Successful project installations typically have some of the following characteristics:

- **Site Willingness**: CHP projects must begin with the willingness of individuals and an institution to consider a major investment of financial and staff resources to a project that is not a part of their core business and is not the status quo. Typically, a host site will have a small number of internal champions who are willing to do the leg-work to scope-out the proposed project, present their case to the decision-making entities, and ultimately “stick their necks out” for a project to be approved internally.

- **Loads**: A site’s electric and thermal loads must be suitable to a CHP system. Thermal loads include space, water, and process heat. Cooling loads can be supported by thermally-activated cooling (absorption and adsorption chillers), and also by dehumidification loads (desiccant dehumidification). CHP systems are typically sized to meet baseline electric loads to optimize project economics by running the system at a high capacity factor. Characteristic loads of particular business types lend themselves well to CHP, for example, hospitals, industrial laundry facilities, and data centers.

- **Opportunity Fuels**: Natural gas is the predominant CHP fuel; however, other fuels may be available on-site or nearby that can simultaneously reduce fuel costs, reduce the need for waste disposal, and in some cases, qualify as a renewable fuel. These opportunity fuels include by-products of agricultural, forest, and urban/industrial processes. Proximity to a natural gas well might present a similar opportunity.

- **Siting**: System siting should be an early consideration; both regulatory agencies and the host customer must be open to the project. Regulatory considerations include the emissions restrictions defined by the regional air quality board, electric grid interconnection rules, local noise regulations, and restrictions on proximity to schools and other public places. Host customers must be willing to host the CHP system on-site, have a structurally-sound space, and be assured that the visual and aural properties of the system do not interfere with their business models.

- **Utility Support**: Utilities can have a significant influence on the success of a project: they administer interconnection regulations; provide tariffs; and can provide design assistance. Interconnection can be a significant portion of project costs, especially for smaller (10s to 100s of kW) projects. Requirements and associated costs include permitting engineering review, and equipment requirements. Involving the local utility early in the project development process helps to correctly identify project requirements and costs, and leverage full utility support.

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SGIP Technology Characteristics

**Combined Heat and Power Projects in the News**

**Ritz-Carlton Hotel: San Francisco, CA**

The Ritz-Carlton has installed four 60 kW microturbines. The system provides about 25% of the on-site electrical needs and the heat is used to power an absorption chiller for refrigeration and cooling. The system saves the hotel an average of $13,000 per month. For more information, visit [http://www.sfenvironment.org/downloads/library/ciscocogenerationreportpdf.pdf](http://www.sfenvironment.org/downloads/library/ciscocogenerationreportpdf.pdf).

**College of the Canyons: Santa Clarita, CA**

The College of the Canyons added cogeneration systems to their central plants as part of their goal for sustainability. The waste heat is used to produce hot and cold water for the central plant operations. For more information, visit [http://www.canyons.edu/office/s/pio/nr110807backgrou.html](http://www.canyons.edu/office/s/pio/nr110807backgrou.html).

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Technology findings from the SGIP 2009 Market Characterization Report by:

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Boulder, CO 80302
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Financing: CHP systems incur a large up-front cost in exchange for continuous returns in the form of energy expenditure savings. The availability of suitable financing of these up-front costs is often necessary for a project to be considered.

Unsuccessful projects typically have the following characteristics:

- **Vulnerability to Uncertainty**: CHP systems are long-term investments with high levels of uncertainty in fuel and electricity, the timing and extent of unscheduled outages, and site demand for electricity and heat. Stable costs can make project economics less risky. Long-term natural gas contracts and maintenance (scheduled and/or unscheduled) contracts can successfully mitigate risk and uncertainty. While contracts may not be available or attractive for the lifetime of the equipment, they are often available for five years. This exceeds the payback period of most economically compelling projects and therefore reduces the significance of uncertainty further out in the project life.

Another option for sites is to have CHP systems installed under a power purchase agreement, in which a third party owns the equipment and sells power and performance to the site. While this mitigates the site’s risk, this risk is transferred to the CHP system owner. Again, long-term contracts can mitigate this risk.

- **Disengaged Staff**: Poor system performance can lead a site to give up on a project; staff need to actively monitor the system to ensure that the CHP system is operating as expected and to catch performance problems early on. System performance can suffer if staff do not have the proper training to evaluate performance, do not have accessible, intuitive tools for evaluating performance, or are not in the practice of contacting proper staff or contractors immediately when performance irregularities arise.

Best customer types for the technology:

- Wastewater treatment plants (can utilize a renewable fuel)
- Agribusiness community including dairies (usually requires a digester)
- Hotels/casinos
- Cold storage
- Food industry (e.g., grocery stores, breweries, food processing and storage, cheese plants)
- Manufacturing
- Health care industry
- Colleges and universities
- Foundry industry
- Data centers
- Facilities with opportunity for replicability, e.g., grocery stores, hospitals, big box retailers, fitness centers with swimming pools, and industrial laundry facilities.