

Better Buildings, Better Plants

Low and No Carbon Showcase Buildings - Action Plan Template

Partner Profile and Highlights

Date: January 2023

Company Name: Columbia Association

Point of Contact (name, email): Jeremy Scharfenberg
Jeremy.Scharfenberg@columbiaassociation.org

Better Buildings Account Manager: Andrea Doukakis

Contents

1. [Low Carbon Pilot Background](#)
2. [Importance of an Action Plan](#)
3. [Action Plan Instructions](#)
4. [Goal Setting and Tracking](#)
5. [Showcase Building Selection](#)
6. [Data Reporting – Priority Waterfall](#)
7. [Current Barriers](#)
8. [Turning Plans into Action - Implementation Strategies](#)

Low Carbon Pilot Background

Buildings and manufacturing plants account for roughly two thirds of U.S. CO₂ emissions, and therefore present a significant opportunity to meet carbon reduction goals. The Department of Energy (DOE), through the [Better Buildings Initiative](#), is working with interested partners on a [Low Carbon Pilot](#). The goal of this pilot effort is to demonstrate how to achieve carbon dioxide

equivalent (CO₂e) operational emission reductions in buildings and plants. Partners will share their experiences, successes, and challenges pursuing low carbon strategies at two or more of their buildings or plants within a two-year timeframe. Low carbon strategies may include implementing ultra-energy-efficient building and management practices, followed by a combination of installing on-site renewables, grid-interactive solutions, and investing in or purchasing renewables from off-site sources.

Importance of an Action Plan

Getting to low and no carbon can be challenging. To help you think through your low carbon strategy, DOE has developed this draft Action Plan Template, which you can use to help develop low carbon pathways for your selected showcase buildings. As this is a draft, DOE would like partner feedback on the usefulness of the template and ways to improve it. Please send feedback about this template to your Better Buildings account manager and Izzy Ballet (iballet@retechadvisors.com)

Through this pilot, we will work closely with you to understand your proposed path to low carbon as well as the opportunities and challenges you face. By the end of the pilot, this action plan can help expand efforts across your organization's portfolio.

This plan focuses on moving a building towards low operational carbon, which accounts for the carbon from buildings using energy from carbon-emitting sources. The pathway to low carbon priority waterfall below illustrates the pilot's focus on prioritizing energy efficiency, followed by on-site renewable energy generation or other non-carbon-based generation, off-site energy generation, and finally procuring offsets.

Pathway to Low Carbon – A Proposed Priority Waterfall



Action Plan Instructions

Feel free to adjust or change this plan to suit your building's needs and processes or use it as a resource to develop your customized roadmap. Instructions and prompts are given throughout the plan and *written in italics*. You may erase these instructions for your final version. If a standalone plan doesn't work for your organization, feel free to share already developed planning documents. This plan can be updated over time and will be used to identify current barriers and opportunities. Once complete, please share this plan with your Better Buildings account manager and Paul Torcellini (paul.torcellini@nrel.gov). This plan will not be shared publicly in whole or in part without your expressed permission.

Goal Setting and Tracking

1. *What are your organization's current company-wide carbon related goals?*

Existing corporate GHG emission goals are a 75 percent reduction in scope 1 & 2 relative to our 2012 baseline.

2. *What methods or tools are being used for tracking progress towards these goals?*

Existing methods include internal data accounting and use of the FEMP carbon accounting tool to estimate emissions and track performance over time.

3. *Are there specific protocols that you use for reporting data?*

We currently are not using any specific protocols other than a general adherence to the WRI Public Sector Protocols.

4. *How do these goals translate into facility-level improvements or targets?*

Emission goals generally translate into a general effort to install on-site solar PV to reduce electricity consumption, wind RECs embedded in electricity supply contracts, and energy efficiency measures.

5. *Other?*

Showcase Building Selection

Briefly describe the buildings that will be used for the pilot. If you are submitting more than 2 buildings, please add additional columns to the table.

Table 1 – Showcase Building Selection

SHOWCASE BUILDING	Supreme Sports Club	Kahler Hall (community center)
YEAR BUILT	1986	1970
BUILDING AREA (ft ²)	100,000	13,945
BUILDING USE	Fitness Club	Community Center
PERCENT SAVINGS SINCE BASE YEAR (OPERATIONAL ENERGY – THIS VALUE CAN BE 0%)	30% (2012 BY)	25% (2012 BY)
ADDITIONAL INFORMATION DESCRIBING THE BUILDING'S HISTORY/ NOTABLE CHARACTERISTICS	60 kW CHP generator	20 kW solar on site as of 2017

Data Reporting – Priority Waterfall

To understand the total amount of building energy being met by renewable sources we have developed the following tables. Fill out the table based on the total building energy being met by the identified renewable and carbon free sources from your base year. Even though the pilot has a timeframe of two years, your desired end goal can be further out to match your company's current goals or time frame. When filling out the table, the starting point and end goal columns should add up to 100%.

Supreme Sports Club

Table 2 – Priority Waterfall

RENEWABLE/CARBON FREE SOURCE	DESCRIPTION	STARTING POINT (%)	END GOAL (%)
Energy efficiency	LED lighting, high eff. HVAC, setbacks, CHP	20%	25%
Beneficial electrification	Dual fuel heat pump, ductless	0%	26%

	splits, heat pump domestic hot water		
On-site renewables	Rooftop solar PV	0%	5%
Off-site renewables		0%	0%
Grid integration		0%	0%
Power purchase agreements including utility offerings	Wind REC bundled supply	41%	34%
Carbon capture and sequestration		0%	0%
Non-renewable carbon-free energy sources		0%	0%
Offsets	Carbon credits or white tags	0%	10%
Non-met carbon load	Nat. gas heating (space & water)	39%	0%
Total		<i>Column should add up to 100%</i>	<i>Column should add up to 100%</i>

Kahler Hall (community center)

Table 2.1 – Priority Waterfall

RENEWABLE/CARBON FREE SOURCE	DESCRIPTION	STARTING POINT (%)	END GOAL (%)
Energy efficiency	LED lighting, high eff. HVAC, setbacks	15%	20%
Beneficial electrification	Dual fuel heat pumps, ductless splits, heat pump water heater	0%	23%
On-site renewables	Rooftop solar PV	15%	12%
Off-site renewables		0%	0%
Grid integration		0%	0%
Power purchase agreements including utility offerings	Wind RECSs	0%	30%
Carbon capture and sequestration		0%	0%
Non-renewable carbon-free energy sources		0%	0%
Offsets	Carbon offsets for non-met load	0%	15%
Non-met carbon load	Nat. gas heating (space & water)	70%	0%
Total		Column should add up to 100%	Column should add up to 100%

Current Barriers

Below is a list of common barriers identified by partners when implementing low carbon strategies. On a scale of 1-5, with five being a major barrier and one being a small barrier, select the barriers that your organization faces when implementing low carbon strategies. Feel free to add rows to the table to include barriers that are not currently listed. In the comments field, provide additional detail on your organization's top 2-3 barriers.

Table 3 – Current Barriers

BARRIER	HIGH LOW RATING (1-5)	COMMENTS
Financing	2	CA has capital available for projects, general leadership support for sustainability initiatives
Access to data and information	2	Most data available
Data analysis and reporting	2	In-house capacity supports implementation, self-directed reporting to stakeholders
Measuring carbon reductions	2	Working on Scope 3 emissions with their large heavy duty fleet, and installing EV stations
Engaging employees, occupants, and customers	2	Most stakeholders supportive of efforts to reduce the carbon footprint of our facilities
Partnering with utilities	3	Local utility is currently promoting natural gas as a fuel, but existing EE incentive programs are beneficial
Operational challenges	4	Most operational adjustments already implemented Limited area for on-site renewables deployment so will be dependent on offsets of some form
Electrification	5	Existing array of newer gas fired package units that are sunk investments Lack of power capacity at HVAC units for traditional auxiliary resistance heat Need more readily available commercial dual fuel heat pump package HVAC units

Acquiring expertise	3	In-house capacity helpful, but generally dependent on vendors for advanced strategies which may come with bias
Shift from source EUI focus	2	Electrification runs counter to long running practice of reducing source EUI and using that as a benchmark
Offsets with local additionality	3	Can be challenging to identify economical offsets (green or white) that have local and new aspects
<i>*Other (Fill in) - Add rows as appropriate</i>		

Turning Plans into Action - Implementation Strategies

As mentioned in the introduction, the goal of this pilot is to work with industry leaders to explore low carbon pathways and demonstrate what is possible, the remaining challenges that exist, and showcase successful solutions. Understanding the specific strategies, you are planning and barriers that you anticipate, will help inform DOE's strategy moving forward. **Please use the tables below** to share details on your implementation strategies as they relate to, energy efficiency, on-site renewables, off-site renewables, grid integration, PPA's/utility offerings, and offsets. Table entries may get long - that is okay.

For the implementation time frame, we are considering **short as two years** (duration of the pilot), **medium two to six years**, and **long term as more than six years**.

1. Energy Efficiency

- ▶ How do you plan on incorporating ECM's in your low carbon strategy? See examples populated in the table for reference. If financing continues to be a prominent barrier, consider viewing the [Better Buildings Financing Navigator](#) to explore financing options.

Table 4 – Energy Efficiency

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
Supreme Sports Club	Arena LED conversion from HOT5	Short (completed)	Lower ROI going from HOT5 to LED	Continued improvement in LPW of LEDs to improve economics
Supreme Sports Club	Installation of HE dual fuel HVAC heat pump units (6)	Short (completed)	Limited equipment options	More options for dual fuel heat pump package HVAC units – larger sizes and features
Supreme Sports Club	Shift Laundry to Cold Water	Short (completed)	None	Modify extractor settings

<i>Supreme Sports Club</i>	<i>Pool LED conversion from HOT5</i>	<i>Medium</i>	<i>Scheduling access to pool space, lower ROI going from HOT5 to LED</i>	<i>Continued improvement in LPW of LEDs to improve economics</i>
<i>Kahler Hall</i>	<i>Installation of HE dual fuel HVAC heat pump units (3)</i>	<i>Short (completed)</i>	<i>Lack of available equipment</i>	<i>More options for dual fuel heat pump package HVAC units – larger sizes</i>
<i>Kahler Hall</i>	<i>Ballroom and basement LED conversion</i>	<i>Short</i>	<i>Lower ROI going from fluorescent to LED, fixture style constraints</i>	<i>Continued improvement in LPW of LEDs to improve economics</i>

*Note: Typical energy conservation measures had been well deployed at the pilot facilities prior to the commencement of the Low Carbon Pilot. These measures include: occupied schedules and setbacks; occupancy sensors; near total retrofit to LED lighting technology; conversion to on-demand water heaters or condensing boilers; and roof replacements with insulation upgrades and white membrane material.

2. On-site Renewables

- ▶ *How do you plan on incorporating on-site renewables in your low carbon strategy? Explore the Better Buildings [Renewable Energy Resource Hub](#) for additional guidance.*

Table 4.1 – On-site Renewables

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>Supreme Sports Club</i>	<i>Install 27kW rooftop solar PV (phase 1)</i>	<i>Short</i>	<i>Structural loading, available roof area, economics</i>	<i>Continued advancement in solar PV economics</i>

<i>Supreme Sports Club</i>	<i>Install 30kW rooftop solar PV (phase 2)</i>	<i>Short</i>	<i>Structural loading, available roof area, economics</i>	<i>Continued advancement in solar PV economics</i>
----------------------------	--	--------------	---	--

Note: CA is a 501c4 nonprofit and has not been historically eligible for the federal tax credit. CA also retains ownership of the renewable energy credits generated by its systems so does not realize associated cost savings.

3. Off-site Renewables

- ▶ *How do you plan on incorporating off-site renewables in your low carbon strategy?*

Table 4.2 – Off-site Renewables

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>TBD</i>				

4. Grid Integration

- ▶ *How do you plan on using grid integration in your low carbon strategy?*

Table 4.3 – Grid Integration

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>TBD</i>				

5. PPA's / Utility Offerings

- ▶ *How do you plan on using PPA's or working with your local utility?*

Table 4.4 – PPA's / Utility Offerings

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>Supreme Sports Club</i>	<i>Continued bundled electricity and wind REC supply</i>	<i>Short/Medium/Long (completed)</i>	<i>None, already in electricity supply contract</i>	<i>NA</i>

<i>Kahler Hall</i>	<i>Continued bundled electricity and wind REC supply</i>	<i>Short/Medium/Long (completed)</i>	<i>None, already in electricity supply contract</i>	<i>NA</i>
--------------------	--	--------------------------------------	---	-----------

6. Offsets

- ▶ *How do you plan on incorporating offsets in your low carbon strategy?*

Table 4.5 – Offsets

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>Supreme Sports Club</i>	<i>Carbon offsets for natural gas usage</i>	<i>Short/Medium/Long</i>	<i>Cost of offset, identifying high quality offsets</i>	<i>Guidance on acquiring high quality carbon offsets</i>
<i>Kahler Hall</i>	<i>Carbon offsets for natural gas usage</i>	<i>Short/Medium/Long</i>	<i>Cost of offset, identifying high quality offsets</i>	<i>Guidance on acquiring high quality carbon offsets</i>

7. Beneficial Electrification

- ▶ *How do you plan on incorporating beneficial electrification into your LCP*

Table 4.6 – Beneficial Electrification

SHOWCASE BUILDING	STRATEGY TO BE ACCOMPLISHED	IMPLEMENTATION TIME FRAME (SHORT, MEDIUM, LONG)	POTENTIAL BARRIERS FOR THIS STRATEGY	WHAT IS NEEDED TO OVERCOME THIS BARRIER? LIST SPECIFIC RESOURCES, TECHNICAL ASSISTANCE, ETC.,
<i>Supreme Sports Club</i>	<i>Install only dual fuel heat pump HVAC units (6) (completed)</i>	<i>Short/Medium</i>	<i>Limited availability of dual fuel heat pump package units</i>	<i>More options for dual fuel heat pumps from larger equipment manufacturers (Carrier, Trane, etc.)</i>
<i>Supreme Sports Club</i>	<i>Disable 60kW CHP Unit (completed)</i>	<i>Short</i>	<i>Potential unrealized economic benefit of using the system</i>	<i>Commodity pricing, explore RNG options with BGE</i>
<i>Supreme Sports Club</i>	<i>Pilot heat pump domestic water heater</i>	<i>Medium</i>	<i>Cost and technical feasibility</i>	<i>Technological advancement of heat pump technology</i>
<i>Supreme Sports Club</i>	<i>Conversion of domestic hot water boilers to heat pumps</i>	<i>Long</i>	<i>Cost and technical feasibility</i>	<i>Technological advancement of heat pump technology</i>
<i>Supreme Sports Club</i>	<i>Conversion of RTUs to dual fuel heat pumps</i>	<i>Long</i>	<i>Continued limited technical availability of heat pumps for this application. Also need time to age out numerous installed assets (10-15 years)</i>	<i>Increased dual fuel heat pump offerings and lower ambient performance in package RTUs</i>
<i>Kahler Hall</i>	<i>Install dual fuel heat pump HVAC units (3) (completed)</i>	<i>Short (completed)</i>	<i>Limited availability of dual fuel heat pump package units</i>	<i>More options for dual fuel heat pumps from larger equipment</i>

				<i>manufacturers (Carrier, Trane, etc.)</i>
<i>Kahler Hall</i>	<i>Conversion of domestic hot water to heat pump</i>	<i>Medium</i>	<i>Existing on-demand gas heater is highly efficient</i>	<i>Technological advancement of heat pump technology</i>
<i>Kahler Hall</i>	<i>Conversion of RTUs to dual fuel heat pumps</i>	<i>Long</i>	<i>Continued limited technical availability of heat pumps for this application. Also need time to age out installed assets (~10 years)</i>	<i>Increased dual fuel heat pump offerings and lower ambient performance in package RTUs</i>