Biomass energy and forests
Finding the ‘missing’ emissions

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Is biomass carbon-neutral?

- Policy frameworks generally treat biomass as zero-carbon, based on two assumptions...
- Assumption 1: carbon emitted when biomass burned is reabsorbed as part of natural forest growth cycle
- But, trees would keep on growing if not harvested
- Loss of future carbon sequestration plus higher emissions from biomass -> higher net carbon levels
- Net impact depends partly on counterfactuals
- Most positive outcomes where mill or fast-decaying forest residues are used
- Most negative outcomes from harvesting whole trees, particularly from old-growth forests, displacing wood from other uses
IPCC / UNFCCC reporting and accounting rules

• Assumption 2: burning biomass does release carbon, but this is reported under greenhouse gas reporting rules in the land-use sector; for energy sector purposes, biomass emissions are zero
• This derives from IPCC reporting rules intended to avoid double-counting when biomass is (1) harvested and (2) burnt
• In effect, emissions are assumed to occur at point of harvest, not when burnt – leads to perception of carbon-neutrality amongst energy policy-makers
• But emissions are not recorded in the same way at the point of harvest: potential for ‘missing’ emissions
Three reasons for emissions to go missing (1)

- Accounting of emissions for Kyoto Protocol is not the same in the energy and in the land-use sectors
- Accounting for LULUCF not required in first commitment period (2008–12)
- Is required in second commitment period (2013–20); KP parties given choice of baselines for forest sector
- 3 chose historic baselines (as in other sectors)
  - production of biomass at the baseline level *will not be accounted for* (as long as does not change) – same as other sectors
Three reasons for emissions to go missing (2)

• 32 parties chose business-as-usual baselines – i.e. only account for changes in emissions compared to what was expected to occur when business-as-usual baseline was set
  – 21 included policies encouraging production of biomass in their baseline
  – i.e. emissions from harvesting forests for biomass in line with these projections will not be accounted for
  – (though impacts of post-2009 policies are accounted for)
  – Other 11 might also not account for biomass, but not clear
Three reasons for emissions to go missing (3)

• Emissions from imported biomass not accounted for in the importing country’s accounts
  – Depends whether accounted for in exporting country
• Emissions from biomass imported from KP non-parties will not be accounted for
  – Note: major sources of wood pellet imports to EU all KP non-parties: US, Canada, Russia
• Paris Agreement can fix this
  – but US may withdraw
Impacts

• Potential for missing emissions from biomass
  – Building anticipated emissions into forest management accounting baselines
  – Importing biomass from non-accounting countries

• Potential for perverse incentives due to different accounting approaches in the energy and land-use sectors
  – When accounting in the land-use sector reflects fewer tonnes than it would in the energy sector, there is an incentive to increase use of forest-based biomass regardless of the ‘true’ atmospheric impacts
What’s the volume of the missing emissions?

• Impossible to unravel forest management reference levels to obtain accurate estimate of a country’s missing emissions from biomass energy
• Not always clear how projected harvests will be used
• Unknown source of biomass, e.g., increased harvests versus increased utilisation of residues
• Use of domestic versus imported biomass
• Conclusion: we don’t know
• But total probably significant
Scale of problem

- In 2014 Annex I countries emitted 781 MtCO$_2$ from solid biomass combustion
  - ~ 5.6% of total economy-wide GHG emissions
  - ~ 6.0% of total energy emissions
- US ~28% total Annex I solid biomass carbon emissions
- Germany + Japan + France ~26%.
- US, Japan: no accounting for emissions from their land-use sectors under the Kyoto Protocol,
- Germany accounts against business-as-usual projection that does not explicitly include bioenergy policies
- France uses a business-as-usual projection that includes bioenergy demand from policies (not including RED)
- Woody biomass emissions from all these countries, therefore, have the potential to go unaccounted for
National case studies

- Full paper includes studies of UK, US, Finland, France
- UK, 2014 – solid biomass emissions ~16MtCO₂ (3.8% total CO₂ – about ½ emissions from aviation)
- UK uses BAU reference level assuming some harvest for biomass – up to 17% total harvest
- UK also imports most biomass used for electricity:
  - 2015–16, ~1.5Mt pellets from Latvia and Portugal
    - Both use BAU ref levels including some harvesting for biomass
  - 2015–16, ~5.5Mt pellets from US and Canada
    - Both outside KP
    - Equivalent to ~7.8Mt CO₂ (at least)
- So 16MtCO₂ UK biomass emissions counted as zero in energy sector, and bulk unaccounted in land-use sector
What would fix the problem?

• Ideally, CO$_2$ emissions from biomass burned for energy accounted for within the energy sector, not the land-use sector

• If this option is not followed:
  • All parties to the Kyoto Protocol and Paris Agreement to include land-use sector in national accounting
  • Forest management reference levels to contain detailed information on projected emissions from biomass for energy and origins of biomass
  • Countries importing biomass for energy to report on whether and how country of origin accounts for biomass emissions.
  • Where biomass imported from country that does not account for such emissions at all, or in baseline: emissions should be accounted for by importing country.
  • Countries using domestic biomass for energy should use same baselines for energy and land-use sectors
Thank you