The Convergence of Onsite and Offsite Renewables
Energy Strategy is Changing for Businesses

For over a century the electrical grid was run in basically the same way. Now, the grid is rapidly evolving into a more distributed model enabling cleaner power generation, better energy management, substantial cost reduction, and energy innovation for businesses.

As part of this shift, we have seen the convergence of onsite and offsite renewable solutions such as solar, wind, or battery storage amongst large corporate energy buyers. In this eBook, Duke Energy Renewables and REC Solar look at the trends driving this adoption and provide guidance for companies evaluating each option.

The Evolution of Energy

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1890 - 1920s</td>
<td>Cities and homes lit by electricity</td>
</tr>
<tr>
<td>1950s</td>
<td>Rates remain stable, cleaner air</td>
</tr>
<tr>
<td>1970s - 1980s</td>
<td>Natural gas shortage contributed to higher energy prices</td>
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<tr>
<td>2000s - present</td>
<td>Environmental stewardship and energy conservation became mainstream</td>
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<td></td>
<td>Greater awareness of energy conservation measures</td>
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<td></td>
<td>Reduction in air emissions: sulfur dioxide about 90%; nitrogen oxides about 80%</td>
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First power plants  Nuclear power  wind  solar  hydro  scale up  Scrubber technology  reduce emissions  introduced  Installation of scrubbers on some older units  Increase in renewables (wind and solar)  Increase in natural gas combined-cycle generation

Energy Ecosystem: Fast charging  EVs  Rooftop solar  Harnessing power of electronics  Power plants  Excess power sales  Plug and play  Digital platform  Grid balancing  Smart appliances  Fiber networks  Microgrids  Internet of Things  Grid standards  Hourly forecasts  Low-cost batteries

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Enterprise Adoption of Onsite and Offsite Renewables

In 2016, large corporations bought over a gigawatt of solar and over 1.6 gigawatts of wind power purchase agreements (PPAs). In the last several years, many of these organizations are buying energy from large scale solar or wind farms, in addition to completing local, onsite solar projects. For example, the Apple corporate campus is powered by a solar farm in Monterey, California. Similarly, Anheuser Busch announced plans to buy wind from a large wind farm in Oklahoma.

In addition to having onsite rooftop solar, the Apple campus (below) is powered by a large offsite solar farm in Monterey County.

2016 TOP 10
CORPORATE SOLAR BUYERS,
BY CAPACITY INSTALLED

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Capacity Installed</th>
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<tbody>
<tr>
<td>1</td>
<td>Target</td>
<td>147.5 MW</td>
</tr>
<tr>
<td>2</td>
<td>Walmart</td>
<td>145.0 MW</td>
</tr>
<tr>
<td>3</td>
<td>Prologis</td>
<td>107.8 MW</td>
</tr>
<tr>
<td>4</td>
<td>Apple</td>
<td>93.9 MW</td>
</tr>
<tr>
<td>5</td>
<td>Costco</td>
<td>50.7 MW</td>
</tr>
<tr>
<td>6</td>
<td>Kohl's</td>
<td>50.2 MW</td>
</tr>
<tr>
<td>7</td>
<td>IKEA</td>
<td>44.0 MW</td>
</tr>
<tr>
<td>8</td>
<td>Macy's</td>
<td>38.9 MW</td>
</tr>
<tr>
<td>9</td>
<td>General Growth Properties</td>
<td>30.2 MW</td>
</tr>
<tr>
<td>10</td>
<td>Hartz Mountain</td>
<td>22.7 MW</td>
</tr>
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</table>

The top corporate energy buyers bought over a gigawatt of solar in 2016.

Q&A: Top Trends in Onsite and Offsite Renewables for the Enterprise

We asked business leaders at Duke Energy Renewables and REC Solar about trends in onsite and offsite renewable energy adoption.

WHAT IS DRIVING LARGE ENTERPRISE CUSTOMERS TO INVEST IN ONSITE AND OFFSITE?

Craig: Typically, the primary drivers are ROI, risk mitigation, and sustainability – in that order. The project must pencil. Beyond that, many large energy users want to hedge against the rise of future utility prices and the need to meet corporate sustainability goals.

HOW ARE CUSTOMERS LOOKING AT OFFSITE AND ONSITE?

Drew: Onsite is often looked at first in geographies that make sense, that have available space, sizable energy loads, and sometimes where the business wants the solar to be visible or provide additional benefits like in the case of carports. Customers who have too large a load to offset with onsite alone, or facilities where onsite won’t make financial sense, look at offsite options. Some customers also prioritize risk mitigation as a primary driver for looking at solar and want to look at a single large solar project that meets all their needs for various facilities. Large energy users like Walmart are combining both.

HOW ARE CUSTOMERS FINANCING SOLAR?

Craig: Most customers we talk to are looking at PPAs. This allows them to augment their existing operating expense costs to the utility with a lower cost operating expense. The exceptions are the companies who have decided to buy with capital for their own philosophical reasons and/or because they will save more money over the term of the installation and don’t have capital expense constraints.

HOW IS SOLAR FITTING INTO OTHER ENERGY DECISIONS?

Craig: Customers typically pursue either a strategy of energy reduction or renewables. They rarely look at both at the same time. For example, one year they may prioritize reducing energy consumption, changing out LED lights, etc. The next year they might focus on reducing the cost per kilowatt hour with renewables or other energy contracts. They want to make sure they know what their energy needs are going to look like before making a long-term investment in renewables. Customers generally view solar independently of backup power sources, co-gen, and other decisions. However, the more sophisticated customers look at them holistically and some might see the opportunity to integrate systems.
WHERE ARE ADDITIONAL OPPORTUNITIES FOR THE ENTERPRISE WHEN IT COMES TO SOLAR?

Drew: Some customers are moving towards energy as a service, where they pay to have their cost of power reduced regardless of how it happens. We are starting to see more customers look for integrated solutions that combine onsite, offsite, and battery storage. In the end, their goals are typically driven by cost, risk, and sustainability initiatives and are looking for easier ways to get that triple play that makes the most sense for their business.

Craig: Carports can represent additional value that a lot of customers haven’t thought through – employee satisfaction, customer satisfaction, marketing aspects, protection of vehicles during hail, etc. Energy storage continues to present opportunities for reducing demand charges. And microgrids can be an effective way for customers to better leverage assets they may already have such as solar, batteries, or backup power sources.
Onsite Solar Use Cases

Businesses that are likely good candidates for onsite solar include ones that:

- Prioritize offsetting energy at a local level
- Operate in states like California, Hawaii, or in the Northeast, where energy is expensive and/or there are incentives to leverage
- Have a commitment to sustainability
- Have multiple locations with large, good quality rooftops
- Have available land or a large parking structure adjacent to the facility
- Want customers to see their solar systems for marketing purposes
- Have large energy load requirements
- Are in industries such as retail, manufacturing, or distribution

**EXAMPLE: IKEA**

IKEA has committed to being 100% powered by renewable energy by 2020. Within the United States, they have installed solar atop nearly 90% of their locations and is known as a leader in sustainability. REC Solar has installed over 20 megawatts of projects across 13 states for IKEA.
Offsite Renewables

Use Cases

Businesses that are likely good candidates for offsite renewable energy include ones that:

- Have massive energy requirements, exceeding what onsite sources can generate
- Have individual facilities based in locations where state or utility solar economics don’t pencil
- Operate across a wide range of states, including some with relatively low power costs
- Prioritize risk mitigation and hedging energy costs
- Are data centers, have a large corporate campus, or have a large number of small facilities (such as banks or gas stations) that make onsite solar economics challenging

**EXAMPLE: MARS, INCORPORATED**

Mars is a global, family-owned business best known for their candy products such as Snickers. As part of the company’s “Sustainable in a Generation” plan, they are investing $1 billion to tackle climate change, poverty in their value chain, and resource scarcity. The Mesquite Creek Wind Farm in Texas, partly owned by Duke Energy Renewables, generates 100% of the electricity needs of Mars’ U.S. operations.

Image Source: Mars, Incorporated North American headquarters in McLean, Virginia
Combining Onsite and Offsite Renewables

Businesses that are likely good candidates for combining offsite and onsite renewable energy include ones that:

- Have an aggressive renewable energy strategy and targets
- Have a large enough load to warrant offsite production, but have individual sites with the right load profile, payback, and roof size to warrant onsite
- See the benefit for customers, employees, or partners in having solar onsite (education, visibility, marketing, etc.)

**EXAMPLE: WALMART**

Walmart has committed to being supplied 100% by renewable energy and is the largest onsite renewables user in the United States. Their multi-pronged approach includes onsite solar, onsite wind, offsite wind, fuel cells and other energy solutions.
Evaluating the Best Renewable Options for Your Business

Here are several guidelines to help corporate energy buyers determine whether to invest in onsite, offsite or both.

**DEFINE YOUR BUSINESS GOALS.**

Each corporate culture is unique and has different factors driving investment decisions. To help determine whether the desired business goal and culture behind those goals align with onsite or offsite renewables, we recommend you answer the following questions:

- What is important to you from a financing standpoint? Do you want tax incentives? Are energy projects a capital expense? What is your desired project payback period?
- Are you doing this for ROI, risk mitigation, or sustainability?
- What is your business timeline?
- What is the level of investment of resources and money you are willing to make?
- How is your business expanding and what do you expect your energy requirements to be moving forward?

**IDENTIFY ALL RELEVANT INTERNAL STAKEHOLDERS AND GET THEM ENGAGED EARLY.**

Finance, accounting, operations, and even marketing may have a roll to play as you assess your energy investments.

**EVALUATE SITE-SPECIFIC DATA.**

Start by collecting all the site locations, physical addresses, energy bills, and interval data. Then look at each site, each utility, cost of power, what the avoided cost would be, and what the load profile looks like. This will inform a chart that ranks the sites where you can save the most, expected savings and system sizes. This exercise helps determine total load requirements across each site and how much of that load can be offset with just onsite solar in a financially viable way.

**THINK ABOUT THE BIG PICTURE OF ONSITE, OFFSITE, AND OTHER SOLUTIONS FOR YOUR ENERGY FUTURE.**

A large energy user can diversify their strategy by incorporating onsite and offsite renewables. Having both options lets them amplify their savings and additional benefits, but also enables integration with a wider range of other energy solutions that the business may consider. Battery storage, microgrids, and other advanced technologies can bring incremental value by further offsetting costs, adding resiliency, and improving business operation. By leveraging these technologies, a company brings energy under their own control, providing better cost predictability and resiliency.
Contact Us

To discuss how onsite, offsite, or a combination of the two can work for your business, contact us.

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ABOUT DUKE ENERGY AND REC SOLAR

Duke Energy Renewables is one of the top 10 largest owners of renewable energy assets in the United States, with over three gigawatts of solar and wind. They work with utilities and corporate customers to meet their renewable energy needs.

REC Solar is one of the top commercial solar providers in the country, working with large enterprise organizations like IKEA and Costco to help them leverage onsite solar power. REC Solar is majority-owned by Duke Energy and the two companies work together to build creative solutions bringing together onsite solar, offsite solar, and advanced energy solutions for their customers. To learn more, visit RECSolar.com and Duke-Energy.com.