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GHG ACCOUNTING FRAMEWORKS FOR THE ANALYSIS OF THE CLIMATE CHANGE MITIGATION POTENTIAL FROM WOOD BIOMASS IN CANADA

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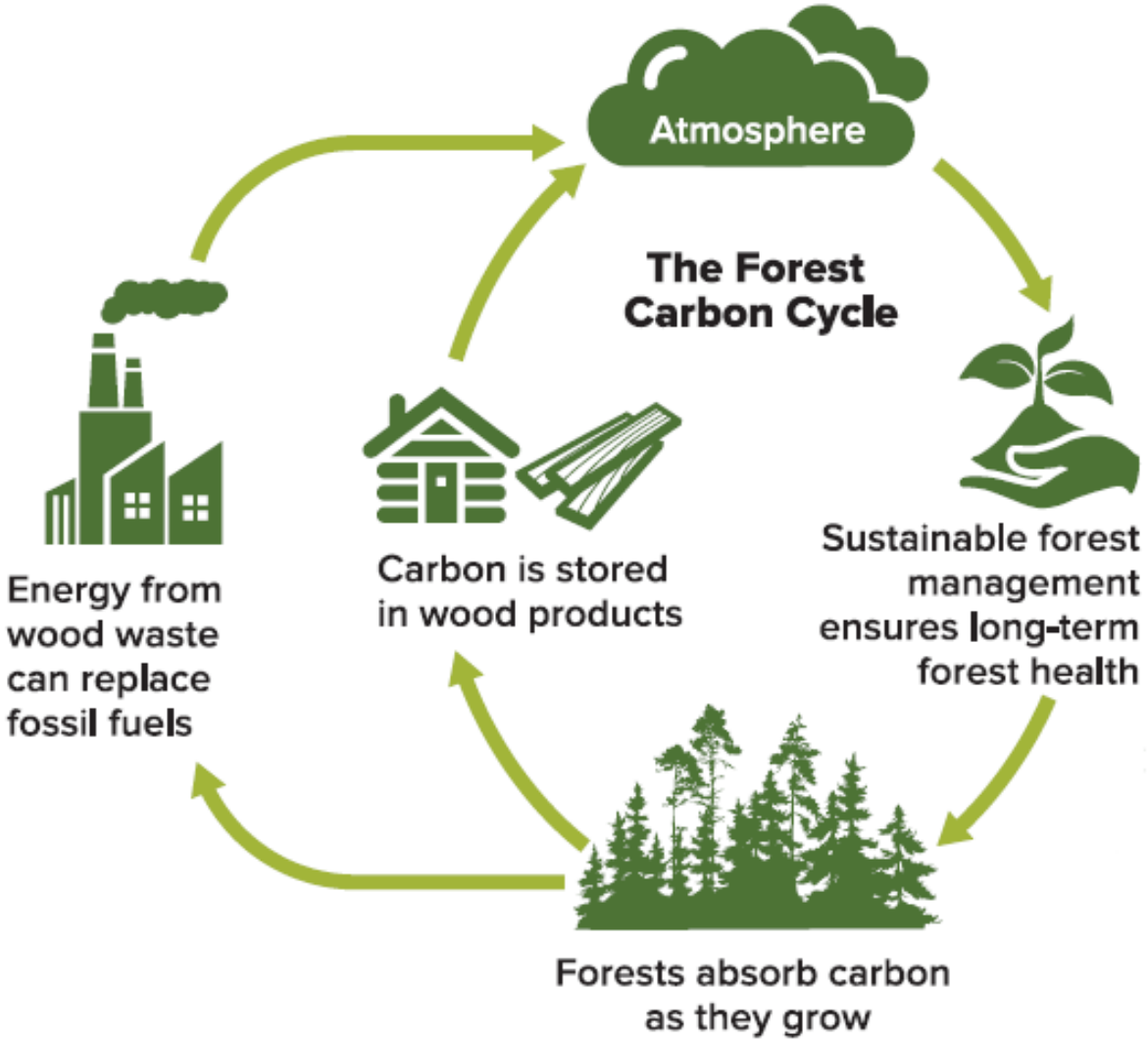
POLYTECHNIQUE MONTRÉAL

Environmental benefits of wood

- Renewable material
- Captures CO_2 as part of the forest carbon cycle
- Usually provides carbon benefits over its life cycle when compared to mineral- or fossil-based counterparts
- Biogenic "carbon neutrality"
  - ➢ $GWP_{bioCO2} = 0$



Source: Ontario MNRF (2016). State Of Ontario's Natural Resources - Forests 2016. Queen's Printer for Ontario. Sault Ste. Marie, ON, p. 7

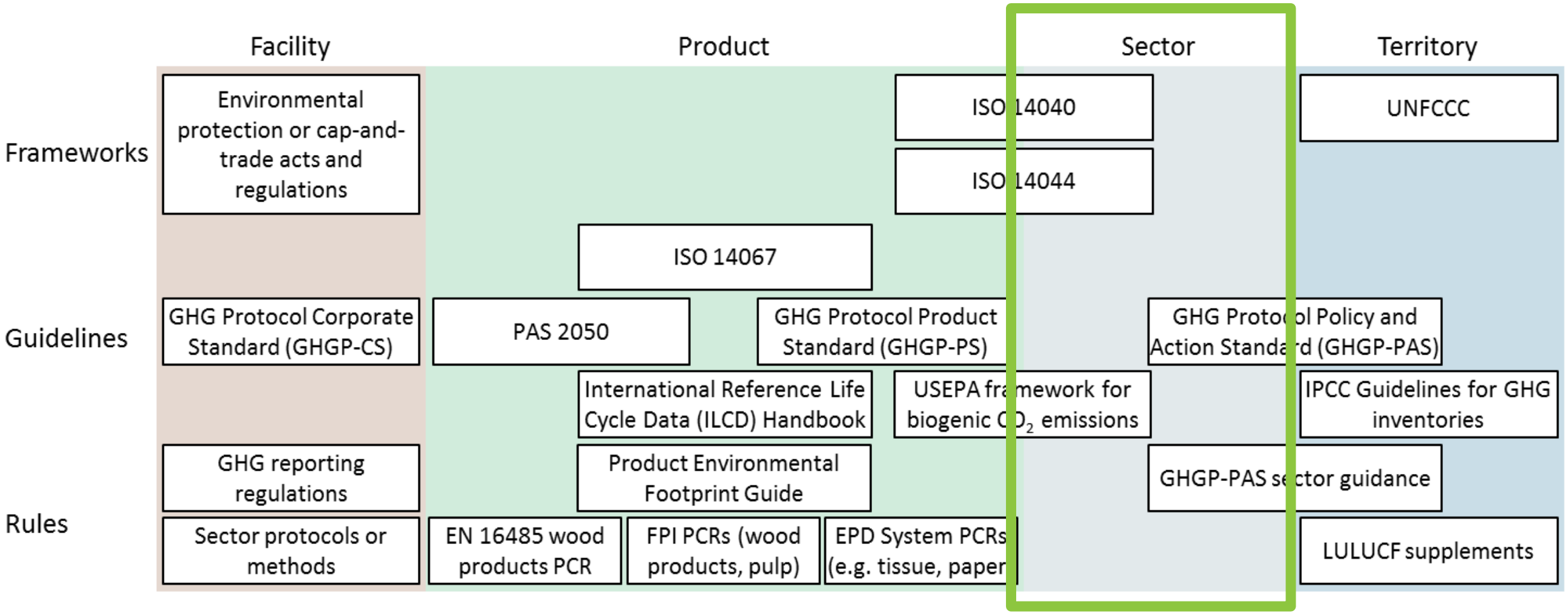
The issue

- *Carbon neutrality* of biogenic CO_2 emissions:
  - **Criticized**
  - **Cannot be assumed for all products made from biomass**
  - **Deforestation, land-use change and forest management practices may lead to net bioCO_2 emissions**
- GHG accounting methodologies are not entirely consistent and have different objectives, leading to different results

Objectives

- Highlight the conditions under which forest biomass used for energy or other purposes can be considered carbon beneficial according to available methodologies or approaches;
- Explore if these conditions are met by current practices in the Canadian forest sector, market demand, and consumer behavior.

GHG accounting methodologies



Conditions under which forest products are carbon beneficial

Forest management

Sustainable forest management

- = stable or rising forest carbon stock
- Under some methodologies, if sustainable: carbon removals by forest = product carbon content (if not, removals = 0)
- In Canada, forest carbon stocks are relatively stable when removing the influence of natural disturbances. However, Canadian forest have been decreasing carbon sinks.
- Recommendations from the literature (Smyth et al., 2014):
  - **Eliminate slash burning**
  - **Increase salvage harvest**

Smyth, C.E., Stinson, G., Neilson, E., Lemprière, T.C., Hafer, M., Rampley, G.J., Kurz, W.A. (2014). Quantifying the biophysical climate change mitigation potential of Canada's forest sector. Biogeosciences. 11: 3515-3529.

Conditions under which forest products are carbon beneficial

Forest management

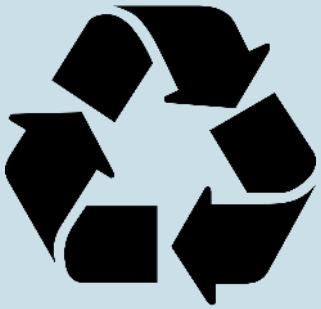
Avoidance of land-use change from forest land to another land-use type

- *Sine qua non* condition
- In Canada, little land-use change from one land-use type to another (deforestation)
  - Based on current forest management practices
  - Reflected into the national GHG inventory

Conditions under which forest products are carbon beneficial

Bioenergy

Use of harvest residues, surplus mill residues and post-consumer waste wood for heat displacing fossil fuels.



- This is the only case for which studies generally show short- and long-term benefits.
- Other cases may be beneficial or not, depending on the context (e.g. feedstock, location, substituted fossil fuel)
- Several cases will also lead to long-term benefits, but to short-term impacts (i.e. longer carbon debt).

Conditions under which forest products are carbon beneficial

Wood products

Use of long-lived wood products displacing GHG-intensive materials in structural or architectural applications.

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- Other cases are also beneficial, such as not so long-lived products displacing not so GHG-intensive products.
- Given the multiple construction materials and types of buildings, possible cases are numerous and must be assessed in their context.

Conclusions

Forest management	Bioenergy	Wood products
Sustainable forest management and avoidance of land-use change from forest land to another land-use type.	Use of harvest residues, surplus mill residues and post-consumer waste wood for heat displacing fossil fuels.	Use of long-lived wood products displacing GHG-intensive materials in structural or architectural applications.
 	 	

- Studies including economic and market-driven effects to account for competition between uses for forest biomass and to avoid leakage are recommended (research is still needed).

QUESTIONS?