

## Detailed Recommendations

### 1. *Increase awareness of fuel and emissions savings potentials from investing in freight truck energy efficiency measures.*

A study by the American Transportation Research Institute (ATRI) found that freight carriers in the Baltimore region that were familiar with the EPA SmartWay program were more likely to have invested in Fuel Saving/Emissions Reducing Technologies (FSERT). Knowledge of the SmartWay program was also linked to plans for future FSERT installations.<sup>13</sup> The first step in a campaign to raise awareness about the fuel and emissions savings potential outlined in the tables on pages five and six should be to increase participation in the in the EPA SmartWay Transportation Partnership.

Overview: SmartWay Program for Freight Carriers<sup>14</sup> – Companies that join the SmartWay program commit to measure the baseline performance of their fleet, identify an environmental performance goal, and develop a detailed plan to meet this goal. Progress is reported to the EPA on an annual basis.

In return, a company's participation in the program is published on the SmartWay website and in regional/national materials. Qualifying trucking companies also receive the SmartWay Transport Partnership logo for display. The EPA provides technical assistance to help companies develop and meet their environmental performance goal as well as direction in regards to financing and incentives.

Currently there are more than 500 SmartWay partners and affiliates; 33 are located in New England and 16 are located in Eastern Canada.

Overview: SmartWay Loan and Lease Program – The SmartWay Finance Center is part of the SmartWay Program. The Finance Center allows interested buyers to browse the vehicles and the technology available under the program. Buyers can also submit a loan or lease application via the website, to which interested lenders can respond with a loan or lease offer. Only the vehicles and technologies listed on the website are eligible for the loans and leases. Canadian partners do have access to the SmartWay Finance Center. However, as lenders are private institutions, access to SmartWay Small Business Administration (SBA) loans is dependant on the lenders' willingness to finance a Canadian based firm. If access to loans through this program is in fact restricted for Canadian partners, provincial governments should consider establishing, or lobbying the federal government for, a comparable program.

The SmartWay program uses SBA approved lenders and other financial institutions. Loans range from \$5,000 to \$25,000. A company's gross receipts must be \$23.5 million in gross receipts or less to be eligible for the SBA express loans.

Buyers can purchase the SmartWay Upgrade Kit or individual SmartWay certified technologies including:

- ❖ Idle Reduction: (1) Auxiliary Power Unit/Generators; (2) Battery Systems; (3) Fuel Operated Heaters; (4) Thermal Storage Systems
- ❖ Aerodynamics: Trailer Aerodynamics (Freight Wing Belly Fairing and Freight Wind Gap Fairing products available).
- ❖ Wheels/Tires: (1) Automatic Tire Inflation System; (2) Low Rolling Resistance Tires
- ❖ SmartWay Certified Tractors
- ❖ SmartWay Certified Trailers

<sup>13</sup> American Transportation Research Institute (2007), *Fuel Saving/Emissions Reducing Technologies and Incentives: Use and Preferences among Diesel Truck Owners in the Baltimore Region* – Final Report. Pages 13 &17.

<sup>14</sup> EPA SmartWay Transportation Partnership website - <http://www.epa.gov/smartway/>

Limitations of the SmartWay Program – The SmartWay program seeks to overcome barriers such as access to information and technical advice that can significantly limit investments in energy efficiency measures. However, as with stationary energy users, a significant obstacle to new investments in these transport energy efficiency improvements is their high first cost. Although the SmartWay program helps minimize the transaction costs associated with seeking financing, it does not offer financial incentives for the measures themselves.

## ***2. Establish financial incentives to promote the purchase and installation of equipment that improves the end-use energy efficiency of heavy-duty freight trucks.***

It was not until Natural Resources Canada (NRCan) implemented an APU rebate program in 2003 that the trucking industry started to “significantly adopt this economically and environmentally beneficial technology en-masse.”<sup>15</sup> Under the NRCan APU program, one manufacturer’s sales increased by 810 percent over 2002 levels. This highlights the importance of government involvement in removing market barriers for new and beneficial technologies and institutionalizing their use. The program cost government \$6.2 million, which in turn leveraged \$31 million in investment by the trucking industry.

Although the payback period for most truck end-use efficiency measures ranges from 1-3 years, the high upfront cost to purchase and install the technologies often prevents them from being adopted, forfeiting the potential economic and environmental benefits. To harvest these benefits, government should establish innovative, low hassle financial incentive programs to overcome the barriers that are limiting investment in cost-effective end-use efficiency measures in the trucking sector.

The ATRI study referenced above found that more than three times the number of freight carriers (73 percent) would be interested in installing fuel and emissions savings technologies if financial incentives were available. The financial tools highlighted in the study included: (1) Tax Credits; (2) Grants; (3) Lease-to-Own Programs; and (4) Low Interest Loans.


A financial incentive program must meaningfully address the high first costs of new, efficient technologies. Energy efficiency programs – such as those successfully implemented by electric and natural gas utilities throughout the region – demonstrate the effectiveness of sharing the costs between government and energy end-users (e.g. 20/80 or 50/50). ENE therefore recommends a similar public-private cost-sharing approach for a trucking efficiency program.

The following table illustrates possible government contribution rates to state and provincial incentive programs that would capture the fuel and energy savings outlined on page six. The total contributions (in \$ millions) are based on the number of registered trucks in each jurisdiction. Additional analysis would be required to determine where the trucks did the majority of their business (although this is not as relevant to a GHG reduction incentive program compared to a PM and/or NO<sub>x</sub> program).

---

<sup>15</sup> Ogburn, M. J., L.A. Ramroth (2007), *Truck Efficiency and GHG Reduction Opportunities in the Canadian Truck Fleet*, page 3. Rocky Mountain Institute. [www.rmi.org](http://www.rmi.org)

### Possible Government Costs for PEET (Top 5 Retrofit Measures and New Efficient Trucks)

 Environment Northeast	20% Public Cost Share (\$ million)	50% Public Cost Share (\$ million)	100% Public Cost Share (\$ million)	Percent of Registered Trucks in NE-EC Region
<b>Connecticut</b>	34.90	87.25	174.50	14.6
<b>Maine</b>	18.17	45.42	90.84	7.6
<b>Massachusetts</b>	49.48	123.70	247.41	20.7
<b>New Hampshire</b>	21.04	52.59	105.18	8.8
<b>Rhode Island</b>	6.22	15.54	31.08	2.6
<b>Vermont</b>	13.86	34.66	69.32	5.8
<b>Quebec</b>	51.63	129.08	258.16	21.6
<b>New Brunswick</b>	6.93	17.33	34.66	2.9
<b>Nova Scotia</b>	13.39	33.47	66.93	5.6
<b>PEI</b>	4.06	10.16	20.32	1.7
<b>NL</b>	4.54	11.36	22.71	1.9
<b>Total</b>	<b>239.04</b>	<b>597.6</b>	<b>1,195.2</b>	<b>100</b>

Various jurisdictions already offer financial incentives to the road freight sector to improve fuel efficiency, some illustrative examples of which are discussed briefly here.

#### Tax Credits

The State of Oregon offers a tax credit for the purchase of truck fuel savings/emissions reduction technologies.<sup>16</sup> Oregon's business energy tax credit for Efficiency Truck Technology Projects is equal to 35 percent of eligible project costs. The credit is filed over five consecutive fiscal years: 10 percent in years 1 and 2 and 5 percent in years 3-5. If eligible costs are \$20,000 or less, the complete credit can be used in one year. A project owner can begin claiming credits the year the project is finished and unused credits can be carried forward for up to eight years.

To be eligible, trucks and/or trailers must be base plated in Oregon and project proponents must have a business or organization site in Oregon. Eligible equipment includes idle reduction equipment, trailer aerodynamic equipment, single-wide tires and wheels, and automatic tire inflation systems.

Eligible project owners that do not have Oregon tax liability (e.g. non-profit organizations and schools) must use the pass-through options. In this case, the project owner transfers the tax credit to a partner that gets a lump-sum cash payment. Project owners that do have Oregon tax liability can also choose to transfer the tax credit.

Oregon also offers a Clean Diesel Pollution Control Tax Credit for add-on emission control equipment.

#### Grants

The states of Wisconsin, Pennsylvania, and New Jersey offer or have offered grants to install idle reduction equipment. The Wisconsin Diesel Truck Idling Reduction Grant Program<sup>17</sup> covers up to 50 percent of the cost to purchase and install the equipment in trucks with post-1998 engines. To be eligible, freight motor carriers must be headquartered in Wisconsin. The program will award \$2 million in grants in 2008 and \$1 million in 2009 and 2010.

<sup>16</sup> More information is available at [www.oregon.gov/ENERGY/CONS/BUS/docs/Truck.pdf](http://www.oregon.gov/ENERGY/CONS/BUS/docs/Truck.pdf).

<sup>17</sup> More information is available at [http://commerce.wi.gov/BDdocs/BD-CA-DieselGrantProgramFactsheet\\_2008.pdf](http://commerce.wi.gov/BDdocs/BD-CA-DieselGrantProgramFactsheet_2008.pdf).

As part of the Texas Emissions Reduction Plan, the state offers the Emissions Reduction Incentive Grants Program to offset the incremental costs of reducing emissions from high-emitting internal combustion engines.<sup>18</sup> California, through the Carl Moyer Memorial Air Quality Standards Attainment Program provides grants to cover the incremental costs of cleaner engines and equipment to reduce emissions. In both Texas and California, projects must be considered cost-effective and the vehicles must operate at least 75 percent of the time in the state or a particular part of the state.

### Lease-to-own

Due to the relatively short payback period for many of the truck efficiency measures, access to “free” capital coupled with a high level of customer service has proven successful as a financial incentive tool for truckers. In the United States, Cascade Sierra Solutions (CSS), a nonprofit organization, has developed an innovative approach to improving the energy efficiency of the heavy-duty freight truck fleet along the I-5 corridor.

To date CSS has opened three outreach centers at truck stops in Coburg and Portland, Oregon and Sacramento, California. At each outreach center energy efficient certified equipment is displayed in a showroom. Truck owners/operators that are interested in retrofitting or upgrading their truck or fleet have immediate access to staff that offer regulatory advice; technical expertise; financing assistance; installation contracting and coordination; and, monitoring, testing, certification and reporting.

With respect to financial assistance, CSS administers the “Everybody Wins” lease-to-own program that is funded by a revolving loan from the Oregon Department of Energy and the Department of Transportation. CSS uses this funding to buy and install technology chosen by a truck owner and works with the truck owner to develop an appropriate pay-back scheme (over a maximum 60 month period). CSS also processes U.S. Small Business Administration loans as part of the SmartWay program and directs truckers to other financial assistance program in the region.

The benefit of the CSS model is that truckers have access to customer services and tailored financing packages in one convenient location. A similar program could be implemented along the I-95 corridor in New England and along the TransCanada Highway in eastern Canada.

### Loans

Numerous states offer low-interest loan programs to small businesses and freight carriers to improve the efficiency of their fleet. The terms of the loans vary by jurisdiction. The state of Arkansas offers loans of up to \$45,000 at 80 percent of the Prime Interest Rate for up to 10 years. Minnesota’s Small Business Environmental Improvement Loan Program offers loans from \$1,000 to \$50,000 at 4 percent or half of the Prime Interest Rate to be paid down in seven years or less. In Maine, low-interest loans are available to purchase APUs and bunk heaters that reduce the need for truck idling. The Virginia Department of Business Assistance offers a Small Business Environmental Compliance Assistance Revolving Loan Fund for air quality and pollution prevention projects. Small business loans are available for up to \$100,000 at 3 percent with repayment terms based on ability to pay and the equipment’s lifespan.

---

<sup>18</sup> More information is available at [www.tceq.state.tx.us/implementation/air/terp/erig.html](http://www.tceq.state.tx.us/implementation/air/terp/erig.html).

## Conclusion

Policy makers considering how to assist truckers and businesses in the NE-EC region manage their fuel costs should consider adopting PEET. PEET would improve the energy performance of existing and new heavy-duty trucks, thus saving the trucking and business sectors money while also cost-effectively abating GHG emissions. In addition to information and technical expertise, program success depends on access to meaningful financial assistance to motivate end-user efficiency investments.

If PEET is implemented in the NE-EC region ENE estimates that over 414 million litres (109 million gallons) of diesel fuel could be saved annually. This translates into approximately \$532 million in annual savings based on current diesel prices and a reduction of over 1,000,000 tonnes of CO<sub>2</sub>.

## Appendix A – Regional Freight Data

### New England Freight Truck Data

NOTE: Only Heavy-heavy Freight Trucks (26,001 pounds +) are included.

US Census Bureau – Census 2002 data: Vehicle Inventory and Use Survey

	<b># Trucks</b>	<b>Total Truck Miles</b>	<b>Average Miles/Truck</b>
Connecticut	21,100	534,700,000	25,300
Maine	11,000	231,400,000	21,100
Massachusetts	29,800	898,300,000	30,200
New Hampshire	12,600	314,000,000	24,900
Rhode Island	3,700	90,700,000	24,800
Vermont	8,400	259,600,000	31,000
<b>TOTAL NE</b>	<b>86,600</b>	<b>2,328,700,000</b>	<b>26,217</b>

Total tonnage and ton-miles shipped in New England in 2002 by state:

	<b>CT</b>	<b>ME</b>	<b>MA</b>	<b>NH</b>	<b>RI</b>	<b>VT</b>	<b>Total</b>
<b>Tons (thousands)</b>	47,291	26,660	70,702	30,651	18,836	14,624	208,764
<b>Ton-miles (millions)</b>	4,348	6,712	11,787	3,711	2,297	2,217	31,072

US EIA Annual Energy Outlook 2008 – National Data

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>Annual Growth</b>
Truck (>10,000 lbs) VMT (billion)	228	250	279	304	1.7%
MPG	6.0	6.0	6.2	6.5	0.5%
Energy Use (quadrillion Btu)	4.74	5.18	5.60	5.85	1.2%

Actual and Projected Freight VMT (millions) in New England to 2020

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
NE Region	2,328.7	2,533.5	2,756.3	2998.7

Actual and Projected Freight Energy Use (gallons) in New England to 2020

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
NE Region	388,116,667	422,250,000	459,383,333	499,783,333

Actual and Projected Freight Emissions (MtCO<sub>2</sub>eq) to 2020

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
NE Region	3.94	4.28	4.66	5.07

## Eastern Canada Freight Truck Data

NOTE: Only Heavy Freight Trucks are included (33,001 pounds +).

### Transport Canada 2005 Data

	# Heavy Trucks	VKT	Liters*
NL	2,800	179,000,000	71,600,000
PEI	2,500	59,000,000	23,600,000
NS	8,100	582,000,000	232,800,000
NB	4,200	117,000,000	46,800,000
QC	39,800	4,252,000,000	1,700,800,000
<b>EC Total</b>	<b>57,400</b>	<b>5,189,000,000</b>	<b>2,075,600,000</b>

\* Based on 2005 average fuel efficiency of 40L/100km - 35.1 is the reported average however discussion with an employee of Transport Canada suggested this is too low.

### NRCan 2005 Data

	Energy Use (PJ)	Energy Use (L)*	GHG (Mt CO <sub>2</sub> eq)
NL	11.4	316,666,667	0.8
PEI	2.0	55,555,556	0.1
NS	15.2	422,222,222	1.1
NB	20.1	558,333,333	1.4
QC	81.5	2,263,888,889	5.9
<b>EC Total</b>	<b>130.2</b>	<b>3,616,666,667</b>	<b>9.3</b>

\*36.4 MJ/L or 0.000,000,036,4 PJ/L

### Projected regional energy use (million L) to 2020 – Heavy Freight Trucking

	2005	2010	2015	2020
Eastern Canada	2,075	2,348	2,567	2,806

### Projected regional GHG emissions (Mt CO<sub>2</sub>) to 2020 – Heavy Freight Trucking

	2005	2010	2015	2020
Eastern Canada	4.92	5.56	6.08	6.65

Forecasted energy use and emissions are based on Canada's Energy Outlook (NRCan) which assumes a 2.5% annual growth rate in energy use for freight transportation to 2010 and a 1.8% annual growth rate from 2010 to 2020.

## Appendix B – Efficiency Measures and Assumptions for Analysis

In 2003, ICF Consulting conducted a study for the US EPA to analyze the potential energy and emissions savings from eight trucking strategies (and variants) being considered by the EPA for its Ground Freight Transportation Initiative. The measures included in the ICF Consulting Study - *Energy Efficiency Strategies for Freight Trucking: Potential Impacts on Fuel Use and Greenhouse Gas Emissions* – were:

1. Improved Aerodynamics (3 variants)
    - a. Tractor Aero Profile (Van Trailer)
    - b. Tractor Aero Features (Non-Van Trailer)
    - c. Improved Trailer Aerodynamics
  2. Wide-Base Tires
  3. Proper Tire Inflation
  4. Tare Weight Reduction
  5. Low-Friction Lubricants (2 variants)
    - a. Low-Friction Engine Lubricants
    - b. Low-Friction Drive Train Lubricants
  6. Reduced Engine Idling (3 variants)
    - a. Direct-Fire Heater
    - b. APU
    - c. Automatic Engine Idle
  7. Speed Reduction (2 variants)
    - a. 70 to 65 mph
    - b. 65 to 60 mph
  8. Driver Training and Monitoring Programs
- 

Assumptions for analyzing the potential energy and emissions savings in the region:

- An approach similar to that used in the ICF study to analyze the energy and GHG savings potential is used for eastern Canada.
- The ICF study fuel savings potentials, current market penetration rates, maximum market penetration rates, and 50% participation level is used.
- For eastern Canada, the 2005 energy use and GHG emissions are based on the VKT included in Transport Canada's 2006 Annual Report. A 40 L/100km fuel efficiency is used and an emission factor of 2370 g/L of diesel fuel (National Inventory Report, Environment Canada)
- Forecasted energy use and emissions are based on Canada's Energy Outlook (NRCan) which assumes a 2.5% annual growth rate in energy use for freight transportation to 2010 and a 1.8% annual growth rate from 2010 to 2020.
- In New England, VMT are based on the individual state Vehicle Inventory and Use Surveys as part of the US Census Bureau's Census 2002. The fuel efficiency standards used and the projected annual increase in VMT are based on the US EIA Annual Energy Outlook 2008. An emission factor of 22.37 pounds CO<sub>2</sub>/gallons (EIA) was used.