NETPLAN Passenger Network Modeling and Simulation

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Case Studies

• **Case 1**: No investment in HSR (Unlimited highway and air infrastructure)
  • Cost = $15.6 T

• **Case 2**: Investment also in HSR fleet and infrastructure (Highway and Air infrastructure limited)
  • Cost = $12.1 T

• **Case 3**: Case 2 with *Value of Travel Time (VoTT)*
  • Cost = $17.9 T (includes *VoTT*)
Investments & Passenger Capacity

<table>
<thead>
<tr>
<th>Mode</th>
<th>Case 1 --&gt; 2 (% change)</th>
<th>Case 2 --&gt; 3 (% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline Cars</td>
<td>-16.02</td>
<td>-2.13</td>
</tr>
<tr>
<td>Hybrid Cars</td>
<td>-22.62</td>
<td>6.21</td>
</tr>
<tr>
<td>Airplanes</td>
<td>-67.51</td>
<td>-10.05</td>
</tr>
<tr>
<td>HSR</td>
<td>2296.85</td>
<td>12.02</td>
</tr>
</tbody>
</table>
Energy Consumption

<table>
<thead>
<tr>
<th>Total Energy Consumed</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline (M gallon)</td>
<td>36406.77209</td>
<td>49971.23802</td>
<td>28153.81556</td>
</tr>
<tr>
<td>Jet Fuel (M Gallon)</td>
<td>118106.8746</td>
<td>43980.37012</td>
<td>42269.63462</td>
</tr>
<tr>
<td>Electricity (GWh)</td>
<td>194232284.7</td>
<td>199115964.8</td>
<td>199784131.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Case 1 --&gt; 2 (% change)</th>
<th>Case 2 --&gt; 3 (% change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline (M gallon)</td>
<td>37.26</td>
<td>-43.66</td>
</tr>
<tr>
<td>Jet Fuel (M Gallon)</td>
<td>-62.76</td>
<td>-3.89</td>
</tr>
<tr>
<td>Electricity (GWh)</td>
<td>2.51</td>
<td>0.34</td>
</tr>
</tbody>
</table>
CO2 Emission – Passenger Transportation

![Graph showing CO2 emission in passenger transportation over years for different cases.]

- **Case 1**
- **Case 2**
- **Case 3**
Data Assumptions & Improvements

1. Infrastructure Capacity limit
   • Highway- No investments
     – 1.31 times existing fleet availability of passengers cars and trucks (in PCE)

   • Air - No investments
     – 1.2 times existing fleet availability

   • HSR track capacity - Investments
     – 15 trains/hour as per EuroStar (London – Brussels)
     – Currently same capacity for all arcs irrespective of lengths
     – Lifespan – 60 years

2. Infrastructure O&M cost
Data Assumptions & Improvements

3. Yearly maximum investment limit?

4. Time Value per mile?
Code Improvement

• Energy consumption imposed by transportation only accounted for one region, leaves out the second region mentioned in the data file
• Also doesn’t account the bi-directional transportation flow

• Goals
  – Try to complete first draft of the paper by 1st week of August 2012
  – Submit paper by the end of August 2012
THANK YOU