M6toll

ASECAP Study Days

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Estimating a carbon footprint for the M6 Toll

Tom Fanning – Macquarie Motorway Group

(Member of ASECAP Steering Committee)

Geoff Pugh – Staffordshire University Business School

Midland Expressway Limited

Operating the M6 Toll

Economic and environmental effects of the M6 Toll

- M6 Toll
  - UK's 1st toll motorway (c.43 kilometers)
  - One of the UK's two major examples of the demand management of traffic

- Evaluation of "external" effects
  - Supported by Midland Expressway and regional partners

① Sub-regional economic impact of a new toll motorway
  - 1st stage completed

② Carbon footprint and offset
  - Underway

The effects of new toll road tolls on economic development

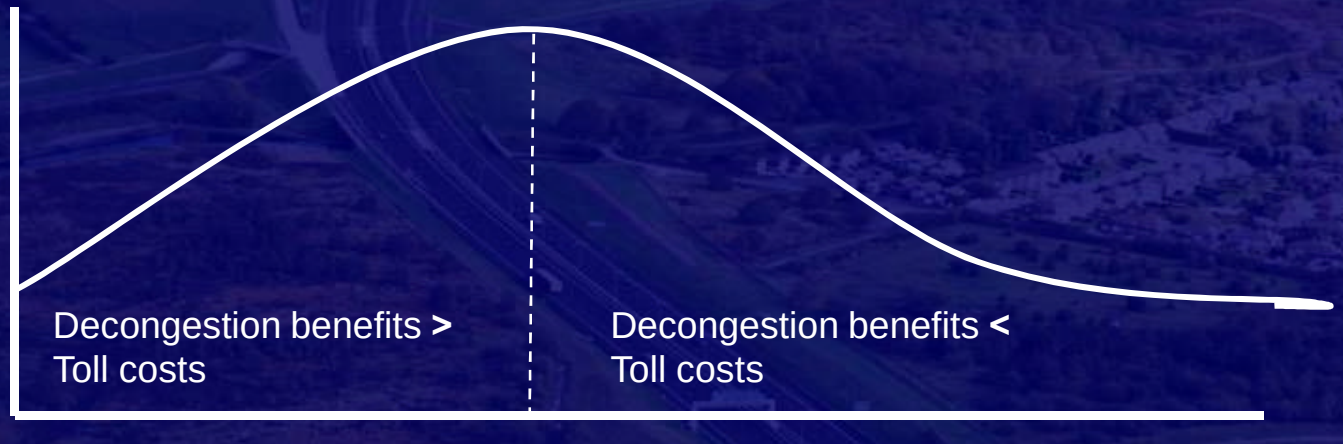
- **Consultancy Report**
  - Later published in *Regional Studies*
- **Conclusions**
  - Big impact on industrial land development in the M6 Toll "corridor"
    - 250 new jobs created
    - NPV of additional output ≈ £100m
      - ≤ 10% of the NPV of the M6 Toll
- **Can we separate the effects of tolling from the effects of infrastructural development?**
  - Common view:
    - Response to our preliminary quantitative findings

"… this study does not address … the effect of tolling the road. Removing the tolls would give a big boost to the economy …"

John McGoldrick, coordinator of the National Alliance Against Tolls (BBC News)

Our response: not necessarily!

Development effect



Economic development effect of tolls

- **Direct**:
- Toll ⇒ less traffic ⇒ negative development effect
- **Indirect**:
- Toll ⇒ decongestion ⇒ positive effect on business use
  ⇒ positive development effect

Which dominates?

- UK roads congested!

  ⇒ Toll roads likely to promote economic development more than un-tolled roads

Carbon footprint: Aims

- Produce carbon footprint for M6 Toll
- Produce carbon footprint for M6
- Produce a set of policy options to address carbon footprint issue

Carbon Footprint: definition

"The carbon footprint is a measure of the exclusive total amount of carbon dioxide emissions that is directly and indirectly caused by an activity or is accumulated over the life stages of a product."

Weidman and Minx (2007)

Carbon footprinting applied to roads

1. Construction

- Main carriageway
- Slip roads
- Bridges
  - 57 new bridges constructed
  - Some existing bridges modified
- 6 Toll stations
- Lighting
- Headquarters and associated buildings

2. Operation

- Toll stations
- Lighting
- Fleet vehicle operation
- Pumping station
- Long-term maintenance
  - Related to traffic volume
- Landscape maintenance
- HQ

3. Traffic

❶ Construction (indicative)

- Previous study (Stripple, 2001)
  - Tonnes of C02 per kilometer constructed
    - Maximum: 2,750
    - Minimum: 2,000
- Applied to M6 Toll (entire length)
  - Maximum: 120,000 tonnes
  - Minimum: 86,000 tonnes

❷ Operation: other than traffic (incomplete)

	Kilowatt hours (kwh) per year	Tonnes of (CO^2) per year
Facilties •Toll stations •MMAs •Pumping Station •ESB	1,351,299	712 *
Lighting	2,179,295	1,148 *
Vehicle fleet	N.A.	178
Total		**2,038**

* Calculated from:
DEFRA's Guidelines for GHG conversion factors for company reporting June 2007

❸ Traffic

- Total 142,096 to 150,264 tonnes per year
  - Motorbikes + Cars + Cars and Trailers
  - HGVs etc. to be determined
- Cars dominate
  - c.16m car journeys in July 2006-June 2007
  - Defra (2007) conversion factors

Class	Total for entire M6 Toll (tonnes of $C0_2$ per year)
• Motorbikes	168 to 230
• Cars	141,000 to 149,000
• Cars and Trailers	928 to1,034
• Vans and coaches	3,154 *
• HGVs	3,000 *

Interim Conclusion: total carbon footprint

- Lifetime totals (tonnes of CO2)
  - Construction (maximum over 50 years): 120,000
  - Operation (minimum over 50 years): 100,000
- Traffic
  - One year: 150,000
  - Traffic dominates
    - But lifetime total $\neq 150{,}000 \times 50$

Some good news!

- EU plans for reducing vehicle emissions
  - Falling per vehicle emissions may more than offset rising vehicle numbers
    - Engine technology
    - Fuel technology
  - CO2 emissions associated with the M6 Toll should peak and then fall

Comparing M6 with M6 Toll

- Some differences
  - More HGVs
  - Longer rush hours
  - More accidents leading to more slow downs
  - Higher maintenance because
    - Higher overall traffic
    - On viaduct in part
    - More accidents

Policy

- On-site issues e.g.
  - Planting of trees
  - Potential for combined heat and power scheme
- Off site
  - Behavioural change through driver education
    - e.g., www.ecodrive.org
- Offsite – offset options
  - Purchase of carbon credits
  - Clean Development Mechanism projects?

Indicative: tree planting

Estimate potential carbon offset in a stand of Oak

Year	Trees per hectare	Tonnes of CO2 offset per per tree	Tonnes of CO2 offset per hectare
0	4,200	0	0
25	4,200	0	7.34
50	1,006	0.08	78.96
75	428	0.49	206.8
100	244	1.54	372.24

Tree planting

- Planted area of M6 Toll
  - 225 hectares
  - 1 million plants/trees

- Using previous slides figures
  - 80 × 225 = 17,776 tonnes offset over 50 years
  - 372 × 225 = 83,754 tonnes over 100 years

This is an overestimate but suggests that a large proportion of the CO2 due to construction has been offset by M6 Toll planting

UK Today

- New Standard – “KITE”
  Tree planting not accepted

- Carbon Trust – Identify 3 steps:-

  Stage 1 - Direct Emissions Reduction

  By reducing directly controlled emissions through energy efficiency, long life bulbs, low carbon energy supply.

  Stage 2 - Indirect Emissions Reduction

  By reducing emissions and costs across the supply chain.

  Stage 3 – Offsetting

  Verify a number of products via that exceed expectations in the level of reductions obtained.

Tolling Policies

- London Concession - Charge penalties for vehicles over 2.0L
- Reconsider charging techniques within the classes

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THANK YOU

Institute for Environment Sustainability and Regeneration

Prof. Geoff Pugh

Staffordshire University Business School

geoff@plainfigures.com

www.staffs.ac.uk/iesr

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