

August 26, 2019

Tom Moore, Air Quality Program Manager
Western States Air Resources Council-Western Regional Air Partnership
3 Caliente Rd #8
Santa Fe, NM 87508

Subject: Proposal to Develop 2028 Air Quality Model-ready Mobile Source Emission Inventory for the WRAP Region Modeling Domain

Dear Mr. Moore,

Thank you for soliciting our response to the 2028 Western States Air Resources Council-Western Regional Air Partnership (WESTAR-WRAP) Mobile Source Emission Inventory Development task. We understand that this analysis is necessary to meet air quality planning needs for regional haze as well as ozone and other air pollution indicators. We are pleased to have the opportunity to develop the 2028 WESTAR-WRAP mobile source emission inventory.

The emission inventory task scope is provided below.

- **Geographical:** Western US Modeling Domain^{1,2}
- **Temporal:** 2028
- **Pollutants:** nitrogen oxides, volatile organic compounds, carbon monoxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, sulfur dioxides, ammonia
- **Sources:**
 - On-road vehicles
 - Off-road equipment³
 - Aircraft
 - Rail
 - Marine
- **Format:** Air quality model (AQM)-ready emission inventory ([Comprehensive Air Quality Model with extensions](#) [CAMx] or [Community Multiscale Air Quality Modeling System](#) [CMAQ])

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¹ California's emission inventory will be obtained directly from the California Air Resources Board (CARB), similar to the WRAP base year 2014 emission inventory

² Emissions from states outside of the WESTAR-WRAP region as well as portions of Canada and Mexico in the Western US modeling domain will be taken from the EPA 2016 modeling platform for 2028 without revision

³ Off-road equipment includes various types of equipment that change locations at least once each year (or in certain cases once each season) such as lawn mowers, forklifts, excavators, all-terrain vehicles, and agricultural tractors.

The following tasks have been identified for this work:

- Task 1: Emission inventory development plan
- Task 2: WESTAR-WRAP states SMOKE-MOVES⁴ vehicle emission inventory
- Task 3: Off-road equipment emission inventory development
- Task 4: Rail, marine, and airport emission inventory development
- Task 5: SMOKE Processing for all off-road sectors
- Task 6: Reporting
- Task 7: Communications

EPA's 2014-2016 modeling platform collaborative will inform this analysis. As part of the 2014-2016 modeling platform collaborative, EPA is developing a 2028 future year emission inventory for the lower-48 states. The 2028 future year inventory is based on a 2016 base year. If WRAP 2014 and EPA 2016 base year inventory methodologies are not consistent for a given mobile source sector, this may need to be addressed in the WRAP 2028 future year emission inventory to ensure consistency between WRAP future year 2028 and WRAP base year 2014 emission inventories. Ramboll will solicit the WRAP Air Quality Program Manager's assistance in getting 2016 modeling platform future year 2028 mobile source emissions data from EPA.

To the extent feasible, steps will be taken to develop a 2028 emission inventory for the WESTAR-WRAP region that (1) includes local input data (e.g., special mobile source studies that have been done in non-attainment areas such as Phoenix, Denver, and Salt Lake City), (2) includes effects of local/state/federal on-the-books and on-the-way regulations, and (3) has methodological consistency with the WRAP Regional Haze 2014 base year. The table below describes emission inventory development considerations for each inventory component. We will consider the feasibility of incorporating the effects of upcoming CARB rules impacts on neighboring states' emissions. We will not consider any potential future regulations; the analysis will be limited to on-the-books and on-the-way regulations and the effects of CARB regulations on neighboring states. During Task 1: Workplan Development, we will document WRAP 2028 inventory development methodology.

⁴ SMOKE-MOVES is a tool that uses emission rate "lookup" tables generated by the MOVES model, grid cell-level meteorological data, and county-level vehicle activity data to develop air quality model-ready emissions input

Source Category	Inventory Development Considerations (bold items are likely to require outreach to WRAP member agencies)
On-road	<ul style="list-style-type: none"> • Develop emissions with SMOKE-MOVES⁵ • Obtain 2028 MOVES emission factor and activity lookup tables from the 2016 platform • Ensure that the inventory includes effects of any local control programs, to the extent feasible
Off-road equipment	<ul style="list-style-type: none"> • Obtain EPA modeling platform collaborative 2028 emissions and/or emission factors • Consider whether MOVES should be re-run for WRAP states based on MOVES version applied in available 2028 emission inventories and the WRAP Regional Haze 2014 base year emission inventory. • Ensure that the inventory includes effects of any local control programs, to the extent feasible • Ensure inclusion of future year port emission inventories, to the extent feasible • Ensure inventory includes special studies performed by member agencies, to the extent feasible • To develop AQM-ready emission inventory files, the approach will likely be to process county-level inventory files through SMOKE
Rail	<ul style="list-style-type: none"> • Obtain EPA modeling platform collaborative 2028 emissions and methods • Based on state/local/tribal agency input, ensure that rail emissions include any additional local control programs beyond what is included in EPA modeling platform collaborative 2028 emission inventory • To develop AQM-ready emission inventory files, the approach will likely be to process county-level inventory files through SMOKE
Marine	<ul style="list-style-type: none"> • Obtain EPA modeling platform collaborative 2028 emissions and methods • Based on state/local/tribal agency input, ensure that rail emissions include any additional local control programs beyond what is included in EPA modeling platform collaborative 2028 emission inventory • To develop AQM-ready emission inventory files, the approach will likely be to process county-level inventory files through SMOKE
Aircraft	<ul style="list-style-type: none"> • Obtain EPA modeling platform collaborative 2028 emissions and methods • No updates are anticipated to the aircraft emission inventory • To develop AQM-ready emission inventory files, the approach will likely be to process county-level inventory files through SMOKE

⁵ We do not expect to perform MOVES model runs as part of this work. Given scope and schedule considerations, we would rely on EPA's 2028 MOVES emission factor look-up table applied to the WRAP base year 2014 meteorology.

The deliverables for this work and associated due dates are:

- **Emission inventory plan**
 - Draft memorandum (1 week from notice to proceed [NTP])
 - Comments based on expedited review of draft memorandum (2 weeks from NTP)
 - Final memorandum (3 weeks from NTP)
- **Agency input memoranda:** a memorandum will be provided for each mobile source category asking for agency review of key emission inventory inputs
 - Memoranda delivered to WRAP Air Quality Program Manager (5 weeks from NTP)
 - Agency input on memoranda (6.5 weeks from NTP)
- **Emission inventory deliverables**
 - Draft memorandum and presentation slide deck summarizing inventory methods and results (9.5 weeks from NTP; October 31, 2019 if NTP is provided on August 27, 2019)
 - Comments on draft memorandum (11.5 weeks from NTP; November 14, 2019 if NTP is provided on August 27, 2019)
 - Final memorandum, AQM-model ready emission inventory input files (12.5 weeks from NTP; November 21, 2019 if NTP is provided on August 27, 2019)

The emission inventory presentation and memorandum will include tables and/or charts summarizing emission changes from WRAP base year 2014 to WRAP future year 2028 and EPA modeling platform base year 2016 to WRAP future year 2028.

Weekly teleconferences with the WRAP Air Quality Program Manager will be held to ensure streamlined communication of methodology, coordination and other task-related subjects. To the extent necessary, the WRAP Air Quality Program Manager will set-up teleconferences and lead outreach efforts to WESTAR-WRAP member agencies when input on emission inventory inputs and/or deliverable review is required. Ramboll will present draft results during a teleconference organized by the WRAP Air Quality Program Manager.

If you have any questions about this proposal, please do not hesitate to contact me or John Grant.

Yours sincerely,



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