SmartWay
Transport Partnership
UN CSD 19
Learning Center

Buddy Polovick
US Environmental Protection Agency
09 May 2011
Outline

Part 1
• Freight Sustainability Drivers and Challenges
• SmartWay Overview
• Questions

Part 2
• Design, Build and Implement a Freight Sustainability Program
• Questions
Global Share of CO2 by Sector

- Manufacturing: 38%
- Transport: 25%
- Households: 21%
- Services: 12%
- Other: 4%

OECD/IEA 2008
Vehicle Freight Miles
Freight Mile Growth Outpaces Passengers

International Transport Forum member countries only
ITF 2011
Energy Volatility

On-Highway Diesel Prices
Price Per Gallon

Source: Energy Information Administration
U.S. Transportation Sector GHG Emissions

GHG (1,820 mmt CO2-eq, 2009)
SmartWay Program Components

Partnership
• Assess, benchmark and track emissions of carriers, shippers, and logistics companies
• National idle reduction program
• New carbon assessment tools
• Partner support
• GHG and fuel savings

Technology Program
• Test program
• SmartWay Tractor/Trailer
• SmartWay-verified technologies
• Test methods

Light Duty Vehicles
• SmartWay certified vehicles
• Preferential leasing, purchasing
• Consumer education

Outreach and Education
• Partner recognition - SmartWay web site, logo, and awards
• Partner education – webinars, fact sheets, e-update, web site, workshops, events
• Innovative pilot programs
• Brand marketing – PSAs, media campaigns, events

Finance Program
• Innovative finance programs (grant programs, banks, retailers)
• SmartWay Finance web site

International Activities
• Conferences, training, workshops
• Replicate public/private partnership
• Pilot projects
• Global supply chain
How Does The Partnership Work?

Shipper

Data

Fuel $ Savings

Carbon Footprint

Technology Vendor

Data

Facilitation

Verification

EPA

Collaboration

Carriker

Banker Financer

$ $ $
SmartWay Partner Results

2, 900+ Partners
- All 100 largest truck carriers and 1K+ medium-small carriers
- All Class 1 Rail lines
- Major logistics firms
- Fortune 500 (and Fortune 50) shippers from every sector

Since 2004, SmartWay Partners saved
- 16.5 million metric tons of CO2
- 235,000 tons NOx
- 9,100 tons PM
- 5 million barrels of oil imports
- 6.1 billion dollars in fuel costs
- Equivalent to taking over 3 million cars off the road for 1 year
SmartWay Global Partners

IKEA
FedEx
Walmart
P&G
COLGATE-PALMOLIVE COMPANY
L’ORÉAL
MAERSK
C.H. ROBINSON WORLDWIDE, INC.
SHARP
DELL
Cadbury
Canon
IBM
Coca-Cola Enterprises, Inc.
Baxter
hp
Johnson & Johnson
PEPSICO
Kellogg's
DHL
Kimberly-Clark
Frito-Lay
APL
MILLIPORE
Why is SmartWay successful?

Shippers:
- Top of the supply chain, drive marketplace demand
- Give preferred status to SmartWay Carrier Partners
- Get better data to improve their own shipping operations
- Modify logistics operations to improve efficiency & reduce emissions, for example:
  - Inter-modal Shipping
  - Full Truck Loads
  - Warehouse Improvements
  - Idle-Reduction at facilities
- Get recognition and PR value with SmartWay brand

Carriers:
- Gain competitive advantage:
  - Preferred status, plus
  - Fuel efficiency, savings
- Reduce emissions
- Integrate fuel saving technologies and strategies into fleets, such as:
  - Idle Reduction
  - Improved Aerodynamics
  - Efficient Tire Systems
  - Driver Training
  - Renewable Fuels
  - Advanced Lubricants
- Get recognition and PR value with SmartWay brand
SmartWay Tractors and Trailers

Specifications include 2007+ engine, idle reduction, low rolling resistance tires, and aerodynamic equipment.

- 10% to 20% reduction in fuel use, relative to a comparable truck without these fuel-saving features.

- Limited to the equipment & truck types that EPA tests.
Get a fast loan quote Now – truck, trailer, & equipment loans and leases

Start Your Loan Application Now:

1. Loan Type
   SELECT

2. Amount $ 0

3. Location Select Location

This Worldwide Web site is provided as a public service by the U.S. Environmental Protection Agency (EPA), SmartWay Transport Partnership. The purpose of this site is to efficiently and conveniently disseminate information on financing that is available for purchasing cleaner trucks and trailers, and emissions reducing and fuel saving technologies (such as auxiliary power units). All loan information contained in this site represents private company loans. These are not Federal government loans. If you obtain a loan from any of the financial entities here you are subject to their contractual terms and conditions. The EPA does not endorse the products or
Public Service Campaign for Shippers

YOU’RE A CLICK AWAY FROM A SMARTER SUPPLY CHAIN

www.epa.gov/smartway

Logistics managers are constantly looking for ways to reduce costs for their customers through customized solutions. SmartWay Transport Partnership is one smart money-saving program grounded in innovative business strategies and new technologies. SmartWay Transport is about streamlined logistics operations that reduce fuel costs while reducing greenhouse gases and other emissions.

To find out more about this collaborative program, please call 1-734-214-4767 or visit www.epa.gov/smartway.
Public Service Campaign for Carriers (TV, Radio, Print)

These Manufacturers Are Hauling The Best Logo In The Business

Introducing SmartWay Certified Tractors & Trailers From These Manufacturers

Tractor makers:
- Freightliner
- International
- Kenworth
- Mack
- Peterbilt
- Volvo

Trailer makers:
- Great Dane
- Trailmobile
- Utility
- Wabash

To learn more visit epa.gov/smartway
Public Service Campaign for Consumers
(TV, Radio, Print)

Reflects Well On You.
Driving a vehicle that is fuel-efficient, produces fewer greenhouse gases, and can save you money reflects well on its owner—especially these days, with growing concerns about climate change. The U.S. Environmental Protection Agency makes it easy to identify environmentally friendlier cars and trucks. Just look for the SmartWay® leaf. SmartWay will help change the way America drives.

For more on SmartWay-certified cars and trucks, leaf through our website at www.epa.gov/smartway.

Reflects well.
(And helps keep the air clean, too.)
Let’s face it, any time your fleet can boost fuel efficiency by 10 to 20%, it reflects well on you and your bottom line. U.S. EPA certified SmartWay Tractors and Trailers allow you to do just that. You can also display the SmartWay certification mark, a symbol of environmental distinction, which also reflects well on you. The SmartWay leaf indicates to both industry and the public that you operate the cleanest and most efficient trucks and equipment available today.

To learn more, visit epa.gov/smartway
Partner Recognition

- Partner logo earned by top-performing SmartWay Partners

- SmartWay Annual Awards recognize the “best of the best”

- SmartWay partners compete for recognition
Survey of supply chain executives shows SmartWay as leading industry sustainability program

*Eye For Transport, June, 2010*
**SmartWay Industry Awareness**

*Shipping executives survey shows SmartWay as leading industry sustainability program*

- Environmental Sustainability Benchmark Study: Leaders Prepare for the “Greening” Supply Chain, *Feb, 2011*

<table>
<thead>
<tr>
<th>Program</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>EPA Smartway</td>
<td>36%</td>
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<tr>
<td>Other, please specify</td>
<td>27%</td>
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<tr>
<td>Carbon Disclosure Project</td>
<td>22%</td>
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<tr>
<td>Sustainable Shipping Initiative</td>
<td>19%</td>
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<tr>
<td>Greenhouse Gas Protocol</td>
<td>18%</td>
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<tr>
<td>Global Reporting Initiative</td>
<td>17%</td>
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<tr>
<td>Coalition for Responsible Transportation</td>
<td>16%</td>
</tr>
<tr>
<td>Wal-Mart Sustainability Assessment</td>
<td>15%</td>
</tr>
<tr>
<td>Climate Leaders</td>
<td>13%</td>
</tr>
<tr>
<td>UN Global Compact</td>
<td>9%</td>
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</table>
SmartWay International Projects

SmartWay International Workshop December, 2008
– Thirteen countries participated
“SmartWay” sister program developments
– Mexico launched Transporte Limpio
– Canada harmonizing Fleet Smart to SmartWay
– France, EU, Australia SmartWay platforms
Commission for Environmental Cooperation
– Recommending strengthening and harmonizing the three programs to share data and emission factors
World Bank and Clean Air Initiative - Asia
– SmartWay technologies used for Green Trucks Pilot Project in Guangzhou, China
– Guangdong Demonstration project to include logistics, finance and capacity building
Green Freight China Program – National program development
Creating a Freight Sustainability Program

I. Exploratory Stage
   • Market research

II. Design and Development Stage
   • Program components, tools materials

III. Implementation Stage
   • Marketing
   • Recruiting and Partner management

IV. Expansion and Refinement Stage
   • Value added components
   • Building program credibility
Stage I - Exploratory Stage

Before designing SmartWay (2001-2002), EPA conducted research on the current state of freight transportation
• Freight industry energy use
• Environmental impacts
• Trends and forecasts

Contractor created report on state of industry and potential for energy savings; found that freight sector:
• Accounted for 19.4% of total transportation energy use
• Contributed 50% of mobile source NOx
• Contributed 30% of mobile source PM
• Contributed 20% of the mobile source CO2
• Grew more rapidly than all transportation sectors except air travel
Stage I - Exploratory Stage

- TOTAL ENERGY USE: 400 kWh (~6.6 mpg)
- Aerodynamic Losses: 21%
- Rolling Resistance: 13%
- Engine Losses: 60%
- Drivetrain: 2%
- Auxiliary Loads: 4%

Source: U.S. DOE, Technology Roadmap for 21st Century Truck Program
## Stage I - Exploratory Stage

**Opportunities to Improve Efficiency**

### Fuel Savings per truck (<3%)
- Automatic Tire Inflation: 0.70
- Tare Weight Reduction (3000 lbs.): 0.80
- Low-Friction Drive Train Lubricants: 0.50
- Low-Friction Engine Lubricants: 1.50
- Reduced Rolling Resist. (Wide based tires): 2.30

### Fuel Savings per truck (3% < x < 6%)
- Improved Trailer Aerodynamics: 1.90
- Driver Training and Monitoring: 1.80
- Improved Tractor Aerodynamics: 1.20

### Fuel Savings per truck (>6%)
- Speed Reduction (70 to 65 mph): 0.90
- Speed Reduction (65 to 60 mph): 3.90
- Idling Reduction (APU): 2.90

Total Maximum Benefit (current technologies): 18.4

### 2010 Emission Reduction (MMTCE*)

*million metric tons of carbon equivalent*
Advanced Truck Stop Electrification
Advanced Truck Stop Electrification

- **Night Light**: Lighted On/Off Button for the screen, so you can find it easily in the dark.
- **120V ShorePower**: Inside and outside your cab for appliances, block/fuel heaters and other accessories.
- **Card Reader**: Slide your member Card and follow instructions.
- **Built-In Touch Screen Computer**: Control your "Home-On-The-Road" and surf the Internet.
- **Help**: Available 24x7. On-Screen Context-Sensitive Help or dial 611 from your cab phone or 800-738-7024 from any phone.
- **Go Buttons**: One-Touch Access to Main Functions.
- **USB Ports**: Use a keyboard, mouse or other USB devices.
- **Telephone**: Plug in a regular phone for incoming and outgoing calls.
- **Television**: Connect your TV with standard COAX cable for Premium Satellite TV.
- **Central Heat & Air**: Thermostat controlled filtered air flow, recycled from your cab.
- **Internet**: High-Speed Ethernet Port for Internet on your Computer - Wireless Internet also available.
# Idle Reduction Technologies
For Trucks and Locomotives

<table>
<thead>
<tr>
<th>Average fuel savings</th>
<th>Emissions Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks: 1 gal/hr</td>
<td>CO₂, NOx, and PM</td>
</tr>
<tr>
<td>Rail: 4 - 12 gal/hr</td>
<td></td>
</tr>
</tbody>
</table>

- Automatic Shut-Down/Start Up System
- Battery Powered Systems
- Diesel Driven Heating System
- Auxiliary Power Unit/Generator Set
- Truck Stop Electrification
Low Rolling Resistance Tires
Single Wide Base and Improved Duals

**Average fuel savings**  
Trucks: 4 - 5%

**Emissions Controlled**  
CO$_2$, NOx

- Single-wide tires
  - Reduced rolling resistance
  - Reduced weight
- Low rolling resistance dual tires
Wheel and Tire Inflation Improvements
Aluminum Wheels, Tire Pressure Monitoring and Inflation

**Average fuel savings**  **Emissions Controlled**
Trucks: 3 - 5%  
CO$_2$, NO$_x$

- Tire pressure monitoring and inflation
  - Ensure appropriate pressure for efficiency
  - Reduced maintenance and extended tire life
- Aluminum wheels save weight and inertia energy
Trailer Aerodynamics

**Average fuel savings**   **Emissions Controlled**
Trucks: 5%                  CO₂, NOx

- Trailer Fairings, Side-skirts
- Nose Cone and Trailer Tail
## Exhaust After-Treatment Devices

<table>
<thead>
<tr>
<th>Average fuel savings</th>
<th>Emissions Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PM</td>
</tr>
</tbody>
</table>

### Diesel Oxidation Catalysts
- Estimated cost: $1,000
- Reduce PM by 25% – 40%

### Particulate Matter Filters
- Estimated cost $6,000
- Reduce PM by 80% – 90%
Intermodal Shipping
Operational Strategies
Stage II – Design & Development Stage

Initial Stakeholder Outreach

- Carriers
- Shippers
- Industry Associations
- Environmental Groups

- Key group of initial industry leaders in the initial planning stages
- Enfranchised them to actively participate in the design process
- Created buy-in from industry
- Strengthened SmartWay as a true public-private partnership

Charter Partnership

- Provided EPA with institutional knowledge of the industry
- Helped legitimize the program
Stage II – Design & Development Stage

**Website**
Includes information on Partners, news, funding opportunities, official program materials, technical reports, general SmartWay information

**Calculator Tools**
- Help partners estimate CO2, NOx, and PM emissions
- Determines effectiveness of strategies used in the fleet
- Allows fleet to determine best strategies for them
- Projects and estimates cost savings and paybacks
- Measures their environmental footprint

**Database**
- To organize Partnership contact and communication information

**Partner agreements**
- To formalize commitments as a Memorandum of Understanding
Stage III – Implementation Stage

Step 1 - Program Launch and Marketing
- Education campaign
- Brand marketing tools
- Consumer education

- Recognize Charter Partners
- Demonstrate Calculator Tool
- Press Releases
- Press Conference
Stage III – Implementation Stage

Step 2 – Recruiting

- Leverage current relationships
  - Trucking and Shipping Associations
  - Shipper Partners (Logistics Partners)
  - Charter Partners
- Use industry resources
- Conferences and Events
  - Shipper and Carrier Conferences
- New strategic relationships
  - Regional Approach
  - Network through Partners
- Cold calls and warm calls
  - Leads from conferences/events
- Direct mailings
  - Associations’ endorsements
Stage III – Implementation Stage

Step 3 - Partner Management

- General assistance with paperwork and data reporting
  - Calculator tool
  - Authorization to use logo

- Develop working relationships

- Technical Guidance

- Marketing assistance
  - Press Release
  - Case Studies
  - Logo Use
  - Authoring articles or internal memos

- Make the Partnership more valuable
  - Using Partner feedback to improve the process for them
Stage III – Implementation Stage

Step 4 - Partner Recognition and Awards

- High visibility industry events and conferences
- High ranking officials
- Award Winners publicize their own achievements
Stage IV – Expansion & Refinement

Value added components:

- Technology Testing and Verification Program
  - SmartWay verified Technologies
  - SmartWay verified Trucks (Tractors and Trailers)

- Online Driver Training E-Learning

- Online Calculator Tools

- Financing programs
  - Grants, loans and subsidies for Technology upgrades
  - Goal: Maximize deployment of fuel saving and emission reduction technologies in the market

- Enhancing the Brand
  - Mark of cleaner/sustainable transportation options
Stage IV – Technology Verification

SmartWay Strategies

- **Trailer Side Fairings**
  - $1,450 - $2,500
  - Saves 7%

- **Trailer Mounted Gap Reducers**
  - $700 - $1,100
  - Saves 2%

- **Trailer Boat Tail**
  - $2,000 - $3,000
  - Saves 5%

- **Low Rolling Resistance Tires**
  - $2,500 Trailer (2%)
  - $3,000 Tractor (2%)
  - Saves 4%

- **Idle Reduction Equipment (APU's)**
  - $6,000 - $15,000
  - Saves 8%

- **Fuel Tank Side Fairings**
  - $1,700 - $2,100
  - Saves 1%

- **Smart Way Approved Tractor Cap**
  - $1,300 differential cost
  - Saves 5%

- **2010 Engine**
  - $9,000 Plus Model Year Escalator - more than 2007 compliant engine
  - 85% less PM than 2006MY
  - 85% less NOx than 2009MY

- **Diesel Exhaust Fluid**
  - $.01 CPM
  - Burn 2 gallons DEF per 100 gallon/diesel
  - CPG = $3.00

- **Aero Mirror & Bumper**
  - $325 differential cost
  - Saves 2%

### Tractor (18% fuel savings)

- Additional Costs per Tractor: $20,025 - $29,425
- Additional Weight: 850 lbs (approx)

### Trailer (16% fuel savings)

- Additional Costs per Trailer: $6,650 - $9,100
- Additional Weight: 900 lbs (approx)

* Fuels saving strategies are not cumulative. Conservative estimate of 25% overall savings yields ROI on all equipment = 1.8 yrs to 2.6 yrs. (Based on long-haul application, 120,000 annual VMT, 2,000 idle hours on APU, and $3.00/gal.)

* Information Courtesy of Interstate Distributor Company: IDC Shippers Summit & Green Freight Training Program 2010
Stage IV – SmartWay verified Trucks
Stage IV – Driver Training E-Learning

Fuel costs are one of the largest expenditures for fleets (and for owner-operators). In fact, fuel costs are the biggest expense after labour costs. As a driver, you have a significant role to play in reducing these costs through energy-efficient driving practices.

This program is designed to give you tools and tips for saving fuel on the road.
Stage IV – Online Calculator Tools

Calculator for single-owner (one truck):

RESULTS:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
<th>% Fuel Savings</th>
<th>Annual Fuel Savings</th>
<th>Monthly Fuel Savings</th>
<th>Monthly Loan Payment</th>
<th>Net Monthly Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>APU, Tires, Aero</td>
<td>$16500</td>
<td>17%</td>
<td>$11371</td>
<td>$948</td>
<td>($411)</td>
<td>$537</td>
</tr>
</tbody>
</table>

STEP 1: ENTER YOUR TRUCK AND LOAN INFORMATION.
Enter your basic vehicle and loan numbers here OR Click the "Load Typical Values" button below for help with typical long haul truck numbers.

Annual Fuel Use: 16667 (Gallons)
Cost of Fuel: $4.10
Annual Idling: 2400 (Hours)
Loan Period: 48 (Months)
Loan Interest Rate: 9.00%
Yearly Fuel Cost: $68335
Monthly Fuel Cost: $5695

STEP 2: SELECT TECHNOLOGIES OF YOUR TRUCK.
Check the technology box below to test various combinations of technologies for your truck. You can check as many items as you want.

Technology
- Bunk Heater (Heater) Cost: $1500
- Auxiliary Power Unit (APU) Cost: $8500
- Aluminum Wheel Sets for Single Wide Tires (Tires) Cost: $5600
- Trailer Aerodynamics (Aero) Cost: $2400
- Automatic Tire Inflation (ATI) Cost: $900
- Oxidation Catalyst (DOC) Cost: $1200

Load Typical Values  Savings Without Loan  Clear

"Savings Without Loan" button sets the loan period and interest rate to zero, to show you the results of buying this technology outright.

http://www.epa.gov/smartway/transport/calculators/index.htm#single
## Stage IV – Financing Programs

<table>
<thead>
<tr>
<th>Cleaner Used Truck</th>
<th>2005 MY Truck on the Used Truck Market</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard Truck</td>
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<tr>
<td>Purchase Price:</td>
<td>$40,000</td>
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<tr>
<td>60 Month Interest Rate:</td>
<td>12%</td>
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<tr>
<td>Monthly Payment:</td>
<td>$890</td>
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<tr>
<td>Total Cost:</td>
<td>$53,400</td>
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Stage IV – Brand Enhancement

SmartWay on EPA’s Green Vehicle Guide website

Automakers promoting their SmartWay vehicles:

- Chrysler
- Ford
- GM
- Hyundai
- Kia
- Mazda
- Nissan
- Subaru
- Toyota
- Volvo

Banks and credit unions offer discounted loans for SmartWay vehicles
Package Labeling Pilot Program

HP consumer electronics are carried exclusively by SmartWay Carrier Partners