Linking Sinks to Domestic Action

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What is this?

- Linking sinks to biofuel using projects is proposed by the Ecologic Foundation of New Zealand as a possible means to side-step a second impasse that may arise at COP6b.

•This presentation

- The object of this presentation is to generate a shared knowledge base regarding the Ecologic proposal so that Parties can know what is involved if they choose this option

Route map

1 What is the proposal?

2 Why a ***biofuel*** link?

3 Sinks in the CDM

4 The negotiating balance

5 How would it work?

The Ecologic proposal (1)

- Each 100 tonnes of CO2-equivalent credit, from both Art. 3.3 and Art. 3.4 related projects, should be linked to a proportionate biofuel-using project contemporary with credit measurement.

- This 'biofuels obligation' would be a few tonnes initially but increase as incremental costs of using biofuel decrease.

The Ecologic proposal (2)

- All Art. 3.4 activities should be measured and monitored.
- Credit against Annex 1 Party commitments in 2008-12 should be up to a comprehensive positive list of discounts with the excess of credits, above the discounted amounts, usable after 2012

Why a biofuel link? ---1

- A real contribution to domestic action might come from linking sinks to ***any*** renewable energy technology. The ***specific link with biofuel*** is because biofuel intrinsically involves land use change, i.e. sinks, and because a particular problem of market co-ordination arises with biofuel.

Why a biofuel link? --- 2

- Biofuel raw material cannot be used unless it is grown previously: neither will it be grown unless landowners can foresee a market. There is no obvious market mechanism to co-ordinate the decisions of landowners and energy sector investors, two very different types of risk-averse decision taker, maybe in different countries.

Why a biofuel link? --- 3

- Also, dispersed collectors of CO2 – sinks – are needed to collect dispersed emissions from transportation. Biofuel closes the cycle, yielding a sustainable system (with increased vehicle efficiency hopefully matching increased vehicle ownership worldwide).

Why a biofuel link? --- 4

- So low emissions scenarios – sponsored by industry, NGO's, governments, international organizations, etc – show a large and increasing role for modern biofuel in the new century, for which there is urgent need to begin growing raw material.

Why a biofuel link? --- 5

WHAT NEEDS TO BE DONE?

The 2040 data left out of the SPM are consistent with scenarios cited in the Fact Sheet that yield the following broad pattern for the 21st century

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Date	**2020**	[20 yr. change]	2040	[20 yr. change]	2060	[20 yr. change]	2080	[20 yr. change]	2100	
Biofuel plantation area (Mha)	**175**	[105]	280	[150]	430	[40]	470	[30]	500	
Productivity (GJ/ha-yr)	**200**	[120]	320	[90]	410	[60]	470	[30]	500	(rapid initial tech progress)
Plantation Bio-energy (EJ)	**35**	[55]	90	[85]	175	[45]	220	[30]	250	(broad scenario trend)
(available from wastes)	25		30		40		50		60	(makes up scenario biofuel totals)
Project starts (thousands)	**18**	[69]	28	[105]	43	[135]	47	[147]	50	(changes include project renewals after 10 years)
Occupied land (Gha)	**.88**	[.52]	1.40	[.75]	2.15	[.20]	2.35	[.15]	2.50	(of which 60% is non-tree cover in agro-forestry areas)
Wilderness(Gha)	**5.3**		4.8		4.1		3.9		3.7	(includes traditional grazing)

NB year 2020 data shown **bold** are a **20** year change starting ~2002: clearly these are unattainable starting 2012

Why a biofuel link? --- 6

HOW WELL ARE WE DOING?

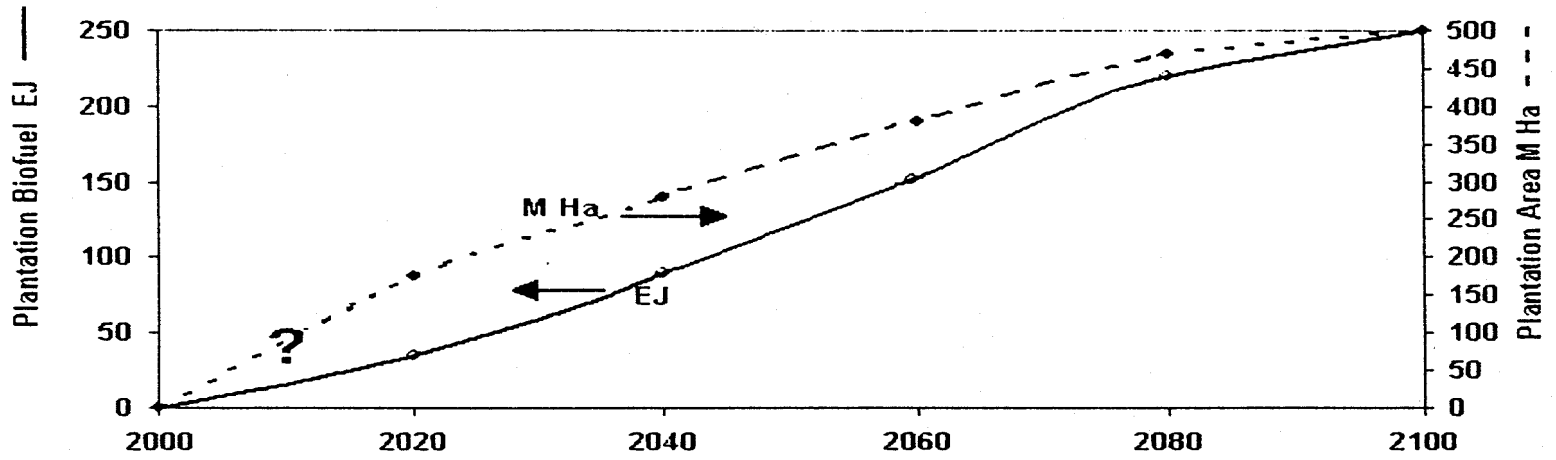

Figure 1: Plantation based modern biofuel output in the 21st century, and related land use change.
various scenarios for plantation based modern biofuel, assuming rising productivity and surrounding agro-forestry

Not very well !

Why a biofuel link? --- 7

- And the feature of sinks that makes them objectionable to those who ‘want policy to hurt’ – that they are a low cost way to get greenhouse levels down – is a precautionary bonus if a low threshold for catastrophic climate change is revealed.

Why a biofuel link? --- 8

- Large scale carbon storage in new forest sinks both enables an urgent response to start from a lower level of carbon in abvtmosphere, and provides a ‘buffer stock’ of potential biofuel that can quickly displace fossil fuel in the existing energy supply system, with the cleared land then available for intensive biofuel production.

Why a biofuel link? --- 9

DATA LEFT OUT OF THE SPM

Technical note on Fact Sheet 4.21 of IPCC Special Report on Land Use Change

The row of data for biofuel that follows (for year 2040) was not included in SPM tables 3 and 4. It is in Fact Sheet 4.21 and assumes that land use change projects are designed to meet community based environmental and socio-economic criteria:

Area	Per cent used[a]	Average C-capture[b]	Range C-capture[c]	Annual Capture[d]
6.2 Gha	10	7 tC $ha^{-1}yr^{-1}$	<2.5-20 tC $ha^{-1}yr^{-1}$	4.4 Gt C yr^{-1}

Notes

[a] For tree cover out of total non-barren non-permanent forest land, including savannas, scrubland, pasture, cropland, degraded forest and forest under threat from predicted climate change: 5% to intensive community scaled biofuel and 5% to tree cover within a larger area of surrounding agro-forestry. Community-scaled projects comprising a core 10E4 Ha intensive biofuel plantation supplying small scale power generation and biofuel-to-liquids plant with 4*10E4 Ha of surrounding agroforestry, 1 part tree cover to 3 parts cultivation, affecting a total 25% of feasible land. This leaves 75% of the area to wilderness and (to the extent they are sustainable under climate change and population pressure) traditional land uses. By 2100, the land occupied under this pattern of biofuel production and agro-forestry will have risen to 40 percent (under the projections in the table below, consistent with the scenarios cited in Section 4.5 of the SR-LULUCF). By that time population is forecast to stabilize (given prospects of increasing female empowerment) and biofuel technology is predicted to be entering a phase of diminishing relative importance, with increasing dominance of solar energy.

[b] Global average after several decades of technological progress and management experience. The conservative average figure reflects multi-purpose use for the 5% of agro-forestry.

[c] Low figure is current for conventional forestry, high figure is current small plot biofuel experience under good growing conditions

[d] Subject to carbon content of displaced fossil fuel, dependant of fuel mix in power generation and refinery balances in alternative fossil fuel supply system. 4.4 Gt C yr^{-1} = 2.5 flow effects of biofuel [with 1:1 displacement] + 0.9 above ground stock change [with 5 yr and 10 year rotations respectively for biofuel and agro-forestry] + 1.0 below ground stock change.

Does it matter? These data show that the flow effect of biofuel is, within four decades greater than all stock effects in carbon sinks

Why a biofuel link? --- 10

WHAT IS THE POTENTIAL OF BIOMASS?

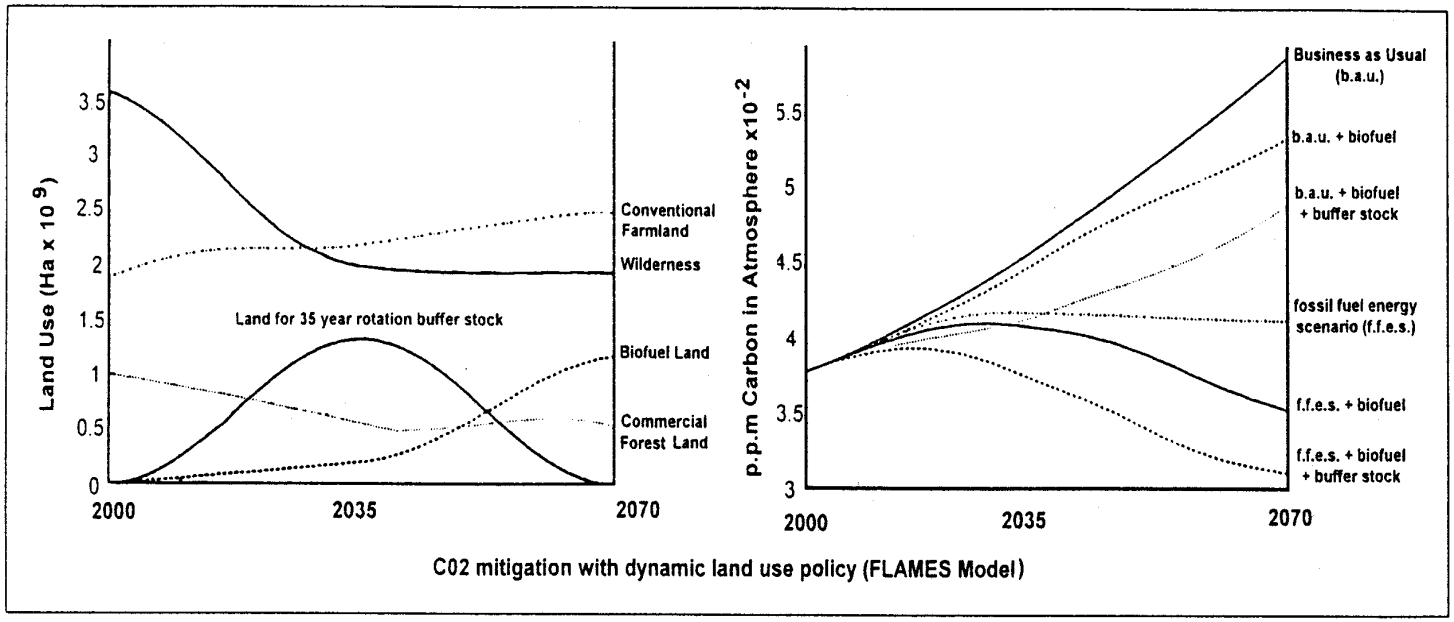

Figure 2: CO_2 mitigation with dynamic land-use policy (FLAMES model).
Impact on GHG levels over 70 years comparing two reference scenarios [business as usual (BAU) and fossil-free energy scenario (FFES)] with two land-use scenarios (enhanced biofuel and enhanced biofuel plus "buffer stock") (Read, 1999) [reproduced from Figure 4-15. SRLUCF].

Combining the flow effect of biofuel production with the first rotation stock effect of creating the biofuel plantation enables carbon <u>LEVEL</u> reductions towards pre-industrial given efficiency improvements and solar wind etc.

Sinks in the CDM --- 1

- Suitable land for growing biofuel raw material is mostly in developing countries, where risks and interest rates are high, deterring investment. So the exclusion of sinks from the CDM (under which carbon credit cash flows can sustain low income land-owners through the initial rotation, when there is no saleable product) is crucially damaging to the timely growth of a modern biofuel industry. Such growth prospectively yields sustainable development to some land-rich but otherwise impoverished G77 Parties.

Sinks in the CDM --- 2

- Biofuel plantations use land on which people live, pointing to the importance of maintaining flexibility to design individual projects that are suited to the requirements of local participants. However, the biofuels-using project could be quite separate, possibly in another country. All that is implied for the CDM project is that a minor additional cost element (relative to the volume of sink credits) is incurred.

The negotiating balance --- 1

- Ecologic's proposal for Art. 3.4 combines EU language about positive lists with US language about discounting. Delayed use of the balance of 3.4 credits, in excess of the discounted amounts used in the first commitment period, lends environmental integrity to Article 3.4 since it would enable greater certainty to develop regarding the magnitude of carbon reductions, including baseline issues.

The negotiating balance --- 2

- The corrected magnitude would be taken into account when negotiating allocated amounts beyond 2012. Such an approach would thus wrap up both measurement uncertainty and non-additionality.
- Owners of credit balances carried over to beyond 2012 may expect to benefit from higher CO2-equivalent prices under more ambitious commitments for the second and later commitment periods.

The negotiating balance --- 3

- This approach also allows the US to win an agreed proportion of 3.4 credits in the interim, reflecting the impact of the definitions of Art. 3.3 activities recommended by the IPCC relative to the less restrictive expectations of US negotiators at Kyoto.

The negotiating balance --- 4

- Without violating Kyoto's environmental integrity, the aim would be to encourage desirable activities that
  - .were not taken into account when the first commitment period allocated amounts were negotiated
  - .involve substantial uncertainty and may yield CO2-equivalent credits that are large in relation to allocated amounts in the first commitment period.

How would it work? --- 1

- The Ecologic proposal for linking sinks to biofuel projects involves novel language. However, elements of the proposal involve language that is already in use and may thus be taken to be definable, with nothing new involved. These are "CO2-equivalent credit, from both Art. 3.3 and Art. 3.4 related projects" – i.e. all credits for removals from the atmosphere due to sink activities – and "biofuel-using project" – i.e. reductions in emissions due to a biofuel project.

How would it work? --- 2

- The specifically new element arises from underlined words in the following extract “a proportionate biofuel-using project contemporary with credit measurement”.

- The proportionate word can be made effective by defining a mechanism for determining the proportionality..

How would it work? --- 3

- A workable mechanism could be that “the proportionality is to be determined from time to time by the COP/MOP for a number of years ahead, in response to recommendations of the SBSTA, with previously determined values remaining in force in the absence of such recommendations, and with an initial default value of 100 per cent for all years ahead”

How would it work? --- 4

- It is anticipated this would substantially block the crediting of sink activities until time had elapsed to enable the SBSTA to negotiate agreed proportionalities for a number of years ahead. The purpose of this is to enable the Ecologic proposal to be agreed in principle at COP6b, if it is needed then in order to avoid an impasse, whilst leaving it to subsequent discussion what proportionality values are appropriate.

How would it work? --- 5

- It is envisaged that negotiations in SBSTA would lead to agreement at COP7, or COP8 at the latest, on a set of proportionality values that might, for instance, increase from 5 per cent in 2003 with 5 per cent increments annually. This would lead to 30 per cent proportionality in 2008, 50 per cent in 2012, etc .
- The meaning of contemporary with credit measurement then requires to be defined.

How would it work? --- 6

- Suppose sink project A, initiated in 2003 in a non-Annex 1 country, leads to removals from the atmosphere of 100 tons in 2004, 2005 and 2006, with the 300 tons of stored carbon then being permanently secured.
- Suppose also that project X, located in an Annex 1 country, incinerates garden waste in a district heating scheme, displacing natural gas, and results in a 5 tons emissions reduction annually for ten years, from 2004 onwards.

How would it work? --- 7

- Then project X could be linked to project A in the UNFCC registry of projects and would enable (5ton/5 per cent) = 100 tons of carbon to be credited in 2004, 2005 and 2006, i.e. 300 tons of carbon credits to be banked under the CDM until 2008-2012.
- Suppose further that sink project B, also in a non-Annex 1country, and initiated in 2006 when the proportionality is 20 per cent, results in emissions reductions for twenty years, beginning in 2007, of 25 tons annually.

How would it work? --- 8

- Then the remaining seven years of emissions reduction from project X of 5 tons annually could be linked to the first seven years of removals by project B

- This would enable 25 tons (= 5tons/20 per cent) credits to be claimed annually from 2007 to 2013 (with the 2007 credit banked till 2008 or later)

How would it work? --- 9

- Also, project X would generate 5 tons of emissions reductions credits annually through 2008-2012 that could be traded to an entity at the point of policy obligation or, through JI, to an entity in another Annex 1 country
- In 2014, it would be open to the owners of project B to seek a different biofuel using project, say project Y initiated in 2013, and to purchase linkage equivalent to (5 tons per year/ 55 per cent) for 13 years ahead from the owners of project Y.

How would it work? --- 10

- Trades would come to be mediated through futures markets establishing prices for:
  - .dated credits for absorption from the atmosphere by sinks
  - .dated credits for reductions in emissions, and
  - .linkages between the first and biofuel projects as a sub-set of (2.).
- Prima facie 1. and 2. would be the same.
- The cost of sinks projects would be increased by cost of linkages linkages (3.) multiplied by the proportionality applying at the time of initiation. This would an offset against the credits for absorption by sinks (1.).

How would it work? --- 11

- A consequence would be that biofuel using projects would receive the enhanced incentive needed, relative to other emissions reducing projects to secure the evolution of biofuel technology in line with low emissions scenarios. The basis for such enhanced incentive would be
- A the significant beneficial features of biofuel noted above
- B the evidence of slow take-up of biofuel using technology, relative to, e.g. PV's, and .
- C the existence of specific barriers to entry facing biofuel systems, also noted above

Summary

- The broad trade-off proposed is that the umbrella group accepts a minor cost increment on sink projects and the EU accepts the US getting from Art 3.4 what it thought it was going to get from Art 3.3.
- A general benefit comes from resolving the co-ordination failure that hampers the development of biofuel, and from accelerated progress with a key technology for reducing transportation emissions.
- There is specific benefit to a number of developing countries.
- Beyond political decisions on the actual proportionalitites involved, implementation involves nothing new beyond a special Registry of biofuel using projects and sink projects and of their project-to-project linkages.
- Market forces would determine the value of linkages over time.