

AASHTO Webinar on FHWA GHG NPRM

July 14, 2022

4:00pm to 5:30pm EDT

Agenda

- Opening Comments
- GHG NPRM Overview
- AASHTO Commenting Process
- Initial AASHTO (Matt Hardy) Assessment
- AASHTO GHG NPRM Analysis Tool
- Open Discussion

GHG NPRM Overview

Basic Information

- **Who:** State DOTs and MPOs
- **What:** Tailpipe CO₂ Emissions on the NHS
 - Function of Gallons of Fuel Sold, CO₂ Factor, ratio of NHS VMT to total VMT
 - MPOs can establish their own calculation process.
- **When:** October 1, 2022
- **How:** Establish declining targets to achieve net-zero emissions by 2050
 - Use the existing national performance management framework.
- **Why:** Transportation sector is a large producer of GHG emissions.

AASHTO Commenting Process

Committee Involvement

- **Lead Committee: Committee on Performance-Based Management**
 - Chair (Acting): Christos Xenophontos, RI
 - Working Group Members: tbd
 - AASHTO Staff: Matt Hardy, (202) 624-3625 or mhardy@ashto.org
- **Key Coordinating Committee (s): Committee on Environment and Sustainability**
 - Chair: Yassmin Gramian, PA
 - Working Group Members: tbd
 - AASHTO Staff: Kelly Cornell-Lew, (202) 624-3692 or kclew@ashto.org
- **Key Coordinating Committee (s): Committee on Planning**
 - Chair: Kristina Swallow, NV
 - Working Group Members: tbd
 - AASHTO Staff: Matt Hardy, (202) 624-3625 or mhardy@ashto.org

PHASE 1: AASHTO COMMENTS DEVELOPMENT		
Step	Date	Notes
AASHTO member webinar outlining input process from committees and initial reaction from members.	July 14, 2022, 4:00pm EDT	Register here .
1. FEDERAL REGISTER NOTICE ISSUED	July 15, 2022	AASHTO to notify all states and appropriate committees with instructions for directing any initial comments
FHWA Webinar(s)	<u>tbd</u>	It is anticipated that FHWA will have one or two webinars rolling out the NPRM.
AASHTO Committee Webinar(s)	<u>tbd</u>	It is anticipated that AASHTO committee will have webinars to gather input from members.
2. INITIAL COMMENT PERIOD ENDS	August 12, 2022	Initial comments identified by states or AASHTO committee members submitted to Lead AASHTO Committee (CPBM).
3. LEAD AASHTO COMMITTEE PRODUCES FIRST DRAFT AASHTO COMMENTS	August 26, 2022	First draft of AASHTO comments sent to those members who submitted comments and AASHTO committees for review and comment.
4. COMMENTS ON FIRST DRAFT AASHTO COMMENTS DUE TO AASHTO STAFF	September 9, 2022	AASHTO staff will collect/compile comments
5. LEAD AASHTO COMMITTEE PRODUCES FINAL DRAFT AASHTO COMMENTS	September 21, 2022	Chair of Lead AASHTO Committee sends final draft to appropriate AASHTO committee chair(s) for sign-off
6. COMMITTEE LEADERSHIP SIGN-OFF	September 30, 2022	Chair of Lead AASHTO Committee sends final draft to AASHTO President and Executive Director.
7. AASHTO PRESIDENT SIGN-OFF	October 7, 2022	AASHTO Final Comments submitted to docket
8. AASHTO BOD INFORMED	October 7, 2022	AASHTO President disseminates to BOD
PHASE 2: INDIVIDUAL STATE RESPONSES BY DAY 90		
Step	TARGET DAY	Notes
9. STATES COMMUNICATE THEIR INDIVIDUAL RESPONSES	October 13, 2022	States are asked to also copy AASHTO on their submittals

Tools and Resources

- Website: <http://www.tpm-portal.com/GHG-NPRM>
- Commenting Template
- AASHTO GHG NPRM Analysis Tool

Initial AASHTO (Matt Hardy) Assessment

Categories

1. Understanding the Equations
2. Authority
3. Target Setting Approach
4. Managing Expectations
5. Technical Aspects

1) Understanding the Equations

Performance Metric

$$\left(\frac{\text{NHS VMT}}{\text{Total VMT}} \right) (\text{Tailpipe CO}_2 \text{ Emissions on NHS})_{\text{CY}} = \left(\sum_{t=1}^T (\text{Fuel Consumed})_t \times (\text{CO}_2 \text{ Factor})_t \right) \times$$

Fuel Data: MF-21 (Highway Statistic Series)

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fhwa.dot.gov/policyinformation/statistics/2019/mf21.cfm

Highway Statistics 2019

Motor-Fuel Use - 2019 (1)

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November 2020

STATE	COMBINED GASOLINE AND GASOHO										SPECIAL FUEL	SUMMARY OF TOTAL USE				
	HIGHWAY USE				NONHIGHWAY USE			TOTAL USE	LOSSES ALLOWED FOR EVAPORATION, HANDLING, ETC. (2)	TOTAL CONSUMPTION		HIGHWAY (3)		NON-HIGHWAY (GASOLINE ONLY)	TOTAL	
	PRIVATE AND COMMERCIAL	PUBLIC USE		TOTAL	TOTAL	PRIVATE AND COMMERCIAL	STATE, COUNTY, AND MUNICIPAL				TOTAL	AMOUNT	PERCENT CHANGE FROM PRIOR YEAR			
Alabama	2,598,931	3,173	57,548	60,721	2,659,652	192,943	3,055	195,998	2,855,650		2,855,650	874,206	3,533,858	4		195,998
Alaska	230,203	1,617	10,742	12,359	242,562	42,165	559	42,724	285,286		285,286	126,670	369,232	9.2		42,724
Arizona	2,794,816	6,667	30,144	36,811	2,831,627	233,072	1,573	234,645	3,066,272		3,066,272	946,619	3,778,246	2.7		234,645
Arkansas	1,410,849	1,729	18,893	20,622	1,431,471	123,952	991	124,943	1,556,414	3	1,556,417	680,318	2,111,789	2.4		124,943
California	14,062,939	26,155	343,489	369,644	14,432,583	981,078	17,927	999,005	15,431,588		15,431,588	3,502,324	17,934,907	0.7		999,005
Colorado	2,232,559	4,519	33,571	38,090	2,270,649	182,810	1,762	184,572	2,455,221		2,455,221	681,901	2,952,550	2.4		184,572
Connecticut	1,434,972	1,928	544	2,472	1,437,444	79,933	28	79,961	1,517,405	803	1,518,208	286,501	1,723,945	(0.2)		79,961
Delaware	519,561	506	2,485	2,991	522,552	34,970	109	35,079	557,631	409	558,040	84,114	606,666	7.1		35,079
Dist. of Col.	86,977	5,685	20,594	26,279	113,256	6,107	917	7,024	120,280	9	120,289	16,539	129,795	5.9		7,024
Florida	8,396,104	12,809	177,756	190,565	8,586,669	868,820	8,442	877,262	9,463,931		9,463,931	1,781,089	10,367,758	0.5		877,262
Georgia	4,639,241	6,712	97,424	104,136	4,743,377	271,147	5,083	276,230	5,019,607		5,019,607	1,342,455	6,085,832	(0.6)		276,230
Hawaii	422,640	2,268	11,803	14,071	436,711	34,549	618	35,167	471,878		471,878	48,952	485,663	0.7		35,167
Idaho	727,654	2,157	4,235	6,392	734,046	127,171	222	127,393	861,439		861,439	327,007	1,061,053	5.8		127,393
Illinois	4,404,195	6,773	44,016	50,789	4,454,984	301,749	2,298	304,047	4,759,031	3,234	4,762,265	1,521,395	5,976,379	(2.9)		304,047
Indiana	2,913,892	3,344	17,431	20,775	2,934,667	208,037	914	208,951	3,143,618		3,143,618	1,254,793	4,189,460	(0.5)		208,951
Iowa	1,463,523	1,588	21,799	23,387	1,486,910	195,754	1,143	196,897	1,683,807		1,683,807	735,232	2,222,142	1.3		196,897
Kansas	1,274,712	1,978	7,560	9,538	1,284,250	101,231	397	101,628	1,385,878	6	1,385,884	502,670	1,786,920	6.0		101,628
Kentucky	2,092,400	2,803	51,001	53,804	2,146,204	118,572	2,663	121,235	2,267,439		2,267,439	811,703	2,957,907	0.1		121,235
Louisiana	2,035,446	3,162	50,525	53,687	2,089,133	161,188	2,863	164,051	2,253,184		2,253,184	757,322	2,846,455	5.2		164,051
Maine (3)	584,683	823	7,747	8,570	593,253	64,799	405	65,204	658,457		658,457	180,116	773,369	-		65,204
Maryland	2,555,462	5,978	40,862	46,840	2,602,302	143,889	2,131	146,020	2,748,322	14,212	2,762,534	550,738	3,153,040	1.4		146,020
Massachusetts	2,651,146	3,732	3,722	7,454	2,658,600	144,937	194	145,131	2,803,731		2,803,731	452,669	3,111,269	(0.4)		145,131
Michigan	4,334,567	5,228	41,735	46,963	4,381,530	478,700	2,175	480,875	4,862,405		4,862,405	969,508	5,351,038	(1.8)		480,875
Minnesota	2,378,891	2,940	29,320	32,260	2,411,151	273,642	1,536	275,178	2,686,329		2,686,329	874,736	3,285,887	1.1		275,178
Mississippi	1,658,625	2,053	7,930	9,983	1,668,608	85,661	416	86,077	1,754,685		1,754,685	709,977	2,378,585	3.3		86,077

CO₂ Emissions Factors

Data revised on February 9, 2022, to add more detail on motor gasoline and to correct small errors in the propane and natural gas heat rates.				
Methodology				
Carbon Dioxide Emissions Coefficients by Fuel				
	Pounds CO ₂	Kilograms CO ₂	Pounds CO ₂	Kilograms CO ₂
Carbon Dioxide (CO ₂) Factors:	Per Unit of Volume or Mass	Volume or Mass	Per Million Btu	Per Million Btu
For homes and businesses				
Propane	12.68 gallon	5.75 gallon	138.63	62.88
Diesel and Home Heating Fuel (Distillate Fuel Oil)	22.46 gallon	10.19 gallon	163.45	74.14
Kerosene	21.78 gallon	9.88 gallon	161.35	73.19
Coal (All types)	4,027.93 short ton	1,827.04 short ton	211.06	95.74
Natural Gas	120.96 thousand cubic feet	54.87 thousand cubic feet	116.65	52.91
Finished Motor Gasoline ^a	17.87 gallon	8.10 gallon	148.54	67.38
Motor Gasoline	19.37 gallon	8.78 gallon	155.77	70.66
Residual Heating Fuel (Businesses only)	24.78 gallon	11.24 gallon	165.55	75.09
Other transportation fuels				
Jet Fuel	21.50 gallon	9.75 gallon	159.25	72.23
Aviation Gas	18.32 gallon	8.31 gallon	152.46	69.15
Industrial fuels and others not listed above				
Petroleum coke	32.87 gallon	14.91 gallon	225.13	102.12
Nonfuel uses				
Asphalt and Road Oil	26.25 gallon	11.91 gallon	166.12	75.35
Lubricants	23.58 gallon	10.70 gallon	163.29	74.07
Naphthas for Petrochemical Feedstock Use	18.74 gallon	8.50 gallon	149.95	68.02
Other Oils for Petrochemical Feedstock Use	22.61 gallon	10.26 gallon	163.05	73.96
Special Naphthas (solvents)	19.94 gallon	9.04 gallon	159.57	72.38
Waxes	21.10 gallon	9.57 gallon	160.06	72.60
Coals by type				
Anthracite	5,715.11 short ton	2,592.33 short ton	228.60	103.69
Bituminous	4,929.71 short ton	2,236.08 short ton	205.40	93.17

VMT: VM-3 (Highway Statistic Series)

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Highway Statistics Series

Highway Statistics 2019

FEDERAL - AID HIGHWAY TRAVEL - 2019 (1) ANNUAL VEHICLE - MILES

Printable [Excel Version](#) [86 KB]
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September 30, 2020

(Millions)

Table VM-3

STATE	NATIONAL HIGHWAY SYSTEM									OTHER FEDERAL-AID HIGHWAYS			ALL FEDERAL-AID HIGHWAYS			ALL NON-FEDERAL-AID HIGHWAYS			TOTAL
	INTERSTATE			OTHER			TOTAL												
	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	RURAL	URBAN	TOTAL	
Alabama	6,644	9,354	15,998	5,574	9,993	15,567	12,218	19,347	31,565	9,043	12,087	21,129	21,261	31,434	52,695	7,750	11,290	19,040	71,735
Alaska	851	790	1,641	333	981	1,314	1,184	1,771	2,955	374	850	1,224	1,558	2,621	4,179	1,032	671	1,702	5,881
Arizona	7,158	8,090	15,248	3,614	14,112	17,726	10,772	22,203	32,975	4,026	26,130	30,156	14,798	48,332	63,131	1,892	5,258	7,150	70,281
Arkansas	4,297	5,655	9,952	4,077	4,322	8,399	8,374	9,978	18,351	6,571	7,038	13,609	14,944	17,016	31,960	3,001	2,138	5,139	37,099
California	17,184	74,947	92,131	16,643	113,582	130,226	33,828	188,529	222,357	18,301	74,447	92,747	52,128	262,976	315,104	4,352	21,380	25,732	340,836
Colorado	4,935	9,927	14,862	4,782	15,127	19,909	9,717	25,054	34,771	4,067	9,522	13,588	13,784	34,576	48,360	2,432	3,842	6,274	54,634
Connecticut	490	9,806	10,296	753	8,129	8,882	1,243	17,935	19,178	1,241	7,974	9,214	2,484	25,909	28,393	705	2,503	3,208	31,601
Delaware	-	1,496	1,496	1,116	3,091	4,206	1,116	4,587	5,702	807	2,077	2,884	1,923	6,664	8,587	605	1,054	1,658	10,245
District of Columbia	-	521	521	-	1,443	1,443	-	1,965	1,965	-	1,017	1,017	-	2,981	2,981	-	775	775	3,756
Florida	11,166	31,627	42,793	11,030	62,161	73,192	22,196	93,788	115,984	8,188	55,607	63,795	30,384	149,395	179,779	7,147	39,588	46,735	226,514
Georgia	8,114	25,484	33,598	7,436	22,556	29,992	15,550	48,041	63,590	10,609	29,760	40,369	26,159	77,800	103,959	5,651	23,518	29,169	133,128
Hawaii	-	2,067	2,067	353	2,697	3,050	353	4,764	5,117	732	2,128	2,860	1,085	6,892	7,977	792	2,255	3,047	11,024
Idaho	2,788	1,727	4,515	2,480	2,188	4,668	5,268	3,916	9,183	2,621	2,848	5,469	7,889	6,764	14,653	2,220	1,184	3,405	18,058
Illinois	9,405	24,518	33,923	3,981	21,896	25,877	13,387	46,414	59,800	8,206	24,185	32,391	21,593	70,599	92,192	3,783	11,551	15,333	107,525
Indiana	8,118	11,154	19,273	5,496	5,164	10,659	13,614	16,318	29,932	9,351	21,659	31,010	22,965	37,977	60,942	7,141	14,636	21,777	82,719
Iowa	5,216	3,225	8,441	6,344	4,081	10,425	11,560	7,306	18,866	6,170	4,410	10,580	17,730	11,716	29,446	2,226	1,865	4,091	33,537
Kansas	3,706	4,116	7,822	4,628	3,250	7,877	8,334	7,366	15,700	5,096	6,871	11,967	13,429	14,237	27,667	1,801	2,375	4,176	31,843
Kentucky	8,426	6,791	15,217	5,166	5,569	10,735	13,592	12,361	25,952	7,656	8,073	15,729	21,248	20,434	41,681	5,349	2,379	7,729	49,410
Louisiana	6,924	9,796	16,719	2,752	7,597	10,349	9,676	17,393	27,069	6,187	12,103	18,291	15,863	29,496	45,359	3,935	2,066	6,001	51,360
Maine	2,175	1,280	3,455	1,880	886	2,766	4,055	2,166	6,221	3,935	1,991	5,927	7,990	4,158	12,148	2,261	463	2,723	14,871

Performance Metric

$$(\text{Tailpipe CO}_2 \text{ Emissions on NHS})_{\text{CY}} = \left(\sum_{t=1}^T (\text{Fuel Consumed})_t \times (\text{CO}_2 \text{ Factor})_t \right) \times$$

$$\left(\frac{\text{NHS VMT}}{\text{Total VMT}} \right)$$



Does this change?



**How do you
affect this?**



**Is this a
constant?**

Performance Measure

$$\frac{(\text{Tailpipe CO}_2\text{Emissions on NHS})_{\text{CY}} - (\text{Tailpipe CO}_2\text{Emissions on NHS})_{\text{reference year}}}{(\text{Tailpipe CO}_2\text{Emissions on NHS})_{\text{reference year}}} \times 100$$



Is this the correct year?

2) Authority

- 23 USC §150: National Goals and Performance Management Measures
 - National Goals versus National Performance Measures
 - No direct connection
 - For examples, Congress did not require a national performance measure for the Reduced Project Delivery Delays.
 - 23 USC 150(c)(2)(C):

(c) ESTABLISHMENT OF PERFORMANCE MEASURES.—

(1) IN GENERAL.—

Not later than 18 months after the date of enactment of the MAP-21, the [Secretary](#), in consultation with [State](#) departments of transportation, metropolitan planning organizations, and other stakeholders, shall promulgate a rulemaking that establishes performance measures and standards.

(2) ADMINISTRATION.—In carrying out paragraph (1), the [Secretary](#) shall—

(A) provide [States](#), metropolitan planning organizations, and other stakeholders not less than 90 days to comment on any regulation proposed by the [Secretary](#) under that paragraph;

(B) take into consideration any comments relating to a proposed regulation received during that comment period; and

(C) limit performance measures only to those described in this subsection.

(3) NATIONAL HIGHWAY PERFORMANCE PROGRAM.—

(A) In general.—Subject to subparagraph (B), for the purpose of carrying out section 119, the Secretary shall establish—

(i) minimum standards for States to use in developing and operating bridge and pavement management systems;

(ii) measures for States to use to assess—

(I) the condition of pavements on the Interstate system;

(II) the condition of pavements on the National Highway System (excluding the Interstate);

(III) the condition of bridges on the National Highway System;

(IV) the performance of the Interstate System; and

(V) the performance of the National Highway System (excluding the Interstate System);

(iii) minimum levels for the condition of pavement on the Interstate System, only for the purposes of carrying out section 119(f)(1); and

(iv) the data elements that are necessary to collect and maintain standardized data to carry out a performance-based approach.

(B) Regions.—

In establishing minimum condition levels under subparagraph (A)(iii), if the Secretary determines that various geographic regions of the United States experience disparate factors contributing to the condition of pavement on the Interstate System in those regions, the Secretary may establish different minimum levels for each region.

-
- AASHTO concerned is about the interpretation of the word “performance”.
 - Many would argue this as the existing performance measures identified in PM3 rulemaking that look at system operations.
 - Expanding to Environmental Performance could open the door to other performance measures as well.
 - Congress already addressed environmental performance in 150(c)(5)(B) that calls for on-road mobile source emissions.

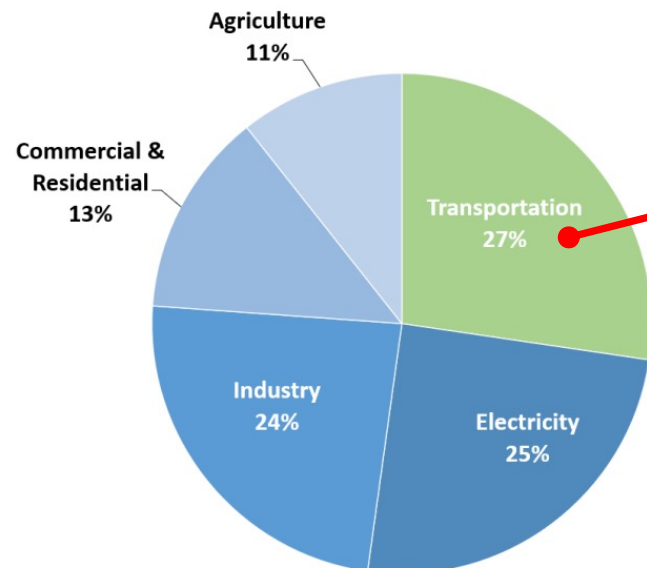
3) Target Setting Approach

- USDOT identifies two aspirational goals
 - Medium term: 50-52% reduction in CO2 emissions by 2030 from 2005 levels
 - Long term: Net-zero GHG emissions by 2050
- USDOT prescribes that state DOT targets must demonstrate reduction in GHG emissions (improving performance) through alignment with aspirational goals.
 - Where does this authority come from as all other performance measures are data driven and set/established by the state DOT.
- If a declining target is required:
 1. Specifically what is the goal you are trying to reach within the transportation sector (specifically...roadways/NHS)?
 2. What is a meaningful decline and what will it take to make it matter? Is it (THE GOAL) even reasonably attainable?

4) Managing Expectations

- What impact can State DOTs have on the performance measure?
- Developing a simple spreadsheet model to conduct scenario analysis to understand the effect state DOTs can have on reducing

Total U.S. Greenhouse Gas Emissions
by Economic Sector in 2020



- ~50% from passenger cars, medium- and heavy-duty trucks)
- ~55% of VMT operates on the NHS.
- PERCENT OF NHS VMT
 - $0.27 * 0.50 * 0.55 = \mathbf{7.43\% \text{ of GHG}}$

5) Technical Aspects

- 1) CO2 Factor
 - What should it be?
 - EPA MOVESs, GREET, EIA or other US Government published data source
- 2) Implementation and Timing
- 3) Baseline Year of 2021
 - Is this the correct baseline to use?
 - Hard to go back to pre-COVID?
 - Establish baseline in the future once travel normalizes
- 4) Unintended Uses/Impacts
- 5) Consequences
 - Limited to writing a report about what a state will do to meet the target next time.
- 6) Balance of Performance Measures
- 7) Fuels/FASH Data
 - Only fuel sold in the jurisdiction?

AASHTO GHG Analysis Tool

Open Discussion