

Long-term plan for Plant Science field research travel (and other) C emission reduction

Proposal for consideration

Martin Entz, Sept 29, 2021

Current status
"Business as usual"



Offset C emissions through
"offset purchases" or
Tree/grassland planting



Drastically reduce fossil
fuel use in Plant Science
field research programs



<https://www.atmosfair.de/en/offset/fix/>

Plant Science research activities to be C neutral by the end of 2022

- A proposal under development - first presentation to Dept council
- Martin Entz, PhD, Dept of Plant Science, University of Manitoba

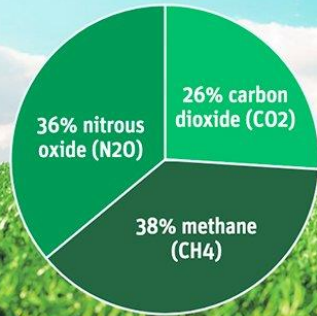


Options for C neutral

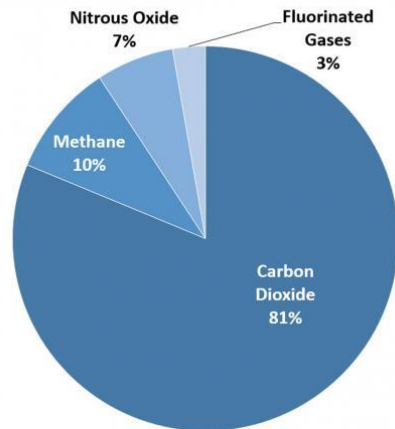
1. Purchase C offsets for all research related travel
 - <https://www.atmosfair.de/en/offset/fix/>
 - 60,000 km driving (10,000 kg CO₂) = 230 Euro
 - Other schemes such as Air Canada (and other airline) offset
 - Entz program - About 400 euro per year field operations; 300 euro for air travel
2. Carbon capture using plants
 - Tree planting initiative on Plant Science lands
 - Perennial herbaceous plants on Plant Science lands
3. Combination of offset purchases and carbon capture

CANADIAN AG'S BIG THREE GHGS

- » Carbon dioxide (CO₂)= soils, fertilizer, on-farm transport, machinery, heating, electricity
- » Methane (CH₄) = livestock internal digestion, manure management
- » Nitrous oxide (N₂O) = soils and manure management



Overview of Greenhouse Gas Emissions in 2018



Looking at the 10,000 kg CO₂ per year that the Entz field research program emits (travelling 60,000 km per year), how much tree planting or perennial grassland conversion would be required to offset that C each year?

Temperate Forest (25 years)

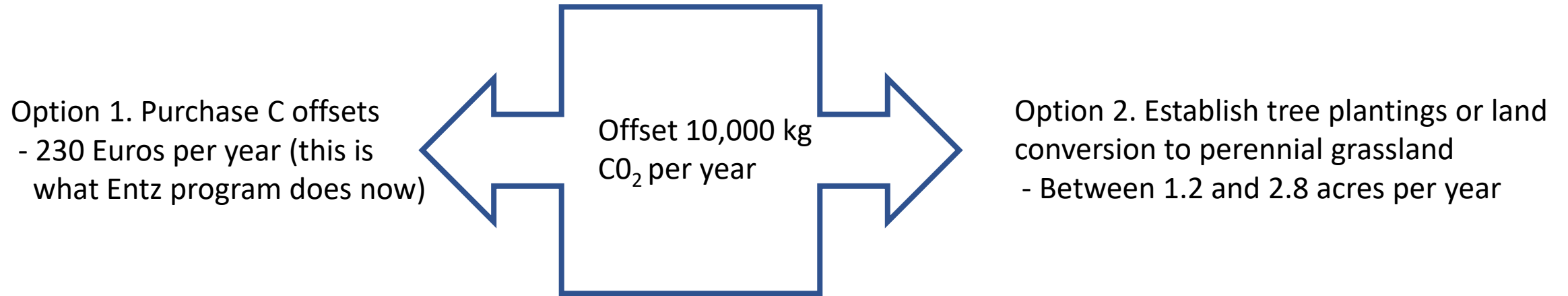
- 7 kg CO₂ per tree per year.
- Entz program 10,000 kg CO₂ per year = $10,000/7 = 1428$ trees
- 500 trees per acre = about 2.8 acres/year

Tropical Forest (25 years)

- 17 kg CO₂ per tree per year.
- Entz program 10,000 kg CO₂ per year = $10,000/17 = 588$ trees
- 500 trees per acre = 1.2 acres/year

Temperate grassland conversion (18 years; Bell et al. 2012)

- Glenlea long-term rotation 2300 kg C/ha/year x 3.6 = 8280 kg CO₂ per year
- $10,000/8280 = 1.2$ acres/year



- How to proceed as a department?
- Options for progress...
 - Do nothing – be “not innovative”
 - Have each research program operate independently (perhaps not all are interested)
 - Establish a Climate Action Committee (led by graduate students?)
 - Fundraise to purchase offsets
 - Add offset costs to research costs
 - Purchase electric vehicles and electric tractors and establish solar array at Point and Carman

Options to eliminate C emissions associated with travel to field experiments, and field operations



Long-term plan for Plant Science field research travel (and other) C emission reduction

Proposal for consideration

Martin Entz, Sept 29, 2021

Current status
"Business as usual"



Offset C emissions through
"offset purchases" or
Tree/grassland planting



Drastically reduce fossil
fuel use in Plant Science
field research programs

