Tracking Greater Tucson's Carbon Footprint

Tucson city skyline photo courtesy of: Wikimedia.org. Photographer: Sahmeditor

by Susanne Cotty and Lee Comrie

Pima Association of Governments (PAG) is the metropolitan planning organization for the Tucson region, which includes the City of Tucson, Pima County, tribal lands and nearby cities and towns. In 2007, the Regional Council, PAG's governing body, recognized the importance of climate change to the region and approved a resolution directing PAG staff to conduct a regional greenhouse gas (GHG) emissions inventory. The goal of the inventory was to provide baseline and current GHG emissions data to monitor the overall progress in achieving regional GHG reductions. The inventory is the result of a cooperative effort among state, Pima County and Tucson staff, and representatives from the electric and natural gas utilities and local industries. The initial inventory was developed in 2008 and was updated in 2010 (PAG, 2010); this summary represents the latest available data.

Separate inventories were developed for eastern Pima County (including Tucson) and Tucson (1990 to 2008), and the County and Tucson government operations (2000 to 2008). The community inventories included emissions from energy use[1] , transportation and waste disposal generated by the County and Tucson and estimated carbon dioxide, methane and nitrous oxide emissions, expressed as carbon dioxide equivalents (CO_2e).[2] Only the County community inventory results are detailed here since the Tucson community emission sources are a subset of the County results.

The government inventories included CO_2e emissions from energy use (government facilities, water-handling activities and streetlights), transportation (vehicle fleets and employee commuting) and waste generation. Both County and Tucson government emissions are presented due to their divergent municipal duties and differences in their emission trends. Pima County is responsible for most of the regional wastewater treatment and reclamation while the Tucson government is charged with pumping and conveyance of potable and reclaimed water for the majority of the region.

Eastern Pima County Community Inventory

From 1990 to 2008, eastern Pima County GHG emissions rose by 54 percent but stabilized from 2007 to 2008 due to the economic downturn (Figure 1). During this same 18-year period, eastern Pima County's population increased by 51 percent triggering a major climb in energy use and vehicle travel evident in the inventory results. Despite these increases, County per capita GHG emissions remained low compared to the national averages.[3]

In 2008, the County generated 15.6 million metric tons of greenhouse gases, with energy consumption and vehicle use being the major emission sources. Combined energy use by the residential, commercial and industrial sectors produced almost two-thirds of the region's annual emissions (Figure 2). Electricity is the region's major energy source and was responsible for over half of the area's emissions (Figure 3). These emissions reflect the predominance of coal-fired electricity generation in the region.

Transportation generated over one-third of regional emissions, 99 percent of which is from personal and commercial vehicle use.

Figure 1.
Eastern Pima County Greenhouse Gas Emissions 1990 to 2008

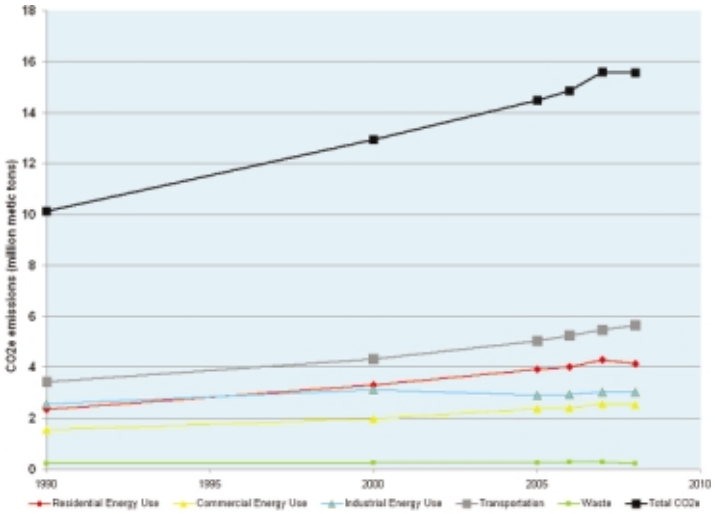


Figure 2.
Eastern Pima County 2008 Greenhouse Gas Emissions by Sector

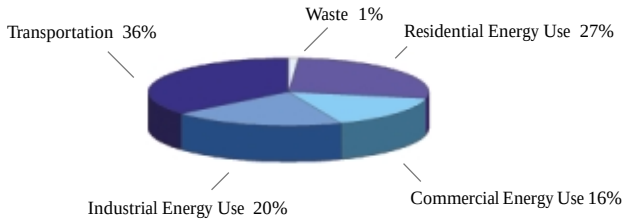
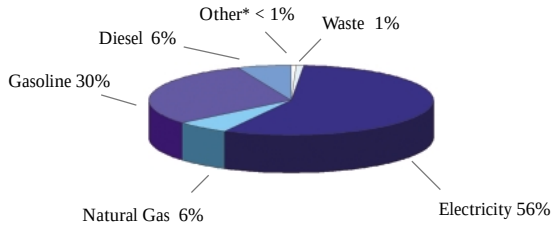


Figure 3.
Eastern Pima County 2008 Greenhouse Gas Emissions by Source



*Other: Biodiesel, CNG less than 1%

Pima County and Tucson Government Operations Inventories

Emissions from government operations represent a small portion of the County and Tucson community totals, 1 percent and 3 percent respectively. Facility and water-related energy use are the major emission sources for both entities, with electricity consumption averaging 70 percent of their total emissions.

From 2000 to 2008, County government emissions rose by 44 percent, with the greatest increases occurring in wastewater reclamation and facility energy use. These increases reflect the rise in demand for services from an expanding regional population. In 2008, facility and regional wastewater reclamation energy use were the major contributors to the County government total (Figure 4).

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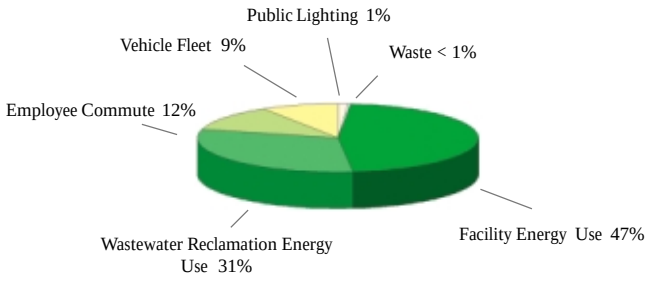
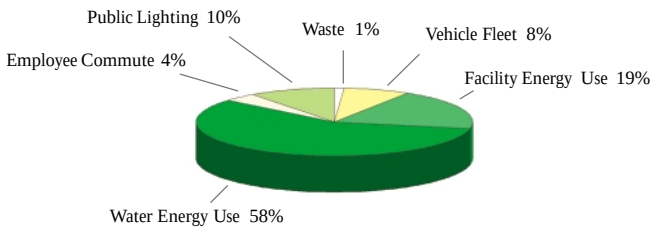
Figure 4.
Pima County Government 2008 Greenhouse Gas Emissions by Sector



Over this same eight-year period, Tucson's government emissions dropped by 6 percent, reflecting substantial reductions in facility energy use, employee commuting and vehicle fleet emissions. In 2008, water-related and facility energy were the major contributors to the Tucson government emissions (Figure 5).

From 2007 to 2008, both County and Tucson governments exhibited a reduction in their emissions. The County government emissions declined by 4 percent and the Tucson government emissions dropped by 2 percent reflecting a one-year decline in their facility and water-related energy uses.

Figure 5.
Tucson Government 2008 Greenhouse Gas Emissions by Sector



Next Steps

Using the report as a guide, Pima County and Tucson have initiated GHG reduction strategies targeting the major emission sources. County government reduction measures include programs to reduce government energy, waste and potable water use, increasing renewable energy use and expediting the purchase of alternative fuel vehicles. From the program's onset in FY2008, County government reduced its energy expenses by $1.2 million, lowered waste generation by 29 percent, reduced water consumption in County parks by 20 percent and generated 5 percent of the County's total energy load using renewable energy.[4] The County government is continuing to develop new programs to meet the GHG reduction goals outlined in its five-year Sustainable Action Plan and Year Two Implementation Report Card.

Similarly, Tucson invested over $1.8 million in solar energy projects, increased landfill gas-to-energy use, expanded alternative fuel use in fleet vehicles and in City buses, and passed ordinances for greater energy and water efficiency for new homes.[5] Under the direction of the Mayor's Climate Change Advisory Committee, City staff is currently reviewing new policies to reduce GHG emissions throughout the community.

Conclusion

The community inventories show a steady rise in regional GHG emissions over the past several years, driven by increased energy use and vehicle travel. The government inventories' results echo the community emissions trends in energy use and demonstrate its clear link to regional water conveyance and treatment. In identifying the major emission sources and trends, these inventories highlight the sectors where reduction strategies might be focused to provide the greatest impact on decreasing the region's carbon footprint.

The initial steps have been taken - recognition of the importance of GHG emissions to the region's social, environmental and economic health, and quantifying the emissions. The next stage in the emission reduction process clearly has begun - County and Tucson representatives

are developing reduction strategies aimed at the major emission sources. By involving the community in an encompassing, cooperative effort, the region can begin to advance toward achieving significant regional GHG emission reductions.

The complete report is available at: www.pagnet.org/Programs/tabid/948/Default.aspx

References

EPA. 2010. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008. U.S. EPA # 430-R-10-006. http://epa.gov/climatechange/emissions/usinventoryreport.html

Pima Association of Governments (PAG). 2010. Regional Greenhouse Gas Inventory: 1990-2008. www.pagnet.org/Programs/tabid/948/Default.aspx

Footnotes

1 Energy use includes both electricity and natural gas consumption.

2 Emissions were estimated using the National Association of Clean Air Agencies (NACAA)/International Council for Local Environmental Initiatives (ICLEI)/ Torrie Smith Associates' Clean Air and Climate Protection model (CACP).

3 In 2008, U.S. per capita GHG emissions were 23 metric tons (EPA, 2010) while County emissions were estimated at 16 metric tons per capita.

4 Sustainable Action Plan for County Operations - Year Two Implementation Report Card FY09/10. 2010. ftp://airinfonow.com/wwwroot/Administration/Sustainability/Year%202%20Report%20Card.pdf

5 The City of Tucson's Sustainability Report 2008-2009. 2009. http://www.tucsonaz.gov/ocsd/docs/CMS1_035184.pdf

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