buy power on the market separately and settle for the price differences. Either the owner or the tenant can leverage VPPAs for off-site renewables in a building, reaping environmental claims (e.g., RECs) and financial benefits (e.g., resilience to market volatility and cost savings).

These off-site renewable solutions offer operational advantages for property owners and tenants alike. They mitigate energy market price risks, provide budget certainty, and eliminate upfront installation costs typically associated with on-site systems. By integrating off-site renewables with tenant-focused strategies, building owners can achieve significant reductions in energy costs while aligning with broader environmental objectives.

PROJECT PROFILE

SHUI ON LAND

Shui On Land's Shanghai Xintiandi community is a pioneering example of integrating off-site renewables into a mixed-use urban development. In July 2024, the company achieved a significant milestone by securing 100 percent off-site renewable electricity for the development, a vibrant district that includes the office buildings, retail spaces, and public areas of several plazas and their associated park spaces.

The company partners with off-site wind and hydro energy suppliers, negotiating fixed pricing of energy for the duration of the contract for its tenants. This provides potential energy cost savings and financial transparency to both the owner and tenants, avoiding the unpredictability of fluctuating state grid electricity rates.

Shui On Land recognizes the critical role of tenant engagement in integrating 100 percent off-site renewables and achieving sustainability goals. While the company procures renewable electricity through a PPA for its buildings, tenants benefit indirectly through carbon reductions that contribute to their own corporate sustainability targets.

This has helped increase tenant retention, attracting multinational corporations and environmentally conscious tenants who prioritize green leasing opportunities. Shui On Land tailors green leasing models to varying levels of tenant commitment, allowing both parties to enjoy transparency and confidence around the responsibilities and incentives of off-site renewables.

Shui On Land also focuses on explaining the environmental impacts and business case for off-site renewables to its tenants by offering tenant education and the option of joining the Low Carbon Alliance, a coalition of tenants that are interested in decarbonization.

Xintiandi Complex, Shanghai. (Courtesy of Shui On Land)

COMMUNITY SOLAR

Coordinated with the local utility, community solar is an off-site renewable energy strategy that offers a subscription service for customers to access solar power generated at a project site, either by an array or solar farm. Customers—typically located within the same utility territory—can subscribe to a portion of the electricity produced by the community solar project. In return, they receive credits on their utility bills for their share of the solar energy generated, reducing their overall energy costs. Community solar can provide significant savings, typically 5 to 20 percent or more, over retail electric bills.

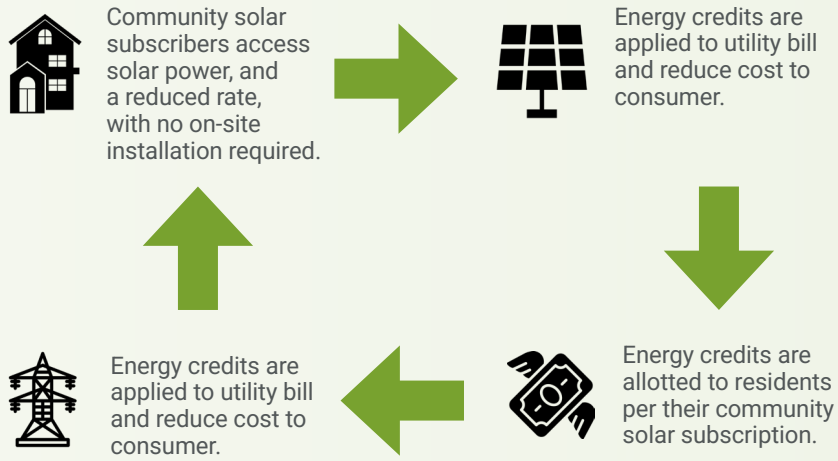
Many community solar developers use off-site PPAs or subscription models to contract with the subscribers. The advantages of this strategy are twofold: subscribers get lower electricity costs, and they do not need to host the solar system on their roof. Tenants, in particular, can leverage this option to use renewable energy even if they do not have the roof rights to install on-site solar.

For their part, owners can generate revenue by leasing rooftop or land space for community solar developers and increase net operating income by hosting community solar, as many tenants are increasingly seeking lower energy costs and sustainable buildings. Since third-party developers install and maintain the system, owners do not have to take on any operational burden.

Community solar also supports broader access to renewable energy, helping to promote energy equity and sustainability in communities.

"When community power came onto the scene, they were at first viewed as a competitor to utilities. But whether the power is coming from renewables, it doesn't make a difference, because the utility makes the money from the transfer either way."

– Andrew Schlesinger, AIA



Community solar programs provide benefits to subscribers. (Shraeya Madhu)

COMMUNITY SOLAR IN ACTION

IBERDROLA

Iberdrola, a Spanish multinational electric utility company, is transforming Spain's energy landscape through its Solar Communities initiative. Sixty-five percent of the Spanish population lives in high-rise buildings, where most individual residents and commercial tenants have no access or rights to rooftop space. Iberdrola's Solar Communities is a community solar solution that makes solar accessible without requiring on-site solar rooftop installations.

Iberdrola partners with commercial property owners, schools, and supermarkets to host solar photovoltaic (PV) systems in exchange for roof rental income. Residents within a two-kilometer radius of an installation can subscribe to the service and receive solar credits, benefiting just as they would have with their own on-site system. The bill credits allow subscribers access up to 30 percent energy cost savings without upfront investment or long-term contracts.

Owners benefit by generating rental income, enhancing the sustainability profile of their properties, and potentially attracting higher-value tenants looking for green buildings. Tenants, on the other hand, enjoy reduced energy bills, exclusive self-consumption rates, and a lower carbon footprint—all without installation costs.

The program has proven to be a success. Since its conception, Iberdrola's Solar Communities have launched over 1,000 projects and 2.4 million Spaniards with an Iberdrola solar community within their reach.

"Ten years ago, tenants didn't understand their energy bills. They would just pay them. Now, for example, they know that 5 euros go towards the overhead lights and 9 euros go towards the heat pump. So, they really see how renewables can help reduce specific costs."

– Luis Buil Franch,
Director of Smart Solutions at Iberdrola

Solar panels on the Giner de los Rios School's rooftop. (Iberdrola)

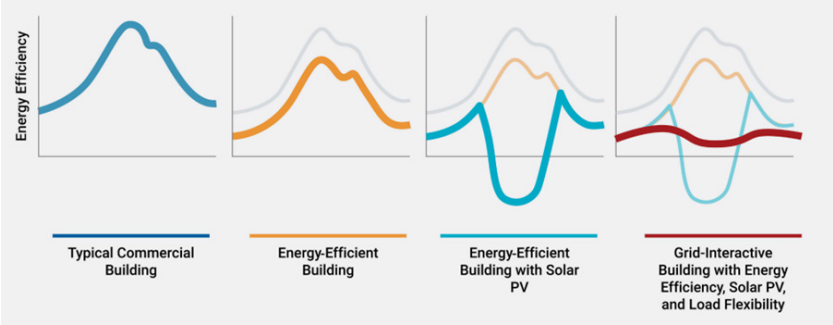
BATTERY STORAGE

Battery storage is a renewable energy strategy that uses battery technology to store electricity. Batteries can store renewable energy generated during peak sunlight, wind, or geothermal conditions and then tap into the stored energy during periods of low renewable generation (or high demand). Programs like demand management and energy arbitrage give owners and tenants the option to avoid higher utility charges and reduce operational costs.

Demand management refers to methods that help building owners and tenants control when and how much electricity they use, especially during times when the grid is under stress or electricity prices are high. The main goal of demand management is to shift energy use away from peak periods of energy use to off-peak times, when energy is cheaper and more abundant. For instance, load-shifting is a method that charges batteries during periods of low demand or when electricity prices are lower (off-peak hours) and discharges them during periods of high demand (peak hours). This helps flatten the load and enables tenants to benefit from reduced utility charges associated with peak demand.

With energy arbitrage, building owners buy electricity during off-peak hours and sell during peak demand hours. This buy-and-sell process involves optimizing the charge and discharge cycles of battery storage, focusing on optimal operation and reducing vulnerability to market fluctuations. For example, real-time market arbitrage involves battery storage responding to real-time price fluctuations by charging or discharging batteries based on minute-by-minute or hour-by-hour price signals. In markets with severe price volatility, this strategy can significantly reduce costs and mitigate risks. This process can reduce energy costs by up to 80 percent for building owners and tenants.

Accordingly, commercial building occupiers have increasingly adopted battery storage to pursue their own net zero goals. There are a few factors that determine if battery storage is a good fit for a building including costs, fire safety, and ease of installation. Thus, it is vital that tenants and owners collaborate on priorities when integrating this technology. By discussing options with tenants, regulators, and third-party stakeholders early on, owners can effectively manage risk and batteries can help overcome the intermittency of renewable sources and ensure a consistent supply of renewable energy.



Load profiles for grid-integrated buildings. By incorporating energy efficiency, distributed energy resources like solar photovoltaic, and grid-interactive load flexibility, a building can significantly reduce its energy demand. (Rocky Mountain Institute)

Small battery storage.

PROJECT PROFILE

PROLOGIS

Prologis, a California-based real estate investment trust, is committed to achieving net zero emissions across Scopes 1, 2, and 3. At a consumer retail company's spec-to-suit distribution center in Tracy, California, Prologis deployed an integrated solar and battery storage system to meet tenant demand for renewable energy while advancing its own climate targets for reducing grid dependency and optimizing energy use. Prologis conducted detailed energy modeling, including shift schedules, HVAC loads, lighting, forklift usage, and metering infrastructure, to right-size the installation of two 500kWh battery systems.

The cornerstone of the project's success was proactive tenant, or customer, engagement. Prologis engaged the consumer retail company early in the planning process and encouraged battery storage for demand management and energy arbitrage during peak hours. Through ongoing communication, both parties discussed the exterior footprint of the batteries and operational safety, including UL certification, the safety standard for energy storage systems and equipment, and rigorous fire safety testing. To formalize this understanding and build trust, the battery storage systems were incorporated into a lease amendment.

For Prologis, incentives, such as investment tax credits for the battery systems and increased property value, further reinforce the strategy of positioning battery storage as a value-add feature to prospective tenants.

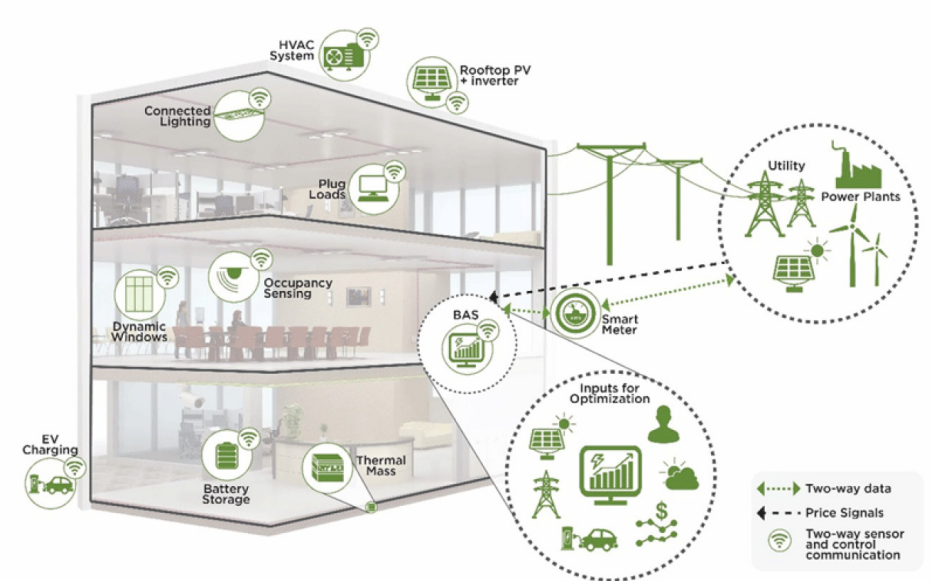
GRID INTERACTIVITY

Grid interactivity is the capability of a building to dynamically communicate and interact with the electric grid using advanced technologies, controls, and energy resources. Grid-interactive buildings, also known as grid-interactive efficient buildings (GEBs), often integrate renewables with smart technology, battery storage, and energy efficiency to provide demand flexibility, which means they can adjust their energy use in real time to optimize energy consumption, lower costs, and enhance grid stability. To learn more about GEBs, read ULI's 2024 report *Get Smart: The Business Case for Grid-Interactive, Efficient Buildings*.

GEBs play a vital role in reducing emissions, but their importance extends beyond supporting net zero goals. GEBs uniquely enable systems to handle challenges such as winter peak loads and periods when renewable generation is intermittent. By providing demand flexibility, GEBs can intelligently shift electricity use from peak to off-peak hours, aligning consumption more closely with the availability of renewable resources. This smart load-shifting not only reduces the strain on the grid during critical periods but also allows large electrical loads to respond dynamically to fluctuations in renewable supply, harnessing it more efficiently. As a result, GEBs help maintain grid reliability and economic stability, ensuring that buildings can support decarbonization without compromising operational needs or financial viability.

Moreover, by leveraging smart controls and real-time data, GEBs can enhance occupant comfort through better temperature regulation and air quality. Tenants gain more control over their energy use, often through accessible interfaces or automated systems that adjust lighting, heating, and cooling to match occupancy without sacrificing comfort. This increased transparency can empower tenants to make informed decisions about their energy consumption, potentially leading to lower utility bills. Additionally, because GEBs are designed to respond to grid signals and store back-up energy, tenants benefit from a lower risk of outages, contributing to a more resilient and secure space.

Owners may also benefit by participating in programs that allow them to sell excess energy back to the grid or by using stored energy to provide backup power during outages. The integration of grid interactivity can help owners meet sustainability goals, increase property value, and attract quality tenants who prioritize energy efficiency and reliability. In addition, these buildings position owners to take advantage of evolving energy markets, incentives, and green certifications, making their assets more competitive and future-ready in a rapidly changing energy landscape.



Source: Building Technologies Office, U.S. Department of Energy

PROJECT PROFILE

JAMESTOWN

Located in San Francisco, California, the Waterfront Plaza office complex, owned and managed by global real estate investment and management firm Jamestown, employs an automated scheduling system to enable grid interactivity. This system leverages real-time building performance and occupancy data along with weather forecasts to create a comfortable and temperate space for tenants, optimize building operations, and maximize energy efficiency.

Tenant engagement plays an important role in supporting load flexibility, ensuring buildings can seamlessly integrate energy efficiency and renewables while meeting occupant needs. Buildings on site make use of energy management technologies, including Nantum AI, an automated demand management product by Prescriptive Data. In addition to automated scheduling for energy conservation at Waterfront Plaza, Nantum AI enables automatic adjustment of building systems according to internal and external conditions, such as occupancy and weather.

This grid-interactivity program has also been implemented at Levi's Plaza, an additional building in downtown San Francisco. At Levi's Plaza, Nantum AI is complemented by heat pumps, solar PPAs, and on-site solar installations, allowing for streamlined management of tenant energy demand, further advancing sustainability goals.

PROJECT PROFILE

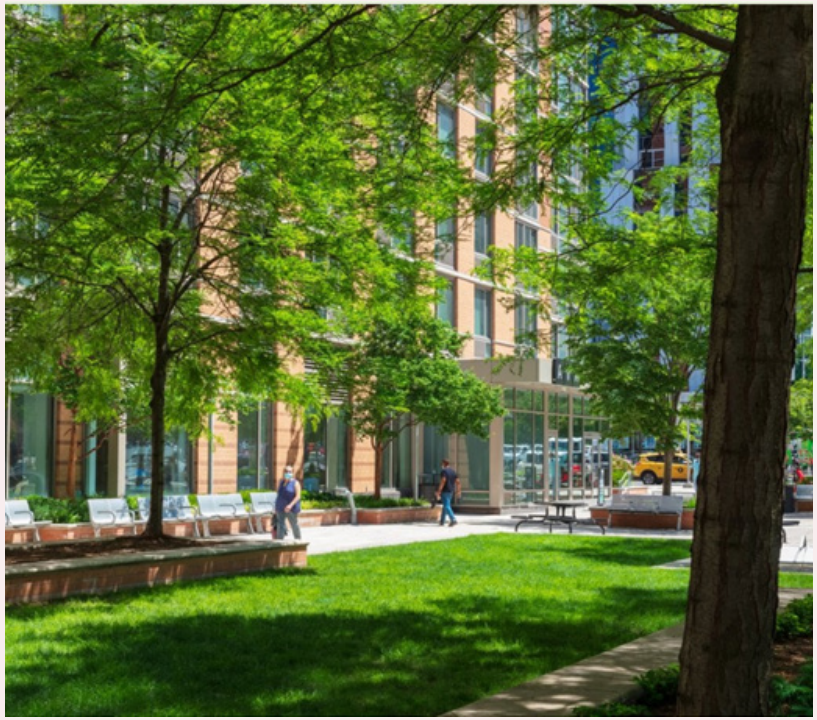
AVALONBAY

Owner-led incentive-based programs have proven effective in getting residents comfortable with aspects of grid interactivity programs. AvalonBay Communities, a publicly traded real estate investment trust, in partnership with Logical Buildings' Grid Rewards program, allows residents to benefit directly from the utility's efforts to reduce peak demand.

By taking actions such as turning off air-conditioning units on certain dates and at specific times, residents receive lower utility bills and program participants saved an average of $43 last year. In 2024, out of 5,312 eligible units, there were 377 active accounts, resulting in a total of 2,331 kWh reduction.

The Grid Rewards through Logical Buildings program is part of AvalonBay Communities' plan for resident engagement with the aim of educating them about the direct impacts of energy consumption. Outreach efforts for this initiative extend into many laterals across the firm and include distribution of both digital and physical media (specifically email and social media outreach, elevator signs, and door hangers).

The program has seen an increasing uptake, which AvalonBay attributes in part to residents increasingly seeking sustainability-focused buildings and lower utility expenses.



Avalon Fort Green, a multifamily structure with 631 Grid Rewards program–eligible units and 9 percent program enrollment. (Courtesy of AvalonBay)

PROJECT PROFILE

BABCOCK RANCH

The Babcock Ranch planned development, developed by Kitson & Partners, located east of Punta Gorda, Florida, was one of the few communities that experienced only minor impacts from the devastating storm of Hurricane Ian due in part to its grid-interactive buildings. Developers had made investments in community resilience, including many grid-interactive measures, to ensure Babcock Ranch would be well-equipped to deal with storms like Ian. The investments, benefiting tenants, included grid redundancy from additional on-site solar generation capacity and battery systems, a community microgrid through 74.5 megawatt solar facilities and solar "trees," and rooftop solar on energy-efficient buildings.

The developers at Babcock Ranch understood that fostering a resilient community involves both infrastructure and engagement. Through partnerships between the developers, Kitson & Partners, the State of Florida, and the utility provider Florida Power & Light, resident needs were central to design and construction. In response to these needs, the community's energy strategy was shaped to empower residents with more control not only over their homes but their environmental footprint and energy consumption.

Solar facility at Babcock Ranch. (Hall Media Strategies)

LOOKING AHEAD

Owners and tenants can leverage renewable strategies such as on-site solar, off-site renewables, battery storage, and grid interactivity to reduce emissions and also to create shared value and aligned incentives.

Continued innovation will only accelerate decarbonization. Smart grids and AI-driven energy management systems can optimize usage, while advanced battery technologies such as utility-scale can provide a stable supply of clean energy around the clock. These solutions unlock the potential for buildings not just to consume, but to store, share, and even sell renewable power.

To fully realize these benefits, transparency and collaboration between owners and tenants is essential. Tools like enhanced data-sharing platforms, green leases, and dashboards can help clarify roles and responsibilities, turning sustainability into a shared mission. As innovations continue to scale, the built environment is poised not just to meet, but to exceed decarbonization goals.

> “With commercial, office, and retail assets, reducing carbon works much better when the owner and tenant are in sync. We can’t do it without tenants, as they are our most important operating partners. We work closely with them to make sure renewables are deployed.”
>
> – Albert Chan, Shui On Land

1909 K Street. (Courtesy of Tower Companies)

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