Assembling an Effective Team for Renewable Generation and Storage Projects

Background

Onsite renewable generation and storage systems have piqued the interest of facility owners to substantially reduce their energy costs and environmental footprint. These systems are becoming more common for several reasons.

- Solar costs are decreasing. Between 2010 and 2020, commercial rooftop photovoltaic systems saw a 69% reduction in cost. The average cost dropped from $5.57 to just $1.72 per watt of installed solar. (Feldman 2021)
- Onsite renewable generation and storage systems can increase resilience from electric outages. They can reduce electric bill costs, lessen financial risk due to utility rate structure uncertainty, and serve increasing electrical loads resulting from facility electrification.
- Incentives for these systems are becoming more prevalent. The Inflation Reduction Act Investment Tax Credit (IRA ITC) is one example which offers credits to reimburse up to 40% of system cost.
- Organizations have identified these systems as a viable pathway to achieving their carbon reduction and electrification goals.

Process

Assembling an effective team before the project begins can streamline the implementation of these systems and ensure that the design, installation, and operation of the system are well aligned with the needs of the facility owner. To inform this process, this resource will provide three specific guidelines:

- **Guideline 1:** Identify common skillsets in renewable energy and storage projects.
- **Guideline 2:** Decide who will fill these skillsets, internally and externally.
- **Guideline 3:** Recognize additional project considerations to ensure cost-effectiveness, increased resiliency, and contribution to both electrification and decarbonization goals.

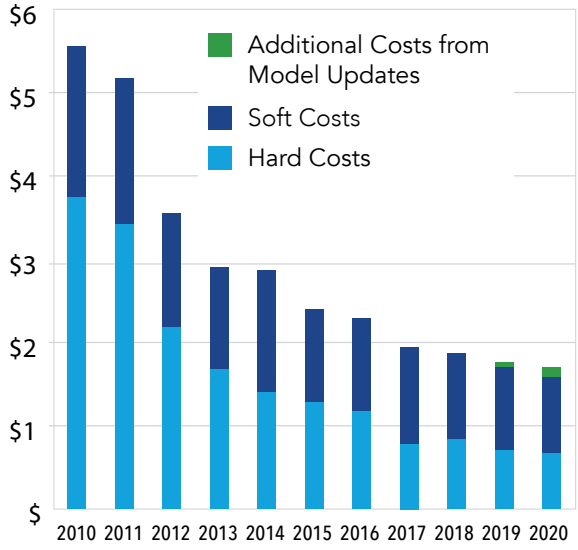


Figure 1. Chart showing the declining cost of a 200kW rooftop PV system from 2010-2020.

(Figure adapted from Feldman, D.; Ramasamy, V. et.al. "U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark (Q1 2020)," https://doi.org/10.2172/1764908.)

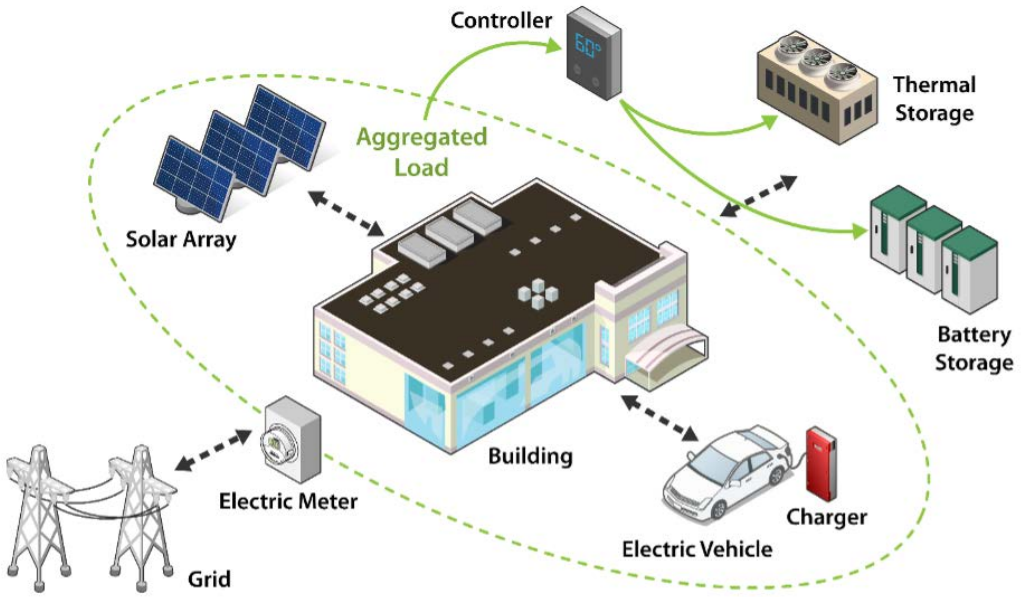


Figure 2. Renewable power and storage technologies offer a proven pathway for decarbonization of buildings and can be integrated with other electrification technologies.

Guideline 1: Identify common skillsets in renewable energy and storage projects.

To assemble an effective team, it is important to have a high-level understanding of project phases and the skillsets required for each phase. Figure 3 provides a high-level summary overview of the process, showing how groups of skillsets contribute to each project phase. For more information about each group of skillsets see the detailed breakdown in Table 1.

As shown in Figure 3, assembling an effective team should be the first step before beginning the design, installation, or operation of a system. An effective team will be able to anticipate hurdles and design the system to overcome them. For example, the team should be prepared to navigate critical utility approval requirements that may have implications on the system design. If the team does not anticipate hurdles at the outset these projects can easily incur costly scope reiterations or be stopped entirely.

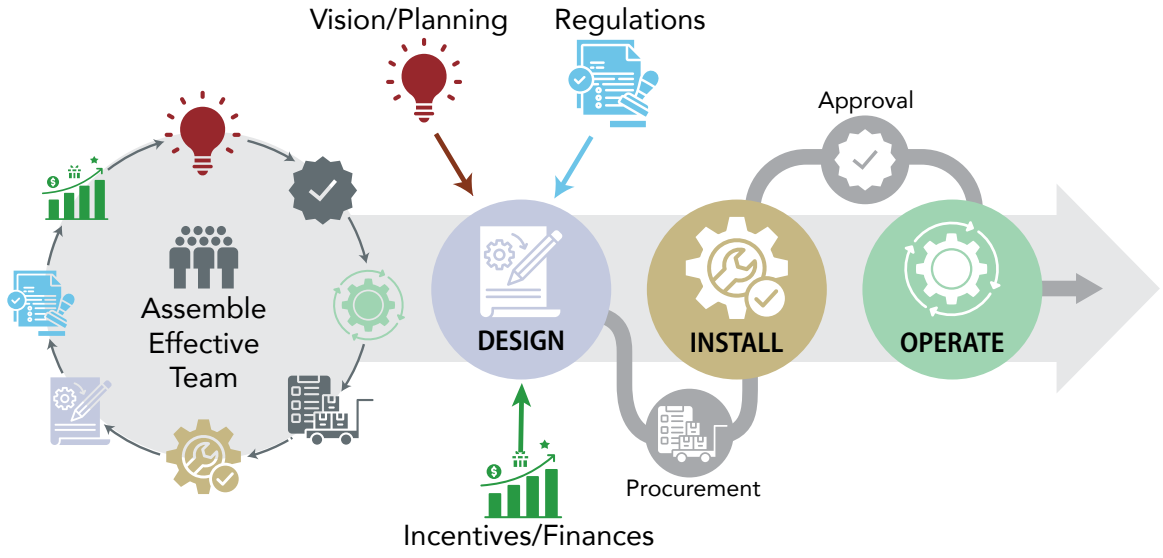


Figure 3: Flowchart showing project phases and how groups of skillsets contribute.

Table 1: Detailed breakdown of necessary project skillsets.

Design Phase		
Group	**Skillset**	**Responsibilities**
Vision/ Planning 	Vision/ Leadership	• Establish project scope (including a range of potential system technologies), objectives, and structure. • Champion the project from scoping to operation. • Define project success, such as financial performance, environmental impact (including retention of renewable energy credits), and resilience.
	Project Management	• Manage the project from scoping to operation. • Oversee design, incentive, and regulatory considerations. • Facilitate proactive communication.
	Facility Expertise	• Advise on facility limitations that may influence system design. For example, identify roof weight limitations, existing electrical infrastructure, and available space for installation.
	Contract Management	• Assess and advise on procurement options. • Review and develop contract language. • Ensure that the facility owner/operator's best interests are communicated to and appropriately addressed by contractors.
Regulations 	Local Permitting Jurisdiction (External)	• Develop and advise on installation clearances and safety requirements (especially for battery energy storage systems). • Review and approval of installation permit application before construction.
	Utility (External)	• Specify interconnection requirements including the max system size, inverter requirements, and battery storage requirements. • Update grid infrastructure (transformers, distribution) as required by project scope. • May implement incentives on behalf of ratepayer funds or state-provided programs (in which they may have rules such as preferred installers).
Incentives/ Finances 	Expertise in Renewable Tax Credits	• Navigate available renewable energy tax credits, direct pay options, and other financial incentives.
	Financial Management of Renewable Generation and Storage Assets	• Advise on project financing options. May examine third party ownership financing structures as well as directly owned financing structures. • Provide accounting expertise.
Design	Technical Knowledge of Renewable Generation and Storage Systems	• Define requirements of the system needed to achieve project energy goals. • Anticipate how the system will interact with facility electricity use (including current and projected uses). • Provide preliminary cost estimation. • Evaluate cost savings and potential tariffs that may result from the system configuration. • Provide technical expertise on component level decisions that may affect other project decisions (budget, permitting, regulation, etc.). • Determine target amount of electricity the system will produce and its value. • Evaluate thermal and electrical storage options. • Develop requirements for monitoring systems and integration with an Energy Management and Information System (EMIS).
	Site Evaluation for Systems	• Evaluate sites for generation and storage system installations. May examine roof, available ground space, parking lot, or facade panels to determine suitability.

Installation Phase		
Group	**Skillset**	**Responsibilities**
Procurement 	Procurement of System Hardware	• Oversee system procurement.
	Construction Management	• Oversee system installation, permitting, commissioning of infrastructure, and safety requirements.
Installation 	Installing Systems	• Install hardware and monitoring software according to system design and associated specifications. • Integrate with EMIS (as required). • Provide training to operations team.
Approval 	Commissioning Systems	• Verify proper equipment installation after construction. • Scrutinize installation's adherence to safety requirements and manufacturer specifications. • Confirm monitoring systems are operational and all users have access. • Confirm integration with EMIS (as required). • Alert owner to any outstanding issues.
	Local Permitting Jurisdiction (External)	• Complete final facility/system inspection and issue approval after construction. They may provide approval to utility.
	Utility (External)	• Issue permission to operate.

Operations Phase		
Group	**Skillset**	**Responsibilities**
Operations 	Daily Maintenance and Operation	• Advise on system design requirements and options for operations and maintenance. • Develop plan to ensure proper operation and maintenance of the system, including whether maintenance will be internal or external (if not included within installation contract). • Manage the regular operation and maintenance of the system after development. • Assess key performance indicators of system.
	Troubleshooting and Repair	• Address system failures. • Perform repairs as needed.

Guideline 2: Decide who will fill these skillsets, internally and externally.

After building awareness of common skillsets and responsibilities needed for these projects, the next step is to identify specific contributors who can accomplish project goals. The worksheet in Table 2 is designed to guide this identification. To use the worksheet, identify whether you can fill the listed skillset internally. If not, mark external. For both internal and external name the specific contributor or mark "I don't know" if unsure. If "I don't know" is selected, it may be necessary to reach out to the named contributors. They may provide expertise that will help identify the remaining contributors. Repeat this process until all names are identified and the table is complete.

Please note that any combination of internal and external parters can contribute to make a variety of projects achievable. Depending on the circumstances, a single contributor may satisfy multiple skillsets. For example, if a project has limited internal expertise, then a single external partner may fulfill the majority of skills. Customize the team to best fit your project and the capabilities of the contributors themselves.

After completing the worksheet, consult the internal contributors. As an internal team, decide the direction that should be taken to hire external partners. For example, decide if external partners will be hired via competitive solicitation, a request for proposal process (RFP), or some other contracting mechanism.

Table 2: Worksheet for team member identification.

Team Member Identification				
	Internal	External	Name of Contributor	I don't know
Vision/Planning				
Vision/Leadership	✓			
Project Management				
Facility Expertise				
Contract Management				
Regulations				
Communication with Utility				
Utility (External)		✓		
Communication with Local Permitting Agencies				
Local Permitting Jurisdiction (External)		✓		
Incentives/Finances				
Legal Expertise in Renewable Tax Credits				
Financial Management of Renewable Generation and Storage Assets				
Design/Engineering				
Technical Knowledge of Renewable Generation and Storage				
Site Evaluation for Systems				
Installation				
Procurement of Renewable Generation/ Storage Technology				
Construction Management				
Installing Systems				
Commissioning Systems				
Local Permitting Jurisdiction (External)		✓		
Utility (External)		✓		
Operation				
Daily Maintenance and Operation				
Troubleshooting and Repair				

Guideline 3: Identify additional project considerations.

Ensuring Facility Owner/Operator's Best Interest

- Are my best interests and potential tenants' being addressed?
- Who is representing me?
- Are my project goals clear?
- Contractors deliver on what is expected?

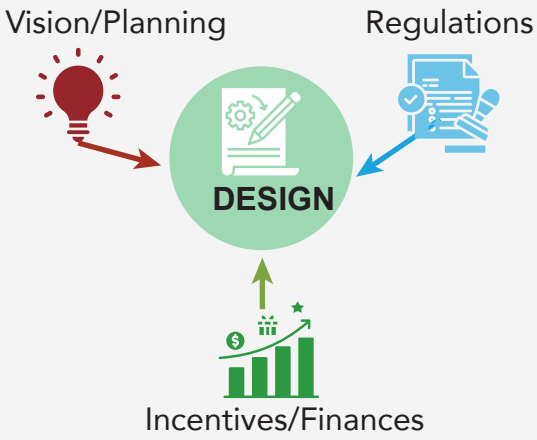
Keeping Operation and Maintenance in Mind

- Who will operate and maintain the system?

Operation and maintenance will require skilled staff onsite, training new staff, or hiring a qualified contractor. Any project with storage will pose additional considerations.

- **Clear Communication = Smooth Deployment**

Proactive, two-way communication is necessary to balance key project goals against design or regulatory limitations. While the vision/planning group should decide the project scope, they must be flexible to accommodate inputs from the regulations and incentives/finances group to facilitate a smooth deployment



Utility Involvement

Utilities may exert more ownership over the project.

Depending on the utility and size of the project, there may be more stringent requirements about contractors that can be involved. Check with your utility about their requirements for installations.

Financing Structure: Direct Ownership vs. Indirect Ownership (PPA/Lease)

Direct Ownership models are best for small systems or organizations with large amounts of resources who can more effectively manage the financial risk of owning assets themselves.

Indirect Ownership models include Power Purchase Agreements (PPA), equipment leases, facility roof leases, and hosting community solar projects. These types of agreements are best for organizations with limited resources. However, such agreements can complicate the contract management for the project.

Permitting/Interconnection Requirements

- What limitations of the facility or area require extra oversight?
- Who are the local permitting jurisdictions that must be involved?

The local permitting jurisdiction is often at the municipality or county level but may include multiple departments. Depending on your location and project scope, stakeholders in the permitting and interconnection process may include:

- Building Inspector (may include structural, electrical, and other trades depending on project scope).
- Zoning and Planning Commission.
- Historical Building Commission or Board.
- Fire Department (especially for systems that include storage) (they may be part of the municipality, quasi-government, or privately run).

Solicitation Process (RFP considerations):

Owners of projects with fewer contractors should be careful to develop contracting language (ex. RFP) that is flexible to accommodate potential changes but does not compromise on key project goals.

Next Steps

1. Complete worksheet to identify internal and external partners.
2. Meet with internal team members and determine pathway for hiring external contributors.
3. Ensure project vision and planning involves all team members, taking into consideration project requirements.
4. Effectively design, install, and operate your system!

ABOUT THIS SERIES

Over the course of eight months, the Onsite Renewable Energy and Storage Working Group convened over 20 partners to identify and highlight ongoing issues and opportunities when planning and deploying onsite renewable energy systems and energy storage systems. This fact sheet is part of a series to provide technical recommendations resulting from the discussion among Better Climate Challenge partners, allies, and DOE experts.

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