Local Power.

To:	Cheryl Taylor
SFPUC CC:	Barbara Hale, Harlan Kelley, Jr.
From:	Local Power Inc.
Date:	October 30, 2012
RE:	CS-920R-B, Task 3, Subtask B, Draft Site Evaluation Criteria

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Introduction

Community Choice Aggregation affords the SFPUC access to customer end-use electrical meter and account data through the CCA INFO TARIFF. This data is not accessible to private developers of renewable and demand-side assets, and gives CleanPowerSF a strategic and commercial advantage relative to these firms.

Local Power is combining this data with a variety of other datasets, and conducting a database and Geographic Information System (GIS) analysis of customer accounts. Based on the criteria contained in this report, the most financially attractive sites for the near-term deployment of distributed generation, renewables, and demand-side assets will be targeted, detailed, and ranked. These will be included in a customer-targeting database that will guide the program's deployment.

The financial attractiveness of a deployment at a given site will be considered from a variety of perspectives. At a minimum, the value-proposition must be compelling to the site owner. The impact of the deployment opportunity for a given site on the program's overall portfolio and wholesale procurement activities will be considered, and used to select sites that further present a value-proposition to CleanPowerSF. Deployments will be ranked to provide the maximum benefit to both the host site and the program overall. As sites will be targeted with multiple technologies, the ranking of sites will depend on a variety of criteria and expert judgment.

An Illustrative Example

A simple example of this process will be instructive. Consider the behind-the-meter deployment of photovoltaics on a medium commercial customer site; the following are a sample of relevant site evaluation criteria, explained at length:

- The customer will have demand charges that are assessed on a monthly basis, set by the highest period of onsite demand within any 15-minute period. This is referred to as customer-coincident demand, and may be a substantial portion of the customer's total electricity bill. The ideal candidate site will have a customer-coincident demand period during the time of day when the photovoltaics are

producing electricity, as this will lower both the customer's energy charges and demand charges.

- Avoiding the export of electricity from distributed generation to the grid is a key strategy for CleanPowerSF to minimize distribution upgrade costs and delays. The ideal candidate site would be a business that has demand sufficient to consume the output of the solar system all seven days of the week. An office, for example, would likely not have sufficient demand on the weekends. However, if the office was adjacent to a property that did have sufficient load on the weekends or on holidays (such as a residential high-rise, or a grocery store), an over-the-fence transaction could be arranged to directly supply the power from the solar array to the adjacent customer for periods when the host site was unable to fully consume the power generated.

To add some complexity to the example, consider the addition of demand-side management technologies.

- Based on the customer's business type and energy usage intensity, the ideal candidate site would, in addition to the above criteria, also consume an above-average amount of energy (compared to similar business types), as this would indicate a demand-side retrofit opportunity.
- The time of day when the customer is consuming this electricity, and the opportunity to reduce this consumption, may have implications for the program's finances overall:
    - The program is paying for resource adequacy each month, for the highest period of demand for the program overall within certain time periods (set by the California Independent System Operator at times when overall California peak demand is likely to occur); this is referred to as system-coincident demand. The system-coincident demand peak for San Francisco is during the daytime between 2 and 3 o'clock from approximately April through October, driven by daytime loads and air conditioning. The photovoltaics array will offset consumption to a certain extent during these months. However, the system-coincident demand period in the winter months is driven by evening residential heating loads between 5 and 7 o'clock, and the solar array will not offset the resource adequacy requirements during these months.
    - If the customer is consuming an above-average amount of electricity during the system-coincident peak demand periods in both the winter and summer months, it would be an ideal retrofit candidate, as installing both a solar array and retrofitting the host site would drive down resource adequacy payments for the program overall, throughout the year.

- These demand periods also tend to coincide with the overall peak price pattern of energy, which is generally more expensive during periods of high demand. As such, the program would also avoid paying for the more expensive on-peak electricity.
- On the other hand, if the customer was consuming an above-average amount of electricity during the off-peak hours, it may still be a viable retrofit opportunity from the host site's perspective, but would be a less desirable retrofit candidate, as lowering the onsite consumption would result in less of a financial benefit to the program's procurement and resource adequacy revenue requirements. As compared to the above example, the site would be assigned a lower priority.

Report Structure

As the example above indicates, some site evaluation criteria are unique to specific technologies, and some are overall considerations that apply across multiple technologies. These are detailed in separate sections as appropriate.

In addition, some large-scale renewable deployments do not depend on customer site-specific considerations, and are detailed in separate sections.

Cross-Cutting Criteria:

- Electricity load curves (derived from hourly data when possible, otherwise utilizing load curves by customer type), to define and target energy usage patterns and demand periods at several levels:
  - Onsite (customer analysis)
  - Local (optimization opportunities for grid and deployment, if data is available)
  - Portfolio (procurement and aggregate revenue requirement considerations)
- Thermal load curves
  - Approximated for select commercial accounts, based on CEUS load-shapes[1] and square footage
- Public Safety Critical Loads
  - Healthcare
  - Police & Fire

[1] California Commercial End-Use Survey, datasets for CZ05: PG&E: San Francisco

- Telecommunications
- Water pumping
- Rest Homes
- Grocery
- Refrigerated Warehouses
- Fuel depot, delivery and filling stations

- Commercial Critical Loads
  - Data Centers
  - High-Tech
  - Pharmaceutical
- Customer bill estimates (if data is available and project timeline allows)
- Secondary distribution network considerations (for generation technologies, depending on data availability)

Technology-Specific Criteria

Demand Side Management

Programmatic:

- Baseline analysis covering customer counts, energy and peak demand; disaggregated by sector (residential, commercial, industrial) and building type/activity (multifamily, hospital, etc.)
- Under-served customer segments and sectors, to be refined in coordination with SFDOE

Energy Efficiency

Individual sites:

- Intensity normalization by usage, customer-coincident peak demand and system-coincident peak demand, normalized per square foot within similar building types and activities (depending on data availability).
- Separation of demand versus energy charges on the average monthly bill, comparison within similar building types and activities (depending on data availability and project timeline).
- Separation of owner-occupied and rental units
  - Turnover rate of rental units
- Analysis of aggregated building load and individual meter loads.

- Sites already audited/engaged by SFDOE or contractor network
- Analysis of building permits pulled for properties by management companies/ contractors/ handyman firms; map to owners, ID and prioritize for program engagement
- Water meter and power account analysis (for potential repayment mechanisms)

OpenADR Servers, Control Systems, and Software

- Programmatic analysis for above average:
  - Demand charges
  - System-coincident demand
- End Use Targets:
  - Lighting
  - HVAC
  - Refrigeration
  - Pumping
  - Industrial Processes
  - For weather-dependent end uses: above average seasonal usage
- Business type targets:[2]
  - Commercial:
    - Small and Large Office
    - Restaurant
    - Retail
    - Food Store
    - Refrigerated Warehouses – Chilled Storage
    - Refrigerated Warehouses – Frozen Storage
    - Unrefrigerated Warehouse
    - School
    - Universities and colleges
    - Hospitals and Healthcare
    - Hotels

[2] Many demand response related criteria draw upon the work of Lawrence Berkeley National Laboratory's Demand Response Research Center

- Industrial:
  - Data Centers
  - Agricultural Pumping
  - Water Pumping (SFPUC)
  - Waste Water Treatment Plants
  - Converted Paper Product Manufacturing
  - Basic Chemical Manufacturing in Addition to Industrial Gases
  - Dairy Product Manufacturing
  - Aerospace Product and Parts Manufacturing
  - Other Fabricated Metal Product Manufacturing
  - Animal Slaughtering and Processing
  - Bakeries and Tortilla Manufacturing
  - Beverage Manufacturing

HAN Gateways, Appliances, and Software

- All electric residential rate schedules
- Seasonal usage intensity

Advanced Energy Storage

- Medium and large C&I rate schedules
- Critical Facility (need for backup power or power quality concerns)
- Programmatic analysis for above average:
  - Demand charges
  - System-coincident demand

Photovoltaics

- Temporal coincidence of generation pattern and onsite loadshapes
- Fog pattern
- Distribution system considerations (interconnection queue, maximum capacity, upgrades) where data is available
- Construction type and roof suitability
- Zoning: historic buildings
- SFPUC roof surveys

Combined Heat and Power

Opportunities to install CHP will target a variety of configurations:

1. District heating: repowering the downtown steam loop
2. Individual building installations
3. 4-8 building clusters for mini-district heating and cooling systems

The following criteria may be considered:

- Boiler age and size
- Chiller type and capacity
- Critical Public or Commercial Facility (need for backup power or power quality concerns)
- Estimated heating and cooling end-use consumption
- Monthly consumption
- Monthly average and peak demand
- High demand charges
- Target business types:
    - Large Hotels
    - Hospitals
    - Large offices
    - Data Centers
    - Residential High Rises
    - Rest Homes
    - Facilities with pools (spas, schools, etc.)
    - Campuses (universities and colleges)
    - Large Restaurants
    - Breweries
    - Food Processing
    - Car Washes
    - Laundromats
- Pre-existing CHP systems

Solar Hot Water

- Estimated hot water usage (CEUS end use intensity estimate, stratified by aggregate usage intensity as proxy for hot water usage)
- Fog zone
- Building construction and roof age (for loading)
- Building or business type:
    - Residential High Rises
    - Inns and hotels
    - Rest Homes
    - Hospitals
    - Laundromats
    - Car Washes
    - Restaurants

Electric Vehicles

Fleet

- Rental agencies and car sharing services
- Taxi fleets
- Delivery fleets
- City fleets

Consumer

- Potential use of DMV database of individual cars in City for targeted offers
- Current electric vehicle tariff status and usage

Over the Fence Transactions

- GIS analysis of adjacent properties and temporal coincidence of generation output and loadshapes for various technologies and site configurations.

Microgrids

- Large customers with public or commercial critical load considerations
- Other factors specific to renewable and demand-side technologies under consideration within microgrid deployment

Large-Scale Renewable Developments

Wind Farm(s)

- Wind resource map (SFDOE)
- Bird safe zones
- Flight path restrictions
- Repower and greenfield opportunities
- Height zoning restrictions
- Locations of interest:
    - Candlestick Park/ Brisbane
    - Treasure Island
    - Bay Delta
    - Altamont Pass

Geothermal

- Wet-dry cooling system retrofit opportunity at the Geysers in Sonoma