Greenhouse Gas Offset Markets

A role for the Motor Coach Industry?

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What are GHG “offsets”?  
How can the Motor Coach Industry generate GHG offsets?  
What could these offsets be worth?  
What are the barriers to implementation?
GHG Offsets are created as part of a “Cap & Trade” system to reduce GHG Emissions from a particular industry/sector

- Electricity generation is most likely sector affected

Offsets are created by Companies/Projects not subject to the Cap & Trade system

Offsets can be used by Companies that are subject to Cap & Trade to meet their obligations under the system

Offsets can be bought and sold like other financial commodities

- Specific “markets” are set up to trade offsets
CO₂ Offsets and the Motor Coach Industry

Cap & Trade System

Hard Cap

Company A

Company B

CO₂ tons/yr

Cap & Trade

Company A

Company B

Allowance

Allowance

Off set

Off set

CO₂ Offsets and the Motor Coach Industry
Voluntary Markets

- Chicago Climate Exchange
  - Self imposed GHG reduction targets for members
  - 131 member companies, institutions
  - Members can comply with requirements using offsets

- Retail Offset Providers
  - Market to individuals and companies
  - Sell offsets that allow someone to become “carbon neutral”
Current U.S. GHG Markets

Mandatory Programs

- **The Climate Trust**
  - Created to assist in implementing a power plant GHG reduction rule in Oregon
  - Has invested $8.3 million in 17 offset projects
- **RGGI (Northeast)**
  - Cap & Trade program to reduce GHG from power plants from Maryland to Maine
  - Allows offsets in specific project categories
- **AB 32 (California)**
  - State law will require GHG reductions economy-wide beginning in 2012
  - Rules not written yet; will likely include Cap & Trade for some sectors
Current GHG Markets Focus

- **Very large projects**
  - Minimum 20,000 tons/year GHG reduction
- **Projects whose benefits are easily measured**
  - Detailed protocols to calculate reductions; third party monitoring
- **Projects specifically allowed as offsets under mandatory programs**
- **Have NOT yet captured any offsets from transportation programs/projects**
  - Reductions per project typically small
  - No protocols have been developed
  - Not specifically allowed by Climate Trust or RGGI
CO₂ Offsets and the Motor Coach Industry

Typical Current Offset Projects

- Landfill methane capture/destruction
- Methane capture/reduction from livestock manure management
- Carbon sequestration through re-forestation
- Energy efficiency improvements at large industrial facilities
Current GHG Offsets are selling for $5 – $10/ton in the U.S.

The higher the “quality” of offsets the higher the price.

Offset “quality” is related to the certainty of reductions from the offset project:
- Standardized measurement protocols
- Little uncertainty in assumptions used in calculations
- Third party monitoring of data used in calculations
GHG Offsets from Motor Coaches

- **Efficiency Improvements (hybrid-electric drive)**
  - Realistically might get 10% MPG increase; high implementation costs
  - Typical 25 bus fleet: ~250 ton/yr GHG reduction

- **Switch to Lower Carbon Fuels (CNG, B20)**
  - CNG will yield 5 – 15% GHG reduction; high implementation costs
  - B20 biodiesel will yield 0-16% GHG reduction
  - Typical 25 bus fleet: 0 - 400 ton/yr GHG reduction

- **Modal shift from Cars from new or expanded service**
  - Much greater potential than other options
Motor Coach GHG Offset Case Studies

- Analyzed data from four existing service corridors to evaluate the potential to generate GHG offsets from new services.
- Assumed that every “group” traveling by coach would have traveled by car if the bus had not been available.
  - An important assumption is the size of each group because it determines number of “avoided car trips”.
  - Assumed 2 per group for airport trips, 1.2 for commuter.
## CO2 Offsets and the Motor Coach Industry

### Case Study Analysis

#### Coach Case Study #1 - Madison & Milwaukee, WI to Mitchel Field Airport

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(Average number of people per group) ÷ 2 = 120,744

Annual Car Trips Avoided

Trip Length = 10,263,240 Annual Car Miles Avoided

+ 22.9 MPG (US fleet average)

= 448,176 Annual gallons gasoline avoided

× 8,482 g CO2 per gallon

= 4,190 Annual tons CO2 avoided

− 1,565 Annual tons CO2 from Coaches

= 2,625 NET ANNUAL TONS CO2 AVOIDED

× $5.00 per Annual Ton CO2

= $13,124 ANNUAL VALUE OF CO2 OFFSETS

### Notes

1. CO2 (tons) = 10,274 g CO2/diesel gallon × Fuel Used (gallons) ÷ 453.6 g/lb = 2000 lb/ton
2. Assume 52 weeks per year
## Case Study Results

<table>
<thead>
<tr>
<th>Service</th>
<th>Weekly One-way Trips</th>
<th>One-way Distance (miles)</th>
<th>Annual Passengers Carried</th>
<th>Annual CO2 Reductions (tons)</th>
<th>Annual GHG Offset Value</th>
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<tbody>
<tr>
<td>Airport Run (WI)</td>
<td>172</td>
<td>85</td>
<td>241,488</td>
<td>2,625</td>
<td>$13,124</td>
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<td>Commuter (NH-Boston)</td>
<td>85</td>
<td>45</td>
<td>157,250</td>
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<td>Airport Run (WI)</td>
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<td>229,320</td>
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<td>Airport Run (IL)</td>
<td>224</td>
<td>71</td>
<td>291,200</td>
<td>2,883</td>
<td>$14,413</td>
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Motor Coach Offset Issues

- To demonstrate that reductions from a project are “Real”, must show that riders would have taken their own car if bus not available
  - Competing modes? (commuter rail, shared ride van)
- Reductions must be “Additional” – can not generate/sell offsets from existing services, only new/expanded
- Reductions must be “Permanent” – will have to commit to keeping new service for 1 year minimum
- Reductions must be “Verifiable” – need to develop a standard protocol to measure reductions, and get it accepted by GHG market participants
New Motor Coach service could generate GHG offsets, but:

- Reductions from individual projects will likely be too small to attract much market interest (may need to bundle projects)
- GHG markets have not shown much interest in transportation projects – they will need to be educated
- Before one can do anything a measurement protocol must be developed and accepted by market participants.