



# North American Black Carbon Emissions Estimation Guidelines

16<sup>th</sup> Global Emissions Initiative (GEIA) Conference

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# Study Overview

## ■ Task Objectives

- Task 1: Review existing black carbon data and methodologies; initial recommendations for North America
- Task 2: Solicit expert review; consensus methodologies to harmonize and improve North American black carbon emissions inventories
- Task 3: Develop user-friendly guidance document

## ■ Team

- Steering Committee – Orlando Cabrera (CEC), Terry Keating (EPA), John Moritz (EC), Luis Conde (INECC)
- ERG – John Koupal (Project Manager), Dr. Joyce Penner, (Biomass Expert) Veronica Garibay-Bravo (Mexico Expert)

## ■ Schedule

- Task 1 – Draft Review Document and Initial Recommendations – June 2014
- Task 2 – Expert Review Consultations – end of September 2014
- Task 3 – Guidance Document – Draft December 2014; Final June 2015



# Master Candidate Document List

- On-line databases => 8,000 studies
- 2004 and later => 1,200 studies
- Available abstract, applicable title => 600 studies
- Final list for review => 140 studies
- Comprehensive Sources

Country	Black Carbon Inventory	Underlying PM Inventory
Canada	Assessment of Emissions and Mitigation Options for Black Carbon, Arctic Council, 2011	• NPRI
U.S.	EPA Report to Congress, 2012	• 2002, 2005, 2011 U.S. NEI • RPO Inventories (Biomass)
Mexico	Supporting National Planning of Short-lived Climate Pollutants in Mexico, 2013	2008 Mexico NEI
Europe	EMEP/EEA Air Pollutant Emission Inventory Guidebook, 2013	
Global	A Technical Document on Global Inventories of Black Carbon and Organic Carbon	

# Documentation Review

## Sectors

- Open biomass burning
- Residential
- Mobile sources
- Industry/Energy
- Other sources

## Review

## Evaluation

- Based on EMEP/EEA Tiers (1, 2, 3)

## On-road Sources

Reviewer	John Koupal
Study no.	BC-12 (Report to Congress on Black Carbon, 2012)
Section reviewed (for comprehensive or multiple sector papers)	4.3.1 (Overview), Chapter 8 (Mitigation), Appendix 2
What years (of emissions, not publication)?	1990, 2005, 2020, 2030
Where (country, etc.)?	U.S.
What subsectors included?	Onroad gas, onroad diesel, tire wear, brake wear
Describe the general methodology	MOVES model used to produce direct EC PM2.5 estimates by subsector (no additional speciation required)
Source of emission factors?	MOVES. PM emission factors derive from emission measurement on in-use vehicles
Source of activity?	VMT from U.S. DOT/FHWA (HPMS)
Source of speciation?	n/a
How is uncertainty addressed?	Qualitative discussion
Source of projections?	VMT growth from Annual Energy Outlook
Mitigation addressed? If so, how?	Chapter 8 focuses on mobile source mitigation. For on-road, effect of U.S. emission standards and low sulfur fuel included in MOVES projections. Additional mitigation strategies discussed (i.e. retrofit), but not quantified.
Does this report highlight additional references that should reviewed for this project?	EPA (2010e) MOVES2010 model. <a href="http://www.epa.gov/otaq/models/moves">http://www.epa.gov/otaq/models/moves</a> .



# Evaluation of Black Carbon Emissions Methodologies

## ■ Evaluation

- Aligned with EMEP/EEA Tiers (1, 2, 3)
- Identifies data gaps
- Use of PM inventories with BC speciation is global standard

### Sector/Subsector: Mobile/On-Road

	Euro Tier 1	Euro Tier 2	Euro Tier 3	< Tier 1	Tier 1	Tier 2	Tier 3	> Tier 3
Method	Aggregate fuel based PM	Refined fuel-based PM w/ speciation	Detailed bottom-up PM w/speciation				Canada ACTF; Mexico NEI (MOBILE6)	EPA RTC (MOVES calculates EC directly)
Emission Factors	Single fuel-based factor	Technology-specific fuel-based	BC/EC emission factors by vehicle class, model year/standard			Canada ACTF & Mexico NEI (MOBILE6)	EPA RTC (MOVES)	
Activity	Total fuel consumed	Fuel consumed by technology	VMT by vehicle class, roadway, speed				EPA RTC (MOVES); Canada ACTF; Mexico NEI	
Speciation	N/A	Technology-specific factor	Technology-specific factor				Canada ACTF; Mexico NEI (SPECIATE)	EPA RTC (MOVES w/speciation by activity)



# We need experts!

- **Role of Sector Experts**
  - Review methodology review document and initial recommendations
  - Provide input and guidance on final recommendations
- **Commitment**
  - CEC webinar in July or August
  - Break calls by sector/sub-sector in August
  - Final methodology recommendations in September
- **Complete this survey to express interest**
  - <https://survey.erg.com/ss/wsb.dll/s/7g1ce>
- **Study contacts**
  - John Koupal ([john.koupal@erg.com](mailto:john.koupal@erg.com)), Paula Fields Simms ([paula.fields@erg.com](mailto:paula.fields@erg.com)), Orlando Cabrera ([ocabrera@cec.org](mailto:ocabrera@cec.org))