MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Development of MOVES Inputs for Upcoming SIP Actions

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Overview

- Current SIP action
  - Marginal Nonattainment Area SIP Requirements
- Upcoming SIP actions
- MOVES Input Development

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Current SIP Action

– Marginal Nonattainment Area Plan for the Missouri Portion of the St. Louis Nonattainment Area Under the 2015 Ozone Standard

- Posted for public comment: April 26, 2021
- Public hearing: May 27, 2021
- Close of public comment period: June 3, 2021
- Second stakeholder meeting: July 29, 2021
- Propose for adoption: August 26, 2021

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Marginal Nonattainment Area SIP Requirements

- Baseline emissions inventory (2017)
  - Based on the 2017 National Emissions Inventory (NEI)
- Nonattainment new source review permit programs
- Periodic inventories
- Emissions statements
- Emission offset requirements (1.1 – 1.0)

Attainment deadline: August 3, 2021 (Based on 2018-2020 data)

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Development of MOVES Inputs for Upcoming SIP Actions – Years of Interest

- Determine data sources for modeling inputs used for SIP emission inventories and motor vehicle emission budgets

- Emission years of interest
  - 2017
  - 2020
  - 2023
  - 2027
  - 2035

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Upcoming SIP Actions

- Pending "bump-up" to moderate
  - 2018-2020 design value 71 ppb
  - Anticipate EPA proposal fall; final early 2022
- Moderate nonattainment area SIP elements
  - Attainment demonstration, reasonable further progress, inspection/maintenance, reasonably available control technology
- Once attainment is achieved
  - Maintenance plan and redesignation request

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MOVES Input Development

Critical MOVES County Database Inputs

- VMT
- Vehicle Population by Source Type
- Fuel Characteristics
- Speed Distribution
- Road Type Distribution
- Age Distribution
- I/M Program
- Meteorology

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MOVES Input Development

Emission Year	Data Source
2017	2017 NEI
2020	2020 NEI (under development)
2023	– 2020 NEI for everything except VMT, and vehicle population – Grow VMT from 2019 – Grow vehicle population from 2020 NEI – Toggle between RFG and conventional gasoline fuel tables – Toggle I/M on and off
2027	
2035	

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MOVES Inputs 2020 NEI (Under Development)

MOVES Input	Intended Data Source
VMT	DNR creates with MoDOT data
Vehicle Population	DNR will create using Missouri DOR vehicle registration data
Age Distribution	
Speed Distribution	Either use EPA default or DNR will create using MoDOT data
Road Type Distribution	
Fuel	EPA/MOVES Default
I/M Program	DNR creates with I/M contractor data
Meteorology	DNR creates with Missouri Historical Agricultural Weather Database

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MOVES Input Development (Future Years)

Growing Vehicle Miles Traveled (VMT)

- Need to obtain an annual growth rate and apply to the most recent representative annual VMT data (2019)
- Evaluate last 10 years of VMT data from MoDOT to determine appropriate growth rate

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MOVES Input Development (Future Years)

Growing Vehicle Miles Traveled (VMT)

Year	Average Daily VMT	Annual Growth Rate (%)
2011	36,113,513	-------
2012	37,331,847	3.37%
2013	37,541,694	0.56%
2014	38,716,856	3.13%
2015	38,630,250	-0.22%
2016	39,931,121	3.14%
2017	40,585,306	1.64%
2018	40,017,969	-1.40%
2019	40,156,202	0.35%

Average daily VMT combined for Franklin, Jefferson, St. Charles, and St. Louis counties, and St. Louis City

Compound annual growth rate = 1.34%

For illustrative purpose only, still evaluating historical VMT figures.

$$(VMT_{2011}) * (1 + compound\ annual\ growth\ rate)^8 = VMT_{2019}$$

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MOVES Input Development (Future Years)

Growing Vehicle Miles Traveled (VMT)

- Propose to apply this growth rate methodology to 2019 VMT data at the county-level to obtain projected VMT data for 2023, 2027, and 2035
- IACG concurrence on VMT growth rate methodology?

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MOVES Input Development (Future Years)

Growing Vehicle Population

- Need to obtain an annual growth rate and apply to the most recent representative vehicle population (2020 NEI)
- Evaluate 2017 and 2019 statewide vehicle population data from Federal Highway Administration to determine appropriate annual growth rate

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Growing Vehicle Population

MOVES Vehicle Type	Federal Highway Administration Vehicle Type
Motorcycle	Motorcycles
Passenger car	Automobiles
Passenger truck	Trucks
Light commercial truck	
Single unit short-haul truck	
Single unit long-haul truck	
Combination short-haul truck	
Combination long-haul truck	
Motor home	
School bus	Buses
Transit bus	
Intercity bus	

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Growing Vehicle Population

Vehicle Type	MO 2017 Population (FHWA)	MO 2019 Population (FHWA)	Annual Growth Rate (%)
Motorcycles	138,294	135,954	-0.850%
Automobiles	2,141,050	2,052,788	-2.083%
Trucks	3,262,212	3,318,327	+0.856%
Buses	27,180	27,220	+0.074%

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MOVES Input Development (Future Years)

Growing Vehicle Population

- Propose holding motorcycle and passenger car populations constant at 2020 NEI values (negative growth between 2017-2019)
- Propose growing 2020 NEI values for trucks and buses as follows:
  - Trucks: 0.856% annual compound growth rate
  - Buses: 0.074% annual compound growth rate
- IACG concurrence on vehicle population growth rate?

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MOVES Input Development

Vehicle Inspection and Maintenance (I/M)

- For the 2020 NEI, we plan to create our own input using data from our I/M contractor
- For future years (2023, 2027, and 2035), we plan to toggle I/M "on" and "off" in MOVES
  - Determine the future benefit of I/M

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MOVES Input Development

Fuel Characteristics

- For the 2020 NEI, we plan to use the EPA/MOVES default inputs for the St. Louis region that account for the benefit of reformulated gasoline (RFG)
- For future years (2023, 2027, and 2035), we plan to toggle between RFG and conventional gasoline
  - Determine the future benefit of RFG

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MOVES Input Development

Meteorology

- For the 2020 NEI, we plan to use local weather data from the Missouri Historical Agricultural Weather Database to create inputs for different regions of the state
- Future years will use the same meteorology as the base year in the relevant SIP action

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MOVES Input Development

Age, Road Type, and Speed Distribution

- For the 2020 NEI:
  - plan to use DOR and I/M contractor data to create age distribution curves
  - either use EPA/MOVES defaults for speed distribution and road type distribution or create these inputs with MoDOT data

- For future years:
  - plan to use the unchanged 2020 NEI data for all three inputs

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Questions?

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