Kyoto – How does it Affect a Forest Owner or Investor?

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Kyoto 101

- NZ (along with 22 of 24 OECD countries) have entered a legally binding international treaty to hold Greenhouse Gas emissions to ± 95% of 1990 levels, in the period 2008-2012...and NZ won’t make its target.
- Forestry is not a contributor to climate change, except to the extent that it uses diesel fuel.
- Policy settings that discourage forestry and shield fossil fuel use will not transition the NZ economy to lower emissions.
### Global Emissions in 2000

<table>
<thead>
<tr>
<th>Countries (Annex 2 in Italics)</th>
<th>MtCO2-equivalent</th>
<th>% of world</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>6933</td>
<td>20.6%</td>
</tr>
<tr>
<td>China</td>
<td>4941</td>
<td>14.7%</td>
</tr>
<tr>
<td>European Union (25)</td>
<td>4728</td>
<td>14.0%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1917</td>
<td>5.7%</td>
</tr>
<tr>
<td>India</td>
<td>1885</td>
<td>5.6%</td>
</tr>
<tr>
<td>Japan</td>
<td>1318</td>
<td>3.9%</td>
</tr>
<tr>
<td>Germany</td>
<td>1010</td>
<td>3.0%</td>
</tr>
<tr>
<td>Brazil</td>
<td>852</td>
<td>2.5%</td>
</tr>
<tr>
<td>Canada</td>
<td>681</td>
<td>2.0%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>654</td>
<td>1.9%</td>
</tr>
<tr>
<td>Italy</td>
<td>531</td>
<td>1.6%</td>
</tr>
<tr>
<td>Korea (South)</td>
<td>521</td>
<td>1.5%</td>
</tr>
<tr>
<td>France</td>
<td>514</td>
<td>1.5%</td>
</tr>
<tr>
<td>Mexico</td>
<td>512</td>
<td>1.5%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>503</td>
<td>1.5%</td>
</tr>
<tr>
<td>Australia</td>
<td>491</td>
<td>1.5%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>73</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

### New Zealand greenhouse gas emissions in 2003 - by sector (% of MtCO₂-e)

- **Energy – other processes (~16.3% CO₂)**
- **Transport (~18.6% CO₂)**
- **Electricity (~8.0% CO₂)**
- **Industrials Processes (5.3% CO₂)**
- **Waste (2.3% CO₂)**
- **Agriculture (49.4% methane and nitrous oxide)**
- **Solvents (0.1%)**
  - fertiliser ~3%
  - urine ~15%
  - methane ~31%
NZ’s Climate Change Policy
MfE’s acknowledgement (24/2/06)

NZ can’t make its 1990 commitment (BAU + policies)
- NZ entered into the Kyoto process in belief of a huge surplus of carbon credits – now there is a huge deficit on the nation’s books, 2005 estimate ≈ $562million ₳
- Govt. proposed a Fart Tax to fund ag. research – Feds lobbied
- Govt. proposed a Carbon Tax – No Coalition support
- MfE had an NGA program – now no more to be started
- MAF proposed a Permanent Forest Sinks program – now acknowledge no real up take – foresters argue its flawed.
- MfE had an Emissions Reduction Projects (grant) program – Treasury questioned it - now canned. NZ doesn’t have the surplus credits to give away (our carbon bank is bankrupt)!
- Where is the accountability?

Major Sources of Greenhouse Gas
– NZ emissions 2003

<table>
<thead>
<tr>
<th>Greenhouse gas</th>
<th>total excl. LULUCF</th>
<th>New Zealand sources</th>
</tr>
</thead>
</table>
| Carbon dioxide (CO₂)   | 34.7 Mt CO₂        | Fossil fuel combustion (90%)
|                        |                    | Industrial processes (10%)                   |
| Methane (CH₄)          | 26.6 Mt CO₂e       | Animals (91%), Waste (6%)                    |
| Nitrous oxide (N₂O)    | 13.5 Mt CO₂e       | Agricultural soils (97%)                     |
| Fluorinated gases      | 0.5 Mt CO₂e        | HFCs as ODS replacements
|                        |                    | PFCs from Al smelting
|                        |                    | SF₆ from switchgear                           |
Atmospheric CO₂ Concentration

Mauna Loa Carbon Dioxide Measurements

Climate projections for 2100, If CO₂ capped at 450 ppm
Kyoto & Forestry - the Harvested Wood Products (HWP) Framework

- Default Assumption: “Instant Oxidisation”
  - All Carbon in trees is immediately lost back into the atmosphere at time of harvest.

- Thus emissions liability rests with the forest grower
  - Current NZ Govt policy framework removes emissions liability for post-1989 forests (and also the credits).

- C.f. NZ’s Coal exports – emissions liability pass on to the consumer.

- C.f. Oil Imports – NZ accepts emissions liability for all imported oil.

New Plantings & Replanting-NZ
(Afforestation / Re-forestation / Deforestation UN LULUCF)

Graph 1: Estimated Areas of New Planting and Replanting

↑ 1990 is Kyoto “baseline” year
Implications for NZ’s GHG Net Position under Kyoto

Had NZ maintained a planting rate of mid 1990s, Kyoto would have delivered a “big cheque” in CP1.

Australia’s GHG Net Position - Regardless of Kyoto!
Age Class Issues
Kyoto rules - 1990 distortionary

Mostly Kyoto Forests

NZ Forestry Investment Climate

- Clear expectation NZ’s sink credits would be devolved (or a significant portion thereof)
- Deforestation cap/tax (self-fulfilling prophecy?)
  - Rush to convert to pasture before 2008
- Fall off in new plantings in NZ
  - Contrasts with optimism in Australia
  - NZ tree nursery industry losing capacity
- Uncertainty beyond CP1
  - New Douglas-fir forests will endure for a minimum of 8 Commitment Periods
- Biofuels & Energy
  - opportunity or threat?
Q: Carbon Sequestration or Biofuel feedstocks?
Investors need clear signals & unwavering Government policy

- Do we stay with the Pinus radiata 28 year rotation model?
- For Biofuels, may be better to go short (4 to 7 year) rotation Eucalypt, hybrid Poplar or Willow (coppice, but more disturbance – lower biodiversity, more chemical intensive, harder to eco-certify)
- To maximise Carbon Sequestration, esp. on East Coast of South Island:
  - Q: better go to Douglas-fir on 60 to 100 year rotations?

Vision - Biofuels

- Future forests seen as a feedstock to reduce NZ’s dependence on imported oil “oil reservoirs protecting our erodible hills”—
  - Local biomass to liquid (BTL) fuel production is incentivised
  - NZ Log truck & harvest fleet is self sufficient on biofuels
- Small sawmills incentivised to install pellet mills to feed domestic wood burners (with wetback water heaters), or co-firing ‘hogged’ wood chips with coal in schools & hospitals.
- Mid-sized sawmills allocated risk capital to develop Combined Heat and Power plants (JVs) to provide distributed generation, with heat used onsite for timber drying kilns
  - 1 to 10 MegaW Gasification or Steam Hydrolysis / Pyrolysis plants increase the efficiency over conventional steam boiler co-generation, while reducing discharges to air, thus reducing RMA hurdles.
- Large pulp & sawmills (10 to 100 MegaW) profitability assured?
Forest Growers proposal to Govt

Full devolvement of Credits and Liabilities for post 1989 forests…. or

Annual Environmental Services payment ($/ha) = sum of
- {[Part of value of Carbon sequestered ($/tonne CO₂e/ha)] +
- [Nitrate offset ($/Kg N / ha avoided)] +
- [Clean water delivered ($ / m³/s)] +
- [Biodiversity gain ($/kiwi, frogs, falcons, etc /km²)] +
- [Other Conservation gain ($/yr )] +
- [Soil conserved or retained ($/tonne/km²/yr)] +
- [Public recreation opportunities availed ($/person day)], etc.}

Modelled on English & Scottish policy

Harvested Wood Products (HWP) Default Assumption

- Instant Oxidisation “C oxidised in Year of Removal”

- Emissions liability rests with the forest grower
  - Current policy framework removes emissions liability for post-1989 forests (and also retains the sink credits).

- NZ Proposes a variant - the Simple Decay Model
  - Postpones liability at National level
  - Posed as a “stepping stone” to take International community towards Atmospheric Flows Approach
  - Probably no advantage to growers as 1990’s planting boom and subsequent gap means NZ goes hugely into deficit in & after CP3 (2017-2021)
Harvested Wood Products (HWP) Options

Alternatives to “Oxidised in Year of Removal” (IPCC 1997):

- **Stock Change Approach**
  - Accounts for Net Changes in carbon stocks in Forests and Wood products pool within a country
  - Stock change = stock change (Forests + Consumed products)

- **Production Approach**
  - Accounts for Net changes in carbon stocks in Forests and Wood when but not where they occur
  - Stock change = stock change (Forests + Consumed products made from a specific county’s harvest)
  - Wood exports are an emission vs. Importing & storing wood

- **Atmospheric Flows Approach**

http://unfccc.int/meetings/workshops/other_meetings/items/2940.php

NZ Forest Grower’s preferred Harvested Wood Products (HWP) Option?

- Atmospheric Flows approach
  - Shared emissions liability: saw log & pulp log liability passed on to consumer (mill) or exported,
  - Forest Grower liable for residues (Soil Carbon, Slash, Litter etc).

- Closer to NZ’s Coal exports – emissions liability pass on to the consumer.