Hydrogen Fuel Cells and Electric Forklift Trucks

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Value Proposition and Fuel Cell Tax Credit

• Federal fuel cell tax credit increased in “Bailout Bill”
  – $3000/kW or 30% of unit price whichever is less
• Tax credits extended to 2016
• Has a significant impact on financial viability
Sample Financial Analysis

- Illustrate impact of key factors on value proposition
  - Tax credit
  - Labor rate
  - Battery change time
  - Productivity improvement
- Assume large distribution center with 125 trucks
  - 6 Class 1 counterbalance trucks
  - 4 Class 2 order picker trucks
  - 25 Class 2 reach trucks
  - 90 Class 3 pallet trucks
- 24/7 operation
  - Most trucks run 2 shifts
Key Assumptions

• **Average battery change time** = 10 minutes
  – Includes occasional queue
• Range of **hydrogen fill time** = 2 – 4 minutes
  – If hydrogen fill rate = 0.4 kg/min

• **Battery life** = 1500 discharge cycles ~ = 5 years
• **Fuel cell stack life** = 7500 hours ~ = 2 – 7 years

• **Electricity cost** = $0.10/kWh
• **Hydrogen cost** = $6/kg

• **Productivity improvement** = 2%
# Results – Single Variable Analysis

<table>
<thead>
<tr>
<th>Case</th>
<th>Range</th>
<th>NPV</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakeven</td>
<td>-</td>
<td>$0.0M *</td>
<td>0%</td>
</tr>
<tr>
<td>Labor rate</td>
<td>$25 - $35/hr</td>
<td>$1.2M increase</td>
<td>100%</td>
</tr>
<tr>
<td>Battery change time</td>
<td>10 – 15 min</td>
<td>$0.9M increase</td>
<td>70%</td>
</tr>
<tr>
<td>Tax credit</td>
<td>0 – 30%</td>
<td>$1.0M increase</td>
<td>80%</td>
</tr>
<tr>
<td>Productivity</td>
<td>2 – 4%</td>
<td>$1.1M increase</td>
<td>90%</td>
</tr>
</tbody>
</table>

* Initial incremental investment = $1.3M