Low Carbon Shipping, Transport & Market Incentive Programs

Carbon Labelling Project

Deliverable 8: Report on the Evaluating of the USEPA Smart Way Transport Program and how it could be improved if implemented in the EU

- November 2007 -

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Executive Summary

This report is being prepared by the EU Carbon Labeling Consortium through a grant provided by the DG Energy and Transport Intelligent Energy Initiative. The project involves participation from five countries (UK, Poland, Germany, Netherlands, Malta) and a group of companies, governments and non profit organizations interested in developing carbon labeling systems for fuels, lubricants, shipping and various transport sectors. An important objective of the overall program is to evaluate how to implement a carbon labeling program in the shipping sector by reviewing what activities have occurred to date in the USA, UK and other regions. This included a task to evaluate the US EPA Smart Way Transport Partnership and determine its suitability as a model for promoting more efficiency and low carbon shipping of goods to market. The report that has been prepared to meet this requirement is intended for review by various agencies in the EU Commission or interested industry groups to help develop a road map for how to provide incentives for implementing a low carbon shipping program in Europe.

The report has the following key summary conclusions and recommendations: The EPA Smart Way Transport Partnership is an excellent program for involving both the shippers and carriers in a coordinated effort to improve transport energy efficiency and reduce carbon emissions. There are some strengths and weaknesses of the program that are evaluated in detail in the report but overall it could easily be incorporated with some modifications in the EU and provide a strong incentive for carriers and shippers to improve shipping efficiency.

The most important change in the program for any EU introduction is to emphasize the carbon improvement of shippers and carriers as opposed to a US program focused on efficiency. This effort would be greatly aided by a system of carbon labels for fuel, lubricants, tires, trucks, rail and shippers that helps identify low carbon products to use and recognized shippers and carriers that take steps to reduce their carbon footprint from shipping. This will mesh well with any efforts to place carbon labels on end products such as the UK Carbon Trust program.

A mechanism to recognize shippers and carriers for their improved carbon performance when shipping goods could fit in well with creating market demand for low carbon fuels in conjunction with any policy efforts directed at increasing the use of biofuels, alternative fuels or other means to reduce carbon from fuels in transport.

The implementation of a Smart Way Transport system and labeling of fuels, shippers or products would be particularly effective if it were coupled with a revenue neutral shift in VAT (by type of product) that led to higher VAT for shipping of products with high carbon emissions and lower VAT for shipping using a lower carbon emission carrier. This policy option is detailed in the report in looking at various implementation options and policy impacts.

1 Introduction

1.1 Context of the EU Carbon Labelling project

The evaluation of the Smart Way Transport Program and other efforts at carbon labeling affecting shipping has developed in conjunction with the initiation of a Co2 Star carbon labeling program in the transportation sector. Five countries and various organizations have joined together to look at how to develop and implement a program to put carbon labels on fuel, lubricants and shipping and then expand the effort in alignment with any parallel EU policy initiatives. The overall objective of the program is to develop a strong set of market incentives that will drive demand for lower carbon fuels, lubes and shipping as a result of shifts in consumer and corporate behavior and preferences for purchase of low carbon goods with a minimal shipping impacts

1.2 Objective of this report

This report is being written to provide an evaluation of the various programs being set up in North America and UK to encourage low carbon shipping and how they could influence the feasibility of setting up a similar program in Europe The objective is to understand what has worked in the US EPA Smart Way Transport program and what modifications are needed to have it work in the EU. This includes a look at excellent programs for involvement of companies shipping products and carriers moving products to market (truck, rail, barge, etc.) through a program of defined goals and retrofit of vehicles or shifts in management to accomplish these goals.

Particular attention will be paid to determining how to better integrate Co2 Star efforts to place labels on fuels and lubricants with creating greater demand for these fuels and lubes in the shipping sector. This can primarily be accomplished through efforts to define a carbon strategy that is based on the improvement of transport efficiency and use of increasing percentages of biofuels and alternative fuels that achieve the lowest possible carbon emissions.

The report will cover the following topics in each chapter:

Chapter 2: US EPA Smart Way Transportation Program and the expansion of the program in Mexico & Canada.

Chapter 3: Carbon Labelling Programs in the UK

Chapter 4: Review of the Smart Way Transport Program & Applicability to EU Transport System

Chapter 5: Major Differences of EU Transport System and Examples of Programs Already Implemented Suggestions for Freight and Multi-Sector Low Carbon Transport Program in Europe

2 US EPA Smart Way Program

2.1 Objectives of the US EPA Smart Way Program

US EPA has established a program with the US trucking and rail industries that involves a market incentive program for companies to undertake measures to improve the efficiency of their trucks, locomotives or freight logistics in conjunction with encouraging shippers to use the more efficient shipping options. The program developed out of the successful effort to label appliances, lighting and electronics through the EPA Energy Star program.

SmartWay Transport establishes incentives for fuel efficiency improvements and greenhouse gas emissions reductions through product testing, certification of benefits, introduction of technologies to truck and rail sectors, labeling, financing and general program advertising. The program is aimed at ground freight transport which accounts for about 20% of CO_2 emissions in the USA and most of the diesel fuel consumption. US truck and rail freight shipments are responsible for350 million metric tons of CO_2 per year and consume 35 billion gallons of diesel fuel.

EPA has established as a goal by 2012 to reduce between 33 - 66 million metric tons of carbon dioxide (CO_2) emissions and up to 200,000 tons of nitrogen oxide (NO_x) emissions per year and provide fuel savings of 150 million barrels of oil annually (3.3 to 6.6 billion gallons or 9% to 18% improvement). This is meant to offset the projected 25% increase in emissions based on current trends from the freight sector in the USA, which will result in 450 million tons of CO_2 emissions and an increase of diesel consumption to 45 billion gallons/year.

The following section describes how SmartWay Works. The Smart Way is a voluntary effort that defines specific goals for shippers and carriers to take to achieve more efficient transport

- Partners receive benefits, including technical assistance and recognition.
- Freight Carriers (Trucking and Rail Companies) – Agree to work toward improved
- Efficiency and reduced fuel consumption over a 3-year period.
- Freight Shippers – Agree to work toward shipping more of their product with SmartWay
- Carrier Partners, as well as improving their operations.
- Logistics Companies – Agree to work toward bringing contracted carriers into the
- Partnership, as well as shipping more freight with SmartWay Carrier Partners.
- Affiliates – Agree to work to promote SmartWay to their members and constituents..

2.1.1 Product testing

Product testing involves a program with various technology providers that sets up testing requirements and certification and then has EPA review and certify the accuracy of product claims. There are numerous technologies being evaluated including improved aerodynamics (wind screens), idling reduction systems, improved freight logistics, automated tire inflation systems, advanced lubricants, advanced power train systems and driver training.

2.1.2 Improving efficiency

A program is also in place with shippers to get them to change how they do business to improve efficiency and lower costs. It involves intermodal shipping, improved logistics, pickup and delivery scheduling, full truckloads, idle reduction at docks, driver comfort

stations, warehouse improvements, electric forklifts, improving logistics, hybrid powertrain technology, improving aerodynamics, driver training, weight reduction, reducing highway speed, using low-viscosity lubricants, and other aspects. The objective is to suggest changes to logistics and how freight is moved so there is a reduction in CO_2 emissions. The program uses examples of how companies change their shipping practices to save money and emissions.

Intermodal shipping

Intermodal shipping involves getting shippers and carriers to switch from just trucking to a combination of rail and truck. Assistance includes information about the benefits of multi-modal shipments in terms of reduced costs or other considerations.

Improving aerodynamics

Improving the aerodynamics of a US line-haul truck by 15% can cut annual fuel use more than 2,000 gallons, resulting in $3,500 in fuel savings and elimination of 20 tons of CO_2 per year. Tractor aerodynamics can be improved by adding integrated roof fairings, cab extenders, side fairings, and air dams. New truck buyers can purchase aerodynamic models with streamlined profiles. Trailer aerodynamics can also be improved by minimizing tractor-trailer gap, adding side skirts and rear air dams, and arranging cargo and tarpaulins as low, taut and smooth as possible. Single unit trucks can be improved with air deflector bubbles or by purchasing new streamlined models.

Improving logistics

Improved logistics can reduce the miles that a truck drives empty. Eliminating 15% of a line-haul truck's empty miles could save $3,000 in fuel and reduce 24 tons of CO_2 annually. Improved logistics include load matching, more efficient routes and delivery schedules, and improved shipping and receiving practices. A carrier may employ low-cost options like triangular routing, coordinating loads with other fleets, and checking electronic load boards, or it may purchase freight broker services and logistics software.

Driver training

Driver training is part of the program as well. Even highly experienced drivers can boost their skills with training aimed at raising fuel economy by 5% or more, which would save $1,200 in annual fuel costs and cut 8 tons of CO_2 per year. Effective driver training programs can improve fuel economy by 5% or higher. Some fleets report fuel economy gains of up to 20%. Among other techniques, drivers learn progressive shifting, engine speed optimization, idle reduction, smoother braking and acceleration, anticipatory driving, speed control and optimal gearing.

Hybrid Powertrain Technology

Hybrid vehicles can provide roughly $2,000 in fuel savings and cut CO_2 by up to 12 tons per year when used in stop-and-go freight applications like parcel delivery service.

Hybrid vehicles have two propulsion power sources, making it possible to capture energy otherwise lost during braking and provide boost to the main engine which in turn can run more efficiently. Most hybrid vehicles use an internal combustion engine for the main power source with various secondary power and energy storage configurations, including electric and hydraulic systems.

Low-Viscosity Lubricants

When used in a line-haul truck, synthetic engine and drive train lubricants can improve fuel economy by 3%, saving nearly 500 gallons of fuel and cutting 5 tons of CO_2 annually. Low-viscosity synthetic or semi-synthetic lubricants flow more easily and withstand the extreme

pressure of engine, transmission and drive train systems better than conventional mineral oil blends. The operator of a typical line-haul truck can save up to $500 annually by switching to low-viscosity lubricants, with additional savings possible due to reduced wear and maintenance of truck systems. Fuel savings vary from summer to winter, with much greater savings in the winter (2%) than in the summer (1/2%). The total amount of savings vary from report to report but have been reported as high as 5% in some engineering journals and 4% in one European study. To get this level of fuel savings, both the drive train and motor lubricants need to be used. This adds about 50% to lubricant cost but the savings more than offset the costs.

2.1.3 Creating parterships

The program also concentrates on creating partnerships between technology providers, transportation companies and shippers. Partners commit to measure and improve the efficiency of their freight operations, using EPA-developed tools that quantify the benefits of a number of fuel-saving strategies. The partners are then recognized through a promotional program that involves advertising and listing of company "partners" in the general program promotion.

2.1.4 Financing

The SmartWay Transport program also includes a financing element that involves partnerships between banks and other groups wanting to provide financing. Financing is provided for approved measures that is used by companies wanting to install measures but that do not want to commit the capital up front. EPA has developed a calculator of the savings possible from the measures that are used by the banks and customers to calculate how much the measure will save and use that as a basis for establishing possible levels of loans and repayment schedules.

For carriers, there is a specific program for financing retrofit measures. EPA has taken the technologies in its retrofit list and calculated the net savings that would result if the equipment is purchased using a loan and loan costs are added to the technology costs. The fuel savings result in net cash flow benefits. EPA is working with various national banks and state governments or non-profits to make loan funds available to interested trucking companies. Some state small business or environmental offices have loan programs for economic development or environmental protection that can be used to finance efficiency upgrade kits for trucks. EPA has partnered with loan programs in Arkansas, Minnesota, and Pennsylvania. It is working with an Oregon non-profit, Cascade Sierra Solutions, to implement a loan program for upgrading trucks that travel along the I-5 Corridor (from Washington to California). Several commercial banks have developed loan programs aimed at providing below market rate capital or preferred terms to trucking companies for the purchase of fuel saving and emission devices.

2.1.5 Establishing idle-free corridors

Another objective of the program is to establish a "National Transportation Idle-Free Corridors" program. This involves mapping out locations at truck stops or refueling locations where there are facilities for trucks to plug in when taking a break to keep the trucks from idling. This is intended to get truckers to turn off truck engines and reduce emissions and lower fuel consumption. Typical trucking operations in the US often involve stops at truck fueling stations or rest areas where trucks are often kept at idle to operate heating or cooling systems or for power. The facilities now being set up allow for plug in of the truck and even include internet and telephone connections. EPA is mapping out where these facilities are

located. It is also evaluating and certifying savings possible from various technologies that provide alternatives to the main engine idling that lower emissions or fuel use. The program is also aimed at various points where trucks are concentrated including ports, distribution hub and borders. There is also a program for rail aimed at rail switch yards.

2.1.6 Introducing mode shift

Mode shift is also part of the program. SmartWay Transport provides information to shippers about where it might be practical to use rail by itself or in combination with trucks to reduce emissions on a ton-mile basis and lower costs. The shift to "just in time delivery" of inventory has led to much greater shipping of much of the freight in the US to trucking, with rail carrying primarily bulk commodities. Government statistics indicate that 85% of total cargo value is shipped by truck in the US and 66% of total freight by weight. EPA is identifying how to encourage a shift to more efficient rail by trying to improve operations and introducing technical innovation and then suggesting shipping situations where a multi-modal shipment or shipment by rail might make sense.

2.1.7 Partnerships of shippers and carriers

The core element of the program is the "Partnership" commitments made by both shippers and carriers. Companies are required to meet certain goals in order to be able to display the "Smart Way Transport Partnership" logo and benefit from program promotion. EPA has developed a "Fleet Logistics, Energy and Environmal Tracking" (FLEET) performance evaluation that is used to provide scores for improving efficiency and lowering carbon and air pollution emissions. Carriers (truck or rail companies) must get a composite score of at least 1 over a 3 year period. Shipper partners must achieve a FLEET performance improvement of 50% over 3 years.

The key concept is to have both shippers and carriers work together in meeting the EPA goals by having carriers improve the efficiency and environmental performance of operations and getting shippers to choose carriers making these changes in combination with other measures to improve the efficiency of their shipping. The FLEET performance evaluation is meant to assist the companies in understanding the economic and environmental impacts of their operations and then evaluate and implement a set of measures that can help improve efficiency. The incentive for participation involves both the possible fuel savings from implementing the measures and the recognition as a shipper or carrier for taking steps to lower environmental impact of shipping. By establishing specific goals and deadlines, companies must take at least make some progress as defined by the FLEET goals in order to be able to use the logo.

2.1.8 Promoting participating companies

EPA has undergone various steps to advertise the program that includes direct promotion of the participating companies. In most US airports there are Smart Way Transportation posters describing the program and some posters include the names of the participating companies. This includes a large "Thanks" promotion that lists the initial participants in the program. Trade publications include articles and advertising and provide additional exposure. The web site provides statistics about the impact of freight transportation on air quality and greenhouse gas emissions to help educate the public and press and uses some of these statistics in their promotion of the program to the public. There are also adds targeted at both shippers and truckers that indicate how "smart" it is to choose to become a Smart Way shipper and that details annual savings from implementing measures in trucks or choosing Smart Way carriers.

2.1.9 Promoting biodiesel use

A new element in the program is the "Grow and Go" program. It involves the promotion of biodiesel use by the freight sector by identifying fuel suppliers carrying biodiesel fuel and then getting this information to carriers. Businesses that want to ship "green" then find truckers who use biodiesel through the program. The EPA has teamed up with the National Biodiesel Board (NBB) to educate the trucking industry about the benefits of biodiesel, and match shippers with truckers using biodiesel. It is designed to help increase the use and acceptance of biodiesel in the freight industry, and to educate truckers and small fleets on the benefits of biofuels. EPA announced the program at the Great American Trucking Show (GATS) in Dallas in August, 2007 and has gotten positive responses from various shippers wanting to use carriers that are using biodiesel and from truckers wanting assistance in understanding biodiesel benefits and locating where it is available.

In conjunction with this objective the NBB has worked out a program with ProMiles® to identify biodiesel locations through a mapping routing and mileage software program called ProMiles XF®. The NBB, ProMiles, the National Renewable Energy Laboratory (NREL), and the Oil Price Information Service (OPIS) are working together to produce a continuously updated and accurate list of truck-accessible biodiesel locations to be included in mapping software. This first set of locations is now incorporated into ProMiles XF® software and available for truckers.

2.2 Smart Way Transport Partnership outreach efforts in other countries

Smart Way Transportation has completed outreach efforts in two countries so far; Canada and Mexico. The effort has involved the adaptation of their program to the different trucking industries in the two countries. Cooperation between the countries is common because they are strongly impacted by NAFTA agreements pertaining to trucking of goods and there is a lot of movement of goods by US, Canadian and Mexican trucking and rail companies.

2.2.1 Canada: SmartWay Transport program and FleetSmart program

EPA's SmartWay Transport Partnership and Natural Resources Canada's (NRCan) FleetSmart programs have joined forces to encourage voluntary action by the international freight industry that will result in measurable fuel savings, verifiable emissions reductions, energy security and improved public health. They signed a Memorandum of Understanding (MOU) that is posted on the Smart Way Transportation website. The MOU outlines how the two agencies will work together and provides a framework for how to develop a similar proposal with the EU.

It appears that there are about 50 Canadian companies participating in the program from the list on the website. It consists of primarily trucking companies. Many of the shipper members are multi-national companies.

The FleetSmart program involves two elements in the overall program: technology demonstration and a technology incentives. The Freight Technology Incentive Program provides cost-shared funding to companies and non-profit organizations in freight transportation to help them to purchase and install proven emission-reducing technologies. It is oriented toward technologies that reduce air pollution and greenhouse emissions and includes purchase of diesel anti-idling equipments in rail yards, ports, airports and trucking stations, purchase of hybrid switching locomotives and purchase of electronic speed control systems. Canadian and non-Canadian private enterprises can apply including air carriers, railways, trucking companies, marine carriers, and eligible port and airport facilities. The first round has been funded already and three rounds remain that will occur over the next two years. Projects can be funded to cover a maximum of 50% of project total eligible costs up to

$500,000 over a two-year period. The Freight Technology Demonstration Fund provides the Canadian freight industry with cost shared funding for demonstration of aerodynamic devices to reduce drag on moving trailers, implementation of fleet management best practices and integration of technologies to reduce fuel consumption. To be considered for funding, a proposed project should involve the demonstration of an under-utilized technology or equipment that has the potential of reducing emissions cost-effectively in the freight transportation sector. Technologies must be tested in real world conditions and not in a lab environment (i.e. freight carriers).

Table 2.2.1 Examples of possible projects included in funding guidelines of FleetSmart

Air	Marine
Fleet management practices Integration of technologies to reduce fuel usage Lighter weight materials of construction	Freight handling equipment Voyage optimization (tidal current impact) Short sea shipping demonstration
Rail	**Road**
Alternative fuel (e.g Biodiesel) Idling reduction Modification of existing technology designs	Aerodynamic device to reduce drag Cold storage air conditioning systems Continuously variable transmissions
All modes	
Testing of technologies in one mode that are already proven in another mode	

The MOU between Canada and the USA defines that there is an interest in working with other countries and suggests ways the cooperating countries can work together. In essence, USEPA will provide the following key information to a counterparty government agency:

- Companies and contact people that are part of the Smart Way Tranport Partnership
- Permission to use logo and promotional materials (particularly important in Canada & Mexico because of the intermodal trucks operating in all countries)
- Links through web sites and promotional materials

The details of what might be involved in signing an MOU with Smart Way Transport Partnership will depend to what extent the EU program is identical to the US program, like in the case of the Energy Star program, or if it is very different and unique.

2.2.2 Mexico: SmartWay Transport Program and Blue Skyways Colloborative

Mexico is a member of EPA's Smart Way Transport Partnership. The outreach effort is consistent with the need to lower pollution from Mexican trucks, which tend to be both much less efficient and much dirtier than US trucks. Mexican participation is incorporated into the Blue Skyways Collaborative, which was created to encourage voluntary air emissions reduction in North America's heartland. Participants of the collaborative pledge to make that goal possible through active and meaningful participation in planning or implementation of projects that use innovations in diesel engines, alternative fuels and renewable energy technologies. Working together allows members to leverage funding, share technology and

professional expertise. Today Blue Skyways incorporates ten states, Minnesota, Iowa, Nebraska, Missouri, Kansas, Arkansas, Oklahoma, Louisiana, Texas and New Mexico, and the area along the borders with Canada and Mexico.

Mexico and the US have been working for several decades cooperatively through the La Paz Environmental Agreement to help safeguard the health of border residents and improve border air quality. The two governments, in partnership with border tribal, state and local governments, have worked to increase the knowledge about pollution sources and their impacts on both sides of the border, establish monitoring networks to assess air pollution levels in several key areas, conduct emissions inventories, and build local capacity through training.

Through these efforts, the two countries have established a cooperative relationship to enhance binational air quality assessment, planning, and management programs. The overall program goals are to determine ambient concentrations from pollution emissions, assess contributing emission sources and their relative impacts, and develop and test or demonstrate non-traditional, cost-effective control strategies for meeting US air quality standards. Funds are allocated annually by US EPA for grant projects involving the border region and implementation of programs to clean up the air.

This cooperation has formed the initial basis for approaching the Mexican government about participating in the Smart Way Transport Partnership. Discussions are now on going about initiating a national program that will mirror the activities of the US Smart Way program in the Mexican shipping and trucking/rail sectors. The program will be similar to the US program but with some differences to account for the differences in the trucking and rail fleets and the priorities of the participating governments and companies.

3 Carbon Labeling in the UK and value in design of an EU Smart Way Program

Any attempt to look at a carbon labeling initiative for shipping in the EU should take into consideration the activities within different member states to develop carbon labeling or to shift to lower carbon shipping. The UK provides the best example of initiatives that might have value as their impact begins to spread from UK companies to their EU counterparts including differential taxing of biofuel incentives on the basis of carbon reductions and the labeling of finished products in stores.

3.1 Carbon Labeling Initiatives of Major Supermarkets

What is perhaps the most interesting development in the UK involves the decision of various major food retailers to provide information on the life cycle carbon emissions of their products through development of carbon labels on foods. This initially involved one supermarket chain, Tesco, which started to use 50% biodiesel in its trucks. It then announced a program in cooperation with a potato chip manufacturer to place a carbon label on their product indicating life cycle carbon impacts of its maufacture. This led to an announcement by Tesco that they will be providing a carbon label on foods or other products that indicates the Co2 emissions associated with the purchase of that product. This was then duplicated by most of the other major supermarket chains, who all announced various versions of product carbon labelling that will all go into place next year.

3.2 National Carbon Labelling Program of Dept. of Tranport & Carbon Trust

Actions by the supermarkets was quickly picked up by the press and led to strong interest in setting up a national carbon labelling program. Carbon Trust and Dept. of Transport recently announced that they will initiate a national carbon labeling effort in about one year that will lead to a common label on foods and other products. Co2 Star met with the director and staff of Carbon Trust to discuss their interest in developing a fuel, lubricant and shipping carbon label and how that might affect their efforts to develop a national carbon labelling program. They were receptive to the idea but indicated that their current efforts are focused on product labels. We discussed possible designs they are considering to see if there was any similarities that could be used in augmenting consumer recognition. There are similarities in the designs of their product carbon label and the label now being developed for the Co2 Fuel Star and Co2 Lube Star programs.

3.3 Reporting Requirements for Carbon and Sustainability under RTFO

The Renewable Transport Fuel Obligation (RTFO) will require transport fuel suppliers to have a set percentage of their sales include renewable fuels with a target of 2.5% by April, 2008 increasing to 5% by 2010/11. The requirement includes that fuel suppliers track the carbon life cycle impacts of biofuels and report these impacts starting in 2008. By 2010/11 it is anticipated that biofuels will need to meet a minimum carbon and sustainability requirement in order to meet the RTFO percentage blend requirements.

shippers that utilize synthetic jet fuels with evolution to renewable jet fuel (possible with next generation BTL).

4 Review of the Smart Way Transport Program and Applicability to EU Transport

There are numerous very valuable elements in the US EPA Smart Way Transport Partnership that offer opportunities to duplicate the program in Europe. At the same time, there are many differences in the freight, trucking and rail sectors and fuel and lubricant choices that would suggest a very different program for the EU. This section will try and evaluate what seems to fit the best out of the US EPA Program and how the program could be expanded and changed to fit into what is most likely to work in a EU Freight and Shipping Carbon Labelling Initiative.

4.1 Strengths and weaknesses of the US EPA Smart Way Transport Partnerships

The Smart Way Transport Partnership has many aspects that fit well with the European freight sector and could be incorporated piecemeal into a European program. There are other elements that require significant modification before they would fit in a European freight system. The section discusses the strenghts and weaknesses of the various components of the US EPA SmartWay program.

4.1.1 Choice of and Testing and Certification of Technologies

Strengths:

EPA's program to evaluate data provided by manufacturers provides an important third party verification of data that is very useful in building credibility with the truck and rail companies and in getting accurate data in front of shippers and freight carriers. The testing data provides

an important data base that is very useful even if not all the tests have been done by European labs and it should not be necessary to redo the tests to overcome differences in test protocols between Europe and the USA. There is also substantial field data from the use of these technologies in the field that can help corroborate the test data and manufacturers claims.

Weaknesses:

The number of technologies included in the list is limited and it is very difficult to meet the threshold for entry established by the US EPA. The primary problem is that if the technology has any negative impact on air pollution then it will not be considered for the program, regardless of the other air pollution and carbon benefits. EPA has been reluctant to promote 20% biodiesel because it could potentially increase NOx (although US DOE's Renewable Energy Lab NREL thinks otherwise) even though 20% biodiesel means a 12% improvement in particulate emissions. Any fuel additive that contains any compound that has not gone through full EPA Health Effects testing is not being considered in the program. Since only a few additive companies have spent the millions of dollars for this certification per additive, no additives are considered, even when they can provide substantial fuel savings. For example, the compound ferrocene, which is essentially iron, was ruled out for consideration in a meeting Co2 Star had with EPA because of fear of "heavy metals" even though the rust coming from a tailpipe results in much higher levels of metal contamination than any minute levels of ferrocene. This is even though the compound can reduce particulates by 30% and NOX by a substantial margin while improving fuel efficiency and lowering Co2 by 3%. This is done at a cost of 1 cent per gallon.

The program emphasis seems to be on measures that involve the purchase of new equipment or the retrofit of tires or chassis or auxiliary equipment. The measures they have worked on have been done very well and represent important sources of emissions and wasted fuel. At the same time, the list of measures left out of consideration is fairly substantial. In the lubricant sector, they have reviewed test data on low viscosity lubricants but have only looked to a limited extent at friction modifiers. This is unfortunate, since friction modifiers address a different source of losses in an engine and can probably provide savings in addition to any savings resulting from lower viscosity oils.

The other problem with the choice of technologies that they are evaluating is that these are measures that most truck companies are already undertaking anyway. There is much less idling now that most major truck stops have facilities for power hook up and there are regulatory measures at major terminals that require measures be taken to reduce air pollution from idling. Aerodynamic equipment is now mounted on almost every long haul truck so that it is a good measure but being done anyway. This can lead to the promotion of a program that is not pushing the envelope of what is possible.

4.1.2 Partnership Formation

Strengths:

A Large List of Current Partners: 224 freight shippers, carriers, and affiliates in 38 States and Canada (as of Sept. 28, 2005). A list of current Partners is provided in Attachment 2.

Numerous Public Service Announcements (PSA's) and Ad Campaigns:

- Initiated in Dec. 2004 to raise awareness of the Partnership among industry and the public.
- 5 PSAs developed and placed in more than 25 publications.
- Multiple free full-page or multi-page placements received from Forbes, Business Week, Inc., and Fast Company.

Numerous Partners that Are Exicted About Participating, such as UPS, Swift Transportation, IKEA USA, Coomes Inc, H-E-B, Bison Transport, Averitt Express, and Interface Inc.

Certainly the strongest part of the program is the partnership formation between shippers, carriers and government partners. These contacts are important because they identify a set of companies that are already committing to the concept of Smart Way Transport and it is not too difficult to get the same companies to participate in a program in the EU.

Weaknesses:

The effort to initiate a network process with EU shippers and carriers will involve contacts with different companies who have different carrier/shipper relationships, carbon expectations and consumer interests. This means the network process may be different to take advantage of the unique aspects of EU carriers and the stronger interest in Co2 reductions in the corporations and general consumer. This means any design needs to be reconsidered in looking at specific aspects of the freight infrastructure and needs of carriers and shipping companies

4.1.3 Financing

Strengths:

Financing of efficiency improvements is a good idea and overcomes capital barriers to implementing the program at a corporate level. Several financial institutions in the Smart Way Transport Partnership offer low interest loans for the purchase of equipment. This includes Wachovia Bank and others. The loans are provided for equipment that is approved for use by the US EPA and the loan period is established based on the payback calculations that define net cash flow. The banks typically pay for 80% of the capital cost of the improvement and set the loan amounts due on the basis of some percentage of projected savings. This is an important program for trucking companies that do not have or do not want to spend capital resources up front to pay for efficiency improvements.

Some of the financing entities involved in the national effort are operating in both the USA and Europe. Independent of the companies, there are also financing justifications, calculations and protocols that can easily be used to justify a European program with or without private bank participation. Clearly one of the good aspects of this program is the coordination between state and federal programs and the private banks to set up a system for reduced rate or simplified term loans. This is something that should be proposed at the national, local or banking & finance level in various institutions involved in finance in the EU. To the extent that the contacts and framework are useful of the Smart Way program in the EU finance community, communications should be initiated to evaluate how to set up financing for an EU low carbon shipping program.

Weaknesses:

The financing industry in Europe is a little different from the USA. This includes a lower aversion to risk, longer loan review periods, higher interest rates and other differences. This may affect interest in lending to carriers in association with this strategy.

4.1.4 Idle Free Corridors

Strengths:

An important aspect of the US Smart Way Transport Partnership is the emphasis on reducing idling in trucking and rail operations. This is accomplished by working with various fuel supply and truck stock partners or rail lines to identify infrastructure that can be installed at

the facilities to allow truckers or locomotives to use these facilities and turn off motors. Many US major truck stops are now equipped with facilities that allow a truck to plug in their auxiliary power system to the truck stop power supply. The same connections also usually include a heating or cooling air vent, telephone cable and internet hookup. This eliminates the need to keep the truck running to provide basic requirements for heat, cooling or communication. This saves fuel and lowers pollution substantially.

Weaknesses:

The EU Trucking and rail sectors operate slightly differently and have different issues with idling and emission or fuel use. The higher cost of fuel makes it a more expensive proposition for EU truck and rail operators so the frequency of it occurring may be much less. Some evaluation of the extent of the problem in the EU should be evaluated to determine its importance as a major emphasis in the EU program. At the same time, it is the bulk of the proposed savings in the US program and important evaluations have been completed of technologies that offer solutions to reducing the need for idling.

Also important are the policy and infrastructure suggestions for companies at their warehouse and terminal locations. This includes the dock heating and cooling systems, no idle signs at wait points for delivery and other measures. Another difference between the EU and US is how fuel stations are set up for trucks. Truck stops in the USA tend to be very large with lots of space so it is normal to add in facilities for trucks to stay for a long time for overnight rest, dinner, repair, etc. The limited amount of space, shorter shipping distances, regulations about truck rests and other factors will affect the feasibility of any transfer of the concept of idle free corridor.

4.1.5 Mode Shift

Strengths:

Smart Way Transport Partnership has done a good job of identifying shipping situations that are suitable for mode shift transportation including long distance cross-country hauls where both the point of origin and point of destination are near rail hubs. The other key criteria is the willingness of the shipper to delay delivery, since rail can be much slower than trucks in delivering products to the market. This can impact both inventory and cash flow and needs to be considered in comparison to lower shipping costs and a reduced carbon footprint. One big advantage of rail is in shipping of large volumes of commodities like biofuel, vegetable oil, coal, timber and other products because these products are often shipped long distances and have high energy density. Commodity shipments also often are shipped to locations that have large rail and truck hubs and intermodal transfer systems. Another logical target of mode shifts are in shipping of products coming or going out by ship, where it is easy to move products from one mode to another very easily. The US EPA Smart Way program has identified some of these opportunities to shippers and encouraged them to use the most efficient, environmentally friendly alternative.

Weaknesses:

Europe has done a lot of work with promoting mode shift and multi-modal transport of goods so the suggestions in the Smart Way Transport program could be easily incorporated into a European version of Smart Way. Of course, the modes for freight transport are different. Europe already uses a much greater percentage of rail, so it is difficult to shift more freight to rail since market segmentation has already occurred. Europe also has the unique system of barges that are added to rail as a means to move bulk commodities. At the same time, this does represent an important mechanism to reduce the carbon intensity of shipment and any

means to shift to lower carbon shipping options or multi-modal shipments should be encouraged.

4.1.6 Improved Aerodynamics, Lighter Trucks, Other Retrofits

Strengths:

Smart Way Transport partnership has evaluated a set of measures that could be best termed as "retrofits" or new truck choices. This includes the most common item of a wind screens that divert air aerodynamically from the cab over the trailer so there is less wind resistance. Other aerodynamic items include wind screens in the area between the cab and trailer on the side or in the underbody. These measures are very inexpesive and have rapid payback so they have been adopted by many trucking firms. In connection with new trucks, the suggestions are towards purchase of lighter trucks and trailers that offer similar strength or performance but much lighter weight that results in fuel savings.

Weaknesses:

The higher fuel cost borne by EU truck & rail sectors means that many of these measures have been done already on EU trucks or are limited by safety or other regulations. At the same time, it is important to look carefully at all retrofit options and transfer both the extensive evaluation and rating of technologies already done by US EPA and identify how to implement the same program in the EU. The development of an outreach program to provide this information to all truck unions and associations in Europe with information tailored at EU trucks could be very effective in insuring all feasible retrofit measures are implemented whenever there is replacement of parts, trailers or engines or as part of a corporate shift in all vehicles.

There are significant differences in how freight is transported in the US and EU when looking in particular at the trailers and the means used for unloading (most US trucks are rear loaded while many EU trailers are soft shelled and open on the side. Other differences include chassis weight and design (because of the lighter trailer weight) and other differences. This includes a very different cab arrangement with a perpendicular front and very different aerodynamics. This means that many products appropriate for the US market are not suitable for EU trucks. However, it should be emphasized that there are a lot of similarities and truck and trailer manufacturers share a market that involves both US and EU approaches to equipment and that most of the equipmentcan be modified to account for design differences between trucks or rail used in both continents.

4.1.7 Tires

Strengths:

One important source of savings in the US program is to switch to aluminium wheel rims and wider tires. This is primarily oriented to double wide tires that are standard practice and savings associated with using a fa single wider tire, which results in less rubber on the road and less rolling resistance which then improves fuel consumption. A large number of trucking companies have switched to single wide tires in the US and the improvement in fuel economy and reduced tire cost more than justified the switch.

Weaknesses

While many European wheel rims are still steel, the use of double wide tires and longer larger trailers that are heavier is less than in the USA. Any solution involving tires needs to be marketed to whatever the tire characteristics common in Europe.

4.1.8 Lubricants

Strengths:

One important mechanism that is part of the Smart Way Transport Partnership is the effort to promote efficient lubricants. This is mostly directed at promotion of low viscosity synthetic lubricants which improve fuel efficiency by reducing friction. The program provides a very effective mechanism to promote the use of more efficient lubricants and to evaluate the cost benefits of various lubricant options to improve efficiency. The information at the EPA Smart Way site provides an overall evaluation of synthetic lubricants and fuel economy benefits of the various products on the market. It also discusses the use of friction modifiers in transmissions.

Weaknesses:

There is some mention of friction modifiers although it is only minimal and there are few effective friction modifiers that have gotten through the screening criteria of USEPA.

There is no mention of the use of friction modifiers in the engine, drive systems, wheel grease and other areas that account for the overall friction variable and its impact on fuel use.

4.1.9 Driver Training

Strengths:

Teaching drivers ways to improve fuel economy can provide substantial net fuel savings if the training programs are directed at providing the right information to the drivers and there is the right incentives for drivers to use the information once they return to a work environment. The EPA Smart Way program provides some examples of possible fuel savings from drivers participating in training on how to improve their driving. It also includes in its list of measures speed governors that limit the maximum speed on trucks.

Weaknesses:

There are limitations to the approach and measures suggested. Training is essential. However, it is only effective if there are incentive programs at the company level to reward drivers for helping to reduce fuel consumptions and CO_2 emissions.

4.1.10 Logistics

Strengths:

There are various recommendations in the Smart Way Transport partnership that suggest how to improve shipping logistics and overall fuel consumption. The primary one involves signing up logistics partners, who are one of three tiers of members in the web site and an important part of the implementation plan. Smart Way offers to have members join if they make commitments to calculate their current portfolio of shippers, shipments and carriers and then develop and implement a plan for improving emissions using more efficient transport and Smart Way carriers. To join Smart Way they must Commit to increase the amount of freight shipped with SmartWay Carrier Partners by 5% per year or increase the number of SmartWay Carrier Partners by 20 per year.

Weaknesses:

The weak point of the program is that there is no other goals established other than the increase in the amount of freight shipped or partners they ship with. This is a good goal for an initial program starting point but falls far short of the role logistics partners could play as an intermediary between companies wanting to ship with a lower carbon footprint and the

ability of logistics companies to choose companies that meet the objective of shippers. In other words, if the main point of competition is to achieve "low carbon" shipping, it is not just enough to select a Smart Way partner. The competition should be between the carriers themselves, the goals they have achieved in a given year and the net carbon benefits they are able to deliver if the shipper chooses that carrier. It is then a competition based on cost, service and carbon reductions and the companies meeting all three criteria will get the business of shippers. Logistics can play a key role in that evaluation because they can balance the need for better and more efficient logistics, the availability of companies with trucks (or rail with empty cars), the cost to ship, the reliability of the company and the carbon footprint per mile from using that company.

4.1.11 Fuel

Strengths:

The addition of the "Grow and Go" element to the Smart Way Transportation Program was an important first step in promoting low carbon fuel use and other measures to improve carbon emissions through changes in the fuel. The program provides basic information about biodiesel fuel and encourages shippers and carriers to choose biodiesel fuel as a means to lower the carbon footprint of fuel use.

Weaknesses:

There is a lack of information on carbon life cycle values of different biofuels and the opportunities to promote low carbon fuel choices in a meaningful way. There is no analysis of the benefits of different oil feedstocks for biodiesel and of competing second and third generation biofuels and alternative fuels in terms of competing carbon benefits. The Grow & Go program is just a generic promotion of biodiesel and a pat on the back for those promoting and using it. It is not a market driven mechanism to increase value through carbon benefit quantification, sustainability checks and overcoming other barriers and generating a market for the best low carbon biofuels including better biodiesel and biofuel or alternative fuels competing in the same fuel market.

There is also a strong aversion to any fuel additive being included in the mix of technologies that are considered unless they have gone through millions of dollars of health effects testing. This is even though the fuel additives can be sold in the US fuel market and may be undergoing testing at a state level to certify either emission or fuel efficiency benefits. We are aware of at least one additive that EMTA Corporation has that they refuse to include in the program because it is a Ferrocene compound, even though the only metal it has is iron, which is coming out of the tailpipe in large quantities. This additive is going through certification for use in Texas to meet air quality requirements and is providing both large fuel savings (3%) and substantial air quality benefits. To strike it off the list just because of a perceived problem that is probably not real is frustrating and indicates that the thresholds for participation have more to do with control of air pollution and toxics than with reduction of carbon and improvement of fuel economy.

Another weak point of the EPA Smart Way program is the lack of involvement of major fuel companies. None of the major truck stop companies is a member of Smart Way Transport Partnership, even though they are essential to the delivery of any change in the fuel options offered. They are not participating because there is not a clear link between the offering of more efficient fuels and lubes and the EPA program through labels at the pump or a mapping program that details the efficiency and biofuel products they offer. This is changing now with the introduction of the Grow and Go program but would be more effective if there was a carbon labeling program on fuels and lubricants that would provide a visible mechanism to

promote low carbon fuels and lubricants. The mapping software identifies the location of biodiesel fueling stations and will create some market pressure on other fuel distributors or retailers to join. However, that interest in joining will be particularly strong if there is a mapping of the carbon benefits or fuel efficiency benefits of fuel suppliers on a map and then an understanding that the shippers and truckers are all competing on the basis of carbon benefits they can deliver and will be demanding from fuel suppliers exactly those kinds of fuels.

4.2 Overall Smart Way Transport Program Strengths and Weaknesses

The purpose of an overall review of the strengths and weaknesses of the EPA Smart Way program are aimed at understanding the innovative path EPA has created improve the efficiency and carbon footprint of the freight sector. It is also to highlight how changes to the program will make it more effective as it evolves in the future.

One of the greatest general strengths of the program is how effective it has been in getting most of the major cross continental truck and rail companies to join Smart Way. This means that most of the companies are at least members of the program and have made commitments to take the steps that are part of the program and meet goals as defined in the FLEET calculator for efficiency improvements. This calculator provides numerous choices that can be taken to ship products more efficiently.

A very good example of where the program has worked best is in connection with one of their two members that are both shippers and carriers. WalMart won the 2006 Smart Way Excellence Award as a result of measures they implemented including idle reduction technologies, advanced aerodynamics, speed controls and tire improvements. It resulted in a reduction of 670,000 tons of CO_2 and the saving over 60 million gallons of diesel fuel annually. Wal-Mart has made a public commitment to increase their truck fleet fuel efficiency by 25% by 2008 and 100% by 2015. As a SmartWay Shipper, they have hosted several carrier meetings to introduce SmartWay to their carriers, which have resulted in 25 new partners.

This strength is also a weakness because of the way the program orients the logistics companies to work with Smart Way companies and shippers to use Smart Way carriers. If most of the major carriers are Smart Way members, then the only savings accomplished are related to the FLEET fuel efficiency goals as established for each of the carriers and their ability to meet these goals each year. If these goals are not aggressive enough or there is not the availability of the needed fuels, lubricants or market drivers, then the efficiency improvements and carbon reductions will be less than they could be with a more aggressive program design.

An important benefit of the Smart Way program is the work done to date to address scheduling of shipments of freight so that it optimizes both the shipment of the product and minimizes fuel and environmental impacts. This involves communications or logistics software that is designed to identify where trucks are and schedule deliveries so they are on-time and minimize idling time and wait time at the shippers facilities. This needs to closely involve any logistics companies used by either shippers or carriers so that all existing parties in the chain of distribution optimize efficiency and carbon reductions in freight delivery. This can be done by insure that shipments are made full, are made in off hours when traffic is lower and other options to improve efficiency, lower costs and lessen congestion.

Any replication of the program in the EU will require looking at the US EPA program as a template and then designing a program that is suitable for the EU, where carbon is a much more important issue for companies shipping products and consumers. The overall design will also need to account for the differences in truck design, engine design and other technical differences. One of the biggest factors is the regulatory difficulties and openness of the

market to new products. There are substantial barriers to the entry of new products to the European market because of a very strict regulatory regime, particularly with fuels, lubricants and any measures that impact safety.

5 Major Differences of EU Transport System and Pilot Programs Implemented

There are substantial differences in the EU transport sector that will make it possible to implement some aspects of the US EPA Smart Way Transportation program and make it difficult to implement others. The primary differences are described in this chapter.

5.1 Design of cabs and trailers

Anyone who just looks at a North American or EU truck understands that the vehicles are very different and cannot necessarily use the same equipment retrofits. The front of most EU trucks is flat, primarily because space constraints make it difficult for larger trucks to drive, park and maneuver. Many European trucks have cloth or roll up covers over the trailer to allow for partial load deliveries and side unloading of the truck trailer. Chassis and wheels also have important differences. This immediately limits the ability to use the same technology in both continents. At the same time there are many similarities in the trucks. Regardless, the market has adjusted to the differences and developed different retrofit products for both markets. However, the carbon and efficiency savings possible with some measures in the US may or may not apply to the same measures being implemented in Europe, particularly in connection with changes in weight, aerodynamic equipment and other measures. This then suggests the need to develop a tailored program that may not benefit as much from the work already done by US EPA.

5.2 Political factors

There are a set of regulatory factors that are affecting the response politically to demands on transport that impact the types of choices truck, rail or freight shippers might consider. Environment is a much more important issue to Europeans and there is a strong consensus that something must be done about climate change. The gains made in reducing CO_2 emissions in the energy and industrial sectors has been offset by increased CO_2 emissions in transport. This means there is a recognized need to concentrate in this area and a much greater political will to act. At the same time, the EU is 27 countries, all with vested powers, especially with regard to taxation. Fuels are a major source of tax revenue so efforts to change the tax structure are very difficult to implement on an EU wide basis. Furthermore, most of the revenue is put into general government support and the changes in the flow of revenues affect budgets and deficits.

5.3 Examples of successful pilot projects

Progress in reducing emissions in the EU has primarily been accomplished through the implementation of a set of pilot projects whose aim is usually to demonstrate new technologies, management techniques, software, truck or trailer technologies or freight logistics that can reduce CO_2 and air pollution emissions. These projects are included in an industry best practices guide put out by the International Road Transport Union (IRU), which represents most of the trucking companies in the EU and advocates for policies that aid the trucking industry. The project have been organized in categories to help understand how the experience base of “best practices” might easily adapt to a European version of a Smart Way Program:

Smarter Logistics and Distribution:

1 ECOLOGUS – Ecoefficient Distribution in Évora

11 Improvement of the Utilisation Rate by 6-Section Vehicles

16 Prevention of Accidents using Simulation

17 Optimisation of Internal Logistics

32 Avoiding Empty Trips

19 Reduction of Empty Kilometres

21 Manoeuvrable City Trailer with Increased Capacity for Tank Transport

The logistics projects all involved some variation of how freight was handled to improve the utilization rate and freight carried by various trucks. In the Ecologus project, freight is placed in distribution centers and then carried by smaller trucks shared by the participating companies. Utilization projects generally involve optimizing the use of trucks to cut the number of trips and miles driven, by increasing the number of back hauls and mechanisms to increase the amount of cargo carried round trip. This included various means tested to evaluate the weight of freight carried and to reduce "empty" kilometers.

There is a similar aspect to the Smart Way program that involves the encouragement of the use of various logistics control programs, GPS systems and mechanisms to improve logistics. There is an active involvement of the logistics companies that often act as intermediaries in the US in scheduling freight. The combination of both US and European approaches to improving logistics and the requirement that trucking companies calibrate the fuel consumption and carbon emissions of their loads would quickly help identify inefficient carriers and provide a strong motivation for optimizing efficiency.

5.4 Driver training

Various projects in Europe have focused on driver training to improve efficiency:

13 Eco-Driving Project

39 Driver Training for more Fuel-Efficient Driving

30 Driver Training and Testing

44 Driver Training for Safe and Fuel-Efficient Driving

56 Emission Control by the Preparation of Green Accounts

These have involved various measures to reduce fuel consumption by training drivers on methods to reduce fuel consumption through better fuel filling, washing of trucks, governor speed controls, and other measures. There is a similar emphasis on driver training in programs in the USA and Canada and they form an important step in helping to reduce inefficiency through better training of drivers for efficiency and safety. The IRU holds regular driver training courses and attendance would increase dramatically if companies environmental performance and fuel consumption were a major factor in purchasing decisions of shippers. Perhaps one of the closest steps taken to the Smart Way Program was a project that prepared green accounts for drivers. The accounts enabled the company Johnny Amtoft to improve transparency in terms of resource consumption and the environmental impact resulting from their operation. The accounts also contributed to efficient management and helped make employees more aware of the goal of sustainable development within the company.

5.5 Technologies and retrofit measures

Various pilot projects involved the evaluation of measures that would provide energy or environmental benefits including a tire management plan, precise maintenance and upgrade of of vehicles, zero emission and hybrid drive system, retrofit of Euro 4 emission measures on engines and other measures.

5.6 Measures supported and not supported by trucking unions

One way to evaluate the acceptance of any different programs within the freight sector or the acceptance of any program like Smart Way is to evaluate the opinion of the Trucking Union. While they do not mention the Smart Way Tranportation program of the USA they do mention their support for the FleetSmart program in Canada. They mention the program as an example of what they would like to see in the EU in terms of a subsidy or demonstration program. They also mention the SELA Intiatives in the Netherlands as another good example.

The trucking union is not very supportive of biodiesel and biofuels. This partly because of the shift away from subsidizing biodiesel as a B-100 fuel so it is no longer cheaper. There is also a sense that the subsidies should be shifted from the biofuels sector to the trucking sector with co-financing of various efficiency and other programs.

6 Suggestions for Freight & Multi-Sector Low Carbon Transport Program in EU

6.1 Introduction

One objective of this report is to evaluate the US Smart Way Transport Partnership and other international programs to see if they make sense for the EU. Another is to provide suggestions for how a carbon labelling could be integrated into the freight and transportation sector in conjunction with policy measures that make this labeling important to the market This section will outline the justification for an integrated strategy, make specific suggestions for initiating a program and suggest partnerships and policy frameworks that will make it effective.

There are three basic recommendations:

- Modify and implement an EU version of the US EPA Smart Way Transport Program
- Introduce an EU-wide carbon labeling program for shippers, carriers and end products
- Evaluate feasibility of a differential value added tax on the basis of carbon benefits

6.2 Modify and Implement Smart Way Transport Program

The key aspects of Smart Way and recommendations for integration into an EU Smart Way type freight incentive program include the following:

6.2.1 Networking and incentive measures for participation

The most effective method to gain interest and participation by both shippers and carriers is the network system set up by US EPA. We would suggest a similar approach in the EU with attention focused on getting major shippers to agree to make decisions regarding which transport carriers they use on the basis of carbon footprint. The goals of an EU program should be more aggressive and should have a great emphasis on carbon as opposed to just fuel savings.

6.2.2 Retrofit Measures (tires, trailers, wind screens, other technology)

Significant energy savings and carbon reductions are possible with relatively simple modifications to trucks.

6.2.3 Tires and Wheels

In the case of tires it involves the use of a single wide tire as opposed to twin tires , use of aluminum wheels, and use of either tire pressure monitoring equipment or auto-fill systems. The investment in these measures can provide large carbon reductions and does not compromise safety or reliability. Possible savings from all measures could reach 3-4%. More complex retrofits such as regenerative braking are on the threshold of becoming cost effective and offer promise for savings in the future. We strongly support implementing tire related incentives, labeling and promotion in a Smart Way program.

6.2.4 Trailers

Use of lighter trailers with aluminum body components has led to substantial cost savings in both the US and Europe. Expansion of this measure will require providing more in depth information to truck companies at point of sale when they are replacing trailers. Further efficiency improvements are possible with either tire pressure monitoring equipment or auto-fill systems. The investment in these measures can provide large carbon reductions and does not compromise safety or reliability.

6.2.5 Aerodynamics

Various measures to reduce aerodynamic drag are available with equipment tailored to the EU truck designs. While the savings are not as large as from US trucks and modifications, they provide a high payback because of the high cost of fuel.

6.2.6 Idle Reduction

Idle reduction offers opportunities for large reductions in both climate change and air pollution. The EU can play a key role in its implementation because one of the most congested areas in the EU are at border crossings. These long wait times provide opportunities to improve productivity of truck drivers and solve some infrastructure problems. Instead of waiting in line, trucks could get a number when they arrive at the border and then go into waiting areas. These areas could be paid for by the private sector if they were able to charge for the provision of services like food, drinks, internet and phone service and other services. What could be offered for free is systems for providing heat and cooling in conjunction with a requirement that all engines be turned off and not left on idle. This would also solve problems associated with the lack of rest rooms at border crossings, which also cause health problems. Turning off engines will lower both pollution and noise as well as lowering carbon emissions and saving fuel. Once the model is successfully demonstrated at border crossings, it can be used in other areas where there is a predictable long wait time for trucks.

6.2.7 Driver Training Coupled with Financial Incentives

Certainly a good option for achieving fuel efficiency improvements in the trucking sector is to train drivers in techniques to drive more efficiently. Numerous driver training programs are in place so it is a matter of motivating companies to train their employees or send them to a

program. The ITU has regular driving training courses. More important than driver training is to couple this training with incentives to get drives to drive more efficiently.

One company in Arizona, EMTA, worked with one of the largest trucking companies in the state to develop a smart driver program that included a set of prizes for the best drivers and that included a debit card issued to each driver that put a portion of the fuel savings achieved on trucks in the driver's own credit card for spending on anything they wanted to. This gave a strong motivation to driver's to apply any knowledge of more efficient driving to their everyday driving behavior. Coupled with this was the use of fuel and lubricant additives to improve efficiency. The result was a very large improvement in efficiency that provided room for bonuses for drivers and helped develop strong driver retention and high morale. The second largest problem facing trucking industries after the volatility of fuel costs is the retention of drivers because of problems with high turnover. Driver Rewards programs can help solve this problem and strongly impact the effectiveness of driver training in improving truck efficiency.

6.2.8 Efficient Lubricants

The use of synthetic engine and drive train lubricants can improve fuel economy by 3%. Even greater fuel savings can be achieved with the use of friction modifiers. Some of the products being sold to truck fleets in the USA are achieving fuel savings of 5 to 7% and have a cost increase in the lubricant of 20%. It is possible with the treatment of all components in the truck or locomotive (engine, transmission, gear shaft, wheel hubs, etc.) to achieve these high fuel efficiency improvements with very minor cost impacts. There are some barriers to use. Synthetic lubricants double lubricant cost, so this prevents consideration by some, even though it is a cost effective measure. Friction modifiers can leave residuals in the oil from the chemical process (chlorine) that are of concern to some engine companies (although this can be overcome with a good chlorine scavenger).

6.2.9 Fuel Energy Efficiency and Biofuel Content

Energy Efficiency of Fuel

One important area where innovation has not been systematically applied is in the development of mechanisms in fuel to improve fuel utilization, energy intensity, efficiency of the burn process and other innovations. The regulatory process is often a major barrier, since it requires millions of dollars of testing to evaluate effects that have minor impacts on health while usually minimizing positive values of technology entry on air quality or fuel consumption. The development of a carbon label for fuels that is applied to diesel and gasoline would provide a strong incentive to encourage the introduction of fuel efficiency additives. The regulators might also want to allow for a reduction in testing requirements when a product is at an early market stage. This would allow for innovation to enter the fuel market and if sales reach a certain level, extensive health effects testing could be required.

An example of how this approach could be implemented is the California Low Carbon Fuel Standard. It approaches the problem of fuel energy intensity by simply requiring that fuel suppliers reduce their carbon intensity by 1% per year over a 10 year period to reach at least a 10% improvement in fuel carbon intensity. This can be done either with biofuels or fuel efficiency additives and both approaches will most likely be used by refiners and distributors.

Biofuels and Alternative Fuel Content

One of the most effective ways to achieve carbon reduction in fuels is to aggressively phase in the use of higher blends of biodiesel and other low carbon advanced biofuels (renewable

diesel, synthetic gas to liquid (GTL) and biomass-to-liquids (BtL) fuels) using a policy that requires that biofuels meet certain carbon and sustainability goals.

An effective way to insure biofuels and alternative fuels play a meaningful and competitive role in fuel supply is to open the market to global supplies while applying incentives on the basis of carbon and sustainability criteria. These incentives could be based on subsidies, but future renewable or alternative fuel goals could also be met through mandatory requirements that are based simply on meeting a carbon reduction goal for fuel. This approach is being taken in California with the implementation of the low carbon fuel standard. It requires a 1% reduction in carbon emissions in fuel per year by a set of measures that are approved by the California Air Resources Board. A similar program could be set up at a national or EU level that evaluated all biofuels and alternative fuels and determined carbon reductions and sustainability criteria for each fuel. Fuel suppliers would then have an obligation to reach a carbon reduction goal but with flexibility to choose various options to achieve this goal including biofuels, alternative fuels and fuel additives.

Another option that shows possible policy direction with low carbon fuels is the Renewable Transport Fuel Obligation (RTFO). The RTFO is a mechanism requiring UK transport fuel suppliers to ensure that a set percentage of their sales are from a renewable source. It is scheduled to begin from April 1st 2008 and sets targets set at 2.5% by volume 2008/09, 3.75% 2009/10, 5% 2010/11. Targets can be met with any mix of fuels (bioethanol or biodiesel). Companies will be issued with RTFO certificates for each litre of biofuel sold. The obligation can be met either by supplying biofuels, by purchasing RTFO certificates from other suppliers or by paying buy-out fee. The UK has a 20ppl duty incentive for bioethanol and biodiesel that has been extended to 2010. To receive certificates and obtain the duty incentive obligated companies must report on carbon and sustainability. From 2010 fuels will receive certificates based on carbon savings. From 2011 only fuels meeting minimum sustainability criteria will receive certificates.

A similar sustainability and carbon requirement is being considered for biofuels in the EU as part of the new renewable energy policy package, to be released in early 2008. It will set minimum requirements for carbon and sustainability in conjunction with any requirements, goals, incentives or other mechanisms. A policy scheme addressing greenhouse gas balances will need some mechanism to identify and label the carbon reductions in fuel from the addition of biofuels, alternative fuels or fuel additives. The Co2 Fuel Star program is one mechanism that can be used to provide this familiarity with a labelling system and to allow consumers to quickly understand and value fuels that provide better carbon reductions.

6.3 EU-wide carbon labeling program for shippers, carriers and end products

The carbon labeling program is designed to addresses the behavior of business and private consumers in purchasing decisions and use of energy, of fuel suppliers in the energy content of their fuels, of equipment manufacturers in the efficiency of their products and of governments in their responsibility for the impacts of transportation on the environment. The development of a carbon labeling program affecting all stakeholders can assist in developing a productive market which financially rewards behavior leading to higher efficiency.

Since the GHG performance of biofuels will become an important aspect of upcoming biofuels policy on EU level, the EU is in an ideal position to propose a regional carbon labeling program that includes freight and bus sectors. This can be tied to the implementation of higher biofuel or alternative fuel requirements as they are implemented and allows the fuel consumers to understand why the change in fuels is occurring. The use of carbon labels in a wide variety of transport sectors then leads to everyone being involved and equally

contributing to greenhouse gas reductions and taking advantage of any market benefits from this "green" fuel use. The issue of carbon will become more and more important as climate change problems increase and there is strong consumer awareness and concern.

The fuel suppliers would be able to respond to consumer demand that would tend to prefer lower carbon fuels and develop biofuel blends for diesel and gasoline that optimized the carbon benefits. In this way, the market would quickly innovate and find lower carbon feedstocks for entry into the biofuel market.

The development of a means to evaluate the relative carbon benefits of each of the fuels as they enter the market would make it clear that biofuels or alternative fuels can play a meaningful role in carbon reduction and help support the implementation of any mandatory requirements in the fuel quality directive or other options being considered.

The carbon label could also be used to keep out alternative fuels that are not petroleum based but have high greenhouse gas emissions. For example, coal-based fuels such as CTL are likely to be very low in cost but could double carbon emissions. This would make them uncompetitive in an incentive system based on carbon benefits. Alternatively, it might get the projects to take additional steps to sequester CO_2 to avoid the carbon penalty. For example, CTL could be coupled with algae ponds who can sequester large amounts of algae in a full commercial stage in the right environments. These algae can provide oil for biodiesel production and either feed for livestock or energy for a biomass to energy or biomass to liquid process.

Involvement of either the individual members states or the EU Commission in the review and certification of technologies in connection with a carbon labeling program is an essential element of any carbon labeling effort. This evaluation and review can be initiated by non-profit groups such as World Business Council on Sustainable Development (WBCSD) or other groups. It can also be initiated at a country level through efforts such as the UK's Renewable Transport Fuel Obligation (RTFO). Even end product labeling of carbon benefits can be done as evidenced by the activities of the UK Dept. of Transport and the non-profit Carbon Trust. However, it would be best if the EU Commission took the lead and underwent a certification effort for a variety of appropriate products including fuels, lubricants, tires, vehicles, shipping lines, end products or other products involved in significant energy consumption. This would result in a uniform base of information on the carbon and efficiency benefits or various products and would provide a mechanism for incorporating this information in the labeling of products using guidelines developed by the same Commission agencies developing test and certification systems.

A mechanism that could further highlight that certain truck and rail carriers have achieved quantified carbon reduction goals is the integration of the Co2 Truck Star and Co2 Rail Star carbon labeling systems into a general EU version of a "Smart Way" program. The advantage of this approach is that the labeling system and quantification allows shippers to compete on both their general reliability and service and on the fuel & carbon efficiency. A label denoting that a trucking company is making best available efforts to achieve carbon reductions in conjunction with quantification of that level of carbon reduction (on an average basis) can be a very effective mechanism to get truck or rail companies to implement various retrofit measures, use biofuels, undergo driver training or take other steps to improve logistics efficiency and other general steps to lower fuel consumption. This would also lead to pressure on other sectors such as barges that might take additional steps to improve their operating efficiency or use biofuels in order to improve the efficiency of their operations vs. other competing barge companies.

Another option in connection with carbon labeling on finished products. This end consumer product labelling is already being done in the UK by some of the major supermarkets and a

national program is being developed by the Carbon Trust. The dissemination of this type of labelling to all levels of the EU product flow would clearly drive demand at a consumer level. If there is end product labeling, companies will be paying great attention to the carbon impacts of shipping. While it may be complex to add labels at the finished product level, it offers the most effective way to shift the entire market to lower carbon production, shipping and distribution.

Another form of carbon labeling is the labeling of corporations themselves. Various organizations such as the Carbon Reporting Project and others now rank the top 500 corporations on their efforts to reduce carbon emissions. If the EU Smart Way freight program is linked to these programs and makes it clear to corporations that their participation will affect their carbon rankings at a corporate and shareholder level, motivation to participate will be higher. This is already occurring to a limited extent as a result of the US EPA Smart Way Transport Program and the reference to this program as an example of how they are reducing carbon emissions. This could be particularly effective, however, if there was explicit reference to the fact that participation and levels of carbon reduction achieved in shipping and transportation will be available to carbon reporting groups and the ranking of corporations based on efforts made in reducing carbon in transportation encouraged.

6.4 Feasibility of a differential value added tax on the basis of carbon benefits

One important policy option that can be pursued in looking at how to provide the right price signals to industry to get them to produce the most efficient equipment possible. This can partially occur with carbon labels but is particularly attractive if there is the "carrot and stick" of some differential in end product prices as a differences in tax rates based on carbon.

The best way to pursue this policy is to first institute a carbon labeling program and allow the market to begin to adjust to competition on the basis of carbon without having initially a more significant differential in the price paid for products. This allows the kinks to be worked out on how to differentiate, evaluate and certify efficiency and carbon impacts of different products. The potential of further steps to link carbon labels to future tax changes will result in industry and business paying a lot of attention to the carbon labels in taking voluntary actions while also not complaining too much because of short term impacts on market shares.

This first step of carbon labels can then be followed up with an EU wide policy that moves from a flat rate VAT to a VAT based on the carbon footprint. This would be best as a "revenue neutral" approach that lowered the tax rate on lower carbon products and services and increased the VAT on higher carbon services or products. The "carbon variable" VAT could start first with in areas where carbon regulation is the most difficult and where carbon emission impacts are the greatest. Examples of where it could be applied and why it could work are described in the next paragraphs

6.4.1 Shipping

The area most relevant to this report where it could be applied is in connection with shipping. There is a VAT added to products or passed on to the final product as a result of shipping costs. It would be relatively easy to adjust the final VAT on products on the basis of determining if the product achieved a certain carbon reduction goal through more efficient shipping. This could be differentiated on the basis of the type of product being shipped (coal, steel, wood, consumer goods, etc.). This would lead to competition in purchasing shipping services from the most efficient, lowest carbon shipper and would quickly change the shipping industry to lower carbon shipping to take advantage of the value of lower or higher taxes for the shipping of a particular good. It might be advisable to lump together goods often

shipped together such as consumer goods to simplify the program. The initiation of a carbon labeling of trucks, ships and rail would be a part of this process, with information from this labeling being used to compute the net efficiency gains from hiring more efficient and/or low carbon carriers.

6.4.2 Fuel

One of the most important VAT variable rate initiatives would be in connection with fuel. While individual member states set their fuel tax, the EU Commission still has a VAT tax on fuel that could be varied on the basis of the carbon reductions in the fuel. This would provide a strong incentive to add lower carbon fuels to the fuel blend such as first, second and third generation biofuels and fuel additives to improve efficiency. Consumers often make choices on fuel on the basis of only 1 cent or less per liter so the tax change would have a big impact on consumer choices. This is particularly true if the VAT rate change is "revenue neutral" and raises taxes on the high carbon fuels while lowering it for low carbon fuels even if they are only a small percentage of the blend. The use of higher blends would then have an immediate competitive impact on fuel prices and allow the EU Commission to reach its 20% alternative fuel goal in 2020 with the maximum possible carbon benefits from additives and biofuels.

6.4.3 Lubricants

A similar shift in the VAT tax for lubricants would have a big impact on sales. This because some measure have up to a 5-7% fuel savings and the acceptance of this data by the EU would immediately provide a decisive market advantage in an industry that generally sees little change and few improvements in efficiency of lubricants ever reaching the market.

6.4.4 New Trucks, Trailers or Other Equipment

One option is to have a variable VAT rate on the basis of the carbon efficiency of the new truck, trailer or other new equipment. If buyers paid a lower tax on highly efficient equipment and a higher tax on less efficient equipment, the tax revenue collected would be the same but there would be strong incentives for truck, rail or engine manufacturers to offer the most efficient equipment possible to lower tax rates. This also has a large impact on the consumer decision to buy a certain truck or trailer or other shipping equipment since there is always a general interest in lowering taxes.

6.5 The Need for an Integrated Approach to Transport Efficiency & Labelling

In order to meet the greatest possible greenhouse gas reductions at the lowest cost, an integrated approach is the most efficient overall concept. This requires using a holistic methodology rather than concentrating only on one element of a solution, for example technologies. The integrated approach incorporates all relevant stakeholders in the chain of energy production and use, to apply effective energy saving measures and technologies. These stakeholders include actors in equipment manufacturing, commercial businesses, consumers and policymakers.

The integrated strategy also involves consumers. Any decision of companies to take an action in the environmental sector is driven in part by their assessment of its relevance to their customer base. If they feel it is important to their customer base or market share and could impact the marketing of the product then it affects their willingness to evaluate the technical, logistical or economic issues associated with implementation. A set of integrated strategies

using a common name and label can build off each other and generate strong consumer awareness and interest in action in different areas. This allows a freight initiative that leads to labeling of trucks, ships, rail and shipping to influence the success of a similar effort directed at cars, fuels, lubes and tires. It also allows higher profile efforts directed at travel and events to provide the critical mass to get the consumer recognition to drive interest in participation by major corporations, who want to capitalize on the significant positive impression points they can gain for their own product line.

The integrated strategy can be applied in various transportation sectors including freight, new vehicles, eco-travel and air travel. In the case of an integrated strategy aimed at autos, the program helps achieve the behavior change by business and private consumers in their vehicle purchasing decisions, vehicle use and driving behavior. The label and program design are intended to provide information to consumers to help them understand that their ongoing decisions about what fuel to use in their car or what lubricants and tires they use when maintaining it can have as large an impact on their transportation carbon emissions as which car to buy. The endorsement of the use of new fuel, lube and tire products by the vehicle manufacturers leads to confidence in using these new fuels, lubes and tires. This then leads to strong demand for various alternative fuels, fuel additives, efficient lubricants and efficient tires. Once there is a demand, suppliers of these products to car companies will quickly meet any quality requirements or carbon goals and provide the elements necessary to achieve very large life cycle carbon reductions. This integrated strategy is of interest to auto companies because they are seeking Co2 credits from the EU Commission and have already negotiated to get them for efficient tires. In the future, gaining additional efficiency from fuels and lubricants can put less pressure on car companies to dramatically improve vehicle efficiency. More importantly, much greater overall carbon emission reductions will occur.

A similar integrated strategy is possible in the freights sector through carbon labeling of shippers, carriers (rail, truck, barge), corporations and products. This is the essential strategy of the Smart Way Transport Partnership program and the adoption of this strategy can be a very effective way to implement an integrated strategy in the freight sector. This is particularly true if there is a lot of attention paid by shareholder reporting groups on getting corporations to participate. It can also be driven by consumer demand for more efficient shipping as a result of carbon labels on products or other such initiatives (Carbon Trust & Supermarkets in UK).