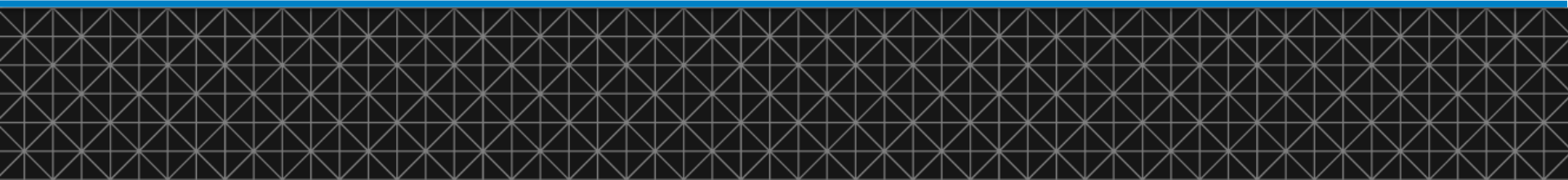**DTCC**

Securing Today. Shaping Tomorrow.®

DTCC Energy & Sustainability

Tampa Site Focus

Workplace Design & Services

April 18th, 2019

Agenda – Energy Audit from the Client's Perspective

Engage	• Management • Business stakeholders • Building occupants • Building operations
Project Specifics	• Developing a baseline and define goals • Choosing a good building candidate • Choosing the right ECMs
Measure, Validate, Socialize, Maintain	• Define what metrics to track from the start • Ongoing tracking and validation • Socialize your results & encourage ongoing engagement • Set yourself up to maintain your sustainability program

Management, Stakeholder & Building Engagement

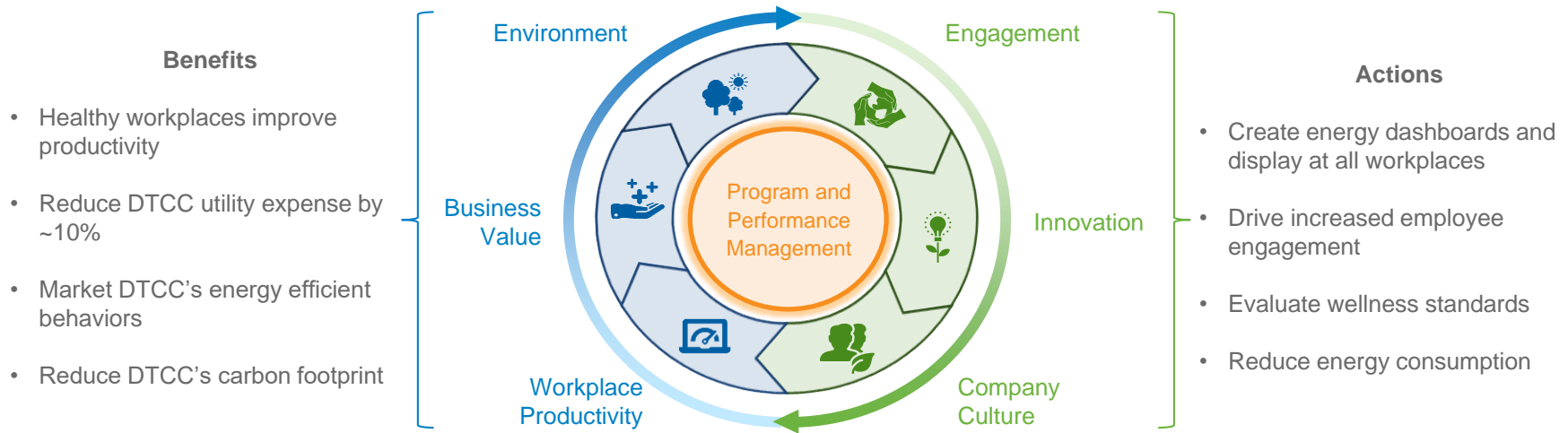| Senior Management	• Why is sustainability important to DTCC? • We want to be environmentally responsible • Adds business value in the form of cost savings • Improves workplace productivity
Business Stakeholders & Building Occupants	• Who did we talk to & when? • Tampa site operating committee • Corporate Social Responsibility & Human Resources • Building Occupants via email, signage & desk drops
Building Operations	• Who was part of the decision making process & when? • Real Estate Planning • Building Operations • Building Engineers & Maintenance

(Example) Senior Management Engagement

Our sustainability and wellness program seeks to identify conservation measures that provide superior financial return while increasing employee awareness, health, and safety.

Sustainability and Wellness Framework

Our sustainability framework can be divided into two parts: the benefits from implementing sustainable programs and the corresponding actions we need to take in order to be successful:

Benefits

- Healthy workplaces improve productivity

- Reduce DTCC utility expense by ~10%

- Market DTCC's energy efficient behaviors

- Reduce DTCC's carbon footprint

Actions

- Create energy dashboards and display at all workplaces

- Drive increased employee engagement

- Evaluate wellness standards

- Reduce energy consumption

Environment · Engagement · Innovation · Company Culture · Workplace Productivity · Business Value · Program and Performance Management

(Example) Business Stakeholder Engagement

Program and Performance Management

2016 Baseline and 2018 Target

- 2016 Baseline: 65 mil kwhr or 110 mil vehicle miles driven

- 2018 Goal: Reduce by 6.5 mil kwhr or 11 mil vehicle miles driven

- Wave 1 Reduction Projection: 4.3 mil kwhr or 7 mil vehicle miles driven

- Wave 2 Reduction Projection: 3.5 mil kwhr or 6 mil vehicle miles driven

Wave 1 ($400k savings) w/ Tampa Project Highlights

- Office lighting energy reduction in excess of 50% using products warranted for 10 years

- HVAC Retro Commissioning: Right sized ventilation & temperature, air quality & occupancy monitoring

- UPS replacement: End of life replacement program became energy reduction project w/ payback via right sizing & strategic UPS selection

Wave 2 ($350k savings) w/ JC Project Highlights

- Parking garage LED lighting energy reduction in excess of 50% using maintenance reduced products w/ 10+ year lifespan

- HVAC Retro Commissioning: Right sized ventilation & temperature, air quality & occupancy monitoring
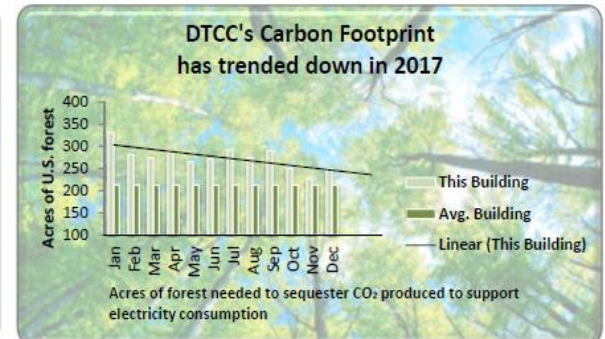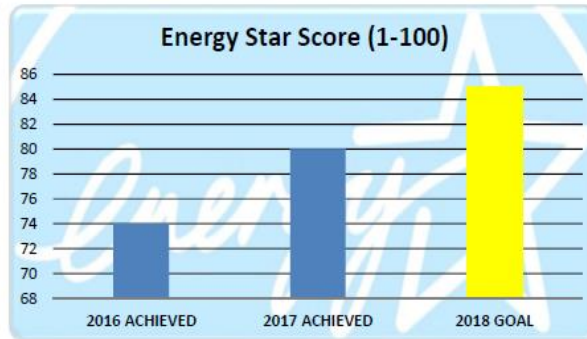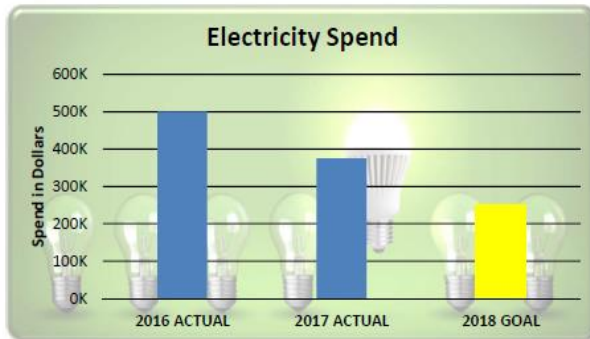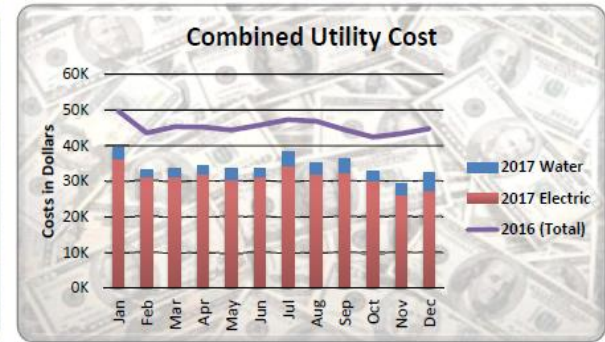
(Example) Building Occupant Engagement
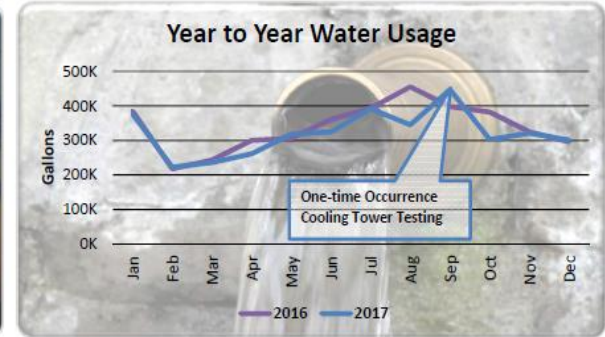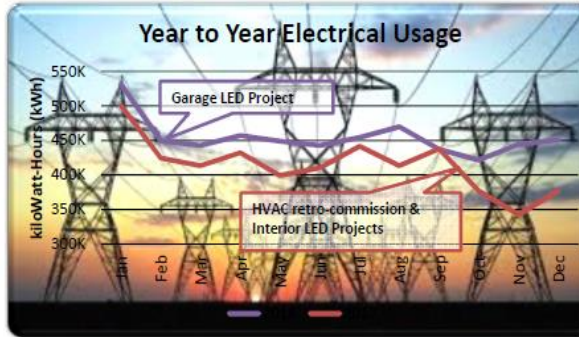
DTCC Tampa Project Specifics

Baseline & Goals

- DTCC chose 2016 for its baseline year
- Energy Reduction Goal: 10% Global with 25% in Tampa.
- Improve workplace health, comfort & improve productivity
- Reduce operating costs

Eligible Buildings

- Prioritized buildings we wholly owned
- Evaluated our energy cost/SF, usage/SF & % of Global Cost
- Identified incentives available from the local utility
- Prioritize older assets that are inefficient and at EOL

Choose ECMs

- First time costs, operating costs, & maintenance costs
- Ease of implementation (operational vs equipment changes)
- Opportunity to right size equipment considering full/part loads
- Level of improvement to workplace quality & comfort

(Example) Choosing ECMs & Ongoing Monitoring

Site	Implementation Idea	Wave	PO Issued	Project Complete	Annual Energy Reduction (kWh)	Payback (Years)
TPA_BERMUDA	Replace Open Office T8s with LED fixtures	2017A	✔	✔	226087	7.4
TPA_BERMUDA	Retro Commissioning	2017A	✔	✔	815217	1.1
TPA_BERMUDA	Demand control ventilation	2017A	✔	✔	453587	0.9
TPA_BERMUDA	Lobby lighting replacement	2017A	✔	✔	216326	2.8
TPA_BERMUDA	Garage stair lighting	2017A	✔	✔	12413	4.6
TPA_BERMUDA	Static pressure reset	2017A	✔	✔	165196	0.6
TPA_BERMUDA	Adjust thermostat setpoints	2017A	✔	✖	227283	0.0
TPA_BERMUDA	CRAC operations	2017A	✔	✔	48913	1.1
TPA_BERMUDA	OA reduction	2017A	✔	✔	68370	5.6
TPA_BERMUDA	EP UPS end of life replacement / right sizing	2017A	✔	✔	49717	6.6
TPA_BERMUDA	Energy Plant (perimeter & courtyard)	2017B	✔	✔	15217	9.6
TPA_BERMUDA	Install timeclock to shutdown water heater after hours	2017A	✔	✔	27174	1.0

Measure, Validate, Socialize & Sustain

Metrics & Tracking
- Identify metrics and keep them consistent throughout
- Track progress often (monthly) & socialize with operations
- Allow building occupants to view results
- Stay flexible and adaptive

Socialization
- Quarterly updates to Tampa site operating committee
- Signage & desk drops in building during project construction
- Energy Dashboards so you know if you're winning or losing
- Share success stories with the entire project team

Define Next Steps
- Develop a corporate sustainability policy
- Develop design standard templates for real estate planning
- What is next year's goal?
- Setup quarterly milestones so you can stay adaptive

(Example) Choose your metrics

Vendor 1: TAMPA ELECTRIC COMPANY
Supplier #:
Vendor 2: #N/A
Area (sqft): 193,000
Capacity: 1,405

Loc./Type	Currency Year/Rate		
TPA_EXIST	2016	2017	2018
USD	1	1	1

Notes

Is tax included in Compare Rate?
If YES enter 1, If NO enter tax rate:

Average Temp & Departure from Mean:
https://www.ncdc.noaa.gov/cag/

2017

	kWH			kW		Cost			Cost to Compare	Price in USD $	kWh per sqft	Watt per sqft	Cost ($) per sqft	Cost ($) per person	Occupancy	Avg. (°F)	+/- Mean (°F)	Days/Bill Cycle	Power Factor	Billing Period Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)
	On Peak	Off Peak	Total	On Peak	Off Peak	SBG Credit	Total														
Jan	123,675	376,690	500,365	825	825	0.00	3,990.00	36,335.24	0.00	36,335.24	2.59	4.3	0.19	#DIV/0!		66.3	6.1	34	96.960	12/15/2016	1/18/2017
Feb	107,960	316,439	424,399	751	804	0.00	3,990.00	31,096.51	0.00	31,096.51	2.20	4.2	0.16	#DIV/0!		68.8	6.7	28	96.890	1/19/2017	2/16/2017
Mar	106,102	307,455	413,557	790	790	0.00	3,657.50	31,164.97	0.00	31,164.97	2.14	4.1	0.16	#DIV/0!		70.0	-1.3	28	96.890	2/17/2017	3/17/2017
Apr	116,430	315,937	432,367	764	764	0.00	3,823.75	31,917.94	0.00	31,917.94	2.24	4.0	0.17	#DIV/0!		77.1	2.5	31	96.530	3/18/2017	4/18/2017
May	122,753	276,725	399,478	785	787	0.00	3,823.75	30,651.77	0.00	30,651.77	2.07	4.1	0.16	#DIV/0!		81.0	2.2	28	96.000	4/19/2017	5/17/2017
Jun	122,588	287,858	410,446	777	777	0.00	3,823.75	31,133.14	0.00	31,133.14	2.13	4.0	0.16	#DIV/0!		82.6	-0.5	29	95.270	5/18/2017	6/16/2017
Jul	123,327	318,318	441,645	879	883	0.00	3,823.75	34,186.60	0.00	34,186.60	2.29	4.6	0.18	#DIV/0!		84.2	-0.6	31	95.240	6/17/2017	7/18/2017
Aug	126,411	287,045	413,456	814	825	0.00	3,823.75	31,939.83	0.00	31,939.83	2.14	4.3	0.17	#DIV/0!		85.0	1.2	28	95.530	7/19/2017	8/16/2017
Sep	122,918	314,957	437,875	770	788	0.00	3,823.75	32,586.73	0.00	32,586.73	2.27	4.1	0.17	#DIV/0!		83.4	-0.4	32	95.640	8/17/2017	9/18/2017
Oct	118,892	258,014	376,906	837	837	0.00	3,823.75	30,030.25	0.00	30,030.25	1.95	4.3	0.16	#DIV/0!		78.2	0.1	28	95.170	9/19/2017	10/17/2017
Nov	93,611	249,073	342,684	748	767	0.00	3,823.75	26,347.98	0.00	26,347.98	1.78	4.0	0.14	#DIV/0!		72.1	1.0	27	96.370	10/18/2017	11/14/2017
Dec	88,913	288,644	377,557	664	780	0.00	3,823.75	27,395.11	0.00	27,395.11	1.96	4.0	0.14	#DIV/0!		67.3	-2.8	29	96.910	11/15/2017	12/14/2017

2018

	kWH			kW		Cost				Cost to Compare	Price in USD $	kWh per sqft	Watt per sqft	Cost ($) per sqft	Cost ($) per person	Occupancy	Avg. (°F)	+/- Mean (°F)	Days/Bill Cycle	Power Factor	Billing Period Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)
	On Peak	Off Peak	Total	On Peak	Off Peak	Delivery	SBG Credit	Total														
Jan	92067	307294	399,361	745	745	0.00	4,306.75	26,689.80	0.00	26,689.80	2.07	3.9	0.14	#DIV/0!		59.7	-0.5	33	97.010	12/15/2017	1/17/2018
Feb	84062	237413	321,475	753	753	0.00	4,306.75	24,806.25	0.00	24,806.25	1.67	3.9	0.13	#DIV/0!		74.2	12.1	29	96.680	1/18/2018	2/15/2018
Mar	80041	235979	316,020	703	703	0.00	4,290.70	23,755.77	0.00	23,755.77	1.64	3.6	0.12	#DIV/0!		66.1	-5.1	28	95.990	2/16/2018	3/16/2018
Apr	89758	246726	336,484	604	622	0.00	4,306.75	24,008.86	0.00	24,008.86	1.74	3.2	0.12	#DIV/0!		74.6	0.0	31	87.220	3/17/2018	4/17/2018
May	94345	214310	308,655	623	701	0.00	4,306.75	23,141.89	0.00	23,141.89	1.60	3.6	0.12	#DIV/0!		78.9	0.1	28	0.000	4/18/2018	5/16/2018
Jun	100118	232071	332,189	674	719	0.00	4,306.75	25,130.73	0.00	25,130.73	1.72	3.7	0.13	#DIV/0!		83.6	0.5	29	0.000	5/17/2018	6/15/2018
Jul	100779	247784	348,563	700	708	0.00	4,306.75	26,601.65	0.00	26,601.65	1.81	3.7	0.14	#DIV/0!		84.1	-0.1	31	0.000	6/16/2018	7/17/2018
Aug	101548	218806	320,354	680	695	0.00	4,306.75	24,858.25	0.00	24,858.25	1.66	3.6	0.13	#DIV/0!		83.9	0.1	28	0.000	7/18/2018	8/15/2018
Sep	111265	261277	372,542	669	684	0.00	4,306.75	27,823.98	0.00	27,823.98	1.93	3.5	0.14	#DIV/0!		85.8	2.0	33	0.000	8/16/2018	9/18/2018
Oct	106814	241196	348,010	848	940	0.00	4,306.75	29,181.29	0.00	29,181.29	1.80	4.9	0.15	#DIV/0!		80.0	1.9	28	0.000	9/19/2018	10/17/2018
Nov	76018	199190	275,208	664	686	0.00	4,306.75	21,391.19	0.00	21,391.19	1.43	3.6	0.11	#DIV/0!		70.7	-0.4	27	0.000	10/18/2018	11/14/2018
Dec	73925	220927	294,852	585	585	0.00	4,306.75	21,217.35	0.00	21,217.35	1.53	3.0	0.11	#DIV/0!		65.4	-4.7	29	0.000	11/15/2018	12/14/2018

(Example) Share Success with the Entire Project Team

Subject: Update: Lighting upgrades in your area - January 29th and 30th

Hi Everyone,

We wanted to provide you with an update on today's progress. We have removed all of the existing lights and have installed approximately 1/2 of the LED fixtures.

We are on schedule to finish the installation by the end of business on Tuesday. We will provide another update tomorrow.

Thank you for your patience and understanding as we make DTCC a greener place to work.

Subject: RE: Update: Lighting upgrades in your area - January 29th and 30th

Good morning Steve, thanks for the update, that was cool I wasn't expecting it ☺

Kind regards,

Subject: RE: Update: Lighting upgrades in your area - December 6th and 7th

The team you have doing the work is doing a fine job. Neat, courteous and quick.

Joe

Subject: RE: Update: Lighting upgrades in your area - December 13th and 14th

Steve,
The consistent communication you have provided through this process is the level of customer service that should be emulated by others and has been very much appreciated.

Thank you.

DTCC Tampa Timeline

September — Energy Audit

September — Retro-Commissioning

November — Chiller & Controls

2016   **2017**   **2018**

September — Central Plant Audit

March — LED Lighting

December — UPS Replacement

DTCC Tampa Results (Annual usage, expense & peaks)

- 2015   5.9mil kwhr $554k   939kw(avg peak)

- 2016   5.4mil kwhr $508k   869kw(avg peak)

- 2017   4.9mil kwhr $375k   793kw(avg peak)

- 2018   3.9mil kwhr $298k   700kw(avg peak)

- Year   3.8mil kwhr $289k   659kw(avg peak)

DTCC Tampa Present Day Energy Dashboard

WORKPLACE PROFILE: BERMUDA GREEN BUILDING

2018 Q4 UPDATE

SITE STATISTICS

Tampa, Florida
South Eastern United States

Avg. temp. 72.5°F / 22.5°C
Subtropical climate

193K square feet
Business center

1167 occupants
1405 Maximum capacity

Constructed 1999
DTCC occupancy 2004

Energy star score 85
Trending upward from 57 in 2016

BASELINE PERFORMANCE

Site energy
5.4MM kWh
Site energy is the amount of electricity consumed by the building as reflected on 2016 utility bills

Energy Use Intensity (EUI)
28.16 kWh/ft^2
EUI expresses a building's energy use as a function of its size or other characteristics

Greenhouse Gas Emissions
4.1K metric tons CO2
Equivalent carbon dioxide emissions estimated from the amount of fossil-fired energy consumed

Equivalent to...
608 Homes' electricity use
Annual home electricity consumption multiplied by the CO2 emission rate PU of delivered electricity

Equivalent to...
1413 Tons of waste
Greenhouse gas emissions from landfilled waste instead of recycling

SITE IMPROVEMENTS

Trend vs 2016 baseline
-27.81%
Percentage of site energy saved comparing current usage to 2016 baseline year

Energy project savings
-1.5MM kWh
Implemented projects' contribution toward current site energy savings

Carbon Footprint Reduction
-1.1K metric tons CO2
Equivalent carbon dioxide emissions reduction as a result of sustainability program

Equivalent to...
29K trees planted
The CO2 sequestered by a medium growth coniferous tree, allowed to grow for 10 years

Equivalent to...
-2.8MM miles not driven
CO2 emissions per gallon of fuel divided by weighted avg. fuel economy of a passenger car