

# **Incentives for Deployment of Onboard Safety Systems Final Report**



**U.S. Department of Transportation  
Federal Motor Carrier Safety Administration**

**December 2007**

## **FOREWORD**

As part of an ongoing research project evaluating onboard safety technologies, this report identifies potential incentives that could expedite the deployment of onboard safety systems into the marketplace.

The objective of this report is to outline possible ways to “incentivize”—through either tools of government or private industry—the procurement and utilization of onboard safety technologies. This report describes the five major stakeholders highlighted in the onboard safety technology incentives matrix: technology manufacturers, truck original equipment manufacturers (OEMs), trucking companies, insurers, and government agencies. The primary sources used for the compilation of potential incentives were industry stakeholders who offered their insights on incentives and related issues. As a result, the information provided in the following sections about incentives does not constitute an endorsement by FMCSA.

Although the report can be helpful to the general public in understanding the deployment of new safety technology for commercial motor vehicles, the report is primarily targeted toward commercial motor carriers and their drivers.

This publication is considered a final report and does not supersede another publication.

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## SI\* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS					APPROXIMATE CONVERSIONS FROM SI UNITS				
Symbol	When You Know	Multiply By	To Find	Symbol	Symbol	When You Know	Multiply By	To Find	Symbol
<u>LENGTH</u>					<u>LENGTH</u>				
in	inches	25.4	Millimeters	Mm	mm	millimeters	0.039	inches	in
ft	feet	0.305	Meters	M	m	meters	3.28	feet	ft
yd	yards	0.914	Meters	M	m	meters	1.09	Yards	yd
mi	miles	1.61	Kilometers	Km	km	kilometers	0.621	miles	mi
<u>AREA</u>					<u>AREA</u>				
in <sup>2</sup>	square inches	645.2	square millimeters	Mm <sup>2</sup>	mm <sup>2</sup>	square millimeters	0.0016	square inches	in <sup>2</sup>
ft <sup>2</sup>	square feet	0.093	square meters	m <sup>2</sup>	m <sup>2</sup>	square meters	10.764	square feet	ft <sup>2</sup>
yd <sup>2</sup>	square yards	0.836	square meters	m <sup>2</sup>	m <sup>2</sup>	square meters	1.195	square yards	yd <sup>2</sup>
ac	acres	0.405	Hectares	Ha	ha	hectares	2.47	acres	ac
mi <sup>2</sup>	square miles	2.59	square kilometers	km <sup>2</sup>	km <sup>2</sup>	square kilometers	0.386	square miles	mi <sup>2</sup>
<u>VOLUME</u>					<u>VOLUME</u>				
fl oz	fluid ounces	29.57	Milliliters	ml	ml	milliliters	0.034	fluid ounces	fl oz
gal	gallons	3.785	Liters	L	l	liters	0.264	gallons	gal
ft <sup>3</sup>	cubic feet	0.028	cubic meters	m <sup>3</sup>	m <sup>3</sup>	cubic meters	35.71	cubic feet	ft <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.765	cubic meters	m <sup>3</sup>	m <sup>3</sup>	cubic meters	1.307	cubic yards	yd <sup>3</sup>
<u>MASS</u>					<u>MASS</u>				
oz	ounces	28.35	Grams	G	g	grams	0.035	ounces	oz
lb	pounds	0.454	Kilograms	Kg	kg	kilograms	2.202	pounds	lb
T	short tons (2000 lbs)	0.907	Megagrams	Mg	Mg	megagrams	1.103	short tons (2000 lbs)	T
<u>TEMPERATURE (exact)</u>					<u>TEMPERATURE (exact)</u>				
°F	Fahrenheit temperature	5(F-32)/9 or (F-32)/1.8	Celsius Temperature	°C	°C	Celsius temperature	1.8 C + 32	Fahrenheit temperature	°F
<u>ILLUMINATION</u>					<u>ILLUMINATION</u>				
fc	foot-candles	10.76	Lux	Lx	lx	lux	0.0929	foot-candles	fc
fl	foot-Lamberts	3.426	candela/m2	cd/m2	cd/m2	candela/m2	0.2919	foot-Lamberts	fl
<u>FORCE and PRESSURE or STRESS</u>					<u>FORCE and PRESSURE or STRESS</u>				
lbf	pound-force	4.45	Newtons	N	N	newtons	0.225	pound-force	lbf
psi	pound-force per square inch	6.89	Kilopascals	kPa	kPa	kilopascals	0.145	pound-force per square inch	psi

\* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

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# 1. INTRODUCTION

Safety is at the heart of the Federal Motor Carrier Safety Administration's (FMCSA) mission. Working together with the trucking industry, FMCSA envisions a future of smart technologies that support the expanding role of the trucking industry to safely, securely, and efficiently transport the nation's goods and products. One way to save lives and reduce the number of injuries on the nation's highways is through the expanded use of onboard safety systems, such as lane departure warning systems, stability control systems, and collision warning systems.

Incentives have the potential to accelerate the manufacture, purchase, and use of a new safety technology. As a result, the purpose of this report is to outline possible efforts to “incentivize”—through either tools of government or private industry—the procurement and utilization of onboard safety systems. These potential incentives include:

- Federal Tax Expenditures
- Public Information
- Federal Loans
- Insurance
- Corrective Tax
- Project Grants
- Tort Liability

**The primary sources used for the compilation of potential incentives were industry stakeholders who offered their insights on incentives and related issues. As a result, the information provided in the following sections about incentives does not constitute an endorsement by FMCSA.**

## **2. METHODOLOGY**

### **2.1 OVERVIEW**

The methodology used in this report included qualitative data collection and an integrated review of previously collected and analyzed quantitative data in the area of incentives.

The sources of qualitative data were industry stakeholders who offered their insights on incentives and related issues, organized by the five major stakeholder categories (carriers, original equipment manufacturers [OEMs], technology manufacturers, insurers, and government agencies). To manage the complexity of interview data, qualitative analysis software (QSR NVivo) was used to create data nodes for the eight incentive categories (tax expenditures, public information, grants, loans, insurance, tort reform, taxes, and other), and five major stakeholder categories. Analyzing these categories separately provided an understanding of shared versus disparate opinions of stakeholders. To validate inferences and statements made during the interview process, quantitative data from established publications were cited.

### **2.2 INTERVIEW DISTRIBUTIONS**

Predicated on the assumption that onboard safety technology is both innovative and proven, the two concepts listed below were used to identify interview participants that would provide information about incentives:

1. Product Adoption (within the trucking industry).

Mirroring standard “product adoption” processes developed in business marketing research, individuals and firms go through typical stages in the process of incorporating new products. The stages generally include (a) becoming aware of the new product, (b) seeking information about it, (c) developing favorable attitudes toward it, (d) trying it out using some direct or indirect means, d) formulating an opinion or position, and (e) adopting the product into a standing usage or repurchase pattern.

Within the target groupings, potential “adopters” often fall into different categories associated with their level of decision-making risk. These labels – which in the trucking industry are usually determined both by corporate philosophy and financial viability (often related to company size) – relate to a chronological labeling of willingness to adopt a new or innovative product. The standard marketing descriptions and ostensible number of total adopters include the following:

- Innovators (first 2 to 5 percent);
- Early adopters (next 10 to 15 percent);
- Early majority (next 35 percent);
- Late majority (next 35 percent);
- Laggards (final 5 to 10 percent).



## 2. Standard Trucking Industry Organizational Design

The trucking industry is relatively homogenous in its organizational design (functional roles), but firm size dictates the number of different functional roles for any one person. For example, larger firms have dedicated staff in charge of functions such as maintenance, safety, investment, staffing, whereas smaller firms may lump these functions together under a single individual.

Based on these product adoption assumptions, larger carriers were primarily selected for interviews, since they typically have larger capital investment budgets and greater liquidity to become the first adopters of onboard safety systems. If larger carriers make the initial investment, future lower prices will increase purchasing opportunities for smaller carriers. Yet, one smaller carrier was also interviewed. In a few cases, regardless of carrier size, specialized segments such as munitions haulers are often required to invest in certain safety technologies.

This rationale also applies to a lesser degree to technology manufacturers, truck OEMs, and insurance companies. The interview participants are shown in Table 1.

**Table 1. Interview Participants**

<b>Category</b>	<b>Entity</b>
<b>Trucking Industry</b>	Schneider National, US Xpress, Boyle Transportation, American Trucking Associations (ATA), legal entity
<b>Truck OEMs</b>	Volvo, Freightliner, National Truck Equipment Association
<b>Insurance Industry</b>	Great West Casualty, Liberty Mutual, National Accounting & Finance Council
<b>Governmental Agencies</b>	FMCSA, Internal Revenue Service (IRS), Commercial Vehicle Safety Alliance (CVSA)

## **3. INDUSTRY DESCRIPTIONS AND MOTIVATIONS**

### **3.1 TRUCKING INDUSTRY**

As an integral part of freight transport in the United States, the trucking industry hauled 10.7 billion tons, or 69.0 percent of the nation's total freight tonnage, in 2006.<sup>1</sup> Due in part to the deregulation of the 1980s and 1990s, competition among trucking firms has become more intense, putting considerable pressure on operating margins. More specifically, deregulation lowered barriers to entry such as operating authority and financial viability, thus leading to growth in registered carriers from less than 20,000 to nearly 565,000. The effect of this increased competition has reduced typical net operating margins to between 2 and 4 percent.<sup>2</sup> Additional factors that impact a carrier's financial health include:

- Competition among other freight transporting sectors
- Economic recessions
- Driver shortages
- Volatile and increasing fuel costs
- Skyrocketing insurance rates

The trucking industry is primarily motivated by economic factors. Based on the pressures described above, capital investments are researched and scrutinized to determine fully allocated return on investments and opportunity costs. Fixed costs associated with the industry are found in fuel, labor inputs, and essential equipment such as trucks, trailers, and tires. Taxes also play a role, with a typical carrier paying approximately \$8,959 annually in Federal taxes on a typical 5-axle, tractor-semi trailer combination.<sup>3</sup> These items are, as their category implies, necessary for service provision. Variable inputs such as onboard safety technology are not necessary for operations if a lower-cost safety alternative such as training and/or hiring practices are available—ostensibly whether or not these alternatives are proven. A recent industry survey produced by the American Transportation Research Institute (ATRI) and Gartner G2 stated “few respondents...have deployed automated safety systems such as load stability sensors, lane departure warning systems, and automated collision notification systems,”<sup>4</sup> indicating that large investments in safety technology are not a top priority for the trucking industry.

### **3.2 TRUCK ORIGINAL EQUIPMENT MANUFACTURERS**

Truck OEMs are highly dependent on the trucking industry to purchase their equipment and follow similar economic growth and recession patterns. In a month-by-month comparison of OEM sales between in the years 2006-2007, overall new truck sales typically fell more than 50

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<sup>1</sup> American Trucking Associations, 2007.

<sup>2</sup> Berry, 2004.

<sup>3</sup> American Trucking Associations, 2006 figure, [www.atri-online.org](http://www.atri-online.org).

<sup>4</sup> Trucking Technology Survey Results Summary, p. 2

percent from the same month in the previous year, with class 8 truck sales often declining at the greatest rate.<sup>5</sup> In 2006, approximately 445,000 Class 6-8 trucks were sold in the U.S.<sup>6</sup>

Factors influencing this decline included the economic recession and rising costs of diesel and insurance. Complicating matters for OEMs, future demand for new vehicles is not expected to keep pace with freight tonnage growth because of the existing truck surpluses. It is believed that staged regulations placed on diesel engine manufacturers by the Environmental Protection Agency in 2002, 2004, and 2005 will also play a crucial role in future sales. The result is increased difficulty in deploying new vehicle-installed safety systems into the marketplace.

OEMs are primarily motivated to install onboard safety devices if it is perceived that the feature will enhance the value-perception of their product and increase the likelihood of a purchase. Barriers to installing specific onboard safety devices first include Federal excise taxes (FETs). The additional cost of the product is added into the final retail cost and is subject to the 12-percent retail sales tax. Aftermarket installation does not incur this FET. Thus, OEMs would be motivated to include onboard safety technology if the cost were lessened through decreased FETs, or if carriers had other external incentives to utilize such devices.

### **3.3 TECHNOLOGY MANUFACTURERS**

Technology manufacturers are motivated to develop innovative products that will be purchased once the learning curve is established. Often “innovations” are revisions and refinements to technology transfers from other applications. Thus, if incentives exist and a market for a safety concept is identified, more manufacturers will enter the market, and create and improve upon the current state of onboard safety technology knowledge. Those who already have products in the marketplace will also benefit from demand-creating incentives.

### **3.4 INSURANCE COMPANIES**

The insurance industry has seen substantial cost increases in recent years due, in part, to damages and lawsuits arising from the events of September 11, 2001. While most of these costs were initially born by the insurance industry, they were passed on to all insurance clients, resulting in insurance premium increases for most policies relating to auto, home, property, and umbrella coverage. As a result, the trucking industry experienced an average annual insurance rate increase of 26.3 percent in 2002,<sup>7</sup> though average premium rates did decline slightly in 2005 and 2006. Over the last several years, insurance rates have been relatively stable, allowing the trucking industry to better predict and incorporate insurance costs into business plans.

By definition, insurers are risk-averse. Each company has a different formula to determine risk and what, if any, premium and deductible a trucking company will have as part of their policy. Insurance premiums will not change simply because a new input is added into the field. They traditionally will only lower rates as loss performance improves over a given time. Therefore, this risk-averse industry does not appear to be motivated to make short-term changes based on

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<sup>5</sup> Transport Topics, November 19, 2007.

<sup>6</sup> Ward's Automotive Group, 2007

<sup>7</sup> American Trucking Associations, 2003 and 2003 Annual Trucking Industry Insurance Survey (based on 1,000 respondents)

anything other than: (1) widespread and longitudinal testing and utilization of products, and/or (2) documented improvements in safety records and scores. Safety technologies have to meet one or both of these internal requirements.

### **3.5 GOVERNMENT AGENCIES**

A major objective of the United States Department of Transportation (USDOT) is to provide a safe transportation system to meet the needs of citizens. In accordance with the USDOT mission, and in response to legislative action, FMCSA was created with a purpose of reducing accidents, injuries, and fatalities that involve large trucks and buses.

Improving safety is the mission of FMCSA. In doing so, it has funded research projects that demonstrate the effectiveness of onboard safety technology and hopes to increase the use of onboard safety technologies.

## 4. INCENTIVES

Incentives are defined activities that can be done to accelerate the manufacture, purchase, and use of a new safety technology. The primary sources used for the compilation of potential incentives were industry stakeholders listed in Table 1 who offered their insights on incentives and related issues. As a result, the information provided in these sections about incentives does not constitute an endorsement by the FMCSA. Table 2 through Table 9 present the incentives in the following categories:

- Federal Tax Expenditures
- Corrective Tax
- Public Information
- Project Grants
- Federal Loans
- Tort Liability
- Insurance
- Other

**Table 2. Incentives—Federal Tax Expenditures (see Appendix A-1)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Heavy Vehicle Use Tax: A tax credit, deduction, or reduction based on procurement costs of onboard safety technology.	Carriers: Carriers who use technology would receive this benefit.	Legislative/U.S. Treasury and Congress/FMCSA/ Low to Medium
Federal Excise Tax; Retail Sales Tax on new Trucks: A tax credit, deduction, or reduction on the excise tax for all or part of the sale of technology as part of a new vehicle and/or the new truck itself.	OEMs: OEMs would be able to install the technologies and not pass as much or any of their costs onto consumer. Carriers: Carriers would benefit from safety technology included in new truck purchase at cost minus tax, minimal cost, or no cost, depending on type of retail sales tax relief.	Legislative/U.S. Treasury and Congress/FMCSA/ High for carriers; Low to Medium for implementers
Federal Excise Tax; Commercial Truck Diesel Taxes: A tax credit, deduction, or reduction on fuels purchased by the carrier based on use of onboard safety technology.	Carriers: Carriers would realize a decrease in a very costly area of their business.	Legislative/U.S. Treasury and Congress/FMCSA/ Very Low
Federal Income Tax: A tax credit or deduction in Federal income tax burdens placed on carriers or OEMs based on use or installation of onboard safety technology.	OEMs: A decreased tax burden would be available to companies who install onboard safety technology during production. Carriers: A decreased tax burden would be available for using onboard safety technology.	Legislative/U.S. Treasury and Congress/FMCSA/ Medium to High

**Table 3. Incentives—Public Information (see Appendix A-2)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Dissemination of Data and Research: Materials, such as data and research collected in onboard safety technology evaluations, which offer extensive information to the industry and, in doing so, lessen or remove the cost to industry members of researching new products themselves.	Carriers: Carriers would accrue fewer costs in researching the product themselves and will be more likely moved toward use of onboard safety technology. Objective, positive evaluations of the technology will offer stakeholders fewer risks in utilization of the device and opportunity cost.	Administrative/FMCSA/ NHTSA/High
Expert Testimony: In addition to written information, the use of testimony to further solidify that the technology is viable and will offer the stakeholder cost-free information.	Carriers: Carriers would accrue fewer costs in researching the product themselves and will be more likely moved toward use of onboard safety technology. Objective, positive evaluations of the technology will offer stakeholders fewer risks in utilization of the device and opportunity cost.	Administrative/FMCSA/ NHTSA/High

**Table 4. Incentives—Federal Loans (see Appendix A-3)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Direct Loan: A direct loan to a carrier for the purchase of onboard safety technology equipment. This can be designed with various rates of interest and payment schedules.	Carriers: This group would benefit from low interest loans for the purchase of new equipment.	Administrative/U.S. Treasury, Small Business Administration (SBA), Department of Commerce (DOC)/FMCSA/High
Loan Guarantee: A loan given by a private lender for the purchase of onboard safety technology equipment in which the loan is guaranteed by the government if the borrower defaults.	Carriers: Carriers may receive lower cost loans if the lenders risk is lessened by government guarantees.	Administrative/Banking Industry, U.S. Treasury, SBA, DOC/FMCSA/ Medium

**Table 5. Incentives—Insurance (see Appendix A-4)**

<b>Incentive Description</b>	<b>Stakeholder and Benefits</b>	<b>Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value</b>
Private Insurance: A decrease in insurance costs would be implemented by the insurance companies if this type of plan worked well with their business model. Burden is on the proven benefits of the technology prior to this incentive offering.	Carriers: Carrier costs for insurance have risen dramatically in recent years. A decrease in insurance could free up capital.	Administrative/Insurance Industry/Low to Medium

**Table 6. Incentives—Corrective Tax (see Appendix A-5)**

<b>Incentive Description</b>	<b>Stakeholder and Benefits</b>	<b>Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value</b>
Corrective Tax or Charge: An increased tax rate, fine, or charge to one or more areas of cost for trucking. This would be placed on those who do not use onboard safety technology; would create an incentive to procure and install these devices. Disincentive effects could be reduced by pooling tax revenues for a pooled accident reimbursement fund.	Carriers: Carriers who already use the device, or have plans to in the short-run, will benefit from this type of plan because their competition will face additional costs. This will create an incentive for carriers to purchase onboard safety technology before the tax is implemented, and will also create incentive once the tax is law.	Legislative/U.S. Treasury/FMCSA/Low

**Table 7. Incentives—Project Grants (see Appendix A-6)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Carrier Grants: Funding to help offset or eliminate costs of evaluating new onboard safety technology on all or part of a fleet.	Carriers: This stakeholder benefits from low-cost or no-cost research and the resulting information derived from it; develops the critical base of knowledge and product validation.	Administrative/FMCSA/ Medium to High
OEM Grants: Funding to help offset or eliminate costs of evaluating new onboard safety technology that is tested by a new truck manufacturer.	OEMs: OEMs could determine through research that the technology has value and should be installed in all new vehicles.	Administrative/FMCSA/ Medium to High
Technology Manufacturer Grants: Funding for technology manufacturers to give free or low-cost onboard safety technology to companies for the purpose of evaluation.	Carriers and Technology Manufacturers: Carriers would benefit from low- or no-cost evaluation. Technology manufacturers could offset costs of evaluation for their product.	Administrative/FMCSA/ Low to Medium
Joint Grants: Evaluation grants given to all or some of the above-listed stakeholders.	Carriers, Technology Manufacturers, and/or OEMs: These groups would benefit from low or no cost evaluations while working with other industry stakeholders.	Administrative/FMCSA/ Medium to High
Grants to current users of technology: Grant money paid to carriers who currently use the product for evaluation and documentation purposes.	Carriers: Knowledge gained during evaluations could be used as evidence for additional carriers to purchase onboard safety technology.	Administrative/FMCSA/ Low



**Table 8. Incentives—Tort Liability (see Appendix A-7)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Liability: Lessening or removal of liability for crashes where onboard safety technology is properly installed and used.	Carriers: Carriers would have less liability and, therefore, an incentive to use the product. Insurers: Insurers' risk would decrease as liability for those who they insure decreases.	Legislative or Judicial (as the result of a court case)/ Medium
Use of Data by Plaintiffs' Attorneys: Prevention of the use of the data collected by onboard safety technology from being used against carrier by plaintiff attorneys.	Carriers: Carriers would have less liability, which would be an incentive to use the product. Insurers: Their risk would decrease as liability for those who they insure decreases.	Legislative or Judicial (as the result of a court case)/ Medium

**Table 9. Incentives—Other (see Appendix A-8)**

Incentive Description	Stakeholder and Benefits	Implementation Type/ Primary Agent/ Secondary Agent/ Incentive Success Value
Accelerated Depreciation: Depreciation of the onboard safety technology to accelerate for tax purposes.	Carriers: Carriers who chose to purchase the technology can deduct a capital depreciation allowance.	Legislative/Medium
Mandate for Federal and/or State class 6 through class 8 vehicles and/or those companies who use such vehicles to do contract work for the Federal government (such as companies who move freight for the USPS).	Carrier: Prices for technology would decrease as more devices are used, and they will offer evidence that such devices are useful.	Legislative/Medium to Low

# APPENDIX A: INCENTIVE CATEGORY DESCRIPTIONS

## A-1. FEDERAL TAX EXPENDITURES

*Federal Excise Tax (FET):* For the purposes of this project, five categories of Federal excise taxes were analyzed. Two of these can be considered corrective taxes (e.g., alcohol and tobacco), a third category is for general items such as telephone use, and a fourth is for retail. Finally, there is an excise tax category for those taxes imposed on manufacturers. Only six designated items are associated with this tax category: gasoline, firearms, bows, ammunition, fishing equipment, and the “gas guzzler” tax. Two other items in this final tax category are a per-pound tax on highway tires and a flat 12-percent rate on the sale of trucks. The charge for tires and new truck and trailer sales has remained the same since 1990, as have nearly all of the other excise taxes above.

FETs are considered both a tool to raise revenue and change behavior. Exemptions to the Federal excise tax are few and targeted to specific populations. For instance, the FET exemptions for taxes associated with telephone communications include ambassadors, government agencies, and schools associated with religious organizations. This is the general indicator of exempted targets across the five categories, and change to these taxes does not occur with great political ease or frequency.

*Heavy Vehicle Use Tax:* The Heavy Vehicle Use Tax (HVUT) is one collected by the IRS on vehicles that weigh greater than 55,000 pounds. There are currently few exemptions from this tax, but include a waiver for vehicles that travel less than 5,000 miles per year and one for farm vehicles that travel less than 7,500 miles annually.

*Federal Income Tax:* Exceptions to Federal income tax laws occur more frequently in order to change behavior. These may be in the form of tax credits or tax deductions.

A tax deduction reduces a tax burden by identifying an amount of money that is deductible, thus reducing taxable income for an individual or organization by that amount. For example, the Federal government encourages donations to non-profit groups. If \$300 is donated and taxable income is \$1,300 initially, the deduction leads to taxable income decreasing to \$1,000. At a 33.3 percent tax rate the savings will be around \$100.

A tax credit, on the other hand, reduces tax liability rather than taxable income. A useful example may be the Energy Credit given to small businesses that begin using solar or geothermal energy sources. They receive a tax credit for the amount spent on the purchase and installation of that product. Therefore, if a participating business has taxable income of \$100,000, is taxed \$25,000 and spends \$5,000 within the boundaries of the Energy Credit, they will receive a credit and only pay \$20,000 in income taxes that year, thus retaining \$5,000 of their initial tax burden.

## **A-2. PUBLIC INFORMATION**

Public information campaigns are generally used to change the behavior of specific populations by changing the awareness, knowledge, and or opinions of a population. There are many well-known public information programs, ranging from Stop Smoking campaigns to the recent introduction of a newly designed \$20 bill.

Public information can appear to its audience to be directly from a government agency. The Centers for Disease Control and Prevention successfully educates the public on diseases with pamphlets that list research findings and offer strategies for maintaining a desired level of health. In this case, it is apparent where the information campaign originates from and for what reason it was published. This example of information dissemination is more scientifically centered and more focused on specific populations and the changing or informing of what those populations think and how they behave.

Public information also can be a form of indirect government involvement. The White House Office of National Drug Control Policy had an information program that developed the *Parents: The Anti-Drug* campaign. These campaigns are produced and shown under the name, National Youth Anti-Drug Media Campaign, which conceals the fact that the information source is an Executive office. With this type of campaign, it is uncertain where the message is coming from, but the message is still apparent.

In the case of FMCSA incentivizing utilization of a safety technology, a direct government approach would enhance the information, through its credibility as a government agency and its expertise in the trucking industry. An indirect campaign might offer the target population the appeal of an apparently independent, non-governmental “peer-based” initiative.

## **A-3. FEDERAL LOANS**

The Federal government has the ability to create borrowing incentives that encourage or direct populations to behave in certain ways. This can be done through two forms of loan products: Direct Loans and Loan Guarantees.

A Federal loan program is designed and implemented as a direct service of government. In the case of safety technology, an agency can offer low- or no-interest loans to encourage purchase of the devices. The government is in charge of directly loaning the money and collecting on delinquent borrowers (with components that are sometimes subcontracted to outside firms). The largest program of this kind is the Federal student loan program, where students are encouraged to attend colleges and universities where the cost may be too high. The tool basically encourages a more educated population.

A less direct and more easily implemented type of program is a loan guarantee program. These allow loans to be offered through existing private resources, but are guaranteed by a government entity, thus shifting the risk from the lender to the government and allowing for more risk-permissive loan programs. This type of program is much less complex for an agency because the lending infrastructure is already in place. An example is the Housing and Urban Development

(HUD) loan guarantee program, which offers loans through approved lenders to encourage stability among lower income Americans through home ownership.

#### **A-4. INSURANCE**

Private insurance incentives are not presently a tool that has been successfully and directly managed by government. Although it is ideal that private insurance encourage the use of safety devices, insurers, like those they insure, are driven by economic and safety forces. Recognizing this, it is clear that insurers change premiums for carriers only when economic or safety inputs change (i.e., reduced risk, proven safety advantages, and improved returns on investment).

#### **A-4. CORRECTIVE TAX**

Corrective taxes are used to change behaviors, especially those that negatively affect social welfare. These types of taxes are often associated with “sin taxes” such as those excise taxes on alcohol and tobacco.

Although this type of tax may be effective at changing behavior through its coercive effect (with increasing effectiveness as penalties increase), they are politically unpopular. Nevertheless, they may be appropriate if it can be determined that:

- Certain safety technologies exist and can be easily purchased and installed.
- Those devices are effective and diminish accident potential.
- Not using these devices is harmful behavior that negatively affects society.
- Revenues can be used to improve safety for those carriers not involved in technology purchases.

#### **A-5. PROJECT GRANTS**

Trucking industry carriers and OEMs occasionally receive direct or indirect grants to participate in a project and complete a set of tasks. For example, the U.S. Department of Energy recently chose Schneider National and Caterpillar to test truck idling reduction technology. This money is used to support activities that the Federal government does not have the ability or resources to accomplish, or to focus on activities that would be more appropriately completed by industry.

The result of projects such as the one described above offer insight as to whether certain products can support the goals and objectives of the sponsoring agency. These results can be shared with the larger population that the agency or office regulates in order to influence their knowledge base, behaviors, and activities. Thus, public information and project grants are tied closely with one another, because validating an objective and disseminating related information are often necessary in changing behavior.

## A-6. TORT LIABILITY

One theory holds that tort liability may reduce the burden on government agencies to “protect” citizens by transferring financial damages to other involved parties. It does so by allowing citizens who are harmed by individuals or organizations to hold those parties financially liable for their actions in civil courts. Another theory proposes that excessive tort liability raises risk and hinders product development and adoption. The resulting logic, promulgated by industry, is that revising tort law will increase technology utilization and data-sharing.

Tort reform can take place through judicial acts or through an act of Congress. An example of a judicial act is the 2003 Supreme Court case *State Farm versus Campbell* with a court-set precedence that excessive punitive damages violated due process after Campbell was awarded \$145 million. Legislative bodies can also play a roll in limiting liability. The Y2K Act prevented those who received damages due to the year 2000 computer glitch to collect on those damages.

In the case of data or information privacy, the Health Insurance Portability and Accountability Act (HIPAA) has been created to protect privacy controls that individuals have over their medical records and has impacted use of that information in civil law.

## A-7. OTHER: INCENTIVES CYCLE AND STAKEHOLDERS

The incentive cycle flow and the relationship among the five stakeholders are shown in Figure 1.

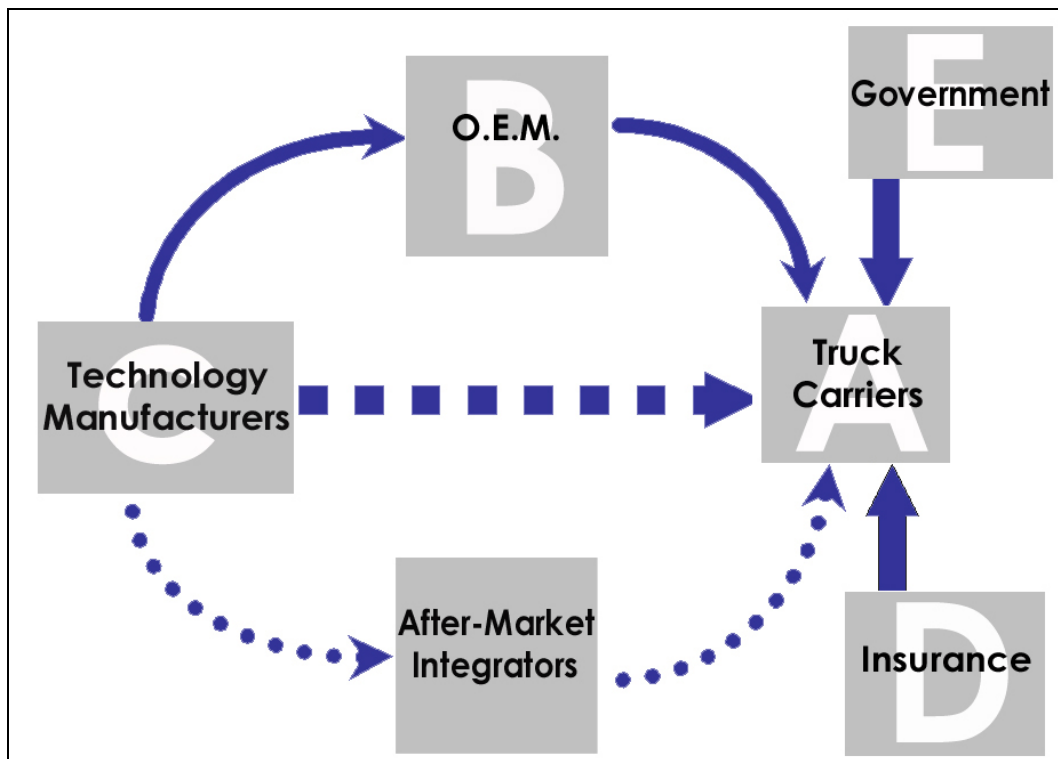


Figure 1. Incentives Cycle and the Five Stakeholders

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- Interview with Insurance Researcher, Liberty Mutual
- Interview with Insurance Underwriter, Great West Casualty
- Interview with Principal Engineer, Volvo Trucks of North America
- Interview with Operations Manager, Boyle Transportation
- Interview with Safety Director, Schneider National, Inc.
- Interview with Vice President of Technology, US Xpress Enterprises, Inc.

Interview with Policy Director, Commercial Vehicle Safety Alliance

Interview with Government Regulations Manager, National Truck Equipment Association

Interview with Intellectual Property Attorney