



## **Reducing Black Carbon from Diesels: A Near-Term Climate Strategy**

### **PROBLEM**

Black carbon is a form of particulate matter emitted by diesels (and other sources), that warms by absorbing sunlight and radiating heat into the air (like a blacktop road). Black carbon can darken snow and ice, and directly accelerate melting.<sup>i</sup>

Black carbon is one of the largest contributing pollutants to global warming.<sup>ii iii</sup>

As a warming pollutant, black carbon is about 2000 times more potent than the equivalent amount of CO<sub>2</sub> over a 20-year period.<sup>iv</sup>

The United States has the highest per-capita emissions in the world for black carbon.<sup>v</sup>

57% of U.S black carbon comes from diesels; 41% from on-road diesels and another 16% from off-road diesels.<sup>vi</sup>

### **SOLUTION**

Diesel particulate filters (DPFs) are the only retrofit technology that can virtually eliminate black carbon particles (90+ percent effectiveness).<sup>vii</sup>

Retrofitting diesel engines with filters is one of the few actions that will have immediate climate benefits, complementing long-term efforts to reduce CO<sub>2</sub> emissions.<sup>viii</sup>

Despite clean diesel regulations for new engines there are 11 million old diesels in the U.S. that may be in use for decades and should be retrofit with the same filter technology required under U.S. EPA rules for new on-road and off-road diesels.<sup>ix</sup>

Installing a diesel particulate filter on a class 8 truck (e.g. tractor-trailer truck) is like eliminating the carbon dioxide emissions of 6 passenger cars.<sup>x</sup>

A CATF proposal that would result in rebuilding one million heavy-duty Class 8 trucks with diesel particulate filters between 2012 and 2030 would provide the total carbon dioxide equivalent reduction of eliminating the annual emissions of 21 million cars or 1.8 million class 8 diesel trucks. (A program total of 96 million metric tons.)<sup>xi</sup>

Reducing diesel particulate matter will also improve public health and could avoid thousands of premature deaths in the U.S. each year.<sup>xii</sup>

## REFERENCES

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- <sup>i</sup> ICCT (2009) A policy-relevant summary of black carbon climate science and appropriate emission control strategies. [http://www.theicct.org/documents/BC\\_policy-relevant\\_summary\\_Final.pdf](http://www.theicct.org/documents/BC_policy-relevant_summary_Final.pdf)
- <sup>ii</sup> Ramanathan, V. and Feng, Y. (2008). On avoiding dangerous interference with the climate system: formidable challenges ahead. PNAS, v. 105, no. 38, p. 14245-14250.
- <sup>iii</sup> Jacobson, M. (2001) Strong radiative heating due to the mixing state of black carbon in atmospheric aerosols. Nature. V. 499. February 2001.
- <sup>iv</sup> See, e.g.
- Bond, T. C. and Sun, H. (2005). Can reducing black carbon emissions counteract global warming? Environmental Science and Technology, v. 39, p. 5921-5926.
- Fuglestvedt, J., Shine, K., Berntsen, T., Cook, J., Lee, D., Stenke, A., Skeie, R., Velders, G., and Waitz, I. ( in press, 2009). Transport impacts on atmospheric and climate: Metrics. (doi:10.1016/j.atmosenv.2009.04.044)
- <sup>v</sup> See: <http://www.yaleclimatemediaforum.org/2009/07/black-carbon-and-global-warming/>
- <sup>vi</sup> Bond, T., Streets, D., Yarber, K., Nelson, S., Woo, J., and Klimont, Z. (2004). A technology-based global inventory of black and organic carbon emissions from combustion. Jour. Geophys. Res., v. 109, p. D14203.
- <sup>vii</sup> Frank, B., Tang, S., Lanni, T., Rideout, G., Beregszaszy, C., Meyer, N., Chatterjee, S., Conway, R., Windawi, H., Lowell, D., Bush, C., Evans, J. (2004). A Study of the Effects of Fuel Type and Emission Control Systems on Regulated Gaseous Emissions from Heavy-Duty Diesel Engines. SAE paper 2004-01-1085, 18p.
- <sup>viii</sup> Jacobsen, M. (2002). Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming. Jour. Geophys. Res. V. 1078, p. D19.
- <sup>ix</sup> See EPA National Clean Diesel Campaign Web site at: <http://nsdi.epa.gov/otaq/diesel/>
- <sup>x</sup> See CATF Report: The Carbon Dioxide-Equivalent Benefits of Reducing Black Carbon Emissions from U.S. Class 8 Class 8 Trucks Using Diesel Particulate Filters: A Preliminary Analysis. <http://www.catf.us/projects/diesel/>
- <sup>xi</sup> See CATF Report: The Carbon Dioxide-Equivalent Benefits of Reducing Black Carbon Emissions from U.S. Class 8 Class 8 Trucks Using Diesel Particulate Filters: A Preliminary Analysis. <http://www.catf.us/projects/diesel/>
- <sup>xii</sup> Clean Air Task Force (2005) Diesel and Health in America, the Lingering Threat. At: [http://www.catf.us/publications/reports/Diesel\\_Health\\_in\\_America.pdf](http://www.catf.us/publications/reports/Diesel_Health_in_America.pdf)