Intelligent Microgrids – Feasibility And Planning

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Introduction

On October 29th, 2012, Superstorm Sandy slammed into New York City's shoreline. In the days and weeks that followed, the New York City Subway system and all but one of the road tunnels entering Manhattan were severely flooded, entire neighborhoods were decimated and millions of customers in New York City and on Long Island lost power – many for days and weeks. Microgrids kept the lights on at New York University in Manhattan, Princeton University in New Jersey, South Windsor High School in Connecticut and Co-op City in the Bronx during Sandy storm and its aftermath. In addition to providing greater resilience compared to the conventional power grid, microgrids have also been recognized as a key strategy for improving energy efficiency, deferring or avoiding capital investments in new transmission and distribution infrastructure and mitigating cyber security risks. In the aggregate, these forces are moving microgrids from the margins into the mainstream of America's energy economy. The following eBrief is the first in a three-part series describing the key regulatory, technical and financial issues affecting microgrid projects. This eBrief describes the regulatory issues likely to affect a microgrid project, including the risk of violating franchise laws and the possibility that the microgrid will be subject to economic regulation under state utility law. In addition, the eBrief provides strategies for avoiding these pitfalls in order to realize the maximum value from a Microgrid.

Figure 1: Expertise Required for Pursuing Microgrid Projects – All Three Are Equally Critical to Success
Anatomy of a Microgrid Project

A microgrid is seldom pursued as a single project, but rather as a series of phased projects tailored to the specific needs, constraints and objectives of a customer or group of customers. For example, rather than sizing the system's generating capacity to meet anticipated demand growth, a microgrid may install a smaller power generating system initially and expand its capacity incrementally over time as demand increases. Similarly, the first phase of a microgrid may be designed to serve only a subset of a customer’s total demand, but include plans to expand service in the future. Microgrid development involves a series of technical, regulatory and financial milestones that each can involve many months of process. Owners need to be prepared to support development cycle and soft costs of engineering and implementation that can take up to 12 or 24 months.

While the benefits of adopting a microgrid can be significant, the potential risks should not be overlooked, especially for microgrids pursued prior to completing a robust feasibility analysis. The potential risks affecting the different phases of a microgrid project are diverse and dynamic, but as a general matter they can be classified as either regulatory, technical or financial.

The following diagram is designed to identify risks that are likely to affect a hypothetical microgrid project based on several key attributes of a microgrid.
Deep-Dive On Regulatory Risks: Franchise Rights and Utility Regulation

Despite significant potential benefits, microgrid adoption rates have remained lower than one would expect. This is partially due to uncertainties in the regulatory environment one would expect when a new business model upsets a long-established model. Most current risks stem from regulatory uncertainty associated with the legal standing of a microgrid.

Although a few states have established laws and policies clarifying the rules and regulations that apply to microgrid systems, the vast majority of states have not considered regulatory oversight of microgrids directly. Most states, instead, have extended the regulatory standards and protocols used for regulating traditional distributed generation to microgrids in some shape or form. These states are addressing ambiguities in the traditional regulatory scheme as applied to microgrids on a case-by-case basis.

Is it legal for one or more customers to build and operate a microgrid in a given area? The answer may depend on how effectively the microgrid developers have tailored the project to comport with the applicable legal and regulatory requirements in that area.

Microgrids have a legal right to exist in many states, but the legality is almost always contingent on several stipulations. In particular, local and state regulations may require the microgrid’s owners or operators to be the primary consumer of the electricity the system generates, be physically located on or contiguous to the site where power is generated or serve only a limited number of customers. Complying with
these stipulations may be more or less complicated depending on the specifics of local regulation. For example, in Georgia, customers are not considered contiguous if they are separated by an easement, public thoroughfare or utility-owned right-of-way. Despite these issues, several states like New York and Connecticut are promoting deployment of microgrids through incentive programs and by initiating regulatory proceedings to resolve concerns about franchise encroachment.

Crossing the Street: Franchise Rights
A prospective microgrid faces considerable uncertainty with regard to where and how it can be built and operated under the existing regulatory environment.

* Utility and regulatory limitations may impair functional access of a microgrid's ability to serve buildings nearby if power supply lines cross a street or public right of way. A robust analysis of the ability to serve contiguous properties and cross rights of way is critical for microgrid projects.

Microgrids that cross a public right of way (e.g., for moving transmission or distribution facilities over public streets) may trigger multiple regulatory requirements under state and local law related to franchise rights. A microgrid that distributes power and/or thermal energy across a public street may violate the franchise rights granted to an incumbent utility. A franchise represents a contract between a company or service provider and a local municipality or state government. Franchises are granted for specific geographic areas and remain in place for a limited number of years.

Although franchise rights can be exclusive, monopoly is not an essential feature of a franchise. For example, in New York State, franchise rights are not exclusive. Many municipalities permit narrow encroachments into existing franchises by granting right of way permits, revocable licenses, revocable consents and similar instruments. For example, New York City granted New York University a revocable consent to install and operate a microgrid system in Manhattan that technically violated the local utility's franchise rights by distributing electricity and thermal energy across a public right of way.

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It is critical to resolve any uncertainty about the legal treatment of a microgrid under existing franchise law prior to pursuing a microgrid project, especially if it is located within the service territory or franchise area of an existing utility. In many cases, the mere threat of litigation is enough to derail small enterprise from pursuing a potential microgrid project.

State regulatory bodies are realizing that out-of-date regulatory rules are limiting Microgrid adoption and are working to change regulation. States such as New York, Connecticut, and Minnesota have allocated...
funding and started conversations on how best to change the state regulation to allow for Microgrids to be adopted. Regulators realize the significant value that microgrids can provide to their constituents and have begun efforts to accommodate them within the existing regulatory paradigm. Given the customer-centric focus of microgrids, more and more utilities and utility regulators are starting to appreciate any opportunities they may have to collaborate with customers considering a microgrid project. Engaging utility regulators as early as possible can also help customers identify any specific challenges that may affect their planning for a microgrid project.

Utility Regulation
Another equally significant regulatory risk affecting microgrids is the potential that it will be regulated as a public utility by the state utility commission. If a proposed microgrid is considered to be a public utility under state law, it will face far more significant barriers to implementation. For example, the New York State Department of Public Service establishes the rates that utilities charge customers for providing service and has significant control over the utility’s financial operations. Utilities are also typically required to comply with various reliability standards and consumer protection laws.

Microgrid developers can avoid the risk of utility regulation by assessing the applicable legal framework rigorously at an early stage of the project. In particular, this assessment will involve careful consideration of the applicable legal definition of a “public utility,” That definition will determine whether a microgrid owner or operator is subject to regulation by the state utility commission?

Like franchise rights, the statutory definition of a public utility varies – often significantly – from one state to the next. For example, in South Carolina, the public utility commission has jurisdiction over the sale of electricity such that anyone who sells electricity is regulated as a public utility. If the owner of an apartment building sold electricity produced onsite by solar panels to one of the building’s tenants, the owner would be considered to be a public utility.
Microgrids create conflicting pressures on utilities and regulators. Understanding these pressures – and knowing what strategies are effective for managing them – can be critical to a project’s success. For instance, regulators across the country have different notions of what a microgrid is and how it might operate, and their opinions may depend on how the microgrid concept is framed. When framed as a small independent power producer, a microgrid may yield a different reaction than when it is framed as a large distributed generator, or placed in the context of energy services or demand management.

It is critical for microgrid owners to understand the utility relationship and associated regulatory access processes. Both microgrid owners and microgrid project developers have to realize that utilities are one of the important stakeholders involved in any microgrid project. Utilities are not necessarily an obstacle to microgrids. On the contrary, the more forward-thinking utilities are extremely supportive. They recognize the added value, diversity, and specialized services that can be provided by microgrids. However, the utility must pay for the installation, operation, and maintenance of the external power supply system. To remain in business, they must continue generating value for shareholders. The inability to recover capital invested in equipment that utilities were obligated to install as a regulated monopoly could impede this objective.

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The traditional utility is more likely to perceive microgrids as a direct economic threat in markets where electricity revenue is based principally on volumetric sales of electricity in kilowatt hours. It is important to fully understand the tariff conditions in the regional market and to assess macro market conditions that allow for purchase or sale of electricity to the grid.

Long after a microgrid has been constructed and begun operations, the local inter-connected utility still
provides the microgrid with important and beneficial services most of the time. In establishing inter-connected generating capability, the microgrid-utility relationship necessarily becomes more complex and requires a higher degree of communication than a simple provider-recipient relationship.

For decades, institutional and commercial buildings and campuses have addressed their need for uninterruptible power by installing local generators. Most engines powering these generators are rated to operate for only a few hours. One could argue that microgrids are already in operation when the local energy supplier is not able to provide energy due to weather or other causes. To help stakeholders embrace this de-centralized generation approach: microgrids could be viewed as a UPS system rated to operate continuously and reaching beyond the facility that houses it.

**Key engagement strategies**

- Establish a team of trusted advisors with expertise in regulatory, technical and financial aspects of energy projects and with strong track record for completing projects successfully
- Engage stakeholders – including regulators and utilities – in front-end discussions
- Include utilities and other stakeholder groups in design and implementation of microgrid project
- Be open/transparent/factual/honest

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