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Decarbonizing buildings: *The opportunity for private equity investors to invest in solutions driving the transition to net zero buildings.*



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SUMMARY

Key themes driving our investment strategy:

- Decarbonizing buildings is imperative to meeting the Paris Agreement targets.
- A confluence of regulation and consumer sentiment is driving a commercial opportunity for companies serving building owners in this transition.
- Nuveen's focus on inclusion, and partnerships across our investment teams, drives significant value creation opportunities in this space.

BUILDINGS AND CLIMATE CHANGE

The building sector accounts for roughly 39% of global GHG emissions. Of that, 28% comes from operational emissions, meaning the emissions generated to keep the lights on, power building systems, and heat and cool. The remaining 11% are generated via the materials required to construct the buildings and deconstruct them – representing the full lifecycle of each building.¹

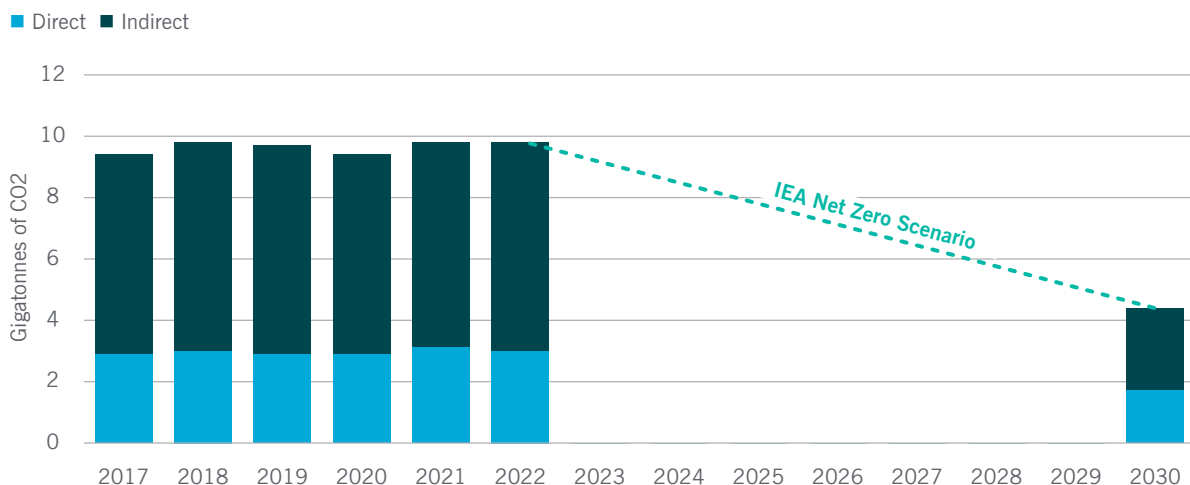
Reduction in the carbon intensity of buildings will require both a decrease in the energy consumption of buildings via retrofits and upgrades, but also via behavioral changes in energy use, and a shift in the mix of energy sources that power buildings towards renewables and away from fossil fuels. Most net zero scenarios, including the International Energy Agency's net zero pathway, call for a more than 50% reduction in emissions from buildings by 2030 from 2022 levels.²

Rapid action is needed to meet these targets and to keep the world on a path to less than 1.5 degrees celsius of global warming – the threshold beyond which scientists broadly agree the impacts will be enormous on human life on this planet.³

OPINION PIECE. PLEASE SEE IMPORTANT DISCLOSURES IN THE ENDNOTES.

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Past and projected building-related emissions



ADDRESSING CLIMATE CHANGE NO LONGER A ‘NICE-TO-HAVE’ FOR BUILDING OWNERS

- Energy prices and cost savings:** As energy prices increase in the U.S. and are projected to continue to do so for the next several years⁴, the materiality of a company’s energy consumption to their financial performance also increases. As a result, energy efficiency, building retrofits, and even new leasing in energy efficient buildings will become increasingly attractive in the U.S. This is undoubtedly a tailwind for building managers with an intentional focus on sustainability and more efficient use of energy.
- Changing consumer sentiment and increased focus on climate change.** As the physical impacts of climate change are increasingly felt by U.S. consumers, large companies are taking note – of the Global Fortune 500 companies, 63% have set net zero by 2050 (or sooner) targets.⁵ The impact

of these targets is trickling down to building owners and managers, because meeting any operational net zero target requires decarbonization of the physical spaces in which these companies operate.

- Regulatory pressures and incentives.** Local regulators are increasingly focused on the emissions profile of building stock. Regulations like Local Law 97, a New York City regulation that requires buildings with greater than 25,000 square feet onto a net zero by 2050 pathway, can result in a series of increasingly costly penalties for noncompliance (to the tune of \$268 per ton of carbon over the established limits).⁶ On the flip side, more than \$1 trillion in incentives and tax credits is available as part of the Inflation Reduction Act and other state incentive programs to drive electrification and grid decarbonization, which will directly support building owners interested in improving the sustainability profile of their assets.

PRIVATE EQUITY IMPACT INVESTING CASE STUDY

Generating energy savings at small businesses virtually

Power TakeOff (PTO) is a provider of virtual energy efficiency services, serving small and medium businesses to drive decarbonization in an underpenetrated market with zero changes to building infrastructure. PTO uses artificial intelligence and machine learning to mine utility data to identify energy savings opportunities, and works directly with small businesses to implement changes to their building management systems and energy usage to generate emissions savings. On average, PTO generates savings of 15-20% for each business, per year. In October, 2023, Nuveen Global Impact Fund I made a \$18 million investment in PTO to support their scaling of this service and expansion into adjacent markets.

Note that Nuveen Global Impact Fund I is closed to new investment.

KEY CHALLENGES REMAIN THAT PREVENT IMMEDIATE ACTION

There are, however, considerable challenges, despite these clear tailwinds, to implementing decarbonization strategies for most buildings, and progress will require both technological and business model innovation.

- **By 2040, two-thirds of the global building stock will be buildings that exist today.** That means new construction can only account for a fraction of the decarbonization that is necessary, and significant changes will need to be made to existing building stock. Effectuating these changes in a way that doesn't produce significant emissions and can quickly result in a lower building emission profile is essential. The alternative of constructing new buildings is massively more emissions-intensive than mitigating actions on existing building stock.
- **Electrification can only get a building so far if the grid is still carbon intensive.** The push to electrify building systems (think heat pumps and electric appliances) is essential on the pathway to net zero emissions, but if buildings still pull energy from the grid, and the grid has not decarbonized, the impact of these interventions will be muted. Buildings will need to consider on-site or off-site renewable energy generation such as community solar, alongside electrification, in order to achieve net zero. Additionally, distributed energy resources, microgrids, and grid resiliency technologies will play an increasingly important role in expanding grid access quickly to allow buildings to access renewable energy sources.
- **Financing these retrofits and installations remains a challenge.** Significant progress has certainly been made in financing residential and commercial decarbonization retrofits. Structures like C-PACE (Commercial Property Assessed Clean Energy) have significantly simplified access to finance for building owners, but financing remains among the most significant barriers to these types of capex-heavy projects.⁷ This is partly because, while C-PACE has grown rapidly, it is still only available in 32 states.
- **Driving an equitable transition requires innovative business solutions.** Low-income individuals are more exposed to the physical impacts of climate change, and are less likely to benefit from the economic tailwinds that the transition will create. Affordable housing, which is insufficient to meet housing demand in most developed markets, is particularly exposed to the challenges listed above.

PRIVATE EQUITY IMPACT INVESTING CASE STUDY

Helping low-income customers access renewable energy and cost savings

Nuveen Global Impact Fund I invested \$25 million in Perch Energy, a SaaS servicing platform for community solar in the U.S., providing renewable energy access to 70%+ of the U.S. population that cannot access rooftop solar, while also providing 10-20% utility bill savings. Perch acquires and manages community solar subscribers on behalf of project developers – helping to drive renewable energy access to residential and low and middle income households. As an investor in the company, NGIF I will provide Perch with access to Nuveen Real Estate's Affordable Housing platform as a potential subscriber base in a pilot partnership to drive access to low cost renewable energy to residents and meaningful savings on their utility bills, underscoring the value of our impact investing expertise bolstered by Nuveen's broader platform.

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OPERATING COMPANIES WITH INNOVATIVE BUSINESS MODELS AND TECHNOLOGY HAVE A KEY ROLE TO PLAY

Overcoming these challenges is ultimately in the hands of business owners and managers. Nuveen's real estate team has set a net zero by 2040 pathway and has released a detailed roadmap for how it plans to achieve that goal.

On the Private Equity Impact Investing team, our focus is on identifying the growth-stage operating companies that have developed business models or technologies that can profitably support real estate owners (like Nuveen Real Estate) with this transition. Further, because these businesses are the 'picks and shovels' of the transition to a low carbon building sector, they don't typically face the same significant technology or regulatory risks that many climate-tech companies do. They leverage proven technologies, existing commercial frameworks, and innovate the business model to deliver that technology in novel ways.



Abigail Dean

*Head of Strategic Insights,
Nuveen Real Assets*

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*As one of the top 5 largest real estate asset managers in the world, with a focus on net zero carbon and a target to achieve this by 2040, we see the need for solutions to help building owners decarbonize. We see this as a considerable addressable market and **Nuveen's Private Equity Impact team has been a helpful partner in identifying these solutions and bringing them to our platform.**”*

Below are some of the key business models and sectors we are targeting:

SECTOR/BUSINESS MODEL	RATIONALE
 <p>On-site or regional renewable energy production</p>	<p>18% of global emissions arise from energy generation for buildings. As electrification of building heating systems, and installation of electric vehicle charging stations continues to accelerate, the need for renewable energy generation will only increase. Private companies can drive (and are driving) this transition – as asset-light developers, servicers, and financiers of renewable energy – either on-site (e.g. rooftop solar) or nearby (e.g. community solar) commercial and residential buildings.</p>
 <p>Energy efficiency</p>	<p>Reducing energy usage per square foot is essential to meeting the targets set forth in the Paris Agreement. Further, as U.S. utilities increasingly focus on near term ‘low-hanging-fruit’ opportunities to reduce pressure on the grid, efficiency is likely to be a prime target. Providing meaningful savings to residential and commercial utility customers offers multiple potential revenue sources for effective efficiency businesses, and the shift to pay-for-performance contract models ensures the alignment between revenue and impact that we target for our funds.</p>
 <p>Efficient building materials and building management software</p>	<p>Efficiency upgrades to building stock require new technology, suited to the intricacies of existing buildings. New building shells, heating and cooling systems, and hardware/software for building management will need to be cheaper, more energy efficient, and easier to install in order to achieve the necessary building retrofits necessary to decarbonize existing building stock. Within this sector, asset-light manufacturers, installers, and servicers are particularly attractive for our growth-stage investment profile, as are developers of building management software that help owners manage down their energy usage and emissions.</p>
 <p>Financing</p>	<p>Overcoming upfront expenditures for building retrofits requires expertise in both real estate and commercial financing – both of which Nuveen has. As building owners (both commercial and residential) increasingly focus their efforts on changes to existing building stock, and incentives from federal and state governments in the U.S. and other countries proliferate, businesses financing the installation and management of decarbonization technology – and new, energy efficient builds – will be increasingly attractive to private equity investors like ourselves.</p>

Contact us

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For more information, please visit our website, nuveen.com/impact.

Endnotes

- 1 <https://worldgbc.org/wgbw19/>
- 2 <https://www.iea.org/energy-system/buildings>
- 3 <https://www.ipcc.ch/sr15/>
- 4 https://www.eia.gov/outlooks/steo/report/elec_coal_renew.php
- 5 <https://fortune.com/2022/09/21/companies-net-zero-emissions-government-demands/>
- 6 <https://www.nyc.gov/site/sustainablebuildings/l197/local-law-97.page>
- 7 <https://gettingtozeroforum.org/wp-content/uploads/sites/2/2021/10/Strategies-for-Setting-and-Achieving-Net-Zero-Goals-in-Global-Real-Estate-Portfolios-GTZForum.pdf>

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