

Coping with a Changing Climate: The Role of Electric Vehicles

**Presentation to
Workshop on Interfacing Electricity and
Transportation Networks**

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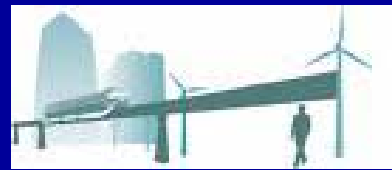
Electric vehicles can play an important role helping the nation to...

- **protect human health and the environment**
- **adapt to and mitigate climate change**
- **build sustainable communities**

Climate Change and Sustainable Communities

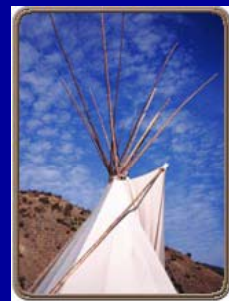
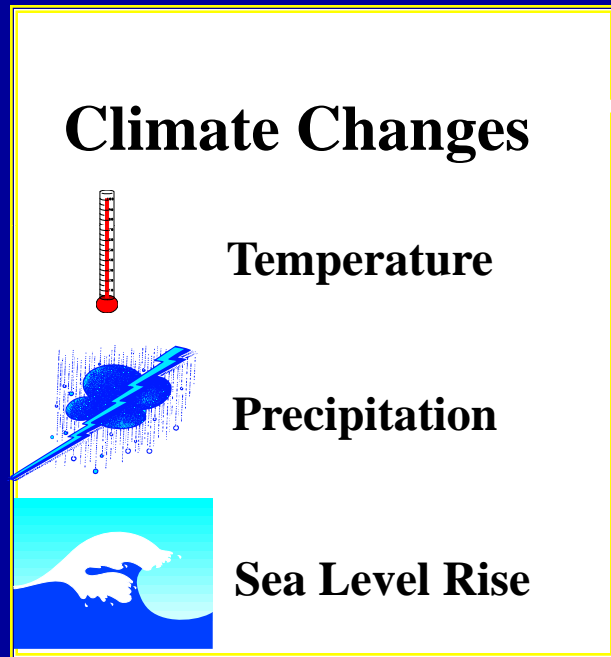
- We live in a world in which the climate is changing.
- It is in this rapidly changing world that we are trying to develop sustainable communities.
- Many of the outcomes communities are trying to attain and sustain are sensitive to changes in weather and climate:
 - clean air
 - safe drinking water
 - economic growth

Climate Change is Affecting Human Health and the Environment



Infrastructure

Water
Transportation
Energy Supply & Use



Cultural Resources

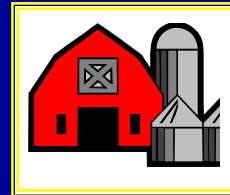


Economic Disruption



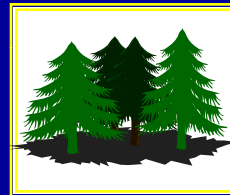
Health

Weather-related Mortality
Infectious Diseases
Air Quality -Respiratory Illnesses



Agriculture

Crop yields
Irrigation demands



Forest

Change in forest composition
Shift geographic range of forests
Forest Health and Productivity



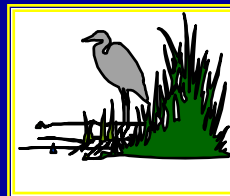
Water Resources

Changes in water supply
Water quality
Increased competition for water



Coastal Areas

Erosion of beaches
Inundate coastal lands
Costs to defend coastal communities



Wildlife and Ecosystems

Shift in ecological zones
Loss of habitat and species
Damage to Coral Reefs

Climate Change and Sustainable Communities

- Until now, city planners have been able to assume “stationarity” of climate
 - *i.e.*, climate is relatively stable and future climate will mirror past climate
- But the past is no longer a good predictor of the future. Climate is changing more rapidly and in unprecedented ways.
- Climate change is posing new challenges and is making it more difficult to develop sustainable communities.
- **Cities must adapt. They must anticipate and plan for future changes in climate.**

Adaptation

- Adaptation is not a choice – our choice is whether to adapt proactively or respond to the consequences.
- We have always adapted to variability – but now the trends are moving outside of human experience and we need to be prepared.

Potential Impacts of Climate Change on U.S. Regional Air Quality

(EPA report released April 17, 2009)

***Fundamentally: Is climate change something we
have to pay attention to going forward?***

Answer: Yes

***Climate change should be considered by air quality
managers as they develop air pollution control
strategies (e.g., in SIPs).***

Impacts on Ground-Level Ozone

Climate change has the potential to produce significant increases in ground-level ozone concentrations in many regions of the U.S.

Policy relevance:

- O₃ non-attainment areas, and areas just below the O₃ NAAQS, should begin to consider effects of climate change.
- Need to account for “climate penalty” imposed on control policies.
- Additional emissions reductions may be required in the future.

Critical Clarification

- We are not looking at the question of whether the ozone standard should change because of climate change.
 - Standard is health based
- We are looking at the question of whether climate change will make attainment of any standard more difficult.

**The National Academies identified
“*adapting the air quality management
system to a changing (and most likely
warmer) climate*” as a key challenge in
coming decade***

* NRC, 2004: Air Quality Management in the US

Opportunity for “Co-Benefits”

Adaptation strategies can lead to multiple (“ancillary”) benefits, *e.g.*,

- Reductions in emissions of greenhouse gases (GHGs)
- Improvements in water quality
- Protection of human health
- National security

Mobile Sources and Climate Mitigation*

- Mobile sources are a main source of greenhouse gas (GHG) emissions
- The number of motor vehicles and their miles driven has increased rapidly over the past 60 years, most recently in developing countries; likely to continue
- In response to strong and aggressive regulatory programs, new vehicles sold in many countries today are much cleaner (criteria pollutants) today than before

* *Global Climate Change – The Technology Challenge*
(Princiotta, ed., forthcoming)

Mobile Sources and Climate Mitigation*

(cont.)


- Modest programs to reduce fuel consumption or GHG emissions from light duty vehicles are being phased in
- Much more will be needed
- **Likely shift to electric vehicles** or fuel cell vehicles fueled by renewable hydrogen in future decades
- If mobile CO₂ emissions are to be reduced, it will take a rapid development and use of low carbon technologies to counteract the projected increases in vehicle miles traveled (VMT) globally

* *Global Climate Change – The Technology Challenge*
(Princiotta, ed., forthcoming)

Important Role of Electric Vehicles

Electric vehicles have the potential to be an important component of any strategy to adapt to climate change, mitigate greenhouse gas emissions, and attain sustainable outcomes.

EPA Climate Change Adaptation Team

A photograph of water cascading over a dam. The water is white and frothy as it falls. The dam structure is dark and appears to be made of concrete or stone. The background is a blurred natural setting with trees and a bright sky.

**“Mainstreaming”
Climate Adaptation
into the Agency’s Programs &
Regulatory Processes**

EPA Climate Change Adaptation Team

Integrated Planning

**Climate Adaptation,
Sustainability, and
Smart Growth Efforts**

Ultimate goal is sustainable communities!

Funding Opportunities

- U.S. Global Change Research Program (USGCRP)
 - New foci: Adaptation and Mitigation
- Office of Sustainable Communities (within Office of Policy)
- EPA Global Change Research Program
 - Impacts and adaptation (e.g., climate change & air quality)
 - Mitigation
 - Co-Benefits
 - Sustainable technologies
- STAR Grants Program
- EPA National Risk Management Lab (NRMRL)

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