Clean Energy Transportation: The Case for U.S. Jobs

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What does it take to compete?

- Nations
- Industries
- Firms

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What is a value chain?
Geography of a value chain
Example of LED Lighting

Emerging players

Global leaders

Product designers

Subcontract manufacturers
Manufacturing Climate Solutions
12 clean energy studies by CGGC

LED Lighting  Hog Waste Treatment  Hybrid Trucks
Efficient Windows Recycled Energy Residential Re-insulation
Anti-Idling for Trucks Heat Pump Water Heaters Wind Power
Solar Power Carbon Capture and Storage Public Transit Buses
How do you count green jobs?

- United Nations Environment Program
- World Wildlife Fund
- Renewable Energy Policy Project
- Center for American Progress
- Political Economy Research Institute
- Pew Charitable Trusts
- U.S. Conference of Mayors
- The Climate Group
### How are value chains different?

<table>
<thead>
<tr>
<th>Traditional reports</th>
<th>CGGC reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate industry #s</td>
<td>Firm-level analysis</td>
</tr>
<tr>
<td>Broad NAICS categories</td>
<td>Whole supply chain</td>
</tr>
<tr>
<td>Limited or no filtering</td>
<td>All firms filtered</td>
</tr>
</tbody>
</table>
What have we learned about clean energy transportation jobs?

1. Ripple effects
2. Demand
3. Synergies
1. Ripple effects

- 249 U.S. manufacturing locations in 35 states
- Highest concentrations:
  - NY: 32
  - IL: 23
  - PA: 26
  - CA: 22
  - OH: 13
Rail vehicles and components

**Capital side:**
*Jobs in manufacturing, construction, project management*

EDRG estimate:
24,000 jobs per $US billion of capital investment

**Operating side:**
*Jobs in operating public transit systems and maintaining vehicles and infrastructure*

EDRG estimate:
41,000 jobs per $US billion of operating investment

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**CGGC estimate:**

- 4,000 current jobs
  - Rail car and locomotive builders
  - Component parts manufacturers
  - Infrastructure equipment manufacturers
  - Infrastructure construction firms
  - Project management, finance and leasing firms

- 6,000-10,000 current jobs
  - Passenger and transit rail agencies
  - Rail operating firms
  - Maintenance and rebuild firms

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2. Demand

<table>
<thead>
<tr>
<th>Company</th>
<th>Size of TOTAL fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>FedEx Express</td>
<td>30,000</td>
</tr>
<tr>
<td>United Parcel Service</td>
<td>73,000</td>
</tr>
<tr>
<td>Coca Cola</td>
<td>22,000</td>
</tr>
<tr>
<td>Verizon</td>
<td>59,000</td>
</tr>
<tr>
<td>Pepsi</td>
<td>19,000</td>
</tr>
</tbody>
</table>

- 95 U.S. commercial and utility truck fleets have purchased or are testing hybrids.
3. Synergies

Hybrid trucks and transit buses

- Materials and techniques that will advance other clean energy:
  - Lightweight materials
  - Aerodynamics
  - Power electronics
  - Energy storage

Significance way beyond vehicles
What can federal policies do?

1. Support domestic manufacturing
2. Improve local content accountability
3. Increase investments
4. Put a price on carbon
1. Support U.S. manufacturing

Hybrid Trucks

- Continued support for R&D
- To get purchase volume up → production costs down:
  - tax credits for fleet purchases of trucks
  - non-tax purchase incentives such as rebates
Rail

**Propulsion systems**
- Truck
  - Suspension
  - Wheel set
  - Brake system
- Engine
- Fuel system
- Traction motors
- Electric generator

**Electronic systems**
- Auxiliary power units
- Electric collector
- Security system
- Driving control systems
- Communication system

**Body & Interior**
- Hatch covers
- Bathroom
- Door system
- Coupler
- Horn, bells
- Windows
- Lighting
- Body
- Seating
- HVAC

**Passenger & transit railcar OEMs**
- Railcar firms
- Locomotive firms

- Support for R&D and coordinated efforts to expand knowledge base
- Support for retooling (loan funds, conversion grants)
2. Improve local content accountability

• Improve accountability
• Heighten transparency
• Offer incentives to increase domestic content
3. Increase investments in public transportation

- Over $248 billion in new fixed guide-way projects
- At current rate of federal spending would take 77 years
4. Pass climate legislation (single most powerful tool)

Cleantech VC Investment in California

- Disclosed VC
- # Companies

Source: Cleantech Group (cleantech.com)
Thank you for your attention!

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