

# Electric Rate Stability Guide

**CUTTING AND STABILIZING  
LONG-TERM ELECTRICITY  
RATES IN UNCERTAIN  
RATE ENVIRONMENTS**



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# UNCERTAIN RATE ENVIRONMENTS



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**Owners and financial executives must carefully manage all of the costs of their operations. While future costs cannot always be controlled or predicted, creating conditions that enhance the stability of major cost areas—or at least achieve a known level of predictability if costs are expected to rise—helps to keep a company’s costs as manageable as possible.**

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Achieving stability and predictability in management of energy costs—and specifically, electric utility rates—is an important area of concern for financial executives, who need to know:

- 1. The factors that cause instability**  
in electricity costs for power purchased from an electric utility
- 2. The options available**  
to lower and stabilize these costs, and the advantages and disadvantages of each
- 3. The best choices among these options**  
to cut and stabilize long-term electricity costs, based on the company’s specific needs



# FACTORS CREATING INSTABILITY IN ELECTRIC UTILITY COSTS

## Electric utility-generated power offers limited competitive choice for business consumers

Electricity is an essential need for every business operation, but it is also one of the few cost centers in a business having, up until now, few competitive options to lower and/or stabilize costs on a meaningful basis.

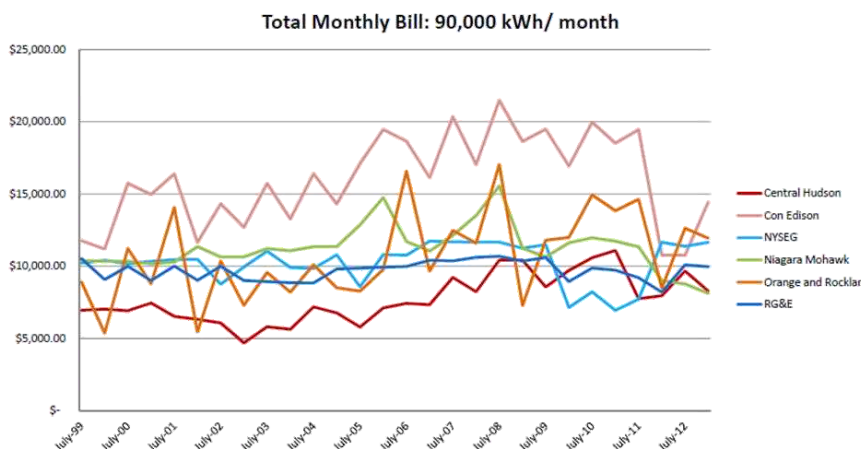
A number of factors contribute to this cost instability, and are likely to continue to cause unstable electricity costs for power purchased from electric utilities:

### ELECTRIC UTILITY POWER GENERATION RATES ARE DIRECTLY LINKED TO FUEL COSTS

Electric utility rates often reflect the costs of the fuel used to generate power for the utility. Natural gas, now being used to generate 23% of all electric power in the U.S.<sup>1</sup>, and over 50% of electric power in New York State and New England, is often

subject to very high price spikes due to pipeline distribution constraints during severe weather events. This occurs most often in the Northeast, where these price fluctuations have significantly increased electricity costs for commercial customers that buy directly from a utility company.

## Commercial Electric Utility Rate Variability New York Utility Rates, by Utility (1999-2012)



Based on "Typical Customer" bills published by NY Public Service Commission

Sources: NY Public Service Commission & Utility websites

**Electric rate fluctuations create a costly challenge for effective financial management.**

<sup>1</sup> American Electric Power

SOURCE: New York State Energy Research Development Authority (NYSERDA)

# Factors Creating Instability in Electric Utility Costs

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## WIDE FLUCTUATIONS IN ELECTRICITY COSTS ARE PREVALENT IN THE NORTHEAST

Electric utility bills in the Northeast (and especially New York State) have historically shown wide seasonal price fluctuations. These price shifts have been triggered by higher fuel costs due to unforeseen severe weather events that increase electricity demand from businesses and residential utility customers (see NYSERDA chart on previous page).

## THE INFLUENCE OF SEVERE WEATHER ON ELECTRIC UTILITY BILLS IS NOT SUBSIDING

The frequency and severity of extreme weather incidents is steadily increasing, particularly in the Midwest and Northeast. Many experts recommend factoring this trend into energy cost plans.

## SHUTDOWNS OF COAL-FIRED ELECTRIC GENERATION PLANTS DRIVE MAJOR INCREASES IN ELECTRIC BILLS

Environmental policies, such as recent regulations forcing shutdowns of coal-fired electric generating plants operating widely throughout the Midwest, may threaten supply, thereby pushing costs higher.

## Instability may break the long tradition of “low and predictable” U.S. electricity rates

Mark Maddox, former senior U.S. Department of Energy official, writing an article for *The Hill* magazine, states that recent DOE projections of higher electricity costs, in combination with more stringent environmental regulations, create a long-term picture of price instability. According to Maddox, these developments threaten to break the Depression-era social compact of “low and predictable” electric rates first established during the early days of U.S. electrification



which had long been a primary goal of U.S. electric utility policy.

Given this potential outlook for continued volatility of electricity costs into the foreseeable future, business owners and executives must take affirmative steps to keep their electric costs as low as possible, and to protect their businesses from price shocks due to unexpected spikes in electricity bills.

For these reasons, there is clearly a need for options that help financial leaders stabilize their electricity costs, and gain better control of these costs over the long term.

# OPTIONS FOR LOWER ELECTRICITY COSTS AND GREATER ELECTRIC RATE STABILITY

**BUSINESS OWNERS AND FINANCIAL EXECUTIVES HAVE A VARIETY OF OPTIONS THEY CAN PURSUE – AND IN SOME CASES, COMBINE – TO HELP THEM CUT THEIR ELECTRIC UTILITY BILLS AND ACHIEVE GREATER PRICE STABILITY IN THE FACE OF POTENTIAL RATE INCREASES AND UNEXPECTEDLY HIGH UTILITY BILLS.**

## Negotiate utility rate agreements

In certain states, some commercial and industrial businesses may have the option to negotiate lower electric rate prices and usage schedules with their local utility. These rate

schedules provide business owners with the rate assurance of paying agreed-upon kilowatt/hour rates based on their historical electricity usage patterns. For example, a business owner can negotiate a fixed rate for electricity costs for a set time period, or an all-inclusive variable rate (with an upper price limit) based

on total kilowatt/hours used, time of day, etc.

Rate agreements can be effective in keeping electricity costs lower, stable, and more predictable. But for many businesses they are not an option, due to their smaller size, lower electricity usage, or geographic

OPTION	DESCRIPTION	BENEFITS	CONSIDERATIONS
<b>NEGOTIATED RATE AGREEMENT</b>	Case-by-case negotiation of electric rates with local electric utility	<ul style="list-style-type: none"><li>• Can offer immediate savings on electricity costs</li><li>• Can offer longer term protection against future rate increases</li></ul>	<ul style="list-style-type: none"><li>• Companies may not qualify, based on smaller size or lower electricity usage</li><li>• Programs not available in many areas</li><li>• Program may be terminated when company expansion triggers higher electricity usage</li></ul>
<b>ENERGY SERVICES COMPANY (ESCO)</b>	In deregulated utility markets, companies can purchase their electricity from one of several competing suppliers	<ul style="list-style-type: none"><li>• Can offer immediate savings on electricity costs</li><li>• Fixed-price and controlled variable price options offer predictability on electricity costs</li></ul>	<ul style="list-style-type: none"><li>• Price agreements in effect only for short time periods</li><li>• Owners can be locked into higher electricity costs if utility rates decrease due to lower fuel costs</li></ul>
<b>CONSERVATION (“SMART ENERGY MANAGEMENT”)</b>	Using programmable, networked thermostats, sensors, and other devices to monitor and control electricity use	<ul style="list-style-type: none"><li>• Highly accurate electricity monitoring allows for better overall control of energy costs</li><li>• Ongoing measurement allows companies to track and optimize their energy use to cut their real-time electricity costs</li></ul>	<ul style="list-style-type: none"><li>• Offers little protection from higher costs due to unexpected weather events or long-term energy price increases</li><li>• Conservation provides no additional savings benefits once fully optimized</li></ul>
<b>COMBINED HEAT AND POWER (CHP) GENERATION</b>	Using microturbine units to provide both electricity and heat to supplement existing electric utility power	<ul style="list-style-type: none"><li>• Highly efficient, clean-running option for generating on-site power</li><li>• Excess generated heat can be used for heating, cooling, or industrial processes</li></ul>	<ul style="list-style-type: none"><li>• Requires a fuel source (natural gas, propane, diesel, etc.)</li><li>• Requires capital investment or financing</li><li>• Requires detailed financial analysis to determine success for each installation</li></ul>
<b>WIND POWER GENERATION</b>	Using wind turbines to generate on-site electricity to supplement existing electric utility power	<ul style="list-style-type: none"><li>• Not dependent on any fuel source</li><li>• Can be a viable option in areas having steady and consistent wind activity</li></ul>	<ul style="list-style-type: none"><li>• Intermittent power delivery</li><li>• Requires capital investment or financing</li><li>• Usually not a practical for many companies</li></ul>
<b>ON-SITE SOLAR POWER GENERATION</b>	Using solar panel arrays to generate on-site electricity to supplement existing electric utility power	<ul style="list-style-type: none"><li>• Not dependent on any fuel source</li><li>• Can work well even in lower-sunlight areas</li><li>• Provides steady energy output for 25 years or more with little maintenance</li></ul>	<ul style="list-style-type: none"><li>• Intermittent power delivery</li><li>• Requires capital investment or financing</li></ul>



## Options for Lower Electricity Costs and Greater Electric Rate Stability

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location. Also, rate agreements may not protect business owners from higher costs due to unexpected storms or other events that increase fuel cost to the utility.

Negotiated rate agreements can also be terminated by the utility in the case of a company plant expansion causing increased electricity usage that would move the utility customer into a higher electricity rate schedule. This can place business owners into situations where they must pay significantly higher electric bills if they decide to expand their plant operations.

### Buy electricity through an energy services company (ESCO)


In deregulated markets, which include New York, Ohio, and most of the Northeast and Midwest, electricity users can choose from different suppliers for the electricity they buy through their utility, paying a separate cost for the power they use to a third-party provider, and another cost to the utility for the transmission of this power to their location.

In deregulated electricity markets, commercial electricity users have the option of buying their electricity through a number of Energy Services Companies (ESCOs) who compete with each other to provide electricity to business and residential electricity users in their markets. ESCOs buy large amounts of electricity in the wholesale energy market, and then re-sell this energy to consumers at a lower rate than a customer's local electric utility. Other ESCOs generate their own power from plants they control.

Under an ESCO agreement, electricity is delivered to the user by their own local electric utility, with the user receiving a standard monthly utility bill identifying the ESCO as the customer's energy supply company. The customer pays the combined electricity supply cost (from the ESCO) and distribution cost (from the utility) itemized in their electric utility bill.

ESCOs offer a range of both fixed-rate and variable-rate plans. Additionally, many ESCOs provide a single, fixed rate for both peak and non-peak electric usage to protect businesses from higher





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costs when using electricity during certain times of the day. ESCOs also offer guaranteed fixed-rate plans that run on a month-to-month basis for specified time periods.

One of the disadvantages of buying electricity at a fixed price through an ESCO is that business owners could be locked into paying higher electricity costs if rates suddenly decrease due to unexpected declines in market prices, which can be triggered by slumps in demand or natural gas prices, or other factors. Conversely, if rates increase, business owners are exposed to those higher rates once their ESCO purchase agreement expires.

While ESCOs offer both savings and rate stability for commercial electricity users, this option, which depends on state and local electric utility regulations, is not available in many areas of the U.S.

## **Employ smart energy management technology**

Energy conservation—specifically, optimizing energy consumption through the use of energy management

technology—is another option available to business owners for cutting energy costs and maintaining ongoing control of these costs.

Smart energy management technology makes use of programmable, networked thermostats, temperature sensors, HVAC equipment monitoring devices, lighting controls, and other electronic devices to help business owners and facilities managers measure, monitor, and control their electricity use.

In a smart energy management system, these devices are all networked into a unified system which provides the business owner or facilities manager with a real-time view of their company's energy usage. The temperature and energy use data is stored in the monitoring system's database and combined with analysis tools to provide business owners with an effective means to assess their facility's energy use, and accurately evaluate the cost impact of changes to energy use, such as use of thermostat setback schedules to lower or raise building temperatures to save on heating and cooling costs.

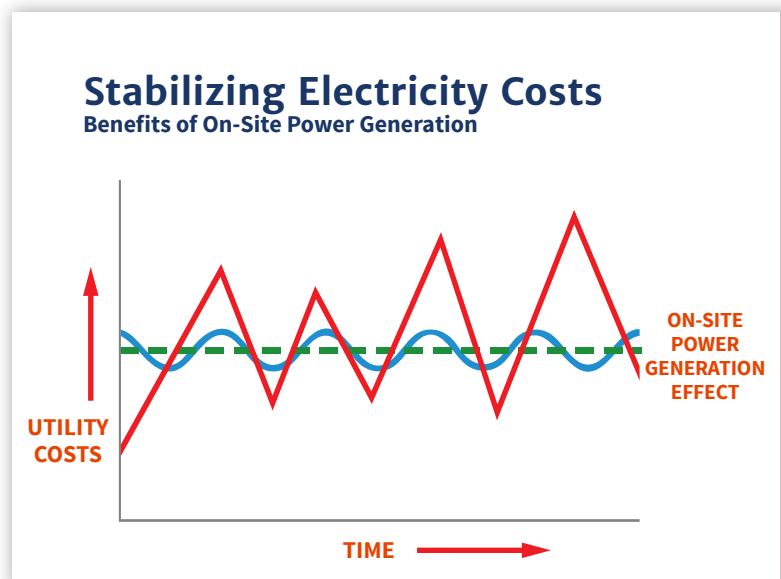
## Options for Lower Electricity Costs and Greater Electric Rate Stability

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While smart energy management systems have been proven effective in helping companies save significant energy costs, energy experts agree that there are limits to the savings that can be gained through conservation alone. Moreover, by themselves, energy management systems offer little protection from the price shocks of higher costs due to unexpected weather events, or longer-term trends, such as higher fuel costs or stricter environmental regulations, which could lead to higher electric utility bills in the future. However, smart energy management systems can be applied in combination with other approaches, such as utility rate plans and on-site power generation, to maximize electricity cost savings and minimize the effects of price instability.

### Generate on-site electricity (Distributed Power Generation)

Companies also have a number of options to generate electricity on-site at their facilities. This approach, also called distributed power generation, can provide business owners with significant electricity cost savings and far greater stability and control of ongoing electricity and energy expenses.



On-site distributed power generation options, such as CHP and solar, generate a significant share of a facility's power needs, reducing the effects of electric utility price spikes and providing long-term savings in electricity costs.

There are three major on-site power generation approaches available to business owners: Combined heat and power (CHP), wind power generation, and solar power generation.

### **COMBINED HEAT AND POWER GENERATION**

Combined heat and power (CHP) generation systems provide electricity, heat, and cooling to an office, plant, warehouse, or manufacturing floor.

CHP systems with microturbines feature small, clean-running engines that generate electricity as they operate. Microturbine systems are highly efficient, in that they can recover fully 90% of the heat they generate while they operate, making this energy available to provide heat to the facility, or converting this heat through an air chiller unit to cool the building or facility during summer months.

CHP systems can save commercial energy users on their combined electricity, heat, and cooling expenses, and are ideal for office buildings, hospitals, or other multi-level buildings. Because they generate clean, high

temperature exhaust gas as a by-product of electricity generation, the excess heat from CHP systems can also be recycled for use in making hot or chilled water, or steam.

CHP systems allow business owners to generate their own on-site electricity to supplement the electricity they buy from their local utility, often with significant cost savings. Since they can be fueled by a facility's existing, highly dependable



Combined heat and power systems generate on-site electricity to reduce the amount needed from a local utility.



## Options for Lower Electricity Costs and Greater Electric Rate Stability

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natural gas pipelines, CHP systems also can provide companies with a reliable backup source of electricity to keep their facilities operating in case of electric utility power outages due to storms or other electric grid disruptions.

#### ON-SITE WIND POWER GENERATION

Wind power generation utilizes highly optimized turbine units to capture wind energy for the facility. Placed on tall towers (usually around 100 feet tall)—to avoid trees, buildings, and other obstructions and to capture the most wind energy—wind turbines can generate usable electricity at low but steady wind speeds.

Wind power generation is most practical in areas having predictable and consistent wind activity, such as coastal areas, mountaintops, or large, open land areas. However, it is a highly intermittent power generation source, due to the unpredictability of wind activity found in many areas of the U.S. where businesses are normally located.

Also, local building codes and zoning ordinances for areas around populated and established areas may prohibit

erection of tall wind generation towers in some communities.

Due to its intermittent delivery of power, and the number of wind turbines that would be required to generate power for an industrial facility, wind power may not be a practical or economical solution for most individual light industrial companies.

#### ON-SITE SOLAR POWER GENERATION

On-site solar power generation, by either roof-mount or ground-mount location, is an increasingly popular power generation approach for cutting electricity costs and achieving longer-term stability and predictability in electricity rates.

With a solar power installation, arrays of solar panels, either mounted on the roof of a building, factory, or warehouse, or on open acreage near a facility, generate power to supplement a company's electric utility use. Solar power installations typically generate between 20% to 30% of a company's electricity use, and under "remote net metering" programs, excess power generated by a facility can be credited to the business owner's future electric utility charges.

Due to increased efficiencies and substantial price declines in the costs of solar panels, on-site solar power generation has become a realistic power generation option that can produce electricity at competitive rates even in lower-sunlight areas across the entire U.S., and not just for areas with more sunshine like the Southwest. In fact, Germany, having less sunlight than the continental U.S., now generates a significant share of its total electricity from solar: One in six businesses in Germany now operates their own on-site solar power generation facilities.

Solar power systems are ideal for companies having warehouse, plant, or manufacturing facilities with large rooftop areas, or who have sufficient open land area for a ground-mounted solar installation.



**Solar installations  
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## Options for Lower Electricity Costs and Greater Electric Rate Stability


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### **DISTRIBUTED POWER GENERATION CONCLUSION**

As on-site distributed power generation alternatives, both CHP and solar are the most practical, efficient, and economical methods for generating supplemental electric power for many light industrial manufacturing operations. Any business owner considering the implementation of an on-site power system will benefit by working with an experienced and knowledgeable distributed energy partner, who can perform a thorough financial analysis of the company's previous electricity costs and develop a detailed projection of the cost savings and lifetime ROI from an on-site CHP or solar installation.

When installed by an experienced and knowledgeable partner, choosing from these two on-site power and electricity generation options helps owners and financial executives of light industrial companies achieve substantial savings on their electricity costs, and long-term stability, control, and predictability of their electric utility costs for many years over the long lifetimes of these highly efficient on-site distributed power systems.



GEM Energy has published a number of useful guides to help owners, financial executives, and facilities managers gain a better understanding of the distributed power generation options available to them for stabilizing—and reducing—their energy costs.

To access these guides, visit: [www.GEMEnergy.com](http://www.GEMEnergy.com).

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## ABOUT GEM ENERGY:

A multi-faceted resource for power generation and conservation, GEM Energy is a trusted adviser to leading organizations in the institutional, industrial, governmental and commercial sectors. While what we do is technically complex, it's simple to explain: We optimize the efficiency of your facility for reduced operating costs. Our expertise includes combined heat and power (CHP) system design and integration using Capstone micro turbine technology, and comprehensive solar development from funding through array installation.

GEM Energy is ranked among the Top 500 Solar Contractors for 2015 and is an independent solar contractor to New York State Energy Research Development Authority (NYSERDA).

GEM Energy is a member of the Rudolph Libbe Group which offers a broad range of specialty and general contracting for construction, maintenance and facility-related services.



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