### **2030 District Program and Small Commercial Toolkit**

2015 Building Technologies Office Peer Review





**ENERGY** Energy Efficiency & Renewable Energy

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# **Project Summary**

### Timeline:

Start date: October 1, 2013

Planned end date: March 30, 2016

#### Key Milestones

- Develop program resources and tools, 9/30/14
- 2. Complete demonstrations, 9/30/15
- Deployment to other 2030 Districts, 3/30/16

### Budget:

Total DOE \$ to date: \$2M (for program and toolkit, no dollars are applied to retrofits – these costs are born by bldg owners)

Total future DOE \$: N/A

### Target Market/Audience:

Small commercial office and retail buildings within 2030 Districts in major U.S. cities.

### Key Partners:

LBNL	Architecture 2030		
Cleveland 2030 District	Green Building Alliance / Pittsburgh 2030 District		
Seattle 2030 District	Prospect Silicon Valley / City of San Jose		
ASU	Emerging 2030 Districts		

### Project Goal:

Create 2030 District Program guidance and a technical Toolkit that provides products to promote, develop, and successfully execute 2030 District energy efficiency savings programs specifically for small commercial office and retail, which can be deployed nationwide.



## **Purpose and Objectives**

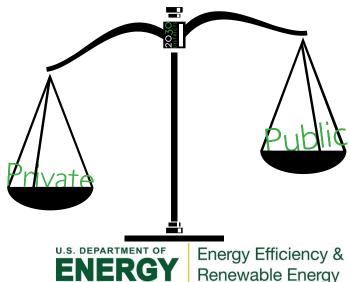
**Problem Statement**: The small commercial buildings sector has distinct issues in implementing energy efficiency (EE) –

- Buildings are very resource constrained and lack access to affordable EE expertise (architects, engineers, consultants)
- Existing EE tools and services have high-cost entry points

**Target Market and Audience**: Commercial buildings under 50,000 square feet, (office and retail) representing over 90% of all U.S. commercial buildings and consumes over 40% of the sector's energy use. Small commercial property currently comprise 66% of the properties in the existing 2030 Districts. Total commercial building stock is 6.5 quads energy use, approximately half of which is attributed to small commercial.

#### **Distinctive Characteristics**:

2030 Districts are <u>private sector-led</u> – increases buy-in and ownership of the effort. Independent demonstration areas are tied into a Network with shared goals, timelines and performance metrics. Increases best practice sharing and collaboration.



### **Purpose and Objectives - Impact**

#### Planned Contribution to Energy Efficiency:

- Project Yrs 1-3 deliver program guidance to develop self-sufficient 2030 Districts, leveraging peer relationships to influence market uptake of EE. A suite of technical tools delivered, identifying cost effective EE strategies to achieve a minimum of 20% energy savings.
  - Exceeding target of 25-40 demonstration sites, with 53 sites targeting a minimum of 20% reduction per site, estimated savings of 11-20 million kBtu/yr. Energy savings reported annually through EnergyStar PM.
- 2. After Year 3 tools and program guidance will be deployed to:
  - 5-10 new 2030 District nationwide (200M sq. ft./commercial space, with 10M sq. ft. of small commercial). 2030 Districts and members commit to >20% building energy reduction, contributing to a target 10% energy reduction per District. Outreach to emerging districts during project.
  - Energy savings up to 2.4 billion kBtu/yr, \$40 million in energy cost savings, \$175 million/year of economic activity, \$290 million of increased asset values, 1640 direct and 3370 indirect jobs.



### Approach

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**Approach**: District scale approaches provide multiple advantages:

- motivates members
- leverages the needs at scale to deliver EE programmatic offerings such as low cost auditing and Cx, financing means and equipment purchase programs.
   The best practices these districts employ to establish self-sustaining EE programmatic local resources are captured in this project for use by other districts. A suite of no- or low- cost EE tools and services will be packaged that serve this sector, designed for use by practitioners engaged in this sector, e.g. HVAC or electrical contractors. Existing tools are leveraged, and a small set developed to fill identified needs.

Key Issues: Some k	key barriers to energy	reductions in this sector are:
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Technical	Programmatic
1) access to centralized, comprehensive, cost-evaluative information about how to achieve energy targets	4) guidance on bringing disparate stakeholders together
2) affordable access to auditing services	5) financial models for district self-sufficiency
3) reduced transaction costs or incentives that make reduction efforts attractive	6) member outreach, including to historically underserved communities

### **2030 Districts Network**





- 785 Buildings
- 236 Property Members
- **109** Professional Stakeholders
- > 83 Community Stakeholders

District and Member Reduction Targets	Potential District Savings
20% Individual Building Retrofits by 2015	Up to 240 Million kBtu/year District Wide
10% Aggregated District Savings by 2015	\$4 Million in Energy Cost Savings
50% Incremental District Savings by 2030	\$17.5 Million/year Economic Activity = \$29 Million Asset Value Increases

## 2030 Districts + Small Commercial Building Toolkit



#### Key Project Highlights:

- Year 1 Program guidance on Districts and Toolkit developed to enable and make easier identification, execution and tracking of efficiency measures and consumption
- Year 2 53 demonstration sites in 4 partner Districts, 20% reduction target per demonstration + 10% per district by 2015
- Year 3 Deployment to 5-10 new Districts

# *Identify > Execute > Track*



## Year 1 - Small Commercial Program Toolkit Development

 Program guidance was developed using <u>best practices from established</u> and emerging districts. <u>Provides multiple models</u> for program approaches to achieve success on:



The pathways and protocols to establishing a 2030 District as a private/public partnership



Identify and engage prospective property owners, aligned organizations and the general public



Overview of various financing strategies for 2030 Districts in their early stages.



Free and discounted resources to help property owners and managers

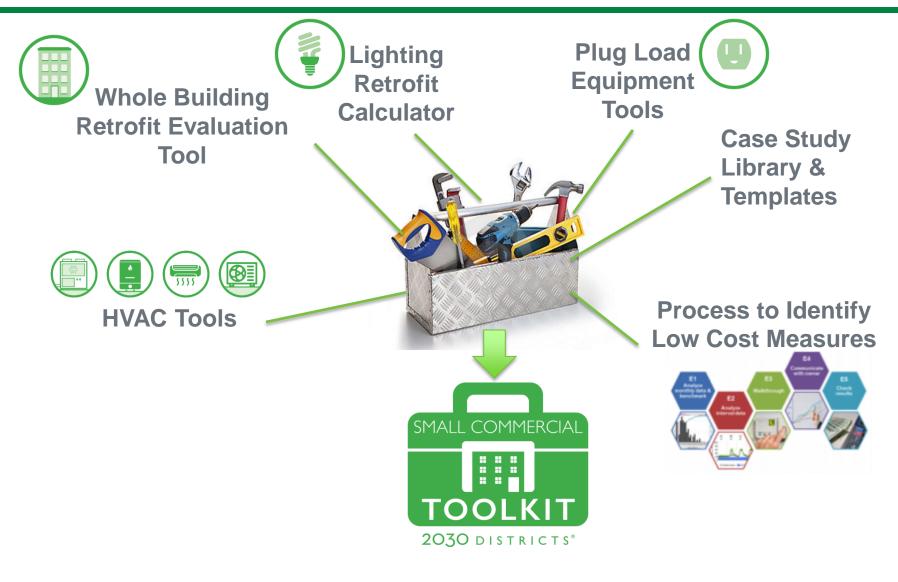


Collecting, analyzing, and reporting building performance data in a 2030 District.



Valuable resources and insight into the complex world of financing a performance oriented project

### Year 1 - Small Commercial Technical Toolkit









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### Year 1 - Small Commercial Technical and Program Toolkit

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DISTRICTS	ABOUT DISTRICTS TOOLKITS RESOURCES NEWS CONTACT US SEARCH Q	LIGHTING RETROFIT TOOL	Privacy
	High Performance Building Districts	PROJECT 123 Main Street \$ SESSION • SAVE TO RESULTS DASHBOA	ARD
TOOLKITS	WELCOME TO THE 2030 DISTRICT TOOLKITS	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow SA$	AVE
Small Commercial Toolkit Tutorials Small Commercial Toolkit Member Resources Toolkit Outreach & Communications Toolkit District Funding Toolkit Project Financing Toolkit District Formation Toolkit Performance Metrics Toolkit	SMALL COMMERCIAL SMALL COMMERCIAL This is a series of video tutorials of the programmatic and technical tools TOOLKIT	SELECT OR COLLECT     EDIT     APPLY & REVIEW     SUMMARY       Open Office     Private Office     Summary       New Space Name     Project     +       OpenOff1     Create New Space     +       Save     Duplicate     Delete     Reset     Apply       General     Schedule     Lighting     Economics     Controls 1     Controls 2	
2030 DISTRICTS NEWSLETTER Email Address • First Name •	SMALL COMMERCIAL       Commercial Toolkit         The 2030 District Small Commercial Toolkit is a national 2030 District Program that Includes a set of program and technical products aimed at small commercial buildings (Buildings < 50,000 s.f.)	Space Floor Area     Number of Workstations     Typical Workstation Area       6000     ft2     70     86     ft2       Location: State     Billing Rate     Electricity       PA     \$     0.0991     /kWh     \$     12	
Last Name *	MEMBER RESOURCES	Baseline Lighting Type     Upgrade Lighting Type       T12 Fluorescent     Image: Control Strategies       Upgrade Control Strategies     Image: Control Strategies       Tuning     Coccupancy     Daylight Dimming     Personal Controls	
	OUTREACH         Dutreach & Communications Toolkit           TOOLKIT         The Outreach and Communications Toolkit is a set of tools to assist 2030 Districts is used organizations and the general public.	Profile     Energy     Cost     62.3%       Lighting Power Density Profile Curve     Energy Savings       1     51.3%       Peak Demand Savings	gs
	DISTRICT FUNDING	24.8 Years Simple Payback Perio	d
	PROJECT FINANCING PROJECT FINANCING Project Financing Toolkit This guide provides some valuable resources and insight into the complex world of financing a performance oriented project.	Savings Based On Controls	

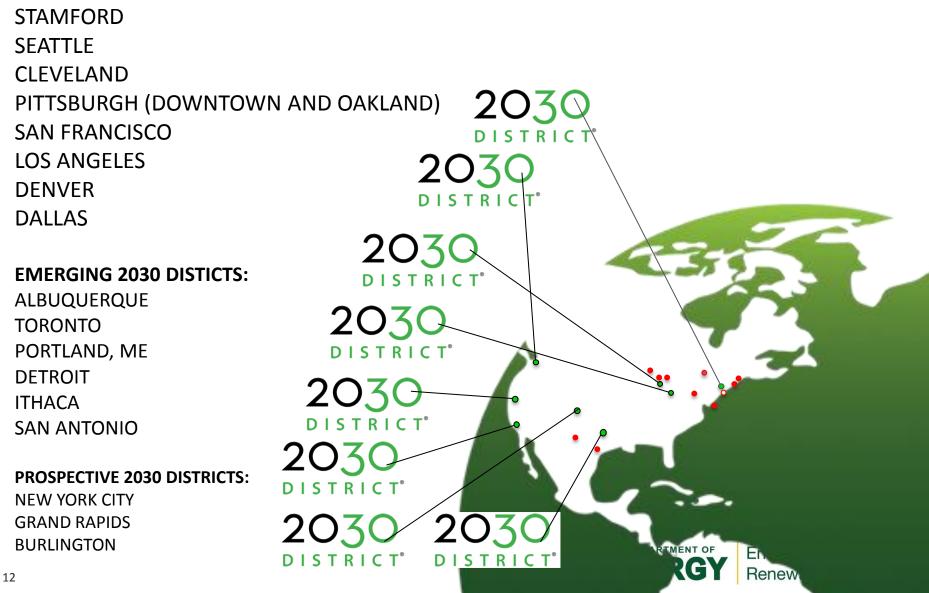
### Year 2 – Demonstrations; Year 3 - Deployment

- Year 2 <u>Program and Technical Toolkit Demonstrations</u> 53 Small Commercial Sites in demonstration partner cities – Cleveland, Seattle, Pittsburgh and San Jose: 10 Retail; 16 Office; 27 Mixed Use
  - Commence energy tracking and savings verification
  - Refine Technical Tools and Programmatic Resources
  - Develop a group purchasing organization to obtain preferred pricing not currently available to small commercial owners on select high performance building technologies.
- Year 3 <u>Verification and Deployment</u> Demonstration site savings verification, case study development, outreach
  - Outreach and industry engagement, deploy 2030 District model, establishment of 5 to 10 New 2030 Districts
  - Educate potential partners about demonstrated successes and value to communities/cities
  - Case Studies and other materials disseminated at national conferences and partner events



### 2030 Toolkit – Emerging and New 2030 Districts

#### **ESTABLISHED 2030 DISTRICTS:**



**Lessons Learned**: Regardless of technically proficient tools and reasonable ROIs from analysis, <u>any</u> financial commitment to making improvements can deter some audiences. Financial incentive or alternative financing approach is a larger priority for this audience than in large commercial. The framing of EE assessments in the context of the business model of a small commercial owner/advocate can be useful as a first step.

#### Accomplishments:

- Technical tools developed, including the web portal, lighting retrofit tool, whole building retrofit tool, case study template and library, 'guide me' process, and the results dashboard.
- Program guidance developed on district formation, district funding, outreach and communications, project financing, performance metrics, and member resources.
- Trainings held in 4 partner cities with contractors.
- Los Angeles, Denver, Stamford, San Francisco and Dallas 2030
   Districts launched. Network now totals 182 million sf committed.
- MOUs and relationships in place for partnerships with larger national organizations (e.g. EcoDistricts, EPA, ULI Greenprint,
- <sup>13</sup> IFMA, LA-BBC, etc.)

DISTRICT DFNVFR STAMFORD DISTRICT SAN FRANCISCO DISTRICT DALLAS DISTRICT®

### **Progress and Accomplishments**

**Market Impact**: Project is just commencing the demonstration phase, projected energy savings figures or actual energy savings are not yet available. However, the team has completed industry workshops on small commercial tools, developed new tools and tracking tool, coordinated on web portal and completed six toolkits containing numerous program guides.

- Ensuring or accelerating market outcome(s)
  - Exceeded target of 25-40 demonstration sites, with 53 enlisted
  - Partner cities conducting trainings with members on technical tools
  - Architecture 2030 is actively engaged with the other five established 2030 Districts and fostering inquiries and early formation activities with ten additional U.S. cities, priming the project for early deployment of the program guidance and tools
  - Industry outreach continuing with conferences and working on industry collaborations with national organizations to partner at the local level (e.g. BOMA, IFMA, ULI, ASHRAE)
  - 2030 District Network Summits to disseminate to emerging and prospective Districts

#### Awards/Recognition: N/A.

# **Project Integration and Collaboration**

#### **Project Integration and Communications:**

- FOA Project team hold weekly meetings; trainings on tools and guidance
- 2030 District Summit, Sept 2014 convenes all established, emerging and prospective districts. Toolkit tools and guides presented, coordinated.
- Trainings held with small commercial contractors HVAC and electrical, in all 4 partner cities on the Energy Management Process
- 2030 Districts hold regularly meeting with their members and stakeholders and perform trainings on the toolkit with the demonstration partners.
- Architecture 2030 presented at the 2013 National Preservation Conference, the 2014 SPEER Summit, CNU22, and the 2014 EcoDistricts Summit.

#### Partners, Subcontractors, and Collaborators:

- Architecture 2030, program guidance and 2030 Districts convener
- Seattle, Cleveland and Pittsburgh 2030 Districts and Prospect Silicon Valley, small commercial outreach, demonstrations, best practices
- ASU, case studies template and library.
- Emerging 2030 Districts



The project is currently mid-way in its 30 month project period. Tasks that remain include:

- a. Complete dissemination and usage of technical toolkit to demonstration sites.
  - I. Document >20% energy savings in projects.
  - II. M&V period, collect M&V results.
  - III. Collect feedback, lessons learned and improve tools
- b. Complete and deploy program guidance to 2030 Districts.
  - I. Complete Special Purchasing Alliance program development.
  - II. Collect feedback, lessons learned, develop further as needed.
- c. Deploy technical and program toolkits to further 2030 Districts.
- d. Risks and mitigation

Demonstration sites may stagger implementation of the retrofits over a longer period than anticipated during the project timeframe, shortening M&V period. Mitigated by enlisting more than double the target number of sites to maintain a core number progressing in the project timeframe.



# **REFERENCE SLIDES**



Energy Efficiency & Renewable Energy Project Budget: 2,000k, awarded by DOE FOA-0000829
Variances: No variances have occurred or are expected.
Cost to Date: 1,151k
Additional Funding: N/A

		Budget	History		
	2014 ast)		.015 rent)		2016 nned)
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
2,000k	2,000k	N/A	N/A	N/A	N/A



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Project plan, milestones as noted in the schedule below. Project period 10/1/13-3/30/16.

• FY15Q1 milestone was delayed due to scheduling issues with participants

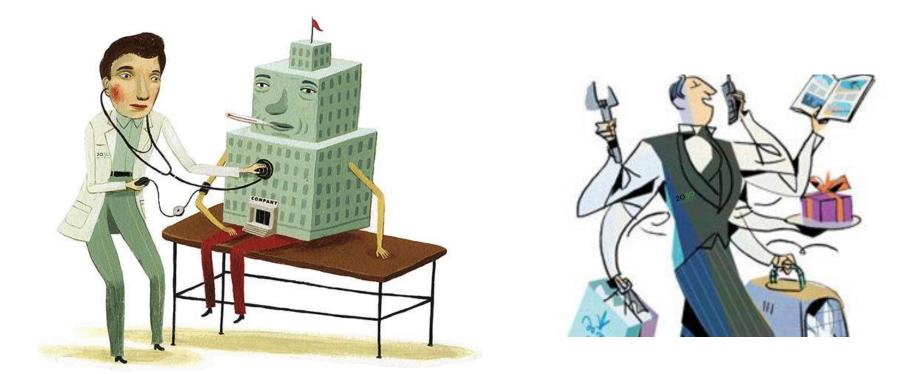
FY14 Go/No-go: Stop the demonstration phase if the following not met (9/30/14):

- # of tech. tools developed >4
- Case study library developed >20 case studies; # Case study templates >1
- # of program energy saving tracking tools developed > 1
- # of program guides & templates developed > 5

FY15 Go/No-go: Stop the demonstration phase <20 demonstrations in progress

Project Schedule												
Project Start: Oct. 1, 2013		Comp	leted V	Vork								
Projected End: Mar. 30, 2016		Active	Task (	in prog	gress w	ork)						
	•	Milest	:one/D	elivera	ble (Oi	riginall	y Planr	ned)				
	•	Milest	:one/D	elivera	ble (Ao	ctual)						
		FY2	014			FY2	015			FY2	016	
Task	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)
Past Work												
FY14Q1 Milestone: Conduct tool workshops												
FY14Q2 Milestone: Case study and initiate toolkit dev.												
FY14Q3 Milestone: Identify demonstration sites in cities.												
FY14Q4 Go/No Go: 4 tools developed, case study library >20, 5 program guides developed												
FY15Q1 Milestone: Develop program resources and tools.												
Current/Future Work												
FY15Q2 Milestone: Report on tool use by partners.												
FY15Q3 Milestone: M&V period started for demo sites.												





2030 Districts act as a concierge and GP – pointing partners towards tools for accurate diagnosis and treatment









# For Building Owners, Managers and Developers



Utilize special financing programs

Improve competitive positioning





Access exclusive incentives, discounts & programs

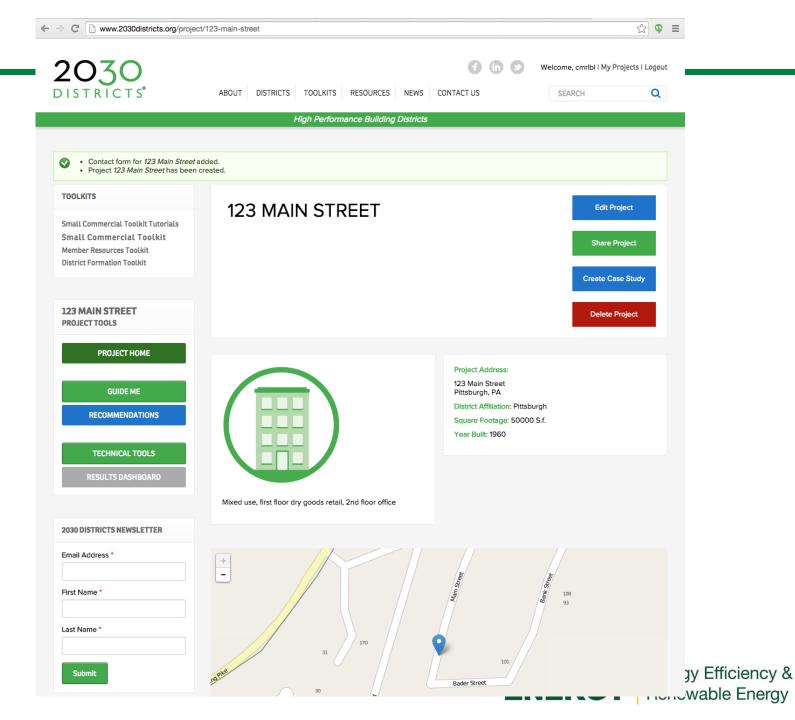
Receive comparative analysis reports





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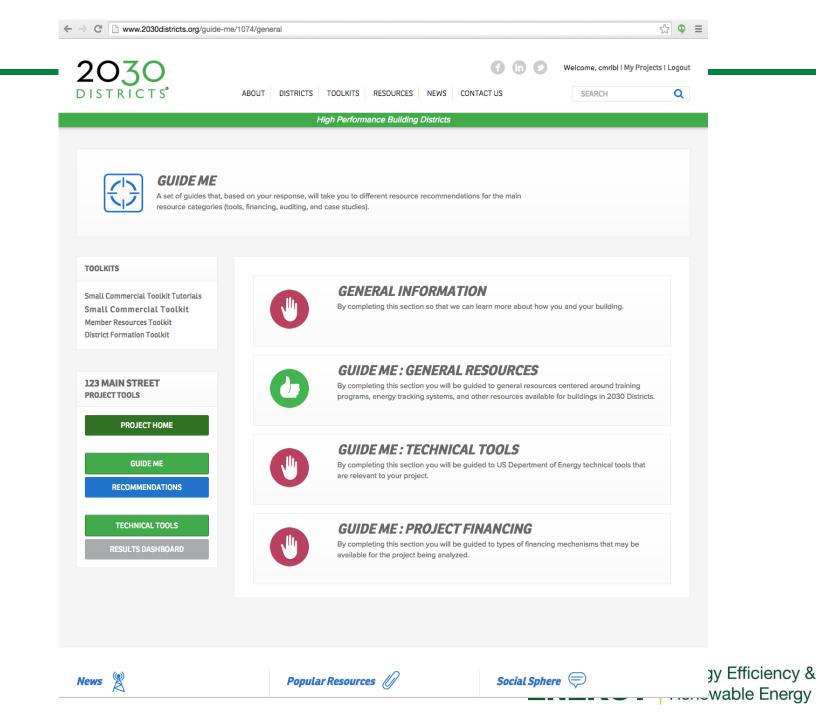


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TOOLKITS	WELCOME TO THE	2030 DISTRICT TOOLKITS	
Small Commercial Toolkit Tutorials			
Small Commercial Toolkit		Small Commercial Toolkit Tutorials	
Member Resources Toolkit District Formation Toolkit		This is a series of video tutorials of the programmatic and technical tools	
2030 DISTRICTS NEWSLETTER	TOOLKIT		
Email Address *			
		Small Commercial Toolkit	
First Name *	SMALL COMMERCIAL	The 2030 District Small Commercial Toolkit is a national 2030 District Program that includes a set of program and technical products aimed at small commercial buildings	
Last Name *		(Buildings < 50,000 s.f.)	
	TOOLKIT		
Submit			
		Member Resources Toolkit	
	MEMBER RESOURCES	2030 Districts offer their members a number of free and discounted resources to help property owners and managers reach the maximum performance of their buildings and	
	TOOLKIT	benefit from participating in	
		District Formation Toolkit	
	DISTRICT FORMATION	This toolkit explores the unique aspects of a 2030 District, how they differ from other aligned efforts, and the pathways and protocols to establishing a 2030 District as a private/public partnership.	

<sup>7</sup> Efficiency & able Energy

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		-
	High Performance Building Districts	
TOOLKITS		
TOOLKITS		
Small Commercial Toolkit Tutorials	WELCOME TO THE 📾 SMALL COMMERCIAL TOOLKIT	
Small Commercial Toolkit Member Resources Toolkit	TECHNICAL TOOLS AND GUIDANCE FOR COMMERCIAL BUILDINGS UNDER 50,000 S.F.	
District Formation Toolkit		
	Guide Me	
	You must be a registered user with a project to be guided to	
	recommended resources and technical tools	
	I am experienced, just take me to the	
	Technical tools	

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	High Performance Building Districts	
	NFORMATION	
By completing this se	ection so that we can learn more about how you and your building.	
TOOLKITS	General	
Small Commercial Toolkit Tutorials	What is your role in the project?	
Small Commercial Toolkit	Property Manager	A V
Member Resources Toolkit District Formation Toolkit	Type of Project	
	Mixed Use	*
	☑ Office	
123 MAIN STREET PROJECT TOOLS	Residential     Restaurant	
	✓ Retail	
PROJECT HOME	Estimated Size of Project	
	50000 SF	
GUIDE ME	How long from today's date do you plan to be in your location?	
RECOMMENDATIONS	>10 years	Ť
	How long have you been in your location?	
TECHNICAL TOOLS	5 to 10 years	* *
RESULTS DASHBOARD	Input the building into Energy Star Portfolio Manager? No	
RESULTS DASHBUARD	⊖Yes	
	Are you currently benchmarking your buildings performance?	
	O No	
	Had an Energy Audit in the last 12 months	
	○ Walkthrough w/ recommendations	
	Other I haven't had an energy audit / assessment	
	How is your building/space operated	
	I do it	*
	SAVE CANCEL	

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ISTRICTS	ABOUT DISTRICTS TOOLKITS RESOURCES NEWS CONTACT US SEARCH Q
	High Performance Building Districts
	GENERAL RESOURCES ection you will be guided to general resources centered around training programs, energy
	d other resources available for buildings in 2030 Districts.
TOOLKITS	
	General Resources
Small Commercial Toolkit Tutorials Small Commercial Toolkit	What type of project are you doing?           Retrofit
Member Resources Toolkit	
District Formation Toolkit	Do you want to know about ways to track building energy use? Yes
123 MAIN STREET	Have you engaged your tenants in a resource reduction strategy?
PROJECT TOOLS	
	Are your facility managers trained in resource efficiency?
PROJECT HOME	
	Do you have a resource efficiency plan?
GUIDE ME	
RECOMMENDATIONS	Are you owner occupied?
TECHNICAL TOOLS	How is your building/space operated? The building is managed under contract by a property management company
RESULTS DASHBOARD	The building is managed under contract by a property management company a
	SAVE CANCEL
	SAME AND STREET

News X North Texas Council of Governments (NTCOG) joins Dallas 2030 as a Community Stakeholder

Popular Resources

VIDEO: 2030 Districts Overview This video introduces 2030 Districts, which are being...



2030 Districts @2030Districts RT @Arch2030: "The greenest building is the one that's y Efficiency & wable Energy

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ISTRICTS	ABOUT DISTRICTS TOOLKITS RESOURCES NEWS CONTACT US SEARCH	Q
	High Performance Building Districts	
	PROJECT FINANCING	
By completing this see being analyzed.	ection you will be guided to types of financing mechanisms that may be available for the project	
TOOLKITS		
Small Commercial Toolkit Tutorials	Financing How do you plan to pay for your project?	
Small Commercial Toolkit	Self Financed	÷.
Member Resources Toolkit District Formation Toolkit	Tax Implications	
District Pormation Footkit	Are you a not for profit organization?	
	No	*
123 MAIN STREET	Do you want to know about any of these tax implications?	
PROJECT TOOLS	□ 179D Questions ☑ Tax-exempt bond financing	
PROJECT HOME	Are you going to own the upgrade that you are doing?	
	Yes	\$
GUIDE ME	What is the scope of your project?	
RECOMMENDATIONS	This is the only project	\$
	Who will be doing the construction of your project?	
TECHNICAL TOOLS	Hire a General Contractor to oversee the entire project	*
RESULTS DASHBOARD	SAVE CANCEL	

### News

North Texas Council of Governments (NTCOG) joins Dallas 2030 as a Community Stakeholder 11 March 2015 - 12:29pm

Popular Resources

VIDEO: 2030 Districts Overview This video introduces 2030 Districts, which are being...

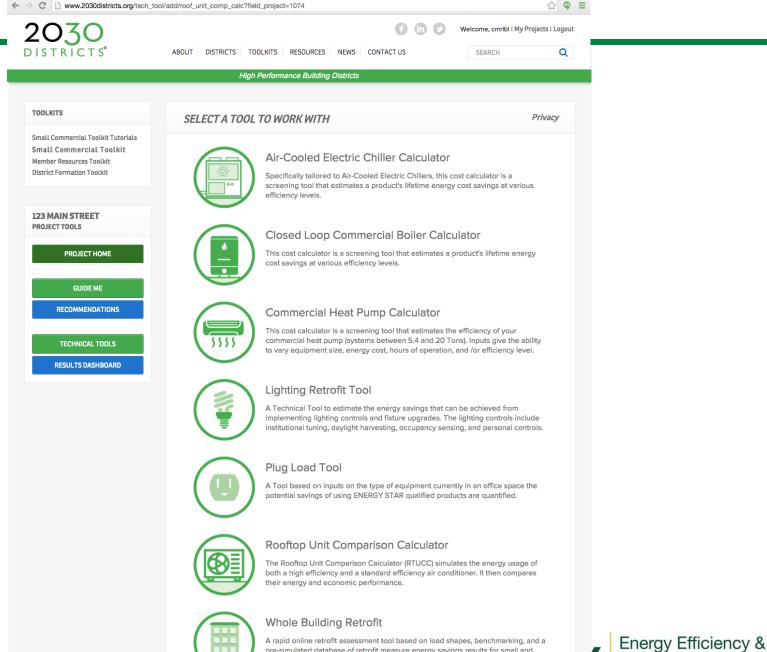
2030 Districts Introduction



2030 Districts @2030Districts RT @Arch2030: "The greenest building is the one that's already there" Nice adaptive reuse here: http://t.co/Zgmkmi79ku @gbd\_mag.http://t.co... - 9 manthe 1 work ano

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GUIDE ME: 1	TECHNICAL TOOLS
	action you will be guided to US Department of Energy technical tools that are relevant to your
project.	
OOLKITS	Technical Tools
mall Commercial Toolkit Tutorials	What energy use data do you have available?
mall Commercial Toolkit	Utility Bills
lember Resources Toolkit	
listrict Formation Toolkit	Type of Heating System?
	Boilers
	Type of Cooling System?
23 MAIN STREET	Other \$
ROJECT TOOLS	In the last 5 years, have you done any of the following?
PROJECT HOME	Yes No
PROJECT HOME	<ul> <li>Upgraded the majority of your Heating and Cooling System</li> </ul>
	Boiler
GUIDE ME	Chiller
RECOMMENDATIONS	Heat Pump
RECOMMENDATIONS	Rooftop Unit
	What is the System's Efficiency?
TECHNICAL TOOLS	Standard Performance
RESULTS DASHBOARD	
	<ul> <li>Upgraded the majority of your lighting fixtures</li> <li>Upgraded the majority of your lighting controls</li> </ul>
	<ul> <li>Upgraded the majority of your roof insulation</li> </ul>
	<ul> <li>Installed a cool roof membrane</li> <li>Upgraded the majority of exterior walls</li> </ul>
	<ul> <li>Oppraded the majority of exterior windows</li> <li>Oppraded the majority of exterior windows</li> <li>Opurchased new office-type equipment in the last 5 years?</li> </ul>
	<ul> <li>Upgraded the majority of exterior windows</li> <li>Purchased new office-type equipment in the last 5 years?</li> <li>Office Equipment</li> </ul>
	<ul> <li>Upgraded the majority of exterior windows</li> <li>Purchased new office-type equipment in the last 5 years?</li> <li>Office Equipment</li> <li>Below 50%</li> </ul>
	<ul> <li>Upgraded the majority of exterior windows</li> <li>Purchased new office-type equipment in the last 5 years?</li> <li>Office Equipment</li> <li>Below 50% \$</li> <li>Kitchen Equipment</li> </ul>
	<ul> <li>Upgraded the majority of exterior windows</li> <li>Purchased new office-type equipment in the last 5 years?</li> <li>Office Equipment</li> <li>Below 50%</li> </ul>



A rapid online retrofit assessment tool based on load shapes, benchmarking, and a pre-simulated database of retrofit measure energy savings results for small and medium office and retail buildings. The tool is being designed with three levels of analysis capabilities depending on the level of information available.

**Renewable Energy** 

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BELOW IS THE CHILLER CALCULATOR ON THE DEPARTMENT OF ENERGY'S WEBSITE	
Disable Interaction	CAPTURE RESULTS
This cost calculator is a screening tool that estimates a product's lifetime energy cost savings at various officiency levels.	ENTER RESULTS BELOW
earn more about the calculator assumptions and definitions.	
Project Type	
Is this a new installation or a replacement?	
New 🔾 Replacement	
How many chillers will you purchase?	
1	
Performance Factors	
Existing What is the existing design condition?	New Replacement
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the existing chiller?	New Replacement Number of Chillers 1
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the	
Existing What is the existing design condition? Full Load O Partial Load What is the cooling capacity of the existing chiller? 10C tons What is the full-load efficiency of the existing chiller? 10. EER	Number of Chillers
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the existing chiller? 10C tons What is the full-load efficiency of the existing chiller?	
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the existing chiller? 10C tons What is the full-load efficiency of the existing chiller? 10. EER What is the partial-load efficiency of the existing chiller?	Number of Chillers     1       Full Load     Partial Load       Capacity of New Chiller     100
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the existing chiller? 10C tons What is the full-load efficiency of the existing chiller? 10. EER What is the partial-load efficiency of the existing chiller?	Number of Chillers
Existing What is the existing design condition? Full Load Partial Load What is the cooling capacity of the existing chiller? 10C tons What is the full-load efficiency of the existing chiller? 10. EER What is the partial-load efficiency of the existing chiller? EER New What is the new design condition?	Number of Chillers     1       Full Load     Partial Load       Capacity of New Chiller     100

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COLLECT	ENABLE	INPUT & S		CALCULATI		CAPTURE				
BELOW IS THE P	BOILER CALCULATOR	ON THE DEPARTME	NT OF ENERGY	'S WEBSITE						
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What fuel is Gas Oi										
How many b purchase? 1 unit(s					Numt	er of Boilers		1		
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www.2030districts.org/tech_to	pol/add/heat_pump?field_project=1	074		\$	Φ ≡
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STRICTS	ABOUT DISTRICTS TOOL	KITS RESOURCES NE	VS CONTACT US	SEARCH	2
	High Po	erformance Building Distr	icts		
COMMERCIAL HEAT PUM	IP CALCULATOR			Privacy	
PROJECT 123 Main Street	▼ <b>SESSION</b> Ses	sion #	SAVE TO RESULTS	S DASHBOARD CANCEL	
- 1 🔥 Z	2 > 3	> 4	5	<b>SAVE</b>	
COLLECT ENAB	BLE INPUT & SELECT	CALCULATE	CAPTURE		
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	Disable Interaction				
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2030 DISTRICTS' ABOUT DISTRICTS TOOLKITS RESOURCES NEWS CONTACT US SEARCH Q	
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O Code-based or National Average LPD     Select Code/National Average	
O Input your own LPD	
<ul> <li>Fixture information to calculate LPD</li> </ul>	
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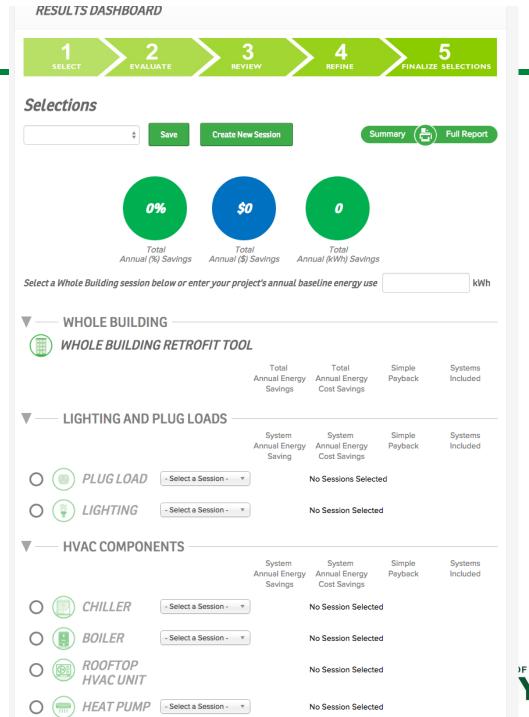
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#### Energy Efficiency & Renewable Energy

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## gy Efficiency & wable Energy





#### **Energy Management Package - Auditing**

- Streamlined package for energy management: guidelines & worksheets
- Focused on operational savings measures
- Delivered by HVAC contractors





## **Element 1: Monthly Data & Benchmarking**

Requires:

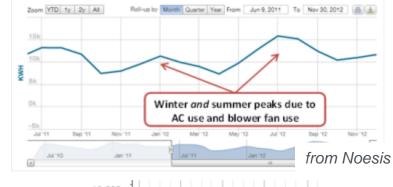
- At least 1 year of monthly electricity and fuel use;
- Building floor area & type;
- ✤ 30-60 minutes

A) What are the seasonal patterns?

*B)* How does this year compare with the previous year?

# C) How does my building compare to others?

- Energy use intensity (kBTU / sf yr)
- % of buildings with higher EUI (Energy Star Score)







from GreenQuest



Energy Efficiency & Renewable Energy

& benchmark

Analyze

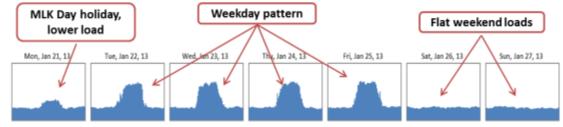
monthly data

### **Element 2: Interval Data**

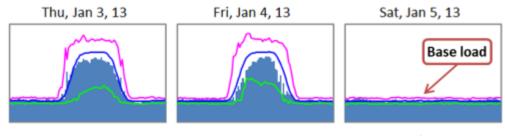
**Requires:** 

- 3-12 months of hourly (smart meter) electricity data
- 30-60 minutes

A) Are the daily and weekly load schedules as expected?



B) How much energy is used at night and on weekends (Base load)?



from BizEE

- C) Are there spikes or unusual activity ?
- D) Can peak loads be reduced or shifted to non-peak periods in the day?
- E) Are there changes over time?



Energy Efficiency & Renewable Energy

Analyze interval data

#### **Element 3: Walkthrough**



1 hour walkthrough at building site

Check lighting & thermostat settings

Consult with manager about energy management practices

#### E3 Walkthrough Worksheet Building: Building operating hours: Facility contact name: Weekdays Phone: Saturday: Sunday: STEP 1 Overview List major energy consuming equipment in this building: If issues were highlighted in: Pay special attention to question number: E2 Step 3: High evening / weekend / base load 1, 5, 6, 7, 8, 11c, 11e, 12 (office), 13 (kitchen) E2 Step 2: Load schedule does not match 8, 11a, 13 (kitchen) occupancy schedule E2 Step 5: High peak, daytime loads 11b. 11d. 9 E1 Step 5: High seasonal variability 10 Questions in **bold** below are the typically the most important to assess.

#### STEP 2 Look for these items throughout the building

#	Description	Yes	No	NA	Corrective Action / Comments	Solved ?
1	Are occupancy sensors installed and working? Are they placed appropriately? Consult manager / occupant about functioning.					
2	Are incandescents or T12 fixtures present?					
3	Are fans or portable space heaters being used?					
4	Are radiators and air vents clear and unobstructed?					
	53 Wold	brough	Wor	kshaa	t DRAFT: Do not Circulate	



#### **Element 4: Communicate with Owner**



- Tips on pitching efficiency measures
- Tool to generate summary (right)
- Incentive identification
- Goal setting guidelines
  - "I think together we can improve the Energy Star Score by 5 points this year."

How is your building performing?

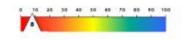
Prepared for Delightful Dentistry, 32 Main St. by Got your back HIMC

Your building uses 150 kBFU/sf per year, which is more efficient than 8% of office buildings

Your building's energy use has decreased by 2%, compared with the previous year.

Based on your percentile ranking, there are likely many low-cost opportunities to improve the energy efficiency of this facility.

By reducing your building's energy use by 5N, you could save \$310 annually, based on national average energy costs. This is equivalent to selling 31 more destat cleanings per year! This program aims to use low-cost measures to reduce energy use by 3-5N, but higher savings can be achieved by completing many recommediations or additional measures with higher upfront costs.



Knowing is half the battle. But what's the other half? The following table includes low-cost opportunities to reduce your building's energy costs. The more items you choose to implement, the more energy you are likely to save. Additionally, regular energy meetioring is recommended to maintain the energy sames that you achieve.

Recommendations	How easy to this?	Who?	Cost	Incentive?	Date Completed
Switch off computers and monitors at night	Easy	Owner	\$		
Replace T12 lamps with efficient T8 lamps	Medium	Lighting Contractor	\$\$	Utility rebate \$16/fixture	
install occupancy sensors or time clocks for lighting control	Difficult	Lighting Contractor	\$\$\$	Utility rebate Sil/sensor	
Adjust thermostat setpoints	Medium	Owner or Contractor	5		
Switch off copiers, printers, etc at night	Easy	Owner	5		
Addess load spikes and erratic behavior in daily load profiles	Medium	Contractor and owner	55		



### **Element 5: Check Results**

Requires:

- Updated monthly and/or hourly data
- 30-60 minutes

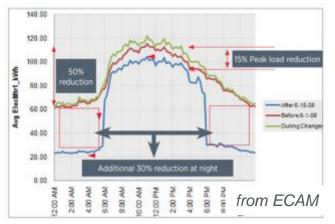
A) How much energy as been saved?

*B)* Can we verify changes to scheduling?

- C) Further steps to energy efficiency
- D) Leveraging success in future sales opportunities



from Noesis







#### **EMP is one option for 2030 Districts**



