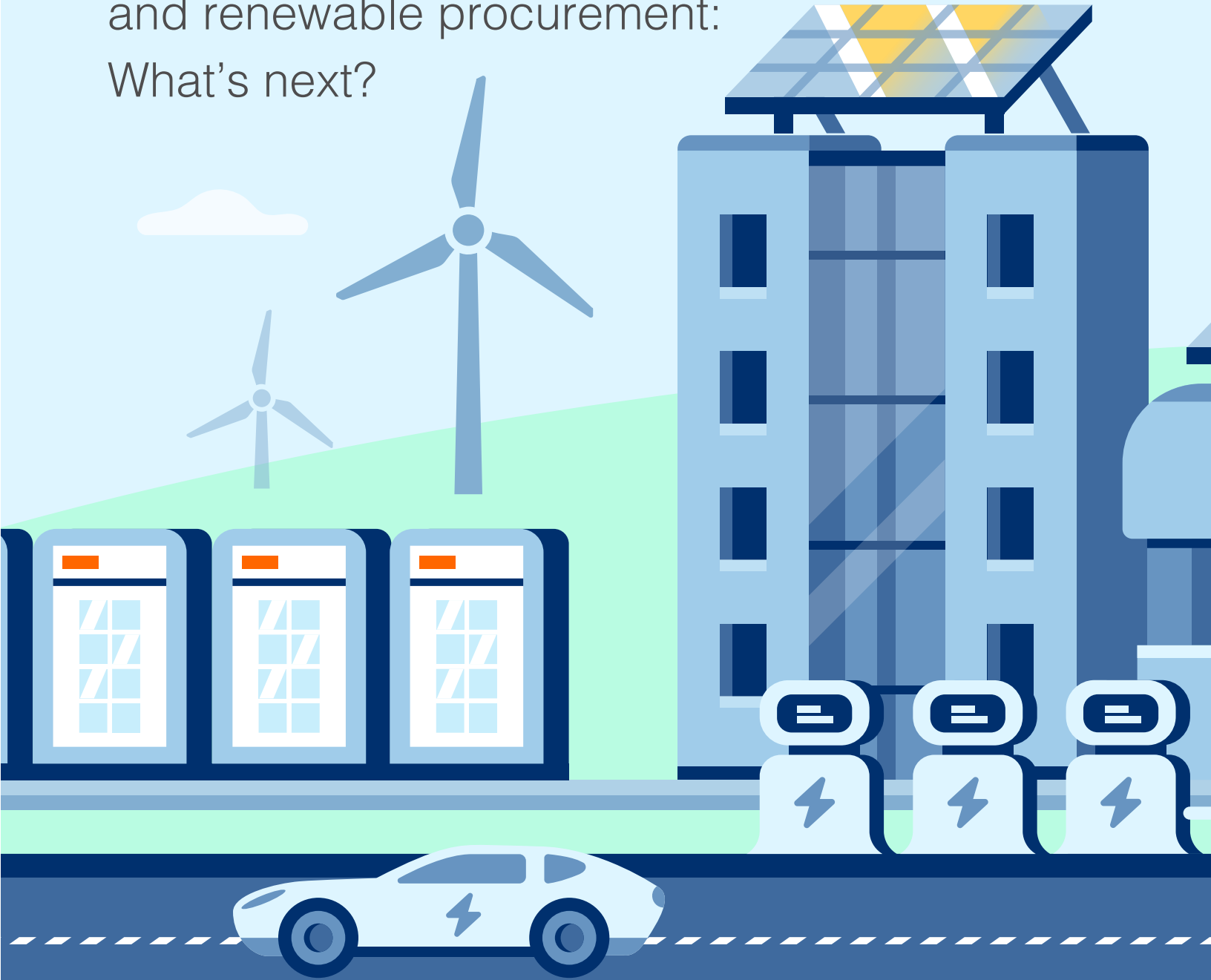


Enterprise Energy Strategies

Beyond energy efficiency
and renewable procurement:
What's next?



Executive Summary

Developing strategies for adapting to the energy transition

As some of the largest electricity consumers, enterprises are key participants in the energy market. For most enterprises, energy is among their biggest non-discretionary – and most unpredictable – costs, and is often looked at as a tax on operations. At many organizations, energy remains unmonitored and not carefully managed, likely due to complexity and lack of control. But leading enterprises are demonstrating innovative strategies for taking control of their energy spend and becoming leaders in sustainability.

Nearly 50 publicly traded companies have added a Chief Sustainability Officer to their executive teams.¹ Corporations are adopting measurable, publicly stated sustainability goals, with over 60% of the F100 making public commitments to reduce energy and almost all F500 companies formalizing sustainability and carbon emission reduction initiatives.

Even as the US government pulled out of the Paris Accord and cut funding for the Environmental Protection Agency in 2017, corporate climate commitments skyrocketed and corporate investment in renewables grew 33% between 2017 and 2018.² Facebook, AT&T, Walmart, ExxonMobil and Microsoft lead the clean energy acceleration with the top five highest volume in deals.³ These commitments, and investor interest in them, have grown in 2019, as both parties realize that energy use is now a material part of how businesses are run.

Because energy affects the whole organization – from profitability and brand reputation, to risk management and resilience – enterprises of all sizes are giving their energy leaders a seat at the table for decisions that stretch far beyond how energy is consumed.

This white paper offers enterprise leaders in energy, operations, and facilities information about the changing energy landscape and leading-edge enterprise strategies for adapting and staying ahead.



Danielle Azoulay, Head of CSR and Sustainability for L'Oreal USA



¹ Weinreb Group (2018). Updated CSO Research.

² Cite source here

³ Rocky Mountain Institute (2018). Corporate Renewable Energy Procurement Continues to Break Records in 2018.

The Business Impact of the Transforming Energy Environment

The ways we produce, manage and consume energy are dramatically changing. The grid is undergoing a significant transformation driven by several powerful forces:

- Growing customer demand for increased choice and control, along with investor interest in Environmental, Social and Governance (ESG) awareness
- Corporate renewable procurement and participation in grid and utility programs
- Replacement of aging infrastructure with adaptive energy infrastructure
- Declining cost of renewables and distributed energy resources
- Increased digitalization and industrial modernization

Fueling this technological transformation are efforts of regulators, lawmakers and the private sector to address climate change, reduce carbon emissions and act as environmental stewards. The result: An increasingly dynamic market, driven by new, complex business models and innovation. As executives have awakened to the realities of managing energy in this dynamic landscape, their CSOs have done much to shed light on energy's five impact areas on the enterprise.

5 Ways Energy Impacts The Enterprise



Developing an energy strategy that addresses all five of these impact areas requires teams to integrate best-in-class business strategy, innovative thinking, and a deep understanding of new technology, the energy market, and regulatory drivers. A tall order for any enterprise.

Energy strategies: Learnings from leading enterprises

Enterprise energy strategies can be categorized under 3 primary buckets:



All three categories are necessary for enterprises that seek to remain competitive, enhance sustainability, and build resilience. Leaving any one of these areas unaddressed keeps your enterprise at risk.

1. Energy Efficiency

- Exclusive focus on site-level energy efficiency measures
- Relegated to building managers and site engineers
- No executive focus or integration into enterprise roadmap

For the first decade of this century, enterprises were able to appease stakeholders in and outside the company with energy efficiency measures alone. You may recall General Motors' 2002 media blitz around winning the Energy Star Excellence In Energy Management Award for a host of energy efficiency measures at their plants—an award they've won six times since.⁴ Similarly, PNC Financial Services was one of the first to build a LEED-certified building in 2000, and rode the wave of good press for several years.⁵

Much of the energy savings to be had—prior to renewables becoming cost-competitive—came from LED-changeouts, smarter HVAC scheduling, and machine upgrades. These days, site engineers propose those upgrades as a matter of routine.

But, this phenomenon hasn't vanished altogether; in 2015 Apple's big public-facing sustainability campaign was focused on the claim that their new UK headquarters would be "the greenest building in the world".⁶ The difference today isn't that leading enterprises forego energy efficiency measures, it's that they're table stakes for a much more comprehensive set of practices.

Energy Efficiency Strategies

Get an energy audit to assess your overall energy use and identify ways to reduce energy use.

—
Upgrade to higher efficiency lighting, HVAC, and machines.

—
Set guidelines for behavior change around high energy consuming systems. Examples include turning off lights overnight and staggering the process of turning on equipment.

—
Install or update your Building Automation System to automate efficiency.

4 Energy Star (2018). Industrial Partner of the Year Awardees 2001 - Present.

5 Forbes (2010) The Most High-Tech Green Buildings.

6 Fortune (2015). Will Apple's new complex really be the greenest building on the planet?

2. Renewable energy purchasing

- Expanded focus to sourcing and utilizing on- and off-site renewables
- Inclusion of exec-level focus, but still siloed to sustainability and operations teams
- Integration into enterprise roadmap as public-facing commitments

Although they were by no means the first, Apple and Google won tremendous acclaim for their early adoption of renewables. In particular, Google's financing of solar, wind, and biogas operations, beginning at their data centers and extending to their whole operations, made them the world's largest purchaser of renewable energy, and a pathbreaker for the rest.

Nearly overlooked by the press, enterprises like The North Face and Cisco have been purchasing renewables since as early as 2008.⁷ It began with wind turbines at energy-intensive sites, then rooftop solar on buildings with large footprints. Utilities quickly caught on, and began developing Power Purchase Agreements (PPAs) with enterprises, enabling utilities to expand their renewable infrastructure at minimal risk and enterprises to "go green" without the upfront cost. Leaders like Nike and Walmart have embraced this model, which allowed the former to go 100% renewably powered by 2018, the latter by 2020.⁸

Procuring renewables has landed many efficiency-conscious enterprises in the halls of "most sustainable companies". But in today's dynamic energy landscapes, accolades and balance sheets don't always match up. Plenty of enterprises powered partially by renewables, with the right engineering and management teams scouring their facilities for new energy efficiency measures, still struggle through the energy market's volatility and resilience challenges. In 2019, The Home Depot had to buy back \$15 billion in stocks after the winter's polar vortex slammed its Q4 2018 earnings.⁹

Thriving amidst these challenges requires an adaptive energy infrastructure, one that understands market movements, your business's needs, and where the two meet.



Renewable Energy Purchasing Strategies

Install solar or wind generation at your facility. This energy can be consumed directly by your facility or sold back to the utility through a Net Energy Metering (NEM) policy.

Renewables can be purchased directly or through a Power Purchase Agreement (PPA), which produces long-term cost savings at a fixed price over a long contract term, with no upfront capital or maintenance costs.

Contract directly with a renewable resource developer to build a solar or wind farm offsite, explicitly for your company. In 2018, a quarter of all solar projects were driven through this method.

Purchase Renewable Energy Credits (RECs) to offset your energy consumption. Pay renewable electricity providers for the right to claim the provider's electricity towards your clean energy goals.

7 BusinessWire & Cisco (2008). The North Face Announces Completion of a 1MW Solar Energy System.

8 Nike (2018). Nike Renewable Energy.

9 Fortune (2019). Home Depot Plans \$15 Billion Buyback after Polar Vortex and Government Shutdown Hit Earnings.

3. Adaptive Energy Infrastructure

- Flexible energy resources operated by software controls to adapt within a dynamic energy environment
- Driven by expense management and budget certainty, risk management and operational efficiencies, and innovation/brand reputation
- Spearheaded by c-suite, executed cross-functionally, managed by external providers
- Priority feature of enterprise roadmap

The advent of “adaptive energy infrastructures” sprung from a series of realizations at the corporate level. First among them is the need to respond flexibly to the risks posed by time-variable energy costs such as demand charges, time-of-use rates, and rate changes. Energy efficiency and renewable assets reduce total amount of energy consumed, but they do not help optimize the timing of that energy use.

Adaptive energy infrastructure, such as intelligent energy storage, gives enterprises the flexibility to buy, store, or generate energy at the most optimal times. Today, adaptive energy infrastructure consists primarily of battery energy storage and artificial intelligence control software. These foundational elements can be connected to energy efficiency and renewable energy assets to make them more flexible and adaptable.

Adaptive energy infrastructure is operated by software controls, so it has the flexibility to adjust its operating patterns to deliver the most value at any given time. And unlike a standalone efficiency or renewable asset, adaptive energy infrastructure can, well - adapt - instantaneously. During the lifetime of a renewable asset (about 20 years), utility rates will typically change between five and eight times, which can impact the predicted value of that renewable asset. By adding adaptive energy infrastructure to support renewable strategies, you can future-proof those renewable assets.

Adaptive Energy Infrastructure Strategies

Pair intelligent energy storage to all onsite and offsite solar projects. Energy storage is available with the same purchase or PPA financing agreements as solar. Stem works with a large network of solar providers and can typically be bundled into existing solar agreements.

Work with an energy storage provider to deploy storage for onsite energy optimization and participation in demand response and wholesale energy markets.

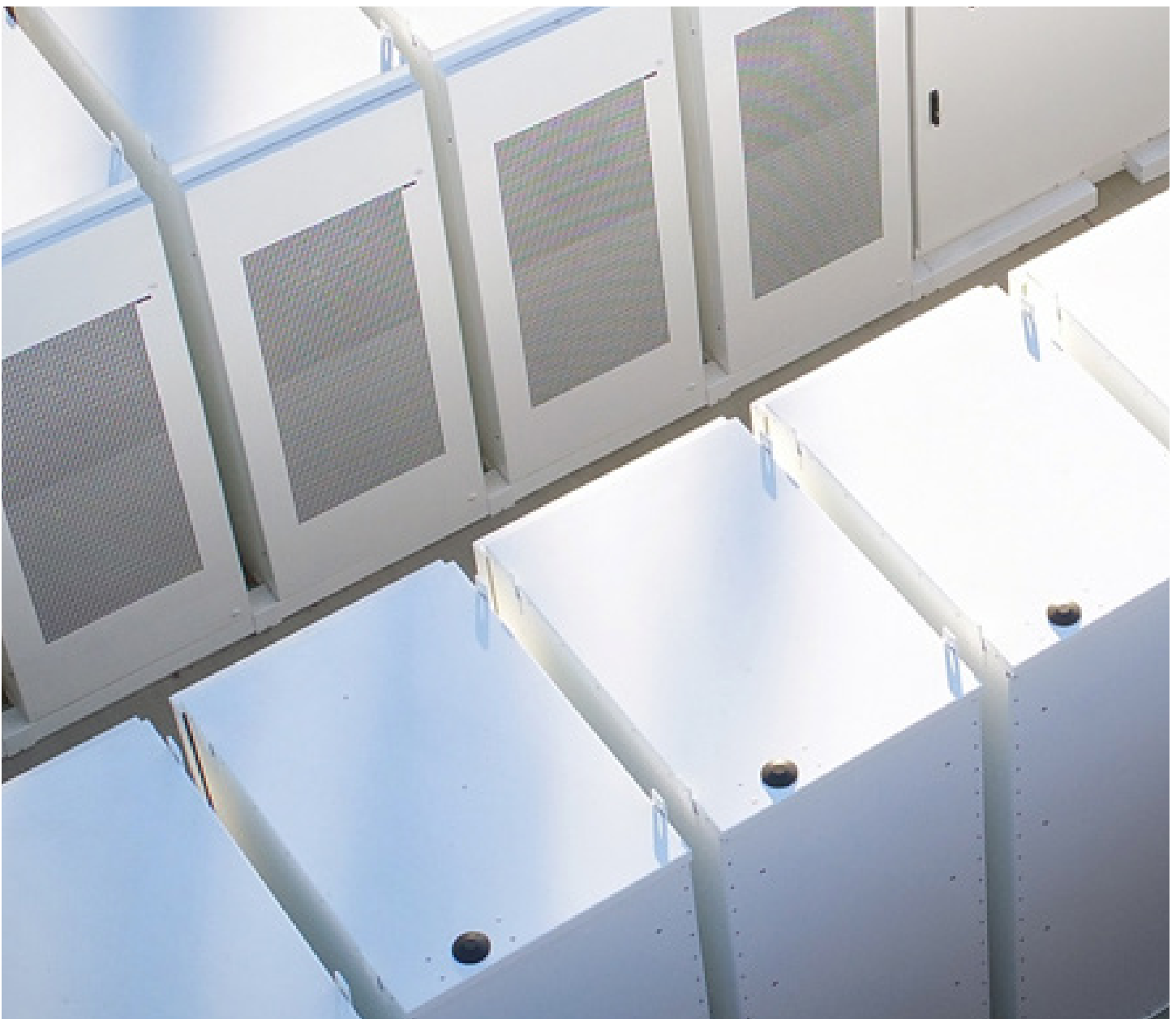
Use intelligent energy storage for backup power or evaluate the potential for a full microgrid solution. Stem works with power solution partners to deliver customized backup power and microgrid solutions.



Adaptive energy infrastructure also gives enterprises the ability to participate automatically in demand response programs and wholesale energy markets, without disrupting operations. Beginning in 2019, grid operators across the country are opening up their markets to energy storage participation to comply with FERC Order 841. This presents an enormous opportunity for enterprises to add more value to renewable projects that are paired with adaptive energy infrastructure.

And, adaptive energy infrastructure can deliver backup power during a grid outage or storm. Enterprises have realized the need to keep operations running during power outages and improve business resiliency and mitigate risk. Even a five minute outage puts strain on equipment, spoils products mid-process, and kills worker productivity, disrupting operations and putting you in the red for the day. With power interruptions becoming far more frequent, backup power has become a necessary part of an adaptive energy infrastructure.

Adaptive energy infrastructure enables enterprises to realize new revenue streams, supplement power supply when utility rates and demand are high, serve as a backup when power fails, and increase renewable consumption when paired with solar generation.



Summary

Developing a Comprehensive Energy Strategy

Whether or not your enterprise has one yet, a comprehensive energy strategy is critical to success in the new energy economy. What was once purely a matter of brand reputation has become a major driver of profitability, competitiveness, government compliance, and risk management.

The challenge is that, while having a fully-developed energy strategy is a business must, most enterprises have little competency in energy strategy and no leverage to build out an energy unit within the business. Some enterprises will try to fill the gap with major efficiency projects, overhauling their most energy-intensive equipment. Others will double down on their procurement of renewables, wagering that running operations on green energy can't be bad for business. But the winning enterprises will meet this challenge by turning to an adaptive energy infrastructure, one that turns their efficiency and renewable assets into flexible technology, and allows them to work with—not against—the ever-changing energy landscape.

Their energy infrastructure will respond automatically to dynamic conditions, using tools like AI to deliver daily savings without disturbing operations. And they'll develop their energy infrastructure using providers that have partner networks able to integrate a host of solutions, from energy storage, solar, power quality, and other DERs. Since 2009, Stem has helped leading enterprises develop their own adaptive energy infrastructures, placing them on the cutting edge of the energy strategy advantage. Today, we work with dozens of partners in the energy industry to deliver the most flexible and customized energy solutions on the market today. Adaptive infrastructure reduces costs, mitigates risk, enhances sustainability efforts, and represents the next wave of energy innovation for enterprises.

Ready to learn more about adaptive energy infrastructure?

Request a demo of Athena, the AI at the center of our adaptive energy infrastructure, by visiting stem.com/demo. Or simply contact us at stem.com/contact.

