MEMORANDUM

Date: October 12, 2018

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Additional Material for the Board of Supervisors October 16, 2018 Meeting Agenda Item Number 13, 2018 Sustainable Action Plan for County Operations**

As a follow up to my October 16, 2018 memorandum, I am providing a breakdown of cost savings achieved from the implementation 2014 Sustainable Action Plan for County Operations (SAPCO) as well as implementation information for the 2018 SAPCO. Appendix 1 is further information in support of a bulleted list of highlighted accomplishments achieved under the first (2008) and second (2014) iteration of the SAPCO (Attachment 1).

I. Avoided Costs (2014-2018)

Staff have calculated that $14 million in avoided costs were accrued over four years from the following efforts:

- $80,125 in Renewable Energy savings
- $8 million through Energy Efficiency Improvements to County properties
- $1.5 million through strategic changes in Meter Rate Plans
- $4.46 million through the Employee Tobacco Cessation Program

This list does not include all of the cost savings resulting from Pima County's sustainability efforts, many of which are not tracked or reported directly through the Annual SAPCO Report Card; avoided fuel and maintenance costs that resulted from route optimization efforts by Fleet Services; cost savings from energy conservation efforts in County buildings like turning off lights, etc. The following is an overview of the data sources and analyses used to further explain the savings that were reported:

1. Renewable Energy ($80,125)

Pima County saved money by purchasing solar electricity through solar service agreements. Overall, electricity purchased through the County's solar service agreements is less expensive than traditional power purchased from the electricity grid. The cost savings from renewable energy was generated by using cost and consumption data provided by Facilities Management (Facilities). This data was used to determine how much the County would have spent if the

electricity purchased through solar service agreements had instead been purchased from the electricity grid, the difference being the amount saved.

2. Energy Efficiency Improvements ($8 million)

Based on annual avoided cost estimates of $1 million provided to the Pima County Energy Manager by consultants for energy efficiency projects completed in 2010. The projects were completed at no cost to the County using Energy Conservation Block Grant funds. An analysis completed by the Office of Sustainability and Conservation shows a 38 percent energy efficiency improvement in County buildings compared to 2008, indicating the cost savings estimate is likely very conservative.

3. Strategic Changes in Meter Rate Plans

In 2014, Facilities contracted with Cost Control Associates (CCA) to audit all of the gas, water and electricity utility bills that Pima County receives. As a result of the audit recommendations, Facilities reassigned nine of the County's larger accounts to Tucson Electric Power general service demand rate from a non-demand rate. The change was estimated by CCA to save approximately $500,000 per year, accumulating $1.5 million in avoided cost since the changes were made.

4. Employee Tobacco Cessation ($4.46 million)

The use of tobacco by Pima County employees has significant health consequences, that result in reduced productivity and increased insurance costs. This cost saving figure was generated using national statistics from the Center for Disease Control (CDC) regarding the average costs of $3,500 saved by an employer for each employee who quits smoking. This figure was multiplied by annual changes in the number of self-reported tobacco users to produce the final figure.

II. Implementing the 2018-2025 SAPCO aligned BOS Climate Resolutions 2017-39 and 2017-51

The US economic costs associated with the impacts of rising temperatures will increase 50 percent by 2027 to $360 billion annually, which is estimated to be about 55 percent of economic growth (Bloomberg, 2017). Pima County will not be immune to this drag on the economy or direct costs associated with combatting climate change regionally. Furthermore, the recent major report by the United Nations Intergovernmental Panel on Climate Change, declared that avoiding a climate crisis as early as 2040, or within 12 years, will require unprecedented global effort to transform economies to low carbon solutions.

Recognizing the urgency of these circumstances, Pima County along with 280 other cities and counties; 2,142 businesses and investors; and 345 colleges and universities across the United States have pledged to uphold and work towards meeting the carbon cutting goals and climate

adaptation objectives of the Paris Agreement. Through the strategies outlined in SAPCOs five chapters -- Carbon, Water, Landscapes, Materials and Workforce – the County is committing to building climate solutions through cutting greenhouse gas emissions, conserving water and land, supporting increased food security, and preparing our work force for climate extremes.

1. Carbon

Core targets in the Carbon Chapter include: 1) Reducing the carbon emissions from County facilities by 50%; 2) Reducing carbon emissions from the County fleet by 10% in non-electric vehicles and replacing up to 120 gas sedans with electric vehicles; and 3) Reducing carbon emissions from solid waste generation by 10%. An estimate of carbon reductions and associated avoided costs were calculated by staff and provided on Page 3, Table 1 (Attachment 2) of the Pima County Board of Supervisors Climate Change Resolution 2017-39 & Resolution 2017-51: Report and Recommendations to meet The Paris Agreement and slightly revised in the Pima County GHG Analysis 2018 (Attachment 3). Through implementing the recommended strategies by 2025 the County could reduce its greenhouse gas emissions (GHGs) by approximately 88,381 metric tons[i] of carbon dioxide equivalents (MT CO_2e), slightly more than required to reach the County's Paris Agreement Target of 78,832 MT CO_2e. Staff estimated that these actions would result in an approximate cost savings of $4.16 million per year[ii] when fully operationalized. The 2017 Energy Management Plan developed by Facilities Management[iii] details the strategies and priorities for reducing energy use. It is highly notable that staff determined the County has been consistently successful in reducing carbon emissions associated with facilities and between 2005 and 2016, Facilities has cut emissions per square foot by 34 percent.[iv]

Fleet Services has produced a strategic plan[v] to reduce carbon emissions associated with the County's fleet. Strategies include: assessing departments a surcharge for excessive idling, removing underutilized vehicles from departmental motor pools, downsizing departmental vehicles to smaller and more fuel efficient models, adding a surcharge for four-wheel drive vehicles and purchasing 120 electric vehicles over seven years. These efforts will all result in additional cost savings.

2. Water

Core targets in the Water Chapter include: 1) Reducing potable water use across all County facilities by 15%; and 2) Monitor the use of reclaimed water for groundwater recharge. This chapter reflects a modest 5% increase for a total of 15% reduction in potable water use, compared to the 2014 version of SAPCO that targeted a 10% reduction. The implementation strategy proposed by Facilities is to continue the process of replacing older, inefficient bathroom fixtures with more efficient ones and sub-meter water systems during building retrofits; replace aging chillers and reduce open cooling systems during daylight hours. These last two strategies are detailed in the 2017 Energy Management Plan.

Pima County Regional Wastewater Reclamation Department (RWRD) has been involved in groundwater replenishment since 1979, a process that is governed by an IGA from the Southern Arizona Water Rights Settlement Act. The County receives credit for its long-term storage account as a result of groundwater recharge activities. The details are reported annually by the RWRD in the Effluent Generation and Utilization Report.[vi]

3. Landscapes

The Landscapes Chapter is segmented into four areas that reflect and support the County's long-term commitment to conserving important landscapes. The Natural Areas and Cultural Resource sections report on continuing efforts in these areas are supported through voter approved general obligation bond programs. Two new sections, Urban Areas and Food Systems were introduced in this iteration of SAPCO to address climate adaptation needs. The Urban Areas Targets were developed through a collaborative, cross-departmental planning process. Additionally, six department identified 43 sites for installing green infrastructure and trees. Members of a green infrastructure by Pima County Environmental Quality undertook two pilot projects, to model the triple-bottom line costs and benefits of green infrastructure during the past year. These are detailed in the Climate Adaptation through Green Infrastructure (GI), Low Impact Development and Trees: A GI Action Plan for Pima County (August 3, 2018), produced by PDEQ in collaboration of many staff experts[vii]. Furthermore, staff have been trained on and are continuing to use AutoCase™, a software modeling tool that allows users to calculate the costs for designing, building and maintaining GI sites over time. Costs for GI vary per project based on a number of factors which can include size, location and design parameters. Worth noting is that the results of both AutoCase™ pilot studies, produced a net positive benefit when factors for increased property values, recreation benefits, reduced utility costs (for cooling) and improved air quality were added to the analyses, among other items. Net positive results (net present values) emerged even with the inclusion of standard operation and maintenance costs over a fifty year span. Lastly, the GI Action Plan details a number of potential funding opportunities available through federal grant programs.

4. Materials

The Materials Chapter integrates the previous SAPCO chapters that covered waste reduction and green purchasing includes the following Targets: 1) Reduce the volume/weight of landfill waste by 20%; 2) Recycle 100% of industrial waste; and 3) Increase the percentage of Preferred Green Products purchased by the County by 20%. Staff have been exploring a number of ways to improve recycling at Pima County. According the SAPCO Report Cards from 2014-2017, recycling rates at the County fell consecutively reaching a low in 2017 of 4.7% below the baseline. Additionally, recycling is not currently available in most County parks, stadiums and recreation areas. The single largest hurdle to improving recycling in these operations is the associated cost. To better understand challenges and opportunities associated with recycling and to explore options for cost recovery of more valuable commodities, staff produced a

Proposal to Develop a Scope of Work and RFP to Reduce Waste, Improve Recycling and Cost Effectiveness for County Operations[viii]. Recommendations are under review.

Related to recycling industrial waste, the County is already recycling 100% of its industrial waste as required by state and federal laws, and will continue to do so.

Related to green purchasing, staff worked with vendors to improve websites for ordering preferred products and have developed a green purchasing training program to assist green purchasing representatives with questions. This program will be implemented beginning in January 2019.

5. Workforce

The Workforce Chapter is a new addition to SAPCO, replacing the previous Employee Wellness Chapter and focuses on improving the resilience of the County's workforce under climate change. Targets include: 1) 100% of County employees complete emergency trainings; and 2) 100% of employees download emergency checklist and information handouts. Both Targets will draw upon and integrated materials produced by State and Federal agencies in collaboration with the County's staff experts in Risk and Emergency Management. The cost to design and implement these prevention-focused education programs will be nominal and will reduce employee exposure to climate-related risks like extreme heat and other associated threats.

CHH/lab

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Linda Mayro, Director, Sustainability and Conservation

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[i] Pima County GHG metrics 082718_Final
[ii] Pima County Board of Supervisors Climate Change Resolution 2017-39 & Resolution 2017-51: Report & Recommendations to meet The Paris Agreement, July 11, 2017
[iii] Pima County Facilities Management Energy Management Plan 2017
[iv] Pima County GHG metrics 082718_Final
[v] Memo Re: Pima County Resolution 2017-39 (December 8, 2917)
[vi] Pima County Regional Wastewater Reclamation Department, Effluent Generation and Utilization Report 2017
[vii] Climate Adaptation Through Green Infrastructure, Low Impact Development and Trees: A GI Action Plan for Pima County (Aug. 3, 2018)
[viii] Proposal to Develop a Scope of Work and RFP to Reduce Waste, Improve Recycling and Cost Effectiveness for County Operations

ATTACHMENT 1

Appendix 1.

Highlights of Accomplishments of the 2008 and 2014 Sustainable Action Plans for County Operations

The information below serves as a resource to provide additional background information and context to Pima County's sustainability successes..

- ***13.48 megawatts of solar photovoltaic installed***

What percentage of Pima County's electricity is produced by solar?

Approximately 16% of the electricity the electricity consumed by Pima County was generated by solar.

Where are the solar installations located?

Below is a table listing the location and other details of each site. *Please see Exhibit A for a map*

Location	Generation Capacity (kW)	Installation Date
Sullivan Jackson Employment Center	4.6	July 2009
Agua Nueva Wastewater Reclamation Facility	1,000	August 2010
A-7 Ranch	5.6	March 2011
Tres Rios Wastewater Reclamation Facility	1,100	April 2011
Herbert K. Abrams Public Health Center	206	April 2011
Prairie	5,000	December 2012
Fleet Services	636	November 2014
Pima Emergency Communications and Operations Center	416	December 2014
Adult Probation	199	December 2015
Kino YMCA	339	December 2015
Sheriff Admin	493	December 2015
Kino Service Center	199	May 2016
Interagency Advocacy Center	279	May 2016
Elections	309	May 2016
Nanini Library	224	December 2016
NRPR	265	December 2016
Pima Air and Space	370	December 2016
Curtis Gym	268	January 2017
Juvenile Courts	1,247	March 2017
Medical Examiner	272	May 2017
Kino Sports Complex Club House	187	August 2017
Kino Sports Complex Stadium	468	August 2017

- ***5 buildings have received LEED silver certification or higher***

What is LEED?

Leadership in Energy and Environmental Design, or LEED, was developed in 2000 by the U.S. Green Building Council (USGBC). LEED is a set of rating systems that promote, identify, and implement green building design, construction, operations, and maintenance. This certification offers a third-party verification that the design, construction, operations, and maintenance of a building, home or community achieve high performance in areas of human and environmental health.

LEED measures nine key areas of human and environmental health. These areas include sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality, locations & linkages, awareness & education, innovation in design, and regional priority. These measurements are evaluated by and certification is awarded by the Green Building Certification Institute (GBCI).

Which buildings have received LEED silver certification or higher?

- Jackson Employment Center – LEED Gold 2010
- Pima County Fleet Services Facility – LEED Gold 2015
- Sporting Chance Center – LEED Gold 2015
- Central Laboratory Complex – LEED Silver 2013
- Public Service Center – LEED Silver 2015

- ***Nearly 15,000 acre feet of reclaimed water used for groundwater recharge since 2008***

What is groundwater recharge?

Groundwater recharge is a hydrologic process where water moves downward from surface water to groundwater. It is the primary method through which water enters an aquifer. Recharge occurs both naturally (through the water cycle) and through anthropogenic processes (i.e., "artificial groundwater recharge"), where rainwater and or reclaimed water is routed to the subsurface.

- ***More than 170,000 Mt C02e emissions avoided***

How was this number calculated?

OSC calculated the annual carbon intensity of County Operations (total carbon emissions/ ft^2 of building space) for each year starting in 2007. Avoided emissions were then calculated based on reductions in annual emissions per square foot.

Avoiding the emission of 170,000 Mt CO2e is equivalent to preventing over 84,300 Metric tons of coal from being burned or taking 36,400 passenger cars off the road for one year.

What do we mean by "avoided emissions?"

Avoided emissions are the emissions we avoid (or the emissions benefits) by implementing sustainability measures, e.g. green power, building efficiency, fleet efficiency, etc.

- ***Addition of hybrid and fully electric vehicles in the County's fleet***

What was the impetus to electrify our Fleet?

Purchase of electric vehicles is in accordance with a 2017 memo directing Pima County Fleet Services to replace 120 gasoline sedans with fully electric vehicles by 2025 or sooner.

- ***83,850 acres of natural open space lands conserved***

Where are these conserved open space lands?

Please see Exhibit B for a map

- ***604 acres of riparian areas restored***

What are the completed restoration projects to-date?

- Arroyo Chico Multi-Use Project
- Big Wash Restoration
- Cañada del Oro Ecological Reconnaissance
- Cienega Bottomlands Restoration Project
- Cortaro Mesquite Bosque Construction Project
- Kino Environmental Restoration Project (KERP)
- Pantano Jungle Restoration Project
- Paseo de las Iglesias Phase I: Santa Cruz River Bank Protection, Ecosystem Restoration, and Linear Parkway, Ajo Way to Silverlake Road
- Rillito River/Swan Wetlands Ecosystem Restoration Project
- Lower Santa Cruz River Living River Project

What is a riparian area?

Riparian areas are the areas bordering rivers and other bodies of surface water. They include the floodplain as well as the riparian buffers adjacent to the floodplain. Riparian areas provide many environmental and recreational benefits to streams, groundwater and downstream land areas.

What does the term "restored" mean?

Ecological restoration is the practice of renewing and repairing degraded, damaged, or destroyed ecosystems and habitats in a given environment through active human intervention and action.

- ***Four historic properties restored or adaptively reused***

Which historic properties were restored?

- Linda Ave House
- Jelks House/ Stables
- Canoa Ranch Foreman's House
- CCC Headquarters Building at Colossal Cave

- ***17 percent increase in the beneficial use of RWRD biogas since 2008***

What does beneficial use mean?

Beneficial use refers to methane recovery and purification for use as a fuel source in the wastewater treatment process. Methane that is not recovered and used in this way is flared and otherwise wasted.

- ***More than $14 million saved in avoided costs***

How was the avoided cost calculated?

Here is a breakdown of the more than $14 million in avoided costs:

- $80,125-Renewable Energy
- $8,000,000- Energy Efficiency Improvements
- $1,500,000- Strategic Meter Rate Changes
- $4,466,000-Employee Tobacco Cessation

This list does not include all of the cost savings that also resulted from Pima County's sustainability efforts, many of which are harder to calculate (e.g. avoided fuel and maintenance costs that resulted from route optimization efforts by Fleet Services; cost savings from energy conservation efforts in County buildings like turning off lights; etc.). To help further explain the savings that were reported, I've provided an overview of the data sources and analyses used, below.

Employee Tobacco Cessation ($4,466,000)

The use of tobacco by Pima County employees has significant health consequences that result in reduced productivity and increased insurance costs. This cost savings figure was generated using national statistics from the Center for Disease Control (CDC) regarding the average costs of $3,500 saved by an employer for each employee who quits smoking. This figure was then multiplied by annual changes in the number of self-reported tobacco users to produce the final figure.

Renewable Energy ($80,125)

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than traditional power purchased from the electricity grid. The cost savings from renewable energy was generated by using cost and consumption data provided by Facilities Management. These data was used to determine how much the County would have spent if the electricity purchased through its solar service agreements had instead been purchased from the electricity grid, with the difference being the amount saved.

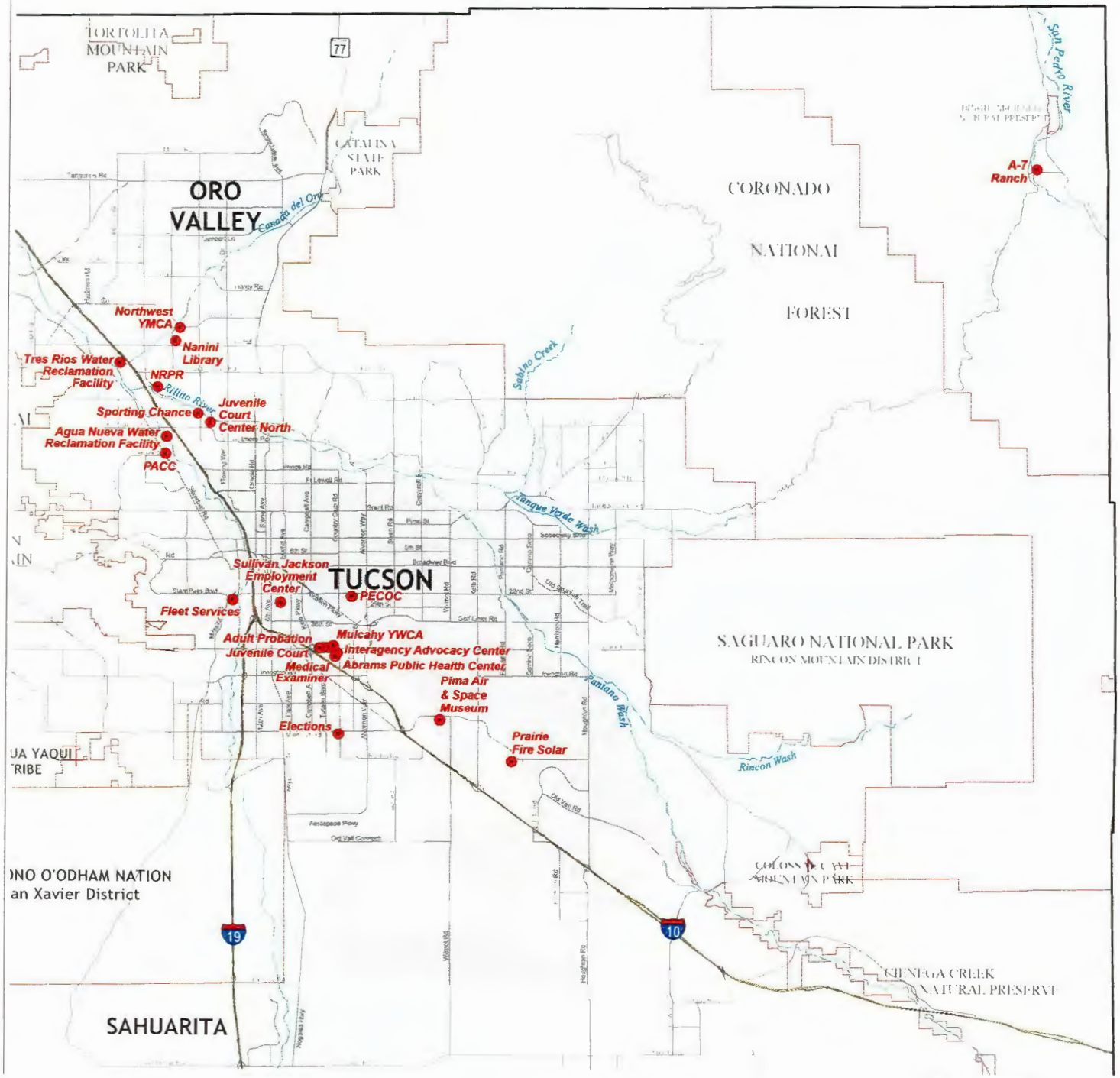
Energy Efficiency Improvements ($8,000,000)

Based on annual avoided cost estimates ($1 million/yr) provided to Marc Lynn by consultants for energy efficiency projects completed in 2010. The projects were completed at no cost to the County using Energy Conservation Block Grant funds. An analysis completed by OSC shows a 38% energy efficiency improvement in County buildings compared to 2008 indicating the cost savings estimate is likely very conservative.

Strategic Meter Rate Changes ($1,500,000)

In 2014 Facilities Management (FM) contracted with Cost Control Associates (CCA) to audit all of the gas, water and electricity utility bills that Pima County receives. As a result of the audit recommendations, FM reassigned nine of the County's larger accounts to TEP's general service demand rate from a non-demand rate. The change was estimated by CCA to save approximately $500,000 per year, accumulating $1,500,000 in avoided cost since the changes were made.

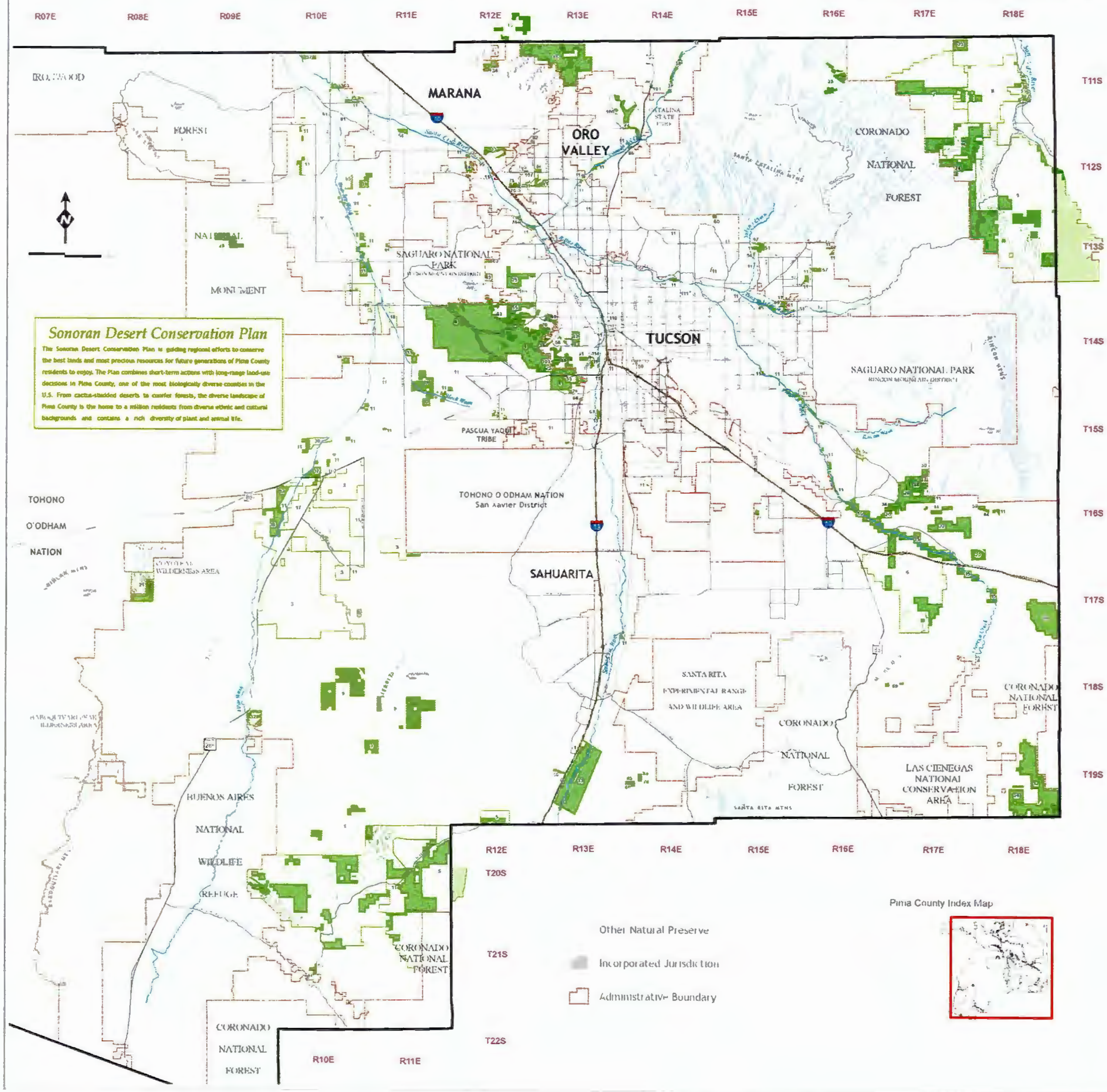
PIMA COUNTY SOLAR ENERGY INSTALLATIONS



- Solar Sites
- Towns and Cities

Pima County Preserves

Lands Owned or Managed by Pima County for Open Space, Habitat, and Resource Protection



County Preserves

- Fee Land or Conservation Easement
- Grazing Lease or Management Agreement

Map ID	Name	Acres
1	A7 Ranch	[illegible]
2	Rancho Seco	[illegible]
3	Diamond Bell Ranch	[illegible]
4	Tucson Mountain Park	[illegible]
5	Sopori Ranch	[illegible]
6	Bar V Ranch	[illegible]
7	Six Bar Ranch	[illegible]
8	M Diamond Ranch	[illegible]
9	Marley Ranch	[illegible]
10	Tortolita Mountain Park	[illegible]
11	FLAP	[illegible]
12	Sands Ranch	[illegible]
13	Canoa Ranch	[illegible]
14	King 98 Ranch	[illegible]
15	Cienega Creek Natural Preserve	[illegible]
16	Tucson Mountain Ranch	[illegible]
17	Buckelew Properties	[illegible]
18	CAVSARP	[illegible]
19	Empirita Ranch	[illegible]
20	Colossal Cave Mountain Park	[illegible]
21	Old Hayhook Ranch	[illegible]
22	Cienega Corridor	[illegible]
23	Gracie Ridge	[illegible]
24	Bushman Canyon	[illegible]
25	Sweetwater Preserve	[illegible]
26	Clyne Ranch	[illegible]
27	Honey Bee Biological Corridor	[illegible]
28	Lords Ranch	[illegible]
29	Walden	447.3
30	City Of Tucson/NRG CLS Off-Site Mitigation	426.7
31	38th Street Corridor	[illegible]
32	Madera Highlands	[illegible]
33	Cascada North Donation	[illegible]
34	Agua Verde Creek	[illegible]
35	Ajo	350.7
36	Cochie Canyon	[illegible]
37	Oracle/Ina	[illegible]
38	Catalina Regional Park	[illegible]
39	Bingham Cienega Natural Preserve	[illegible]
40	Painted Hills	[illegible]
41	Arthur Pack Regional Park	[illegible]
42	Tumamoc	[illegible]
43	Frick	272.4
44	Mumford	[illegible]
45	Tanque Verde Creek	[illegible]
46	Los Morteros	[illegible]
47	Rancho Del Cielo	[illegible]
48	Ben	[illegible]
49	Andrada	[illegible]
50	Wendt	[illegible]
51	Swanson Donation	[illegible]
52	Estates at Old Spanish Trail	[illegible]
53	Avra Open Space	[illegible]
54	Lower Santa Cruz Replenishment	[illegible]
55	CPR-OSTMP1	[illegible]
56	Starr Pass Restore Easements	[illegible]
57	Drachman Regional Park	[illegible]
58	Tracy	[illegible]
59	Patrell	[illegible]
60	Elephant Head Sec.15 Mt. Lands (Kinsey)	[illegible]
61	Tanque Verde & Houghton Partners LLC	[illegible]
62	Malcolmson Donation	[illegible]
63	Marana Cottonwoods	[illegible]
64	Tierra Rancho Grande	72.1
65	City Of Tucson/NRG CLS On-Site Mitigation	[illegible]
66	Escondido Wash	[illegible]
67	Valencia site	[illegible]
68	PCDOT Mitigation Land	[illegible]
69	Southeast Corridor	[illegible]
70	Dos Picos	[illegible]
71	Cultural Resource Parcel	[illegible]
72	NRPR	[illegible]
73	Southeast Regional Park	[illegible]
74	Canoa Ranch Phase II	[illegible]
75	Carlota/Hallman	[illegible]
76	De Anza Donation	[illegible]
77	Avra Valley I-10 Wildlife Corridor	[illegible]
78	Elephant Head Sec.15 Mt. Lands (Easely)	[illegible]
79	Manzanita Park Extension	40.4
80	Nancy	[illegible]
81	Park	[illegible]
82	Esther And David Tang	[illegible]
83	Elephant Head Sec.15 Mt. Lands	[illegible]
84	Rancho Agua Verde	[illegible]
85	Picture Rocks District Park	[illegible]
86	South Wilmot LLC	[illegible]
87	Agua Caliente Creek	[illegible]
88	Eskota Wash	[illegible]
89	Doucette	[illegible]
90	Habitat 36th & Kino	[illegible]
91	DOT Section 7	[illegible]
92	Hubbard Donation	[illegible]
93	Realty Rezoning - CLS Off Site Mitigation	[illegible]
94	Bear Creek Ranch	[illegible]
95	Continental Ranch Development LLC	[illegible]
96	Steam Pump Ranch	[illegible]
97	Sneed Parcel	[illegible]
98	San Domingo Head Prime Area	[illegible]
99	Highway 77 Wildlife Overpass ROW	[illegible]
100	Honey Bee Village Preserve	[illegible]
101	Treehouse	[illegible]
102	Robles Ranch	[illegible]
103	Havens Donation	[illegible]
104	Tucson Mountain Park Biological Corridor	[illegible]
105	Linda Vista/Patrick Property	[illegible]
106	Mission & 36th Subdivision	[illegible]
107	Reid Parcel	[illegible]
108	Mission Gardens	[illegible]
109	Lazy D Ranch Estates	[illegible]
110	Dunbar School	[illegible]
111	San Pedro Chapel	[illegible]
112	Ajo Train Depot	[illegible]
113	Wahlberg Conservation Easement	[illegible]
114	West Branch Santa Cruz	[illegible]

PIMA COUNTY

7/1/2018

ATTACHMENT 2

Table 1. Proposed list of immediate and near-term carbon mitigation and climate adaptation actions for County operations.

Paris Agreement GHG Target for Pima County Operations 74,332 MT CO2e/Yr[2]					
Actionable Items to Reduce GHG Emissions 2017 - 2025	**kWh Saved/ Yr**	**MT CO2e/ Yr**	**% of Target**	**ROI (Yrs)**	**Avoided Cost (Savings)**
Immediate Priority					
1. Solar: Install 41 MW of Solar at County Facilities	86,739,000	79,000	106%	2	$3,000,000/yr[3]
Near-term Priorities					
2. Energy Efficiency in Buildings & Operations: Improve EE by 20% in 10 Highest Energy Use Buildings (improve water efficiency by 10% is not included in cost calculations).	9,538,000	8,700	12%	0.4 - 2.5	$1,049,000/yr
3. Fleet Efficiency: **a.) Improve Fleet Fuel Efficiency 10% (in non-electric vehicles)**	N/A	590	1%	Varies	$49,000/yr
b.) Replace 120 gasoline sedans with electric vehicles	N/A	91	<1%	<1	$69,000/yr
4. Green Infrastructure/Low Impact Development Stormwater Management with Trees **a.) GI/LID+Trees (proxy = 66,000 SF/1.5 acres rain garden & curb cuts[vii])**	N/A	176[4]	<1%	8	$73,000/yr[5]
b.) Just Trees (10K desert-adapted low VOC)[viii]	970,000[6]	700	1%	NA	$460,000/yr[7]

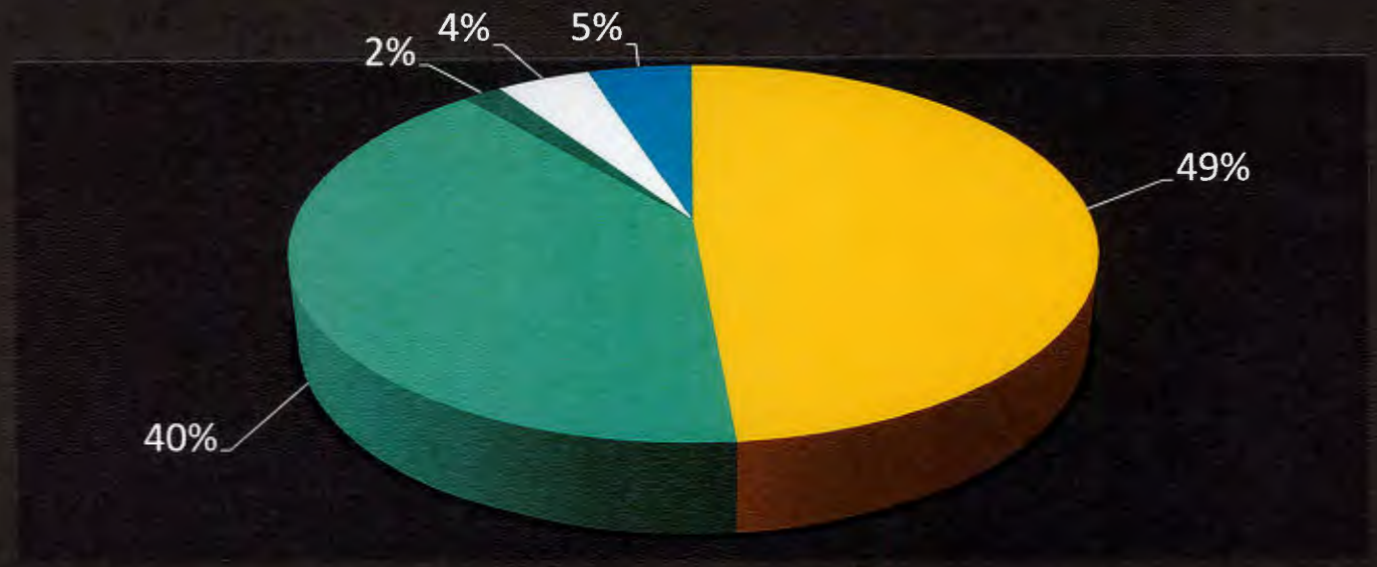
[2] Based on an estimated annual growth
[3] Average annual savings over 20 years
[4] The physical carbon value is 0.267 MT/yr for every 100 square feet of green stormwater infrastructure, approximate 1 tree for every 50 square feet. This includes carbon saved from energy to pump water, shading buildings as well as the carbon sequestered in the tree. (WMG, 2017)
[5] Includes indirect benefits (air quality, flood risk reduction, plus increase in properties values etc.)
[6] Assumes planting near large commercial buildings
[7] Less long-term maintenance

ATTACHMENT 3

Foundational Understanding

- BOS Reso 2017-51:
  - *Reduce greenhouse gas emissions by 26%-28% below the 2005 level by 2025*
    - Pima County Emissions Target to reach PA: **78,832 MtCO2e or below**
  - *Prepare an update to the Sustainable Action Plan for County Operations to reflect the County's alignment with the Paris Agreement.*
- Used PAG methodologies to produce projected GHG emissions and Pima County square-footage for SAPCO

Pima County GHG Emissions (FY 2015 – 16)



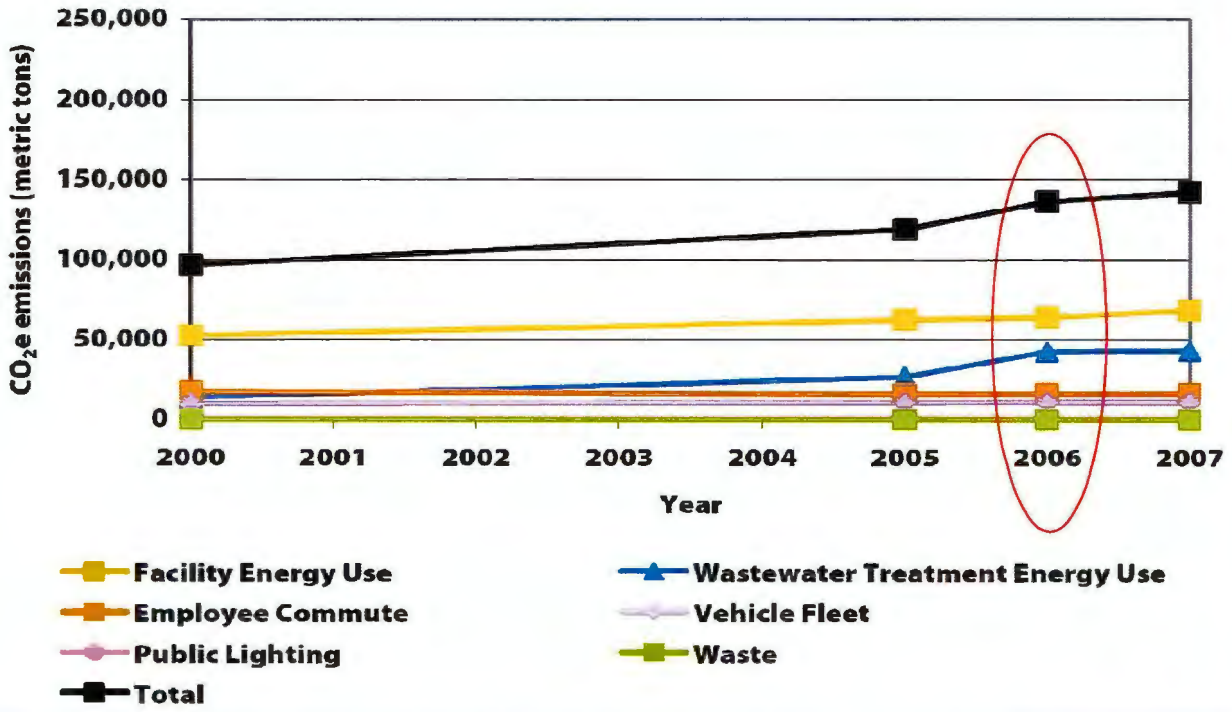
- Buildings and Facilities
- RWRD Electricity and Natural Gas
- RWRD Treatment Process Emissions
- Fleet
- Waste Production

County Total GHG Emissions (FY 2015 – 16)

Source	MT CO2e	Percent of Total
Buildings & Facilities	**64,816**	**49.5%**
RWRD	53,653	41%
Waste	6,546	5%
Fleet	5,904	4.5%
Total	**133,415**	**100%**

County Total GHG Emissions (2000 – 2007)

Figure 11. **County Government GHG Emissions 2000-2007**



Source: PAG Regional Greenhouse Gas Inventory report, 2008

County Buildings & Facilities: GHG Emissions & Square Feet

	2005	2016	2025 (projected)
GHG Emissions	65,056 MtCO2e	64,816 MtCO2e	89,723 MtCO2e*
Total Ft2	4,107,755	6,099,289	7,261,017**
Emissions/Ft2	35 lbs/Ft2	23 lbs/Ft2	27 lbs/Ft2
% change in GHG emissions		-0.03%	38%
% change in emissions/Ft2		-34%	17.4%

*Based on annual average GHG Δ 2000-2016, approximately 2%/ yr
**Based average percent change between 2000-2007 and 2013-2014

Total County GHG Emissions & PA Target

	2005	2016	2025 (projected)	PA Targets
Total GHG Emissions	106,530 MtCO2e	133,415 MtCO2e	159,444 MtCO2e	Total County GHG Emissions Target to Reach for PA: 78,832 MtCO2e = 41% reduction of 2016 baseline emissions to meet PA 26% below 2005

Total GHG Emission Reduction Strategies

Reduce overall greenhouse gas emissions by 26-28 % below the 2005 level by 2025

Total County GHG Emissions Target to Reach for PA: 78,832 MtCO2e or below		
Strategy	**MT CO2e/ Yr Avoided**	**% of Target**
Install 41 MW of Solar at County Facilities	79,000	**98%**
Improve EE by 20% in 10 Highest Energy Use Buildings[1]	8,700	**11%**
Improve Fleet Fuel Efficiency 10% (in non-electric vehicles)	590	**1%**
Replace 120 gasoline passenger sedans with an electric alternative (EV)	91	**<1%**
GI/LID+Trees (proxy = 66,000 SF/1.5 acres rain garden & curb cuts	176	**<1%**
Just Trees (10K desert-adapted low VOC) [2]	700	**<1%**

1. Based on average efficiency increase from recommissioning/ retro-commissioning
2. Assumes trees are planed near large commercial buildings

Suggested Revisions:

- SAPCO Core Area "Buildings and facilities" will be renamed "Buildings, Facilities and Wastewater Treatment"

- SAPCO annual report cards will track aggregate CO2e and CO2e/Ft2 to accommodate for square-footage growth

- **U.S. and Pima County ledged to reduce emissions by 26%-28% relative to 2005 levels.**