

**State of California
AIR RESOURCES BOARD**

**Research Screening Committee Meeting
Cal/EPA Headquarters Building
1001 I Street
Conference Room 510
Sacramento, California 95814
(916) 445-0753**

**November 14, 2008
9:00 a.m.**

ADVANCE AGENDA

Interagency Agreement

1. "Potential Design, Implementation, and Benefits of a Feebate Program for New Passenger Vehicles in California," University of California, Davis, \$796,641, Proposal No. 2668-262

A feebate regulation combining a rebate program for new, low-emitting vehicles with a fee for new, high-emitting vehicles could contribute significantly to the reductions from the transportation sector necessary to achieve the goals of the Global Warming Solutions Act of 2006, particularly if the Air Resources Board (ARB) does not receive a waiver from the United States Environmental Protection Agency to enforce ARB's motor vehicle greenhouse gas standard (Pavley). Researchers from the University of California, Davis will provide a comprehensive study on the implementation and design options for a feebate program based on quantitative modeling of manufacturer and consumer response, past experiences of similar programs, expert interviews, consumer focus groups, and a statewide household survey. This contract will assess the potential emissions reductions and policy implications for various program designs for both a feebate-only program implemented in place of the Pavley standards and a feebate plus Pavley program to achieve additional reductions beyond those expected by the Pavley program. These results will help to inform decision-making on how to design and implement a feebate regulation for California, should it be necessary.

Draft Final Reports

2. "Characterization of the Off-Road Equipment Population," Eastern Research Group, \$299,985, Contract No. 04-315

The operation of off-road equipment generates ozone precursors, particulate matter, toxics, and carbon dioxide. Due to its widespread use, an accurate assessment of the off-road equipment population and activities has been difficult to characterize, but is needed for emissions inventory improvement and potential regulatory development in

California. Off-road equipment encompasses a diverse group such as lawnmowers, chainsaws, bulldozers, paving equipment, and portable generators. In this study, researchers used a telephone survey to collect data from 1,164 participants regarding 3,388 pieces of off-road equipment of less than 175 horsepower. Key data collection includes equipment classification, model year, horsepower rating, fuel type, annual hours of operation, seasonal activity distributions, and user application. To better understand the extent of operation of construction and mining equipment, a subset was equipped with dataloggers. Notable findings from the survey indicate agricultural tractors have a median age greater than 20 years, which is not reflected in ARB's current OFFROAD model. All terrain vehicles (ATV) powered by diesel were repeatedly identified, but are not included in OFFROAD defaults. Gasoline agricultural tractors are in greater prevalence than current OFFROAD values indicate. And, seasonality data indicating variation in activities across the year should provide a basis for updating seasonal allocation factors within the model. Study results indicate ATVs are repeatedly used in agriculture, suggesting further investigations to determine if they should be classified as agricultural equipment. This research provides a comprehensive and consistent profile of the lower-horsepower off-road equipment population and activity data for the agricultural, commercial, and residential sectors, thus, allowing refinements to the OFFROAD emissions model.

3. "Evaluation of the Potential Impact of Emissions of HFC-134A from Non-Professional servicing of Motor Vehicle Air Conditioning Systems," ARMINES, \$126,073, Contract No. 06-341

Millions of motor vehicle air conditioning (MVAC) systems exist in California. The refrigerant used predominantly in MVACs is HFC-134a, a potent greenhouse gas with a global warming potential of 1300. A do-it-yourself (DIY) vehicle owner saves money by recharging an MVAC system with small cans of refrigerant instead of having a professional perform the recharge. However, the non-professional may not properly identify the leak or repair it due to a lack of adequate training and/or equipment. In addition, a DIY recharge of an MVAC system may unintentionally release more HFC-134a than a recharge performed by professional technicians. The research project determined: 1) the mechanisms responsible for the emissions associated with DIY servicing of MVAC; 2) the amount of HFC-134a remaining in the can after use (heel) after refrigerant transfer; 3) the amount of refrigerant that is emitted from MVAC during the re-charging process by the non-professional; and 4) an evaluation of professional servicing and diagnostic procedures. It was found that on the average two-thirds of the charge from the small can goes into the system with one-third being emitted either due to the heel or during the charging process performed by the non-professional. The information is needed for a Global Warming Solutions Act Discrete Early Action Measure for reducing HFC-134a emissions from DIY MVAC servicing and to consider other measures in the field of professional servicing.

4. "Quantifying Pollutant Emissions from Office Equipment," University of California, Berkeley, \$797,427, Contract No. 04-302

Rapid advancement in computer technology combined with its affordability and an increasing reliance on personal computers has led to the introduction of computers and printers into a substantial number of homes. Concern has arisen over potential exposure of individuals, who have these devices in their homes, to toxic emissions. This study was funded by the California Energy Commission (CEC), and was designed to systematically measure and assess the range of toxic pollutants emitted from computers and printers. The pollutants measured included volatile organic compounds (VOC), aldehydes and acetone, semi-volatile organic compounds (SVOC) such as plasticizers and flame retardants, PM, and ozone. In general, the investigators found that the devices produced levels of VOCs, aldehydes and acetone, SVOCs, and ozone lower than most California health benchmarks. However, in a 20 m³ room, formaldehyde emissions from computers would likely exceed the Proposition 65 no significant risk level (NSRL) of 1.6 µg/m³ and the chronic reference exposure level of 3 µg/m³. Likewise, dibutylphthalate emissions from printers would likely exceed the Proposition 65 NSRL of 0.44 µg/m³. Emissions of VOCs and SVOCs from computers decreased with time; however emissions did not decrease from printers, but rather they were associated with active printing events. Ozone was only detected from laser printers, where the highest emitting printers emitted ozone at rates of 583 ± 111 µg/h and 1750 ± 92 µg/h. PM emissions were not detected for computers or inkjet printers, but laser printers produced intermittent bursts of fine and ultrafine particle emissions, which were associated with starting up the printers after they were off or idle. These events yielded particle concentrations between approximately 100,000 and 500,000 particles/cc in a 400 L chamber. However, in a typical room these concentrations would likely be at least an order of magnitude smaller. ARB will use these data to better estimate source emissions contributing to the public's indoor exposure to toxic air contaminants, and to better inform the public of ways to mitigate their exposure to such compounds. CEC will use these measurements to assess the relationship between pollutants emitted from office equipment and ventilation requirements and energy usage.