EMISSTAR

Mobile Emissions Technology, Policy and Implementation

Control Technology Analysis

TERC/HARC Strategic Technology Assessment

The Houston-Galveston-Brazoria region of Texas has been designated by the US EPA as a severe nonattainment area for ozone. To facilitate meeting the emission reduction targets of the region, the State of Texas contracted Eastern Research Group (ERG) and Emisstar LLC to develop a first of its kind *Strategic Technology Assessment* which has produced an interactive tool designed to predict NOx emission reductions in the region. A database containing highly specific nonroad construction equipment and engine information has been developed for the Greater Houston area, incorporating a level of detail that provides a mechanism for the assessment of emission control reductions at the equipment/engine manufacturer and model level. Married to this database of over 40 construction equipment types are 17 NOx and PM reduction control technologies and technology combinations. The database and resultant predictive model estimates emissions reductions for a myriad of specific combinations of equipment type, operating profile, exhaust gas temperature distribution and control technology. It represents the first of its kind in the level of detail, number of engine types, range of operator categories, and the breadth and depth of included control technologies.

The model has been developed for the calculation of uncontrolled and controlled emissions to aid both air quality planners and technology vendors alike. Towards this end, it incorporates a Graphical User Interface, or "GUI" comprised of two key components: 1) a Regulatory Calculator designed to assist environmental professionals in evaluating the potential impact of specific equipment and control technology combinations on NOx reduction targets; and 2) a Vendor Data Lookup Interface, designed to assist control technology manufacturers in evaluating the market potential of specific emission control technologies on specific equipment types and makes.

The ramifications of the database and predictive model are not limited to Texas. Through continued development encompassing database refinement, expansion into other sectors such as locomotive and marine, and increasing the number and type of equipment/engine parametric datasets as well as emission control technologies, Emisstar and ERG seek to transform this work product into a tool applicable for other US regions, eventually encompassing the entirely of the United States and resulting in a national database/predictive model.

Why MECA Members Would Be Interested: When fully developed, this database and accompanying predictive model and user interface will serve as a valuable tool for manufacturers to analyze the market depth and sales potential for specific technologies, applied to specific geographic areas, at the engine/equipment make, model and application level.

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Control Technology Deployment, Nonroad Sector

Croton and CAT-DEL "BAT" Projects

Croton Water Treatment Plant

The Croton Water Treatment Plant (CWTP) Project is the first of its kind focusing upon implementation of "Best Available Technology" (BAT) in accordance with New York City (NYC) Local Law 77 (LL77) for nonroad construction equipment. Following the enactment of NYC LL77 in 2003, Emisstar was hired by the City of New York DEP to lead the first implementation of BAT, requiring retrofitting of diesel exhaust emission controls on nonroad construction equipment and cement trucks. Emisstar managed the entire project, from overall design through implementation, including presenting the benefits of the technologies at contentious public meetings, and measuring actual emission reduction effectiveness using portable emissions measurement systems (PEMS), which validated the in-field performance of retrofits. Due to the diversity of the technologies (active and passive DPFs, DOCs and SCR) and engines, Croton represents the most comprehensive deployment and analysis of BAT retrofit technologies in the U.S. to-date. It serves as a model for future projects seeking to meet the requirements of "Best Available Technology" and achieve quantifiable clean air benefits.

CAT-DEL

Following upon the success of the CWTP Project, the City of New York contracted Emisstar to provide consulting services geared towards compliance with NYC Local Law 77 involving evaluation and determination of BAT for the Catskill-Delaware ("CAT-DEL") Project, the second major drinking water treatment facility construction endeavor in the region. Using an in-house developed "equipment cataloging" technique, Emisstar provided a comprehensive assessment and characterization of 56 different pieces of nonroad construction equipment operating on the seven+ acre site. In-use exhaust gas temperature monitors were installed, with the resultant data collection and analysis serving as a guideline for accurate determination of the most appropriate BAT required to satisfy the precepts of NYC LL77. Ongoing compliance oversight, including review of contactor mandatory monthly reports to the NYC DEP, and continuing assessment and compliance determinations for new equipment that regularly enter the site, is ensuring contractor compliance with LL77 for the duration of the project.

Why MECA Members Would Be Interested: These two "first-of-a-kind" nonroad emissions control deployment projects demonstrate the viability of air emission control technology programs following BAT, provide invaluable documentation of successes as well as "lessons learned" that can be beneficial in the development of a superior, more robust, control technology product, and serve as bellwethers for future mandatory program development, nationally.

Transportation Conformity Research

NYMTC – Research of Emissions Reduction Measures
In the New York Metropolitan Region

Urban areas, such as the greater New York City region, face continuing challenges to meet air quality standards required by federal and local clean air laws. To anticipate potential problems with meeting air quality conformity budgets, the Program, Finance and Administration Committee of New York Metropolitan Transportation Council (NYMTC) commissioned a study to identify supplemental measures to reduce air pollutants from mobile sources. Emisstar completed in-depth research of the three following supplemental emissions reduction measures identified for potential implementation in the region.

- Use of biodiesel fuel with diesel particulate filters in diesel powered vehicles.
- Accelerated replacement, scrappage and/or retrofit options for diesel powered trucks, school buses, taxis and black cars.
- Regional idling reduction, including enforcement, public education and supporting equipment.

From the research effort, Emisstar offered NYMTC seven key recommendations to implement a targeted diesel emissions reduction program with the following components:

1. Fleet modernization program for accelerated replacement of vehicles in conjunction with installation of retrofits;
2. Rebate style retrofit program;
3. Dealer/distributor supported vehicle diagnostic, repair and modernization facilities;
4. Idle reduction summit;
5. Lease/loan program for idle reduction technologies;
6. Biodiesel/DPF research followed by public fleet implementation; and
7. Education and outreach to promote the above programs and idle reduction strategies.

In addition, Emisstar provided funding source recommendations to pay for the suggested emissions reduction programs, including the Congestion Mitigation and Air Quality program, State Supplemental Environmental Project program, New York Power Authority funds, and State Infrastructure Bank loans.

This Emisstar research has significant policy implications. NYMTC responded favorably to the recommendations and the organization is preparing to develop the business planning tools and resources required to implement many of the measures. Several of the recommendations are anticipated to significantly improve air quality during the so called "in-years", given available funding. For example, with funding of $30 million, Emisstar estimates that even if NYMTC implements only recommendations 1, 2 and 5, reductions of approximately 180 tons of particulate matter and 2,200 tons of nitrogen oxides are attainable over 5 years.

Why MECA Members Would Be Interested: Provisions under SAFETEA-LU[1], allowing for "CMAQ for retrofit", are creating unprecedented opportunities in non-attainment areas for emission control technology providers. Emisstar's research is laying the groundwork for future programs of this type with national implications.

[1] The "Safe, Accountable, Flexible, Efficient Transportation Equity Act – Legacy for Users" which authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009.