
JACKSON ASSOCIATES

MAISY[®]*

*Battery Storage Marketing
and Sales Assistant Profiler*

October, 2015

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

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Introduction

Qualifying New Customer Interval Loads on First Contact

Marketing and sales costs tend to be extremely high in new technology markets. One reason for these high costs is difficulty in identifying market segments likely to provide the greatest customer value and the best business case for the technology. Even after identifying attractive market segments, individual customers within the segments must be evaluated to ensure that 15-minute electric loads, utility rates and technology characteristics align to provide a financially attractive application.

This market analysis/sales effort is illustrated on the right as a winnowing process where market segmentation and target marketing (step 1) identify the most promising general customer categories followed by qualifying individual customers within those segments (step 2). The qualification process typically begins with one or more onsite sales calls, followed by obtaining electric load data, if available, from the utility and finally engineering design and analysis.

While interval load data for prospective customers is often accessible through the utility, these data are typically not available immediately or even for several weeks or months following initial customer contact resulting in significant expenditures on sales and preliminary system design for potential customers who turn out to provide little or no value for the storage or storage technology.

MAISY Customer Segment Databases and client-specific analysis provide information to support the first step while MAISY Profiler software described here provides an easy, low-cost solution for qualifying potential battery storage and battery/PV customers.

The MAISY Battery Storage Marketing and Sales Assistant Profiler can significantly reduce the cost of the second customer acquisition step. Designed for use prior to or during initial sales contacts, Profiler software uses potential customer characteristics to search the MAISY Utility Customer Databases, to identify and return hourly or 15-minute interval load data for customers with similar characteristics and to provide an immediate financial analysis based on likely customer electric loads, electric utility rate structures and storage characteristics. The Profiler can even accept available customer monthly electric billing information to calibrate interval load data. Profiler tables and charts provide easy-to evaluate individual customer business cases analysis and information including 15-minute interval data.

Profiler output tables and charts can also be applied in “Executive-Level” customer proposals to assist in the sales process.

Considering New Markets and Customers Prior to Contact

In addition to providing preliminary customer-specific business case analysis on initial customer contact, the Profiler can be applied to evaluate new customers and markets prior to actually engaging potential customers. The graphic at the right shows a company with a market presence in three utility service areas in California and one service area in Arizona with potential new markets in New York. Entering the New York ZIP code and building characteristics of interest (e.g., office building, 200,000 square feet), returns 15-minute loads and business case analysis for the specified customer type using utility rates for that ZIP code.



MAISY Battery Storage Marketing and Sales Assistant Profiler

The MAISY Battery Storage Marketing and Sales Assistant Profiler is designed to support marketing and sales staff by providing immediate evaluation and illustration of storage and or storage/PV systems financial benefits with limited customer information.

The Marketing and Sales Assistant Profiler consists of an Excel Workbook interface that:

- Accepts user building and occupant specifications including the ZIP code
- Identifies the electric utility serving that ZIP code and accesses the appropriate electric rate structure
- Identifies buildings in the MAISY Utility Customer database most closely matching characteristics provided by the user, and
- Returns the following information for the user-specified building:
 - 8,760 or 15-minute interval kW loads for a year
 - Monthly electricity billing data based on customers loads and current service area rate structure
 - Electric rate structure details
 - Summary electric load profile information (monthly kWh, peak kW, etc.)
- Provides easy user customization and the ability to generate preliminary executive proposals to support sales efforts

Commercial Customer Applications

Standard Marketing and Sales Assistant Profiler User Inputs

The standard Profiler user interface form allows the user to specify building characteristics with the following inputs:

- Building type: medical office, bank, finance and real estate, general office, fast food restaurant, etc (see MAISY Building type at <http://www.maisy.com/cvar.htm>), or
- SIC code or NAICS code (user will specify either building type or SIC/NAICS as a selection variable)
- Location: ZIP code
- Square feet (optional)
- Employees (optional)
- Electric space heating (Y/N) (optional)
- Electric AC (Y/N) (optional)
- Construction year (optional)
- Building high winter, high summer electric bills and spring/fall electric bills (optional)

Extended Marketing and Sales Assistant Profiler User Inputs

In situations where more detailed customer information is available the database matching process can be refined and extracted interval loads can be calibrated to actual customer billing data.

- Daily operating hours for each day in the week (optional)
- Office equipment/miscellaneous equipment characteristics (optional)
- Number of stories(optional)
- Billing Information as available (optional, for one to 12 preceding months)
 - Monthly kWh, peak kW for each billing interval in available months depending on the utility rate structure (e.g., kWh use in off peak, part peak and peak periods, monthly peak demand)
- Other information as requested

Residential Customer Applications

Standard Marketing and Sales Assistant Profiler User Inputs

The standard Profiler user interface form allows the user to specify building characteristics with the following inputs:

- Building type: single family detached, single family attached, multifamily <5 units, multifamily > 5 units, mobile home (see MAISY Building type at <http://www.maisy.com/cvar.htm>), or
- Location: ZIP code
- Square feet or number of bedrooms(optional)
- Number of adults and number of children (optional)
- Electric space heating (Y/N) (optional)
- Electric AC (Y/N) (optional)
- Electric water heating (Y/N) (optional)
- Construction year (optional)
- Building high winter, high summer electric bills and spring/fall electric bills (optional)

Extended Marketing and Sales Assistant Profiler User Inputs

In situations where more detailed customer information is available the database matching process can be refined and extracted interval loads can be calibrated to actual customer billing data.

- Electric appliances in the dwelling unit (number of refrigerators, electric dryer, etc.)
- Billing Information as available (optional, for one to 12 preceding months)
 - Monthly kWh, peak kW for each billing interval in available months depending on the utility rate structure (e.g., kWh use in off peak, part peak and peak periods, monthly peak demand)
- Other information as requested

Profiler User Inputs

The Marketing and Sales Assistant Profiler user inputs are used to match potential customer characteristics with utility customers in the MAISY Databases providing hourly or 15 minute load profiles that most closely reflects matching customers. The user form below shows a standard MAISY Commercial Profiler input worksheet.

MAISY[®] PROFILER ELECTRICITY STORAGE/PV MARKETING AND SALES ASSISTANT

<p>Location -ZIP Code <input type="text" value="32804"/></p> <p>Business Activity <input type="text" value="Office"/></p> <p style="text-align: center;">- or -</p> <p>SIC/NAICS Code <input type="text"/></p> <p>Year of Construction</p> <table border="1" style="width: 100%;"><tr><td><input type="checkbox"/> to 1960</td></tr><tr><td><input checked="" type="checkbox"/> 1980 to 2000</td></tr><tr><td><input type="checkbox"/> 2000 to 2014</td></tr></table>	<input type="checkbox"/> to 1960	<input checked="" type="checkbox"/> 1980 to 2000	<input type="checkbox"/> 2000 to 2014	<p>Session Title <input type="text" value="Analysis of Office Buildings in Orlando, Florida"/></p> <p>Fuel Uses</p> <table border="1" style="width: 100%;"><tr><td colspan="2">Heating</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Electricity</td></tr><tr><td><input type="checkbox"/></td><td>Natural gas</td></tr><tr><td><input type="checkbox"/></td><td>Fuel oil/other</td></tr><tr><td><input type="checkbox"/></td><td>None</td></tr><tr><td colspan="2">Air Conditioning</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Electricity</td></tr><tr><td><input type="checkbox"/></td><td>Other</td></tr><tr><td><input type="checkbox"/></td><td>None</td></tr></table>	Heating		<input checked="" type="checkbox"/>	Electricity	<input type="checkbox"/>	Natural gas	<input type="checkbox"/>	Fuel oil/other	<input type="checkbox"/>	None	Air Conditioning		<input checked="" type="checkbox"/>	Electricity	<input type="checkbox"/>	Other	<input type="checkbox"/>	None	<p>Bldg Size: Floor Space <input type="text" value="25.2"/> 1,000 Square footage</p> <p style="text-align: center;">- or -</p> <p>Bldg Size: Employees <input type="text"/> Number of workers main shift</p> <p>Customer Electric Bills (if available)</p> <table border="1" style="width: 100%;"><tr><td><input type="text"/></td><td>High Winter</td></tr><tr><td><input type="text"/></td><td>High Summer</td></tr><tr><td><input type="text"/></td><td>Minimum Spring/Fall</td></tr></table>	<input type="text"/>	High Winter	<input type="text"/>	High Summer	<input type="text"/>	Minimum Spring/Fall
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<input checked="" type="checkbox"/>	Electricity																												
<input type="checkbox"/>	Natural gas																												
<input type="checkbox"/>	Fuel oil/other																												
<input type="checkbox"/>	None																												
Air Conditioning																													
<input checked="" type="checkbox"/>	Electricity																												
<input type="checkbox"/>	Other																												
<input type="checkbox"/>	None																												
<input type="text"/>	High Winter																												
<input type="text"/>	High Summer																												
<input type="text"/>	Minimum Spring/Fall																												

Extended Profiler inputs include the additional items identified in the previous section when more detailed customer data are available. For example, if the sales contact is able to obtain kWh and peak kW for billing periods in one or more month's electric bills, this information is used in the database extraction process and interval data development.

Extended Profiler inputs can include any of the variable data items maintained in the MAISY Utility Customer Databases (see MAISY Building type at <http://www.maisy.com/cvar.htm>) and <http://www.maisy.com/rvar.htm>)

Profiler Battery Storage Analysis

Profiler technology analysis calculates load leveling, peak shaving and load shifting strategies based on technology characteristics including kW/kWh characteristics and load variations within each billing period. Technology cost data and utility rate structure details are applied to calculate bill savings and to evaluate the business case for alternative system configurations.

Jackson Associates works with clients to incorporate other operating characteristics and constraints and operating strategies.

Profiler Outputs

Profiler outputs are customized for each MAISY client. All Profiler applications include the following output result:

- 8,760 or 15-minute interval kW loads for an entire year
- Monthly electricity billing data based on customers loads and current service area rate structure
- Electric rate structure details
- Summary electric load profile information (monthly kWh, peak kW, etc.)

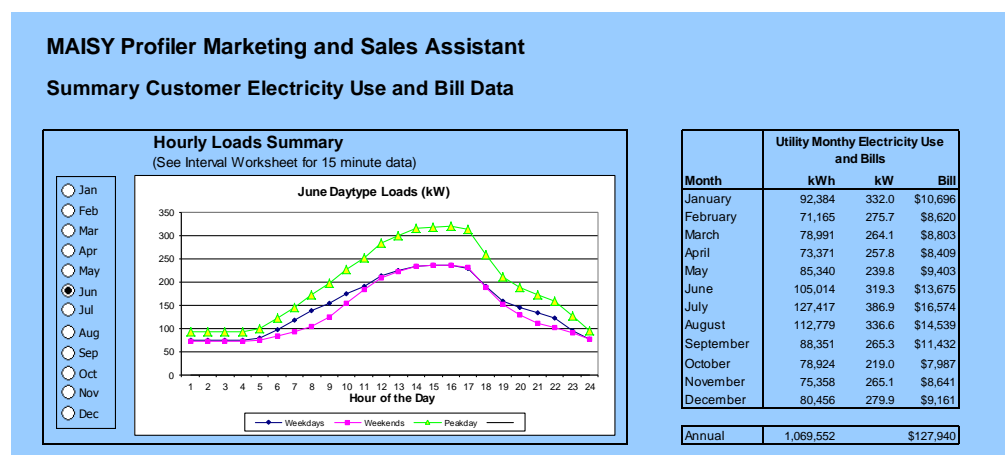
Profiler outputs also include client-specific technology evaluations including:

- Load leveling, shifting and peak clipping potentials for each month
- Peak demand reduction potentials for each month
- Electric bill impacts
- Other client-requested analysis/presentations

Example output tables and charts are shown to the right and below

Monthly summaries are calculated from hourly or interval loads applied to utility rate structures to calculate monthly bills.

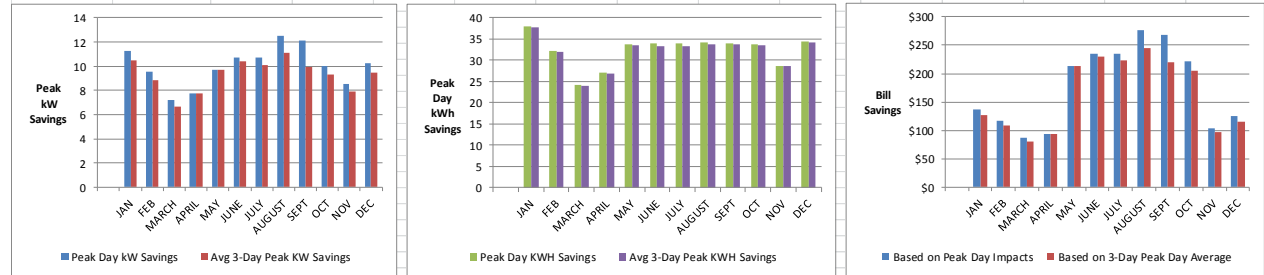
Technology impacts on maximum peak



day load and kWh reductions for the peak day are presented. Additional data on number of days the storage system must be employed to achieve the peak demand reduction and other performance characteristics can be provided. Full year 8,760 or 15-minute electricity loads are presented for evaluation and application to client-provided analysis.

Summary Analysis of Technology Energy and Electric Bill Impacts													
KW and kWh Impacts	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	TOTAL
Peak Day kW Savings	11.3	9.6	7.2	7.8	9.7	10.7	10.7	12.5	12.1	10.0	8.5	10.2	120.3
Avg 3-Day Peak KW Savings	10.4	8.9	6.7	7.8	9.7	10.4	10.1	11.1	10.0	9.3	7.9	9.5	111.7
Peak Day KWH Savings	37.9	32.2	24.2	27.0	33.7	34.1	34.0	34.1	34.0	33.8	28.7	34.5	388.2
Avg 3-Day Peak KWH Savings	37.7	32.0	24.0	26.9	33.6	33.4	33.4	33.7	33.7	33.6	28.6	34.3	384.9

Customer Bill Savings	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	TOTAL
Based on Peak Day Impacts \$	137	116	87	94	214	236	236	276	268	221	104	125	2,114
Based on 3-Day Peak Day Ave \$	127	108	81	94	214	230	223	244	220	205	96	116	1,959



Full-Year 15 Minute Interval Electricity Use					
Day-of-year	Month	Day-of-month	Day-of-week	Hour	Hourly kW Loads
1	1	1	3	1	30.61
1	1	1	3	1	30.58
1	1	1	3	1	30.43
1	1	1	3	1	29.97
1	1	1	3	2	30.74
1	1	1	3	2	31.96
1	1	1	3	2	31.80
1	1	1	3	2	32.02
1	1	1	3	3	32.16
1	1	1	3	3	31.68
1	1	1	3	3	30.62
1	1	1	3	3	30.70
1	1	1	3	4	30.44
1	1	1	3	4	29.99
1	1	1	3	4	29.66
1	1	1	3	4	29.08
1	1	1	3	5	28.44
1	1	1	3	5	28.15
1	1	1	3	5	27.56
1	1	1	3	5	27.30
1	1	1	3	6	27.01
1	1	1	3	6	26.66
1	1	1	3	6	26.83
1	1	1	3	6	26.81
1	1	1	3	7	26.64
1	1	1	3	7	26.50
1	1	1	3	7	27.18
1	1	1	3	7	26.97
1	1	1	3	8	27.33
1	1	1	3	8	26.72
1	1	1	3	8	26.62

Electric Utility Rates

The MAISY Marketing and Sales Assistant Profiler applies utility rate structures to hourly or 15-minute electric loads to calculate monthly electric bills for potential customers and financial analysis of the storage technology.

The MAISY Rates Database includes electric rate structures for most US utilities. Rates include details (peak, part peak, off peak, seasonal, kWh and kW charges, etc.) associated with each rate structure as appropriate for client applications.

Battery Storage and PV Systems

The MAISY Marketing and Sales Assistant Profiler can incorporate battery storage and battery/PV systems impacts on potential customer electricity use and bill reductions. Calculations of hourly or 15-minute electric loads and PV systems impact apply the same weather data to integrate storage and PV analysis.

Green Button Data

Some utilities provide customer interval load data through a “Green Button” online interface. The Profiler can optionally access and process Green Button data to conduct quick “executive level” onsite evaluations when this information is available.

Risk Analysis

Jackson Associates (JA) can include risk analysis to calculate Value-at-Risk and other investment risk measures associated with uncertainty in weather, future energy prices, technology performance, guaranteed pricing and other sources of uncertainty. See our related Web site for an example of JA risk analysis: www.energybudgetsatrisk.com.

MAISY Technology Analysis Experience

Jackson Associates’ MAISY technology analysis has been applied for 20 years to 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 technologies and various smart grid technologies.

Clients range from start-ups to some of the largest technology companies and electric utilities. A partial client list is clients are provided in the following section.

License Fees

Contact Jackson Associates for license fee quotes.

Partial List of Jackson Associates Clients

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