

The Role of Carbon Pricing Policies in Contributing to Stabilization of Agricultural CO₂ Emissions in North America: Emphasis on Agriculture

Presented at: AAAS Annual Meeting:

Toward Stabilization of Net Global Carbon Dioxide Levels Session

February 16, 2012 – Vancouver, British Columbia, Canada

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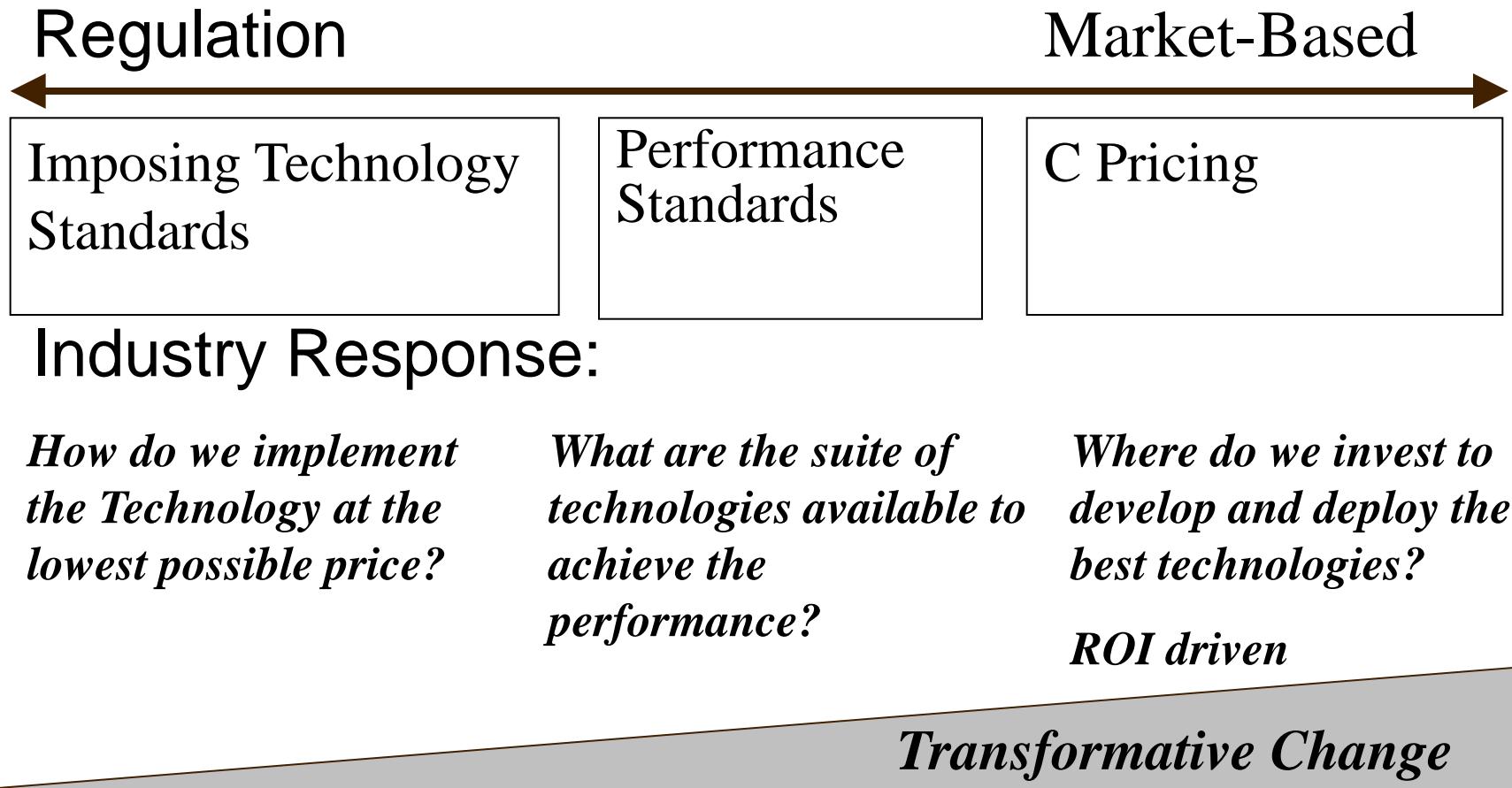
Overview

1. The path to putting a price on carbon in North America
1. Science, policy and market considerations in creating opportunities for agricultural innovation

The Path to Putting a Price on Carbon

1. Creating the incentive to reduce
2. Determining the price of carbon
3. The impact of policy measures on price
4. Emerging North American regulations
5. The confusion behind carbon pricing

Policy Tools – What and Why

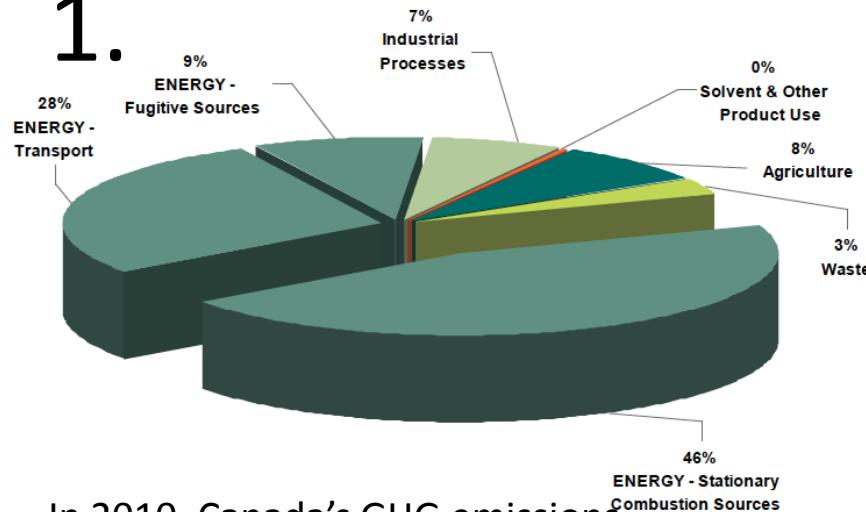


Innovation

Carbon Pricing

Creating the Incentive to Reduce

1.



In 2010, Canada's GHG emissions totaled 690 Mt CO₂e with little "carbon" cost to related emitters.

2.



There is a real environmental cost to emitting carbon. A carbon price requires polluters to pay for each tonne CO₂e emitted.

4.

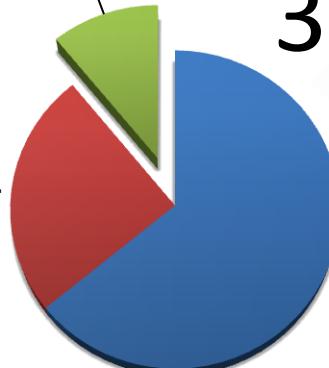


Industry finds new, less carbon-intensive means of production

Carbon

Labour

3.



This allows industry to factor in the price of polluting into production



Most Commonly a C Price is Determined by:

1. Allowances

- Tradable permits to pollute
- Issued by a regulatory authority under an Emissions Trading System
- Can be acquired through
 - Auction
 - Allocation

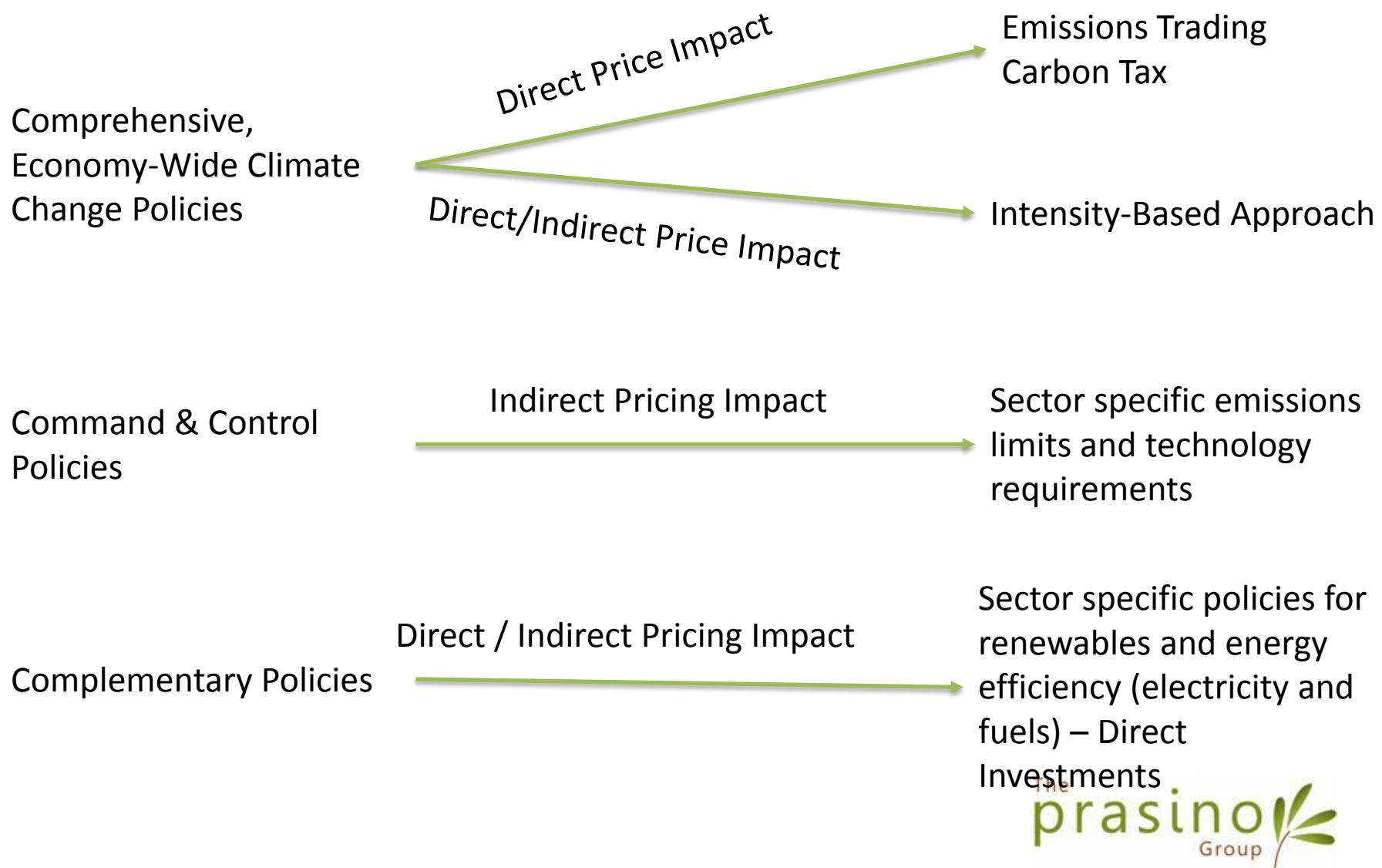
2. Offset Credits

- Generated by projects which are not regulated
- Multiple requirements in both voluntary and regulatory markets including additionality, validation, verification, quantification protocols

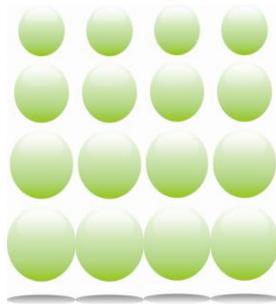
3. Complementary Measures

- Command and control programs (electricity / emissions standards)
- Renewable portfolio standards
- Renewable and low-carbon fuel standards
- Direct incentives for Energy Efficiency and Renewable Energy technologies

The Impact of Policy Measures on Price



Tradable Units – Allowances and Offsets

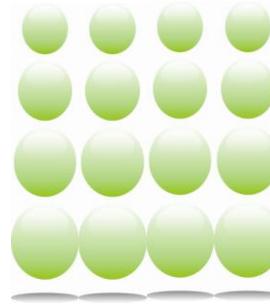


BUYERS

\$

\$141.9 billion¹

Voluntary²
\$424 million
131 million tonnes



SELLERS

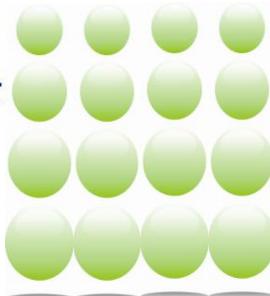
↓CO₂e

¹State and Trends of the Carbon Market. World Bank. 2011.

²Ecosystem Marketplace Back to the Future, State of the Voluntary Carbon Markets. 2011.

Voluntary market profile

AEP AMERICAN ELECTRIC POWER Bank of America Merrill Lynch



BUYERS



CATHAY PACIFIC

Disney

DUPONT
The miracles of science™

Google™

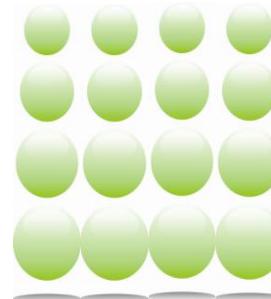
The co-operative



Rabobank



HSBC



SELLERS



29%



20%



35%

U.S.A.

28%

Latin America

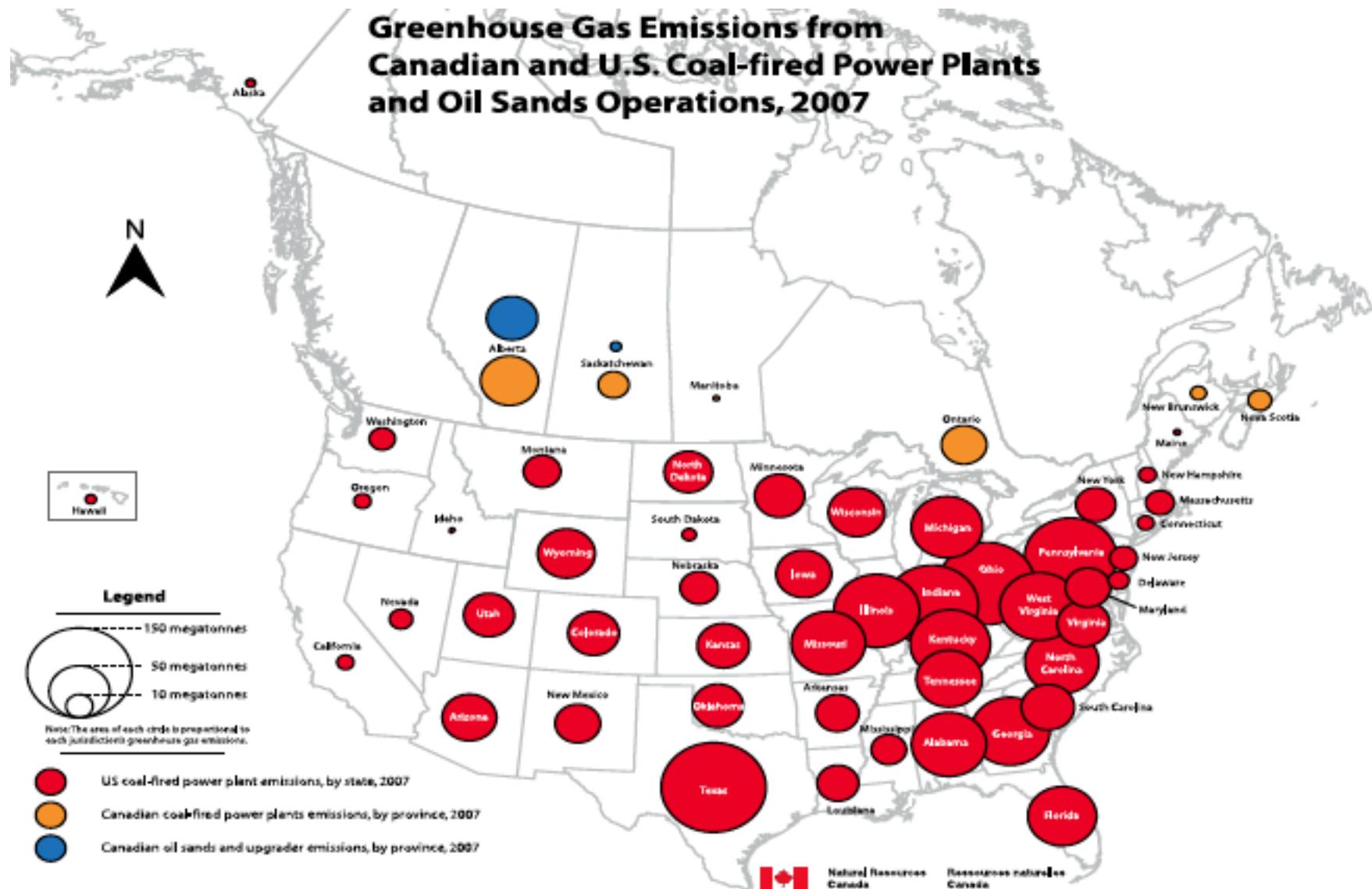
17%

Asia

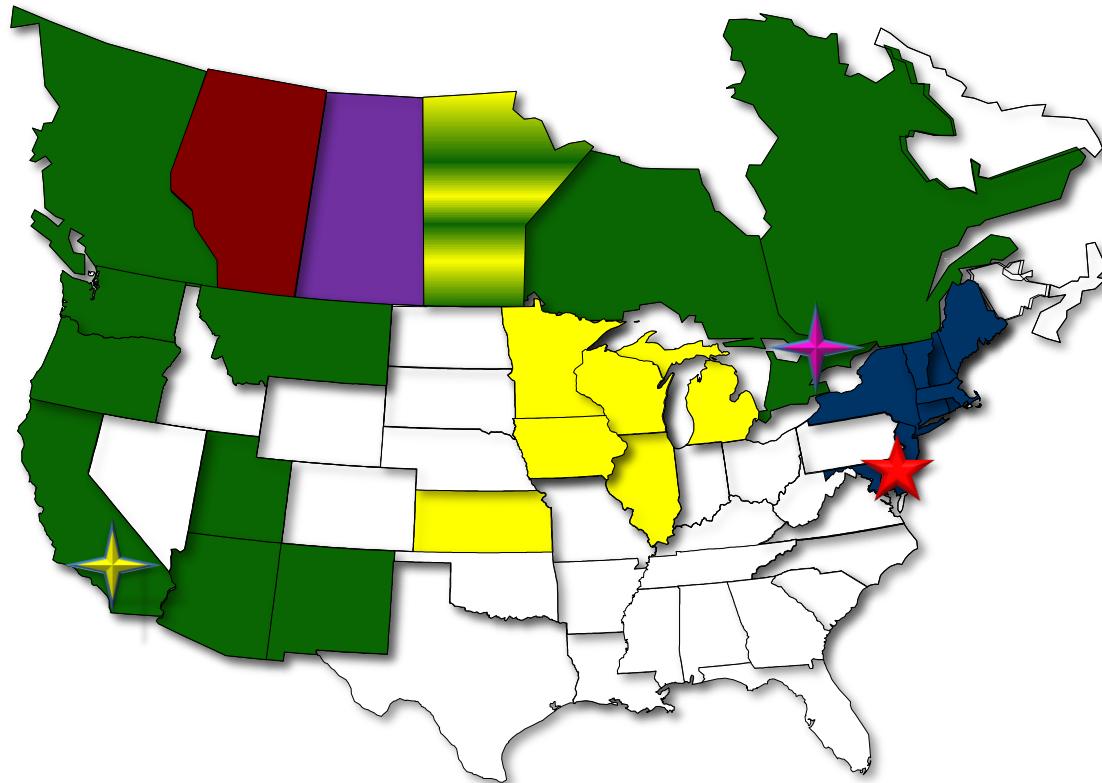
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Greenhouse Gas Emissions from Canadian and U.S. Coal-fired Power Plants and Oil Sands Operations, 2007



N.A Carbon Pricing Policies



- Western Climate Initiative † *
- Midwestern GHG Reduction Accord*
- SK Bill 95*
- Canadian Federal Initiative*
- American Federal Initiative*

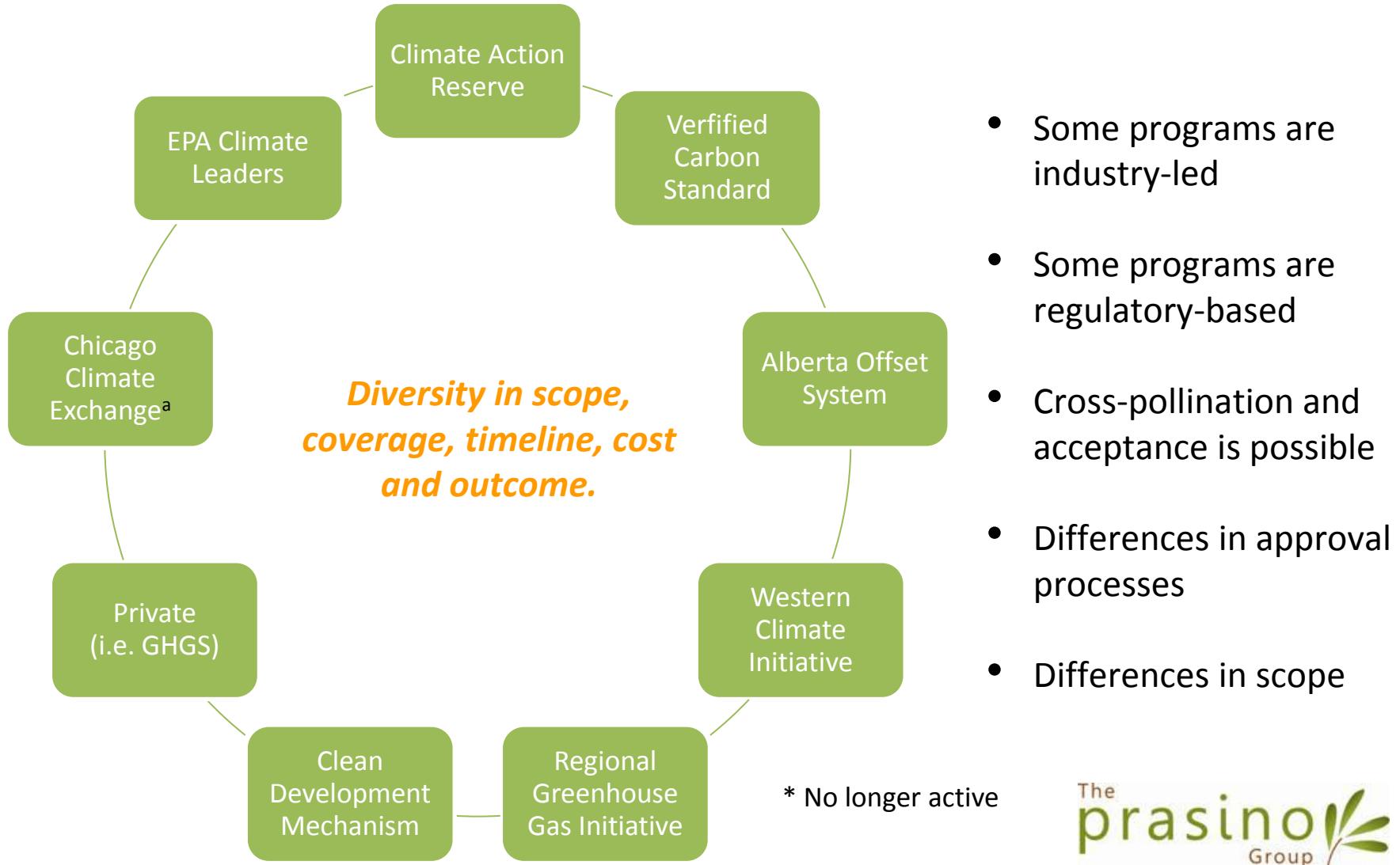
- Regional GHG Initiative
- AB Specified Gas Emitters Regulation
- California AB32

* Not in effect currently

† Enabling policies have been implemented

British Columbia is moving forward as is Quebec and California

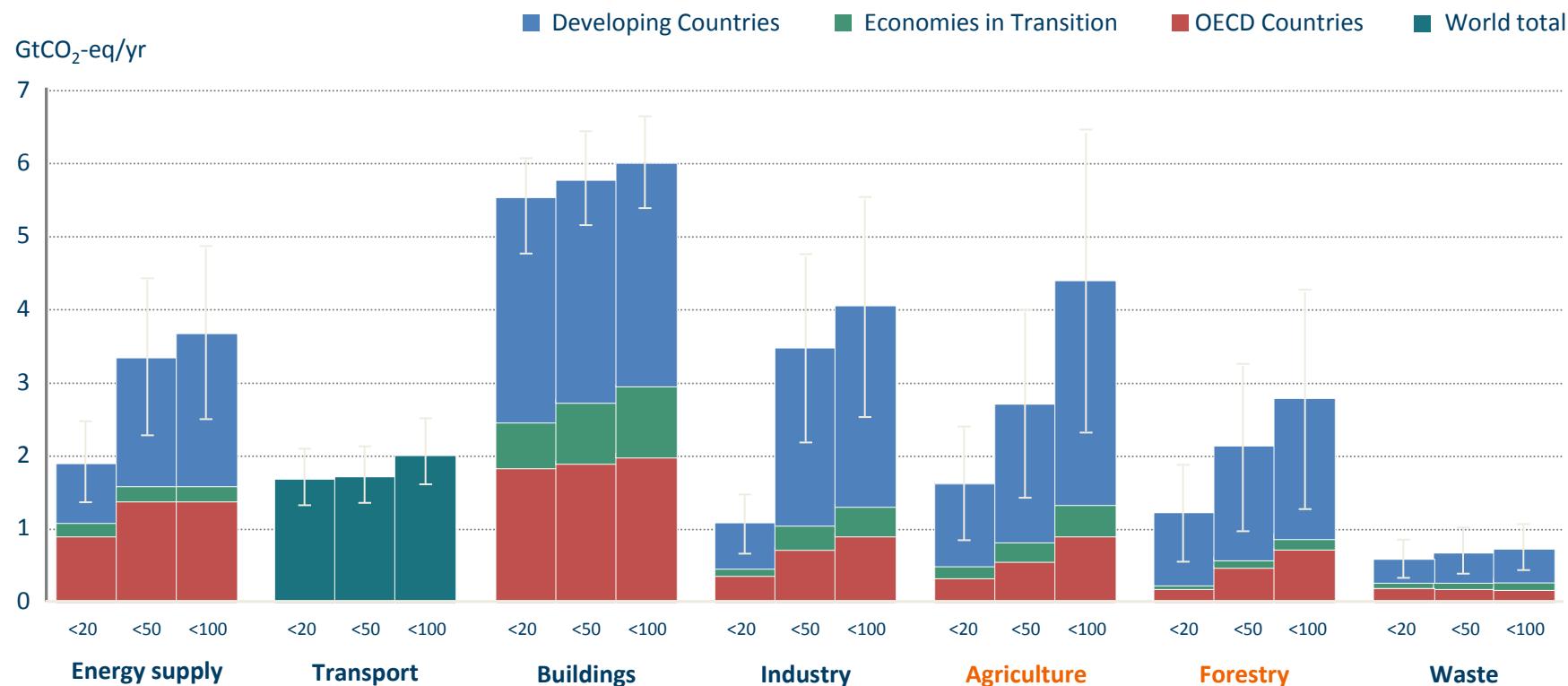
The Carbon Price Rule Confusion



Science, policy and market considerations in creating opportunity for agricultural innovation

1. The impetus agricultural carbon innovation
1. Where science, policy and markets meet
2. Opportunities and constraints for agricultural carbon mitigation
3. Leveraging science to enable agricultural mitigation

Mitigation Potentials by Sector – IPCC 4th Assessment Report



Relative contribution of Agriculture + Forestry to total mitigation potential

US\$ 20/tCO₂ – 21%

US\$ 50/tCO₂ – 32%

US\$ 100/tCO₂ – 45%

*Slide courtesy of D. Martino, Coordinating Co-Chair of IPCC 4th Assessment Report, 2008, Agriculture Chapter

A Mitigation Opportunity - Missed by Kyoto

	Emission Reductions (GtCO₂-eq/yr)	
Mitigation Practice	Economic Potential	Kyoto Mechanisms
C sequestration in agricultural lands	4.0 (2.8/1.2)	~0 (three AI Parties)
Afforestation / Reforestation / Agroforestry	0.8 (0.6/0.2)	n/e (nil in NAI Parties)
Reduced emissions from deforestation	0.8 (0.7/0.1)	n/e (nil in NAI Parties)
Forest management	1.3 (0.7/0.6)	0.2 (20 AI Parties)
Total	6.9 (4.8/2.1)	<0.5

Developed Countries: net sink of **1.2 Gt CO₂** in 2004

*Slide courtesy of D. Martino, Presentation to IISD, Winnipeg 2009

Bridging the Science-Policy Gap

- Two Major International Enablers:
 1. Intergovernmental Panel on Climate Change
 - Science-based Guidance on GHG quantification
 - Different Tiers of customization (Tier 1,2,3 – Country level accounting)
 1. Project-Level (Offset) Accounting Standards
 - WRI GHG Protocol/ISO 14064-2
 - Promotes consistency and transparency in GHG quantification, monitoring, reporting and verification
- Similarities:
 - Quantification, assessment, fidelity and truthfulness stressed in both
 - Principles - completeness, accuracy, consistency, transparency and documentation

Key Enablers in ISO 14064:2

- Completeness Principle:
 - Knowledge and Scientific Judgment
 - Substitute for direct evidence where lacking or impossible to measure cost-effectively
 - Models and conversion factors
 - Estimate uncertainty
- Conservativeness Principle
 - Applied as a risk-based approach where science is less synthesized, but uncertainties are known
 - Strive to underestimate baseline emissions
 - Collective decisions by synthesizing the literature, and putting it through expert peer review (IPCC style)
 - “Serves as a moderator to accuracy”

ISO 14064:2 Principles

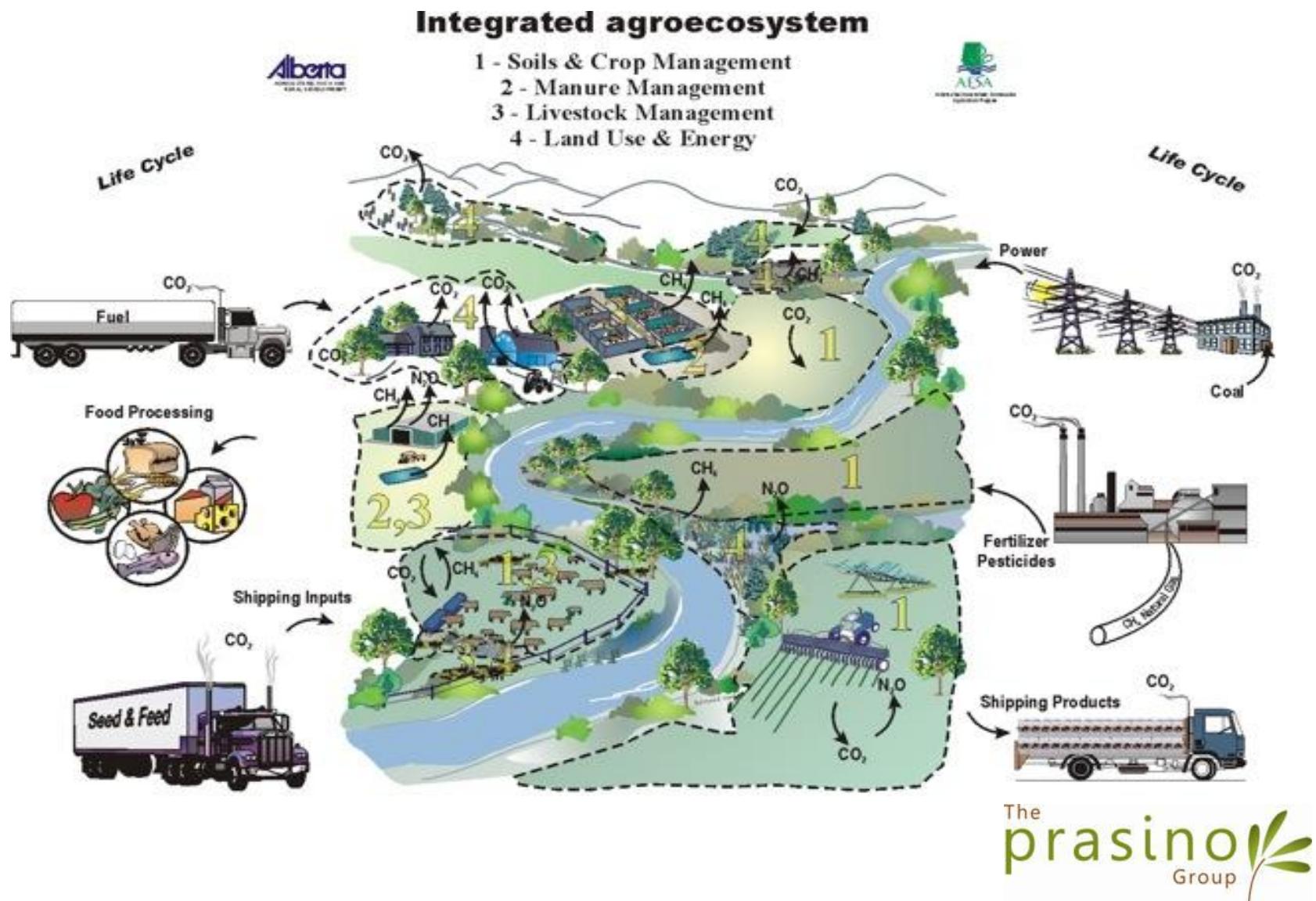
Quantification Approaches for Agriculture

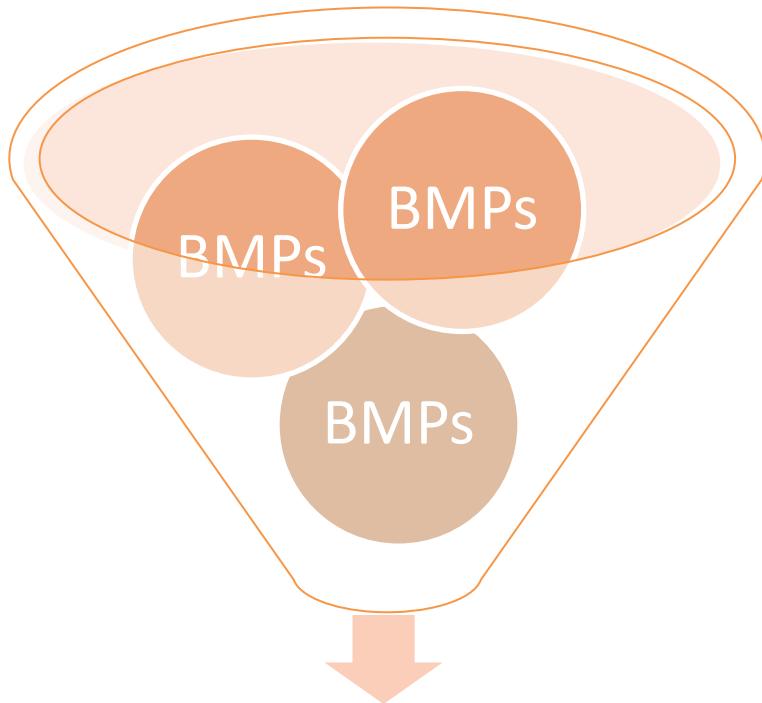
Complexity	Quantification approach	Aggregation Level/Uncertainty	Notes
Tier 1	IPCC Tier 1 default factors	Typically large spatial units; National scale; annual resolution	Suitable for rough overviews and where limited data is available
Tier 2	Hybrid of process-model; empirical data; some default factors	Finer spatial and temporal resolution than above; can be monthly time step; application will depend on available information	Can be suitable for project-based accounting and inventory roll-ups to national scale;
Tier 3	Process-based models	Site-scale with weekly resolution	Suitable for small-scale applications where local variability can be managed; complexity, cost and time spent applying the model may be beyond the average project developers expertise.
	Sampling and Measurement	Site scale uncertainty can be high if not applied correctly	Level of errors may become overwhelming in sites/projects with high variability can be most costly to implement

A Harmonizing Set of Policy Criteria

- **Additional/Incremental**
 - beyond business as usual practice/technologies (needs a valid and defensible baseline at the project start); surplus to regulations/received incentives)
- **Measurable, Quantifiable**
 - agreement on best available science and activity data – develop a Protocol. Must stand up to a Review Process; account for all 6 GHGs – addresses leakage, uncertainty.
- **Verifiable**
 - carbon accounting, and tracking process must be clear, defensible, and have good QA/QC procedures; verified by qualified 3rd party.
- **Permanent**
 - must protect against carbon reversals; account and replace mechanisms
- **Functionally Equivalent – Consistent Metrics (intensity-based)**
 - same level of quantity or service between baseline and project
 - *A common base for calculating emission reductions*

Quantification – On-Farm, Upstream/Downstream and Activity Shifting





Offset Policy Criteria

Where
Science,
Policy, and
Markets
Meet

Commercializable Commodity =
Carbon Offset

- Four aspects:
 1. **Quantification Methodology** – modeled (estimated), measured, calculated - best available science, IPCC, NIR methods, etc.
 2. **Quantification accounting basis** – principles and procedures for calculating the GHG reduction
 - ISO-14064:2; Baseline to Project – relative quantification
 - 6 Principles
 - Procedures for addressing offset criteria – permanence, ownership, Measuring, Monitoring, Reporting and Verification
 3. **Farm Activity Data** - the data collected from the Project/Farm to calculate the GHG reductions
 4. **Farm or Third Party Source Documentation** – evidence to support the data that went into the GHG calculations –" Positive Proof" that activities occurred

The Opportunity



Carbon Sequestration – Agriculture soils and forestry sub-wedge opportunities.



GHG Reductions – Direct reductions from livestock, nitrogen management and other sub-wedge opportunities.



Waste Management – Avoided methane emissions, methane capture and destruction, biogas, indirect reductions through electricity and heat capture sub-wedges.



Materials Switching – Substituting biological products such as biofertilizer, biocomposites and biomaterials.



Strategic Carbon Management – Landscape level or integrated large scale opportunities to reduce emissions.

Activity Constraints



Lack of enabling public policy or current public policy barriers (domestic and international);



Limited understanding of the range of practices and technologies, with a clear assessment of their potentials;



Lack of credible measurements of emission reductions associated with various practices and technologies;



Confusion among the types of Carbon accounting standards (i.e. Carbon Offsets, Life Cycle Assessments, Carbon Footprinting) for recognizing the environmental values created;

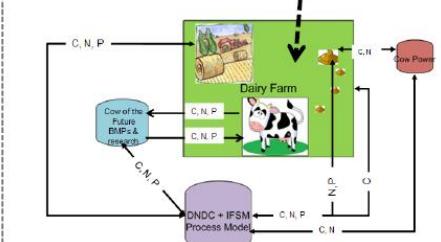


The lack of a coherent and coordinated approach to address biological potentials.

Corporate Initiative Examples - North American Context

Innovate: FarmSmart project

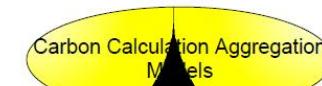
Farm Site Information



- Availability of Providers
- Cost
- Grant
- Bidding

Farmers Decision Making

Quantifiable Reductions



LCA Reporting

Life Cycle Assessment

Sustainability Scorecarding

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