LEED Pilot Credit Library

Pilot Credit 8: Demand Response

Pilot Credit 8: Demand Response

Applicable Rating Systems >>
Requirements >>
Submittals >>
Additional Questions >>
Background Information >>
Changes >>

Applicable Rating Systems

This credit is available for pilot testing by the following LEED project types:

- New Construction
- Core & Shell
- Schools
- Retail
- Healthcare
- Existing Buildings: Operations & Maintenance

Intent

To increase participation in Demand Response technologies and programs that make energy generation and distribution systems more efficient, increase grid reliability, and reduce environmental impacts and greenhouse gas (GHG) emissions.

Requirements

Design building and equipment to participate in, or have the ability to participate in, Demand Response programs through load shedding or shifting. On-site electricity generation does not meet the intent of this credit.

Note: Only 1 point total is available for the Pilot Credit, though both Options are shown to reflect the credit as it appears in the 2012 Rating System.

CASE 1: Existing Demand Response Program Available

Participate in an existing Demand Response (DR) program with the following requirements:

All Projects

- Have in place a system with the capability for real-time, fully-automated DR based on external initiation by a DR Program Provider.

- Enroll in a minimum 1-year DR-Participation Amount Contractual Commitment (DR-PACC) with a qualified DR program provider with the

intention of multi-year renewal, for 10% or more of the estimated peak electricity demand, or a minimum of 20kW, whichever is greater.

- Develop a comprehensive plan of how the project will meet the contracted demand reduction commitment during a Demand Response event.

NC, CS, Schools, Retail Healthcare Only

- Peak demand is determined from EA Credit: Optimize Energy Performance.
- Include the DR processes in the scope of work for the commissioning authority, including participation in at least one full test of the DR response plan.

EBOM Only

- Peak Demand is based on electric utility bills.
- Include the DR processes in the Current Facilities Requirements and Operations and Maintenance Plan.
- Initiate at least one full test of the DR response plan.

CASE 2: Demand Response Program not yet Available

Provide infrastructure to take advantage of future demand response programs or dynamic/real-time pricing programs. Project team must:

All Projects

- Develop a comprehensive plan of how to shed at least 10%, or 20kW, whichever is greater, of building estimated peak electricity demand during a Demand Response event.
- Contact local utility representative to discuss interest in, and availability for, participation in future DR programs.

NC, CS, Schools, Retail Healthcare Only

- Peak demand is determined from EA Credit: Optimize Energy Performance.
- Install interval recording meter with communications and ability for BAS to accept an external price or control signal, such as a data logger, external data recorder, or solid state meter, which can accept pulses.
- Include the DR processes in the scope of work for the commissioning authority, including participation in at least one full test of the DR response plan.

EBOM Only

- Peak Demand is based on electric utility bills.
- Include the DR processes in the Current Facilities Requirements and Operations and Maintenance Plan.
- Initiate at least one full test of the DR response plan.

Potential Technologies & Strategies

New construction projects should incorporate Demand Response into the design process. Designs for Demand Response may include measures for ancillary services, storage, and peak curtailment. Measures may include lighting management, hot water storage, ice storage, battery storage, EV charging stations and integrated IT design with standard DR strategies, to name a few. As with all LEED projects, an integrated approach to Demand Response in the design and construction phase will yield long term benefits.

Many utilities also will work with project teams to review Demand Response options available in a given region and make design suggestions.

Credit Submittals

General:

1. Register for Pilot Credit(s) here.
2. Register a username at LEEDuser.com, and participate in online forum
3. Submit feedback survey; supply PDF of your survey/confirmation of completion with credit documentation

Credit Specific:

1. Demand Response – Participation Amount Contractual Commitment (DR-PACC)

   (Not Applicable to Option 1, Case 2)

   Submit proof of enrollment in a DR-Participation Amount Contractual Commitment, containing the physical address of the building(s), authorized agents for event notification, utility account numbers associated with each building, terms for earning revenue, terms for revenue sharing, number and duration of events, notification process, monitoring requirements, enrollment periods, minimum size, performance and consequences for non-performance, penalties and renewal options.

   The official evidence of enrollment is the document or other verification issued by the ISO, RTO, or energy provider after the asset is successfully registered in a specific Demand Response program.

2. Demand Response Action Plan

   Submit a comprehensive Action Plan, including:

   - Potential for Demand Response Participation, such as curtailment of peak demand, and the elected Demand Response value, or schedule of values, in kWs, to be registered with the DR provider.
   - Event notification process for Demand Response events, such as a phone call, an alarm with countdown clock or a signal to a BAS console, depending on the degree of Demand Response program automation, i.e. manual, semi-automated, or automated.
   - Detailed procedures and responses to execute the Demand Response program measures consistent with the Demand Response Enrollment Contract and the registered Demand Response Participation Amount, including the notification method, specific actions, the order of execution, the load monitoring process and the post event recovery process.
   - Energy Management Team responsible for management of the Demand Response program, and coordination with the Demand Response Program provider, the Facilities Department, and internal Risk Management, including Demand Response event notification and response, revenue settlements, contract administration, assessments, Demand Response action fulfillment, employee awareness training, Demand Response readiness drills, and energy management reporting.
   - Description of end use systems which will be impacted, such as HVAC, or lighting, on a stand-alone, or integrated basis, during participation in Demand Response events.

3. Demand Response Test Report

   (EBOM Only)

   Submit evidence of Demand Response test conducted in compliance with the DR Program Provider's test requirements to verify the building's ability to participate in a DR event. The tests can be performed by the building's facility engineer, a 3rd-party engineer, or other qualified parties, such as an energy services company (ESCO), in conformance with the Program Agreement.

4. Demand Response Training Program

   Submit a training plan and objectives developed for those employees directly responsible for executing the Demand Response action plan that addresses key activities in implementation of the DR Action Plan, including:

   - Individual assignments
   - Event signals
   - Communications protocols

- Recovery
- Reporting
- Clear status

For impacted employees and building occupants, provide training on possible impacts of various Demand Response events, such as shutdown of production lines, or changes in lighting or heating levels, and how to react and proceed during an event. Measures for personal safety, and proper evacuation, if needed, also should be addressed.

5. Demand Response Program Financial Analysis

   Provide an evaluation of the financial investments required to implement and manage the Demand Response program. Where possible, calculate ROI or Payback, especially in those cases where significant infrastructure or personnel investments are made. Carefully evaluate the investments in personnel and capital equipment required. Key factors include:

   - Capital Investment for new equipment or system modifications
   - Changes to programming in existing BAS
   - Rebates, Incentives, and Tariffs
   - Projected revenues
   - Energy Efficiency impacts and interactions with Demand Response.

Additional Questions

- Was demand response an effective strategy for your project?
- As a result of applying this strategy, did the project team use fewer energy efficient measures in the project?
- Were there barriers to implementing the strategies used under this credit?

Background Information

Purpose of Demand Response (DR)

Demand Response is defined as changes in electric use by demand-side resources from their normal consumption patterns in response to changes in the price of electricity or to incentive payments. These are designed to induce consumers to change electricity use in response to high wholesale market prices or when system reliability is jeopardized.

When weather temperatures rise or fall dramatically, and use of air conditioning or heating is increased, the electricity grid must adapt quickly. Commercial and industrial buildings with a peak demand load greater than 200 kilowatts (kW) have a significant impact on energy demand and electricity grid stability in general, and through participation in Demand Response. This is especially true in urban and business areas with large clusters of commercial buildings or industrial operations.

When the electric grid is near its capacity or electricity prices are high, building operators can participate in reliability-based or price-based Demand Response programs that provide incentives for reducing the building's energy demand during peak hours. Reductions in energy demand during peak hours may be facilitated by shifting electricity use to another time period or by taking measures to reduce electricity demand in the building.

Buildings that participate in DR programs offered by utilities, Independent System Operators (ISO), Regional Transmission Organizations (RTO) and Curtailment Service Providers (CSPs) can secure electricity supply, earn revenues and impact their electricity rates. For example, commercial and industrial buildings utilize load control technologies to change their consumption patterns and benefit by lowering building electricity costs. Programs types vary, and include:

- Economic, or price-based, programs such as Critical Peak Pricing (CPP), Time of Use (TOU), Price Responsive Load Programs
- Capacity Programs, which help utilities manage daily wholesale price fluctuations and economic costs
- Emergency programs which preserve reliability and prevent outages by signaling customers to reduce usage when demand exceeds the physical capacity of the grid

Value of Automated Demand Response

Buildings can participate in Demand Response through both manual and automated strategies. Manual strategies, which involve extensive human intervention to complete, are used when the reduction of Peak Demand is the primary objective. As buildings expand their use of Demand Response, they often look for ways to 'shift' demand to other time periods or modes systematically. As a result, they will invest in an Energy Management Control System (EMCS), such as a building automation system (BAS), and business processes, which support automated Demand Response. Demand shift strategies often lead to adoption of new energy management procedures, which reduce on-going energy usage, and in effect, reset peak demand.

Demand Response Automation Based on How Signals Transmitted

When a DR event is called, the DR program provider sends the signal in the manner specified in the Demand Response Enrollment Contract. The level of Demand Response automation is characterized by the way in which Demand Response signals are received and acted upon, through the Energy Management Control System, which can include one or more of the following: a Building Automation System (BAS), Building Management System (BMS), and Programmable Load Control (PLC).

Virtual Generation

Demand reductions, sometimes called “virtual generation”, benefit grid operators by increasing grid capacity, thus reducing the need for new generation, decreasing carbon and other emissions, and balancing supply and demand into a more efficient grid system. For maximum benefit, fully automated DR capabilities are required, in order to support the response timeframes required to participate in virtual generation programs.

For a list of Demand Response programs available across the country, please visit:

The Demand Response National Database

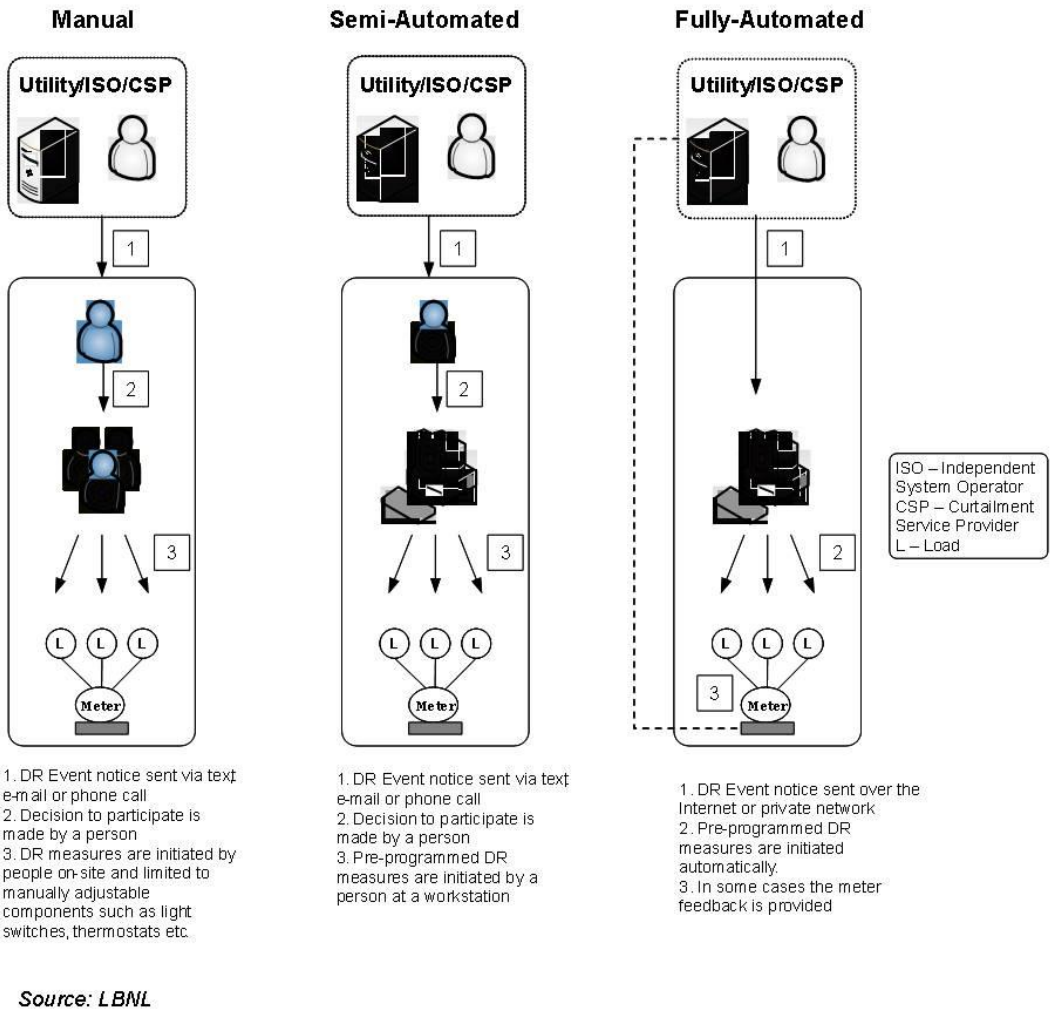

Figure 1: Demand Response Progression, from Manual to Automated Signals and Response

Changes:

Changes made for 3rd Public Comment (March 2012):

- Removed option for Manual DR

Changes made for 2nd Public Comment (June 2011):

- Major modifications to requirements and submittals based on Demand Response working group recommendations
- Elimination of on-site generation as an achievement path
- Addition of Manual/Semi-Automated vs. Fully Automated Demand Response options
- Detailed submittals added based on option modifications

- Additional guidance on process, including initial assessment, DR training and financial analysis, added to submittal requirements