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science in ACTION
INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

AIR, CLIMATE, AND ENERGY RESEARCH

Background

The Clean Air Act has resulted in one of the most effective public health programs in American history by providing the legislation to address air quality in the United States. The legislation has led to millions of lives saved and improved health.

Research at the U.S. Environmental Protection Agency has played a significant role in these health achievements. The work by EPA scientists, engineers and partners demonstrated that exposure to air pollution damages our health, causing lung and heart disease, impacts our immune, nervous and reproductive systems, and shortens our lives.

Their work has linked air pollution to disease and other health problems, contributed to important risk assessments, provided new technology and scientific tools and offered new solutions to protect and manage air quality.

New Challenges

Despite this progress, challenges remain and new

concerns have emerged. Millions of people still live in counties that do not meet air quality standards for one or more pollutants. Research has uncovered many health threats from air pollution. EPA research continues to address these threats and understand their impact on those living in highly polluted areas, other vulnerable groups and vulnerable ecosystems.

Climate change represents a major challenge to the protection of human health and the environment. EPA's research is focused on understanding the environmental impacts of climate change and how to respond to the changes and impacts with sustainable solutions.

Responding to climate change also includes reducing emissions of greenhouse gases. EPA's research in this area is focused on the environmental impacts–both positive and negative–of possible greenhouse gas reduction approaches.

The energy choices we make as a society clearly influence air quality and climate change. But how do we make energy decisions that have the least negative impact and greatest benefit? Research is under way to understand the impacts of air quality as alternative energy sources emerge.

The atmosphere itself has become more complex. In the past, research has focused on the health impacts of single pollutants such as ozone or particulate matter. Yet we live in a world of multiple pollutants that interact and even create new chemicals.

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EPA has shifted its research to learn more about the exposure and health effects of air pollutant mixtures as well as single pollutants.

New and improved ways to monitor air quality are important to support the nation's air quality standards and to provide more comprehensive and efficient air quality management. EPA research is a leader in efforts to improve air quality monitoring.

Research Focus Areas

EPA's Air, Climate, and Energy Research is providing integrated and transdisciplinary research to address today's complex air quality issues. While air quality has improved, many still suffer from asthma, cardiovascular disease and other health problems that can be associated with air pollution.

Research is being conducted in three broad areas to further protect public health and the environment from air pollution.

Assessing Impacts
The goal of this research is to assess human and ecosystem exposures and effects associated with air pollutants and climate change. Scientific questions that are being addressed include:

What are the multi-pollutant exposures and effects and integrated impacts of climate change on air and water quality and human and ecosystem health?

What innovative approaches are needed to improve understanding of the health and environmental effects of air pollutants?

What are the characteristics of populations and ecosystems that are susceptible to the effects of air pollutants and a changing climate?

Preventing and Reducing Emissions
The goal of this research is to provide the data and tools needed to prevent and reduce emissions of air pollutants in ways that are environmentally sustainable, cost effective, and innovative. Scientific questions that are being addressed include:

What tools are needed to support the management of air pollution problems?

What research is needed to conduct life-cycle analyses of alternative pollution reduction and energy options?

What innovative monitoring technologies are needed to support air quality management?

Responding to Changes in Climate and Air Quality
The goal of this research is to provide modeling, monitoring, metrics and information needed to adapt to the impacts of climate change and make public health decisions regarding air quality.

What are the most effective adaptation strategies to respond to climate change?

What are the social, behavioral and economic factors that may hinder the ability of communities and individuals to implement strategies to adapt to climate change and make informed decisions regarding air quality?

The research is described in EPA's Strategic Research Action Plan, developed with input from EPAs partners, other federal agencies and its external stakeholders.

REFERENCES:

Web sites:
http://www.epa.gov/airscience

http://www.epa.gov/research/climatescience

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