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Office of Sustainability Quarterly Update

May 20, 2014



Topics to be covered

Towards a Climate Resilient Austin

Resolution Report: 20131121-060

New Community Climate Plan

Resolution: 20140410-024

Our activities produce heat-trapping gases



Carbon Emissions (million metric tons)



Source: K. Hayhoe for 2014 U.S. National Climate Assessment



... that are building up in the atmosphere



THE NATURAL GREENHOUSE EFFECT

THE ARTIFICIAL HUMAN GREENHOUSE EFFECT



Why is this a problem? Our civilization is built on a key assumption



What happens if that climate isn't stable any more?

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Extreme weather in Central Texas



Bastrop Wildfire, 2011



Lake Travis, 2013

Tropical Storm Hermine, 2010

Snow, 2011

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Climate Change mitigation & resilience





Climate resilience planning steps



1. Data Collection

- a) Climate projections
- **b)** Identify potential departmental impacts
- c) Determine next steps

2. Vulnerability Assessment

- a) Identify Climate Thresholds
- b) Rank Vulnerable Assets
- c) Risk Analysis

3. Climate Resiliency Action Planning and Implementation

- a) Goals/Targets
- **b**) **Develop** action plan(s)
- c) Implement and Monitor

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Climate Projections

Dr. Katharine Hayhoe Texas Tech University Atmos Research

Lead Author of the 2014 National Climate Assessment

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Austin specific climate data

Global Climate Models & the National Assessment return quality information, but too general for specific use

Downscaled climate modeling for the Austin area

- Preliminary analysis
- Latest generation of global climate model simulations
- Camp Mabry weather station
- Higher and lower emission scenarios
 - Lower Scenario = Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway 4.5 (RCP 4.5) scenario where global carbon emissions peak and decline by the end of the century
 - Higher Scenario = IPCC RCP 8.5 where continued dependence on fossil fuels drives continued growth of emissions through the end of the century
- Daily temperature & precipitation
- 10 other secondary climate indicators
- Timeframe: 1960 2100

Climate change projections: SUSTAINABILI Higher temperature averages and extremes



- OBS = Historical observations
- Bars = Average annual values from nine climate models over a 30 year time period
- Whiskers = Range in values projected by nine different climate models

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Climate change projections: More extreme precipitation & drought conditions







Summary of climate projections

The science is certain that we will see:

- Increases in annual and seasonal average and extreme temperatures
- More frequent extreme precipitation
- More frequent drought conditions in summer due to hotter weather

The science is less certain that we will see:

- Change in annual average precipitation
- Increase in humidity and heat index
- Increase in the strength (but not frequency) of hurricanes

More data needed:

 More weather stations, 100 and 500 year floods, soil moisture, seasonal rainfall, hardiness zones, and heat index

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Impacts on our City

Understanding risk and si vulnerability to climate change



Exposure

Degree to which a system is exposed to climatic variations

Minimizing Risk

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- Reducing exposure
- Reducing sensitivity
- Increasing adaptive capacity

Sensitivity

Degree to which a system is affected by climate variations (thresholds) Adaptive Capacity Ability of a system to adjust and moderate damage

Complex interrelated impacts



Participating Departments

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- Austin Energy
- Austin Water Utility
- Transportation Department
- Public Works
- Watershed Protection
- Parks and Recreation
- Homeland Security and
- Emergency Management
- Fire Department
- Health and Human Services



Increased summer heat

Important Thresholds

Days over 100°F, Days over 110°F, Nights over $80^{\circ}F$

Economic Impacts

- Increased energy operating costs
- Increased cost of infrastructure maintenance

Loss of field staff productivity

Environmental Impacts

- Vegetation change
 and loss
- Water supply availability
- Air quality impacts
- Decreased local food production

Societal Impacts

- Increased heat stress at home on vulnerable populations
- Worker safety
- Increased utility usage/cost of living



More frequent drought

Important Thresholds

Duration with 0.0" rainfall, Frequency of dry spells, KBDI - Fire risk

Economic Impacts

- Increased water cost
- Increased vegetation maintenance cost
- Increased pavement maintenance
- Solutions to power plant cooling water scarcity
- Agricultural and tourism losses

Environmental Impacts

- Reduced stream, spring, and river flows
- Water quality protection land viability
- Vegetation, tree, and ecosystem loss

Societal Impacts

- Increased wildfire hazards
- Increased utility usage / cost of living
- Increase in vector borne diseases



Important Thresholds

Days with more than 2in. of rain, 2+ days in a row with extreme rainfall

Economic Impacts

- Property damage and rebuilding
- Increased cost of maintenance of infrastructure systems
- Increased emergency response cost
- Business economic losses

Environmental Impacts

- Vegetation damage
- Debris cleanup
- Groundwater and surface water quality

Societal Impacts

- Evacuee social services & temporary housing
- Need for continuity of service
- Increase in water borne diseases
- Emergency stress on communities

We are already moving in the right direction



Austin Water

- Water efficiency programs
- Reclaimed water
- Drought contingency plan
- Analysis of future water source options

• Fire, Health, and Emergency Management

- Emergency operations plan
- Cooling and warming centers
- Disease surveillance
- Hazard mitigation plan
- Community Wildfire Protection Plan
- Comprehensive Wildfire Risk Assessment

- Watershed and Parks and Recreation
 - Flood Risk Mitigation including:
 - Pre-flood design solutions and buyouts
 - Flood Early Warning System operations and upgrades to gages and software
 - Austin's Urban Forest Plan
 - Green Roof and Heat Island Initiatives
- Transportation and Public Works
 - FHWA Vulnerability Assessment
 - Alternative transportation infrastructure
- Austin Energy
 - Efficiency, renewable energy, and demand response programs
 - Drought contingency and water resource planning for power plants



Imagine Austin

Priority Programs		How implementation increases climate resiliency
1: Invest In a Compact and Connected Austin	➡	Creates a more energy and water efficient community; less development in rural areas helps mitigate the depletion of natural systems.
2: Sustainably Manage Our Water Resources		Provides an increasingly dependable and resilient water and wastewater systems.
3: Continue to Grow Austin's Economy by Investing in Our Workforce, Education Systems, Entrepreneurs, and Local Businesses		Develops a skilled workforce able to mitigate, respond and adapt to climate impacts and extreme weather events.
4: Use Green Infrastructure to Protect Environmentally Sensitive Areas and Integrate Nature Into the City	•	Reduces the heat island effect; reduces stormwater amounts and velocity.
5: Grow and Invest in Austin's Creative Economy		Provides a diverse employment base for shifting job markets.
6: Develop and Maintain Household Affordability Throughout Austin		Locates affordable housing near jobs, grocery stores, transit, and other community resources, increasing adaptive capacity.
7: Create a Healthy Austin		Reduces vector and water-borne diseases and heat related stress.
8: Revise Austin's Development Regulations and Processes to Promote a Compact and Connected City		Creates infrastructure that is resilient to drought, heat, and flooding. 22

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Summary and Recommendations



Takeaways

- **1**. Recent extreme events are likely to be the new normal
- 2. Vulnerable populations are likely to be disproportionately impacted due to limited ability to adapt
- 3. Infrastructure design and construction standards will change
- 4. Some very important issues are out of our direct control:
 - Grid-wide energy capacity
 - Basin-wide water availability
 - Food supply
 - Evacuees from other cities



Recommendations

- Develop more detailed climate projections
- Detailed vulnerability assessments, where necessary and cost effective
- Integration with current departmental planning efforts
 - Enterprise Risk Management
 - Business Continuity Plans
 - Long Term Plans
 - Capital Plans
- Regional coordination on climate issues:
 - LCRA & ERCOT
 - CAPCOG, CAMPO & TXDOT
 - Travis and surrounding counties

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Resolution 20140410-024

Community Climate Plan



Goals and Recommendations

- Council establishes a goal of net zero community wide greenhouse gas emissions by 2050
 - Prefers to achieve as soon as feasible
 - Emission reductions accomplished sooner are more important
- Review the goals and objectives in the 2007 resolution
- Recommendations should also include:
 - Measurable interim targets starting with 2020 and periodically to 2050
 - How and when annual progress reports will occur
 - How often to conduct comprehensive updates to the climate plan



Action Plans

Work with stakeholders to create action plans in the following sectors to meet the long term goal:

- Energy
- Transportation
- Waste / Industrial
- Action plans should also include
 - Secondary goals and measures for sector specific factors (vmt, renewables, etc.)
 - Determine what is feasible and how other sectors could make up for shortfalls
- Sector plans should include existing plans, short term, and long term actions taking into account
 - Population and business growth
 - Available and emerging technology
 - Potential costs and benefits
 - Climate preparedness and resilience
 - Barriers where the City does not exert direct control over community emissions



Stakeholder Process

- Public Input Sessions
- Reviewed by Relevant Boards and Commissions
- Consideration of the results of the 2014 Generation Plan Task Force
- Formation of Technical Advisory Groups to work with city staff to develop action plans

Schedule



- 1. Framework May September 2014
 - a) Interim targets
 - **b)** Framework for meeting targets (actions)
 - c) Progress update to City Council
- 2. Final Plan October 2014 March 2015
 - a) Focused actions and reduction calculations
 - b) Combine emission reductions and climate resiliency into one comprehensive plan document
 - c) Presented for Community review and council adoption
- **3.** Implementation Plan
 - a) Specific actions
 - b) Costs and schedules
 - c) Data tracking

Resolution = 20140410-024



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Thank You!