

Life Cycle Greenhouse Gas Emissions of the Proposed Woodfibre LNG project

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Acknowledgments: We acknowledge no funding sources for this work. This analysis was performed on a volunteer basis because of our desire for this committee to be as informed as possible about the proposed Woodfibre LNG project. We are not professional greenhouse gas accountants.

Aims of this talk

In this talk, I will:

- explain greenhouse gas (GHG) emissions from the Woodfibre LNG (WLNG) project
- place this number in context
- relate this to flooding as a segue for David Roulston

But I will not:

- accept credit for the majority of this research, which was done by Kyle Kirkegaard (Quest 4th-year student) and supervised by Karine Le Du
- cover climate change – I take as a premise that human emissions of CO₂ increase the temperature of Earth's surface
- add my opinion and positions to this talk (until I am finished presenting and speaking as a co-equal member of the committee again)

I would like to convey four messages to you.

1. The entire WLNG project will emit 10.9 million tonnes of CO₂e per year.
This will warm Earth by 0.0000163°C per year.



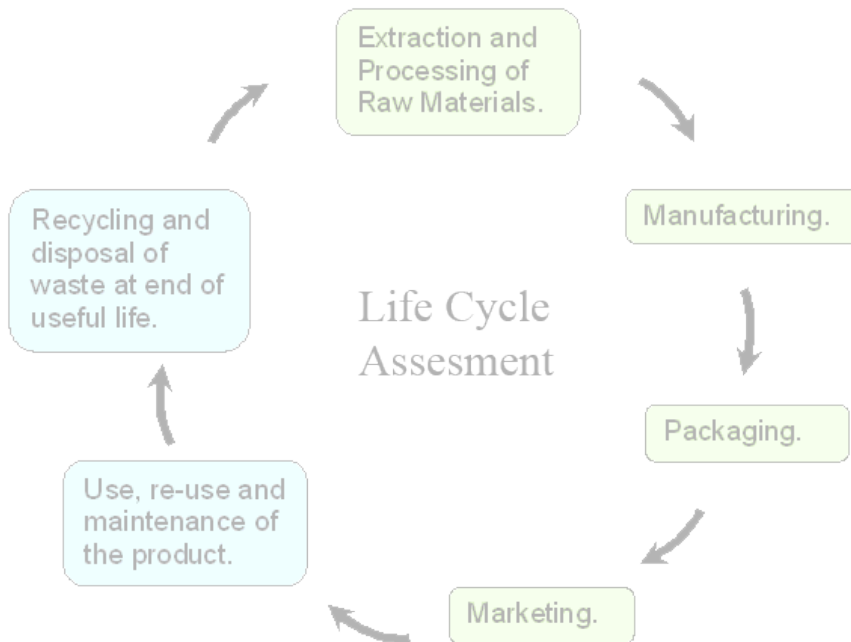
“CO₂e” means “CO₂ equivalents”. Most natural gas warms Earth 18 times as much as CO₂ when released to the atmosphere. For simplicity, counting one of these molecules as 18 CO₂ molecules allows us to express GHG emissions using only one unit.

Our number is from a life-cycle assessment of the WLNG project.

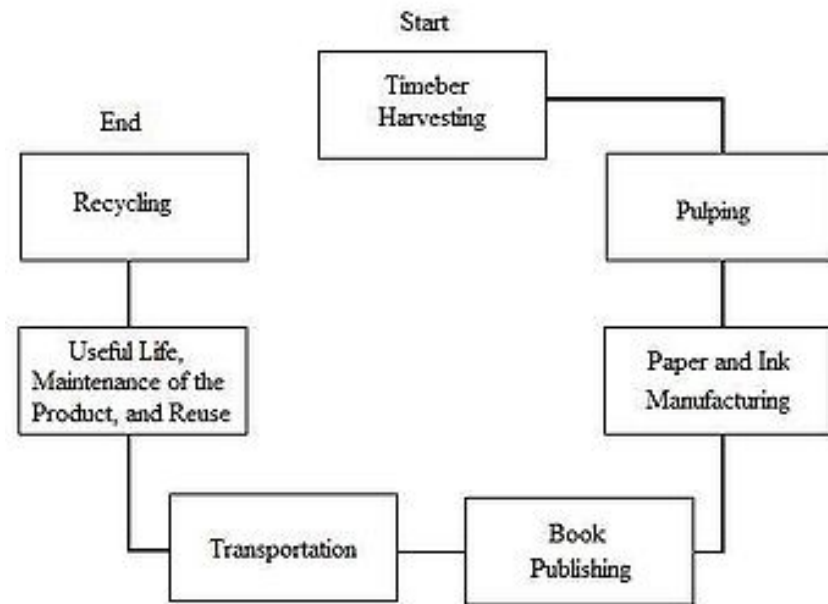
We do a **life-cycle assessment** by counting something that is part of **all the steps in the life** of a product.



concept map



example: LCA of a book

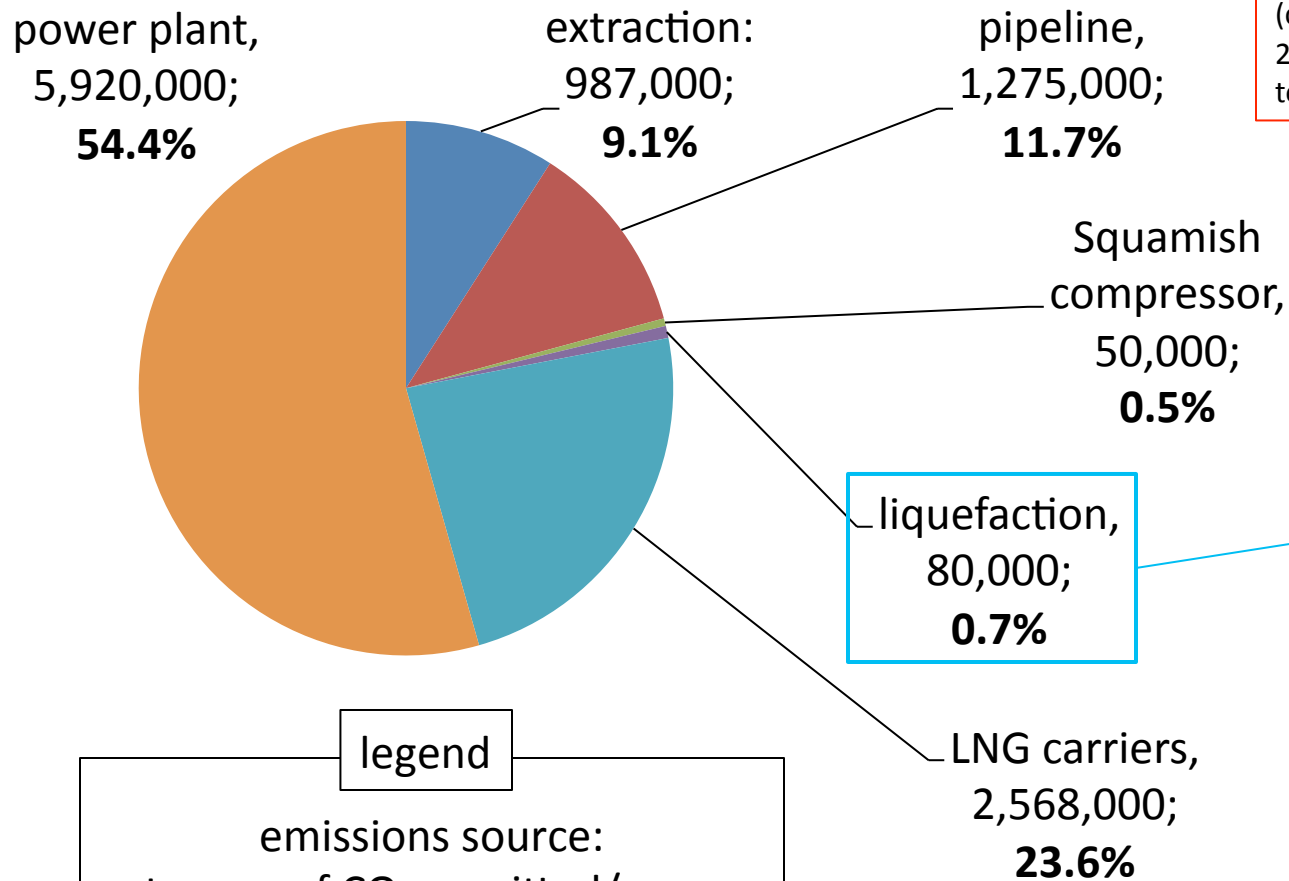


<http://www.tececo.com/images/graphics/sustainability/LifeCycleAnalysis.gif>

http://upload.wikimedia.org/wikipedia/commons/thumb/7/79/Life_Cycle_of_a_Book.jpg/350px-Life_Cycle_of_a_Book.jpg

Most of the 10.9 million tonnes CO₂e/year comes from combustion.

(1 “tonne” is a “metric ton”. It equals 1,000 kg.)



Causes 0.0000163°C warming.

(calculated from Matthews et al., *Nature*, 2009: 1.5°C warming from each trillion tonnes emitted)

completely consistent with presentation by Jeremy Moorhouse of Clean Energy Canada

Powering the plant with natural gas makes this number 520,000 tonnes of CO₂e and increases the entire pie by 4%.

(But, it increases this slice by a factor of 650%.)

(calculated from data in presentation by Jeremy Moorhouse)

We are 80% confident in these values.

Are 10.9 million tonnes CO₂e and 0.0000163°C per year big or small?

It's fairly **small** relative to:

- Alberta oil sands (not LCA): 48 million tonnes CO₂e/year (source: Pembina Institute)
- present BC emissions: 61 million tonnes CO₂e/year (source: Jeremy Moorhouse)
- same electricity from coal (LCA): 13.2 million tonnes CO₂e/year (source: Whitaker et al. 2012, J. Indust. Ecol.)
- the amount of warming since 1880: 0.85 °C
- scientists' "safe" amount of warming: 2 °C

LCA = life-cycle assessment.

Reducing *other* emissions to balance the WLNG project is difficult.

To find emissions reductions that are comparable to those of its project, WLNG could:

- Increase **composting** at the Whistler composting centre from 13,000 tonnes/year to 10,000,000 tonnes/year. (Offsets 2.7 million tonnes of CO₂e/yr.)

Climate change increases the risk of flooding in Squamish

Flooding comes from two sources:

Ocean

- Sea level rise is forecast to be 1-2 m by 2100.
- This is uncertain and subject to varying time lags and geographical variation.

I will restate my four messages for you.

1. The entire WLNG project will emit 10.9 million tonnes of CO₂e per year. This will lead Earth to warm by 0.0000163°C per year.
2. This amount is small(ish) in some ways and large in others.
3. There is no reasonable way to offset this amount of GHG emissions.
4. This will increase the risk of flooding in Squamish very slightly.

Thank you for allowing me to present to this committee.
Calculations and justifications are available upon request from me or Karine.
Contact me at rich.wildman@questu.ca

