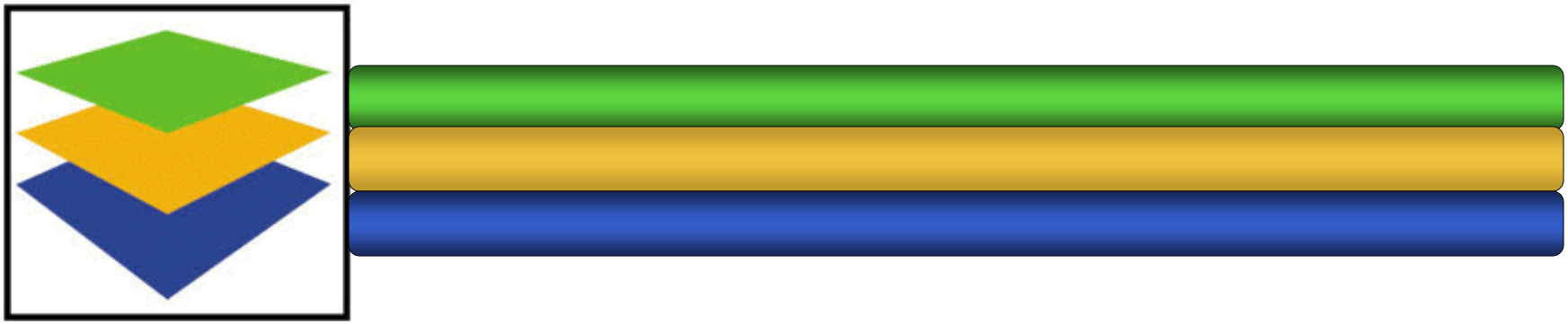
Neenan
ASSOCIATES



Case Study of Niagara Mohawk's RTP Tariff

Presented to:
Price Responsive Load Working Group
July 23, 2004

Presented by:
Neenan Associates

❑ Study Objectives

- ➢ Characterize customer response to & satisfaction with RTP tariff in a retail competition environment
- ➢ Quantify price responsiveness of various customer groups
- ➢ Differentiate between customer response to RTP prices and NYISO DR program incentives

Project Team and Funding

- ***Conducted by***: Lawrence Berkeley National Laboratory (LBNL) and Neenan Associates (Neenan)
- ***Funded by***: California Energy Commission through its Public Interest Energy Research (PIER) Program
- ***Coordinated by***: Consortium for Electric Reliability Technology Solutions (CERTS)

Study Report Products

- The complete report and Executive Summary available at: **http://eetd.lbl.gov/EA/EMP/**
- **Customer Experience Pamphlet -** highlights study results for customers **- funded by NYSERDA**
- **Two-Page Study Fact Sheet –** produced by Neenan Associates and Lawrence Berkeley National Laboratory

Fact Sheet

- Study Objectives
- Study Population
- SC-3A Commodity Price History
- Hedging Actions and Preferences
- Load Shifting in Response to Price
- Load Conservation in Response to Price
- Peak Load Curtailment Potential
- Participation in NYISO Demand Response Programs

Customer Experience Pamphlet

Real-Time Pricing in New York State

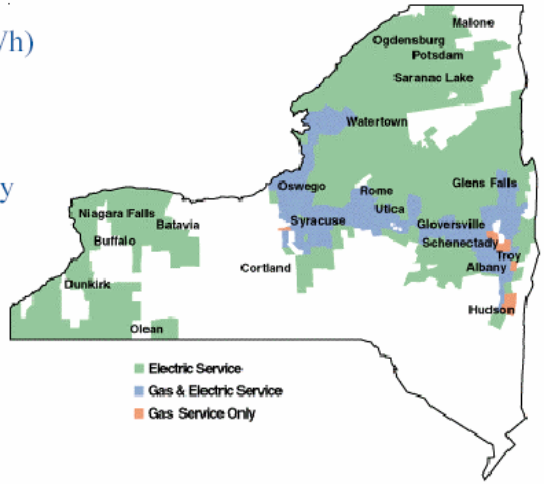
A Case Study of Niagara Mohawk's Large Customer RTP Tariff

Competition was introduced to New York State's retail electricity market in the late 1990's. Traditional tariff rates were restructured to allow competitive suppliers, called energy service companies (ESCOs), to offer virtually all consumers alternatives to the standard offer service available from their utility. ESCOs also can provide retail customers with other services, such as billing and metering. Niagara Mohawk Power Corporation (NMPC), as part of its market-restructuring plan, pioneered the use of market-based pricing as the default service for commercial and industrial customers.

distribution system and the State's electrical system, and other costs. Because the energy charges (per kWh) are unbundled from the other costs (collected largely through demand charges), customers can shop for a better price for their energy needs by comparing the SC-3A hourly rates with those of ESCOs.

NMPC's goal was two-fold. First, unlike traditional rates, the SC-3A service allows customers to hedge price volatility as their individual circumstances dictate. ESCOs and other new market entities were expected to provide a variety of ways to reduce or eliminate

Niagara Mohawk Service Territory



Study Objectives

- ***Characterize how customers adapted to the first competitive RTP program***
- ***Quantify price response by business activity and customer circumstances***
- ***Compare response to RTP and to ISO-based demand response programs***

The New York State Energy Research and Development Authority sponsored the preparation of this research summary to summarize these customers' experiences. These experiences and actions will assist New York policy makers, and those in other jurisdictions, to evaluate the

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Who are the SC-3A Customers?

Over 140 customers began the revised SC-3A service in the fall of 1998. To facilitate comparing their experiences, five customer groupings were created, as illustrated in the adjacent table. Manufacturing customers, the largest sector, include primary manufacturing and fabrication and assembly industries, as well as research and development facilities. Government and Education, the second largest category, includes local, state, and federal government facilities, as well as universities and schools. The Public Works sector is comprised of firms who provide communication, utility, water, or sanitary services. Commercial and retail customers represent facilities such as the gamut of retail stores, office buildings, recreational facilities, as well as large multi-family complexes. Hospitals and other health care facilities make up the Health Care sector.

	All SC-3A Customers		
	Customer Count	PEAK DEMAND (KW)	
		Average	Total
Manufacturing	46	4,789	220,288
Public Works	23	3,696	85,008
Commercial & Retail	17	3,150	53,556
Health Care	17	4,555	77,442
Gov't & Education	44	5,170	227,500

In the summer of 2003, a survey was distributed to the SC-3A customers, asking them to describe their business and how they use electricity, to relate their experiences of the past 5 years in adjusting to market prices, and to indicate what they would do differently, if that was possible. Fifty-three customers responded to the survey, and many of these provided additional detail and insight through a follow-up phone interview. Respondents are generally representative of the population of SC-3A customers, so their opinions, preferences and actions are indicative of circumstances and experiences that all of the SC-3A customers shared over the past five years.

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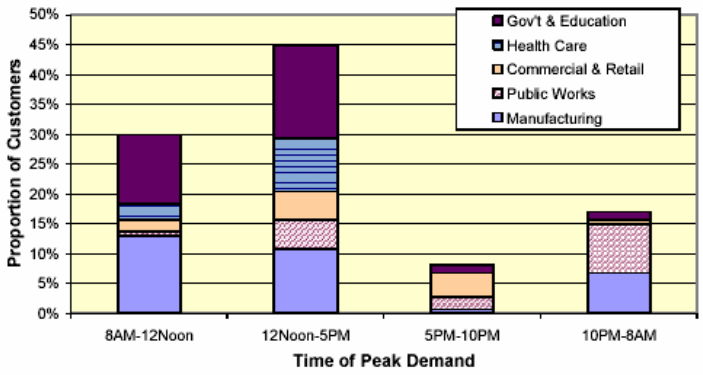
Time of Peak



The coincidence of a customer's demand with high SC-3A prices influences the kind of service a customer prefers. Overall, the SC-3A class' peak use is during the morning and early afternoon, the latter corresponding to the time when high prices typically occur. Almost 20% of survey respondents, consisting mainly of manufacturing and public works, reach their maximum demand in the overnight hours, thereby avoiding the volatile, high priced periods of the day. This is probably the result of the previous TOU rate, which included higher energy prices during the peak period (weekdays from 8:00 a.m. - 10:00 p.m.) and demand charges based on the highest 15-minute demand during that period.

For more information:

SC-3A Rate: **Niagara Mohawk Power Corporation (NMPC) /National Grid** Phone 800-642-4272 or visit NMPC's website at www.nationalgridus.com/niagaramohawk/

Competitive Providers: **New York State Public Service Commission** toll-free at (877) 661-9223 or on the web: www.AskPSC.com or www.dps.state.ny.us/eschoice.htm

Demand Response Programs: **New York Independent System Operator** at (518) 356-6060 or via e-mail: *market_relations@nysio.com*

Demand Response Programs and Public Benefit Funding: **New York State Energy Research and Development Authority** (NYSERDA) toll-free at (866) 697-3732 or visit NYSERDA's website at www.nyserda.org or e-mail *info@nyserda.org*

This study was conducted by Lawrence Berkeley National Laboratory (LBNL) and Neenan Associates (Neenan) with funding from the California Energy Commission through its Public Interest Energy Research (PIER) Program and coordinated by the Consortium for Electric Reliability Technology Solutions (CERTS). The complete report is available at http://eetd.lbl.gov/EA/EMP/

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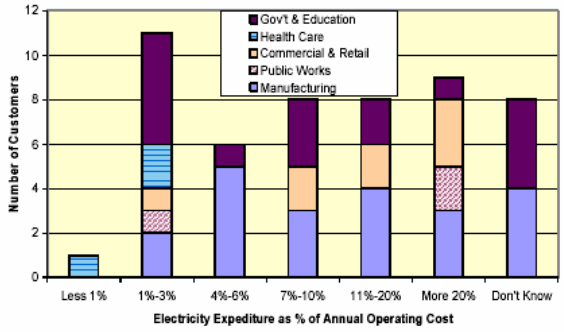
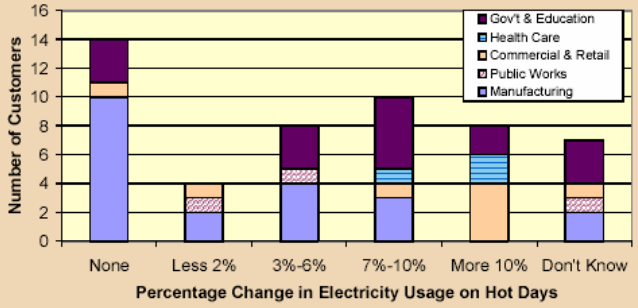
Electricity Expenditures



Electricity cost is the focus of attention for many, if not most SC-3A customers. In some cases, this is because electricity expenditures represent a substantial portion of costs, and in others because it is a cost that can be controlled, regardless of its size. Almost half of the survey respondents indicated electricity costs comprised more than 10% of their annual operating budget. These electricity-intensive businesses would seem to have a motivation to adjust load to price signals, but process and business constraints might make this difficult to accomplish. However, customers indicated no difference in their ability to curtail electricity based on intensity of electricity use.

Sensitivity of Loads to Temperature



On hot days in the summer, SC-3A energy prices are generally higher, as are loads. Over 35% of survey respondents said that their load fluctuated by more than 7% on very hot days. Commercial and retail customers in particular appear to be quite temperature sensitive, Government & Education and load when prices are high, it would likely require sacrificing comfort. Conversely, manufacturing and public works facilities report that their loads

Investments in Enabling Technologies

Investments in load management and energy efficiency technologies are a way for customers to gain greater control over their electricity usage. About 85% of respondents indicated that they had made such an investment before 1998. Investments in efficiency measures were the most common, predominantly upgrades in energy-efficient lighting, HVAC and motors. This

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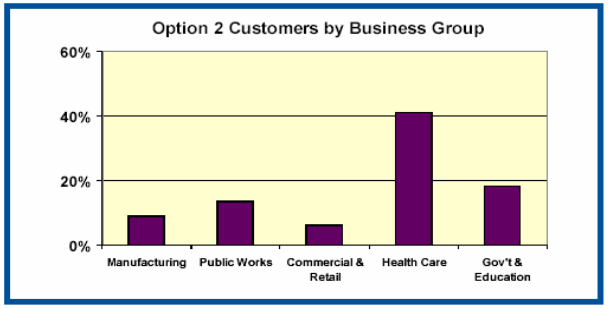


Supply Alternatives to SC-3A

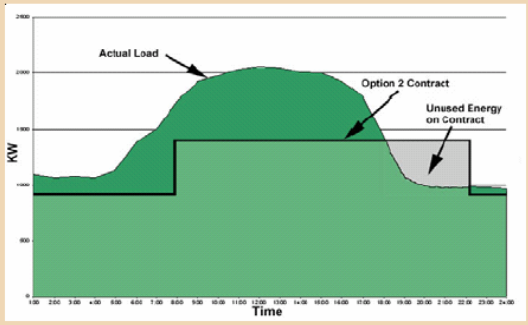
Customers had a variety of alternatives to SC-3A service to chose from, starting with an opportunity to sign up for a hedged service offered by NMPC.

The Option 2 Standard Offer

NMPC provided a one-time chance in Fall 1998, prior to the implementation of SC-3A Retail Choice, to sign up for an alternative, hedged service. SC-3A Option 2 allowed customers to nominate monthly load, for both peak and off-peak periods, in 100% load blocks, for some or all of the period between 1999 and 2003. Load so nominated was subject to a predetermined schedule of peak and off-peak prices. Option 2 was a "take-or-pay" contract: customers that signed up would have to pay for the entire nominated block each month, regardless of whether or not it was consumed. In addition, electricity consumed in excess of the nominated block was paid for at

making hedging decisions for five years in the future. Some customers that elected Option 2 reported savings in excess of 10% over the cost of purchasing the load under SC-3A prices. However, a few customers whose business declined over the duration of Option 2 (1998 - 2003) paid for load they did not use, which eroded their benefits.

The Option 2 Contract



This chart illustrates the Option 2 Take-or-Pay contract. In this example, the customer nominated different amounts of load for On-Peak and Off-Peak. Load used in excess of the contract, shown as the dark solid area above the Option 2 Contract line, was charged at the market-based hourly price. No credit was provided for unused energy below the Option 2 contract amount (light solid shaded area).

Financial Hedges

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Competitive Supply Contracts and Hedging

SC-3A prices are indexed to the New York wholesale market, and therefore subject to fluctuations and trends in supply costs. Prices are especially volatile during the summer months. A recourse for SC-3A customers was to secure supply from an ESCO that reduces or eliminates the price volatility.

Over the past five years, although an increasing number of customers switched to ESCOs, there has been a steady decline in the number of customers taking hedged supply contracts. In June 2003, fewer than half of the customer accounts in the study were purchasing their electric commodity from an alternative supplier. Many customers reported that while fixed-rate contracts were available from ESCOs in the early years (especially before 2001), they have noticed a trend away from fixed rates and toward competitive rates offerings that are indexed to the SC-3A rate, which allows them to realize a small savings for selecting a competitive supplier. Others cited a lack of retail products to their liking.

Alternative Supply Choice by Business Group in June 2003			
Business Class	Option 2	Alternative Supplier	Option 1
Manufacturing	17%	32%	36%
Public Works	13%	9%	22%
Commercial & Retail	4%	12%	13%
Health Care	30%	12%	4%
Gov't & Education	35%	35%	24%
Number of Customers	***23***	***57***	***67***

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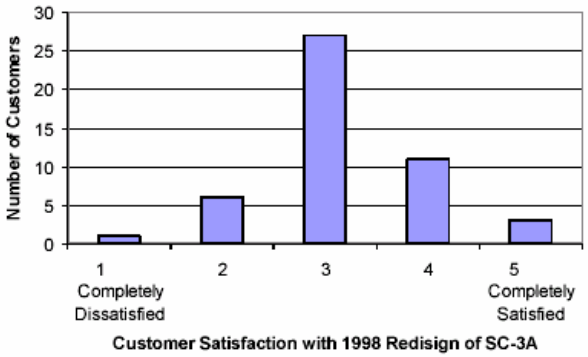
How Well Did the SC-3A Market Initiative Work?

Overall, SC-3A customers reported being satisfied with the experience of the last five years, as the adjacent figure indicates. Some respondents said that more information should have been provided to them about the benefits and consequences of the two options offered by NMPC. Overall, customers indicated that they were disappointed with the paucity of competitive alternatives, especially as the retail market evolved, than the SC-3A tariff itself.

price hedging. Over half switched to an alternative supplier, but many switched back to SC-3A, and by



Customer Satisfaction with 1998 Redisign of SC-3A

2003, it appears almost two-thirds were facing NMPC's SC-3A prices.

cost of their load. But, for a few the take-or-pay provisions reduced their benefits so that they would have done better on SC-3A. Such regrets are inevitable for a hedge that requires forecasting usage and prices for a five-year period.

The SC-3A program achieved considerable success in inducing customers to alter their usage in response to price changes, augmented by the NYISO programs. Although about half of the customers indicate that they cannot shift or curtail usage on high

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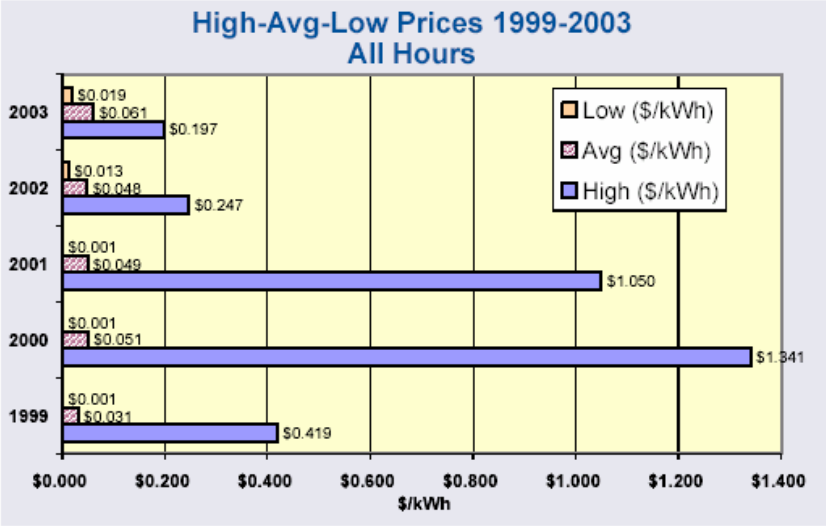

Response to SC-3A Price Volatility

The pattern and level of prices determine how many opportunities there are for SC-3A customers to respond to prices.

Price Trends

Over the course of the first five years of the SC-3A service, commodity prices have averaged $0.048/kWh, soared to over $1.00/kWh on a few occasions, and been below a penny per kWh for many

the hours had prices in excess of $0.05/kWh in 2003.

Overall, the range of commodity prices for electricity has decreased dramatically over the past five years, while the average price has increased.

in excess of $0.05/kWh. In fact, 16 out of the 18 highest priced hours over the past five years occurred during summer daytime hours.

These historical SC-3A price trends may or may not continue on

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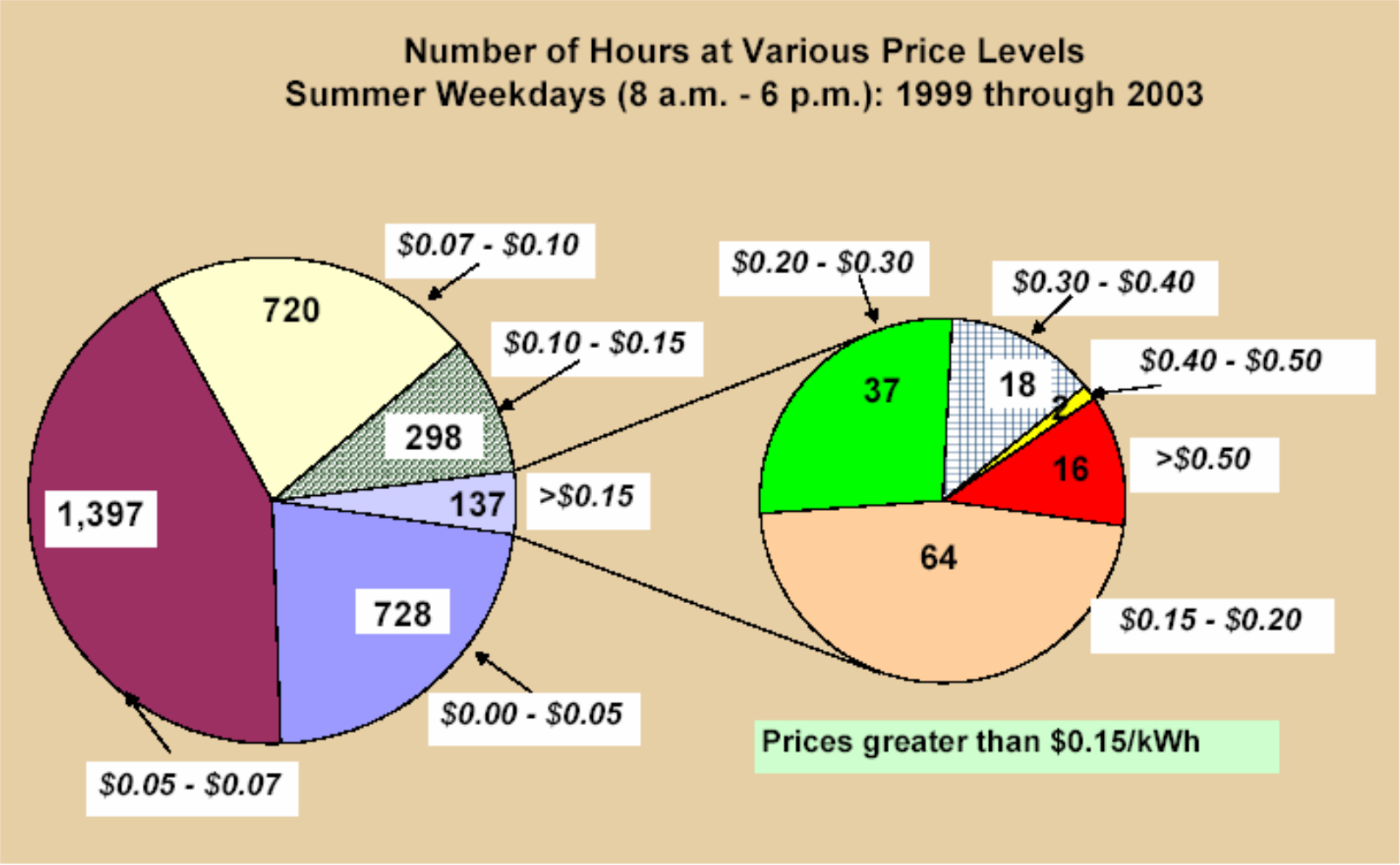

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Price Response by Business Type

An analysis of SC-3A customers' load was performed to quantify their price-responsive behavior. Popular wisdom holds that manufacturing sectors are the most able to respond to changes in price, while more service-oriented industries have far less flexibility to alter consumption. Surprisingly, the results of this analysis showed the contrary – government and education facilities, as well as public works customers, demonstrated the greatest ability to curtail load when prices rose.

Actions Undertaken in Response to Price

Although a majority of customers cited undertaking simple actions in response to high prices, like asking employees to cut back on air conditioning use and to dim overhead lights, there were a few who stated they undertook more aggressive measures by altering or even halting major production processes.

All Actions Taken By Customers to Respond to High Prices	Percentage of Customers
Asked Employees to Reduce Usage	32%
Reduced/Halted Air Conditioning	28%
Shut Down Equipment	23%
Turned Off or Dimmed Lights	19%
Altered Major Production Processes	8%
None	6%
Reduced Plug Loads (e.g. Office Equipment)	6%
Shut Down Plant or Building	6%
Reduced/Halted Refridgeration/Water Heating	4%
Halted Major Production Processes	4%
Started On-Site/Backup Generation	2%

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Peak Load Reductions on RTP

Potential Peak Load Reduction in response to prices of $0.50/kWh	
Manufacturing	17%
Public Works	20%
Commercial & Retail	Less than 1%
Health Care	Less than 1%
Government & Education	20%

SC-3A customers can collectively produce a sizable reduction in load from the bulk power system. Based on models derived from SC-3A customers' usage patterns, the peak demand of roughly 562 MW, is estimated to be reduced by about 13% when the price of electricity reaches to $0.15/kWh, and at a price of $0.50/kWh, load is reduced by over 18%.

Demand Response Programs and RTP

Many customers who claimed to be price-responsive actually did not cite price as their main motivator but a more fundamental reason for reducing consumption during high priced periods: civic duty. Many recognized that high prices generally when the bulk power system is in dire straights. These programs pay participants upwards of $0.50/kWh to curtail electricity on very short notice when system reliability is threatened. Over 25% of SC-3A customers studied participated in the EDRP

NYISO Demand Response Program Enrollment for SC-3A Customers	
DADRP (economic)	<1%
ICAP-SCR (reliability-capacity)	7%
EDRP (emergency)	21%

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Customer Issues

Customers on SC-3A have had to learn quite a bit about themselves, as well as the marketplace in which they reside, since RTP was introduced in 1998. Here is a list of issues customers reported confronting:

How does the wholesale market work?	Many customers said they did not need to have a fluent understanding of the NYISO's wholesale market rules, but they did want a better grasp on the pricing process - like what foreseeable circumstances could cause prices to rise, for how long, and when such circumstances are likely to arise. Generally, price spikes occur when there is a shortfall of generation available to reliably meet the demands of the State's electricity consumers. Such conditions occur when either the demand for electricity is higher than normal (due generally to high temperatures); a number of generators are offline for maintenance (generally in the spring and fall); the bulk transmission system is not running at full capacity, also due to maintenance (generally in the spring and fall); or any combination of the three.
How do I shop for alternative electric commodity supply?	This was the single biggest obstacle SC-3A customers said they encountered as a result of the introduction of retail competition. Many felt they were ill-prepared to make the leap from utility provided services to a market open to competition. Fortunately for those who will be migrating onto RTP in the future, they are able to gain some vicarious experience with the retail market that the forerunners on SC-3A could not. The New York State Public Service Commission, the agency responsible for overseeing the restructuring of the electricity market, has a list of competitive electric commodity suppliers on the web at: http://www.dps.state.ny.us/EnergyCompetition.html