



BEST PRACTICES FOR LEASING NET-ZERO ENERGY BUILDINGS

AN ACTIONABLE GUIDE EXPLAINING THE BUSINESS CASE AND PROCESS FOR
DEVELOPERS AND LANDLORDS TO PURSUE NET-ZERO ENERGY LEASED BUILDINGS

BY CARA CARMICHAEL AND ALISA PETERSEN





ABOUT US

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ABOUT ROCKY MOUNTAIN INSTITUTE

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; Washington, D.C.; and Beijing.

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1. If implemented thoughtfully **net-zero energy (NZE) provides strong returns to developers and landlords**, including a 3 to 7 percent higher occupancy rate, 3.5 percent higher rental rates, and 13 percent higher sale value.
 - **Assuming a 10 percent construction cost premium to build an NZE building (excluding solar PV), an owner will have an 8-year payback through higher operating income.**
 - **If the building is owned for a period of 10 years and then sold, the owner will receive 19% higher profits than a comparable non-NZE building.**
 - **A developer that immediately sells the building upon project completion will receive 17 percent higher profits than a comparable non-NZE building.**

In certain circumstances, NZE-leased buildings result in faster permitting approvals and a more competitive construction bid process. There are mounting case studies that validate this value proposition.

2. **To achieve NZE, four critical components must be included in the lease** process and lease structure:
 - a. **Energy budget:** The energy budget is the amount of energy allocated to each tenant based on the renewable energy generation capacity. Achieving the energy budget requires landlord tracking and tenant buy-in as well as appropriate tenant incentives.
 - b. **Submetering and disclosure:** Landlords and tenants can't manage what is not measured, so there needs to be a basic level of submetering between tenants and common areas. The energy use data needs to be shared with or visible to tenants on an ongoing basis.

- c. **Recommissioning:** Include a requirement for recommissioning in the lease as an operating expense ensuring the building continues to operate as efficiently as possible.
 - d. **Cost recovery:** Leases should have language that allows the costs and benefits for solar photovoltaic (PV) and efficiency upgrades to flow back to the proper party or parties.
3. **NZE leases are possible and profitable for both new construction and existing buildings.** Since existing buildings typically have existing tenants and leases, the landlord and tenant need to work together to get on the pathway to NZE through the following steps:
 - Step 1:** Gather past energy data on the building and share it with tenants
 - Step 2:** Set aggressive yet achievable energy goals with tenants
 - Step 3:** Recommission the building so it is operating as efficiently as possible
 - Step 4:** Implement energy efficiency and solar PV upgrades using financing mechanisms that can be passed through to the tenant such as a solar power purchase agreement (PPA) or commercial property assessed clean energy (PACE) financing.

4. Landlords and tenants alike can **take action today** with ready-to-deploy resources and the model lease provisions provided along with this guide.

WHY ARE MORE ENERGY-EFFICIENT LEASED BUILDINGS NECESSARY?

Eighteen percent of the carbon and 36 percent of electricity consumption in the U.S. come from commercial buildings, and 52 percent of non-government-owned commercial buildings are leased.^{1,2} Reducing energy use in leased buildings is crucial to meet cities' and states' carbon reduction goals, and makes good business sense for developers and landlords. This guide demonstrates the business case for net-zero energy (NZE) leased buildings and provides guidance on how to write and negotiate an NZE lease so that both the landlord and tenant benefit.

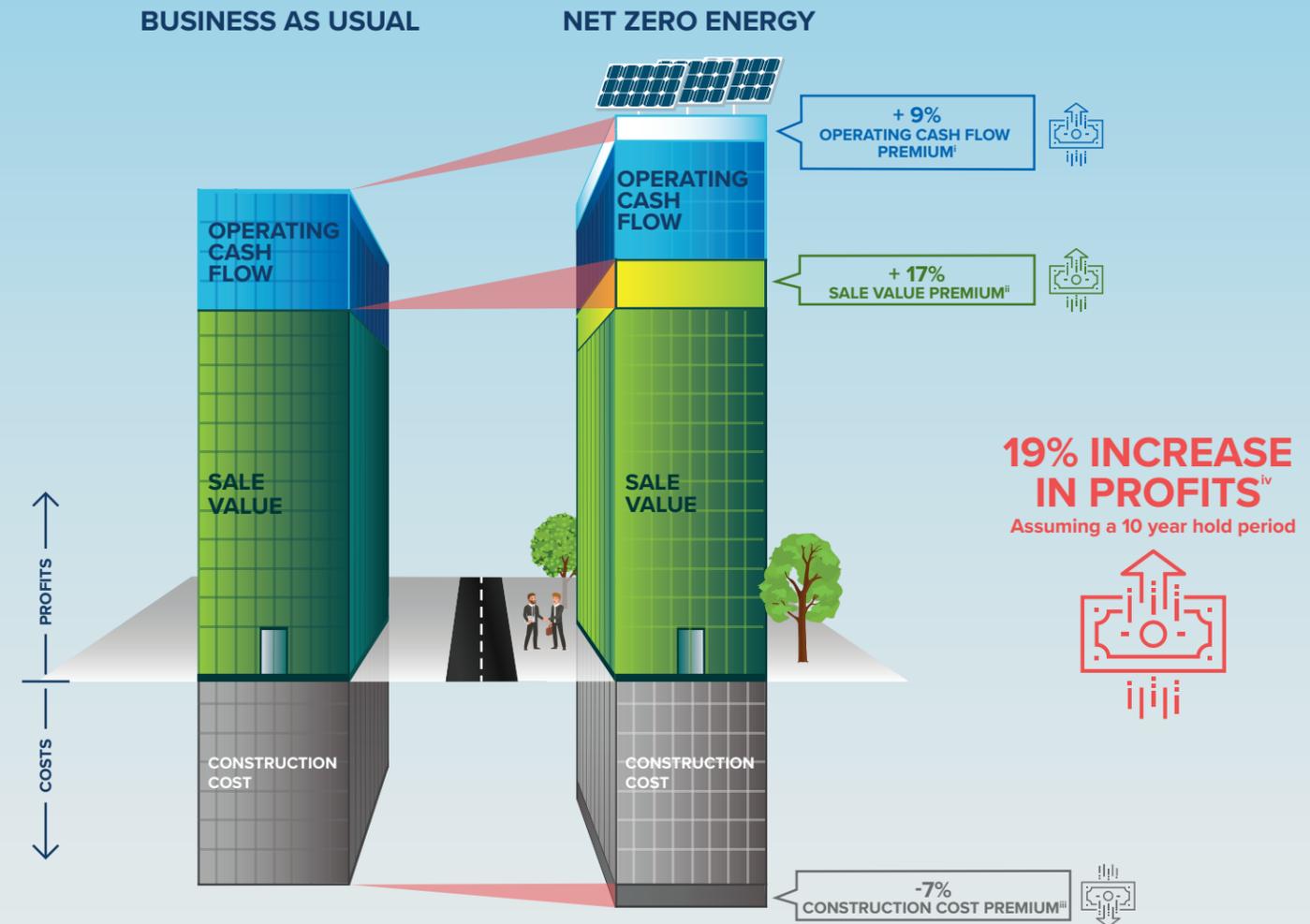
WHAT IS A NET-ZERO ENERGY BUILDING?

A net-zero energy building is a highly energy-efficient building that produces enough carbon-free energy (on-site or through off-site procurement) to meet the building operations' energy consumption annually.³ NZE buildings are typically three stories or less, educational and office, and less than 100,000 square feet, although there are a growing number of NZE projects pushing these boundaries. That said, the vast majority of both new and existing buildings in the U.S. fall within this profile.⁴

WHY ARE THERE FEWER NZE-LEASED BUILDINGS THAN NZE-OWNER-OCCUPIED BUILDINGS?

There are various barriers that prevent leased buildings from being as efficient as owner-occupied buildings, including lack of knowledge, the hassle factor, and the split incentive issue. Split incentives are due to the misalignment of the capital costs for efficiency (borne by the owner) and the cost benefits from energy savings (accrued by the tenants). The good news is a well-designed lease can solve the split incentive issue and taking the time to prove the business case for NZE can help overcome other barriers.

INCREASE YOUR PROFITS WITH LEASED NET-ZERO ENERGY BUILDINGS



WHAT BRINGS TENTANTS IN AND MAKES THEM WANT TO STAY?

- Better daylight & views
- Improved indoor air quality
- Better thermal comfort
- Bolstered employee recruitment & retention
- Improved employee satisfaction & productivity
- Lower operating costs

ⁱThe business-as-usual (BAU) case assumes national average values for rent, vacancy, operating costs, tenant improvement packages, and broker fees. The net zero energy (NZE) case assumes a 3.5% rent premium and 4.5% higher average occupancy over 10 years.^{15, 16}

ⁱⁱBAU sale value was determined using the net operating income and a 6 percent cap rate. A 13 percent higher than BAU sale value was applied to the NZE building.¹⁶

ⁱⁱⁱNZE construction cost does not include cost of solar PV (funded through a PPA). A 10 percent higher than BAU construction cost was applied to the NZE building.¹²

^{iv}Increased Profit Calculation: $(\text{Operating cash flow premium} + \text{sales premium} - \text{construction cost premium}) / (\text{BAU operating cash flow} + \text{BAU sale value} - \text{BAU construction cost})$.

INSPIRING NZE-LEASED BUILDINGS

Several developers have successfully built and leased NZE buildings and blazed a trail for others to follow. Insights from stakeholders in four NZE-leased buildings will be referenced throughout this guide.



Photo Credit: Kaitlin Wutschel

BOULDER COMMONS

Full Case Study: Page 24

Size: 100,000 square feet (across two buildings)

Location: Boulder, CO

Developer: Andy Bush, Morgan Creek Ventures

Project Type: NZE new construction, multitenant

Completion Year: 2017

Lease Structure: Modified triple net lease (NNN),^v landlord pays energy bill

Economics: Projected \$33/sf premium at point of sale compared to a non-NZE Class A office building



Photo Credit: Bruce Damonte

435 INDIO WAY

Full Case Study: https://newbuildings.org/wp-content/uploads/2017/03/CPUC_435Indio.pdf⁵

Size: 31,759 square feet

Location: Sunnyvale, CA

Developer: Kevin Bates, Sharp Development. Sharp Development has developed five leased-NZE buildings to date

Project Type: NZE major renovation, single or two tenant ready

Completion Year: 2013

Lease Structure: Modified full service gross lease,^{vi} tenant pays energy bill

Economics: Less than 6-year payback on the incremental cost to achieve NZE from faster lease-up, lower operating costs, and rent premium. Projected \$123/sf premium at point of sale compared to code-baseline building.⁶



Photo Credit: Nic Lehoux

THE BULLITT CENTER

Full Case Study: <https://casestudies.uli.org/bullitt-center/>⁷

Size: 52,000 square feet

Location: Seattle, WA

Developer: Denis Hayes, The Bullitt Foundation

Project Type: NZE new construction, multitenant

Completion Year: 2013

Lease Structure: Modified NNN, landlord pays energy bill

Economics: The Bullitt Center is fully leased, while the average Class A vacancy rate in Seattle is 7.1 percent.⁸ This results in additional annual rent revenue of approximately \$111,000.



Photo Credit: Jeff Peters

1400 PAGE MILL ROAD

Full Case Study: <http://hanoverpagemill.com/1400-page-mill/>⁹ and <https://urbanland.uli.org/planning-design/solar-array-yields-environmental-economic-rewards/>¹¹

Size: 90,000 square feet

Location: Palo Alto, CA

Developer: Jim Gaither Jr., Hanover Page Mill Associates

Project Type: Net-zero electricity (the building has gas boilers for heating), new construction, two tenants.

Completion Year: 2015

Lease Structure: NNN

Economics: Through a solar lease, solar was installed at no upfront cost. Landlord is anticipating an average 6 percent annual return on cost through PV partners incentive program and through tenants paying the landlord for any solar electricity the building consumes.¹¹

^vA triple net lease (NNN) requires the tenant to pay all real estate taxes, building insurance, and maintenance.

^{vi}A full service lease, or gross lease, requires the landlord to pay all or most building expenses. Typically, the base rent is higher in this case than a triple net lease.

THERE IS A STRONG BUSINESS CASE FOR NZE-LEASED BUILDINGS



The business case needs to take a holistic approach to costs, including incremental capital expenditures and cost savings during operation and sale. In today's building industry, there is likely a cost premium for NZE-ready construction (excludes the cost of solar PV)—anywhere between 1 and 12 percent—but these costs continue to fall as NZE becomes the new normal.¹² **Solar can be viewed as a separate income-generating investment or could be third-party financed via PACE or PPAs, effectively removing the upfront premium.** Other barriers preventing market penetration of NZE buildings are perceived technical barriers, lack of awareness, fear of trying something new, and increased attention from the developer and design team. An increasing number of examples show the market is learning how to build NZE buildings effectively, leaving leasing and other business model components as the next frontier to tackle to scale this market. These barriers are also outweighed by multiple benefits that provide an attractive return on investment to a developer:

TENANT ATTRACTION

Due to a new generation entering the workforce and the shifting paradigm of being able to work anywhere, office spaces are becoming collaborative nodes for innovation. Employers are placing an increasing priority on healthy, productive, and engaging spaces that can attract and retain top talent and the leadership that businesses need to thrive today. This is embodied by good daylight, improved thermal comfort, fresh air, and innovative technologies such as solar PV. These factors, in combination with lower utility bills, have proven to attract tenants with up to 20 percent faster lease-up rates.¹³ **NZE provides a unique offering and differentiates a workplace from the rest of the market.** More tenants have corporate sustainability goals and reporting requirements, with 90 percent of employees saying they wish to work for a company with a strong green reputation.¹⁴ But even for those tenants who might not have core sustainability goals, residing in an NZE-leased building can be a straightforward, cost-effective way to provide a better space for employees.

- 1400 Page Mill Road entered a 15-year lease with the anchor tenant more than 2 years ahead of occupancy and well before the start of construction. Signing a lease that far in advance of delivery is rare. Its second tenant signed a 12.5-year lease before construction completion, resulting in full occupancy at project delivery.
- 435 Indio Way leased-up in 3 months compared to the average 18-month market lease-up time.

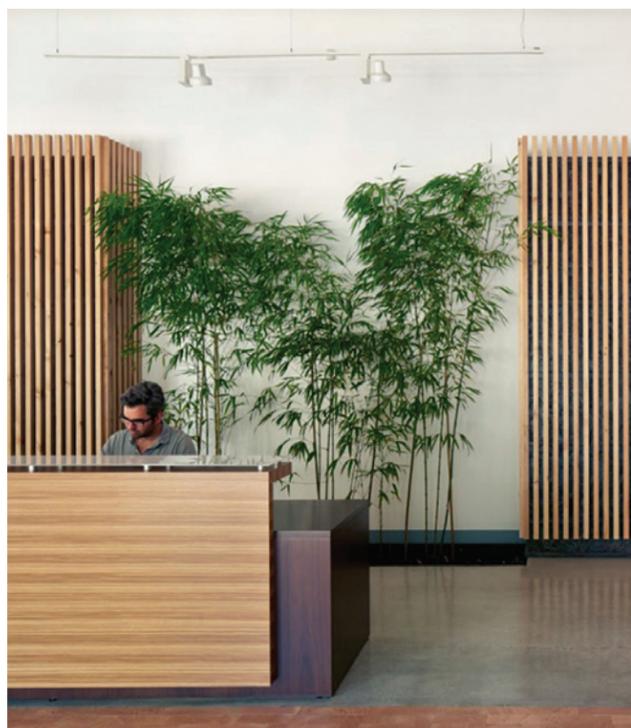
“An employee that currently works in my building [415 Mathilda] said that she cancelled her other two interviews after seeing the building because she wanted to work in this outstanding space.”

—Kevin Bates, Developer of 415 Mathilda and 435 Indio Way, both NZE-leased offices

LOWER VACANCY RATES AND IMPROVED TENANT RETENTION

Studies have shown ENERGY STAR and LEED-certified buildings have 3 and 8 percent lower vacancy rates, respectively, than standard buildings—a trend that will be matched, and likely exceeded, with NZE buildings.¹⁵ Lower vacancy rates are due to higher tenant retention, faster lease-up, and shorter downtime between tenants. Tenant retention has the greatest impact of these factors since finding a new tenant instead of renewing a tenant results in higher tenant improvement (TI) packages and broker fees in addition to lost rent between tenants. Retaining a tenant results in a one-time TI and broker savings to the landlord estimated at \$32/sf in tenant spaces when renewing the lease at the end of the term.^{vii}

- The Bullitt Center is fully leased, despite an average Class A vacancy rate in Seattle of 7.1 percent.⁸



435 Indio Way photo © Bruce Damonte

HIGHER RENT

NZE-leased buildings are unique and differentiated in the market and are often higher-quality, better-performing systems with increased thermal comfort, which drives rental premiums. This is consistent with market research of over 21,000 U.S. rental buildings that demonstrated rent premiums of 3.5 percent for ENERGY STAR certified properties.¹⁶

- 435 Indio Way rented at a 5.5 percent rent premium compared to other leased buildings in Sunnyvale, CA.

HIGHER MARKET VALUE

Speculative developers that don't plan to hold onto their NZE buildings still benefit from a compelling value proposition. Efficient buildings tend to have lower capitalization (cap) rates due to more stable cash flow attributed to lower energy costs and higher occupancy rates.^{viii} As a result of these factors, higher anticipated rent, and lower operating expenses, energy efficient buildings can sell for a premium of about 13 percent.¹⁶

- Boulder Commons has a projected cap rate of 5.5 percent, which is 0.5 percent lower than the typical cap rate for office buildings. This results in an anticipated sales premium of \$33/sf.¹⁸
- 435 Indio Way has a projected \$123/sf premium at sale compared to a code baseline building based on higher rent, lower operating expenses, and additional leasable area from exterior insulation.⁶

FUTURE-PROOFING INVESTMENT

Designing a new construction project as NZE future-proofs and de-risks the building, since trends show tenants and local jurisdictions are placing a higher priority on sustainability. Being ahead of the curve and designing to NZE from the onset of a project reduces risk as codes become more stringent and sustainability becomes a higher priority to tenants. An NZE building won't need to undertake efficiency upgrades to remain competitive. This results in less cost over time since NZE is most cost-effective when done in a new construction application, due to benefiting from incremental costs.

ADDITIONAL BENEFITS FOR FIRST MOVERS

NZE buildings are seen as highly desirable from a city and community perspective, accelerating the approval process of local entitlements, permits, and the local planning authority in several cases.¹⁹ Additionally, because NZE projects are considered cutting edge and innovative, design teams and lenders may be more inclined to offer favorable pricing or lower interest rates, respectively, in order to be a part of the project. This is a well-rounded benefit because the design team gets recognition for being part of an innovative project, the lenders have portfolios that are more appealing to their shareholders, and the developer might trim some cost from his or her project.

- According to the leasing brokers for 1400 Page Mill Road, this project received local government entitlements faster and with fewer changes than any comparative development project from this market in recent memory.

“Once a tenant resides in one of our NZE buildings, he or she won't go to lower quality for the same rent. This helps reduce my risk in downturned markets.”

—Kevin Bates, Developer of 435 Indio Way

“The city and local residents were happy with the NZE project. I got great lenders, great designers, and great tenants. It was just win-win-win-win throughout the entire project.”

—Jim Gaither, Developer of 1400 Page Mill Road

^{vii} Based on national average new tenant improvement costs from JLL research and broker fees of \$44/sf and 5 percent respectively compared to renewal costs of \$16/sf and 3 percent respectively.¹⁷

^{viii} Cap Rate: net operating income as a percentage of a real estate asset's sales price.

CAPTURING THE BENEFITS: COMPONENTS TO INCLUDE IN AN NZE LEASE

While the benefits are significant, care must be taken to set up a lease (or revise an existing lease upon renewal) that aligns the costs and values for both a landlord and a tenant. NZE lease requirements should be directly written into the body of the lease, so that they are less likely to be removed during negotiations.

AN EFFECTIVE NZE LEASE SHOULD INCLUDE THE FOLLOWING COMPONENTS:

1. **Energy Budget:** To achieve NZE operation, tenants and common areas must use less than the amount of energy that the on-site renewable energy generation (typically solar PV) produces. Alternatively, if procuring renewable energy, the energy budget could be set based on an energy use intensity (EUI) target. To ensure energy targets are met, an energy budget that is broken out per tenant is required. Most NZE leases to date have separated energy expenses from operating expenses in order to make the cost more transparent to all parties.
 - a. **What to Budget:** Energy budgets can account for all energy consumed by a tenant, the common areas, or specific end uses. A plug load and lighting budget is recommended since those end-uses are fully in the tenant's control and fairly straightforward to isolate and meter separately. To allow for simply submetering, the landlord should require in the lease that tenant improvement electrical loads be routed through dedicated panels and segregated by lighting loads and receptacle loads. Heating, cooling, hot water, and ventilation loads are often shared through central equipment and require more advanced metering to separate per tenant. These loads are also less important to include in the energy budget since tenant behavior has less impact on these end uses due to efficient HVAC systems and strong envelope performance. If a tenant has large process loads such as data centers, those loads should be metered separately and have a separate energy budget.
 - b. **Tenant Education:** Creating and enforcing the energy budget will be more successful if the landlord and tenant work together to build a foundation of trust. For tenants to feel comfortable with their plug load budget, the landlord needs to provide information on what type of plug loads, lighting, or tenant behavior would be required to stay within their budget so the tenants can understand the energy drivers of their business. Additionally, the landlord should make available the end-use breakdown of typical space types and typical energy consumption, so the tenants understand how aggressive the energy budget is. If the tenants don't feel comfortable with their budget or don't feel it is achievable without compromising employee productivity, it might be a deal breaker, so it is important the tenants have the tools to stay within budget.
 - c. **Tracking the Budget:** Another key to successful energy budget implementation is frequent disclosure to tenants on how they are tracking against their energy budget. Energy budgets should be trued up annually so tenants have time to troubleshoot overages before receiving a penalty. Submetering the end uses included in the energy budget is required for this type of disclosure (e.g., separating lighting from plug loads). While not absolutely necessary to track the energy budget, tenants might benefit from having access to real-time metering, so they can see how their energy consumption changes over time.

d. Enforcement: There are different methods to enforce the energy budget, including a reward, penalty, or hybrid approach. Rewards should be negotiated between landlord and tenant but could include rent credit, reduction in operating expenses, installation of electric vehicle charging stations, or even a catered lunch for tenants who use less energy than budgeted. Penalties could require that tenants pay for excess energy above budget and purchase renewable energy certificates (RECs)—a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation—to offset the excess energy use. It is important in a multitenant building that one tenant's operation does not impact the overall achievement of NZE. This can be done by providing offset purchasing options for tenants who exceed their budget. Many utilities offer green power purchasing programs, or overages could be offset with RECs.^{ix} The landlord should coordinate a plug load energy audit effort for any tenant that exceeds its budget for the year to help identify high-energy-using behaviors or equipment. This is a simple and inexpensive effort.

e. Tenant Equality: In a multitenant building, tenants should all be working toward the same energy budget. This ensures tenants feel they are being treated fairly. This can be accomplished with lease language that adjusts all tenant energy budgets to match the most favorable tenant terms. The one exception to this rule is if tenant spaces are being used in very different ways. For example, a restaurant won't be able to achieve a similar energy budget to an office. One way to make it equitable across different space types is to research typical energy consumption for those space types and then use similarly aggressive reductions in energy when setting the energy

budget. For this to be successful, solar PV will need to be sized assuming separate energy budgets for different use types, or high-energy spaces will need to be comfortable purchasing more RECs. If possible, tenant performance should be transparent so that all tenants see their relative performance.

- Boulder Commons has an energy budget for plug loads of 7 kBtu/sf, which is 69 percent below U.S. average office plug load usage.²¹ Boulder Commons requires tenants who exceed their annual budget to pay the landlord for additional energy purchased as well as any RECs required to offset that unplanned energy. All tenants have the same plug load budget regardless of whether their space is used as an office, restaurant, or salon. While Boulder Commons did not include an energy budget for tenant lighting, it did include LED requirements in the tenant improvement package, resulting in efficient lighting in tenant spaces.
- The Bullitt Center has an energy budget for plug loads and lighting of 7.5 kBtu/sf, 76 percent lower than a typical U.S. office building.²¹ If tenants exceed their plug load budget, they need to pay their energy bills, otherwise energy costs are paid by the landlord. Since purchasing RECs wasn't required in their lease, the Bullitt Center built in a safety factor by installing additional solar PV. To date, all tenants have stayed in their budgets and the building has achieved net-positive operation.

2. **Disclosure:** In addition to disclosing the actual energy use compared to the energy budget, the lease should specify that on an annual basis, tenants receive an NZE operation report that includes total building energy consumption, solar PV production, and whether RECs were required to achieve NZE operation. The best-case scenario for disclosure is a live tracking system that allows tenants to track their energy consumption in real time in addition to the annual report that summarizes the data. Sharing this information between landlord and tenant encourages joint troubleshooting of any problems and helps build a relationship of trust through transparency. Additionally, landlords should consider monitoring tenant feedback through periodic tenant surveys and sharing feedback with the tenants.

- 435 Indio Way provides live energy data for tenants to view.
- The Bullitt Center tracks tenant energy use in real time and releases an annual report to tenants on NZE operation.

Bullitt Center photo © Nic Lehoux



^{ix} Purchasing RECs may be insufficient to claim NZE according to a few definitions of NZE. For example, to qualify for Living Future Institute Zero Energy Certification, renewable energy production needs to occur on-site.²⁰

3. **Regular tune-ups (recommissioning) for the building:** Commissioning is required for both new construction and existing buildings to ensure the building is functioning optimally to reduce cost and improve health and comfort. Commissioning is different but complementary to standard operations and maintenance. There are a few different kinds of commissioning activities, defined below. All are critical for NZE operation.

a. **New Building Commissioning** provides quality control for newly constructed buildings. Commissioning should begin at pre-design and continue through design, construction, and early operation. Commissioning is intended to ensure that building systems and equipment have been designed, installed, and tested to perform in accordance with the owner's project requirements. Commissioning activities yield savings with an average 4.2-year payback period.²² Because commissioning of new construction projects often occurs before tenants are involved with the project, it is not included in most lease language, but is an important activity.

b. **Existing Building Commissioning (Recommissioning)** occurs after the building is occupied and includes diagnostic testing to ensure systems are working as intended and working together (e.g., eliminating simultaneous heating and cooling of a space). Capital improvements may be identified from the recommissioning process, but the costs for those capital improvements would not be included in the recommissioning effort. High energy use or poor thermal performance are common triggers for recommissioning efforts. Recommissioning projects pay back between 8 months and 2 years.^{23,24} Buildings should be recommissioned on a frequent basis (at least every 3 years or ideally triggered when real-time performance monitoring drops). The frequency of recommissioning should be included in the lease so the expense can

be equitably distributed and is not a surprise to tenants. To ensure recommissioning is cost-effective, an annual review of energy consumption compared to weather-normalized expected energy usage could be done, and the full recommissioning process would move forward only if the actual energy usage deviates above anticipated usage by a predetermined amount (e.g., 10 percent).

- The Boulder Commons lease requires annual recommissioning of the common areas and central mechanical equipment, which is passed through to the tenants as an operating expense. Also, tenants who exceed their plug load budget are required to have their space recommissioned with the cost passed specifically to that tenant.



Boulder Commons, Lobby photo courtesy Morgan Creek Ventures

435 Indio Way photo © Bruce Damonte Photography



4. **Cost Recovery:** For landlords to invest in energy efficiency projects or solar PV, they need to recover the cost of these investments. Most green leases contain specific provisions stating that capital expenditures that reduce operating costs can be passed through to tenants. Usually the amount passed through is limited to the modeled energy savings associated with the improvement or the cost is amortized over the useful equipment life. Passing through the cost equating to the modeled energy savings instead of cost amortized over the life of the equipment may allow landlords to see a quicker return on their efficiency investments, therefore making them more willing to invest in efficiency. To ensure both tenants and landlords are benefiting from efficiency improvements, a working group in New York created energy-aligned lease language, which recommends passing through a cost equal to 80 percent of the modeled energy savings, so tenants have a safety factor built in if the energy saving measure doesn't perform as expected.²⁵ Under this model, tenants will realize immediate savings if the equipment is operated efficiently. Additionally, the energy savings measures should be modeled and the results shared with tenants for transparency purposes.

- 1400 Page Mill Road used a solar lease to finance its solar panels. The landlord had no upfront costs for the solar array, but pays the monthly solar lease charge. He expects to see an average annual 6 percent return on solar costs. The landlord receives an incentive per kWh generated by the solar panels through the PV Partners program for the first 5 years of operation.¹¹ Additionally, the landlord charges the tenants for the solar electricity they consume at the same rate as the utility. In many locations, landlords are not able to charge tenants directly for energy, so the landlord had to work with his utility to get approval.

THE PROCESS FOR BUILDINGS WITH EXISTING LEASES TO GET TO NZE

Many owners and landlords want to upgrade and reposition their existing buildings to NZE. This may be more complex with existing leases that may not allow landlords to pass the cost of efficiency improvements or solar PV to tenants and have varying lease timeframes. While almost all the concepts above can apply to an existing lease, there is a recommended process (and time commitment) required for existing buildings on a path to zero.

Step 1: Data Gathering and Disclosure—The conversation around achieving NZE is often led by the landlord, potentially at the request of tenants. The first piece of information needed is the building’s baseline energy use. This can be done by gathering utility bills over the course of a year and comparing the building to other similar buildings in the area by setting up the property in ENERGY STAR Portfolio Manager.^{26,27} An energy audit can help get an estimate of energy consumption for end uses and individual tenants before submetering is in place. For more granular tenant energy consumption, submetering is necessary. To keep costs down, submeter per tenant and only meter specific tenant-controlled end uses such as plug loads and lighting.

Step 2: Energy Goal—Landlords should work with tenants to create an energy goal or “soft energy budget” that is attached to a reward, but without penalty. The soft energy budget should be based on energy use data from previous years and can help identify the effectiveness and extent of possible efficiency improvements. The ultimate outcome of the energy budget is to work toward an energy use intensity that is low enough that the building’s energy needs can be met through on-site solar or off-site procured renewable energy. The soft energy budget will start the discussion between tenant and landlord about building efficiency, and could get tenants on board with future sustainability projects. One way to hold tenants more accountable is to request or help them create an energy management plan, which should include their energy goal, steps toward achieving their goal, and how they will communicate

the outcome with their employees.²⁸ When the lease turns over, the soft energy budget can be written into the lease as a hard energy budget that the tenant is required to meet. Since tenants have already been tracking their energy consumption and are aware of their typical energy consumption, the hard energy budget will be more tangible and achievable.



1400 Page Mill Road photo courtesy Craig Cozart Photography

TIME TO STEP UP

Step 3: Recommissioning—Once baseline energy use is understood and an NZE goal is set, a recommissioning agent should walk through the building and recommend small tune-up projects as well as more significant efficiency improvement projects for the future. The majority of recommissioning occurs on central equipment and it can be done after hours to minimize disturbance to tenants. The cost of recommissioning should be written into the lease at lease turnover or renewal, but could be passed through to tenants as a maintenance cost depending on tenant and landlord negotiation. Recommissioning is a quick and easy way to ensure tenants save energy, especially for buildings that have never been commissioned. Achieving quick results and lower operating expenses should get tenants excited about future cost-saving and energy-improvement efforts to come. Before and after recommissioning, an occupant comfort survey could be administered to show tenants the non-energy benefits associated with a more efficient building.

Step 4: Implementation of Solar PV and Efficiency Improvements—Solar PV and efficiency improvements can be implemented without lease changes using C-PACE, a solar PPA, or a model similar to Lumens as a Service.²⁹ Once the lease turns over or is renewed, energy improvement cost pass-throughs should be written into the lease. Adding solar PV might be a good initial improvement since it can be very visible, will have high impact, requires minimal tenant buy-in, and doesn't disrupt tenant spaces. Once the solar PV system is installed, the landlord should disclose the solar PV production compared to the energy consumption of the building, so both the landlord and tenants can understand the energy reduction required to achieve NZE. Similarly, if NZE will be met through off-site renewable procurement, the energy consumption of the building should be tracked against the energy use intensity goal to show tenants how energy efficiency improvements help achieve the energy goal. Additionally, the tenants and landlord should have check-ins on the progress of the NZE goal to hold each other accountable and show progress toward the goal.

1400 Page Mill Road photo © Craig Cozart Photography



Rocky Mountain Institute is scaling the adoption of NZE multitenant buildings by demonstrating the business case and laying out actionable next steps. Additional resources are provided below. The full case study for the Boulder Commons follows on page 24, and detailed case studies for 435 Indio Way, The Bullitt Center, and 1400 Page Mill Road are available, showing multitenant projects that have profitably achieved NZE.^{5,6,7,9,10}

Once informed, landlords and developers should start conversations with their internal teams as well as tenants around how they can integrate green lease language into their existing portfolio and consider NZE for their next new construction projects.

Additional green lease resources:

- Institute for Market Transformations **Green Lease Library** is a resource center for case studies, lease language, and webinars for all things related to green leasing. <http://www.greenleaselibrary.com/>
- **Green Lease Leaders program** is a recognition program for tenants, landlords, and brokers who have successfully incorporated energy-aligned lease language into standard business practices. <https://www.greenleaseleaders.com/>
- BOMA's **Commercial Lease Guide** includes example green lease language. https://store.boma.org/shopping_product_detail.asp?pid=52168
- Point Energy Innovations released a paper, **Profiting from the Sun**, which demonstrates how developers of leased buildings can benefit from solar PV installations. <http://towercompanies.com/wp-content/uploads/2016/10/Profiting-from-the-Sun-Case-Study-by-Point-Energy-Innovations-Page-46.pdf>
- PlanNY's **Energy Aligned Clause** discusses best practices for passing the cost of energy saving upgrades through to tenants in an equitable way. This includes example lease language. http://www.nyc.gov/html/gbee/downloads/pdf/eac_overview.pdf

- The General Services Administration (GSA) developed a **Green Lease Guidance Document**, which includes a matrix of simple, standard, and superstar green lease recommendations. https://www.gsa.gov/cdnstatic/Olgay_-_High_Perf_Leasing_-_11-17-16_508.pdf
- Lease excerpts from the Bullitt Center and Boulder Commons: http://info.rmi.org/NZE_Lease_Guide



Bullitt Center photo © Nic Lehoux



CASE STUDY

BOULDER COMMONS

REPLICABLE NZE SOLUTIONS FOR MULTITENANT BUILDINGS

AWARDS AND ACCOLADES

Boulder Commons is the largest multitenant net-zero energy (NZE) project in the U.S. and among the first multitenant buildings in the U.S. to achieve net zero energy. This project proves that NZE-leased buildings can have a compelling value proposition for the developer, landlord, and tenant—providing a replicable model for the industry to scale cost-effective and high-performance leased spaces.

PROJECT SNAPSHOT

Location	Boulder, CO
Project Size	100,000 square feet (two buildings)
Developer/Landlord	Morgan Creek Ventures
Principal Architect	Coburn Architects
Tenants	10–15 tenants including office, salon, restaurant, and coffee shop
Estimated Energy Use Intensity (EUI)	26 kBtu/sf before solar PV, 70% lower than the average office in Boulder.
Construction Completion	2017
Warm Core and Shell Construction Costs (Excluding Solar PV, Site, and Soft Costs)	\$235/sf (12% hard cost premium compared to code-compliant office buildings in Boulder)
Solar PV Costs	\$2,300,000 (\$4.05/W)
Estimated Energy Cost Savings	\$146,000/year, compared to standard energy costs for an office building in Boulder.
Solar PV Installed	575 kW mounted on the roof and SE façade. Produces 716,397 kWh/yr, enough to offset the building's annual energy use excluding the restaurant.

“After doing an NZE building, I don’t think I could go back. We’re already in the design phase and have approvals for our next NZE office.”

—Andrew Bush, Principal at Morgan Creek Ventures



Boulder Commons photo courtesy Morgan Creek Ventures

PAVING THE WAY

This project demonstrates that NZE multitenant leased buildings are not only possible but also financially compelling. Additional information and resources on Boulder Commons can be found on RMI’s website. Developers and landlords can use Boulder Commons’ NZE lease as a reference along with the *Best Practices for Net-Zero Energy Leased Buildings Guide* in order to begin the discussion with their teams and tenants on how they can work toward NZE operation in their existing building stock and have their next new construction project be NZE.

RMI was recognized as a 2017 Green Lease Leader by the Institute for Market Transformation and the Department of Energy. Boulder Commons expects to achieve the International Living Future Institute Zero Energy Certification as well as ENERGY STAR certification after a year of occupancy. RMI is a Charter ENERGY STAR Tenant (one of the first) and expects to achieve ENERGY STAR for Tenants certification.

Boulder Commons, Suite 200 Kitchen photo courtesy Morgan Creek Ventures



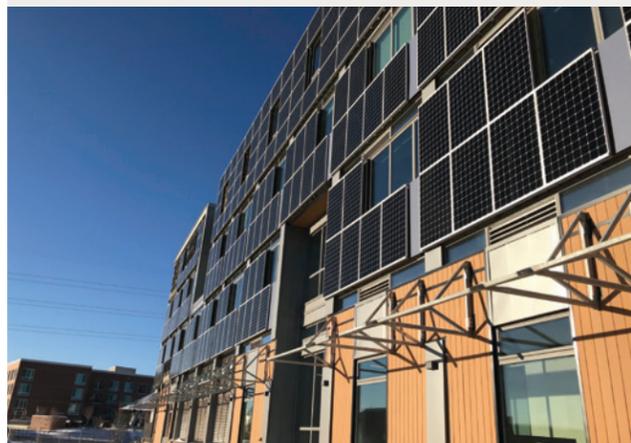
GETTING TO NZE

Morgan Creek Ventures (MCV), the developer and landlord for Boulder Commons, took a very thoughtful approach to NZE from the onset of this project. Its goal was to achieve NZE with an attractive financial return while keeping tenant costs comparable to the local market, both while delivering attractive, desirable, and comfortable spaces. Achieving NZE requires developers to strike a balance between aggressive energy efficiency and renewable energy generation. NZE was achievable using off-the-shelf technology with proven results including the following:

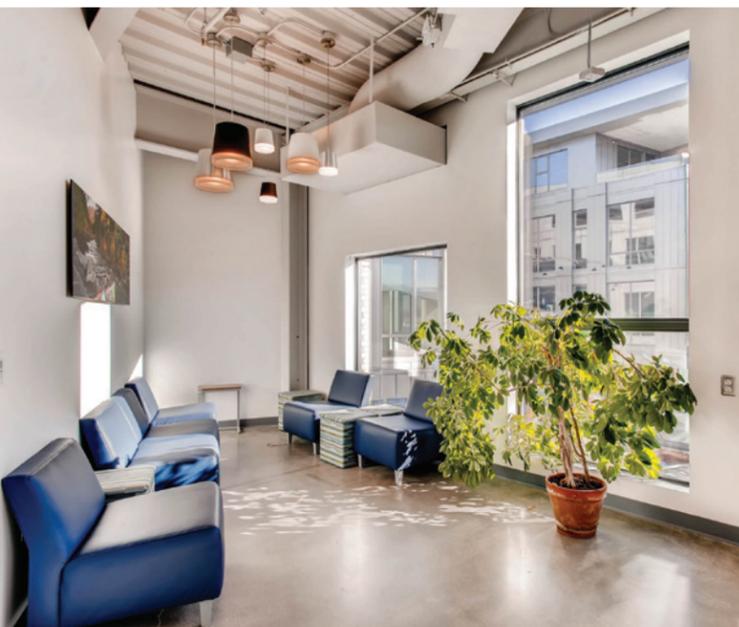
- **Windows:** triple pane windows tuned per façade (center of glass U-0.13, solar heat gain coefficient of 0.49 on N, 0.24 on S, E, W).
- **Lighting:** all LEDs with lighting power density of 0.35 W/sf, 61 percent better than required by Boulder energy code.
- **Lighting controls:** continuous dimming daylighting controls throughout open office. Vacancy sensors throughout open office and conference rooms.
- **HVAC:** variable refrigerant flow with energy recovery and energy recovery ventilation.
- **Renewables:** 575 kW solar PV with 71 percent total generation capacity on the roof and 29 percent capacity on the southeast façade.

BOULDER COMMONS INNOVATIVE SOLAR PV

Boulder Commons took an innovative approach to solar PV design. Since Boulder Commons is a four-story building in a cold climate, it was not able to achieve NZE through rooftop solar PV alone. Rather than pursue deeper energy efficiency measures, it was more cost-effective to install 205 kW of solar PV on the southeast façade, which had the additional benefit of offsetting exterior cladding costs. The vertically mounted solar PV cost approximately \$84/sf, but since it eliminated the need for a metal panel wall system at \$42/sf, the incremental cost for solar PV was only \$42/sf. The southeast facing solar PV has lower performance than the rooftop solar PV by about 28 percent due to its vertical orientation, but at a \$42/sf incremental cost, each unit of energy generated from the southeast facing solar PV has a faster payback than rooftop solar PV.



Boulder Commons photo © Romy Purshouse



Boulder Commons, Suite 200 photo courtesy Morgan Creek Ventures

BUSINESS CASE FOR DEVELOPERS

Boulder Commons achieved NZE at a 12 percent incremental hard cost excluding solar PV compared to a typical office building in Boulder. Between an anticipated 10 percent greater tenant retention and overall 5 percent higher occupancy rates, Boulder Commons will see 5 percent higher net cash flow over 10 years versus a comparable non-NZE building without factoring in a sales premium. Additionally, when the property is sold, the anticipated half a percent lower cap rate would generate an additional \$33/sf premium at the point of sale.

- **Profiting from Solar PV:** MCV chose to purchase the solar PV instead of entering into a PPA because it expects to see a 6.2 percent return on its investment. Because MCV could not charge its tenants directly for the energy produced by the solar PV due to local regulatory restrictions, it added an energy charge to the base rent calculated using energy expenses for a standard office in Boulder. To determine a fair energy charge, MCV studied the energy bills of other local properties and found a range between \$1.80/sf and \$2.50/sf annually. It then used the lower end of that range and added it to the base rent. MCV will pay the actual utility bill, so any reduction in energy cost beyond the roughly \$2/sf will go to the building owner to help recover the solar PV costs. This also provides an incentive for the landlord to continue reducing energy costs over time and investing in technologies like energy storage, demand response, or load flexibility, which would increase the return by reducing demand charges.
- **Competitive Rent:** With the added energy charge in the base rent, Boulder Commons is in line with other Class A office buildings in Boulder.
- **Tenant Retention and Attraction:** In addition to the energy savings value stream, MCV expects Boulder Commons will offer the company additional value during market downturns. Studies have shown ENERGY STAR and LEED-certified buildings have 3 and 8 percent lower vacancy rates respectively. A conservative 5 percent lower vacancy rate than market average results in \$151,000 of avoided rent lost annually. This lower vacancy rate is due to higher tenant retention, faster lease-up, and shorter downtime between tenants. Better tenant retention has the greatest impact of these factors since finding a new tenant instead of renewing a tenant results in higher tenant improvement (TI) packages and broker fees in addition to lost rent. Retaining a tenant results in savings to the landlord estimated at \$28/sf in tenant spaces when the tenant chooses to renew its lease at the end of the term.* MCV expects to see 10 to 15 percent higher tenant retention based on a more comfortable and desirable building.
- **Market Value:** Because NZE buildings have reduced risk through lower utility bills and increased tenant retention, they typically have lower capitalization rates than standard buildings. Boulder Commons has an anticipated cap rate of 5.5 percent, which is half a percent lower than typical office buildings. Because of this lower cap rate, Boulder Commons has an anticipated added value at point of sale of \$33/sf.
- **Recognition:** As the largest NZE multitenant leased building in the U.S., Boulder Commons has received significant press, amplifying MCV's role as a sustainability leader in the industry.

*Based on landlord-estimated new-tenant improvement costs and broker fees of \$40/sf and 5 percent respectively compared to renewal costs and broker fees of \$15/sf and 3 percent respectively.

VALUE TO TENANTS

Some tenants, like Rocky Mountain Institute (RMI), place a high value on NZE to meet sustainability goals, but Boulder Commons is also desirable to companies that may not prioritize sustainability.

- Lower Cost to Rent:** While tenants are paying market rate for base rent, they see an overall lower cost due to lower operating expenses. Tenants don't have to pay a utility bill as long as they stay within their energy budget, so they are insulated from any utility rate increases. This reduces their anticipated operating expenses by approximately 13 percent.^{x1}
- Increased Productivity:** The greatest benefit to the tenant comes from higher employee productivity and satisfaction due to improved thermal comfort, natural daylight, and residing in a healthy building—all proven to increase productivity by 6–16 percent. A recent U.S. Department of Labor study showed that people (salaries) cost a company 100 times more than energy, so while a lower utility bill is great, increasing employee productivity makes residing in an NZE office building very compelling. An analysis for a tech company that is leasing a space in Boulder Commons found that a mere 2 percent increase in productivity from residing in this building would offset its entire base rent cost.
- Customer Marketing Tool:** One of Boulder Commons' tenants owns a hair salon and wanted to differentiate her business by making it a "green salon." The salon owner chose to reside in Boulder Commons specifically because it was an NZE building, and she saw being a tenant as a first step toward marketing her business as a green salon.
- Employee Recruitment and Retention Tool:** Companies can use their occupancy in Boulder Commons to help recruit new employees and embody corporate sustainability objectives. Research from the Society for Human Resource Management found that 67 percent of employees place a high importance on their company's commitment to a "green workplace."

Boulder Commons, Suite 200 photo courtesy Morgan Creek Ventures



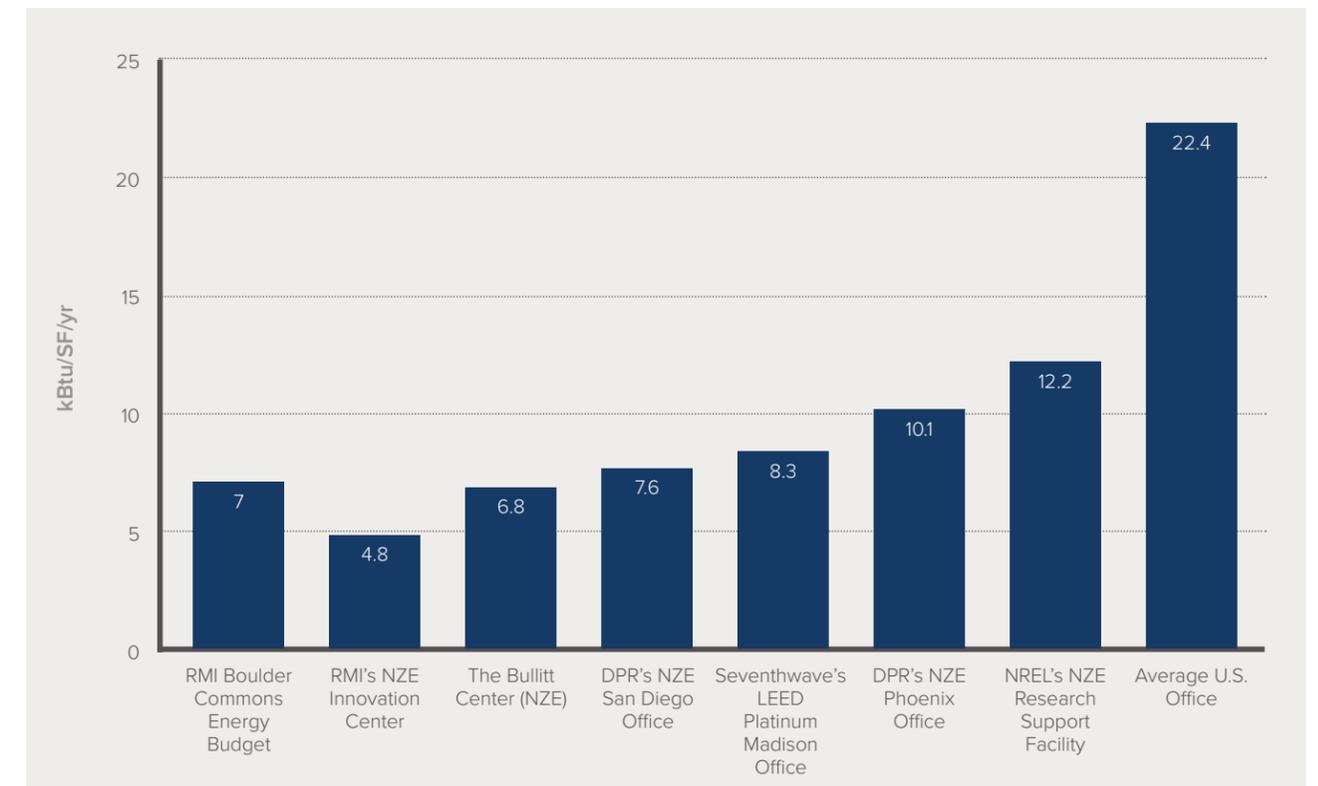
^{x1}The broker assumed operating expenses of \$14.50/sf including energy for Boulder Commons. Since the tenant doesn't pay the energy bill, the anticipated operating expenses are \$12.60/sf excluding energy.

CREATING A NET-ZERO LEASE MODEL

MCV worked with RMI and its counsel at Holland & Hart to develop a new lease structure to meet the net-zero energy goals. In order for this building to successfully achieve NZE, all tenants were required to have NZE provisions in their lease. The key NZE components of the Boulder Commons lease include the following:

- Energy Budget:** All tenants are given a plug load budget of 7 kBtu/sf, which is 69 percent below U.S. average office plug load usage. Tenants' plug load energy is monitored separately, and they receive reports monthly on how their plug load usage compares to the budget. If they exceed their budget, they are responsible for paying the incremental utility bill as well as purchasing renewable energy certificates (RECs) to offset their excess usage. This is crucial to net-zero energy operation, since plug loads are the largest energy end use in typical net-zero energy buildings, and are entirely the responsibility of the tenants.

FIGURE 1
PLUG LOAD ENERGY USE



ENDNOTES

- 2. Annual Recommissioning:** Base building systems will be recommissioned annually to ensure they are operating at optimal performance. This expense will be passed through to tenants as an operating expense. The lease provides clear delineation as to what counts as recommissioning vs. asset improvements vs. standard operations and maintenance. Also, tenants who exceed their plug load budget are required to have their space recommissioned with the cost being passed specifically to the individual tenants.
- 3. NZE Requirement:** NZE was set as a clear goal in the lease so all parties are on the same page. If the on-site renewable energy system does not generate as much energy as the building uses (excluding the restaurant) over the course of a calendar year, the landlord will purchase RECs

to make up any shortfalls. The cost of RECs is a landlord expense, not passed through to tenants, unless the failure to achieve NZE was caused by the tenant exceeding its plug load budget, in which case it is passed through to that specific tenant.

- 4. Disclosure:** In addition to the monthly plug load usage report, tenants will receive an annual report on the building's energy consumption and production.
- 5. Cost Recovery:** Since the landlord is responsible for the utility bill, any energy improvements will directly benefit the landlord, and therefore cost recovery language in this NZE lease is unnecessary.

- <https://energy.gov/eere/buildings/about-commercial-buildings-integration-program>
- <https://www.eia.gov/consumption/commercial/data/2012/bc/pdf/b15-b21.pdf>
- <http://architecture2030.org/zero-net-carbon-a-new-definition/>
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- <https://www.energystar.gov/ia/business/15best.pdf>
- <https://www.rmi.org/insights/lumens-as-a-service/>

Boulder Commons, viewed from above photo courtesy Coburn Architecture





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