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CARBON TAX

DESCRIPTION AND IMPLICATIONS

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Federal Carbon Policy

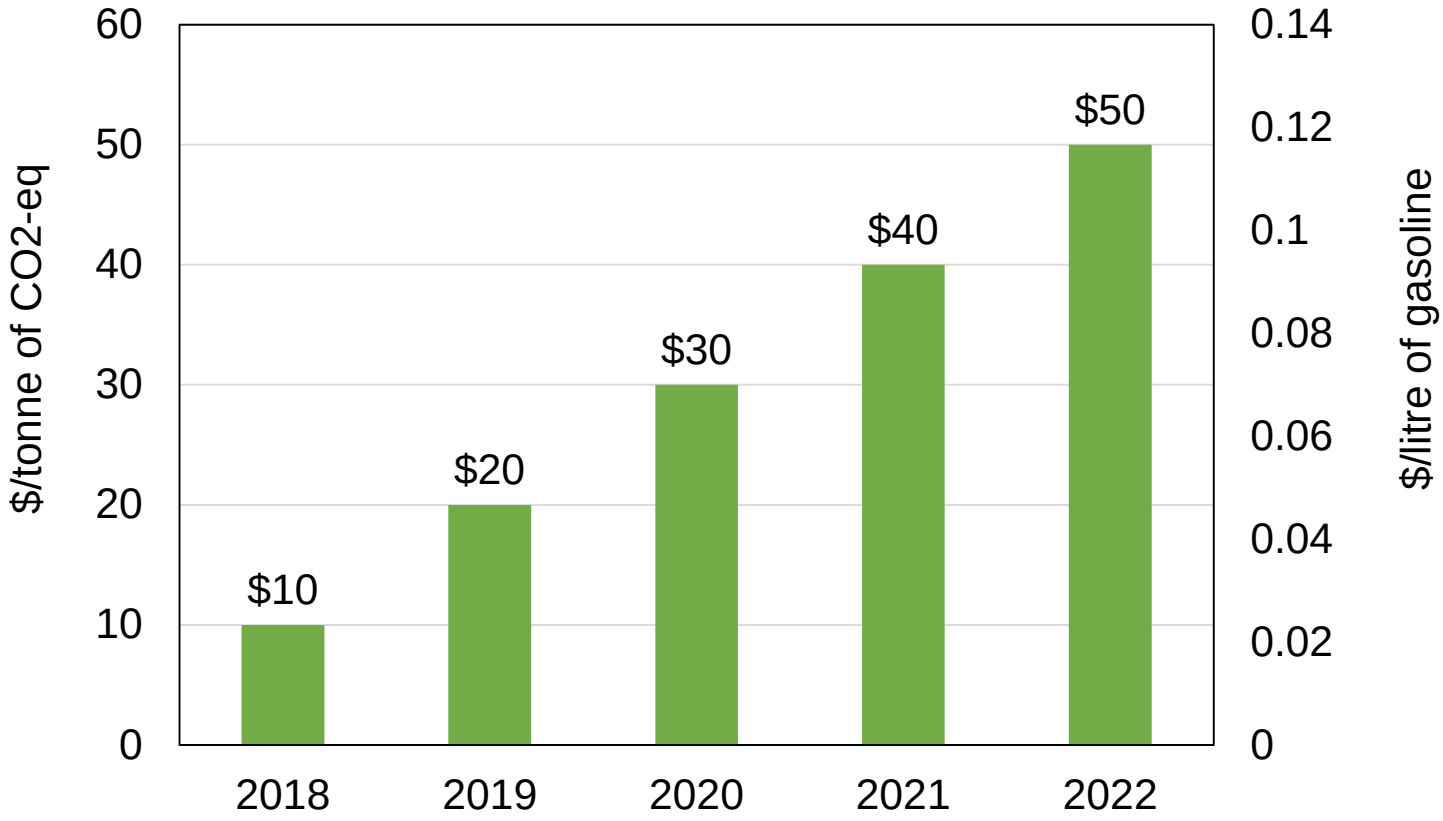
- Beginning in 2018, Canada will implement a *minimum* carbon price of

  $10 per tonne of CO_2-equivalent (CO_2-eq)

- In terms of gasoline, this is equivalent to a tax of approximately

  $0.02 per litre

Federal Carbon Tax (in $/litre of gasoline)



Federal Carbon Policy

DETAILS

- Provinces choose between cap-and-trade or a carbon tax
- Tax revenues remain in the *province of origin*
  - Revenue-neutral tax scheme
- Provinces have the final say on tax revenue distribution
- Goal: **Reduce emissions to 30% below 2005 levels by 2030**

Policy Uncertainty

- Will agriculture be exempt from the carbon tax? If so, which inputs?

From the *Pan-Canadian Approach to Pricing Carbon Pollution*
news.gc.ca/web/article-en.do?nid=1132169

"Common scope: Pricing will be based on GHG emissions and applied to a common and broad set of sources to ensure effectiveness and minimize interprovincial competitiveness impacts. *At a minimum, carbon pricing should apply to substantively the same sources as British Columbia's carbon tax*."

Policy Uncertainty

- BC included agriculture in 2008, but exempted the sector from carbon fuel taxes in 2014
  - *Gas and diesel only*

- **Even with a fuel tax exemption**, several inputs will see indirect price increases from the carbon tax

Fertilizer Cost Impact (per acre) assuming various cost pass-through

	Carbon Tax ($/tonne of CO2-eq)		
Pass through	**$10.00**	**$30.00**	**$50.00**
0	$0.00	$0.00	$0.00
0.25	$0.47	$1.41	$2.35
0.5	$0.93	$2.81	$4.69
0.75	$1.40	$4.22	$7.04
1	$1.87	$5.63	$9.39

Source: P. Slade 2017

Policy Uncertainty

Possible exemptions for “trade-exposed” sectors:

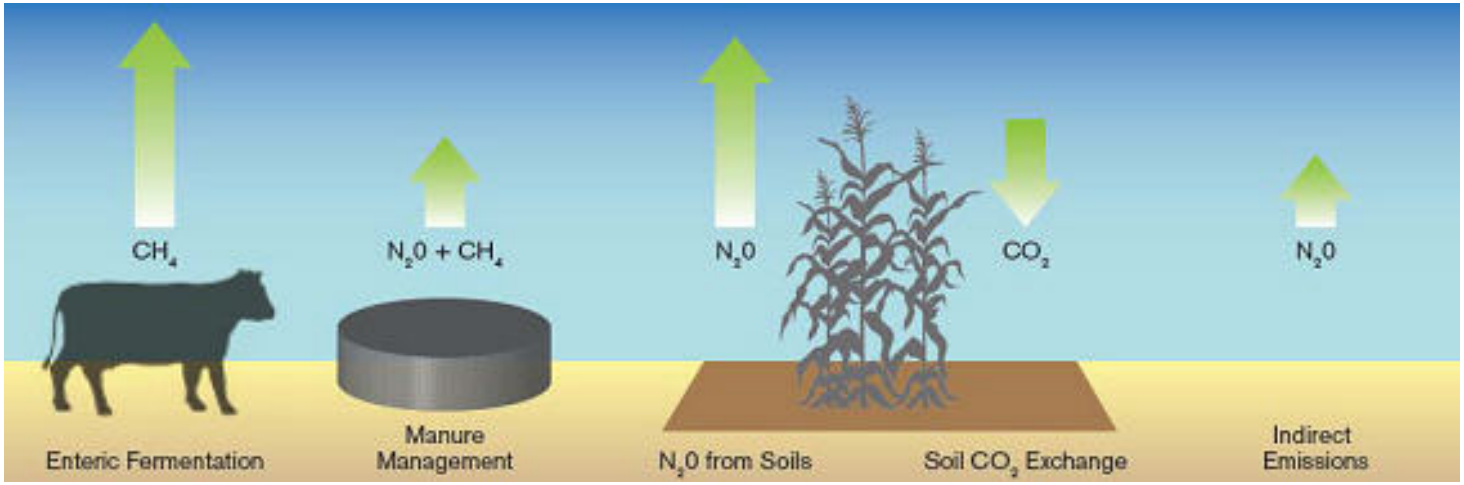
“Carbon pricing policies should minimize competitiveness impacts and carbon leakage, particularly for trade-exposed sectors”

—Pan-Canadian Approach to Pricing Carbon Pollution

Non-fuel GHG emissions

- Will the tax (eventually) be applied to non-fuel GHG emission sources?
- **Primary** concern for both livestock *and* crop farmers
- Carbon dioxide emitted from transportation pales in comparison to the CO_2-**eq** from other sources

Non-fuel GHG emissions

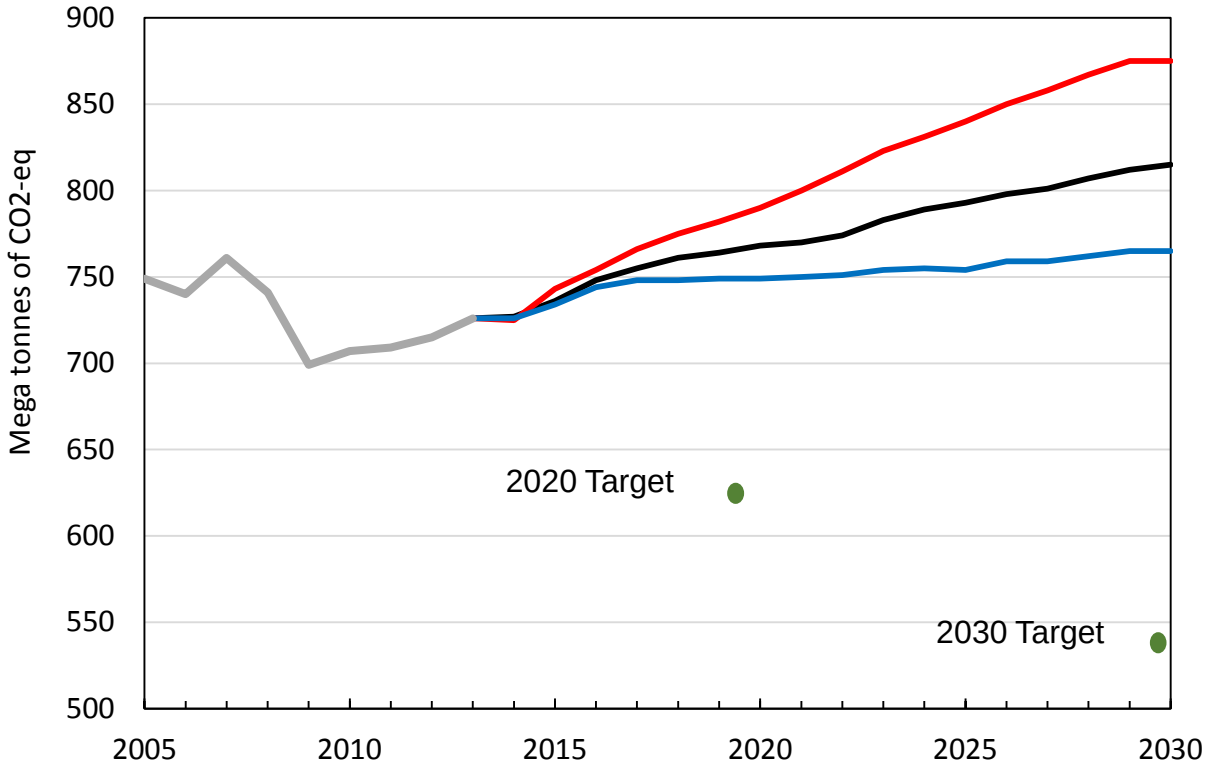


Credit: AAFC, Agriculture and Climate: Greenhouse Gases

- Agricultural emissions account for 8-10% of total emissions in Canada
- Only a small fraction is due to emissions from fuel

Non-fuel GHG emissions

Taxes imposed on non-fuel GHG emissions may be unlikely at first, but consider the Canadian goal for 2030:



Source: Environment and Climate Change Canada

Potential vulnerability for crop farmers?

Fertilizer

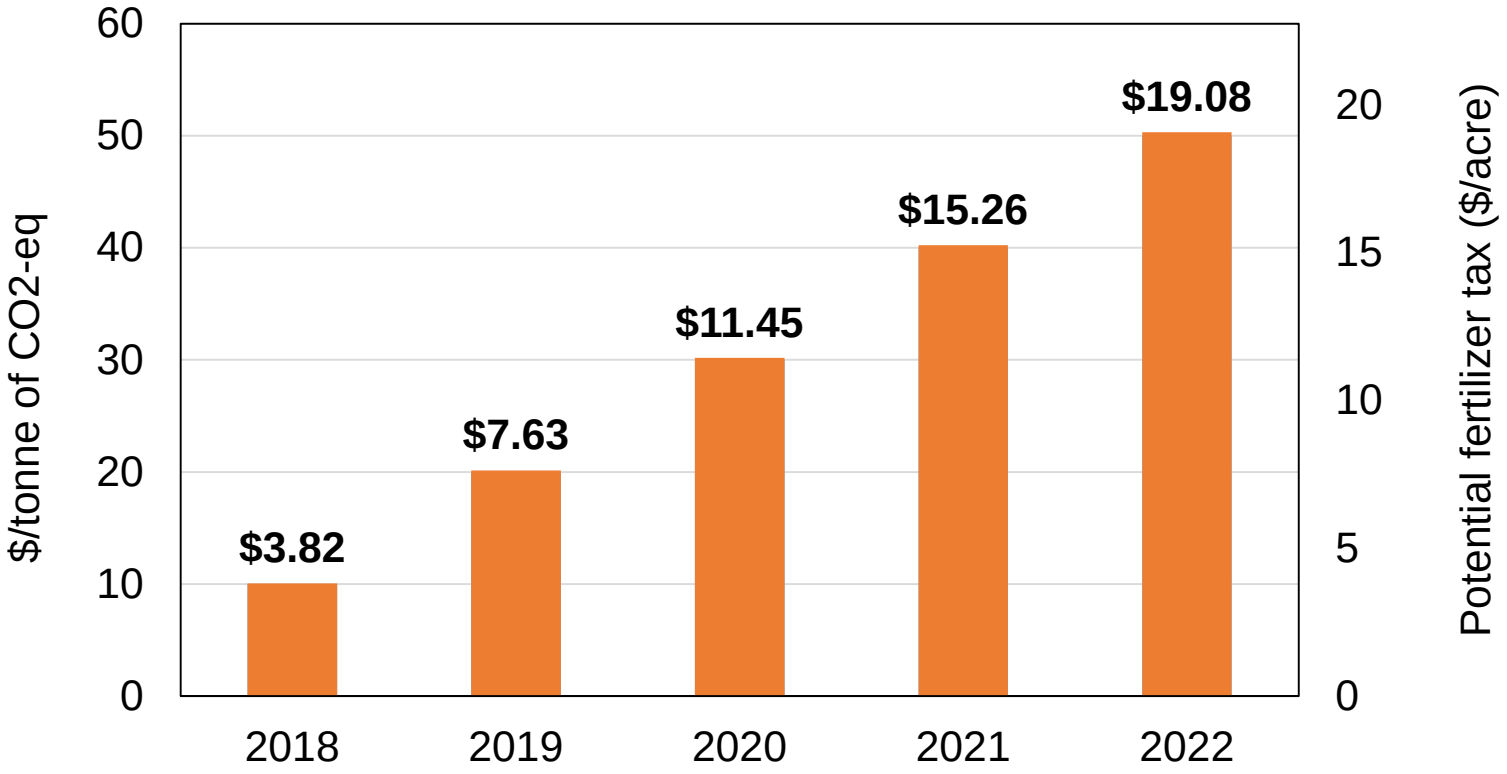
Non-fuel GHG emissions

Fertilizer

- One of the primary sources of N_2O emissions from agriculture
- N_2O has a CO_2-eq of approximately **300**
- Assuming:
  - 2% of applied nitrogen emitted as N_2O
  - Application rates of 100kg of N/hectare (89 lbs/acre)
  - *What would a fertilizer tax look like?*

Assumption source: Dr. Mario Tenuta, Dept. of Soil Science, University of Manitoba

Federal Carbon Tax (in fertilizer cost $/acre)



Source: Grainews, Dr. Mario Tenuta (2017)

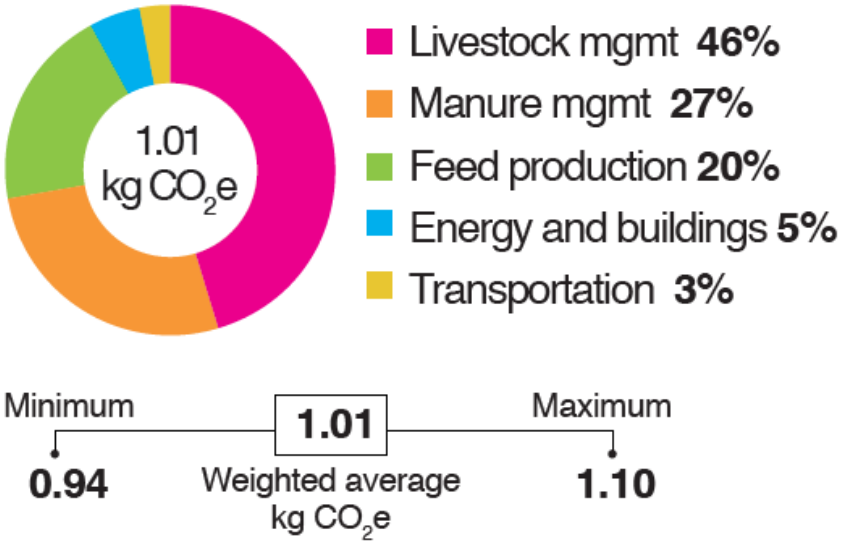
Potential vulnerability for livestock farmers?

Enteric Fermentation and Manure Management

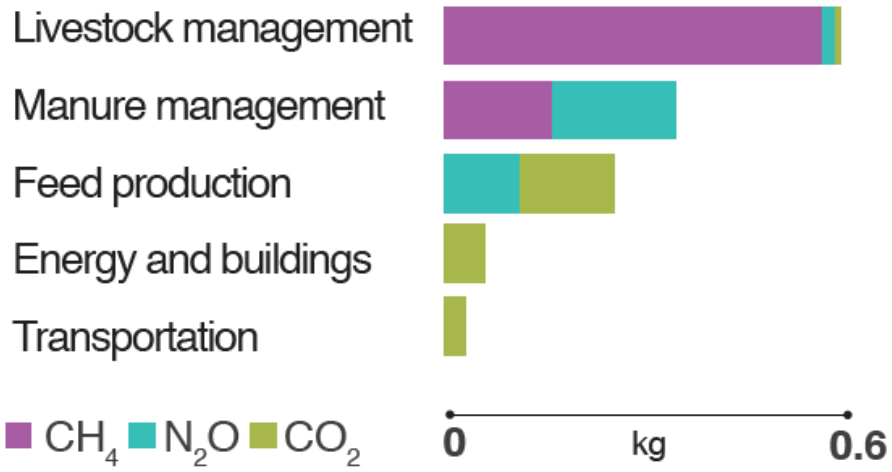
The environmental profile of a kilogram (0.97 litre) of milk

Carbon footprint

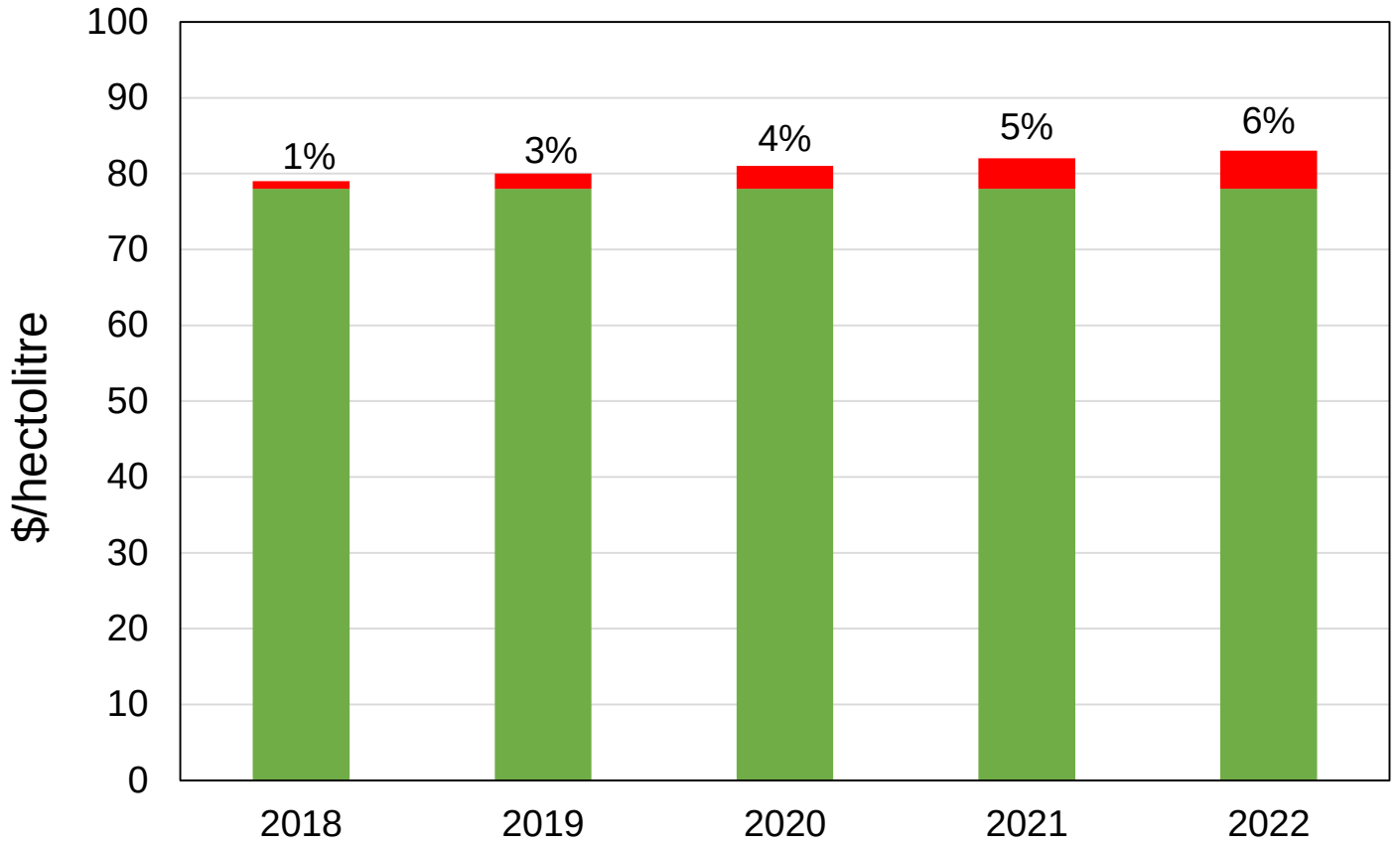
Contribution of each life cycle stage



Breakdown of GHG emissions



Credit: Socioeconomic and Environmental Life Cycle Assessment (LCA) of Canadian Milk Production, commissioned by the Dairy Farmers of Canada



Cost of Production: Biological Processes Carbon Tax

Sources: CDC 2015 Cost of Production, Dairy Farmers of Canada LCA

Short-term Impacts

- Moderate input price increases
- Feed, energy, and fertilizer-inefficient farmers will see comparatively lower margins
- Capital assets for improving feed and energy efficiency may now be cost-effective
- Need for carbon accounting at the farm level—*opportunities for emissions savings?*

Research and Policy Design

- Current policy suggests a focus on *inputs* rather than *emissions*
  - Measurement problem
  - First-best solution likely unattainable
  - Which second-best solution is ***preferable***?

    - Spatially uniform emission factors
    - Regulation of a single GHG
    - Control of a single agricultural input
    - Control of input combinations
    - ***Management practices?***

Research and Policy Design

Management practices

When only input choice is incentivized, BMP adoption ***not*** involving controlled inputs will be limited

As currently written*, the carbon tax policy falls into this category, and will not encourage non-input based BMP adoption, despite the potential for decreased GHG emissions

Research and Policy Design

- Potential evaluation criteria
    - Efficiency (deadweight loss, administrative)
    - Changes in yield/output
    - Changes in net income
    - Changes in GHG emissions
        - AAFC HOLOS model

Research and Policy Design

A final note on **revenue-neutrality**

The method through which revenues are returned will have dramatic consequences on both social welfare and pollution (GHG) reduction (Skolrud and Galinato 2017, Skolrud et al. 2016)

- Lump sum rebate?
- Clean-technology investment?
- Clean-input subsidization?

Thank you for your time

Questions?

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