A ROLE FOR AGRICULTURE IN MANAGING GHGS

ALBERTA IRRIGATION PROJECTS ASSOCIATION
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About ERA and AI

Emissions Reduction Alberta

Established to address GOA climate leadership priorities

Connects gov policy, industry needs, technology solutions

Alberta Innovates

Supports research for the growing global bio-economy

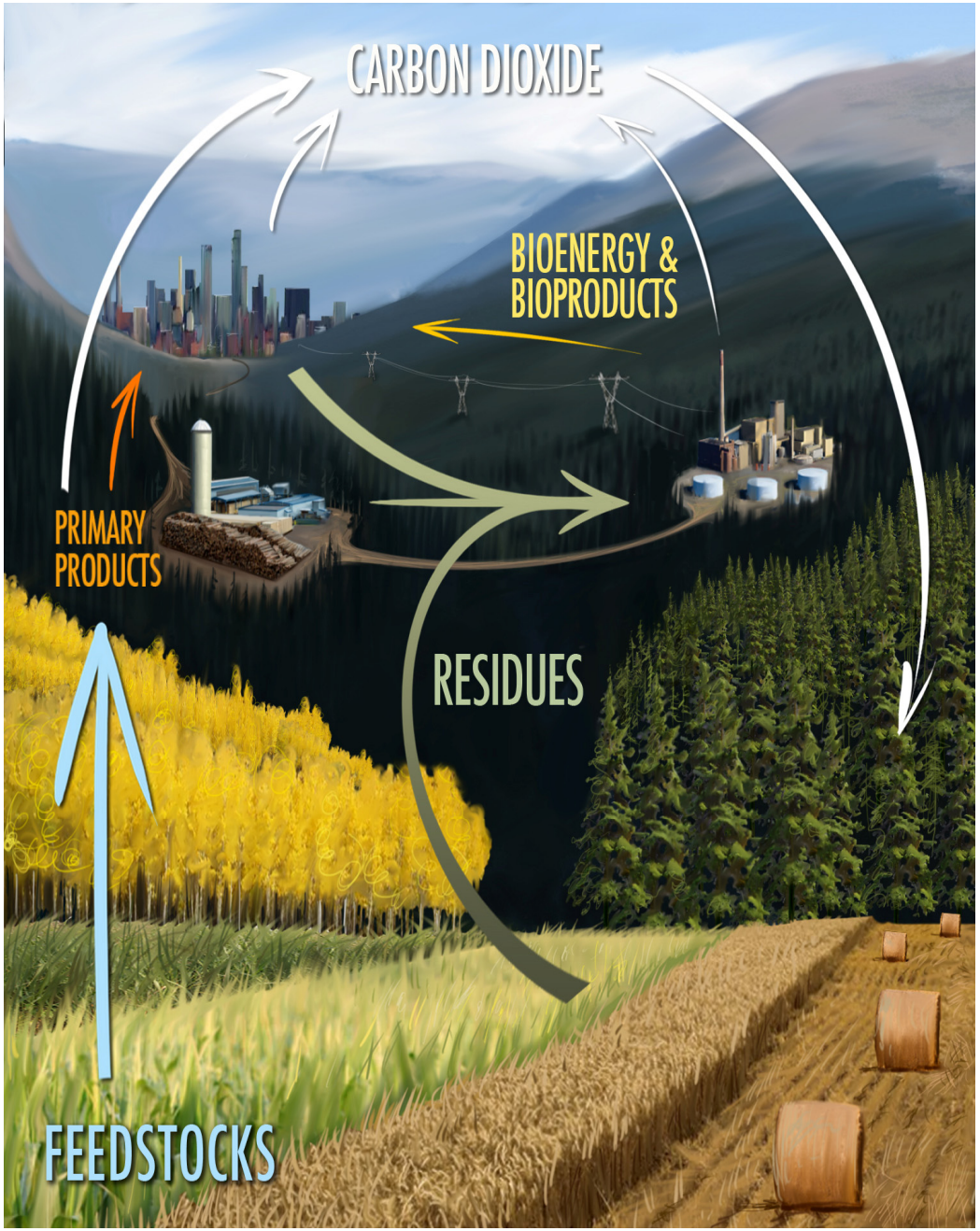
Biological GHG Management Program

Partnership program hosted by AI and supported by ERA

Agriculture and GHGs

- Agriculture produces GHGs
- Agriculture sequesters carbon
- We can reduce emissions from agriculture
- We can help others to do better too

Why is agriculture so important?



About GHGs

Carbon is sequestered by plants through photosynthesis

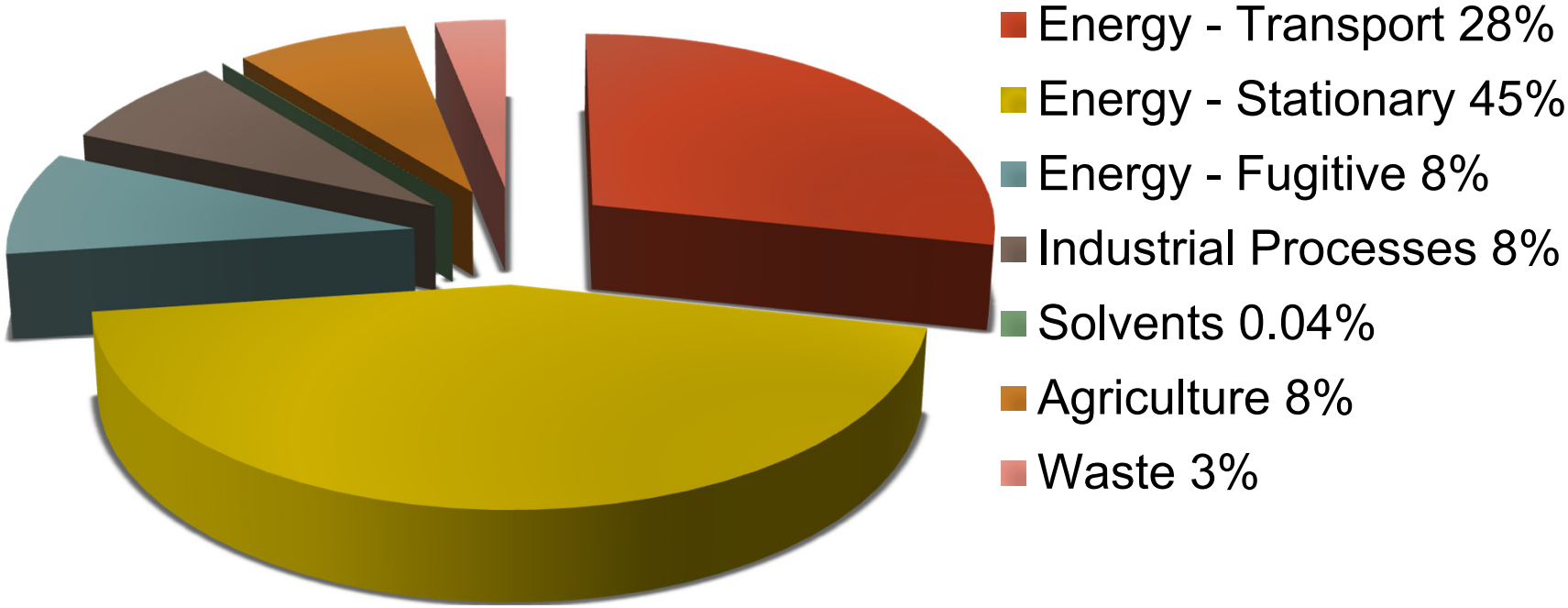
Carbon is lost through decay and combustion

Losses from ancient carbon tip the natural seasonal cycle

We are at a global crisis point

GHG Emissions - Canada

Total Emissions, Canada 2012 = 699 Mt



* Environment Canada National Inventory Report 1990 - 2012

GHG Emissions - Canada

Total emissions from agriculture, Canada 2012 = 56 Mt

- Enteric fermentation 18 Mt CO_2eq
- Manure management 6 Mt CO_2eq
- Agricultural soils 32 Mt CO_2eq

* Environment Canada National Inventory Report 1990 - 2012

Sources and Sinks of Agricultural GHGs

Livestock Production – Methane
- Enteric fermentation
- Manure management

Crop production – Nitrous Oxide
- Fertilizer
- Manure management

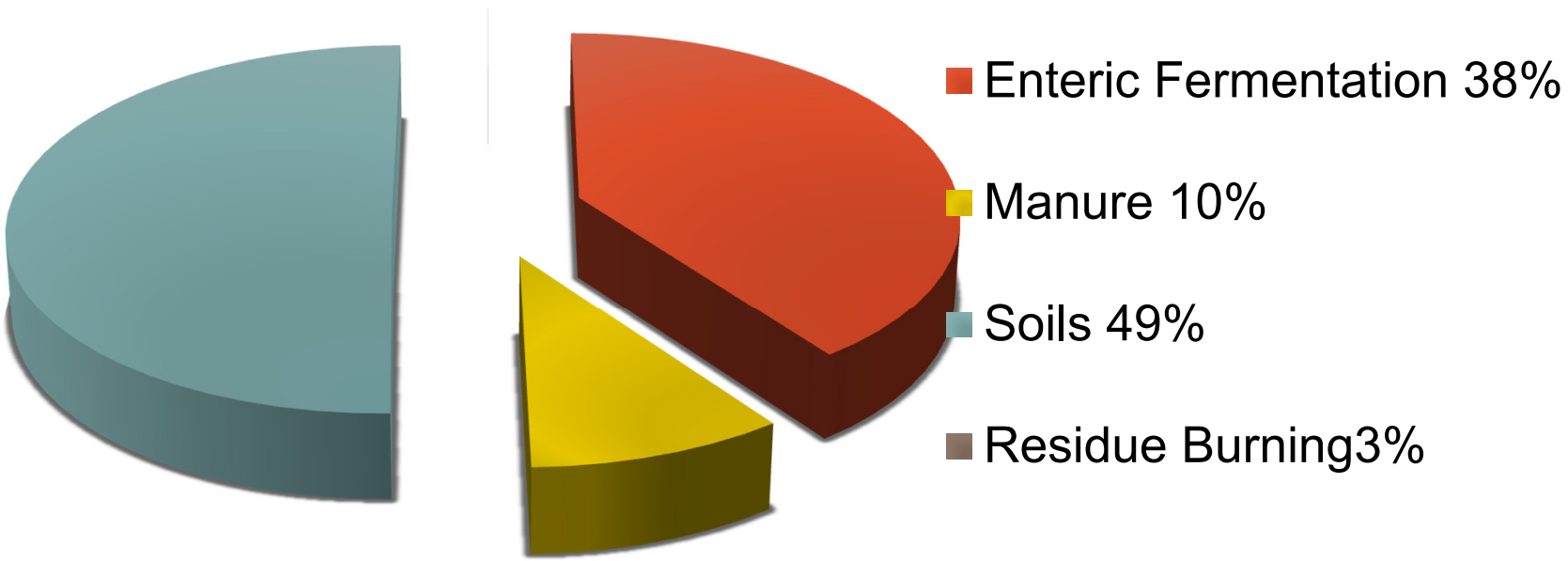
Flooding Impacts - Methane
- Emissions from water-logged soil
- Water course fluctuations

Carbon sequestration – CO2
- Crop production
- Roots and SOC

Key GHGs/GWP
- **CO_2 = 1 = CO_2eq (Mt)**
- **CH_4 = 21**
- **N_2O = 310**

GHGs from Agriculture - Alberta

Total Agriculture Emissions, Alberta 2011 = 17 Mt



* Environment Canada National Inventory Report 1990 - 2011

Anticipated Agricultural Emissions Trends, Canada to 2020*

Emission Source	2005	2010	2020
On-farm fuel	9	13	10
Crop production	19	22	22
Animal production	39	33	33
Total CO2eq (MT)	67	68	65

Alberta Innovates Bio Solutions

CCEMC

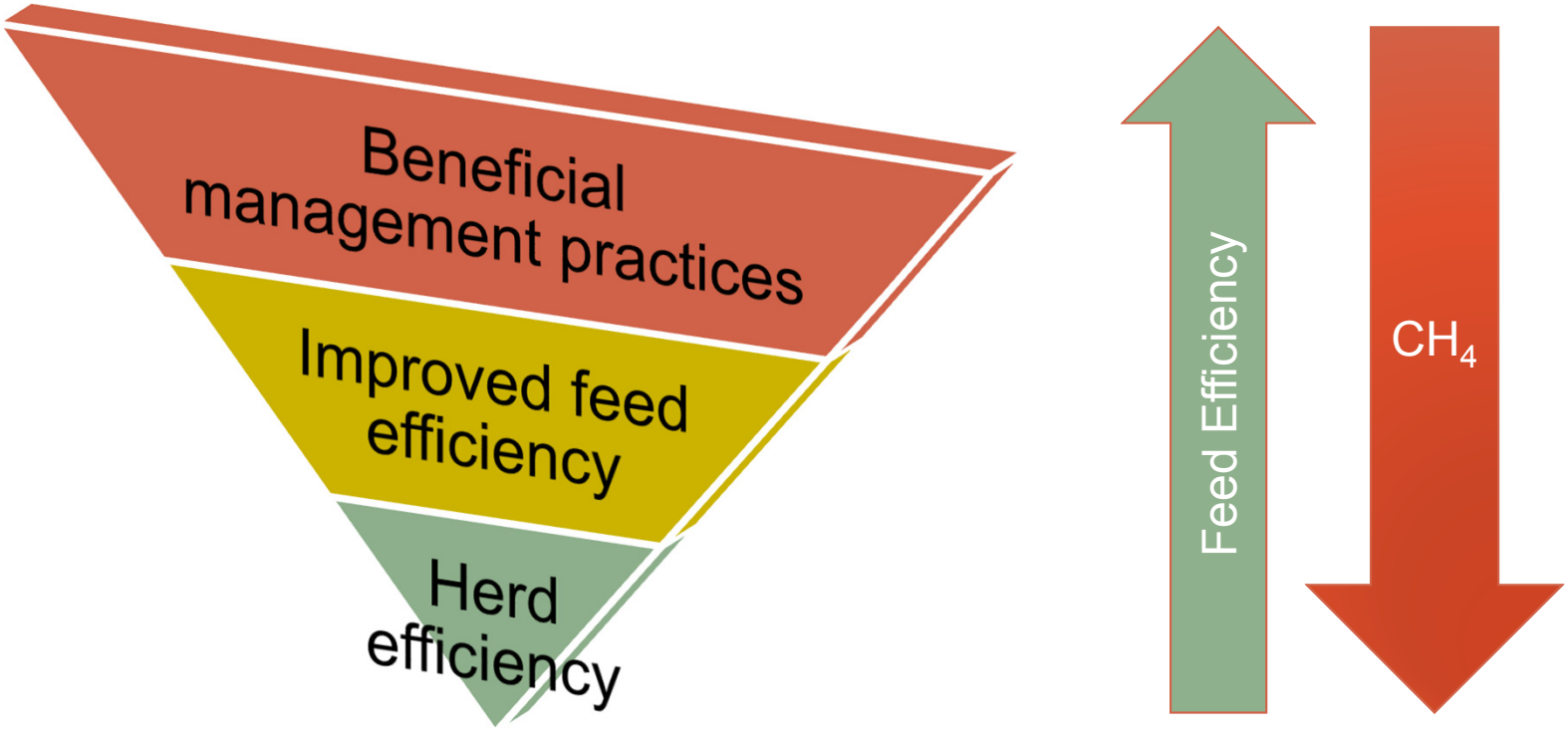
* Environment Canada: Canada's Emissions Trends - 2012

Methane

- Enteric fermentation in Canada represents a significant emission challenge of 18 Mt CO_2eq/yr

Addressing Livestock Methane

- Enteric fermentation represents a significant emission challenge of 18 Mt CO_2eq/yr

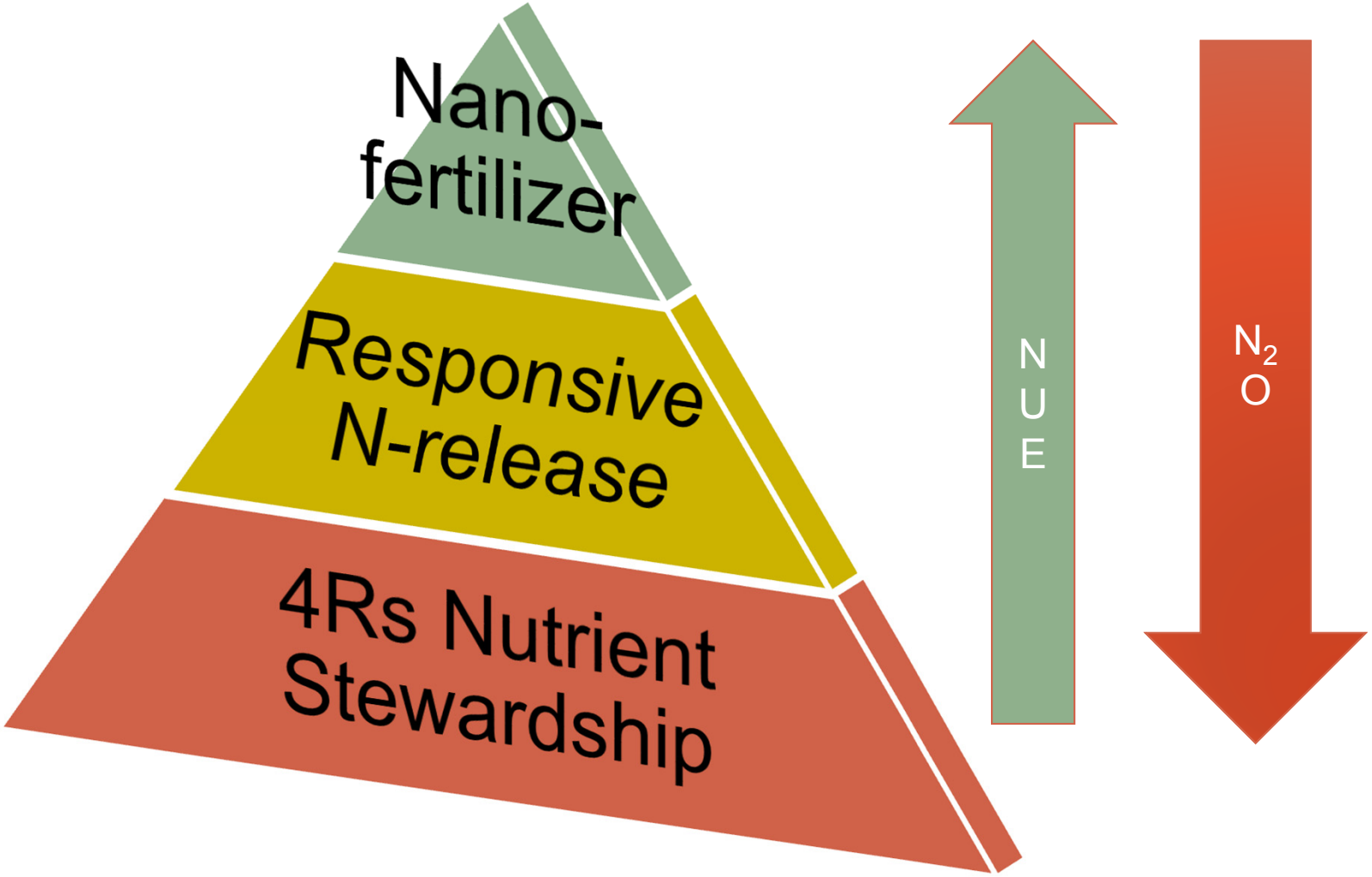


Nitrous Oxide

- Nitrous oxide emissions from soils equal 32 Mt CO_2eq/yr

Beneficial management practices developed in Canada now adopted globally
4Rs focuses on right source, rate, timing and placement

Addressing Nitrous Oxide



Carbon Sequestration

- Short-term vs longer term carbon storage SOC
- Shift from annual to perennial crops
- Use of crop residues for on-farm energy and biochar
- Increasing demand for biocleantech feedstocks (new markets)

Consistent challenge

Balance environmental effectiveness with affordability, in the face of pressure to produce more and more

Conclusions

- GHG emissions from agricultural production represent system losses
- Methane and nitrous oxide reductions may be achieved through BMP and transformative innovations
- The role of carbon sequestration is of increasing importance
- Solutions must balance effectiveness and affordability along the value chain

Thank you

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EMISSIONS REDUCTION ALBERTA

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