

## MEMORANDUM

**SUBJECT:** Treatment of Greenhouse Gases in the Federal Highway Administration  
Proposed Rule For National Performance Management Measures,  
Docket No. FHWA-2013-0054

**FROM:** Center for Neighborhood Technology, Natural Resources Defense Council,  
United States Public Interest Research Group

**DATE:** August 8, 2016

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**Summary.** This memorandum provides comments on the Federal Highway Administration (FHWA) Notice of Proposed Rulemaking “National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program.”<sup>1</sup>

The preamble to the Notice Of Proposed Rulemaking (NPRM) suggests that, in addition to the performance measures included in the text of the proposed rule, a final rule may include a performance measure relating to greenhouse gases (GHGs.) Comments are requested on whether such a measure should be included in the final rule, and if included, how it might be structured.

***NRDC strongly recommends that a performance measure addressing GHGs be included in the final rule.***

The U.S. transportation system is a major source of GHG emissions and a major contributor to climate change, and emissions from transportation must be reduced in order to protect the climate on which we all depend. Indeed, the US cannot hope to meet its emissions reduction goals without action on transportation. Data from the U.S. Energy Information Administration show that earlier this year, for the

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<sup>1</sup> Docket No. FHWA-2013-0054, Regulatory Identifier Number 2125-AF54

first time since 1979, CO<sub>2</sub> emissions from cars, trucks, and SUVs surpassed emissions from electric power plants.<sup>2</sup>

Fortunately, the strategies and technologies exist to significantly reduce GHG emissions from the transportation system. Policies have been implemented around the country that allow people to use cleaner, less polluting fuels, use modes of transportation that generate fewer emissions, and meet their needs while traveling less. All of these have the effect of reducing GHG emissions and protecting us from climate change. In addition, the sustainable transportation policies that lead more people to make these choices have many benefits beyond lower GHG emissions. These include better health due to increased rates of walking and biking and improved air quality, and lower transportation costs for families and businesses.

A GHG performance measure would help transportation decision-makers understand how the current transportation system is generating emissions, and how these emissions would be affected by proposed policies and investments. To be most effective, this program should have the following major characteristics:

1. All State departments of transportation (state DOTs) and metropolitan planning organizations (MPOs) nationwide should participate.
2. The specific measure used to track GHG emissions from transportation should be annual average carbon dioxide (CO<sub>2</sub>) emissions per capita from surface transportation within each jurisdiction.
3. Implementing agencies should adopt and publish targets for each of the forecast years for transportation improvement programs (TIPs) and long range plans; that is, two and/or four years into the future for TIPs and 20 years into the future for long range plans.

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<sup>2</sup> For the 12 months ending in March, 2016, CO<sub>2</sub> emissions from transportation totaled more than emissions from electric power plants when calculated using a rolling 12-month total -- 1.88 billion metric tons of CO<sub>2</sub> from transportation versus 1.84 billion metric tons from power plants. The numbers were similar in February, 2016. Data available at <http://www.eia.gov/totalenergy/data/monthly/#environment>

4. Targets should be presented in several ways to help decision-makers and the public understand what is being proposed. Agencies should publish a per capita CO<sub>2</sub> emissions target for each forecast year, and for each such target:
  - a. the percentage increase or decrease in per capita emissions the target represents when compared to per capita emissions in a common base year identified by FHWA; and
  - b. the percentage increase or decrease in per capita emissions the target represents when compared to projected per capita emissions in the target year after the effect of federal policies such as Corporate Average Fuel Economy (CAFE) and Clean Air Act standards are taken into account.
5. To make implementation as easy as possible, FHWA should provide state DOTs and MPOs with easy-to-use emissions modeling tools that are pre-loaded with state and regional emissions data and default emissions coefficients. Agencies wishing to create their own tailored models could do so, while others could simply rely on federal defaults.
6. Figures provided by FHWA would include state- and region-specific multiplication factors for implementing agencies to use in estimating emissions from the extraction, refining and transportation of petroleum products and natural gas used as a motor fuel, and emissions from electric power plants that provide power for electric vehicles.

Federal law gives FHWA a mandate to work with state DOTs and MPOs to create a *“performance-driven, outcome based approach”*<sup>3</sup> to transportation decision making. FHWA has clear authority to establish a GHG performance measure in the final rule for performance measures and it should do so.

**Contents.** This memorandum is divided into the following sections:

- I. Importance of Addressing Greenhouse Gas Pollution
- II. Legal Framework for a GHG Performance Measure

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<sup>3</sup> 23 U.S.C 134(c)(1)

III. Feasibility of a GHG Performance Measure

IV. Questions Posed in the NPRM

V. Conclusion

## **I. Importance of Addressing Greenhouse Gas Pollution**

The U.S. transportation sector accounted for 26 percent of the country's greenhouse gas emissions in 2014 (more than 1.8 billion metric tons of carbon dioxide equivalents), making the sector's emissions on par with the climate-changing pollution generated by electric power plants. More than 60 percent of transportation emissions came from light duty cars and trucks.<sup>4</sup>

Policies to reduce greenhouse gas pollution from transportation are essential to minimize the impacts of climate change, which has been recognized by health experts worldwide as “the greatest threat to global health in the 21st century.”<sup>5</sup> Climate change is already harming the health of Americans, particularly older adults, young children, and people with existing lung and heart problems. Under continued high levels of greenhouse gas pollution, more extreme and sustained summer heat will likely lead to thousands and possibly tens of thousands more heat-related deaths each year by the end of the century. Rising temperatures and changing seasonal patterns have already worsened air quality in some parts of the country, and continued declines are expected to lead to more premature deaths from asthma and other respiratory and heart conditions, hospital visits, and missed work and school days. Rising sea levels, more extreme storms, and larger and more frequent wildfires will injure or kill more people, and disrupt health care and emergency response services. Climate change also threatens the safety and availability of food and water, will likely expand the range of disease-carrying ticks and mosquitos, and has mental health consequences.<sup>6</sup>

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<sup>4</sup> U.S. Environmental Protection Agency, Office of Transportation and Air Quality, *Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions, 1990-2014*, EPA-420-F-16-032, June 2016, <http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100ONBL.pdf>.

<sup>5</sup> N. Watts et al., “Health and climate change: policy responses to protect public health,” *The Lancet* 386 (10006): 1861-1914. [http://dx.doi.org/10.1016/S0140-6736\(15\)60854-6](http://dx.doi.org/10.1016/S0140-6736(15)60854-6).

<sup>6</sup> Crimmins, A., et al., eds. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, U.S. Global Change Research Program, Washington, D.C., <http://dx.doi.org/10.7930/J0R49NQX>.

Cutting climate change pollution from transportation is also critical to protect the U.S. economy. According to a recent estimate by the Congressional Budget Office, the combination of coastal development and climate change-related increases in hurricane damage could increase annual damages from about \$28 billion today to about \$39 billion (in today’s dollars) by 2075.<sup>7</sup> The Risky Business Project warns that continuing on our current pollution trajectory will also cost the U.S. economy billions of dollars because of crop losses, higher energy prices, and lower labor productivity.<sup>8</sup>

## II. Legal Framework for a GHG Performance Measure

Since enactment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), federal law has required state DOTs and MPOs to follow a transportation planning process with certain prescribed elements as conditions for spending federal highway and transit money<sup>9</sup>. State DOTs and MPOs must adopt and implement plans that “*accomplish*” the national objectives set out for those plans<sup>10</sup>. Prominent among those objectives is environmental improvement. The ‘Declaration of Policy’ in section 101 of Title 23 holds that: “*transportation should play a significant role in promoting economic growth, improving the environment, and sustaining the quality of life*”.<sup>11</sup> This is expanded upon in other parts of the statute, including section 134 (“*It is in the national interest ... to ... minimiz[e] transportation-related fuel consumption and air pollution through metropolitan and statewide transportation planning processes ...*”<sup>12</sup>), in section 150 (“*It is in the interest of the United States to ... enhance the performance of the transportation system while protecting and enhancing the natural environment*”<sup>13</sup>) and in section 135 (“*Each State shall carry out a statewide transportation planning*

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<sup>7</sup> Congressional Budget Office, *Potential Increases in Hurricane Damage in the United States: Implications for the Federal Budget*, June 2016, <https://www.cbo.gov/publication/51518>.

<sup>8</sup> *Risky Business, National Report: The Economic Risks of Climate Change in the United States*, June 2014, <http://riskybusiness.org/report/national/>.

<sup>9</sup> 23 U.S.C. 134 and 23 U.S.C 135

<sup>10</sup> 23 U.S.C 134(c)(1) and 23 U.S.C. 135(a)(1)

<sup>11</sup> 23 U.S.C. 101(b)(3)(G)

<sup>12</sup> 23 U.S.C. 134(a)(1)

<sup>13</sup> 23 U.S.C.150(b)

*process that ... will ... protect and enhance the environment, promote energy conservation, improve the quality of life,*”<sup>14</sup>).

Together these provisions provide a clear expression of congressional intent that the purpose of the planning process is to do more than simply spend federal funds, or even “*minimize fuel consumption and air pollution*” in the abstract, but rather accomplish these national objectives so as to protect and enhance the environment in a manner that sustains the quality of life. As discussed throughout this memo, the public record is replete with reports by agencies of the US government and others showing that the environment will not be protected without limiting GHG emissions. To achieve the environmental protection goals enacted by Congress, GHG emissions must be minimized. The Secretary can enlist the States to “*accomplish*” this objective by including CO<sub>2</sub> within the definition of “*air pollution*” as that term is used in section 134(a)(1) to define the national planning objectives. Doing so clearly satisfies the judicial test that the Secretary’s construction of statutory terms must be consistent with the purpose of the statute. Title 23 does not define “*air pollution*”, which leaves the Secretary of Transportation broad discretion to define this statutory term.<sup>15</sup>

The final rule should adopt a definition of “*air pollution*” consistent with the definition of “*air pollutant*” in the Clean Air Act, which includes “*any air pollution agent or combination of such agents, including any physical, chemical ... substance or matter which is emitted into or otherwise enters the ambient air ...*”<sup>16</sup>. Use of this definition is supported by the canon of statutory construction – *in pari materia* – that encourages the construction of related statutes with common objectives to ensure that they are applied consistently with one another. The Clean Air Act and the Federal Aid Highway Act share the purpose of protecting the environment by reducing air pollution. In addition, the Highway Act contains

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<sup>14</sup> 23 U.S.C.135(d)(1)

<sup>15</sup> “[I]f the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency’s answer is based on a permissible construction of the statute,’ id., meaning one that is ‘reasonable and consistent with the statute’s purpose.’ *Nuclear Information Resource Service v. NRC*, 969 F.2d 1169, 1173 (D.C.Cir.1992). At that point, the court need only conclude that the agency’s understanding of the statute is ‘a sufficiently rational one to preclude a court from substituting its judgment’ for that of the agency. *Chemical Mfrs. Ass’n v. NRDC*, 470 U.S. 116, 125, 105 S.Ct. 1102, 1107-08, 84 L.Ed.2d 90 (1985).” *Troy v. Browner*, 120 F.3d 277, 288 (D.C. Cir. 1997).

<sup>16</sup> 42 U.S.C. 7602(g)

numerous cross references to the Clean Air Act to require or encourage cooperative or coordinated air quality planning.

“*Air pollutant*,” as defined in the Clean Air Act, has been interpreted by the Supreme Court to include greenhouse gases<sup>17</sup>. In 2007 the Court found that the Clean Air Act's definition of “*air pollutant*” granted the US Environmental Protection Agency (USEPA) ample authority to regulate GHG emissions. In 2009, USEPA determined that GHGs must be controlled because they endanger the public health and welfare of current and future generations.<sup>18</sup> As a result, greenhouse gases are now formally controlled by emission limitations promulgated pursuant to section 202 of the Clean Air Act<sup>19</sup>.

While USEPA's resulting emission limitations will achieve some reductions from transportation, they are not enough to achieve the overall reductions in GHG emissions needed to protect and enhance the environment. The benefits of these standards are partly offset by increasing national vehicle miles travelled. For this reason, additional reductions available through the transportation strategies and infrastructure investments implemented through the transportation planning process must be achieved to reduce the overall impact of transportation emissions on climate change.

One of the many examples of how Congress integrated transportation planning under Title 23 with the Clean Air Act is the Congestion Mitigation and Air Quality program (CMAQ), created by ISTEA in 1991. This bill moved through Congress shortly after the Clean Air Act Amendments of 1990, which required transportation conformity to ensure that transportation plans were developed to achieve the motor vehicle emission budgets for nonattainment areas established through the air pollution planning process. USDOT has been clear about the link between CMAQ and the Clean Air Act: “*The CMAQ*

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<sup>17</sup> *Massachusetts v. U.S. EPA*, 547 U.S. 497, 528-29 (2007)

<sup>18</sup> “The Administrator also finds that the combined emissions of these greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare under CAA section 202(a).” Environmental Protection Agency, “Title II – Emissions Standards for Moving Sources,” available at <https://www.epa.gov/clean-air-act-overview/title-ii-emission-standards-moving-sources> (last accessed July 2016).

<sup>19</sup> *Ibid.*

*program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act.*”<sup>20</sup>

Specific language enacted MAP-21<sup>21</sup> (codified as section 150 of Title 23) requires USDOT to establish two measures for evaluating performance of the CMAQ program: one for traffic congestion and another for on-road mobile source emissions. Although this language references the CMAQ program, which focuses on reducing on-road emissions of criteria pollutants in areas that are (or were) designated for nonattainment under the Clean Air Act, the system developed to track these emissions can also be applied to track how implementing agencies “*accomplish*” the national planning objectives enacted in section 134(a)(1), including “*to minimize transportation-related fuel consumption and air pollution.*”

Section 150(c)(5) mandates that a program for tracking on-road emissions addressed by the CMAQ program be established, but it does not limit the program to those pollutants. Section 150(a) broadly declares the policy that: “*Performance management will transform the Federal-aid highway program and provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals ... and improving project decisionmaking through performance-based planning and programming.*” This declaration makes clear that performance management applies broadly to achieving the national transportation goals included in section 150 and throughout Title 23. Performance management is not limited to the minimum performance measures mandated by section 150(c).

Section 150(c)(1) directs the Secretary to promulgate rules that establish the elements of the performance management programs that States and MPOs must implement: “*Not later than 18 months after the date of enactment of the MAP–21, the Secretary ..., shall promulgate a rulemaking that establishes performance measures and standards.*” Subsection 150(c)(2)(C) “*limit[s] performance measures only to those described in this subsection,*” but this limitation only applies to “*performance*

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<sup>20</sup> U.S. Department of Transportation, “Congestion Mitigation and Air Quality (CMAQ) Program Interim Guidance,” available at <https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm> (last accessed July 2016).

<sup>21</sup> Public Law 112-141



*measures.*” The rulemaking authority in section 150(c)(1) applies to both “*measures*” and “*standards.*” As such, the limitation in (c)(2)(C) does not apply to “*performance standards.*”

It is well-settled that “[w]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.”<sup>22</sup> Here there is no reason to believe that Congress included “*standards*” in the rulemaking authority granted to the Secretary in (c)(1), but absent-mindedly omitted it from the limitation in (c)(2)(C). Obviously Congress granted authority to promulgate rules establishing standards for performance management that apply to programs and objectives beyond the programs listed in subsections 150(c)(3)-(6).

This broad mandate for a performance-based approach is not consistent with, and does not support, a narrow interpretation of section 150(c) that Congress intended the performance based approach be limited to the “*performance measures*” listed in section 150(c)(3)-(6). Clearly, Congress intended that the authority to promulgate rules for the establishment and use of performance standards is much broader than the limitation on “*performance measures*” in (c)(2)(C).

The specific language of section 150 also supports this interpretation. It states that: “*In carrying out paragraph (1), the Secretary shall ... limit performance measures only to those described in this subsection.*” On its face, the “*limit*” applies only in a specific circumstance, that is, action taken “*in carrying out paragraph (1).*” Paragraph (1) (that is, 23 U.S.C. 150(c)(1)) is the mandate that certain performance measures must be published. The proviso does not read, for example, “*in carrying out Title 23, the Secretary shall limit ...*”

The application of “*performance standards*” includes criteria for initially assessing, and subsequently tracking, how long-range plans and TIPs “*accomplish*” the national planning objective to “*minimize transportation-related fuel consumption and air pollution.*” The national planning objective in

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<sup>22</sup> *Russello v. United States*, 464 U.S. 16, 23, 104 S.Ct. 296, 78 L.Ed.2d 17 (1983) (citation and internal quotation marks omitted). Cf. *City of Chicago v. Env'l Defense Fund*, 511 U.S. 328, 337-38 (1994) (“[I]t is generally presumed that Congress acts intentionally and purposely” when it “includes particular language in one section of a statute but omits it in another.”); citing *Keene Corp. v. United States*, 508 U.S. 200, 208, 113 S.Ct. 2035, 2040, 124 L.Ed.2d 118 (1993).

section 134(a)(1) is one component of the broader national goal in section 150(b)(6) to “*protect[ ] and enhanc[e] the natural environment.*” Taken together, the broad delegation of rulemaking authority in 150(c)(1) to establish “*standards*” for performance based decisionmaking, and the directive in section 135(d)(2) that “*the statewide transportation planning process shall provide for the establishment and use of a performance based approach to transportation decisionmaking*” related to the national goals, provides ample authority for the Secretary to apply the performance based approach to track how the States and MPOs “*accomplish*” the national planning objective as required by sections 134(c)(1) and 135(a).

When the relevant portions of Title 23 are read as a whole, together with *Massachusetts v. U.S. EPA*, it is clear that USDOT has broad authority to establish a “*performance-based approach*” to “*minimize ... transportation related ... air pollution*”, and this gives it sufficient authority to establish a nationally applicable CO2 performance measure.

### **III. Feasibility of a GHG Performance Measure**

A successful CO2 performance measure and related performance targets for the transportation system would allow transportation planners and policymakers to:

- Gain a clear picture of total CO2 emissions in their jurisdiction from all modes of surface transportation;
- Determine how such emissions are likely to rise or fall in future given current policies and investment patterns;
- Estimate how new transportation plans and policies would affect emissions, including through effects on fleet fuel economy, the amount of travel by different transportation modes, and use of alternative fuels;
- Track performance in achieving specific GHG emissions targets, including targets that are tied to national GHG policies and targets tied to state or regional policies; and
- Inform the public how transportation policies and spending choices are affecting the climate.

Given currently available emissions data and modeling tools, such a system is feasible. Implementing a new CO2 performance measure would simply require these existing resources to be applied toward a new goal.

For decades FHWA has developed and refined a system for tracking many of the key performance attributes of the transportation system that affect CO2 emissions, in particular vehicle miles traveled. Figures are arrived at through a collaborative process involving multiple data sources and multiple federal, state and local agencies. Results are released monthly in the FHWA series *Traffic Volume Trends*<sup>23</sup> and compiled in annually in *Highway Statistics*<sup>24</sup> and in periodic reports summarizing the condition and performance of the highway system.<sup>25</sup> This rich data source can serve as the foundation of a CO2 tracking system.

In addition, the U.S. Environmental Protection Agency (USEPA) and other agencies have developed a series of emission modeling tools that rely on this and other data to both estimate current CO2 emissions and predict future emissions that would result from various spending and policy scenarios. Some of these tools are described in greater detail in the responses to questions 10 and 11 below in Section IV of this memorandum.

The most convincing evidence for the feasibility of CO2 performance tracking is the fact that many jurisdictions have already started doing it. They recognize the value of knowing the consequences their transportation decisions will have on CO2 emissions and climate change as decisions are made. California and Oregon have set carbon pollution targets for each of their metropolitan planning organizations.<sup>26 27</sup> The thirteen MPOs in Massachusetts are required to consider carbon pollution when

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<sup>23</sup> Available at [http://www.fhwa.dot.gov/policyinformation/travel\\_monitoring/tvt.cfm](http://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm)

<sup>24</sup> Available at <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>

<sup>25</sup> *Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance*, available at <https://www.fhwa.dot.gov/policy/2013cpr/pdfs.cfm>

<sup>26</sup> California Air Resources Board, "Sustainable Communities," [www.arb.ca.gov/cc/sb375/sb375.htm](http://www.arb.ca.gov/cc/sb375/sb375.htm) (accessed May 26, 2016).

<sup>27</sup> Oregon Sustainable Transportation Initiative, "Target and Scenario Planning Rulemaking," [www.oregon.gov/ODOT/TD/OSTI/Pages/rules.aspx](http://www.oregon.gov/ODOT/TD/OSTI/Pages/rules.aspx) (accessed May 26, 2016).

selecting transportation projects and must report on annual progress toward pollution reduction goals.<sup>28</sup>

The Chicago Metropolitan Agency for Planning in Illinois, Genesee Transportation Council in New York, Capital Area Metropolitan Planning Organization in Texas, North Jersey Transportation Planning Authority in New Jersey, Metropolitan Council in Minnesota, and Pikes Peak Area Council of Governments in Colorado all use, or plan to use, CO2 emissions as a measure of progress toward transportation and environmental goals.<sup>29 30 31 32 33 34</sup>

That said, it is clear that some agencies are further along the path in tracking CO2 emissions, and it is important that the performance measure created in this rule can be applied by all jurisdictions, including those with less expertise and fewer resource. For this reason, in the responses provided below in Section IV, we suggest several areas in which federal leadership could provide state DOTs and MPOs that are just beginning this process a relatively simple way to get started tracking CO2 emissions.

Specifically, NRDC recommends that FHWA provide state DOTs and MPOs with emissions modeling tools that are already populated with state or regional emissions inventories and include previously-approved pre-loaded values for most variables. State DOTs and MPOs would always have the option of developing their own tailored models, but those choosing not to could rely on data and pre-configured models provided to them.

#### **IV. Questions Posed in the Notice of Proposed Rulemaking**

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<sup>28</sup> Massachusetts Department of Transportation, “Greenhouse Gas Reduction,” [www.massdot.state.ma.us/GreenDOT/GreenhouseGasReduction.aspx](http://www.massdot.state.ma.us/GreenDOT/GreenhouseGasReduction.aspx) (accessed May 26, 2016).

<sup>29</sup> Chicago Metropolitan Agency for Planning, “GO TO 2040 Update Appendix: Indicator Methodology,” October 2014, [www.cmap.illinois.gov/about/2040/download-the-full-plan](http://www.cmap.illinois.gov/about/2040/download-the-full-plan).

<sup>30</sup> Genesee Transportation Council, Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035, June 2011, [www.gtcmpto.org/docs/LRTP.htm](http://www.gtcmpto.org/docs/LRTP.htm).

<sup>31</sup> Capital Area Metropolitan Planning Organization, “Appendix G: Performance Measures,” CAMPO 2040 Regional Transportation Plan, amended September 21, 2015, [www.campotexas.org/wp-content/uploads/2015/10/CAMPO2040PlanFinal\\_Chpt6\\_LowRes.pdf](http://www.campotexas.org/wp-content/uploads/2015/10/CAMPO2040PlanFinal_Chpt6_LowRes.pdf).

<sup>32</sup> Cambridge Systematics, Inc., and Fitzgerald and Halliday Dewberry, “Performance Results: Assessing the Impacts of Implemented Transportation Projects,” Final Report for the North Jersey Transportation Planning Authority, December 2011, [www.njtpa.org/planning/regional-studies/completed-studies/performance-results-assessing-the-impacts-of-imple/performanceresults/njtpa\\_performanceresults\\_finalreport\\_complete\\_000](http://www.njtpa.org/planning/regional-studies/completed-studies/performance-results-assessing-the-impacts-of-imple/performanceresults/njtpa_performanceresults_finalreport_complete_000).

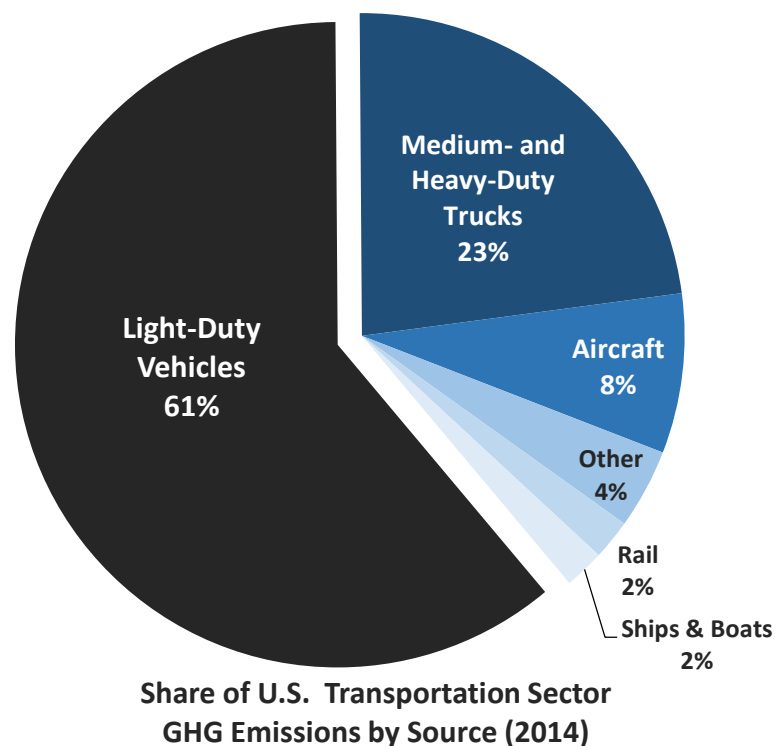
<sup>33</sup> Metropolitan Council, 2040 Transportation Policy Plan, Adopted January 14, 2015, [www.metrocouncil.org/Transportation/Planning/Transportation-Policy-Plan/2040-Transportation-Policy-Plan.aspx](http://www.metrocouncil.org/Transportation/Planning/Transportation-Policy-Plan/2040-Transportation-Policy-Plan.aspx).

<sup>34</sup> Pikes Peak Area Council of Governments, Moving Forward 2040 Regional Transportation Plan, Approved November 2015.

The preamble to the NPRM poses 13 questions regarding how to structure and implement a performance measure for GHGs. Responses are provided below. The questions are not numbered in the NPRM but have been given numbers here for sake of clarity.

*1. Should the measure address all on road mobile sources or should it focus only on a particular vehicle type (e.g., light-duty vehicles)?*

An effective measure would address all surface transportation emissions of CO<sub>2</sub>. Tracking only a portion of such emissions, for example, emissions from light-duty vehicles, would deprive policy makers of both a full picture of the transportation system's contribution to climate change and the potential emissions reduction benefits of policies that affect more than just light-duty vehicles. As shown in the figure below, in 2014 light duty vehicles accounted for only 61 percent of GHG emissions from transportation in the US.<sup>35</sup>



*2. Should the measure be normalized by changes in population, economic activity, or other factors (e.g., per capita or per unit of gross state product)?*

<sup>35</sup> Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2014, U.S. EPA

Indexing a performance measure to some other variable can be valuable, but it should be done sparingly. Indexing can create more problems than it solves when an index variable is prone to unexpected or rapid variations. Population shifts are usually gradual and subject to accurate prediction, which makes state or regional population an appropriate indexing variable. NRDC believes indexing for population is appropriate, and the best choice for a CO<sub>2</sub> performance measure would be CO<sub>2</sub> emissions per capita. Indexing in this way would control for the effect on CO<sub>2</sub> emissions of population shifts between states or regions, and allow policy makers to concentrate on policies that affect emissions per person regardless of total population.

By contrast, state or regional economic performance is both less stable and less predictable over time than population, and as such is not an appropriate indexing factor. A CO<sub>2</sub> performance measure indexed to, for example, gross state product, could rise or fall quickly based on economic trends that are difficult to predict. There is some correlation between economic growth and emissions, but the effect is attenuated and has grown less and less strong over time.<sup>36</sup> The purpose of a performance measure is to shape policy, and a measure that policymakers feel is moving for reasons they do not understand or cannot affect is less likely to be used in guiding decisions.

3. *Should the measure be limited to emissions coming from the tailpipe, or should it consider emissions generated upstream in the life cycle of the vehicle operations (e.g., emissions from the extraction/refining of petroleum products and the emissions from power plants to provide power for electric vehicles)?*

The CO<sub>2</sub> performance measure should capture the total life cycle emissions that result from using transportation fuels. Doing so would have several benefits.

It is commonly accepted that the total CO<sub>2</sub> emissions associated with using a gallon of gasoline are greater than the amount of CO<sub>2</sub> released during combustion. Petroleum must be extracted, refined and transported, and multiple research efforts have found that these processes generate significant CO<sub>2</sub> emissions over and above the CO<sub>2</sub> released during combustion. For instance, one USEPA report

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<sup>36</sup> <http://www.growingwealthier.info/trends.aspx>

estimated total emissions from gasoline use to be 35 to 43 percent higher than just tailpipe emissions.<sup>37</sup>

As a consequence, when people reduce their use of petroleum-based fuels, both tailpipe and non-tailpipe emissions are reduced. State and regional policymakers who implement measures that lead to lower fuel consumption should get full credit for all resulting emissions reductions.

The same pattern holds true for electricity used to power plug-in electric vehicles (EVs). Although an EV has no tailpipe emissions, the total CO<sub>2</sub> emissions from operating it are not insignificant; they depend on the sources of the electricity that charges the vehicle's batteries and the efficiency of the vehicle.<sup>38</sup> Many kinds of electricity generation result in substantial CO<sub>2</sub> emissions, and a CO<sub>2</sub> performance measure that fails to account for this could lead policymakers to improperly estimate the CO<sub>2</sub> emissions benefits of electric vehicles. For instance, driving an EV charged in a region heavily dependent on fossil fuels for electricity—such as in the Midwest—has emissions equivalent to a gasoline vehicle that gets 47 miles per gallon. But driving an EV in the Pacific Northwest, with its high share of renewable energy in the electric grid, has emissions equivalent to a gasoline vehicle that gets over 250 miles per gallon.<sup>39</sup> In a grid composed of 80 percent renewable electricity, an EV will result in 25 percent less emissions from manufacturing and an 84 percent less emissions from driving.<sup>40</sup> These findings show that, although EVs usually result in much less CO<sub>2</sub> than typical gasoline vehicles, emissions are not zero. The CO<sub>2</sub> performance measure should recognize this.

The full fuel cycle approach to estimating emissions should also be extended other transportation fuels, including natural gas. Emissions estimates should include the CO<sub>2</sub> emissions associated with producing and transporting this fuel.

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<sup>37</sup> “For example, GHG emissions associated with the lifecycle of passenger cars running on conventional gasoline were estimated to be 1.35 to 1.43 times that of direct emissions, when taking out transportation-related emissions that are counted elsewhere in the U.S. GHG Inventory.”; Greenhouse Gas Emissions from the U.S. Transportation Sector, 1990-2003, U.S. Environmental Protection Agency, 2006.

<sup>38</sup> *Environmental Assessment of a Full Electric Transportation Portfolio, Volume 1 Background, Methodology and Best Practices*, Electric Power Research Institute and Natural Resources Defense Council, 2015, available at <http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=3002006881>

<sup>39</sup> *Ibid.*, p.2-8.

<sup>40</sup> *Environmental Assessment of a Full Electric Transportation Portfolio*, Electric Power Research Institute and Natural Resources Defense Council, 2015, Figure 3, p.ix.

Accurately estimating lifecycle CO<sub>2</sub> emissions from both petroleum fuels and non-petroleum transportation fuels can be complex. To ease implementation for state DOTs and MPOs, FHWA should develop and publish default multiplier values each implementing agency could rely on if they choose not to pursue a more state- or region-specific approach. FHWA should work closely with USEPA to develop these values, and they should be updated on a regular basis to account for changes in fuel production processes, especially with respect the electricity grid that is quickly transitioning to renewable sources of generation.

*4. Should the measure include non-road sources, such as construction and maintenance activities associated with Title 23 projects?*

From a management point of view, it is appropriate for state DOTs to understand how their construction, maintenance and operational activities are generating CO<sub>2</sub> emissions. This would allow agencies to identify and implement the most cost effective way to reduce these emissions. The potential project life-cycle emission reductions due to improved construction practices are not negligible. One recent assessment found that for every mile of highway lane, initial construction and preservation activities use as much energy to build as 100 average American households use in one year.<sup>41</sup> As noted in the NPRM, tools such as the Infrastructure Carbon Estimator (ICE) and INVEST exist for measuring environmental impacts of transportation facilities. In addition, a self-assessment tool and a well-respected third-party certification of facilities is available from Greenroads, a nonprofit organization based in Seattle.<sup>42</sup>

Low-carbon projects are one indicator that a long-range plan - a portfolio of investments underpinned by a vision and a strategy – is reducing its overall carbon footprint. And while low-carbon project development is important, first and foremost a CO<sub>2</sub> performance measure must account for CO<sub>2</sub> emissions that come from the use of the transportation system.. Tracking emissions from construction and

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<sup>41</sup> Muench, S.T., “Roadway Construction Sustainability Impacts: A Life Cycle Assessment Review”, 2010.

<sup>42</sup> See [www.greenroads.org](http://www.greenroads.org)



maintenance of Title 23 projects is desirable, particularly given the availability of off-the-shelf tools, but use of these facilities warrants the largest share of attention and analysis by agencies.

*5. Should CO2 emissions performance be estimated based on gasoline and diesel fuel sales, system use (vehicle miles traveled), or other surrogates?*

As discussed above in Section III, a system for estimating vehicle miles traveled (VMT) has been developed over many years, and it incorporates various sources of data on gasoline and diesel fuel sales to make VMT estimates. This system should be used as the basis for estimating CO2 emissions.

*6. Due to the nature of CO2 emissions (e.g., geographic scope and cumulative effects) and their relationship to climate change effects across all parts of the country, should the measure apply to all States and MPOs? Is there any criteria that would limit the applicability to only a portion of the States or MPOs?*

It is very important that a CO2 performance measure cover the whole country, which means all states and MPOs must be involved. All surface transportation CO2 emissions are created equal and have the same effect on the climate, regardless of whether they come from a large state or a small metropolitan area.

As discussed above in Section III, recognizing that some state DOTs and MPOs have less expertise and fewer resources than others, FHWA should provide emissions modeling tools that are pre-populated with emissions inventories and include federally-approved pre-loaded values for most variables.

*7. Would a performance measure on CO2 emissions help to improve transparency and to realign incentives such that State DOTs and MPOs are better positioned to meet national climate change goals?*

Absolutely. Performance measures are important because they allow policy makers to know where they stand, know what is likely to happen given business as usual, and know which policies would be most effective in achieving their goals. These elements are the cornerstones to solving any policy challenge, including climate change.

Performance measures also create transparency. Stakeholders and the public can see what goals are being set, how they are being pursued, and the results this is producing.

*8. The target establishment framework proposed in this rulemaking requires that States and MPOs would establish 2 and 4 year targets that lead to longer term performance expectations documented in longer range plans. Is this framework appropriate for a CO2 emissions measure? If not, what would be a more appropriate framework?*

To best integrate performance-based planning for CO2 emissions into the larger transportation planning framework, target years should coincide with the current schedule of two- and four-year updates to both state and regional transportation plans. This process is where program funds are allocated to specific projects, and CO2 considerations should be front and center as determinations are made about which investments to make and which to defer. Aligning with this existing schedule would also make implementation less difficult.

In addition, a target should be set 20 years into the future as part of long range transportation plans. Climate change is a long term problem and many of the measures that will be most effective in reducing CO2 emissions will show their largest effects over the long term.

Implementing agencies should also have the flexibility to set other targets as they wish. Some jurisdictions have adopted their own CO2 reduction initiatives and are taking early action, and to the degree it is feasible, the FHWA-developed measure should support these efforts.

*9. Should short term targets be a reflection of improvements from a baseline (e.g., percent reduction in CO2 emissions) or an absolute value?*

Absolute values should be provided, but by themselves they are not particularly illuminating. Figures should be shown in context as a way to help policymakers and the public understand their significance. Future year targets should be shown in at least two ways:

- as a percentage increase or decrease in per capita emissions when compared to per capita emissions in a common base year identified by FHWA; and

- as a percentage increase or decrease in per capita emissions when compared to projected per capita emissions in the target year once the effect of federal policies such as Corporate Average Fuel Economy (CAFE) standards are taken into account.

To help implementing agencies, FHWA should develop and provide a default business-as-usual case for future year emissions in each state that takes into account the effect of CAFE standards and other policies enacted at the national level. This would allow state and local policymakers and the public to understand which emissions reductions are resulting from federal policies and how much from action at the state or regional level.

To allow for comparability between and among states and regions, the base year against which emissions reductions are reported should be the same for all state DOTs and MPOs.

FHWA should also provide guidance to implementing agencies on the magnitude of emissions reductions that would be in line with widely publicized emissions reduction goals, including the targets contained in the Paris Agreement adopted within the United Nations Framework Convention on Climate Change (UNFCCC). This information will allow policy makers and the public to judge how likely the policies and investments proposed for a state or region are to reduce CO<sub>2</sub> emissions from transportation in line with the levels needed to stabilize the climate.

*10. What data sources and tools are readily available or are needed to track and report CO<sub>2</sub> emissions from on-road sources?*

Ample data sources and modeling tools are available that could be used in tracking CO<sub>2</sub> emissions from transportation.

USEPA's Motor Vehicle Emissions Simulator (MOVES) model is a free, state-of-the-science emission modeling system that estimates emissions for mobile sources at the national and county level. Detailed guidance was released by USEPA on July 1, 2016 showing how to use this tool for: "*estimating greenhouse gas (GHG) emissions from the on-road transportation sector and assessing the potential of*

*on-road travel efficiency strategies for reducing both greenhouse gas and criteria pollutant emissions.*<sup>43</sup>

It is the USEPA-approved model for Clean Air Act State Implementation Plans (SIPs) and conformity purposes and, therefore, is familiar to most state air agencies. MOVES has some limits on its forecasting abilities, but it can be used for out-year inventories.

The MOVES model has a number of national level defaults that can be used to expedite setting up model runs. However, to ease implementation, FHWA should consider partnering with USEPA to create a package for use by state DOTs and MPOs that has state specific, pre-loaded default values for many of the adjustable parameters in the model. This would offer implementing agencies a relatively simple emissions modeling approach at first, while providing an opportunity for modeling to become more sophisticated over time. USDOT could compile and release emissions inventories for each state and metropolitan region to ease the workload on implementing agencies.

The Emissions Inventory System (EIS) Gateway is another tool developed to provide registered, state, local and tribal users with access to emissions inventory data. It provides these users access to facility inventory and emissions data for sources in their jurisdiction. The EIS Gateway allows users to manage their profile information, to add, view and edit facility inventory information for their agencies, and to extract data by running reports.

*11. What tools are needed to help transportation agencies project future emissions and establish targets for a CO2 emission measure?*

A variety of useful modeling tools are available. Although MOVES is valuable for this application, it has limited scenario modelling capabilities. The model relies largely on vehicle activity and vehicle population data to produce an emissions inventory. It does not currently have capabilities to directly assess various policy or land-use changes that may have an impact on transportation. Similarly, MOVES vehicle type data are somewhat limited. For instance, MOVES does not include vehicle types for some advanced vehicle technologies, including standard and plug-in hybrid vehicles. MOVES does include electric vehicles as a vehicle type but applies an emission factor of zero for CO2 emissions, thus

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<sup>43</sup> <https://www3.epa.gov/otaq/stateresources/ghgtravel.htm>

failing to take into account the upstream electricity production. Making some small changes to MOVES would greatly improve its capabilities for this application.

The Energy and Emissions Reduction Policy Analysis Tool (EERPAT)<sup>44</sup> is a scenario analysis tool developed to assist state transportation agencies with analyzing greenhouse gas reduction scenarios and alternatives for use in the transportation planning process, the development of state climate action plans, scenario planning exercises, and to measure the reduction potential of various transportation strategies to meet state greenhouse gas reduction goals and targets. It allows agencies to quickly assess policy interactions in many scenarios.

In addition, USEPA's Travel Efficiency Assessment Methodology (TEAM) assesses the potential regional emission reductions from travel efficiency strategies. TEAM is an analytical approach that uses local travel activity information, sketch-planning travel activity analysis, and MOVES emissions modeling to estimate potential emission reductions from combinations of travel efficiency strategies. It has been used for a series of case studies but has not been broadly used without significant agency guidance and contractor support. This methodology could be further developed to improve ease of use for the purpose of a CO2 performance measure.

Modeling the benefits of improved accessibility has recently become easier due to action by FHWA. In advance of this rulemaking, FHWA purchased and made available to states and MPOs a mobility-oriented dataset, the National Performance Management Research Data Set (NPMRDS.) It provides several valuable factors, including network speeds. This functionality would be improved if combined with "points of interest" data – the location of homes, businesses, schools, parks and other notable sites. Several measures of multi-modal accessibility can then be calculated using network speeds and points of interest. The necessary supplements to NPMRDS are commercially available, and FHWA should acquire them, provide them to state DOTs and MPOs, and help agencies use these tools to develop accessibility standards.

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<sup>44</sup> See [https://www.planning.dot.gov/fhwa\\_tool/](https://www.planning.dot.gov/fhwa_tool/)

CO2 emissions from transportation are in part are a function of VMT, and VMT is affected by multimodal accessibility. Improved accessibility allows for less time spent traveling by any mode, as well as robust alternatives to travel by single occupant vehicle. Armed with accessibility tools and standards, decision-makers will be better able to optimize transportation networks and land use to minimize CO2 emissions and travel costs.

*12. How long would it take for transportation agencies to implement such a measure?*

NRDC believes a measure that relies on existing analytical tools and data sets can reasonably be implemented within 12 to 18 months.

*13. Additionally, the FHWA requests data about the potential agency implementation costs and public benefits associated with establishing a CO2 emissions measure.*

Implementation costs should be modest for a CO2 performance measure that uses existing analytical tools and data sets, particularly if FHWA offers implementing agencies the necessary data sets, emissions coefficients and pre-configured models.

Any such cost should be weighed against the huge net benefits associated with sensible CO2 emissions reduction strategies. Numerous studies have shown that a large portion of the CO2 emissions reductions needed to stabilize atmospheric CO2 levels are actually cost-beneficial, meaning that over the long term, total benefits are greater than total costs. This includes the 2013 report *Pathways to a Low Carbon Economy: Version 2 of the Global Greenhouse Gas Cost Abatement Curve* by McKinsey & Company<sup>45</sup>.

Below are several examples of communities that have identified cost-effective emissions reduction strategies.

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<sup>45</sup> Available at <http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/pathways-to-a-low-carbon-economy>

- Air pollution costs Southern Californians at least \$14.6 billion a year.<sup>46</sup> The Southern California Association of Governments (SCAG) estimates that its clean transportation plan could dramatically improve air quality in the region by 2040. Without the plan, SCAG projects 270,328 air pollution–related illnesses and \$4.5 billion in related health care costs in 2040. Full implementation of the plan could reduce the incidence of these health problems by 13 percent in 2040, saving the region approximately \$596 million. The plan could also reduce emissions of climate-changing pollution by 21 percent in 2040.<sup>47</sup> The study “Climate and Health Impacts of U.S. Emissions Reductions Consistent with 2°C,” published in *Nature Climate Change* 6 in 2016, found that a pathway to slashing 75 percent of the carbon pollution from surface transportation by 2050 could prevent roughly 14,000 premature deaths by 2030.<sup>48</sup>
- In Maryland, public transportation initiatives could cut nearly two million tons of carbon pollution and support up to 1,824 jobs in 2020.<sup>49</sup> An analysis of 11 Northeast and mid-Atlantic states and Washington, DC suggests that implementation of clean transportation policies could save the region’s businesses and consumers \$32.3 to \$72.5 billion over 15 years while adding \$11.7 billion and at least 91,000 new jobs to the regional economy in 2030.<sup>50</sup>
- The Los Angeles County Metropolitan Transportation Authority (Metro) is tracking how Measure R, a voter-approved financing plan, is affecting the quality of life in Los Angeles County.<sup>51</sup>

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<sup>46</sup> Southern California Association of Governments, “Where We Are Today,” chapter 2 in The 2016–2040 Regional Transportation Plan/ Sustainable Communities Strategy, adopted April 2016, [scagtrpccs.net/Documents/2016/final/f2016RTPSCS\\_02\\_WhereWeAreToday.pdf](http://scagtrpccs.net/Documents/2016/final/f2016RTPSCS_02_WhereWeAreToday.pdf).

<sup>47</sup> Southern California Association of Governments, The 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy, Appendix: Public Health, adopted April 2016, [scagtrpccs.net/Documents/2016/final/f2016RTPSCS\\_PublicHealth.pdf](http://scagtrpccs.net/Documents/2016/final/f2016RTPSCS_PublicHealth.pdf).

<sup>48</sup> 37 Shindell, D.T., Y. Lee, and G. Faluvegi, “Climate and Health Impacts of U.S. Emissions Reductions Consistent with 2°C,” *Nature Climate Change* 6 (May 2016): 503-509, [www.nature.com/nclimate/journal/v6/n5/full/nclimate2935.html](http://www.nature.com/nclimate/journal/v6/n5/full/nclimate2935.html).

<sup>49</sup> Maryland Department of the Environment, 2015 Greenhouse Gas Emissions Reduction Act Plan Update, October 2015, [news.maryland.gov/mde/wp-content/uploads/sites/6/2015/10/GGRA\\_Report\\_FINAL\\_10-29-15.pdf](http://news.maryland.gov/mde/wp-content/uploads/sites/6/2015/10/GGRA_Report_FINAL_10-29-15.pdf).

<sup>50</sup> Pacyniak, G., et al., “Reducing Greenhouse Gas Emissions from Transportation: Opportunities in the Northeast and Mid-Atlantic,” Georgetown Climate Center, November 2015, <http://www.georgetownclimate.org/reducing-greenhouse-gas-emissions-from-transportation-opportunities-in-the-northeast-and-mid-atlanti>

<sup>51</sup> LA County Metropolitan Transportation Authority, How Is Metro Measuring Up? 2008–2015 Quality of Life Report, May 2016, [www.scribd.com/doc/314266158/Metro-Quality-of-Life-report](http://www.scribd.com/doc/314266158/Metro-Quality-of-Life-report).

Metro's first report found that public transportation investments increased on-time bus and rail departures by 13 percent from 2008 to 2014.

- Transportation planners can help reduce obesity levels and associated health problems through safer and more convenient options for walking and biking.<sup>52</sup> A 12-year study of 15 municipalities in Canada found a significantly lower rate of obesity and fewer new cases of diabetes in walkable neighborhoods.<sup>53</sup>

## V. Conclusion

The U.S. transportation system is a major source of CO<sub>2</sub> emissions and a major contributor to climate change. Fortunately, the tools exist to significantly reduce these emissions. Policies have been implemented around the country that allow people to use cleaner, less polluting fuels, use modes of transportation that generate fewer emissions, and meet their needs while traveling less.

In addition, these sustainable transportation policies have many benefits beyond lower CO<sub>2</sub> emissions, including better health due to increased rates of walking and biking and improved air quality, and lower transportation costs for families and businesses.

Transportation decision makers need tools that can tell them how the current transportation system is generating emissions, and how these emissions would be affected by proposed policies and investments. A CO<sub>2</sub> performance measure would do exactly this. It would allow state and regional policy makers to understand the consequences of their actions in detail and make the best choices.

Federal law gives FHWA a mandate to work with state DOTs and MPOs to create a "*performance-driven, outcome based approach*" to transportation decision making. FHWA has clear authority to establish a CO<sub>2</sub> performance measure in the final rule, and it should do so.

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<sup>52</sup> Litman, T., "Transportation and Public Health," Annual Review of Public Health 34 (2013): 217-233, [www.annualreviews.org/doi/abs/10.1146/annurevpublhealth-031912-114502](http://www.annualreviews.org/doi/abs/10.1146/annurevpublhealth-031912-114502).

<sup>53</sup> Creatore, M.I., et al., "Association of Neighborhood Walkability with Change in Overweight, Obesity, and Diabetes," Journal of the American Medical Association 315, no. 20 (May 2016): 2211-2220, [jama.jamanetwork.com/article.aspx?articleid=2524191](http://jama.jamanetwork.com/article.aspx?articleid=2524191).