Responsible Aviation and Peak Oil

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What means Responsible Aviation?

- Is RA an oxymoron?
- Who is responsible to whom?
- The white elephant in the room...
The Price of Fuel

U.S. Gulf Coast Kerosene-Type Jet Fuel Spot Price, based on data by the Energy Information Administration
Proportion of operating costs

Fuel is the airlines’ highest single cost item, some 30 to 40% of total costs in 2008.
How much Oil is there?

Oil Discoveries (proved + probable)

Crude oil + NGL / Condensate

Largest oil field (Saudi Arabia)

2nd largest oil field (Kuwait)

1st oil crisis (1973)

2nd oil crisis (1979)

Production

Legend
- Onshore
- Deep water

[Gb per year]

Peaking of global production?

Source: UK Energy Research Centre, 2009

Area under curve = global URR

Increasing global URR by 1 billion barrels delays peak by <5 days

- Global Production
- $\text{URR} = 2000 \text{Gb}$
- $\text{URR} = 2500 \text{Gb}$
- $\text{URR} = 3000 \text{Gb}$
- $\text{URR} = 3500 \text{Gb}$
- $\text{URR} = 4000 \text{Gb}$
- $\text{URR} = 4500 \text{Gb}$
How much are we producing

Global Crude Oil Production in mbpd 2002-2010

chart: www.gregor.us  |  data: eia washington
Comparison with “cost of carbon”

- About 0.42 tonnes CO$_2$/barrel
- Say $20 per tonne of carbon on market => US$ 8.4 per barrel when burned
- Increase between Nov 2010 and April 2011: $39.6 per barrel
- Equivalent to a carbon price of $94 per tonne.
- $100 per tonne of CO2 is considered a high price.
Tourists’ price sensitivity

- Schiff & Becken (2010): airfares for New Zealand
- Mayor & Tol (2007): UK aviation tax
- Pentelow & Scott (2011): aviation policy, Caribbean
- Goessling et al. (2008): developing countries

⇒ Only very high costs of carbon would result in significant impacts on tourist arrivals.
⇒ However, not specifically tested for very high fuel prices.
Macro-economic environment

Global oil price

Global level
- Oil exporting countries
- Oil importing countries

Destination choice
- Macroeconomic effects
- Tourist decision making
- The role of income and price

In-country level
- Tourist behaviour
- Industry response
- Policy response
NZCGE Model – whole-of-economy

- Effects on overall economy relatively small
- Tourism effects substantial
- Differences in market segments (e.g. UK decreases substantially)

<table>
<thead>
<tr>
<th>100% increase in oil price</th>
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<tbody>
<tr>
<td>Real GDP</td>
</tr>
<tr>
<td>Labour force</td>
</tr>
<tr>
<td>Real wage</td>
</tr>
<tr>
<td>Total imports (value)</td>
</tr>
<tr>
<td>Total exports (value)</td>
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<tr>
<td>Tourism exports (value)</td>
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<tr>
<td>Overall tourism consumption (quantity)</td>
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<tr>
<td>Accommodation (quantity)</td>
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<tr>
<td>Rental vehicles (quantity)</td>
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<td>Domestic air transport (quantity)</td>
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## Biofuel

<table>
<thead>
<tr>
<th>Airline</th>
<th>Aircraft</th>
<th>Partners</th>
<th>Date</th>
<th>Biofuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virgin Atlantic</td>
<td>B7474-400</td>
<td>Boeing, GE Aviation</td>
<td>23 Feb 08</td>
<td>Coconut and Babassu (20% blend)</td>
</tr>
<tr>
<td>Air New Zealand</td>
<td>B7474-400</td>
<td>Boeing, Rolls Royce</td>
<td>30 Dec 08</td>
<td>Jatropha (50% blend)</td>
</tr>
<tr>
<td>Continental Airlines</td>
<td>B7474-800</td>
<td>GE aviation, CFM, Honeywell UOP</td>
<td>7 Jan 09</td>
<td>Algae with Jatropha (50% blend)</td>
</tr>
<tr>
<td>JAL</td>
<td>B7474-300</td>
<td>Pratt &amp; Whitney, Honeywell UOP</td>
<td>30 Jan 09</td>
<td>Camelina, Jatropha and Algae blend (50%)</td>
</tr>
</tbody>
</table>

Peeters (2010) estimated that if the biofuel came from Jatropha, an area the size of Germany, France, the Netherlands and Belgium combined would be required to fuel current air transport (i.e. all jet fuel in 2005).
Conclusions

• Responsible Tourism is a multi-layered concept;

• Climate Change is an important issue and is putting pressure on the aviation sector;

• Energy security is an overlooked issue;

• Fuel prices are likely to increase in the future – higher and faster than carbon taxes;

• This could influence business decisions.