The Fast and the Furious:
A Company’s Guide to Reducing Transportation Emissions

28. June. 2017
Our industry can and must respond to climate change.
Make a commitment to climate in one or more areas!

Integrate carbon farming into the agricultural supply chains
Increase energy efficiency
Reduce food-waste in the supply chain
Remove commodity-driven deforestation from supply chains
Responsible engagement in climate policy

Reduce the climate impact of packaging
Commit to 100% renewable power
Reduce short-lived climate pollutant emissions
Reduce climate impacts of transportation

www.climatecollaborative.com/take_action
Our Impacts

77 COMMITTED COMPANIES
Together: $6.3 Billion in revenue!

375 COMMITMENTS
8 Companies committed to all 9 Areas

1ST CLIMATE DAY

500+ ATTENDEES

1,500+ LIVESTREAM AUDIENCE

6000+ Views of the Climate Day Video

↑ 29% since May!

Doubled since May!
Made possible by these generous donors!
Our Speakers

Lisa Spicka
Associate Director
SFTA

Jason Mathers
Director, Supply Chain
Environmental Defense Fund

Katie Clark
Director of Sustainability
Happy Family Brands
Our Program

Transportation’s Climate Impacts

Best Practices: Emission Reduction

Happy Family Case Study

Benchmarking and Goals

Public Policy: Freight Transportation
Best Practices

Reducing Transportation Emissions

Jason Mathers
June 2017
The Company We Keep
Emissions from Freight Transportation
Local Air Pollutants From Freight

- Criteria air pollutants: Ozone, NOx, PM, CO, SO$_2$, Lead
- Toxics – benzene, formaldehyde, DPM, etc.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Guideline (WHO)</th>
<th>Standard (US)</th>
<th>Standard (Canada)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone</td>
<td>51 ppbv (8-hr) (100 μg/m³)</td>
<td>70 ppbv (8-hr) (2015)</td>
<td>62 ppbv (8-hr) (2015)</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>10 μg/m³</td>
<td>12 μg/m³</td>
<td>10 μg/m³</td>
</tr>
</tbody>
</table>
# 100,000 Annual Deaths from NOx

## Annual premature deaths attributable to on-road diesel vehicle NOx emissions, 2015

<table>
<thead>
<tr>
<th>Total deaths</th>
<th>Share of deaths by source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China</strong></td>
<td></td>
</tr>
<tr>
<td>31,397</td>
<td><strong>NOx within regulated limits</strong> 66%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 60%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 63%</td>
</tr>
<tr>
<td><strong>EU–28</strong></td>
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<tr>
<td>28,456</td>
<td><strong>NOx within regulated limits</strong> 65%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 63%</td>
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<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 63%</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td></td>
</tr>
<tr>
<td>26,739</td>
<td><strong>NOx within regulated limits</strong> 77%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 63%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 63%</td>
</tr>
<tr>
<td><strong>Rest of world</strong>*</td>
<td></td>
</tr>
<tr>
<td>8,968</td>
<td><strong>NOx within regulated limits</strong> 74%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 71%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 84%</td>
</tr>
<tr>
<td><strong>Russia</strong></td>
<td></td>
</tr>
<tr>
<td>3,380</td>
<td><strong>NOx within regulated limits</strong> 65%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 58%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 58%</td>
</tr>
<tr>
<td><strong>U.S.</strong></td>
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</tr>
<tr>
<td>2,982</td>
<td><strong>NOx within regulated limits</strong> 84%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 65%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 65%</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td></td>
</tr>
<tr>
<td>1,970</td>
<td><strong>NOx within regulated limits</strong> 71%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 71%</td>
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<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 84%</td>
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<tr>
<td><strong>Brazil</strong></td>
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<tr>
<td>1,818</td>
<td><strong>NOx within regulated limits</strong> 65%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 58%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 58%</td>
</tr>
<tr>
<td><strong>Mexico</strong></td>
<td></td>
</tr>
<tr>
<td>907</td>
<td><strong>NOx within regulated limits</strong> 73%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 73%</td>
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<td></td>
<td><strong>Excess NOx from cars and vans</strong> 84%</td>
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<tr>
<td><strong>South Korea</strong></td>
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<tr>
<td>788</td>
<td><strong>NOx within regulated limits</strong> 65%</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 58%</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td><strong>NOx within regulated limits</strong> 73%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 73%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 84%</td>
</tr>
<tr>
<td><strong>Global</strong></td>
<td></td>
</tr>
<tr>
<td>107,626</td>
<td><strong>NOx within regulated limits</strong> 65%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from trucks and buses</strong> 58%</td>
</tr>
<tr>
<td></td>
<td><strong>Excess NOx from cars and vans</strong> 58%</td>
</tr>
</tbody>
</table>

*Counts only those premature deaths resulting from NOx emissions produced in the other regions shown here.

Source: ICCT
Freight Greenhouse Emissions

57% Heavy-duty trucks account for the dominant share of all logistics-related greenhouse gas (GHG) emissions.

Source: World Economic Forum

<table>
<thead>
<tr>
<th>Source: WEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROAD FREIGHT (1,596 Mega tonnes CO₂)</td>
</tr>
<tr>
<td>OCEAN FREIGHT (476 Mega tonnes CO₂)</td>
</tr>
<tr>
<td>RAIL FREIGHT (168 Mega tonnes CO₂)</td>
</tr>
<tr>
<td>AIR FREIGHT (252 Mega tonnes CO₂)</td>
</tr>
<tr>
<td>BUILDINGS (308 Mega tonnes CO₂)</td>
</tr>
</tbody>
</table>

57%  17%  9%  6%  11%
Reducing Emissions Private Fleets
Engine Losses
Urban: 58-60%
Interstate: 58-59%

Aerodynamic Losses
Urban: 4-10%
Interstate: 15-22%

Inertia/Braking
Urban: 15-20%
Interstate: 0-2%

Rolling Resistance
Urban: 8-12%
Interstate: 13-16%

Drivetrain
Urban: 5-6%
Interstate: 2-4%

Auxiliary Loads
Urban: 7-8%
Interstate: 1-4%
High-efficiency long-haul truck

Tractor specs
- Single drive axle + tag axle
- Properly sized engine
  (details below)

- Roof fairing
- Cab side extenders
- Auxiliary power unit
  (hidden behind fuel tank fairing)
- Trailer side skirt
- Wide-base trailer tires
- After-market aerodynamic
  "moon dish" hubcaps
- Wide-base drive tires
- Aerodynamic bumper
- Aerodynamic cab design
- Rubber aerodynamic
  ground skirts
- Aerodynamic fuel tank fairings
Resources

www.truckingefficiency.org  www.epa.gov/smartway
Reducing Emissions from 3rd Party Distribution
# Drivers of GHGs from Freight

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce distribution miles</td>
<td>Cube/weight</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use most efficient modes &amp; equipment</td>
<td>Distance</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Use lower impact fuels</td>
<td>Equipment Efficiency</td>
</tr>
<tr>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Fuel Footprint</td>
</tr>
</tbody>
</table>
## 5 Principles for Greener Freight

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get the most out of every move.</td>
<td>Get the most out of every move.</td>
</tr>
<tr>
<td>Choose the most efficient transport mode possible.</td>
<td>Choose the most efficient transport mode possible.</td>
</tr>
<tr>
<td>Demand cleaner equipment and practices.</td>
<td>Demand cleaner equipment and practices.</td>
</tr>
<tr>
<td>Redesign your logistics network.</td>
<td>Redesign your logistics network.</td>
</tr>
<tr>
<td>Collaborate!</td>
<td>Collaborate!</td>
</tr>
</tbody>
</table>
Case Study: Walmart

Walmart Fleet Efficiency = Cases shipped / Gallon Burned

- The most cases
- The fewest miles
- The most efficient equipment

Fleet efficiency
Case Study: Walmart

• Saved nearly $1B in FY2016 alone

• Delivered 1 billion more cases and drove 460 million fewer miles as compared to FY2006

• Avoid emissions of almost 650,000 metric tons of CO2
  – Equivalent to GHG emissions of 136,842 passenger cars driven for one year
  – OR, 97 Olympic swimming pools of fuel
Case Study: Ocean Spray

**SHIFTING TO RAIL**
- Intermodal Backhaul
  - Fruit Co. + CSX + 3PL
  - 40% cost Savings
  - 65% CO₂ Savings
  - External Collaboration

**NETWORK REDESIGN**
- Reduced Miles
  - Florida DC
  - 15% cost Savings
  - 18% CO₂ Savings
  - Internal Project
By coloading freight bound for CVS, Colgate & Kimberly-Clark:

- Cut overall trucks trips (109 less)
- Lower emissions (28 tons avoided)
- Increased business value (7% lower inventory & 2% fewer out-of-stocks)
EDF Tools & Resources

• EDF Green Freight Handbook
  – Green freight diagnostic tool to ID project types
  – Advice for building support
  – Recommendations for goal setting
EDF Tools & Resources

- EDF-trained graduate/MBA students
- 10-week fellowship
- nearly $1.4 billion in energy savings identified
- average of $1 million in savings identified for each participating organization
- Companies pay fellows directly

Visit http://edfclimatecorps.org for more information
Jason Mathers
jmathers@edf.org
http://edf.org/freight
Happy Family Case Study

Implementation & Measurement: Emissions Reductions
Our mission is to change the trajectory of children's health through nutrition.
This is how we achieve our mission:

- Nourishing Lives
- Supporting Families
- Protecting our Planet
This is how we achieve our mission:

Do everything in our power to leave the babies that we serve now a healthy and happy planet to grow up on in the future.
This is where we start:

1. Farms
2. Logistics
3. Manufacturing

- 2nd largest emitter of GHG emissions in our supply chain
- Most control over logistics practices
One Step at a Time

1. Measure what matters
2. Prioritize opportunities
3. Take action
4. Repeat
Measuring What Matters (choosing metrics)

GHG Emissions
- Absolute logistics emissions
- Emissions per $ of revenue

&

% of Ton Miles
- For each mode of transport
#1 Measuring What Matters (establishing a baseline)

## Carbon Footprint from logistics in 2016

<table>
<thead>
<tr>
<th>Origin</th>
<th>Destination</th>
<th>Volume of materials shipped</th>
</tr>
</thead>
</table>

Based on
Prioritizing Opportunities (our supply chain)

Grow internationally

- Managed by retailers
- Managed by Happy family/3PLs
- Managed by suppliers

Grow domestically

- Manufacture
- Package
- Warehouse
- Retail
Prioritizing Opportunities (our leverage)

Grow internationally

Grow domestically

Managed by retailers

Managed by Happy family/3PLs

Managed by suppliers

Manufacture

Package

Shipping from domestic suppliers to co-manufacturers

Retail

Warehouse
Prioritizing Opportunities

Tools to Organize Our Action Plan
Prioritizing Opportunities

- Large % of trucks are maxed out by weight or volume
- Lack of analysis tools to increase weight max out frequency

- Rarely (if ever) moving empty miles
- Complicated supply chain → complex project to implement immediately

- Time consuming and complex
- Would likely need to bring in a consultant

- Little leverage as small brand to influence large 3PLs
- Easier to influence changes upstream through advocacy

- Majority of inbound domestic raw materials being shipped by trucks
- New hire in logistics motivated by potential for cost savings
Intermodal

- Easiest conversion
- Largest opportunity for cost savings
Taking Action (our approach in 5 steps)

1. **Generated annual purchasing forecast**

2. **Sent out RFPs to 3PL providers**

3. **3 rounds to eliminate non-competitive bids**

4. **Awarded suppliers for Q2 based on best pricing**

(For example) **Repeat every quarter with updated forecast**
Taking Action (the outcome)

- 57% Of loads by volume could be converted to intermodal
- 30% Of loads by volume were more cost efficient on intermodal
#3

Taking Action (the impact)

18% domestic inbound raw materials going by intermodal since May 2017

- 82 trucks taken off the road/year
- 150 Tons CO2e saved/year
- $90,000 projected cost savings
Taking Action (reflection)

# Benefits

• Didn’t have to change a lot about our process
• Substantial cost savings
• 5% reduction in transportation emissions annually
• Opportunity to share our efforts with other brands to create a ripple effect of action

# Challenges

• Increased lead time by 3-4 days
• Price and availability of refrigerated rail cars limits moving more to intermodal transit
• Some loads have less flexibility on lead times
Continually seeking ways to increase cost and environmental efficiency, such as:

- Analyzing ordering process to find ways to shorten lead times
- Finding ways to max out weight capacity on more loads
Benchmarking & Goals

Emissions Reductions
Benchmarking Freight Leadership
Declare a Goal

28% of companies are setting performance-based sustainability goals

Walmart
Double fleet efficiency by the end of 2015 (compared to 2005)

Unilever
Reduce CO2 emissions from logistics network to 2010 by 2020
Goals II

Cummins

Reduce CO2 per kilogram of goods moved by 10 percent by 2020

General Mills

Reduce fuel use for its outbound moves by 35% compared to its 2005 consumption.

Anheuser-Busch

Reduce greenhouse gases from its global logistics operations by 15% per hectoliter sold

HP

Reduce supply chain-related greenhouse gases by 20 percent by 2020
Benchmark: Invest in future

Companies investing in fuels/equipment or advocating for policy change

11%
If you are…

starting out

1. Designate a clear lead
2. Define objectives & scope
3. ID priority projects and launch pilots
If you are…

established and ready for more

1. Set public improvement goals
2. Scale successful projects
3. Benchmark performance
If you are…

already an industry leader

1. Meet and expand goals
2. Assign resources to support market development
3. Participate in industry collaborations
Public Policy

Freight Transportation
Making Trucks More Efficient
Truck Efficiency: A Bi-Partisan Goal

2007: Call for NHTSA to study and set heavy truck efficiency standards

2011 & 2016: NHTSA fuel efficiency rule & EPA greenhouse gas rules finalized
Rule Regulates Class 2b-8 trucks
Oil Savings from EPA 2021-2027

Source: Siddiq Khan, ACEEE, On EPA Proposal
http://aceee.org/blog/2016/02/fuel-efficient-heavy-trucks-are
12 Companies and BICEP Coalition Sign On to Ad for Strong 2025 Truck Fuel Economy Standards.
Delivering a Greener Fleet of Trucks

The Obama administration’s new proposal will reduce fuel use, cut pollution and spur transportation innovation.

By Indra K. Nooyi And Fred Krupp
June 19, 2015 7:17 p.m. ET

When you walk down the aisles of a supermarket, you probably don’t stop to consider how the array of products made it to the shelves. But as the heads of two organizations deeply involved in supply chain logistics—PepsiCo and the Environmental Defense Fund—we do think about the U.S. distribution system and the potential environmental impact of the delivery fleets that keep stores well-stocked. And we see an enormous opportunity on the horizon.
“….There are aspects of this agreement worth celebrating besides its positive effect on the planet. One is the trucking industry’s thumbs up — a rare departure from the legal blitzkrieg that has greeted most of the administration’s other efforts to reduce greenhouse gases. …”
EPA Court Filing May Signal Trump Review of Strict Heavy-Duty Truck Emissions Rules
Funding for the U.S. Environmental Protection Agency
EPA remains top target with Trump administration proposing 31 percent budget cut
Greening The Fuel Supply
California’s Low Carbon Fuel Standard is working

From 2011 through 2016, the LCFS has helped result in:

8,500,000,000 gallons of petroleum avoided ... and growing

- **CLEAN FUELS**: 57% increase in use
- **MARKET VALUE**: $1.6 billion invested in clean fuel production
- **HEALTH**: $2 billion in avoided public health impacts
- **CO₂ POLLUTION**: 26 million tons of carbon pollution avoided
Actions Your Company Can Take

1. If you buy trailers – tell your suppliers to drop their lawsuit.

2. Tell Congress to say no to proposed cuts to EPA budget.

3. Let California legislators know you want access to clean fuels.