



City of Austin Municipal Operations

Renewable Energy



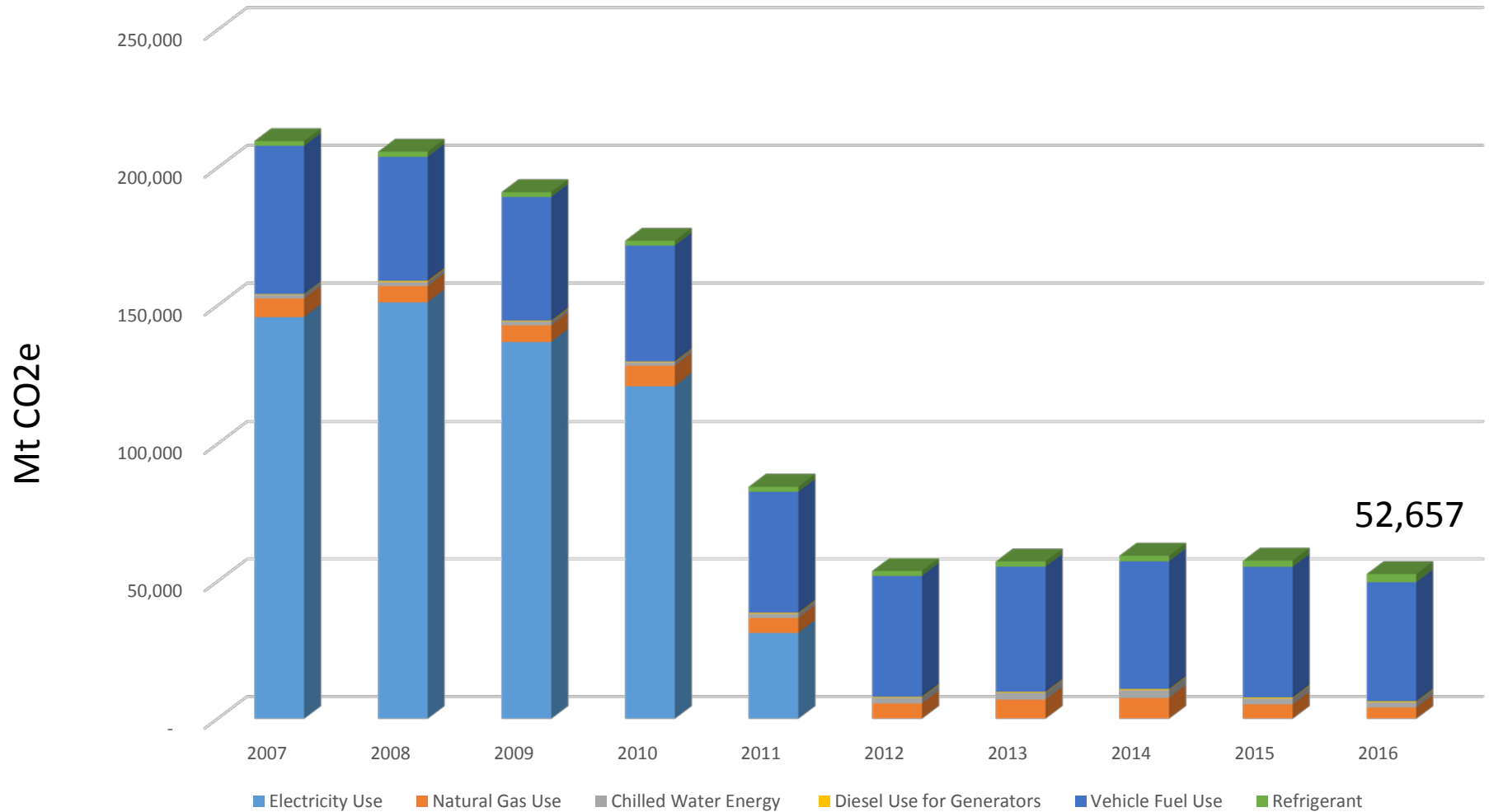
OFFICE OF
SUSTAINABILITY

CITY OF AUSTIN

Outline

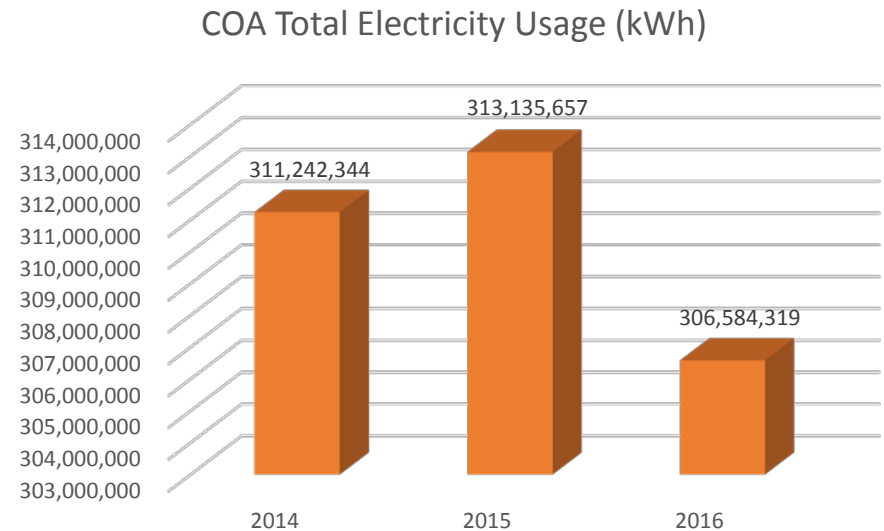
- Municipal Operations Carbon Footprint
- GreenChoice
- Solar on City Facilities
- Energy Efficiency Efforts
- Moving Forward

2007-2016 City of Austin Municipal Operations Carbon Footprint



The Carbon Math

- Over 80% of municipal electricity use is Austin Water
- 1 lb CO₂ / kWh = 139,000 metric tons CO₂
- Eliminating the Emissions
 - Carbon offsets at \$35/ton = \$4,865,000
 - Renewable Energy Credits (RECs) at 1 cent/kWh = \$3,065,843
 - GreenChoice = \$2,900,000



Questions about GreenChoice

- Is purchasing renewable energy backed by RECs a valid strategy for reducing an end-user's carbon footprint? – **YES**
- Do utility-scale wind investments avoid additional carbon emissions? - **YES**
- Is purchasing GreenChoice energy a valid carbon mitigation strategy? - **YES**
- Can City departments use both RECs and offsets to meet their carbon neutral operations goal? - **YES**

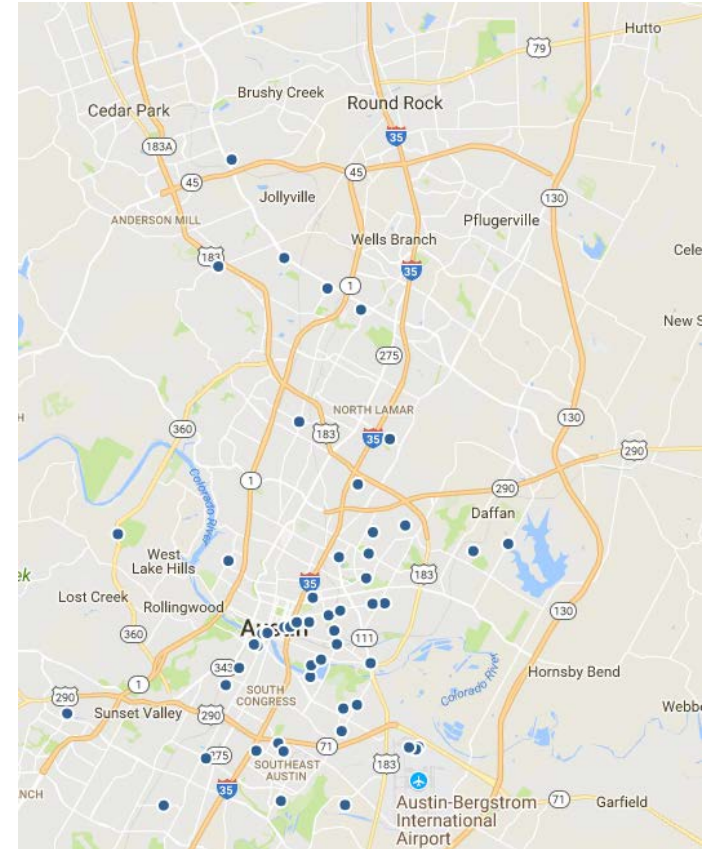
Solar on City Facilities

There are approximately 250 City of Austin Facilities

- The top 100 facilities capture 90% of employees
- Long tail of small buildings, facilities, and land
 - Office Buildings
 - Industrial Facilities (energy / water)
 - Service Centers, Warehouses and Yards (fleet / public works)
 - Libraries
 - Police Stations
 - Fire and EMS Stations
 - Parks, Neighborhood Centers, Rec Centers
 - Community Health Facilities
 - Airport
 - Convention Center

Current Municipal Solar Installs

- 58 City facilities with solar, totaling 1.5 MW-ac
 - Everything from libraries, to police stations, to fleet service centers
- 24 systems (230 kW) installed over 10 years ago, primarily small demonstration projects
- Austin Energy paid for all but Carver Library, which received ARRA funding



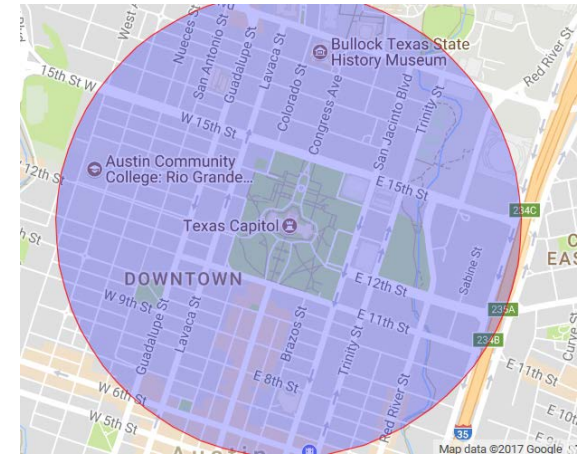
Benefits of Solar on City Facilities

- Help meet local solar goals
- Lead by example
- Option to avoid GHG emissions
- Reduced departmental electric bills, **but** large upfront capital costs
- Future potential: Resilience in a disaster if combined with a battery
 - Police / Fire / EMS
 - Community and Neighborhoods Centers



Solar Needed to meet Municipal Electricity Use

- Current COA Electric Use: 306,000 MWh/yr
- Would need ~**170 MW** of solar PV
 - Would only match the annual kWh amount, not real-time usage or demand
 - ~6x the size of the Webberville solar project, or equivalent to 68 Kingsbery Community Solar projects
- Requires **390 acres** of unshaded rooftops, more if ground
- Installed cost at \$2,400/kW would be **\$408 million**
 - 6x the amount of incentives AE has paid through solar incentive program 2004 to present
 - 4x AEs annual transfer to the general fund



390 acres compared to Capital

Example: Doris Miller Recreational Center

2300 Rosewood Ave

Annual Consumption = 320,600 kWh

Electric Rate = \$.0564/kWh
(without GreenChoice)

Electric Rate = \$.07275/kWh
(with GreenChoice Patron 15)

With Solar

Solar Potential = 50 kW

Annual Production = 70,500 kWh

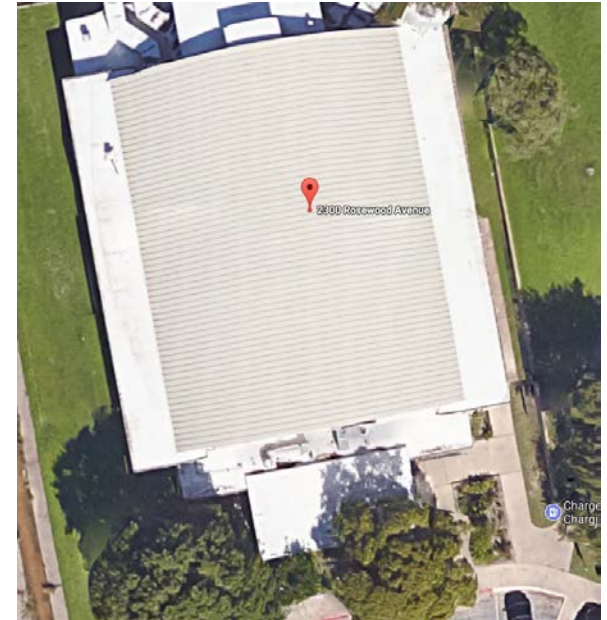
Percentage of consumption covered by PV = 22%

Cost at \$2,400/kW = \$115,300

25 yr Levelized Cost of Energy (LCOE)= \$.081/kWh

Annual bill reduction = \$4,700

Simple Payback = 29 years



Example: Yarborough Branch Library

2200 Hancock Drive

Annual Consumption = 245,440 kWh

Electric Rate = \$.0564/kWh
(without GreenChoice)

Electric Rate = \$.0661/kWh
(with GreenChoice Patron 17)

With Solar

Solar Potential = 35 kW

Annual Production = 49,350 kWh

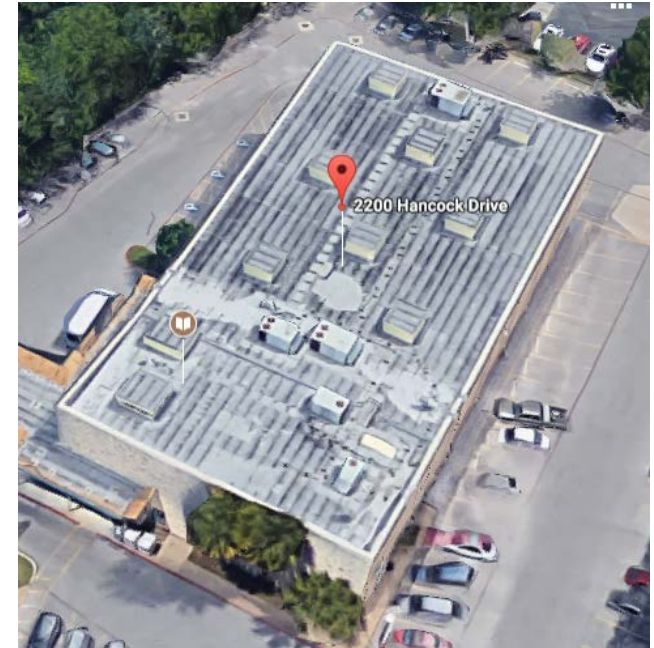
Percentage of consumption covered by PV = 20%

Cost at \$2,400/kW = \$80,700

25 yr Levelized Cost of Energy (LCOE)= \$.081/kWh

Annual bill reduction = \$3,300

Simple Payback = 29 years



Funding & Financing Possibilities

- Capital Improvement Funds
- Departmental Operating Budgets
- SECO – LoanSTAR low-interest loan
 - COA has already hit limit of 2 loans per entity
- Municipal bond
- Federally subsidized bonds (CREBs or QECBs)
- Sleeved Power Purchase Agreement through AE

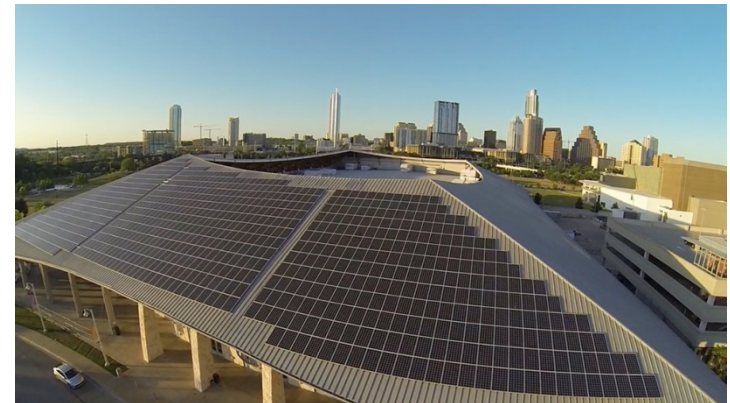
Community Solar Participation



- Subscribe
 - Buy energy from Community Solar program
 - No upfront cost
 - Currently a 1.5 cent/kWh premium, but locked-in rate
 - Would require significant expansion of program to meet all COA's energy use, several years to build projects

- Host

- Install community solar projects on COA buildings to provide solar to subscribers who can't install solar at their own homes
- Costs borne by participating customers
- Continues to power COA facilities with 100% renewable GreenChoice, while also helping expand access to solar in Austin



GreenChoice vs Solar

Green Choice	Rooftop Solar
\$0.038-\$0.044/kWh fixed rate in place of PSA	\$2.40/Watt
Total volumetric rate of \$0.066-\$0.072	LCOE of \$0.081/kWh over 25 yrs
No upfront cost	Upfront capital cost of \$408 MM
Annual O&M cost of \$2.9 MM	Annual O&M savings of \$17 MM

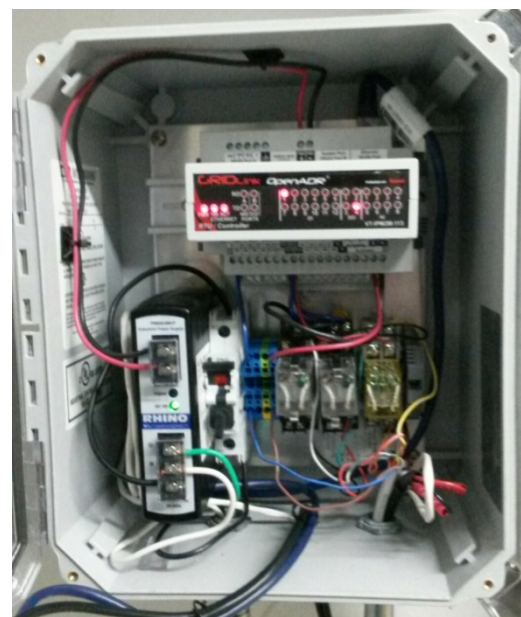
Municipal Energy Efficiency

- In existence since <1990 (over 25 years)
- Over \$26 million in projects (not including solar)
- Savings exceeding \$4.5 million per year
- Historical Funding Sources
 - LoanSTAR, Municipal Bonds, ARRA,
 - Rebates, Departmental funds
- Examples
 - LED Traffic Signals, TES at ABIA, Domain, Technicenter
 - Multiple lighting retrofits, biogas generator, chillers/controls, various pilot projects



Municipal Energy Efficiency

- Coordinating efforts with office of sustainability
- Coordinating commercial rebates for COA
- Expanding Automated Demand Response (DR)
 - Currently at 4 facilities, 5 in progress,
 - Up to 10 more planned
- Retro-commissioning assessment
 - Identified savings over \$350,000/yr
- Remote Energy Audits
- Energy monitoring/advisory effort



Auto DR Equipment

Summary

- GreenChoice
 - Cost effective way to reduce electricity emissions to zero
 - Energy comes from Texas wind projects
 - Supports utility and City renewable energy goals
- Solar on City facilities
 - We would need a LOT of solar to fulfill our needs
 - Would require significant upfront capital outlay
 - Could not meet needs with rooftop solar alone
 - May make sense to focus on solar for resilience and disaster preparedness for critical facilities
- Energy Efficiency at City facilities
 - Continue to look for opportunities to reduce energy use and peak demand at City facilities

Recommendations

- Continue on GreenChoice
 - To reduce emissions in the most cost effective manner
 - Prevent cost-shifting to other Austin Energy customers
- Complete a Municipal Facility solar feasibility study to assess City's rooftop potential
- Investigate adding more solar on City facilities
 - Where it is cost effective
 - In ways that can leverage tax incentive or funding opportunities
 - To integrate into the community solar program
 - Where we can integrate battery backup to boost community resilience

APPENDIX

City of Austin on GreenChoice

GreenChoice Highlights



- 2007 Climate Protection Plan required all municipal facilities powered by renewable energy by 2012
 - 7% of Green Choice accounts but ~40% of MWH sales attributed to COA (FY16)
 - Contributes to 2020 carbon neutral goal
 - Supports LEED Silver requirement

Benefits of GreenChoice

- Supports AE's renewable and affordability goals
- Easy and affordable
- No upfront costs to the City
- Provides for LEED Credits
- Reduces the PSA for all customers
- Spurs the renewable industry in Texas

Additionality

- Additionality is a term used in markets for tradable greenhouse gas (GHG) emissions reductions (carbon offsets).
- It means that a project or activity that reduces GHGs would not have happened without the offset buyer or collective buyers in the market.
- In a business-as-usual scenario—where the market for offsets didn't exist—the project would not have taken place.
- ***While it is one of the most important qualities for carbon offset projects, additionality is not required for renewable electricity generators to create Renewable Energy Certificates (RECs).***
- ***Additionality is not required in order for REC buyers to claim use of renewable electricity, or the reduced carbon footprint that comes from switching to renewable electricity.***