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INTRODUCTION TO ON-SITE CLEAN ENERGY

PURPOSE: This high-level overview of on-site clean energy generation includes a summary of technology options, ownership models, benefits, risks, and other considerations for Energy Customers that are exploring on-site projects. It is intended to equip the reader with a grasp of the key considerations associated with on-site projects. It may be particularly valuable for those team members who do not have a deep knowledge of renewable energy (ex: legal, accounting, finance, communications).

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WHAT IS ON-SITE CLEAN ENERGY GENERATION?

On-site clean energy is generation that occurs on the customer's property, usually behind the meter, or on the customer's side of the electricity meter. These projects reduce the customer's demand for grid-delivered electricity. The most common technology used in these on-site projects is solar photovoltaics (PV); however, other technologies include bioenergy, micro-hydro, onshore wind, storage, and micro-geothermal. As with all clean energy procurement options, the success of an on-site installation will depend on selection of a project that is compatible with a customer's specific goals and motivations for procuring clean energy.

OWNERSHIP MODELS FOR ON-SITE PROJECTS

Energy customers should select the most appropriate model for their specific needs and local market conditions. A company's role in the construction of an on-site project will vary based on ownership model.

	DIRECT OWNERSHIP	THIRD-PARTY OWNERSHIP: ON-SITE POWER PURCHASE AGREEMENT (PPA)	THIRD-PARTY OWNERSHIP: ON-SITE LEASE
Overview	Customer purchases the clean energy equipment outright and consumes the electricity generated by the system.	Customer purchases electricity from an on-site project owned by a developer/project owner. The customer pays the developer a specified rate for the electricity generated over a fixed term.	Customer leases energy generation equipment from a developer and consumes its output. The customer makes monthly payments over a fixed period term to the developer/project owner.

	DIRECT OWNERSHIP	THIRD-PARTY OWNERSHIP: ON-SITE PPA	THIRD-PARTY OWNERSHIP: ON-SITE LEASE
Design/ operation consider-ations	• Customer has full control over the project design and operations • Customer can consume energy for the lifetime of the equipment, which will likely be longer than a PPA or lease term • Customer is responsible for operation and ongoing maintenance of the project, but can outsource • Operational and performance risks fall on customer	• Developer is responsible for financing, installation, operations, and ongoing maintenance • If included in the PPA agreement, the customer may be able to purchase the system at the end of the contract	• Developer is usually responsible for financing, installation, operations, and ongoing maintenance • If included in the PPA agreement, the customer may be able to purchase the system at the end of the contract
Economic consider-ations	• Requires access to upfront capital • Customer directly pays for maintenance • Customer is responsible for participating in wholesale market if applicable, but can outsource	• Usually no upfront costs for customer • Predetermined electricity price for length of contract, which protects against market fluctuation • PPA rate typically differs from current utility rate • The PPA negotiation process can be longer than expected	• Leases can involve an upfront fee, but contracts can also be structured without this • Predetermined electricity price for the length of the contract, which protects against market fluctuation • Because leases involve a monthly fee, customer must pay regardless of energy output (lease contracts usually include a performance guarantee)
Regulatory consider-ations	Customer is eligible for any federal and/or local-regional tax incentives, any available net metering credits, or other local incentives	• Available savings passed on from any tax incentives to customers • On-site PPAs are not allowed in all areas, and in some areas their legality is unclear	• Option for companies who don't want direct ownership and in areas that do not allow PPAs • Incentives accrue to the lessor
EAC Treatment*	Customer has full control over EACs generated by project	Owner of the system has inherent rights to EACs generated by the project, so customer should require attribute ownership through the PPA (if desired)	Owner of the system has inherent rights to EACs generated by the project, so customer should require attribute ownership through the PPA (if desired)

***EACs:** An environmental attribute certificate (EAC) is a representation of ownership rights to the environmental attributes from 1 MWh of clean energy generation. In the U.S., EACs are referred to as clean energy certificates (RECs). If a company wishes to make claims regarding clean energy use, it must purchase and retire RECs to substantiate these claims.

BENEFITS OF ON-SITE PROCUREMENT

On-site projects provide many benefits beyond reduced emissions.

Financial benefits

- **Reduced energy cost volatility and savings:** Buying less electricity from the grid reduces exposure to market price fluctuations. On-site projects typically provide energy at a fixed price – often at a lower rate than grid-supplied energy. In some jurisdictions, using on-site power during peak rate periods can allow the customer to avoid even higher costs.
- **Net metering:** If an on-site project produces excess electricity, it can be sold back to the electricity grid for credit in some locations.

Sustainability and resiliency benefits

- **Reduced grid demand:** Because on-site projects are behind the meter, they reduce the demand for grid-supplied electricity.
- **Accessibility:** On-site projects can help customers make progress toward clean energy procurement in markets where there are few or no other procurement options.
- **Energy resiliency and risk management:** On-site projects reduce reliance on grid-supplied electricity. In some situations, on-site projects may sustain operations should grid-supplied power be interrupted.

Brand benefits

- **Visibility:** On-site projects can be highly visible to stakeholders, which provides a visual demonstration of a company's environmental commitment.
- **Employee attraction and retention:** Many employees care about their employer's commitment to sustainability. On-site projects can be an important contributor to employee retention and attract high-quality talent.
- **Differentiation and leadership:** On-site energy generation demonstrates a company's intent to be a strong actor in the community and can improve an organization's brand value.
- **Managing customer and investor demands:** Many companies, especially those with highly visible consumer brands, recognize the value of clean energy sourcing in the minds of their customers. Likewise, as investors increase their focus on sustainability, companies can point to on-site projects as an example of their commitments to sustainability.

RISKS AND DISADVANTAGES OF ON-SITE PROJECTS

Energy customers should consider the risks and disadvantages of on-site projects before pursuing a project.

- **Limited impact:** On-site projects are often limited by the physical size constraints of properties and often cannot be built to scale. Typically, only up to 15% of host-facility energy needs can be generated by solar PV.
- **Fixed to current premises:** An on-site project is installed on a company's physical property, so technical considerations of what that location can accommodate come into play (e.g., is the roof at the site in good condition? Will it need to be replaced during the project life?). On-site systems are also difficult to move should a company relocate.
- **Low ROI:** On-site projects can have high transaction costs and are often complicated, while usually yielding fewer RECs than off-site projects.
- **Performance risk:** On-site projects may not perform as expected because of defective equipment or poor installation practices
- **Regulatory risk:** Situations may arise when regulations change and negatively impact project economics when compared to budget (e.g., the state where the project is located may change net metering allowances or institutional demand charges).

Performance and regulatory risk can typically be addressed by working with experienced developers, legal counsel, and consultants.

ADDITIONAL CONSIDERATIONS

After the project is completed, commissioning, which is an initial system inspection, and ongoing performance monitoring are key steps to ensure the project meets all design and regulatory specifications and is performing to standards. Typically, commissioning is undertaken by the developer and/or an independent engineer. It is recommended that maintenance and data monitoring are outsourced as well. Metrics such as system performance and safety should be continually monitored.

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