

Chick-fil-A's Carbon Reduction Challenge: Summer 2018



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Objective: Identify and implement additional sustainability initiatives aligning with Chick-fil-A's Sustainability Department's goals to conserve natural resources, save money, and reduce emissions.

Introduction: 3 out of our 4 initiatives have already been signed off on. A breakdown of our reductions by project is shown below.

Restaurant External LED Retrofit

Overview: Chick-fil-A uses metal halide bulbs in Restaurant parking lots and is developing the business case for a rollout of LED retrofits. The Sustainability Department at Chick-fil-A has budgeted for the implementation of 12 additional pilots in 2019.

Additionality: We did not introduce the idea of an LED retrofit to Chick-fil-A, but we did contribute to the internal business case and finance additional pilots.

Co-benefits: brighter, more evenly lit parking lots

COST SAVINGS:

$$\left[\frac{8,102 \text{ kWh}^i}{\text{store} * \text{year}} * \frac{\$.10}{\text{kWh}} + \frac{\$500}{\text{store} * \text{year}} \right] * 12 \text{ stores} = \$16,100/\text{year}$$

CARBON REDUCTION:

$$\left[\frac{8,102 \text{ kWh}^i}{\text{store} * \text{year}} * \frac{1.14 \text{ lbs CO}_2}{\text{kWh}} \right] * 12 \text{ stores} = 111,700 \text{ lbs CO}_2/\text{year}$$



The LED streetlight that will replace the current lights

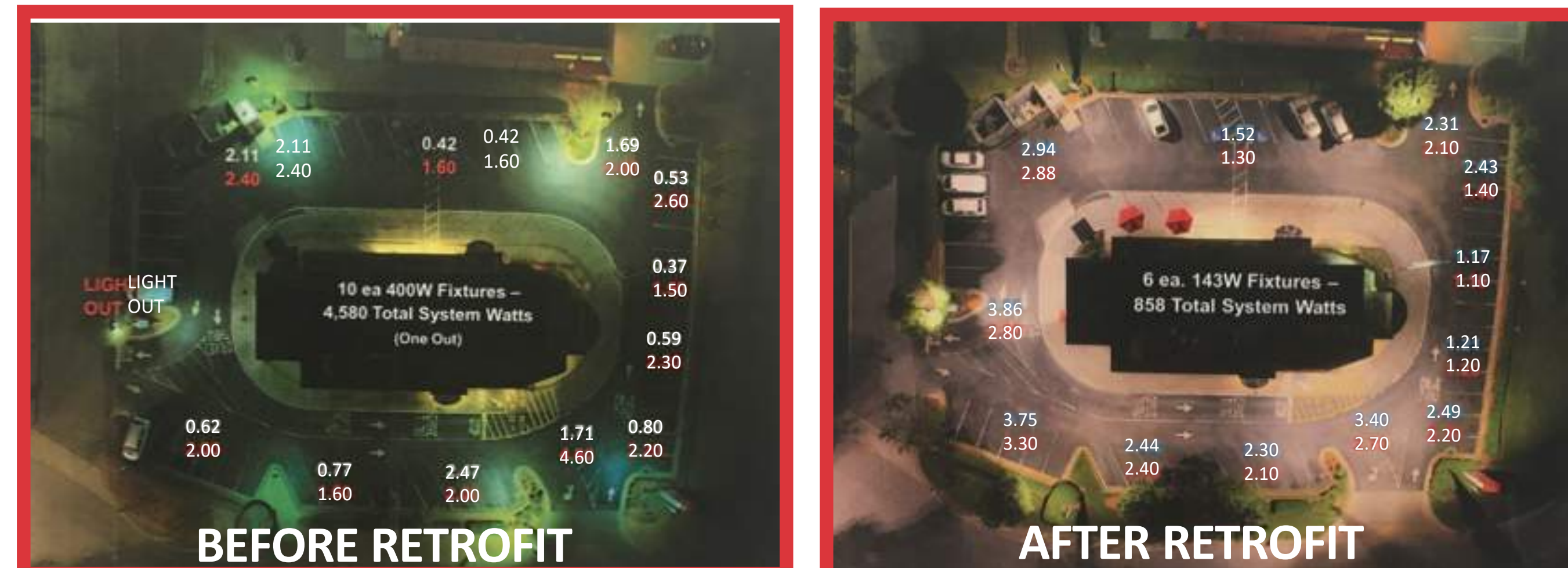
- i. Based on measured wattage draw of nine 400W metal halides (old) vs six 143 W LED's (new)
- ii. Based on average across 12 pilot sites. Raw data from US Energy Information Administration
- iii. Based on chainwide average: \$1,500 for installing a replacement metal halide bulb every 3 years

RETURN ON INVESTMENT:

$$\frac{\$56,483 \text{ initial cost}}{\$16,063/\text{year}} = 3.5 \text{ years}$$

100,000 HOUR BULB LIFE SAVINGS:
\$737,850 and 5,129,660 lbs CO₂

How Much Carbon is That?
3 people's yearly carbon emissions; a 4 acre forest; carbonation in 35 M soda cans



Before and after drone photos of Cowetta, GA previous pilot restaurant. Number pairings indicate actual (top) vs modeled (bottom) footcandles in each location. Minimum recommended brightness is 1 footcandle.

Restaurant Dishwasher Rollout

Overview: Chick-fil-A restaurants hand wash all pots, pans, and dishes. Chick-fil-A is researching the potential impact of dishwashing equipment. Chick-fil-A plans to install dishwashers in 500 Restaurants by the end of 2018.

Additionality: We did not introduce the idea of a dishwasher rollout to Chick-fil-A. We added water and energy savings to the internal business case to encourage adoption.

Co-benefits: reduced complexity, enhanced restaurant staff experience

COST SAVINGS:

$$\left[\frac{\$176.20 \text{ in water}^i}{\text{store} * \text{year}} + \frac{\$247.80 \text{ in energy}^ii}{\text{store} * \text{year}} + \frac{\$6,700 \text{ in labor}^iii}{\text{store} * \text{year}} \right] * 500 \text{ stores} = \$3,562,000/\text{year}$$

TOTAL CO₂ SAVINGS:

$$\frac{2478.46 \text{ kWh}^ii}{\text{store} * \text{year}} * \frac{1.22 \text{ lbs CO}_2}{\text{kWh}} * 500 \text{ stores} = 1,511,860.5 \text{ lbs CO}_2/\text{year}$$

RETURN ON INVESTMENT:

$$\frac{\$16,400,000 \text{ initial cost}}{\$3,547,499/\text{year}} = 4.62 \text{ years}$$



How Much Carbon Is That?
37 people's yearly carbon emissions; a 50 acre forest; carbonation in 309 M soda cans

- i. Water savings based off of difference between hand washing dishes using filled sinks vs using dishwasher
- ii. Electricity savings based off of net electricity saved to heat water: Energy to heat 1.6675E8 mL of water from 23 degrees C to 48.88 degrees C= 1.6675E8(4.184 J/(mL*C))(48.88-23) = 180.56E8 J = 5,015.55 kWh/.9 EF = 5,5667.26 kWh/year- 3695 kWh/year used = 2478.46 kWh/year net savings
- iii. Labor savings based on study of Chick-fil-A restaurant dish washing habits performed by Menu team

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Corporate Travel Car Rental Policy

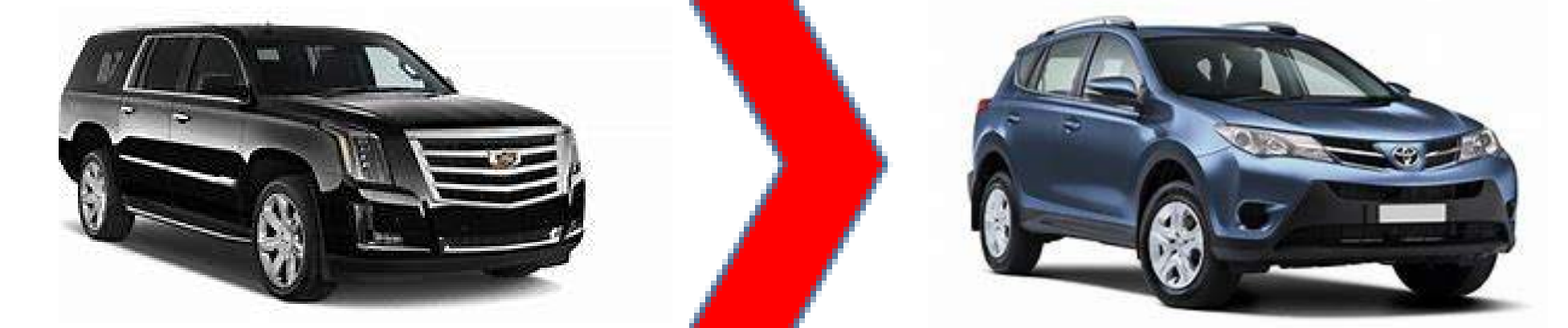
Overview: Chick-fil-A's business travelers can make expensive and inefficient choices when renting cars. We collaborated with Chick-fil-A Corporate Travel to create an educational text box on their rental portal that encourages fuel efficiency.

Additionality: We introduced this initiative to Chick-fil-A's Corporate Travel Department.

Co-benefits: Initiative for staff-wide efficiency education
Sample: switch from premium SUV to intermediate SUV

OPTIMAL COST SAVINGS:

$$\frac{\$10,830 \text{ in gas}^i}{\text{year}} + \frac{\$71,800 \text{ in rental costs}^ii}{\text{year}} = \$82,630/\text{year}$$



OPTIMAL CARBON SAVINGS:

$$\frac{3,609 \text{ gallons}^i}{\text{year}} * \frac{19.64 \text{ lbs CO}_2}{\text{gallon}} = 70,900 \text{ lbs CO}_2$$

Total Optimal Cost Savings: \$710,148/year
Total Optimal Carbon Savings: 326,045 lbs CO₂/year
gas costs and gas use based on Chick-fil-A's 2017 data from Avis Rentals
rental costs based on Chick-fil-A's 2017 data from Avis Rentals

How Much Carbon is That?
8 people's yearly carbon emissions; an 11 acre forest; carbonation in 67 M soda cans

HELLO CHICK-FIL-A TRAVELER, THINK BEFORE YOU CLICK! IN THE SPIRIT OF GOOD STEWARDSHIP, SELECTING INTERMEDIATE VEHICLES WITH BETTER MILEAGE CAN SAVE MONEY AND HELP THE ENVIRONMENT.

The text box added to Chick-fil-A's corporate travel website.

Texas and California Renewable Energy Power Purchase Agreement (PPA)

Overview: Chick-fil-A purchases traditional utility power on a market by market basis. Future energy trends suggest Chick-fil-A Restaurants in Texas and California are most susceptible to volatility. Signing a PPA is a long process, but the potential savings of full implementation are shown below.

Additionality: We introduced the idea of a renewable energy future at Chick-fil-A, and explored avenues for internal stakeholder alignment.

Co-benefits: fixed utility rate and supply, risk mitigation

COST SAVINGS (ASSUMING AVERAGE \$/KWH INCREASES FROM \$.10 TO \$.11):

$$\frac{540,000 \text{ kWh}}{\text{store} * \text{year}} * \frac{\$.01}{\text{kWh}} * (275 \text{ TX stores} + 94 \text{ CA stores}) = \$1,992,600/\text{year}$$

CARBON SAVINGS:

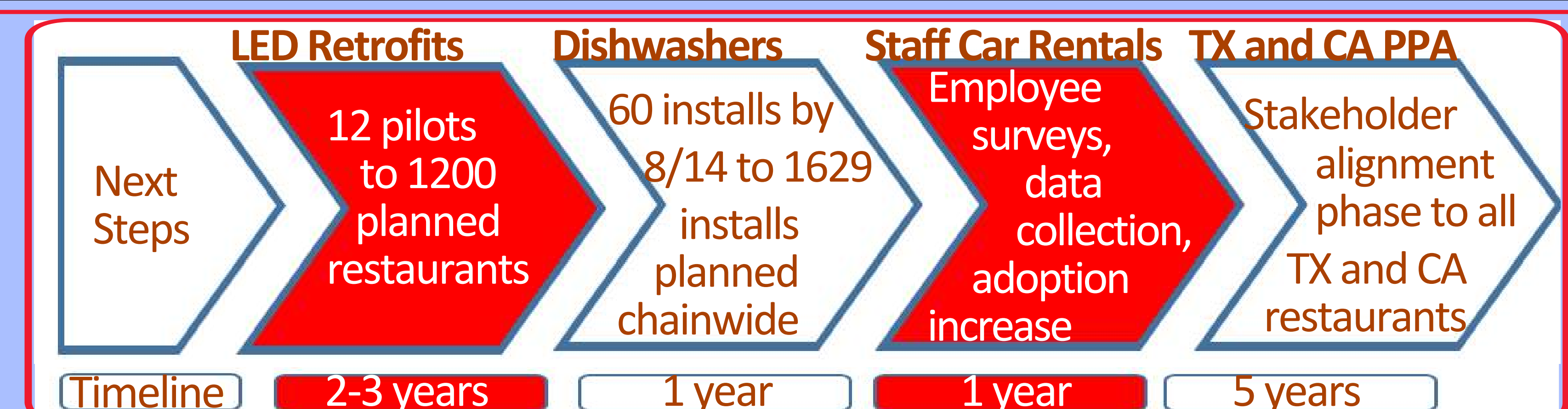
$$\frac{540,000 \text{ kWh}^i}{\text{store} * \text{year}} * \frac{1.22 \text{ lbs CO}_2}{\text{kWh}} * (275 \text{ TX stores} + 94 \text{ CA stores}) = 243,097,200 \text{ lbs CO}_2/\text{year}$$

i. Annual kWh usage based on chainwide average

How Much Carbon is That?
6,077 people's yearly carbon emissions; an 8,103 acre forest; carbonation in 50 B soda cans



Breakdown By Project	LED Retrofits	Dishwashers	Car Rental Program	Texas and California	Sum
Money in the Bank As of 8/14	\$16,100	\$423,800	0*	\$0	\$439,900
Savings Potential: Next Steps	\$1,572,000	\$11,500,000	\$710,150	\$1,992,600	\$15,234,750
Carbon in the Bank (lbs CO ₂) As of 8/14	111,673	181,423	0*	0	325,700
Reduction Potential (lbs CO ₂): Next Steps	11,861,328	4,925,639	326,045	243,097,200	260,210,212



*dependent on adoption rate