



AIR QUALITY PROGRAM

The Air Quality Program at the Texas A&M Transportation Institute (TTI) focuses on transportation-related air quality and allied considerations, covering a range of topics such as mobile source emissions, transportation sustainability, energy and climate change. Additionally, the Air Quality Studies Program also performs real-world emissions and fuel consumption testing on vehicles using a range of state-of-the-art equipment and testing facilities, including the new Environmental and Emissions Research Facility.

RESEARCH AREAS

Air Quality and Greenhouse Gas Emissions

Researchers perform a wide range of research on air quality related to transportation. The program also is involved in the emerging issues of greenhouse gas emissions and alternative energy sources in the transportation sector. Specific areas of focus include:

- Emissions control strategies and deployment
- Policy options and policy analysis related to air quality and greenhouse gases
- Alternate fuel and vehicle technology options
- Vehicle activity patterns for quantifying emissions impact
- Corridor-level analyses of air quality and greenhouse gas impacts
- Feasibility analysis of methane capture as an alternative fuel source

Transportation Sustainability

Sustainability is an area of emerging interest in the transportation sector. This research field addresses environmental, social and economic concerns in an integrated manner. In addition to planning and policy issues related to sustainability, the program also focuses on the quantification and application of sustainability principles. Specific focus areas for sustainability research include:

- Performance measurement for sustainability
- Development and quantification of sustainability indicators and performance measures
- Application of decision-making approaches and methods
- Corridor-level sustainability analyses
- Sustainability frameworks for transportation agencies
- Sustainability through strategic planning
- Sustainability workshops and outreach efforts

Emissions and Fuel Efficiency

Program researchers perform emissions and fuel consumption testing on a broad range of on-road and off-road vehicles using state-of-the-art testing equipment and facilities. Equipment includes portable emissions measurement systems (PEMS), filter sampling dilution systems and ambient monitors. Testing under environmentally controlled conditions is performed in TTI's Environmental and Emissions Research Facility. Real-world testing is performed at test tracks owned by TTI. Specific focus areas of this research include:

- Emissions control technologies
- Fuel efficiency improvement technologies
- Real-world, in-use PEMS testing on a broad range of vehicle types
- Filter sample collection and analysis for air toxics and particulate matter
- Fuel efficiency testing, including procedures such as the SAE J1321 protocol
- Testing in a drive-in environmental chamber
- Developing drive cycles to simulate real-world driving conditions
- Simulation of real-world driving conditions



Recent Accomplishments and Research Highlights

- Establishment of the Environmental and Emissions Research Facility, the largest drive-in, climate-controlled vehicle testing facility in the United States.
- Recipient of a \$3 million grant from the U.S. Environmental Protection Agency (EPA) Office of Transportation and Air Quality — the largest grant awarded by the office at the time.
- National-level project on sustainable transportation performance measures sponsored by the National Academy of Sciences (through the National Cooperative Highway Research Program), published as NCHRP Report 708.
- Air quality research in U.S.–Mexico border regions, including quantification of drayage truck activity and emissions, and the emissions implications of old imported light-duty vehicles.
- Recently completed projects on landfill gas to energy applications for transportation — both in Texas and in India.
- Ongoing research projects on greenhouse gas policy and transportation control strategies for the Texas Department of Transportation (TxDOT) and the Houston-Galveston Area Council.
- Ongoing project on plug-in hybrid and electric vehicle performance testing as part of a National Science Foundation-sponsored research center.
- Developed emissions rates for high speeds that were used to expand EPA's emissions model (MOBILE6) to beyond 65 mph.
- Developed and applied a methodology for the in-use emissions testing of non-road vehicles and equipment as part of a TxDOT research project.

About TTI

The Texas A&M Transportation Institute, established in 1950, seeks solutions to the problems and challenges facing all modes of transportation — surface, air, pipeline, water and rail. The Institute works with nearly 200 sponsors in the United States and abroad at all levels of government and in the private sector and is recognized as one of the finest higher-education-affiliated transportation research agencies in the nation. TTI has saved the state and nation billions of dollars through strategies and products developed through its research program. TTI research has a proven impact — resulting in lives, time and money saved.

Our Sponsors and Partners

The Air Quality Program has been sponsored by and has partnered with numerous organizations, including:

- United States Environmental Protection Agency (EPA)
- Texas Department of Transportation (TxDOT)
- Transportation Research Board/ National Cooperative Highway Research Program (TRB/NCHRP)
- American Association of State Highway and Transportation Officials (AASHTO)
- Texas Commission on Environmental Quality (TCEQ)
- Federal Highway Administration (FHWA)
- Texas State Energy Conservation Office (SECO)
- Department of Energy (DOE)
- Houston Advanced Research Center (HARC)
- Houston-Galveston Area Council (HGAC)
- National Environmental Engineering Research Institute, India (NEERI)
- Numerous Private Sector Organizations

TTI's Mission

To solve transportation problems through research, to transfer technology and to develop diverse human resources to meet the transportation challenges of tomorrow.

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