

San Antonio for a More Sustainable Tomorrow

Thursday, April 28, 2016
(Revised April 29, 2016)

Presented By

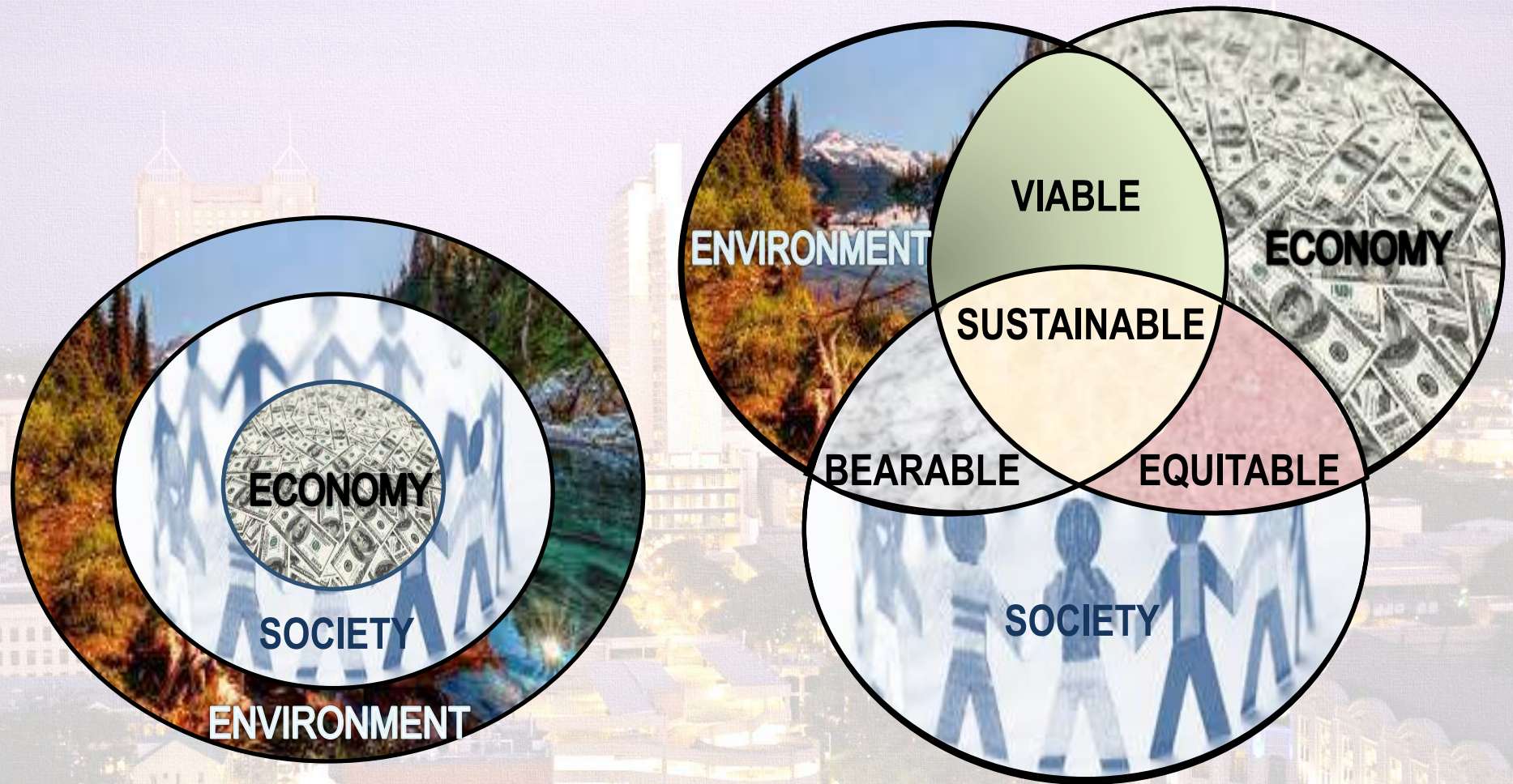
UTSA.
Architecture,
Construction
and Planning

To



**SIERRA
CLUB**
FOUNDED 1892

STRONG vs. WEAK SUSTAINABILITY



“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Our Common Future, a.k.a. the Brundtland Report, United Nations World Commission on Environment and Development (WCED), 1987

KEY ISSUES SELECTED

- Biodiversity
- Water
- Greenhouse Gas Emissions
- Land Use
- Solid Waste
- Urban Heat Island
- Equity



BIODIVERSITY

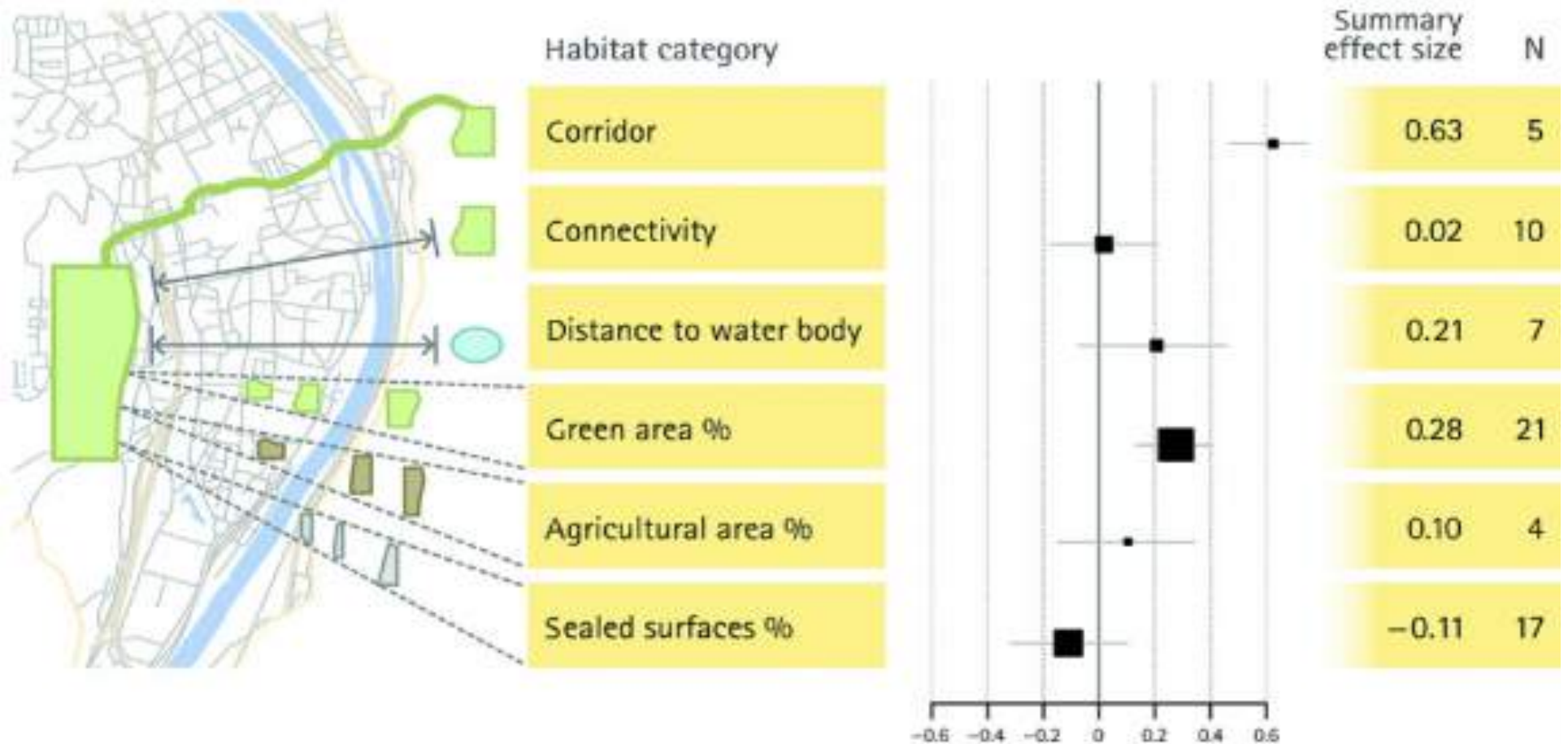


**Biodiversity can be seen
... as a 'life insurance
policy for life itself'.**

Source: Water, Energy, Health, Agriculture and Biodiversity (WEHAB) Working Group, A Framework for Action on Biodiversity and Ecosystem Management, August 2002



STRATEGIES TO MAINTAIN HABITAT



“...the most important strategy in maintaining urban biodiversity is to increase the area of habitat patches and ensure a strong network of corridors.”

Source: Beninde, J., M. Veith, and A. Hochkirch. 2015. Biodiversity in cities needs space: a meta-analysis of factors determining intra-urban biodiversity variation. *Ecology Letters*. DOI 10.1111/ele.12427.

EXAMPLES OF CORRIDOR HABITAT PRESERVATION STRATEGY IN SAN ANTONIO



Phil Hardberger Park
Wildlife Land Bridge



Howard W. Peak Greenway Trails System

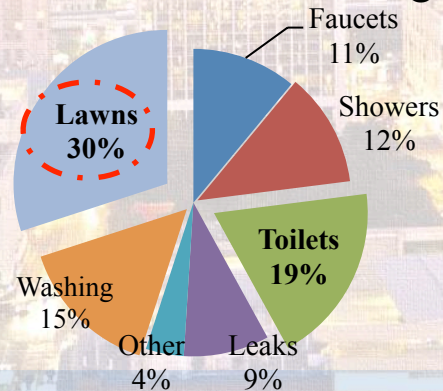
WATER

Water Resiliency:

- Less reliance on Edwards Aquifer and a more diverse water-supply portfolio
- Water conservation and stormwater management at a local level
- Targeting residential lawns as highest user of municipal water



US Residential Water Usage



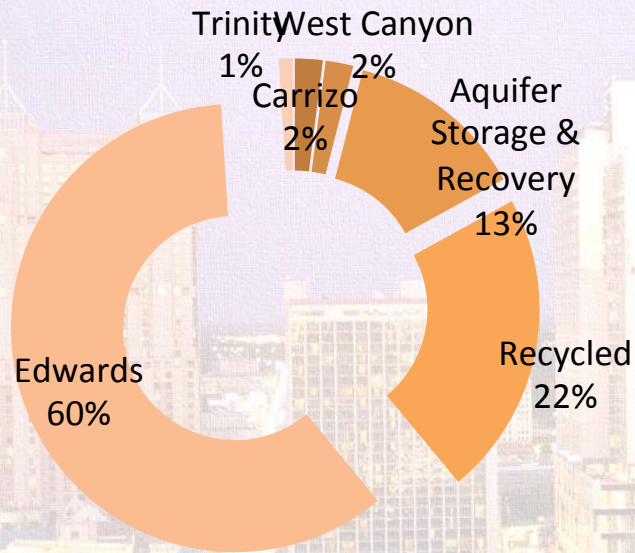
DID YOU KNOW?

Even a 5% reduction in all residentially irrigated lawns across Bexar could save approximately 8 million gallons of water per year.

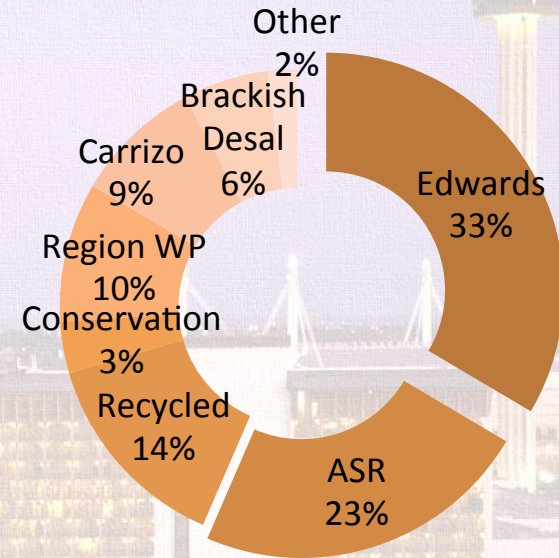
**Based on 22 inches of irrigation per acre per year

OUR CURRENT STATUS

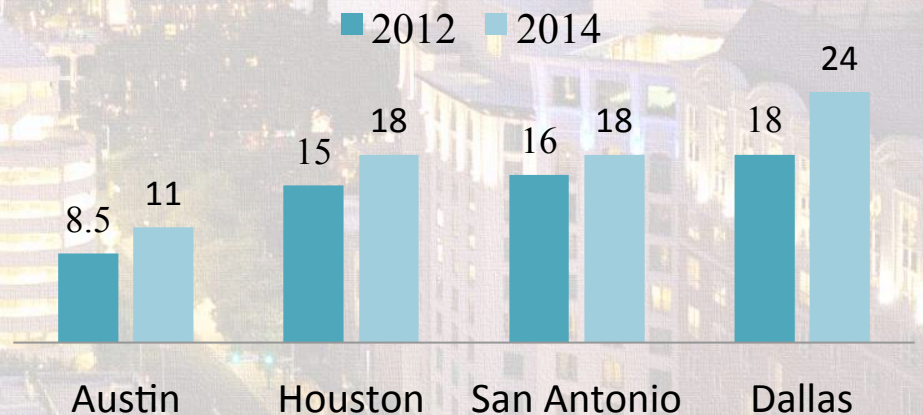
SA Water Portfolio 2008



SA Water Portfolio 2030



Total Percentage Leak



GOALS FOR SUSTAINABILITY

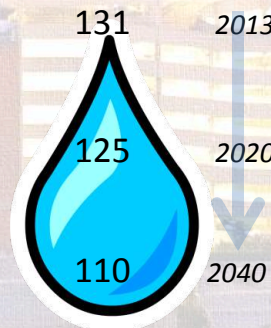
STORMWATER & WATER CONSERVATION TARGETS

Targets	Currently	2020	2040
Increase water conservation thru incentive/rebate programs, targeting more efficient fixtures & appliances. Reduce leak % to conserve further.	131 Gallons per capita daily; SAWS offers free aerators and low flow shower heads; 17.5% of supply is lost to leaks	125 GPCD; low flow toilets; 15% of supply leaks out	110 GPCD (class); HE appliances; 8% of supply leaks out
Incentivize rain barrels, xeriscaping, and the total removal of irrigable lawns and irrigation systems	48,000 ac-ft (15 bil. gallons) of water on lawns(2012), SAWS offers rebates to remove or upgrade irrigation systems and to install patios instead of lawns	Reduce irrigable lawns by 3%; programs promote xeriscaping and rain collection	Reduce irrigable lawns by 8% (12 mil gallon savings per year)
Protect and preserve the Edwards Aquifer, incorporate LID to help manage and clean stormwater runoff; reduce sewer spills and leaks	46% Reliance on Edwards. SAWS & SARA offer education and rebates for low impact design, required in recharge areas	43% Reliance on Edwards; Increase ASR capacity; research future water acquisitions	33% Reliance of Edwards; implement selected water acquisitions



1" of rain = ~600 gallons
*collected on a 1,000 sqft roof

Water Demands (GPCD)



PRE-1980s TOILET



elysianenergy.com

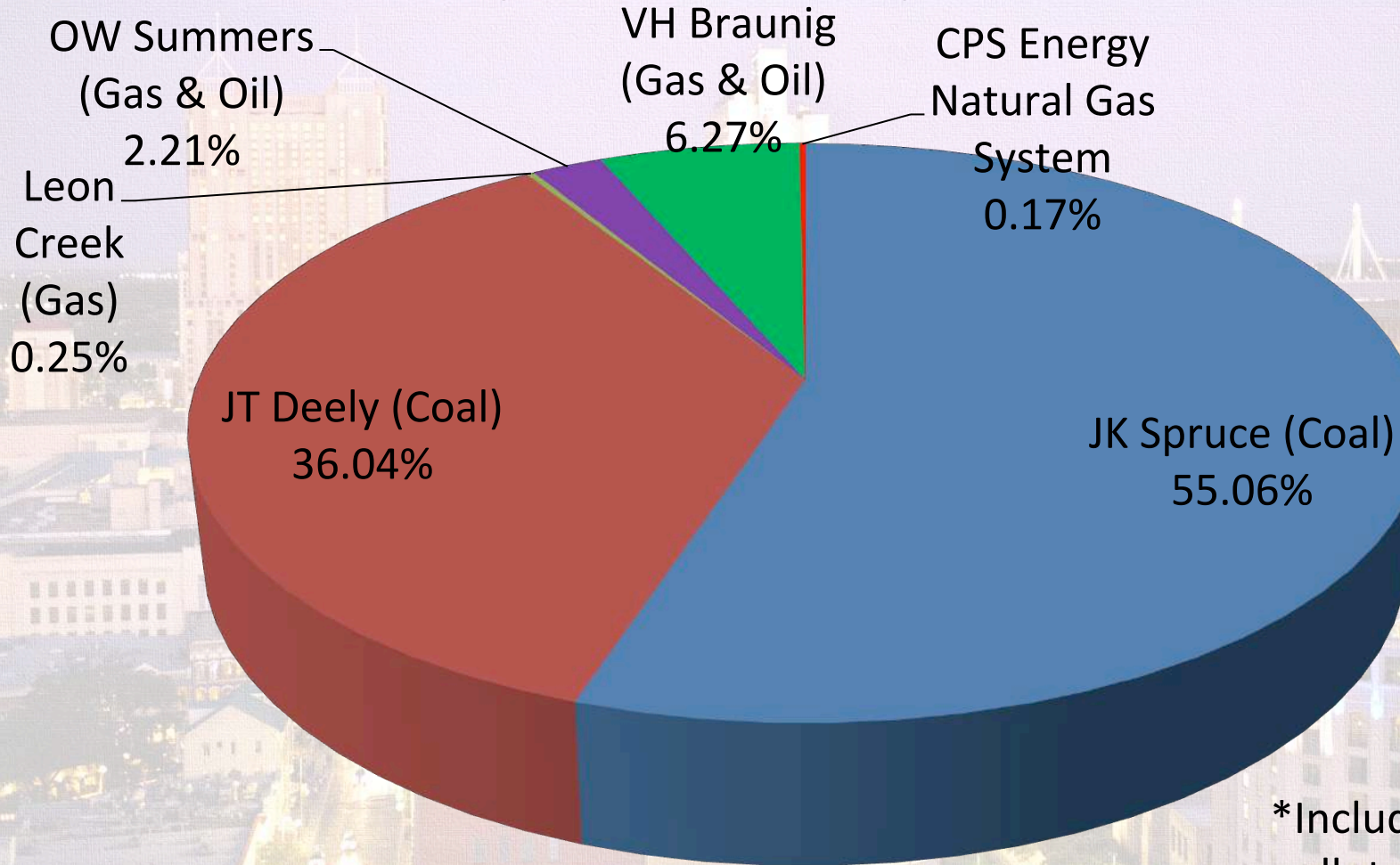
HIGH-EFFICIENCY TOILET TODAY



64% Reduction

Greenhouse Gas Emissions: Energy

Bexar County Power Plant CO₂ Equivalent Emissions in 2014*

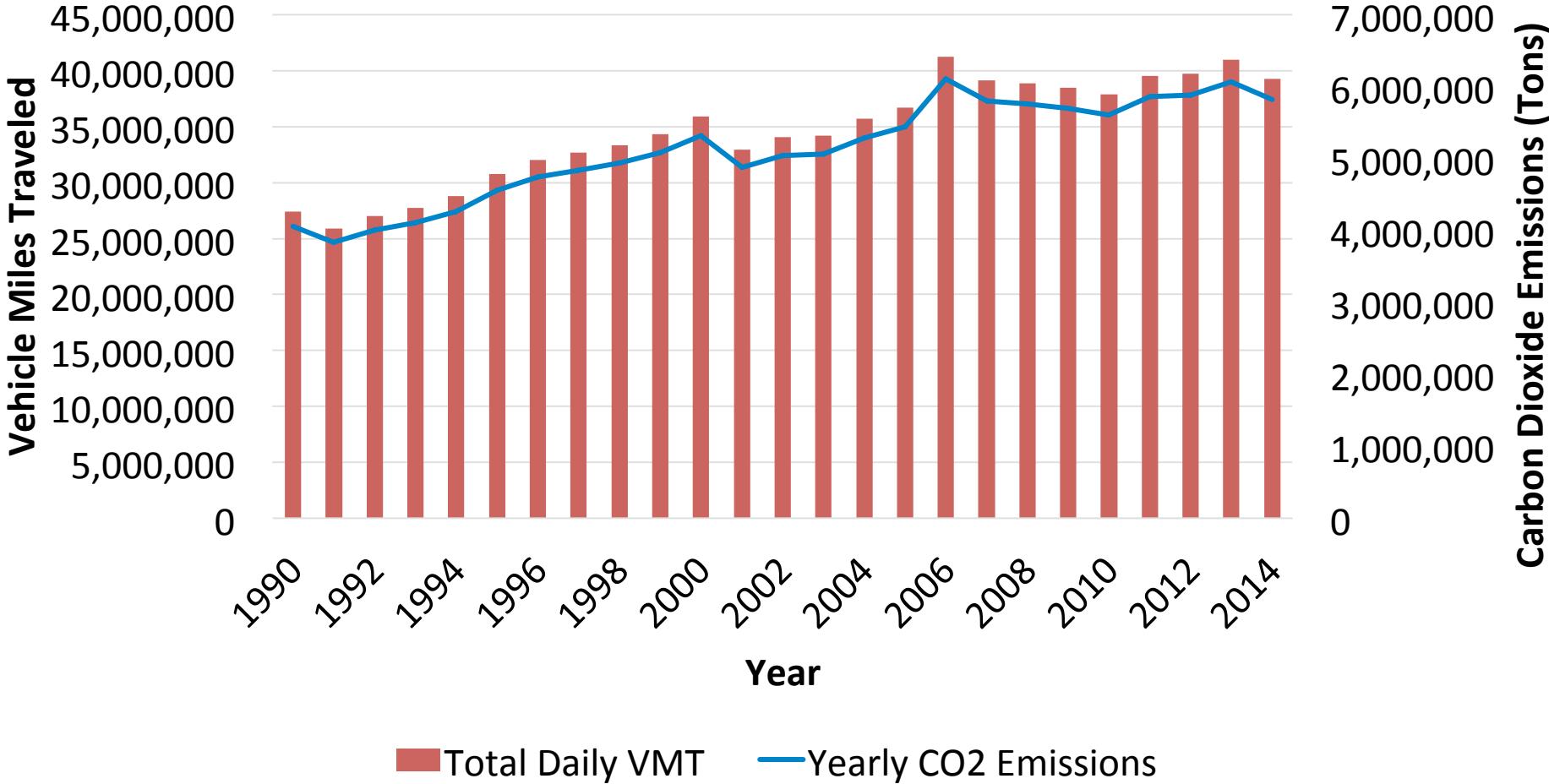


Total Power Plant Emissions in 2014:
16,462,763 metric tons CO₂ equivalent

*Includes certain co-pollutants like nitrous oxide and methane

Greenhouse Gas Emissions: Vehicles

Bexar County Daily VMT and Estimated Yearly Carbon Dioxide Emissions Since 1990



GHG Mitigation Strategies (1 of 2)

Strategy	Task	Institution	Status
Renewable Energy Resource Supply	Phase-out more carbon-emitting power sources; phase-in more renewable energy	CPS Energy	In Progress
	Incentivize Solar PV installation	CPS Energy, City of San Antonio	Existing; should continue
Reduce Electricity Consumption	Incentivize green buildings to reduce cooling/heating needs	City of San Antonio; other cities and town in Bexar County; CPS Energy	Some existing programs in San Antonio
	Educate San Antonio residents of financial benefits of energy efficiency	Non-governmental organizations (like Sierra Club); city agencies	Existing; needs more coordination

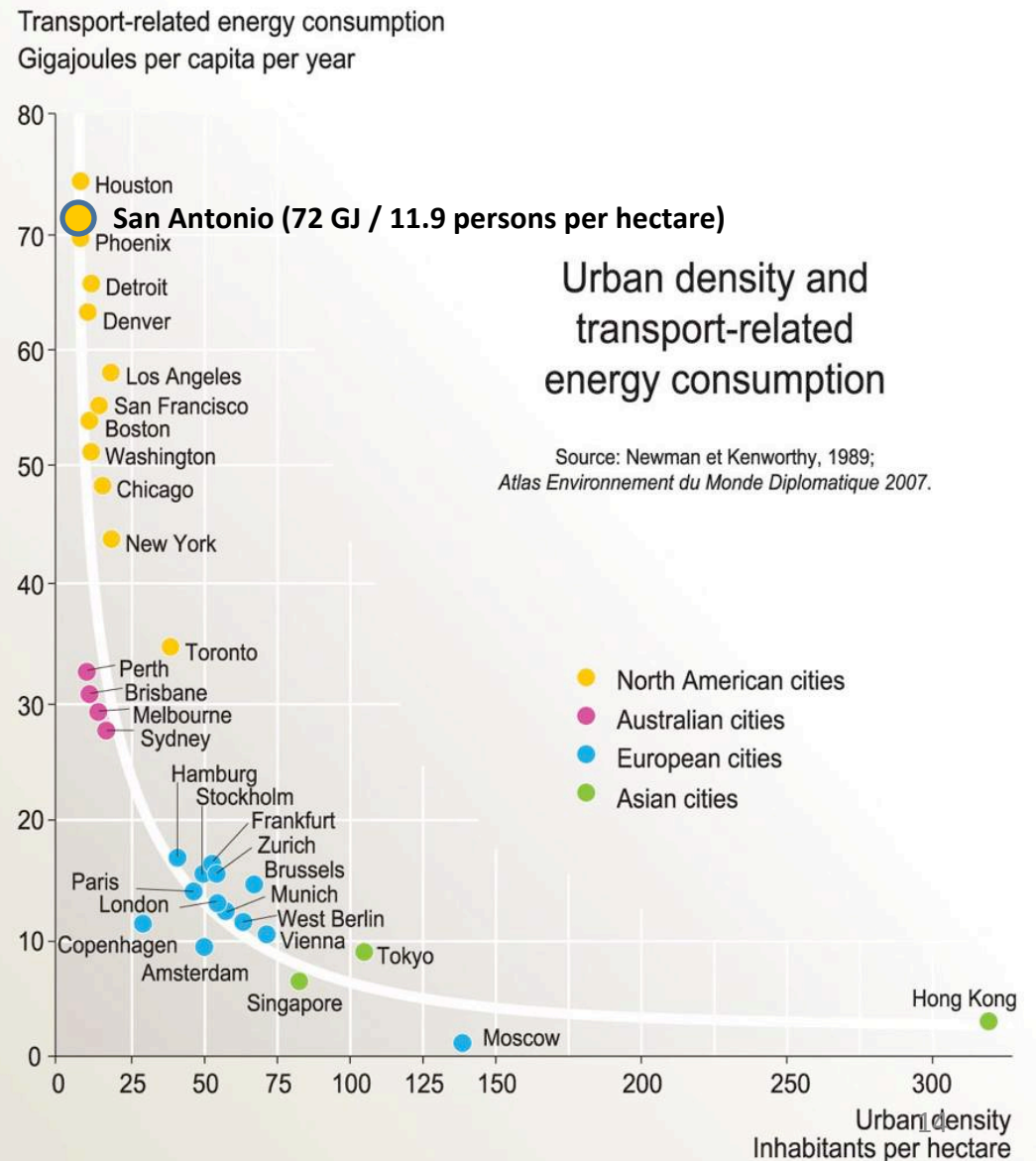
GHG Mitigation Strategies (2 of 2)

Strategy	Task	Institution	Status
Energy Storage	Increase research on energy storage technology	CPS Energy	Under consideration; should be implemented
	Integrate energy storage into electric grid	CPS Energy	Part of research task
Reduce Vehicle Miles Traveled	Integrate land uses for more mixed-use, high-density developments*	City of San Antonio; other cities and town in Bexar County	Some existing programs in San Antonio

* Reducing VMTs in this way is more cost effective than the use of cleaner vehicles

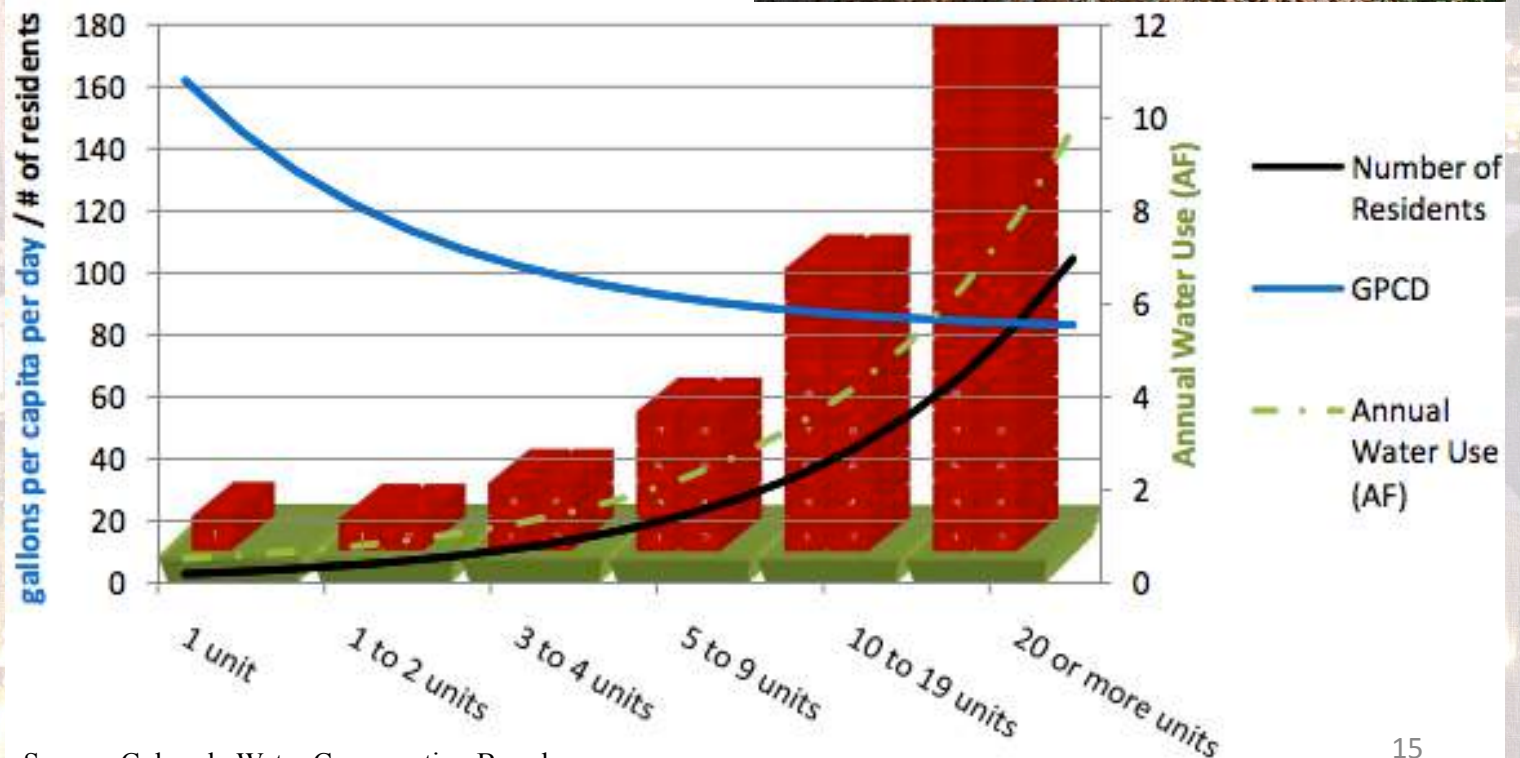
Integrating Higher Density Land Uses to Achieve Sustainability Goals

Higher Densities combined with efficient transportation options leads to reduced transportation-related energy consumption, and thus, GHG emission reductions.



Integrating Higher Density Land Uses to Achieve Sustainability Goals

- Every 20% increase in density yields a 10 percent per capita water savings
- Combined with native vegetation in streetscape plantings and landscaping would result in further reductions in water usage



Source: Colorado Water Conservation Board

Incorporating Rooftops into a Sustainable Land Use Strategy

Toledo Art Museum

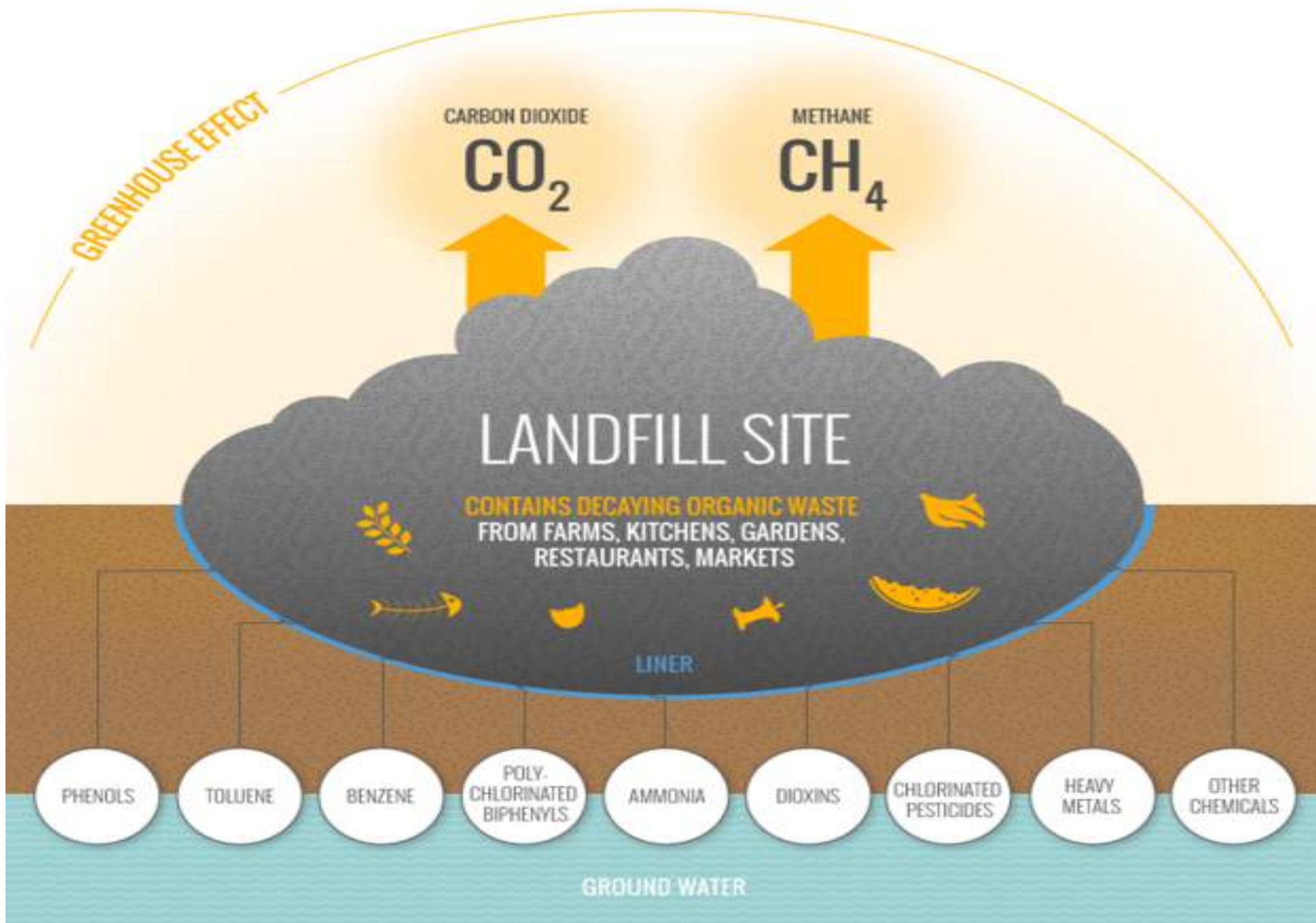


Garcia Federal Building
Rooftop San Antonio



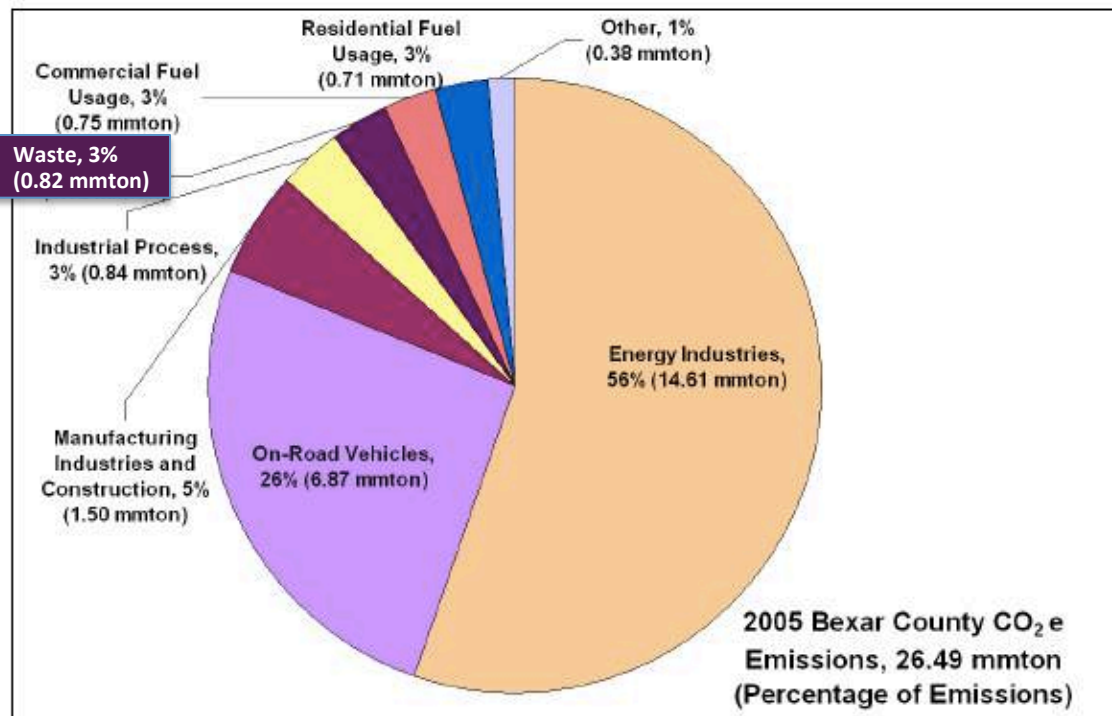
Chicago City Hall





SOLID WASTE EMISSIONS

Of the many sources of urban greenhouse gas (GHG) emissions, solid waste is the only one for which management decisions are undertaken primarily by municipal governments themselves and is hence often the largest component of cities' corporation inventories. Source: Greenhouse Gas Emissions from Waste Management-Assessment of Quantification Methods, October 2011



AACOG, Bexar County Greenhouse Gas Emission Inventory, 2005

30%
The amount that waste sent to the landfill decreased by between 2005 and 2015.

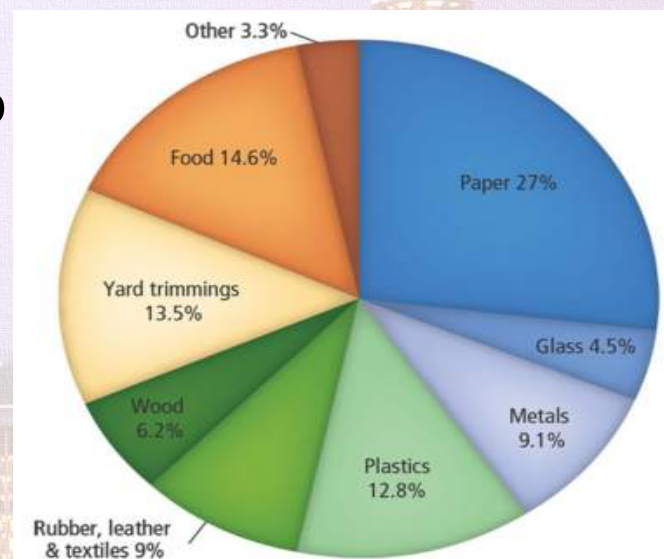
13%
The current residential recycling rate in San Antonio.

17%
The current residential brush mulching and composting rate.

Source: SA Tomorrow

SOLID WASTE

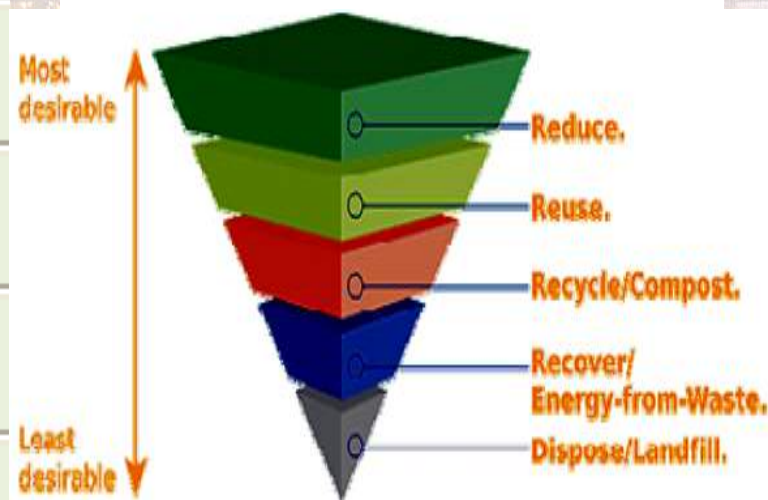
- Current recycling program in San Antonio
 - Curbside recycling
 - Pay-As-You-Throw program (PAYT)
 - Food waste recycling
 - Education and outreach
 - Free landfill day



Total MSW Generation (by Material), 2013
254 Million Tons (before recycling)

10 Year Plan Waste Disposal and Recycling Target Measures

	FY 2010	FY 2020 Goal	% Change
Disposed Waste per Household per Day	7.4 pounds	3.6 pounds	-51%
Recycled or Diverted Material per Household per Day	1.7 pounds	5.5 pounds	224%
Generated Waste per Household per Day	9.1 pounds	9.1 pounds	0%
Recycling (Diversion) Rate	18%	60%	

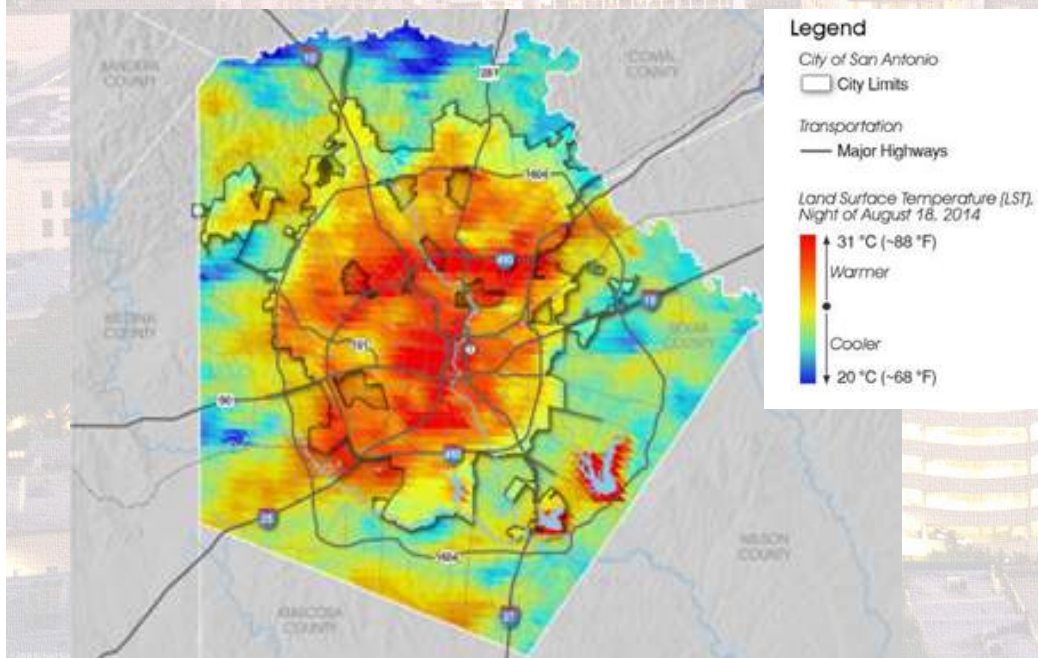
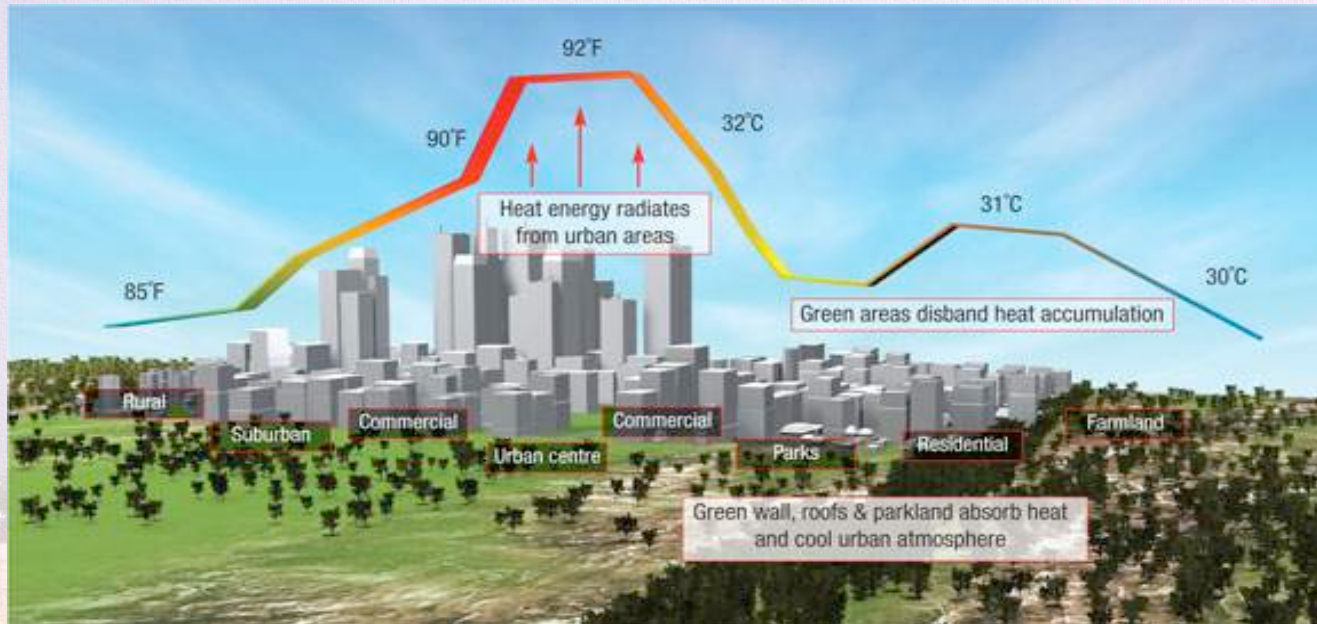


ENHANCED SOLID WASTE RECOMMENDATIONS

- Zero Waste Path way:
 - 60% recycling rate by 2020
 - Zero Waste by 2040

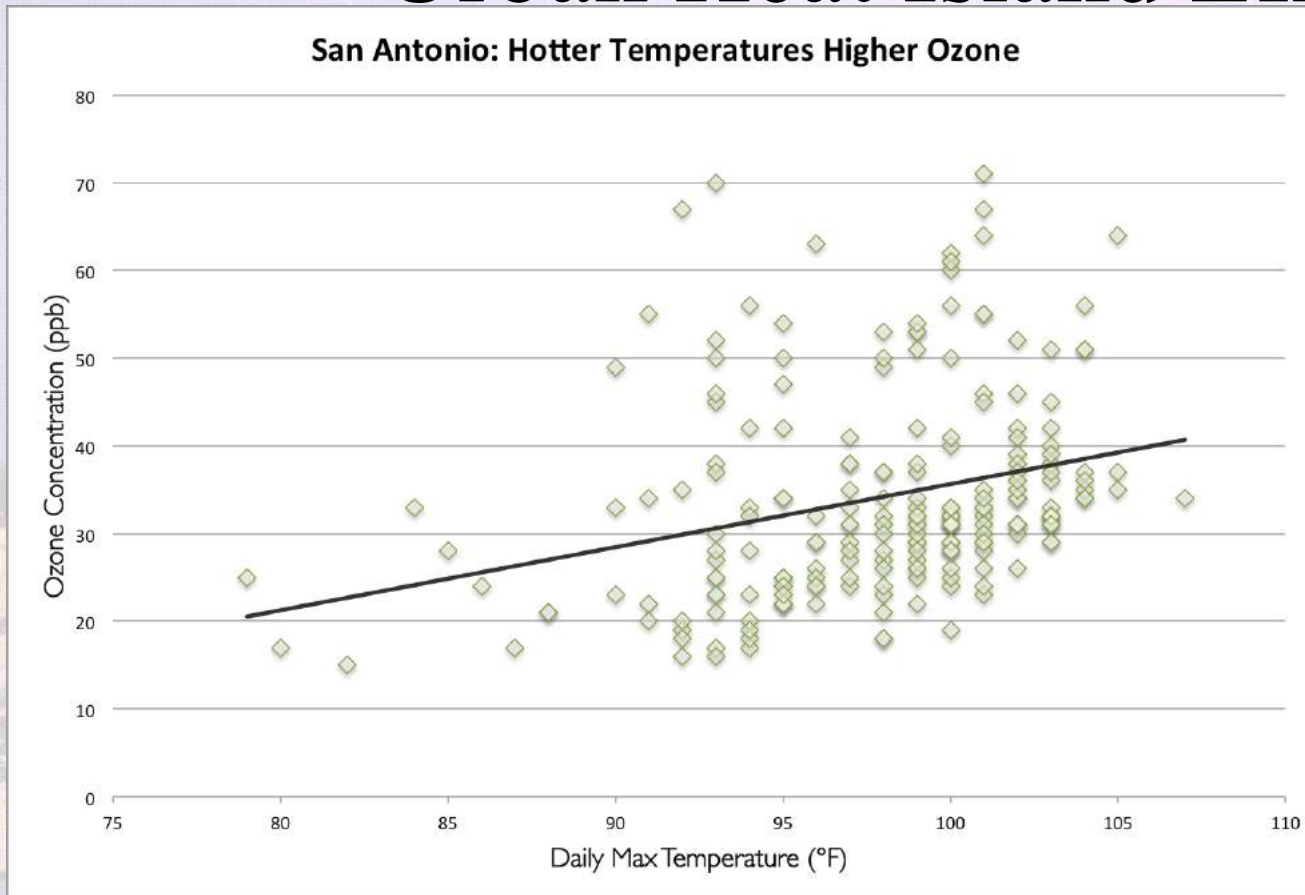
Goal # 1	Goal # 2	Goal # 3	Goal #4
<p>Better incentive for pay-as-you-throw program</p> 	<p>Events held in San Antonio should be required to provide composting and recycle bins</p> 	<p>Improve opportunities for residents and businesses to compost and recycle</p> 	<p>Require recycling in multifamily residential complexes</p> 

Urban Heat Island

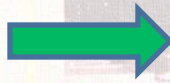


Large urban areas experience a phenomenon known as the urban heat island effect, in which the urban area is significantly warmer than surrounding rural areas. Densely concentrated roads, sidewalks and buildings in an urban environment are made of materials that retain and re-radiate heat.

Urban Heat Island Effects



The term "heat island" describes built up areas that are hotter than nearby rural areas. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.



BLACK ROOF	VS.	WHITE ROOF
<p>ROOF TEMPERATURE 180°F</p> <p>INSIDE TEMPERATURE 115°F</p> <p>REFLECTS SUNLIGHT 20%</p> <p>KEEPS IN SMOG</p> <p>HEATS STORM WATER 30°F</p>		<p>ROOF TEMPERATURE 100°F</p> <p>INSIDE TEMPERATURE 80°F</p> <p>REFLECTS SUNLIGHT 85%</p> <p>SMOG REDUCER</p> <p>SAVINGS ON SMOG & HEALTH 360 MILLION</p>



Climate Change Through Equity

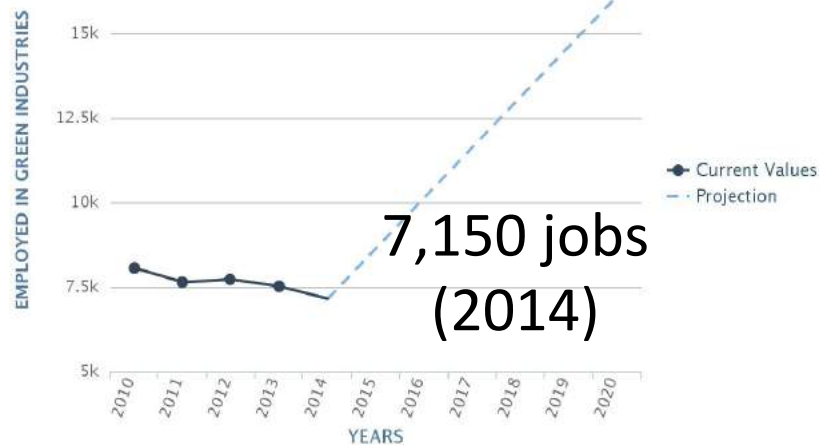


SOCIAL EQUITY: CURRENT STATUS

Residential Income Segregation

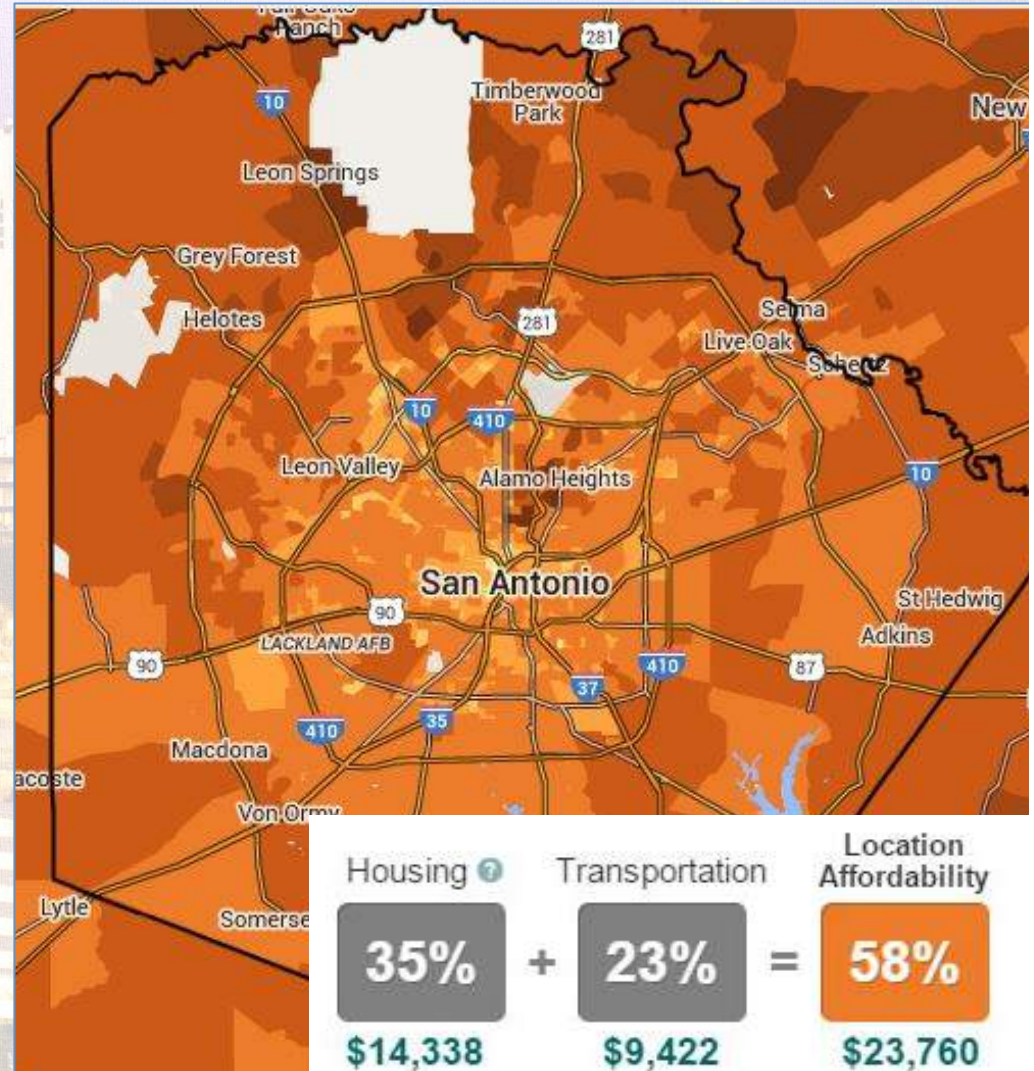
(of the top 10 largest MSAs)	Rank
<u>San Antonio</u>	<u>#1</u>
Houston	#4
Dallas	#8
Austin	#10

Green Jobs in San Antonio



Source: Bureau of Labor and Statistics

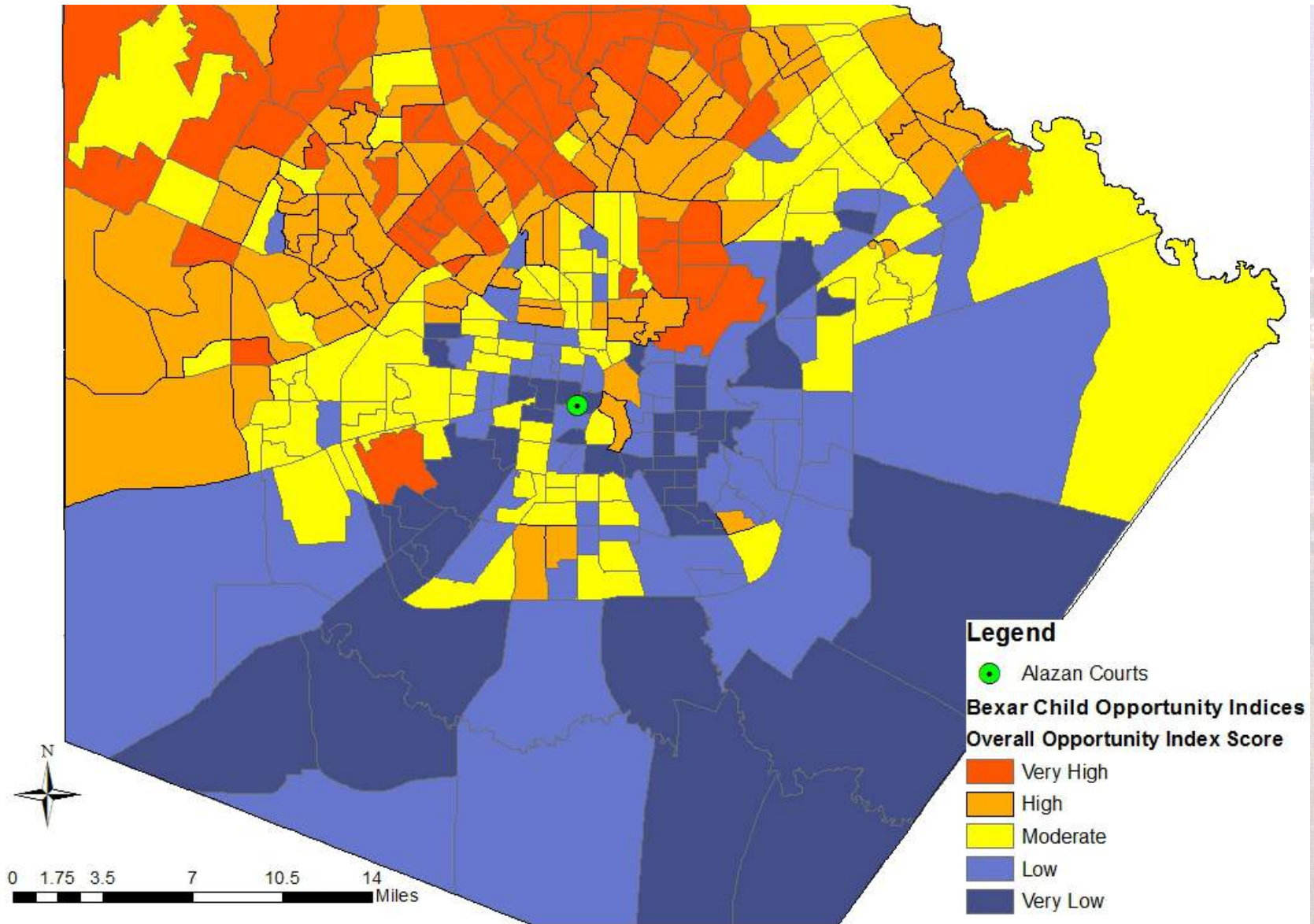
Location Affordability Index Housing and Transportation Costs



Source: U.S. Department of Housing and Urban Development, Location Affordability Portal

Child Opportunity Index

Where a Child Lives Matters When Accessing Educational, Health, Social, Economic, and Environmental Opportunities in Bexar County.



GOALS FOR SUSTAINABILITY

“Smart climate policy can deliver more work, more wealth, and better health for more people.” – Van Jones

Access to Quality Services & Opportunities	Job Creation/ Employment	Fair & Affordable Housing	Civic Engagement
<ul style="list-style-type: none">• Complete streets & public transit networks for low-income.• Urban Gardens• Bring services to low-income areas (mobile pantries, clinics)	<ul style="list-style-type: none">• Double number of Green Jobs.• Promote telecommuting & car-sharing.• Support minimum wage increase.	<ul style="list-style-type: none">• Energy Efficient homes for low-income.• Targeted infill development & rehabs.• Affordable housing in above-poverty areas.	<ul style="list-style-type: none">• Volunteer / donate to sustainable initiatives (i.e. SA2020)• Participate in SA Tomorrow planning.• Increase voter participation.

CONCLUSIONS

- Generally:
 - San Antonio seems to be slowly moving in the right direction
 - Many opportunities exist to simultaneously address energy, water, pollution, solid waste, urban heat island, equity, and biodiversity issues
- The most challenging issues appear to be:
 - Reducing GHG emissions and co-pollutants, especially in the transportation sector
 - Making progress in developing a more equitable community
 - Developing political and financial support for a resilient water supply system
 - Organizing to address reductions in the urban heat island and mitigating its impacts



URP 5453 Spring Class of 2016

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We thank you for your attention!
Questions/Comments?

