JACKSON ASSOCIATES WHITE PAPER

Maximizing Competitive Advantage in Storage and PV Markets With Utility Customer Electricity Use Databases and Analysis

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About the Author

Dr. Jerry Jackson is president of Jackson Associate, a consulting firm providing new technology analysis, market analysis, strategy development and other energy-related practice areas for over 30 years. He has also held positions as a professor at Texas A&M University, Chief of the Applied Research Division at Georgia Tech Research Institute, economist at the US Department of Energy's Oak Ridge National Laboratory and economist at the Federal Reserve Bank of Chicago.

He has advised new technology companies on market analysis, sales and market strategy for a variety of new energy technologies including electric and thermal energy storage, fuel cells, solar PV, combined heat and power, wind, flywheels, demand response, energy efficiency and smart grid technologies.

He is also developer of Jackson Associates' MAISY® Utility Customer Energy Use and Hourly Loads Databases, the most widely used source of utility customer energy use and hourly loads data comprised of information on more than 7 million utility customers. MAISY (Market Analysis and Information System) clients include technology companies, electric utilities, regulatory agencies, state and federal government agencies, research organizations and a variety of other clients. A partial list of clients is available at http://www.maisy.com/clients.htm

Introduction

New technology markets including energy storage and solar photovoltaic applications reflect something of a frenzied environment with many companies competing with different technologies, designs and application strategies to demonstrate advantages of their products.

The extent to which individual companies will succeed as these markets move forward depends on technology characteristics, and often more importantly, on an awareness and understanding of market and customer-related issues. Among these issues are customer and customer segment variations in hourly and 15-minute electric load profiles, energy bill savings, utility rate structures, non-financial customer value-added propositions and other customer characteristics. Incorporating this information in product development, demonstration, and marketing and sales strategies can significantly increase marketing and sales success, customer satisfaction, market share, and sales conversions and reduce customer acquisition costs.

These customer-related issues are often given scant consideration even after the commercialization process has begun. Product design is typically guided by judgmental assumptions concerning the market "sweet spot" without considering the impacts of diversity in customer electric loads or electric rate structures. Even companies who have successfully commercialized their products are often hindered by inefficient marketing and sales processes. For example, the National Renewable Energy Laboratory's survey of PV system installation costs found an average customer acquisition cost of about $3,000 for a 5kW residential PV system, excluding system design costs.

While storage and PV companies can obtain customer electric load data for some individual customers after an initial contact, delays in acquiring interval data from the customer's utility can lead to significant expenditures in sales and engineering efforts for potential installations that are later determined to provide little or no customer benefit. In areas where interval loads are not available for residential or commercial customers, battery and PV providers must estimate energy use and loads. Inaccurate estimates lead to oversizing or undersizing systems compared to the optimal design and reducing savings.

Developing timely information on the entire market to inform product design, marketing and sales one customer prospect at a time is impractical. For new markets customer list vendors provide some customer-detailed data but no information on potential customer electricity use.

Finally, market research shows that sales presentations keyed to customer characteristics have much greater sales conversion rates than more general presentations. When customer information provided by customer list sources is matched with energy use and hourly load characteristics of comparable peer buildings, initial sales presentations provide a more accurate characterization of customer benefits and convey a more knowledgeable and customer-oriented relationship leading to a higher sales conversion rate.

Comprehensive quantitative understanding of potential storage and PV customers and markets can significantly improve product development, demonstration, marketing and sales, providing a substantial competitive advantage for companies in these emerging markets.

Past experience shows that winners in new technology markets emerge in large part because of their ability to align marketing, sales and customer value propositions with appropriate market segments and their ability to develop more effective and efficient sales processes.

Utility Customer Data and Analysis Benefits

This section summarizes the role of utility customer data and analysis in supporting product development, demonstration and marketing and sales for electric storage systems, PV systems and PV systems with electric storage.

Product development. While electric storage products are modular by nature, knowledge of the potential market for various size options can help guide the design process.

Utility customers in different market segments have characteristic load profiles and characteristic within-hour fluctuations in interval loads. Variations in rate structures across utilities, the number of customers within segments in individual utility service areas and size variations of customers within segments make the determination of market potential a complicated but important process. For example, a 30kW battery system may have a greater cost/kW than a 50kW system but may have a larger potential market and a shorter payback because of load profiles and electric rate structures in appropriate market segments.

Demonstration Projects. In addition to demonstrating operation of new technology projects and providing an opportunity to address unforeseen technical issues, demonstration project results can serve as powerful marketing material demonstrating the financial benefit of the technology. Demonstrations are most useful for this purpose if they are conducted for customers within target segments showing the greatest financial advantage and segments that will eventually be targeted in the commercialization process.

Commercialization. The diversity in utility customer hourly and 15-minute electric loads, rate structures, electric bills, and valuation of non-financial benefits makes identification of target markets and the sales process extremely challenging. Marketing and sales processes involved in the commercialization process can be further detailed as including three components:

> **Market segmentation, sizing and potential analysis.** Market segmentation identifies customer segments where customers have similar characteristics with respect to electric loads, rate structures, size, electric bills and other factors that reflect customer value. Market sizing determines the number of customers in segments and sub-segments defined by size, geographic location or other factors. Market potential provides an assessment of the potential for product sales within each market segment and sub-segment based on electric bill savings, purchase probabilities and other factors.

> **Target marketing.** Market segmentation, sizing and potential analysis provide a focus for marketing to potential customers through telephone, mail, in-person or other channels. Within the most attractive segments, individual customers can be "scored" to identify those most likely to convert from a marketing contact to a sale. Scoring can be accomplished by identifying details developed in direct customer contact or in vendor-provided customer lists and energy usage models.

> **Sales conversions**. Potential customers must be "qualified" after the initial contact to determine the likelihood that an application of the technology provides an attractive business case. One of the most important inputs in the qualification is developing information on the customer's hourly or 15-minute electric loads. Since the engineering design process can be costly and information on electric loads may not be readily available, an estimate of the potential customer's electric loads and rate structure impacts can provide an effective filter to determine whether to proceed with further sales efforts including preliminary system design and financial analysis. Customer information on business type, operating hours, building occupants, etc (or for residential, dwelling unit size, space and water heating fuel, etc.) can be applied to develop individual customer load profiles required in the preliminary assessment and design process.

> Market research shows that sales presentations keyed to customer characteristics have much greater sales conversion rates than more general presentations. When customer information provided by customer list sources is matched with energy use and hourly load characteristics of comparable peer buildings before customer contact, initial sales presentations provide a more accurate characterization of customer benefits and convey a more knowledgeable and customer-oriented relationship leading to a higher sales conversion rate.

MAISY ® Resource Summary

Jackson Associate's (JA) MAISY[*] Utility Customer Energy Use and Hourly Loads Databases and analysis software, introduced in 1995 and continuously updated, have been applied to support marketing and sales activities for a variety of new energy technologies including electric and thermal energy storage, fuel cells, PV, combined heat and power, wind, flywheels, demand response, energy efficiency and smart grid technologies.

This section summarizes MAISY Database and analysis resources and describes some of their applications in supporting product development, demonstration and commercialization activities described in the previous section. Readers can click on the hyperlinks to go to more detailed descriptions.

Customer Segment Databases. **Supports product development, market segmentation, market sizing, and target marketing.**

Customer segment hourly and 15-minute electric load databases for commercial and residential customers provide average or typical loads and customer characteristics including electric loads, peak leveling and shaving potentials, electric bill savings and other technology evaluations for distinct customer categories or segments defined by location (service area, weather zone, zip code, etc.), business type and/or SIC/NAICS codes, etc. (commercial) income, demographic, dwelling unit size, etc. (residential) and load characteristic relevant to the battery, PV or battery/PV system.

MAISY Segment Databases provide information for manufacturers and suppliers to prioritize and target the most promising customers based on the financial benefits of the technology, customer load profiles and utility rates, saving thousands of dollars in per-customer acquisition costs.

Jackson Associates market segmentation analysis applies detailed customer analysis to tease out the most attractive 20-100 market segments defined by customer business category, employment, location and other factors (commercial) or income, demographics, location, dwelling unit size, etc. to focus on in marketing and selling technology applications.

Customer segment information provides insights on specific markets supporting product development, product design, marketing strategy, target marketing, developing sales contacts, and initial sales contact interactions.

Individual Customer Databases. Support all market segmentation activities and applications and provide information on individual and/or prototype (e.g., a typical 20,000 square foot, electrically space heated, 1960's office buiding) utility customers.

Individual customer databases provide customer characteristics for individual customers including floor space, business type, fuel choices, building size, etc. (commercial), income, demographics, building age, etc (residential) along with hourly and 15-minute electricity loads.

MAISY (Market Analysis and Information System) Utility Customer Energy Use and Hourly Loads Databases are based on information from more than 7 million US utility customers including detail on buildings, occupants, equipment, operational characteristics for individual commercial and residential utility customers. Databases are available for states, electric utility service areas, and other client-specified geographic areas.

State and service area databases, which can include information on as many as 20,000 customers or more, allow JA clients to conduct in-house market segmentation analysis as well as providing a database of individual customers that can be matched to customer prospects to estimate hourly or 15-minute interval loads. Customer list information and/or information developed in early customer contacts can be applied with customer

*Market Analysis and Information System (MAISY) is the trademarked name for Jackson Associates' Utility Customer Energy Use Databases, Forecasting and Analysis Models.

database information using "nearest neighbor" statistical analysis to develop peer energy use, hourly and 15-minute loads reflecting expected values and confidence intervals around expected values.

MAISY Profiler Software provides easy access to either MAISY Customer Segment Databases or full MAISY Utility Customer Databases records. Profiler software also optionally provides technology and business case analysis customized for each client application.

> MAISY Profiler software provides an easy-to-use Excel-based user interface to extract data from either segment databases or full customer databases. The Profiler also provides customized technology and financial business case analysis software to evaluate technology applications for user-specified customer segments, customers or customer prototypes.

> Profiler software for full MAISY Utility Customer Databases apply user-supplied customer characteristics to match potential customers to database records extracting and processing hourly or 15-minute interval loads of similar database records to provide immediate potential customers loads-based analysis. This customer matching can be applied with customer data from customer list vendors (InfoUSA) or with customer data developed in initial customer contact (e.g., telephone or onsite).

Individual customer annual and monthly electricity usage models forecast commercial and residential annual and monthly energy and peak demand with equation-based models for customer segments or individual customers in ZIP codes, utility service areas, and states throughout the US. These models are designed for clients who value annual and monthly electricity use in targeting and qualifying potential customers based on annual electricity use.

Individual Customer Residential PV Purchase Scoring. Determines the probability individual customers will purchase a solar PV system.

Risk Analysis and Outcome Distributions. Determines potential ranges of results reflecting variations in customer characteristics, weather, etc.

Electric Utility Rates. The MAISY Utility Rates Database includes electric rate structures for most US utilities.

Illustrations of MAISY® Data Applications

Each of the resources identified in the previous section is described in more detail here.

1.   Customer Segment Hourly & 15-Minute Electric Load Databases

Commercial and Residential Customer Segment Databases include hourly & 15-minute electric use and other segment average values derived from the full MAISY Utility Customer Energy Use and Hourly Loads Databases including   information on more than 7 million US utility customers. Individual utility customer records are processed and utility customer information is developed to reflect customers within each customer segment. Electricity use is provided as hourly or 15-minute electric loads for customer segments defined by customer characteristics, location (service area, weather zone, zip code, etc.) electricity use and other factors.

Customer segments definitions are developed as part of a comprehensive segmentation process that minimizes within-segment and maximizes between-segment variation of important client-specific characteristics such as customer load profiles, client technology characteristics, rate structure impacts, utility incentives, potential electric bill savings, etc. Number of customers is typically applied as one of the segment development criteria to ensure that market segments are large enough to warrant targeted attention.

In addition to electric load data, additional information is provided for each segment including number of customers and average or typical characteristics of customers in each segment. The table below illustrates typical detail associated with both Commercial and Residential Databases.

<table>
<tr><td colspan="2" align="center">Customer Segment Database Detail</td></tr>
<tr><td colspan="2">Description: Hourly or 15-minute loads for individual commercial or residential market segments. Load data can reflect the segment average, prototype or a distribution (e.g., low, median and high) of customer loads. Also includes summary characteristics including annual kWh, peak kW, average size and other information for each segment.</td></tr>
<tr><td colspan="2" align="center">Segment detail</td></tr>
<tr><td align="center">Commercial Customers</td><td align="center">Residential Customers</td></tr>
<tr><td>Business type: Standard business types/ NAICS code customer segments or client-specified
Size: (kW, kWh, square feet) small, medium, large or client-specified kWh or kW boundaries
Other: Optional client-specified (e.g., load profile-based, electric space heating, operating hours, etc.)</td><td>Dwelling unit type: Single family, multifamily, mobile home or client-specified
Size: kW, kWh, square feet, rooms, demographics, or client-specified kWh or kW boundaries
Other: Income, end-use fuel types, appliance types, electric space heating, dwelling unit age., load profile-based, etc.</td></tr>
<tr><td colspan="2" align="center">Geographic Detail</td></tr>
<tr><td colspan="2">States, electric utility service areas, climate zones, ZIP code areas or combinations of geographic areas</td></tr>
<tr><td colspan="2" align="center">Electricity Use and Electric Bill Detail</td></tr>
<tr><td colspan="2">Annual and monthly electricity use and peak kW, 8760 hourly and 15-minute electric loads.
Annual and monthly bills based on current utility rate structures</td></tr>
<tr><td colspan="2">Other optional customer detail: See http://www.maisy.com/cvar.htm and http://www.maisy.com/rvar.htm for a description of all MAISY database variables.</td></tr>
</table>

Example Questions/Applications

- How do load profiles vary by customer segment and what are impacts on product design/costs?
- How do customer financial benefits vary across customer segments?
- Which customer segments should marketing and sales campaigns focus on to offer the greatest customer energy bill savings?
- What customer characteristics are most closely associated with the greatest energy bill savings?
- What technology operating strategy maximizes electric bill savings given utility rate structures and incentives?
- How many potential customers are associated with different customer segments?
- What are the implications of load profiles on technology performance, control strategies, lifetime, and other operating and maintenance issues?
- Apply segment-specific load profiles in marketing material targeted to individual segments

- Apply segment-specific load profiles in direct sales contacts to illustrate operation and economic benefits to prospective customers
- Scale load profiles using customer annual or monthly energy use to develop customer hourly load estimates

Segment electric load data is provided in Excel Workbooks as illustrated with the Example workbook below, making access and evaluation easy and facilitating data export to other platforms.

EXAMPLE SEGMENT LOADS

	Climate Zone 1	Climate Zone2	Climate Zone 3	Climate Zone 4	Climate Zone 5
Number of Customers	581	532	585	706	287
Minimum Floor Space	9,127	8,714	9,883	9,681	9,967
Mean Floor Space	25,589	36,426	36,258	37,854	36,952
Maximum Floor Space	77,781	130,208	129,206	132,653	130,371
Minimum Employment	4	5	6	5	7
Mean Employment	22	36	35	38	37
Maximum Employment	82	174	167	174	182

15-Minute kW Loads

Day-of-year	Month	Day-of-month	Day-of-week	Hour	Climate Zone 1	Climate Zone2	Climate Zone 3	Climate Zone 4	Climate Zone 5
1	1	1	3	1	21.8	21.4	19.8	24.9	21.9
1	1	1	3	1	21.9	21.2	19.7	25.1	22.0
1	1	1	3	1	22.0	21.3	20.0	25.1	21.6
1	1	1	3	1	21.7	21.1	20.3	24.9	21.6
1	1	1	3	2	21.1	21.4	21.9	24.3	22.5

1	1	1	3	5	25.1	22.2	25.2	25.8	25.5
1	1	1	3	6	25.4	22.5	25.2	26.1	25.7
1	1	1	3	6	25.7	22.7	25.2	26.4	26.1

2. Individual Customer Databases

MAISY® (Market Analysis and Information System) Utility Customer Energy Use and Hourly Load Databases are the energy industry's most widely-used, authoritative source of utility customer energy use information available. Databases have been developed from information on more than 7 million individual utility customers. MAISY database information has been used by utilities, energy service providers, energy service companies, equipment manufacturers, research organizations and other organizations interested in utility customer energy use. MAISY data have also been used to support US Department of Energy appliance and equipment efficiency standards development.

MAISY Utility Customer Databases include dozens of data items for each customer record including energy use, hourly loads, building, equipment, operating, occupant and other energy-related information including day-type (peak day, week day and weekend day for each of 12 months), 8760 hourly loads for electricity, natural gas and fuel oil/other energy use along with 15-minute electric interval load data. Hourly energy use data are available for whole buildings and individual end uses.

State and service area databases are available for residential and commercial sectors for each state and service area in the US and for each Canadian province. Unique database features include:

- Large number of utility customer records in each state and service area database
- Access to individual customer record energy use including hourly 8760 and 15-minute electric loads
- Twenty+ general business categories and SIC/NAICS codes for each commercial record
- Income and other data items that are not available from other residential customer sources
- Database records reflect either utility customers or buildings
- The most comprehensive, up-to-date utility customer energy use data available
- Detailed segmentation and deep drill-down capabilities
- Excel workbook format for easy access and analysis
- Vetted/applied by over 100 organizations for technology and energy-related market analysis, product development and assessment, cost-of-service studies, energy efficiency, smart grid analysis and more

Database Structure: Each state or utility database typically includes information on between 3,000 and 20,000 individual utility customers, though larger databases can be provided. Each customer record contains a population weight that reflects the number of customers it represents in the state or utility population.

MAISY databases are provided in Excel workbooks. Each individual database record occupies one row of a worksheet. Each column in the row contains a value for a single variable. The right-most columns include either month/day type load profiles or full 8,760 weather-

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2	Example MAISY Commercial Sector Record Layout.											
3	RECNO	WEIGHT	BLDTYP	SIC	NAICS	SQFT	YRCON	HTFUEL	HWFUEL	CKFUEL	PCTCL	ACEQIP
4	23001	31	rest	5812	722511	28,800	00-13	ngas	ngas	elec	100	package
5	23002	131	rest	5812	722511	9,700	80-00	elec	ngas	elec	100	restype
6	23011	225	rest	5812	722513	6,100	80-00	elec	elec	other	100	package
7	23012	108	rest	5812	722513	6,500	60-79	elec	elec	elec	100	package
8	23013	155	rest	5812	722513	3,700	60-79	elec	ngas	ngas	100	package
9	23014	51	rest	5812	722511	41,800	<1960	other	other	other	100	chiller

adjusted hourly loads. 15-minute load databases include each utility customer record including each 5-minute kW value in a single column.

Each record contains a population weight that reflects the number of customers it represents in the state or service area population (i.e., a weight of 31 means that particular customer represents 31 customers in the state, or service area, with the same customer characteristics).

3. MAISY Profiler Software

Profiler software accesses and analyzes data from the MAISY Segment and Customer Databases. User input is provided in worksheet forms and Profiler Software and extracts and presents analysis results relieving the user of data processing tasks. The Profiler applies a unique process to (1) match user-provided customer characteristics with individual records in the 7+million utility customer MAISY databases and (2) extract day type, hourly and 15-minute load data for similar customers.

MAISY clients can use as little or as much customer information as desired to define and receive an hourly or 15-minute full year load profile with the Profiler "filling-in" any missing customer information. If only a business type (commercial) or dwelling unit type (residential) is specified, hourly loads are returned for the average of all businesses or all dwelling units of that type in the selected geographic area. Additional customer detail can be provided to narrow the database record search based on opening and closing hours, square feet, employees and other characteristics (or for residential, income, dwelling unit square feet demographics and other characteristics) to provide even more customer-specific electricity loads.

User-provided customer characteristics reflect actual customers or prototype customers designed to provide loads for representative customers (e.g., medical office buildings, 50,000 – 100,000 square feet in size, residential customers in single family homes with incomes > $100k).

Extracted electric loads are presented and, depending on the client application, applied to technology, utility rates or business case analysis. The MAISY customer characteristics input form is customized for each client application. In addition to building, occupancy and other characteristics, the Profiler can also accept one or more month's electricity billing data and calibrate the full year hourly/interval data to actual usage.

JA works with clients to include detailed engineering performance information associated with energy storage and/or PV systems. Analysis can be conducted for commercial and residential customer segment averages or prototypes and/or for a sample of individual customers within each segment to capture the diversity of technology and business case outcomes within customer segments.

Each MAISY Profiler is customized to meet client needs and provided with an Excel user interface as illustrated with the figure to the right. This workbook shows a combined heat and power business case analysis with separate worksheets for the CHP and other business case input parameters.

MAISY Distributed Generation Business Case

Large Retail Buildings
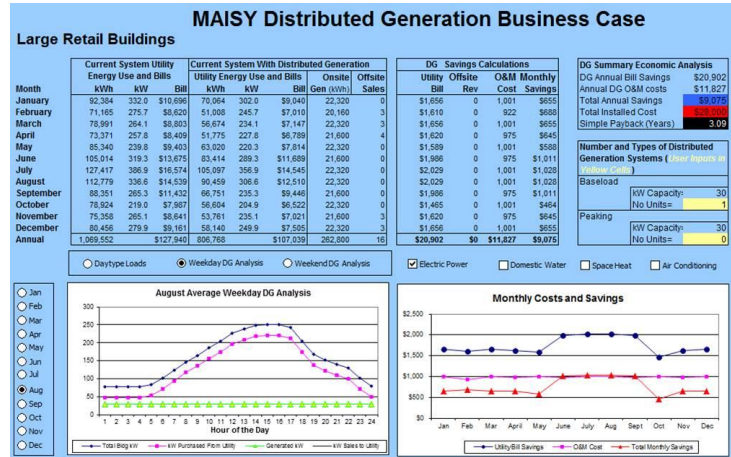
Microturbine Cost and Performance Characteristics
(User Inputs in Yellow Cells)

	Per Unit
Capacity (kW)	30
Elec Generating Effic Efficiency	28.0%
Total Installed Cost	$28,000
O&M Nonfuel Costs	$2,100
Thermal Energy (Btu/kWh)	4200
Thermal Recovery Efficiency	42.0%

User characteristics can provide any variable detail that is included in the MAISY databases (see http://www.maisy.com/cvar.htm or http://www.maisy.com/rvar.htm) desired by MAISY clients. An example of a commercial utility customer input form is shown below.

MAISY 2014 COMMERCIAL UTILITY CUSTOMER PROFILER

Other Client Applications

The full Utility Customer Databases provide access to all individual customer detail; Customer Segment Databases provide information on client-specific customer segments while the Profiler software provides an easy way to access and analyze technology and business case issues using either the Customer Segment or the full Utility Customer Database. This section includes descriptions of client-requested applications that address specific product development, marketing and sales applications.

1. Individual Customer Electricity Usage Models

Usage models apply customer information to estimate annual and monthly electricity use of individual customers prior to contacting customers or at the time of customer contact. Equation-based algorithms can easily be incorporated in client marketing and sales software systems. Models can also be used as stand-alone Excel-based applications using the Excel workbook deliverable that illustrates and documents the model and its application.

Usage models are statistically estimated with individual customer information from the MAISY Energy Use and Hourly Loads Databases. Models are custom-developed to include customer information derived from commercial list vendors (e.g., Dunn and Bradstreet, Donnelley) and/or from direct customer contact. Models are provided with conditional default values that reflect the most likely values of any variables that may be missing from lists or customer contacts.

Electricity usage models are important for identifying potential customers and for vetting customer electricity use prior to or as an alternative to receiving actual historical electricity use from the utility. Usage models forecast commercial and residential annual and monthly energy use and peak demand.

2. Residential PV Customer Scoring Models

Solar PV customer acquisition costs are extremely high. A recent survey by the US Department of Energy's National Renewable Energy Laboratory found an average customer acquisition cost of about $3,000 for a 5kW system, excluding system design costs.

Marketing Solar PV includes challenges that do not exist with most other energy-related products and services. While growing rapidly, the market saturation of solar PV is still in the low single digits in most areas, making mass market media advertising like radio and television ineffective and costly. Similarly broad direct marketing campaigns including mailings and telemarketing tend to provide disappointing results even when targets are selected by income or other traditional segmentation variables.

JA addressed these challenges by developing residential solar market data and applying this data in a statistical modeling process that identifies the impacts of household, dwelling unit, neighborhood characteristics, PV savings, electric bills and other variables on solar PV purchase probability. MAISY Residential Solar PV Scoring Models are estimated with information on more than 7 million utility customers and nearly 500,000 solar PV installations across the US to statistically identify the most likely PV sales prospects.

MAISY PV scoring models apply data such as income and number of household members provided by commercial list vendors for each potential customer along with MAISY variables. Electric bills, solar savings, current ZIP-level PV penetration, and a variety of psychographic variables including proprietary MAISY variables developed specifically to support this application are applied in this process. Scores, which range from 1.0 to 5.0, identify the most "solar PV-receptive" providing the ability to sort and prioritize individual customer contact records.

MAISY Solar Market Potential Scoring significantly reduces Solar PV customer direct marketing acquisition costs and increases profits by identifying the most receptive solar PV leads. Direct marketing costs per sale are reduced by

focusing on the most likely customer prospects, sales conversion rates are increased and other sales costs including sales calls, site visits, and travel time are reduced.

3. Risk Analysis, Outcome Probabilities and Outcome Distributions

The "big data" nature of MAISY Energy Use and Hourly Loads Databases that serves as underlying data for the products and services described above provides a unique opportunity to provide risk analysis, outcome probabilities and distributions for hourly loads, energy use, technology and business case analysis.

For example, in addition to providing the average load profile for a market segment, low, average and high loads can be provided where the low and high loads encompass 80 percent of utility customers in that segment.

4. Electric Utility Rates

The MAISY Utility Rates Database includes electric rate structures for most US utilities. Rates include all details (peak, part peak, off peak, seasonal, kWh and kW charges, etc.) associated with each rate structure as appropriate for client technology applications. Electric rates data can be integrated with segment loads databases, customer/prototype load results and electricity usage models to provide electric billing information relevant to client applications.

Partial List of Jackson Associates Clients

Airtricity	Florida Power and Light	Orange and Rockland Utilities
Aisin	Energy Services Gainesville Regional Utilities	PA Consulting
Arkansas Power and Light	GDF Suez North America	PG&E Energy Services
Austin Electric Utility	Geostellar	Pennsylvania Power and Light
Bandera Electric Coop	Gulf States Utilities	Pedernales Electric Coop
Bastrop Power and Light	Hamilton Sunstrand	PECO Energy Company
Bermuda Electric Company	Houston County Electric Coop	Pratt and Whitney
Bloom Energy	Ice Energy	Puget Sound Power and Light
Bluebonnet, Electric Coop	IdaTech	Reliant Energy
Bonneville Power Administration	Illinois Power Company	Rochester Gas and Electric
Boston Edison Company	Indiana Gas	Rocky Mountain Institute
Capitol One	Independence Power and Light	Sharp Laboratories of America
Carrier Corporation	Ingersoll-Rand	Southern Louisiana Electric Company
Centerpoint Energy	Kerrville Utility Board	Spark Energy
Central Hudson Gas and Electric	Lawrence Berkeley National Lab (US DOE)	State of California
Central and Southwest Services, Inc.	Lawrenceburg Utility Systems	State of Colorado
Central Maine Power Company	Louisiana Power and Light	State of Indiana
Cinergy Corp.	Lower Colorado River Authority	State of Michigan
Citizens Gas	Southern Company	State of New York
City of Wilson Electric Utility	Midwest Energy Cooperative	State of Pennsylvania
Coda Energy	Mississippi Power and Light	State of Texas
Commonwealth Edison Company	New Orleans Public Service	State of Washington
Commonwealth Electric Company	Niagara Mohawk Power Corporation	Sungevity
CoServ Electric Utility	Nebraska Public Power District	Sun Edison
Consolidated Edison Company	New Braunfels Electric Utility	Tanger Outlets
CPS Energy (San Antonio municipal	New Brunswick Public Utility Commission	Tennessee Valley Authority
Deloitte Consulting	New Energy Ventures	Texas Utilities
Direct Energy	New England Power Pool	Tiax (Formerly part of Arthur D. Little)
Duke Solutions	New York Power Authority	Toyota
EDMPro.com	New York Power Pool	Toyota Motor Sales
Electric Power Research Institute	New York State Electric and Gas	TXU Energy Services
ENERNOC	Northeast Utilities	United Technology Research Center
Entergy Corp	Northern Indiana Public Service Company	UTC Fuel Cells
Entergy Integrated Solutions	Northwest Power Planning Council	US Department of Energy
Entergy, Inc.	Oak Ridge National Laboratory (US DOE)	Viron
Eastern Utilities Associates	Omaha Public Power District	Washington Water Power
Evionyx	Ontario Hydro	Xcel Energy
Florida Power and Light		