POLICIES THAT REDUCE OUR DEPENDENCE ON OIL

Carol Lee Rawn
Ceres
November 2013
Ceres is an advocate for sustainability leadership, mobilizing investors and business to build a thriving, sustainable global economy.

**Company Network**
Around 75 members in more than 20 sectors

**Investor Network**
100+ members representing over $11 trillion AUM

**The Ceres Coalition**
Approximately 130 organizations including environmental experts, public interest groups, and investors.
GREENHOUSE GAS SOURCES

U.S. GHG Emissions by End Use Economic Sector, 2010

- Industry: 30%
- Agricultural: 8%
- Commercial: 17%
- Residential: 18%
- Transportation: 27%

U.S. Transportation Sector Emissions by Mode, 2010

- Light Duty Vehicles: 62%
- Med/Heavy Duty Trucks: 22%
- Aircraft: 8%
- Ships/Boats: 2%
- Other: 6%

HOW DO WE REDUCE CARBON FROM THE TRANSPORTATION SECTOR?

Address all three drivers of carbon emissions:

1. **Boost vehicle energy efficiency**
   - CAFE/GHG standards

2. **Reduce fuel carbon content**
   - CFS: Clean Fuels Standard
   - Petroleum based fuels supply 95% of transportation sector’s energy use

3. **Increase transportation efficiency**
   - Improved land use and increased transit/pedestrian/cycling support (VMT reduction)
   - Improving energy efficiency of Intermodal Transportation Network
Final Rule Issued in Aug 2012

- Average Fuel Econ for Cars and Light Duty Trucks:
  - 36.6 MPG by 2017
  - 54.5 MPG by 2025

- Expected to reduce US oil consumption by 12 billion barrels, prevent the release of 6 billion tons of GHGs and save consumers $1.7 trillion in fuel costs

- Strong industry support, including 13 auto manufacturers (representing 90% of US fleet), United Auto Workers and the state of California
CERES/CITI CAFE REPORT

Full report online: http://www.ceres.org/cafe_report_0311

✓ It is both **feasible and profitable** for U.S. automakers to meet the CAFE/GHG standards for 2017-2025.
✓ Strict standards will help U.S. auto industry be **globally competitive**.
✓ Key takeaways:
  - The standards will benefit the auto industry, especially the Detroit 3, in 2020.
  - The standards would be cost-effective for consumers starting at gas prices of $1.50 a gallon in 2020. It will not only reduce petroleum imports but also save consumers money.
SHIFT TO HIGH CARBON FUELS

- Rising Investment in Unconventional Fossil Sources, or “Dirty Fuels”
  - Oil sands, oil shale, coal to liquids

- Will Exacerbate Carbon Emissions Associated with Transportation Sector
Need Massive Shift Away From Petroleum in Cars and Trucks To Come Even Close to Meeting 2 degree C (450 ppm) Goal
CLEAN FUELS STANDARD (CFS)

A CFS requires fuel providers to gradually reduce the carbon intensity of their products over time by mixing low carbon fuels into their supply or by buying credits.

Why adopt a clean fuels standard?

- A CFS is necessary to adequately reduce emissions from the transportation sector
- A CFS will reduce petroleum dependency and expand the market for cleaner fuels; diversifying the fuel supply
- A CFS provides incentives for improvements in the production process, and disincentives for the use of high carbon fuels
INTRODUCTION

Lifecycle Analysis

Who is adopting or considering a CFS?

California adopted the nation’s first LCFS in 2009; took effect in 2010.

11 Northeastern and Mid-Atlantic states signed an initial Memorandum of Understanding supporting a regional CFS.

EU “Fuel Quality Directive” 6% reduction by 2020

BC adopted low carbon fuel measures in 2010

Washington’s Department of Ecology recommended adoption of an LCFS in 2011. Governor Jay Inslee has promised to make clean energy a top priority, and the DOE is authorized to begin the rulemaking process.

Oregon adopted a LCFS in 2012 and is currently in the reporting/data gathering phase. Supporters are seeking to remove a 2015 sunset provision.

California adopted the nation’s first LCFS in 2009; took effect in 2010.
Compliance with the LCFS can be achieved through modest changes and a diverse supply of transportation fuels; over compliance in early years is critical.

The alternative fuels market is evolving rapidly and in unforeseen ways, and the LCFS is driving investment in low carbon ethanol, biodiesel, renewable diesel, and biogas as well as improved production techniques.
INTRODUCTION

Credits and Deficits

![Graph showing the carbon intensity of different fuels over time]

- diesel
- gasoline
- biodiesel, soybeans
- ethanol, CA corn
- CNG
- LNG
- ethanol, sugarcane
- renewable diesel
- electricity
- ethanol, cellulosic
- biodiesel, FOGs
- biomethane
- biodiesel, corn oil
- hydrogen

Carbon intensity (g/MJ)
Overview of Scenario 1

SCENARIOS

Deficits - CARBOB + ULSD

Banked Credits

LCFS Credits (millions)


Off-Road Electrification
Biogas-HD
NG-HD
RD-tallow
BD Canola
BD-corn oil
BD-waste greas
BD-soy
Renewable Gasoline
Biogas - LD/MD
Natural Gas - LD/MD
Hydrogen
Electricity
Ethanol - Cellulosic
Ethanol - Sugarcane
Ethanol - Low CI Corn
Ethanol - CA
Ethanol - Conv Corn
Fuels that substitute for diesel (natural gas, biodiesel, biogas and renewable diesel) will play an important role in compliance; infrastructure investments...
Electricity, Light-duty

- PEV sales are good in California ... and there are good signs from OEMs (see below). About 35-40% of PEV sales nationwide are in California. Drivers: CVRP, HOV access, and more recently, price cuts / attractive leasing offers.

- Vehicle sales may be bolstered by decreasing battery prices. The global capacity of lithium-ion battery manufacturing is drastically over-supplied. For 2013, global production capacity is estimated to be nearly 4,000 MW; however, the demand for batteries is an order of magnitude less – around 400 MW.

- Short-term market boost for BEVs; shift to PHEVs in the mid-term.

---

**Powertrain technologies**

<table>
<thead>
<tr>
<th></th>
<th>OEMs</th>
<th>Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE downsizing</td>
<td>31%</td>
<td>24%</td>
</tr>
<tr>
<td>Plug-in hybrid</td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td>Hybrid fuel systems</td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td>Battery (range extender)</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>Pure battery</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Fuel cell</td>
<td>6%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Source: KPMG Global Auto Executive Survey 2013
Contact Information
Carol Lee Rawn
Director, Transportation Program
Ceres
rawn@ceres.org
(617) 247-0700 x112