

How Goes the Energy Transition?

Consensus Lacking on the Urgency of the Climate Imperative

As the litany of evidence piles up on the societal and economic ravages of climate change, the pressure and urgency to take more meaningful steps about reducing greenhouse gas emissions and preparing to adjust to harsher climate scenarios increases—and seems to bring new actors onto the climate change industry stage with every passing month.

Climate change scientists, theorists or what now could be called sages long talked of ‘tipping points’ where the presumably indelicate balanced equilibrium of atmospheric chemistry, global weather patterns, and natural ecosystems would be shattered, raising the potential for catastrophic impacts with little that mankind could do to stop them.

Even today in the middle of 2023 with abundant evidence of these escalating impacts, it may still be alarmist to say there is little we can do to stop them, but surely there is a lot we can do to slow these impacts down, to minimize them or to adapt to them. This of course is the business challenge of the climate change industry as CCBJ has defined it — and an increasing number would say the existential challenge of our species, but as a business publication we don't want to lapse into further alarmist thinking.

Suffice it to say that there is a continuum amongst national, global and corporate leadership from ‘maintaining the status quo’ to ‘the sky is falling’. Examples abound but here we focus on the United States of America and the current divide between its lead agency providing energy intelligence

The Energy Transition & the Climate Change Industry

Climate Change Business Journal assesses where we are in the energy transition in 2023 with a review of U.S. government energy and emissions data and forecasts, comparing business as usual with long-term net zero strategies. A review of venture activity and 10 company profiles in executive Q&A form reveal key trends.

<i>Energy, GHG Emissions and Industry Scenarios: EIA vs. The White House: The U.S. Energy Information Administration expects U.S. energy-related carbon dioxide emissions to increase in 2023, but likely for the last time. EIA's long-term outlook only has CO2 emissions falling only by one-third by 2050, well behind the White House and NDC pathway outlined in The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050</i>	3
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CLIMATE CHANGE BUSINESS JOURNAL

ISSN 1940-8781

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Climate Change Business Journal® newsletter is published in quarterly feature editions and special supplements by Environmental Business International Inc., 4452 Park Blvd., Suite 306, San Diego, CA 92116. 619-295-7685 or email info@ebionline.org

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and the leadership in the White House. So to ask the question: How goes the energy transition? One first has to ask the question where is it aiming to go, and what grand forces may be guiding it?

At the end of 2021 the Biden Administration through the office of the White House issued *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*. As the name implies the outcome was multiple strategies, pathways and scenarios with the ultimate end of net zero emissions by 2050 for the United States. The report was also the administration's work product to submit the Nationally Determined Contributions (NDCs) or climate action plan to cut emissions and adapt to climate impacts that each party to United Nations Framework Convention on Climate Change's 2015 Paris Agreement is required to establish and update every five years.

Meanwhile across Washington DC at the U.S. Department of Energy, the Energy Information Administration, the principal source of current data used by the White House on energy generation, costs, pricing, fuel mix, emissions and all things energy, continues to crank out periodic updates of its Short Term Energy Outlook and Annual Energy Outlook. The AEO forecasts scenarios of energy use and emissions out to 2050, but with no target outcome for its scenarios other than a range of accuracy based on economic and 'zero-carbon technology cost' factors.

One might expect or even hope that these two sets of scenarios would have more similarities than differences, but this is not the case as demonstrated in the following curated summaries by CCBJ. Admittedly we in a free democratic society that encourages independent thought, and likewise we expect and even hope that these agencies in the government have differing opinions, and don't coordinate a narrative of propaganda to sway the public, investors, industry or the international community.

However, the difference of the end-point of the LTS net zero emissions by 2050 and the EIA's 2050 endpoint at one-third reductions of the U.S. six gigatons of CO2 energy emissions down to four GTs is alarming, to say the least (see chart on page 4). The LTS admits that its 2030 interim and 2050 final goals are 'ambitious', but also states categorically that net zero is 'achievable'—and in so many words in the introduction, executive summary and conclusion that net zero is imperative.

The urgency to make serious commitments to this imperative is shared by a majority of the progressive community, and indeed likely by the majority of the population, and by association their elected representatives. So why does the Energy Information Administration not include such a scenario or pathway in its main long-term forecast it publishes in its widely cited Annual Energy Outlook?

Rather than try to solicit a response that would likely cite the use of best available data on use, production, resource supply, and economic data, one can only speculate. The Europe-based global equivalent to the EIA, the **International Energy Agency** (IEA) produces a similar variety of data sets and in 2021 published *Net Zero by 2050: a Roadmap for the Global Energy Sector*. Well regarded and much cited reports by BP, including the most recent BP Energy Outlook contains 'Net Zero' as one of its three scenarios. Countless governments around the world fulfilling their NDCs and a similar number of non-governmental organizations have painted and published their own net zero scenarios.

And not to single out the U.S. EIA as the only entity not charting a pathway to global sustainability, as there are others foreign and domestic. But with the mounting evidence that the atmosphere and global systems may be spiraling out of tens of thousands of years of relative equilibrium, it is certainly a wise insurance policy, and hardly an alarmist approach, to fully embrace and invest in a net zero strategy. ⚙️

PACE Equity's Cirrus Low Carbon Capital Package Offers Favorable Rates for More Efficient Building Design

Since 2014, PACE Equity (Milwaukee, Wis.) has funded Commercial Property Assessed Clean Energy (PACE) projects. The PACE Equity team has closed over 200 C-PACE projects across the United States and enabled the energy efficient commercial development of over \$1.5 billion while eliminating 2.5 million tons of carbon.

Tricia Baker is SVP of Strategy & Impact at PACE Equity with experience in global business development, marketing, strategy and consulting. At PACE Equity, she leads the Low Carbon Financing program that incentivizes developers and building owners to build green as they earn reduced rates for PACE Equity funding. She also manages marketing and strategy. Tricia was formerly with Johnson Controls (JCI) where she led global teams for Brand Management, Customer Engagement, Digital Solutions and Market Research. Previously she served as the Senior Marketing Business Leader for a start-up business focused on IoT software solutions and building technology, generating over \$50 million in pipeline in the first year. She also led business strategy, market intelligence and business development for a \$1-billion division that sells energy efficiency retrofits to public sector clients. Tricia has an MBA from Marquette University and a BBA from the University of Wisconsin – Madison School of Business. She has certificates in Brand and Reputation from Dartmouth's Tuck School and Big Data and Analytics Solutions from Northwestern University. She is on the Board of Directors of CO.next, a Milwaukee-based ad agency and ESOP.

CCBJ: Congratulations on PACE Equity's recent award. As the company approaches its 10th year, give us some perspective on your startup, how property-assessed clean energy works in principle and practice, and how your business model has evolved?

Tricia Baker: Thank you! PACE Equity offers financing options that support energy efficient commercial real estate development. Commercial Property Assessed Clean Energy (C-PACE) is a state-legislated public/private partnership that offers private capital to fund items in a building's construction budget that have a quantifiable water, utility, or renewable impact. Eligible improvements vary by state and may include HVAC equipment and controls, insulation and envelope, solar PV, roofing, plumbing, lighting, indoor air quality, and more. In some states, PACE funding can also support improvements like seismic strengthening or resiliency improvements.

We work with developers and owners to help them complete their capital stack, with funding for new construction, redevelopment, and even retroactive refinanc-

ing projects for recapitalization or a bridge to stabilization. Repayment of PACE Equity capital is made through a long-term property tax assessment on the property.

PACE Equity's evolution in recent years has included introducing CIRRUS™ Low Carbon, our award-winning product that offers lower interest rates for lower carbon buildings. CIRRUS Low Carbon is the only private capital that offers lower rates for a more efficient building design. We provide the design specification, the low carbon engineering guidance, and a marketing package to promote the low carbon achievement.

CCBJ: What have been some highlights from the 100 or so projects PACE Equity has facilitated?

Baker: PACE Equity has pioneered a number of firsts in green building financing. We funded the nation's first PACE retroactive refinancing project, financed the first PACE new construction projects in multiple asset classes and states, and were the first PACE projects to incorporate elements like Historic Tax Credits and

Opportunity Zone funds. In the last few years, our signature projects have grown to feature CIRRUS Low Carbon Verified projects. This is extremely unique, as CIRRUS Low Carbon financing is the only private financial product with a lower cost of capital for buildings that feature lower carbon designs. CIRRUS Low Carbon includes, at no additional cost, access to our in-house low carbon engineering team who can help clients meet the specification at the lowest possible costs or, if engaged early enough, with no incremental costs.

EBJ: The main attraction of a PACE project seems to be reduced interest rates. What is the approximate reduction and has that changed as prime interest rates and mortgage interest rates have changed?

Baker: PACE Equity financing is a creative addition to a project's capital stack, offering the option to replace more expensive capital or to fill a gap in the capital stack. PACE Equity's rate tracks to the 10-year Treasury rate and is generally about half the cost of outside equity or mezzanine financing. CIRRUS Low Carbon projects typically receive a reduced interest rate that is 50-75 bps below the standard PACE Equity rate. CIRRUS Low Carbon financing yields an average financial benefit that is over eight times the average incremental cost needed to meet the CIRRUS Low Carbon specification.

CCBJ: You mentioned the desire to change the behavior of those who have direct influence over the building stock. Do you mean developers or the real estate financing community?

Baker: Developers, building owners and lenders are certainly key partners for us. We work with numerous developers who have returned to use PACE Equity financing for multiple projects, demonstrating not only the compelling case for PACE funding but our unique approach with end-to-end support.

PACE Equity & Cirrus Low Carbon Signature Projects

Residences at the Agora | Cleveland, OH

The first CIRRUS Low Carbon Verified project in the country is a redevelopment at Cleveland's historic Agora Theater complex, which features office space, 48 apartment units and a restaurant. The developer sought low carbon verification to appeal to potential residents and tenants seeking healthier, more efficient spaces. This project saved 1,166 metric tons of CO₂.

Coliseum Building | Minneapolis, MN

The historic Coliseum Building achieved CIRRUS Low Carbon Verification and accessed lower rates for the building's lower carbon design. The building had been slated for demolition after damage during civil unrest in 2020, before community developer Redesign, Inc. stepped in to transform the property into retail and office space. This project saved 4,070 metric tons of CO₂.

St. Peters Self Storage | St. Louis, Missouri

The developer of St. Peters Self Storage recognized an unmet local need for storage facilities and sought CIRRUS Low Carbon Verification to support the project's energy efficient design. This project saved 3,985 metric tons of CO₂.

New Perspective Senior Living | Milwaukee, WI

Two senior living developments in Wisconsin used PACE Equity to fund the state's largest retroactive financing project. This project saved 43,340 metric tons of CO₂.

U.S. Olympic & Paralympic Museum | Colorado Springs, CO

Two years after its completion, the U.S. Olympic & Paralympic Museum used PACE Equity funding to refinance the museum and achieve greater financial flexibility and sustainability while leveraging the building's existing energy efficient systems. This project saved 2,030 metric tons of CO₂.

We are also proud of the relationships we have built with lenders. Our services include familiarizing lenders with the features and benefits of PACE so that they are supportive of its addition to a capital stack. Commercial real estate stakeholders are increasingly recognizing the financial, brand, and environmental advantages of green building, and we anticipate the industry's growth in that direction will continue to accelerate.

CCBJ: If many of the reduced interest rate agreements are made at design, presumably architects and designers have a significant role?

Baker: Architects, general contractors and engineers play a critical role in the building design and construction process. An expert in-house engineering and optimization team is included in PACE Equity's offerings at no additional cost, helping projects include green building design elements where it makes sense. The end-to-end process includes reviews of local PACE requirements, an energy study to maximize funding, and if needed for a CIRRUS Low Carbon project, support with meeting the required design specification. PACE funding can be incorporated at the beginning of a project, mid-construction, or even after it's completed - and

our team provides engineering and design support at every stage.

CCBJ: How do you characterize potential increased value of the property for parties interested in a PACE program? Is it increased value at sale, likelihood of more long-term lease or rental commitments, potential for higher rental rates or other factors?

Baker: Several factors support the value of improvements made with PACE financing. Higher market value is one compelling element, as data indicates that greener buildings have the capacity to garner a higher sale price. Reduced operating costs are another powerful factor. Cost savings from reduced utility usage mean a higher Net Operating Income which favorably impacts property value. Tenant interest in a healthier environment is another notable factor for developers. Growing demand for green buildings means that developers and owners who prioritize sustainability attract tenants who value green environments for living and working, and are often willing to pay a premium for a space in an energy efficient building. Combined, these factors build a decisive case for the financial benefits of green building.

CCBJ: What about property taxes? Does investment in efficiency impact property tax rates in cities or states, and is this a significant factor in the equation for an investment?

Baker: Property tax implications of green buildings are a consideration for many developers. Programs at the federal, state and local levels incentivize owners and developers to pursue green building designs, and PACE Equity financing often serves as a final piece in a capital stack that includes those incentives. PACE funding frequently coincides with tax credits and grants that add to the ongoing advantage of building greener.

CCBJ: What inspired you to get into this business in the first place?

Baker: The built environment has a tremendous impact on the planet, with buildings responsible for over one-third of carbon emissions. We work closely with the New Buildings Institute, which advocates for “a transformed built environment that is carbon-free, sustainable, and energy-efficient” and “supports thriving economies that benefit all people and the planet.”

Ultimately, we are confident that those with influence in commercial real estate development can see the economic, environmental and social advantages of building green. PACE Equity is a connector between those decision-makers and green financing solutions, and our work is propelled by a belief that the built environment can be part of the solution for climate change.

CCBJ: What’s the most compelling evidence of climate change that you have experienced in your lifetime?

Baker: Countless data points indicate the impact of climate change. The measurable change in weather patterns is one strong indicator, including evolving wildfire and hurricane patterns that demonstrate changes to the environment. But along with growing evidence of climate change, there is also growing demand from stakeholders for buildings that offset the effects of climate change. Interest in PACE financing has grown significantly in recent years, and the introduction of industry-leading CIRRUS Low Carbon verification has ushered in a new era of green building financing. ⚙️

Notes on the White House LTS U.S. Electricity Generation 2005-2050. Generation by source in trillion kilo-watt-hours. Total generation expands to 2050 due to increased use of clean electricity in new applications in transportation, industry, and buildings. Renewable generation in-creases rapidly to keep pace with growing electricity demand and ensure that the share of renewables continues to expand to 2050.

PACE Equity Wins Innovation in Efficient Financing Award from C-PACE Alliance

PACE Equity (Milwaukee, Wis.) received the Innovation in Efficient Financing award from **C-PACE Alliance** in May of this year. The award recognized PACE Equity’s CIRRUS Low Carbon program, a unique financing solution that significantly impacted customers and lowered carbon output during its first year. Announced in early 2022, CIRRUS Low Carbon offers a reduced interest rate for developers and building owners when their project designs meet a design specification outlined by PACE Equity and New Buildings Institute, a Portland-based sustainability think tank. The financing product was designed to change the behavior of people who directly influence the building stock in the United States.

The CIRRUS Low Carbon Design Specification encourages improvements in building designs that push beyond current building codes to an improved energy efficiency level. As the only financial product dedicated to lowering interest rates while generating energy savings and improved property value, the CIRRUS Low Carbon designation has experienced substantial demand and growth in 2023. The CIRRUS Low Carbon program also offers design consultation with PACE Equity in-house engineers to help developers reach the specification with the lowest impact to construction costs. The engineers work directly with developer design teams to provide design guidance and best practice suggestions so clients can meet the specification and earn the advantage of reduced financing rates. “We are excited to see this new CIRRUS Low Carbon program change behavior in the market as developers update their designs to construct lower carbon buildings,” said Beau Engman, president and founder at PACE Equity. “We are grateful for the recognition by our industry peers as innovators in the Commercial Real Estate Marketplace.”

Long-Term Strategy of the United States & Pathways to Net-Zero: U.S. Electricity Generation Scenarios: 2005-2050

