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# Canadian Climate Change Policy

**Karen Haugen-Kozyra, M.Sc. P.Ag.**

**Director, Policy Development and Offset Solutions**

**Climate Change Central**

**Forestry/Agriculture GHG Modeling Forum**

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**Shepherdstown, West Virginia**

*Albertans taking action*

# C3 Background



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- Climate Change Central was formed in 2000, Triple P Partnership
- Focus on reducing greenhouse gases
  - Policy, energy efficiency, technology development, environmental communications.
- Goal is to empower Albertans to take action on climate change
- Facilitated development of the Carbon Market in Alberta



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- Canadian Climate Change Policy
- Quantification Frameworks
- Offsets and Protocol Development

# In a Nutshell...



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**And it's not  
getting any  
better...**

**Expecting clarity  
sometime mid-  
summer**

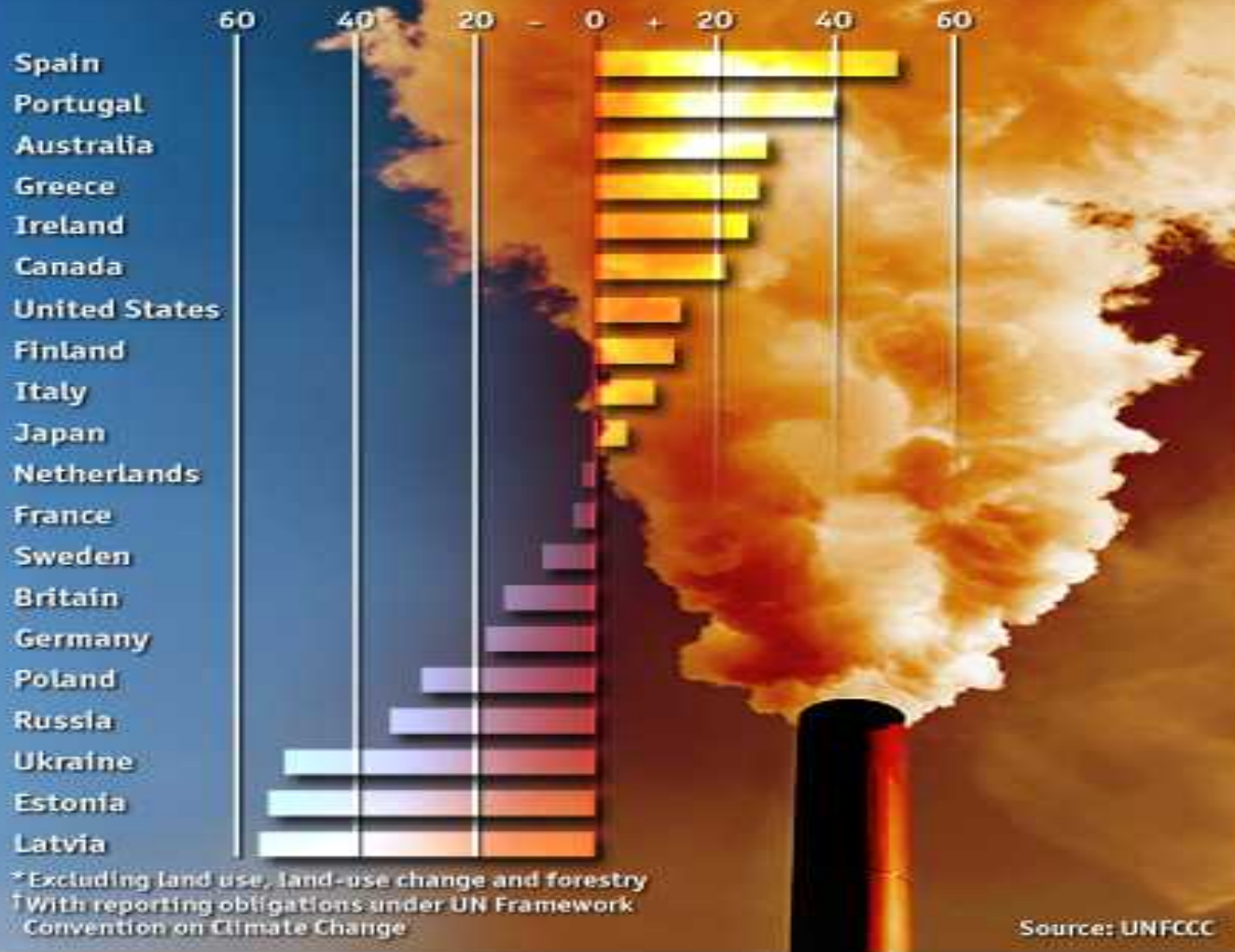
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# We're Not Doing so Hot....



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Change in greenhouse-gas emissions\*, 1990-2006, %  
Selected countries†

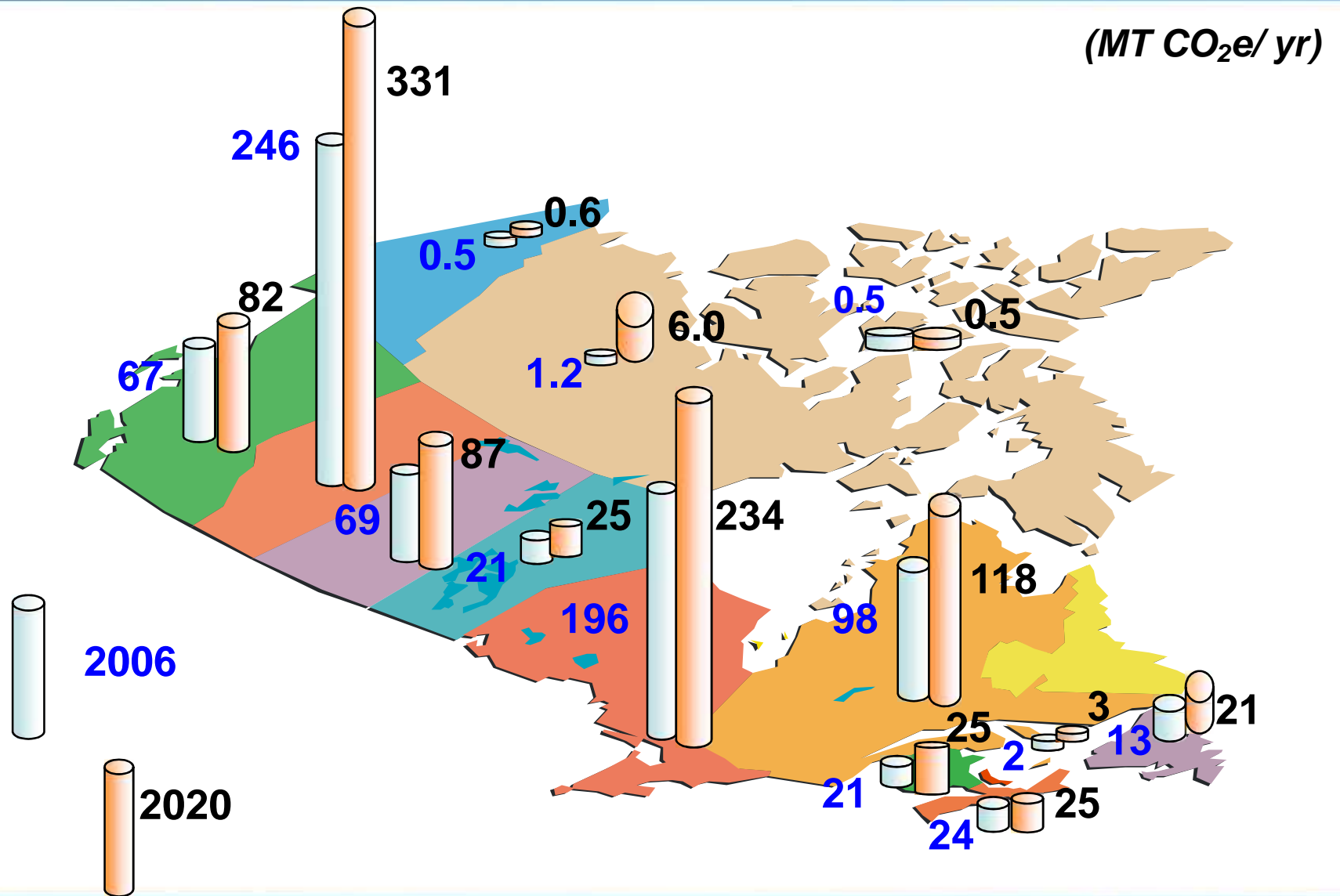


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# GHG Emissions in the Canadian Context



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# The Ride Behind Us



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**1996 – Climate Change Program** (↓20% 1990 by 2005)

**1997 – Kyoto signed** (↓6%1990 by '08-12)  
– 12% above 1990 BAU emissions

**1998 – 16 Experts/Issues Tables; NCCP**

**1999 – DOE/ENV – Baseline Protection**

**2000 – Climate Change Plan 2000**

**2001 - Domestic Emissions Trading WG**

**2002 - Kyoto Ratified**

- Sector Agreement discussions with Large Final Emitters
- Trade Dept, CDM/JI Tours with Industry

**2003 - \$1B Climate Change Plan**

- Principles for Domestic Emissions Trading Program Set

**2004 – One Tonne Challenge**

- Expecting Fall Regulations

**2005 –\$10B to meet Kyoto Targets** by '08-'12;

- 22% above1990 BAU emissions
- Regulations/Offset System and supporting legislation drafted

**2006 – Change in Government**

- Policy uncertainty – at its Zenith
- 10 to 12 mos regroup

**2007 - Clean Air Act (Bill C-30)** omnibus bill attempted; No to Kyoto

**2007 – GHG Regulatory Framework**

- Minimal consultation

**2008 – Turning the Corner Plan**

- ↓ 20% 2006 levels by 2020
- ↓ 60-70% 2006 levels by 2050

# Expected Emission Reductions by 2020



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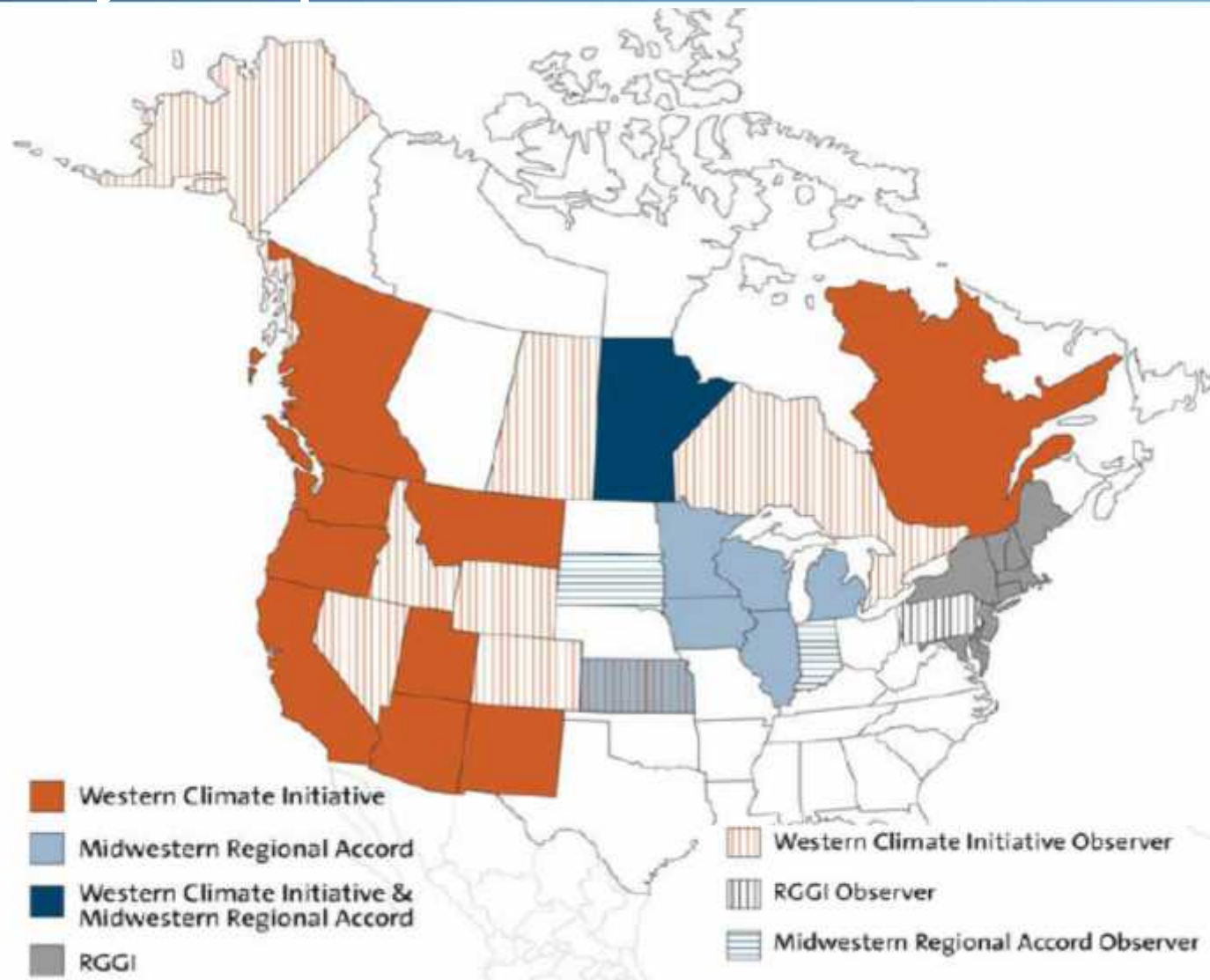
<b>REQUIRED 2020 REDUCTIONS FOR 20% BELOW 2006 LEVELS</b>		<b>~330 Mt</b>	<b>Cumulative from 2006 Levels</b>
<b>FEDERAL ACTIONS</b>	<i>Turning the Corner:</i> Transportation and Consumer and Commercial Products	~ 65 Mt	4.0% ↓
	<i>Turning the Corner:</i> Industrial Regulations	~ 165 Mt	14.0% ↓
<b>PROVINCIAL ACTIONS</b>	Provincial actions announced to date	~ 80 Mt	16.5% ↓
	Clean Electricity	~ 25 Mt	18.0% ↓
	New Measures	~ 35 Mt	20.0% ↓



# The NA Climate Policy Map\*



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\* *Climate Perspectives Bulletin 2008*

*Fasken-Martineau/Perkins Cole*



1. Surplus Credits
  - These are credits for better than target performance (if reduce below the target)
2. Fund Credits
  - Invest in the Technology Fund at \$15/tonne – funds used to develop or invest in technologies, programs, and other priority areas
3. Carbon Offsets
  - Emission Reductions from unregulated companies sold into the System

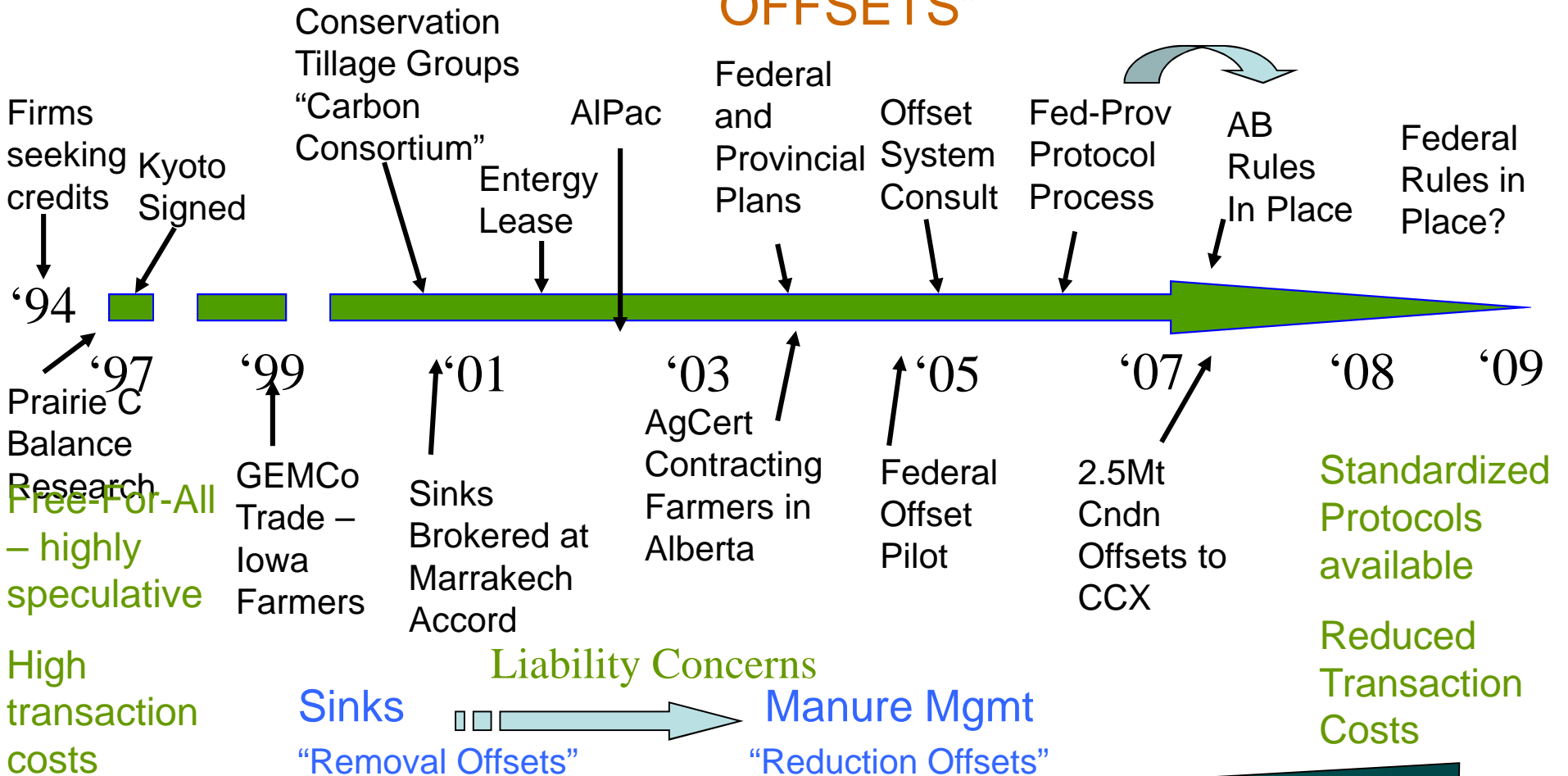
# Offsets Just as Bumpy...



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RISK

## "OFFSETS"



PRICE



- Emission Offsets:
  - Action (project) taken on/after January 1, 2002
  - All actions must occur in Alberta
  - Must be **real, quantifiable and measurable**
  - Not otherwise required by law; clearly owned
  - Must be verified by 3<sup>rd</sup> party
  - Guidance Documents (Projects, Verification, Protocols)
  - Protocols – Most comprehensive set in NA
    - 25 Approved
    - 9 more in protocol review process
    - 6 more signalled their intent
  - Project-based Registry launched = Alberta Offset Emission Registry (AEOR)

***Connect to [www.carbonoffsetsolutions.ca](http://www.carbonoffsetsolutions.ca)***



- 2007 - 25% of liabilities -settled with offsets.
- Tillage System protocol favoured
  - 7 Projects: 3 Tillage, 2 Wind, 1 LFG, 1 Biomass
- \$6 to \$12 / tonne
  - 30-40% transaction costs by aggregators
- To Date - 5 Million tonnes of Offsets created  
13 tillage Projects (approx 1.3 Mt of No Till Offsets)
- Good for Capacity Building

***Note – Demand approx 10 to 12 Mt per year***



# **Progress on Offsets Quantification in Agriculture and Forestry**

Began in the West in 2002...



- **Western Canadian Offset Team - 2002**
- **NOQT – 2003-2006; Fed-Prov-Territorial Committee**
  - **Mandate** -Identify, and prioritise GHG Quantification Protocols to support Offset System
  - Work as of 2006: Afforestation; Biogas, Land fill Gas, Ag Soil Sequestration, Biogas, Beef, Pork, Energy Efficiency, Intermodal
  - CFS started on FCM...



- **Additional/Incremental** – beyond business as usual (establish valid and defensible baseline post Program Start Date); surplus to regulations/received incentives)
- **Real, Measurable, Quantifiable** – agreement on best available science and activity data – develop a Protocol. Must stand up to Transparent Review Processes; account for all 6 GHGs.
- **Verifiable** – carbon accounting, and tracking process must be clear, defensible, and have good QA/QC procedures; verified by qualified third party
- **Permanent** – must protect against carbon reversals; account and replace mechanisms
- **Clearly Owned** – Can be a barrier
- **Not Double Counted** – Registered and serialized once;



# Risk of Inaction too great...



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- Two Major International Enablers:
  1. Country-Level Accounting Standards - Intergovernmental Panel on Climate Change
    - Guidance on Tier I, II and III approaches
  2. Project-Level Quantification Frameworks
    - WRI GHG Protocol/ISO 14064-2
    - Promotes consistency and transparency in GHG quantification, monitoring, reporting and verification

***We must bridge the Science-Policy Divide, by taking action with what we confidently know today, in a risk-based assessment framework***

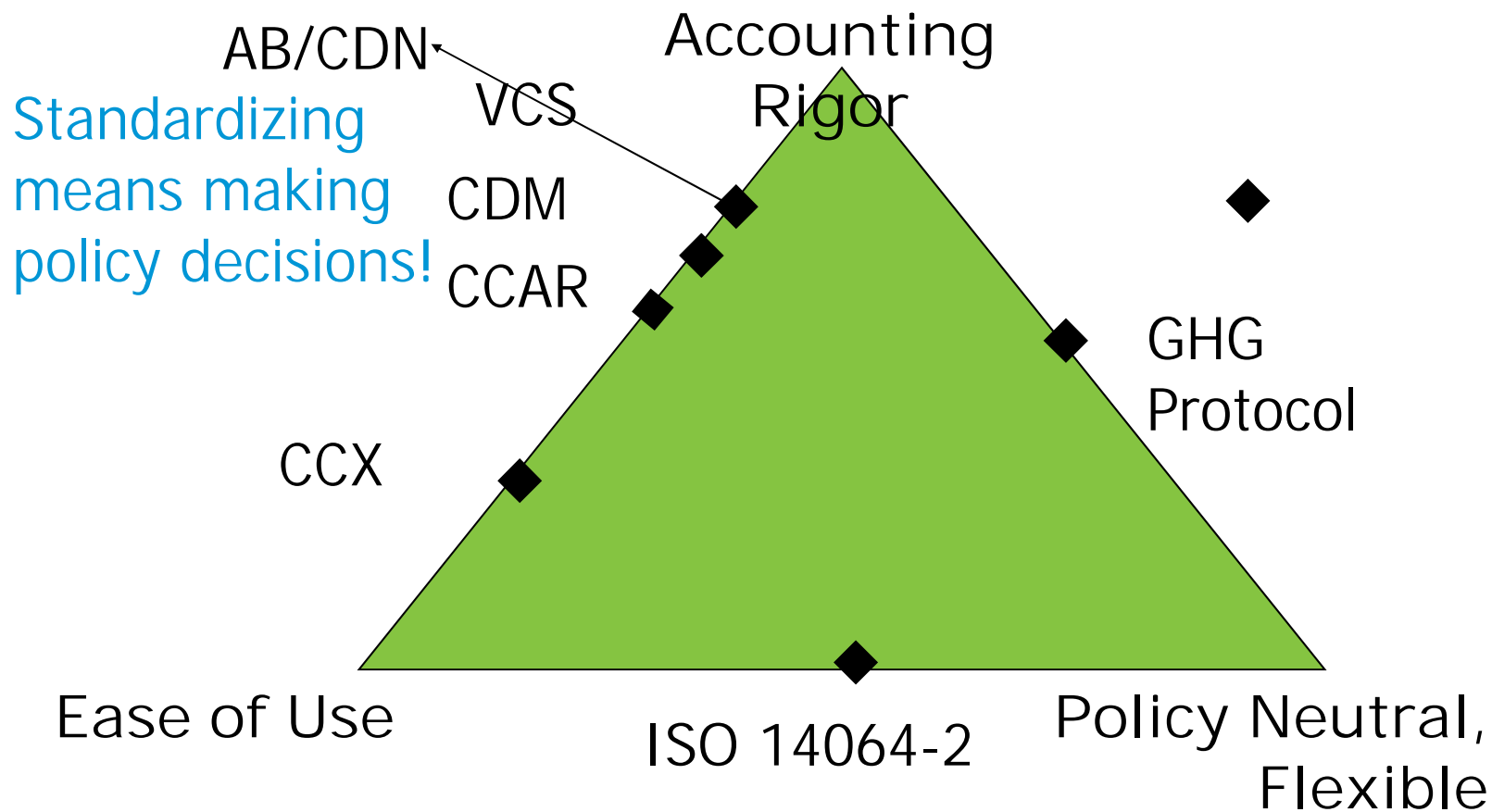


- World has collaborated on Guidance for GHG Quantification
  - Intergovernmental Panel on Climate Change (IPCC 1994, 2001, 2006)
  - Pioneering Standards for GHG Quantification for Country level accounting
  - A Framework for understanding best available science:
    - regularly compiling it and identifying consistent, agreed-to ways of calculating baseline year emissions;
    - which sources/sinks count,
    - emission factors to be used,
    - standard formulae;
    - and QA/QC procedures.

# Carbon Offset (Project-based) Accounting Standards



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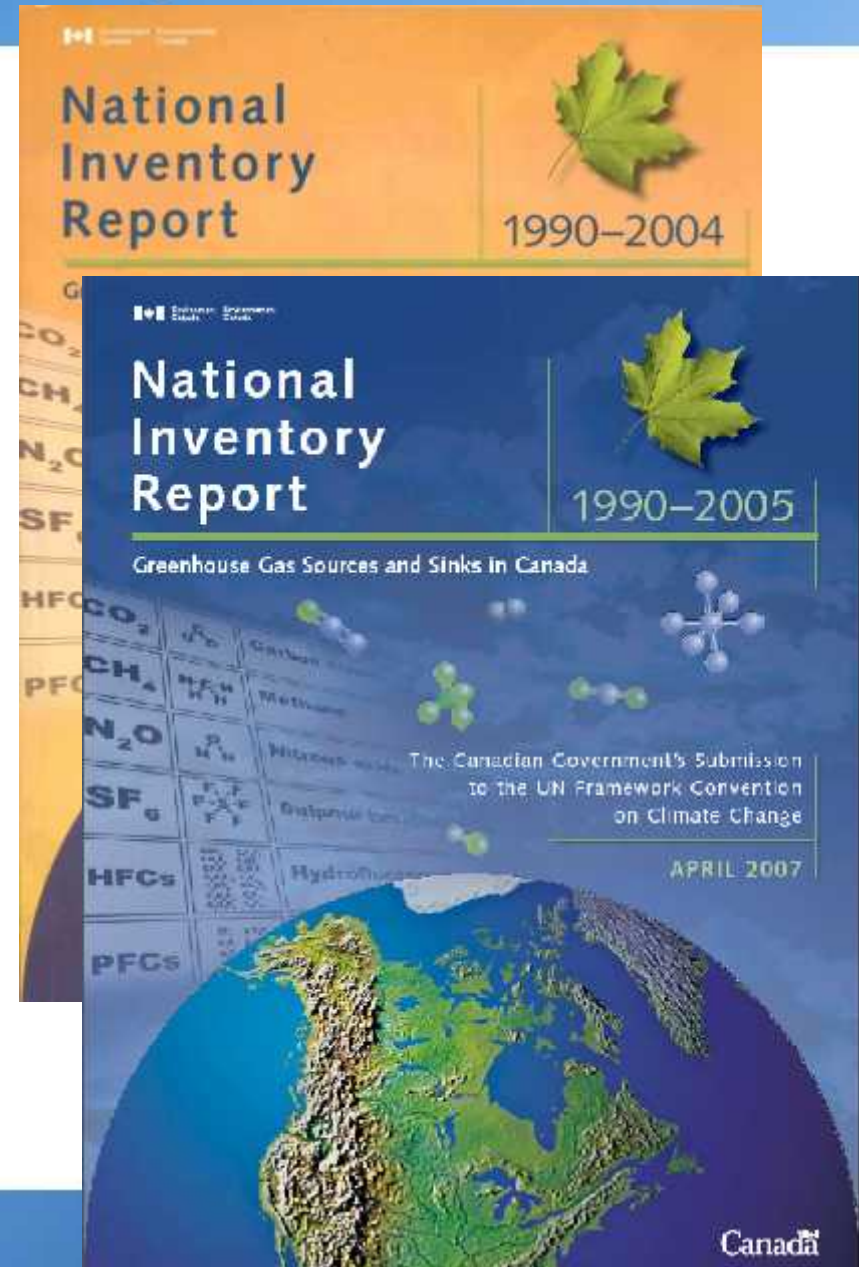


# C Accounting



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- Project Quantification – alignment with National Inventory methods preferred
  - Inventory accounting (emission factors etc) linked to project accounting
  - Project activity level (msmts of cattle, diets, feed intake, etc) linked to inventory emission factors
  - “First Generation Protocols” – with goal of continuous improvement every 5-8 years
  - Basis to drive further refinements



# Fundamentals of Offsets: “Baseline-Project = Offsets”



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- Project Condition
  - What happens (GHGs) in the improved practice/new technology?
- Baseline Condition
  - What was happening (GHG emissions) in the old practice, before the change?
- Are they comparable (same level of activity, product, service) (aka Functional Equivalence)?
- Evidence – Document it:
  - Quantification Plan
  - Monitoring Plan
  - Data Management System and Data Controls

***Defines the Size of the Benefit – or number of carbon offsets per eligible project***

# Baseline Approaches:



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- Historic – site specific usually; assumes past trends continue
- **Performance Standard** – assumes a typical emissions profile for the industry or sector or region and is a reasonable representation of the baseline.
- Comparison-Based – control group compared with Project – must establish both.
- **Projection-based** – either forecast emissions with models or straight-line growth assumptions.
- Pre-registered – already approved baselines in other Protocols, where applicable.



- 1. Relevance** - select GHG sources and sinks, emission factors and formulae appropriate to the environmental integrity of the protocol.
- 2. Completeness** – should consider all relevant GHG emissions and removals. Relevant information used to support decisions made in the quantification process should be transparently documented.
- 3. Consistency** - to ensure meaningful comparison of GHG-related information. In particular, like emissions need to be compared in baseline and project scenarios – ‘Functional equivalence’.
- 4. Accuracy** - reduce bias and uncertainties as far as practical; rely on IPCC and National Inventory methods as much as possible.
- 5. Conservativeness** - conservative assumptions, values and procedures are used to ensure that GHG emission reductions or removal enhancements are not over-estimated.
- 6. Transparency** - present your calculations, assumptions and decisions in a clear, upfront manner that facilitates review by reviewers, interested parties, verifiers - ultimately the Regulator will need this to accept the protocols.



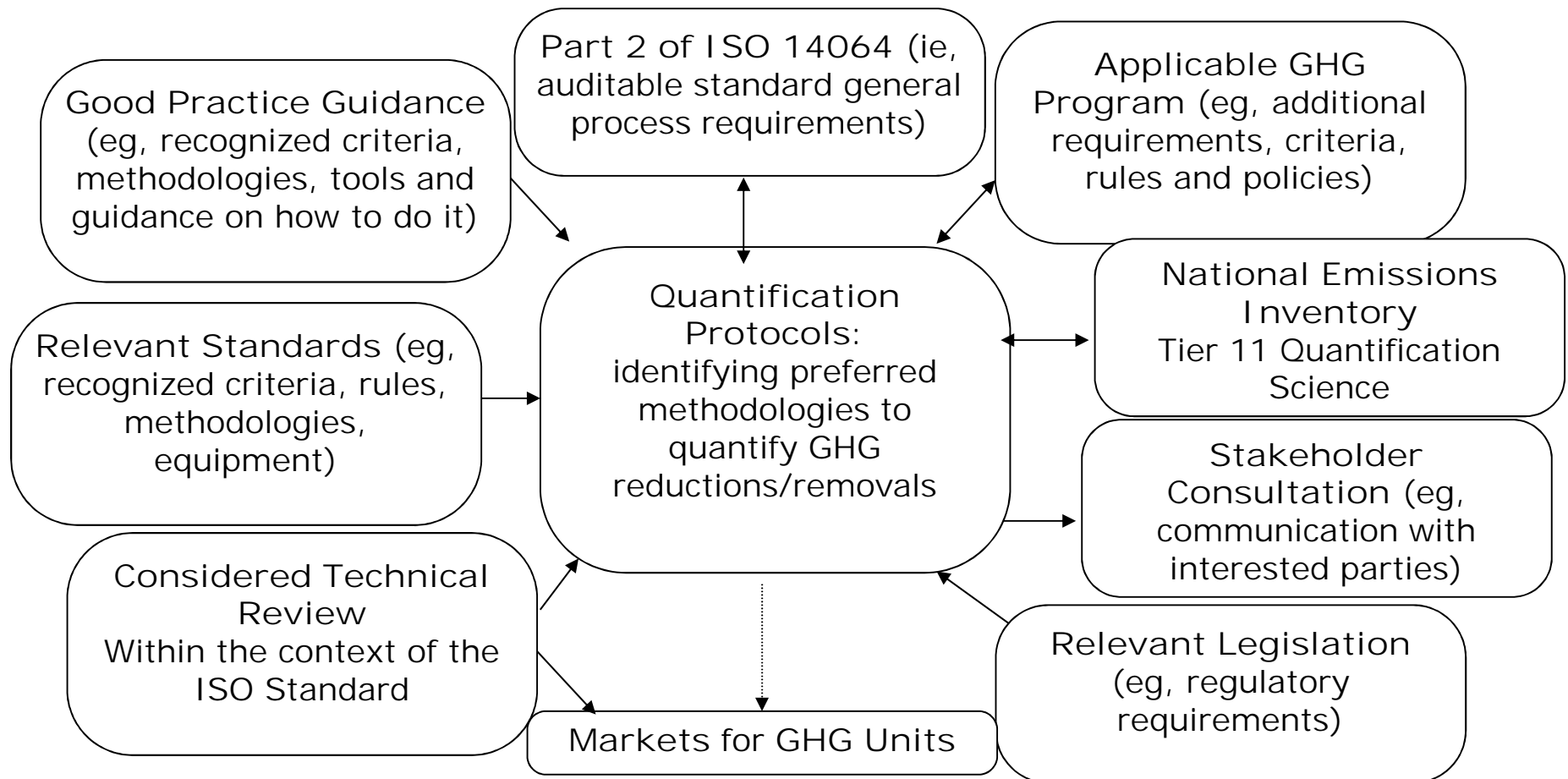
- **Completeness Principle:**
  - Knowledge and Scientific Judgment
    - Substitute for direct evidence where lacking
    - Models and conversion factors
    - Estimate uncertainty
- **Conservativeness Principle**
  - Applied as a risk-based approach where science is less robust, but directionally there
  - Strive to underestimate baseline emissions
    - Use the 80:20 rule; collective decisions through expert peer review (IPCC style)
    - “Serves as a moderator to accuracy”



# Protocol Development Requires.....



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## ISO 14064-2

## Offset System Rules

## Protocol Development

## Project Plans



- Defines the Requirements
- Tells proponent what to do not how to do it
- Generic, nonsectoral

- Some requirements given
- Some procedures
- Sectoral

- Performance-based standard' approach: - simplified and prescriptive to achieve a certain level of performance
- Project Type
- Many criteria and procedures established and justified – the how to's

- Project specific
- Must show they meet the requirements
- Establish some criteria and procedures



## Approved

Afforestation

Beef (3)

Biofuels

Biogas

Biomass

Energy Efficiency

Pork

Tillage Systems

Waste Heat

Landfill Gas

## Approved

Renewables (3)

Enhanced Oil Recovery

Acid Gas Injection

Intermodal Switching

Road Rehab

Land Fill Bioreactors

Compost

Energy Efficiency

## In Review

FlyAsh

Engine Fuel Mgmt/  
Vent Gas Capture

Wastewater Trmt

Sludge Application (2)

Fugitive Emissions

Energy Efficiency

Compressor Stn Retrofits

Buildings (3)

N2O Abatement (2)

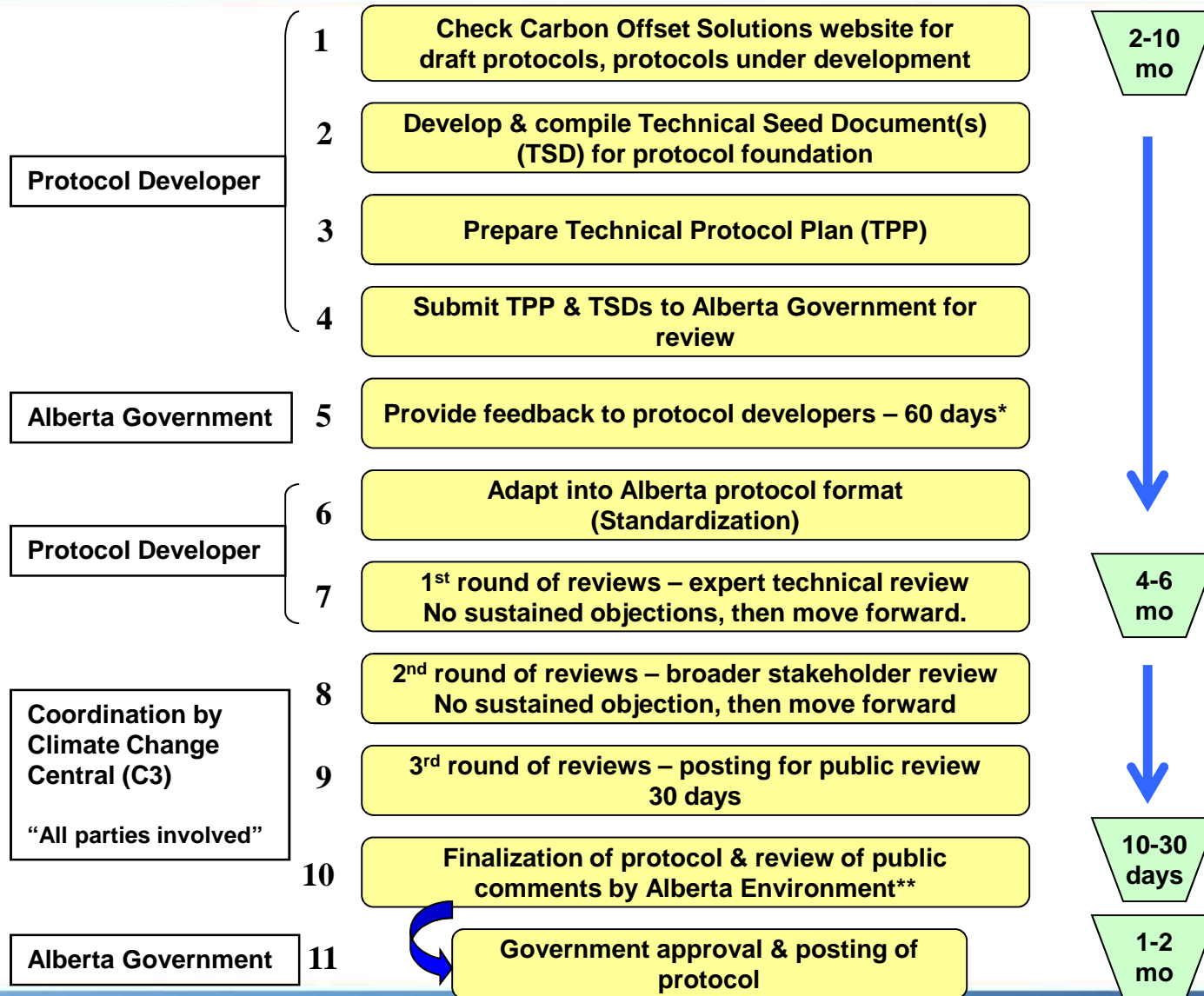
Reduced Summerfallow

Residual Feed Intake Beef

# Protocol Development/ Validation Process



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# Development Process



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- **Phase 1** – Planning and compilation of Technical Seed Documents (4 to 8 mos)
- **Phase 2** – Development of a Science Discussion Paper (3 to 4 mos)
- **Phase 3** – Science Coordination Workshops (1 to 2 mos) for peer-review and consensus building (>80%)
- **Phase 4** – Standardize into Alberta Template (1.5 mos)

Then proceed to the Alberta Protocol Review  
Process (2 to 6 mos)



## *Being Developed or Considered*

Nitrous Oxide Reduction -CFI, AFI

Wetlands Management - DU

Conversion to Perennial Forages

Residue Management

Rangeland

Pasture Management

Soil Amendment



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# Tillage System Management Protocol

# Carbon Made Easy **CARBON OFFSETS**

Illustration: Wai Khan Au  
Text: David Staples

**"Government targets carbon emissions with offset program."**



Mr. Speaker, this offset program allows us to smartly cut back on CO<sub>2</sub> emissions by targeting the most cost-effective places to reduce such emissions.



We thought we'd have to pay tens of millions to Cal's Carbon Busters for new technology to reduce our emissions.

That's a lot of money.

But with this new offset program, we can go in another direction. There are all kinds of offsets, but we like this one with Farmer Frank. If he doesn't till his land, the land doesn't produce as much CO<sub>2</sub> emissions. The government is willing to give him a carbon credit for this reduction in emissions.

We can buy that credit from Farmer Frank, and other offset credits from other farmers. It's going to cost us a few million each year to pay for the offset credits, but it's cheaper than paying \$60 million upfront to Cal's Carbon Busters for this new technology.

I was already going to stop tilling because I am worried about soil erosion. But now I get paid by the government to do what I was going to do anyway.



PAUL'S PERFECT FUCKS



So everyone is happy, except environmental experts, who doubt that offsets actually cut carbon emissions.

Offsets are the next big boondoggle, and they are, in my view, unlikely to be effective.

There's no easy way (for the government) to measure the actual tonnes in an offset.

We're going to be the first to admit that we don't have everything perfect.



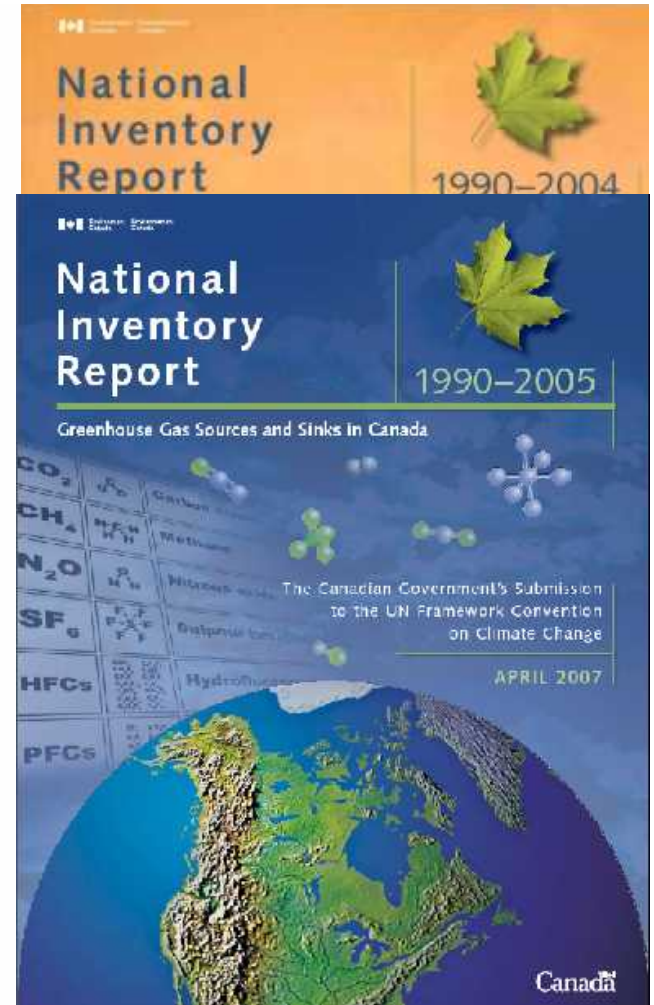
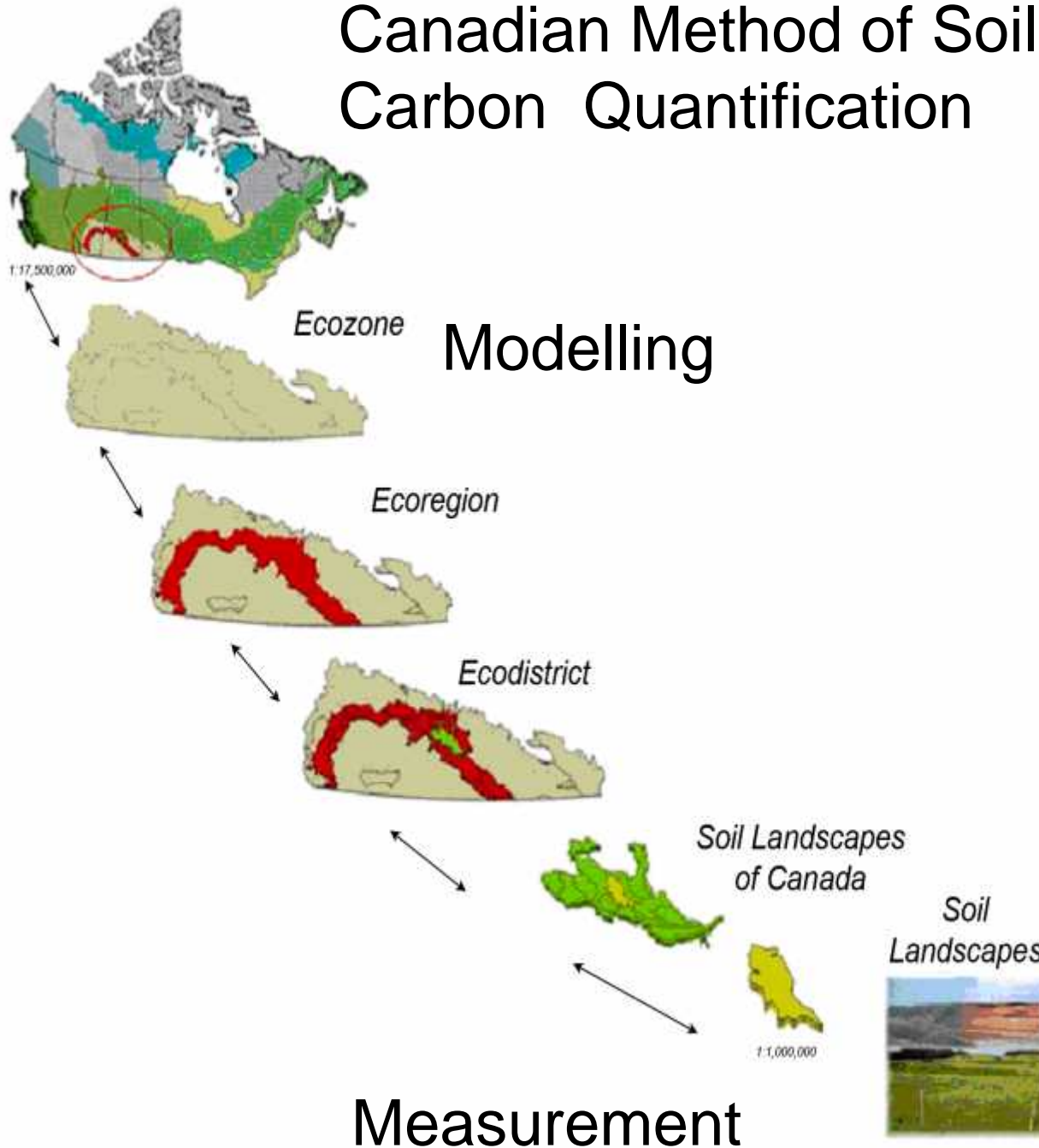
**Mark Jaccard**  
Simon Fraser University



**David Keith**  
University of Calgary



# Canadian Method of Soil Carbon Quantification



# Hybrid Baseline – Performance Std with Projection-Based



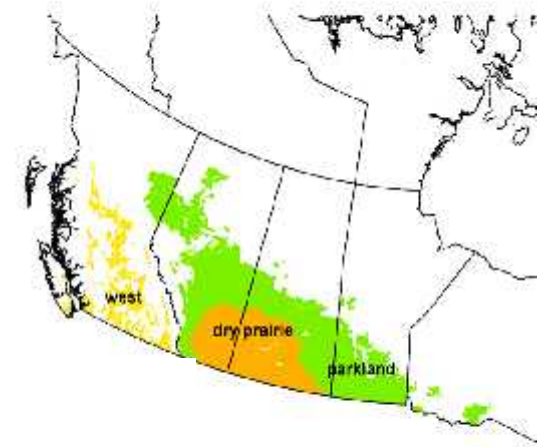
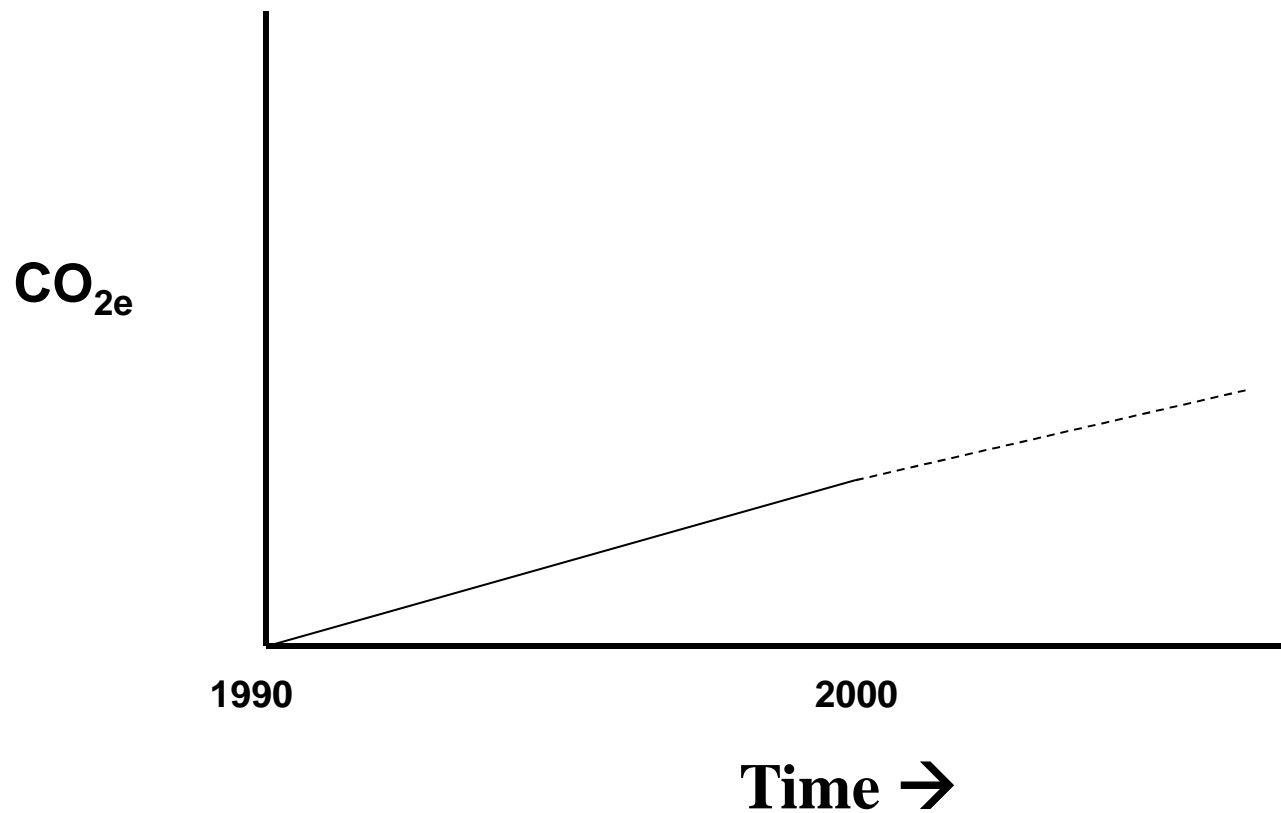
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- Coefficients based on model output, developed and validated with research data (eg. Century for soil carbon)
- Tillage activity definitions
- All that's needed is to monitor the activity
- Minimize administration costs
  - treat large groups of farmers the same
  - cheaper to monitor/verify activity than direct GHG impacts

# Concept – Dry Prairie



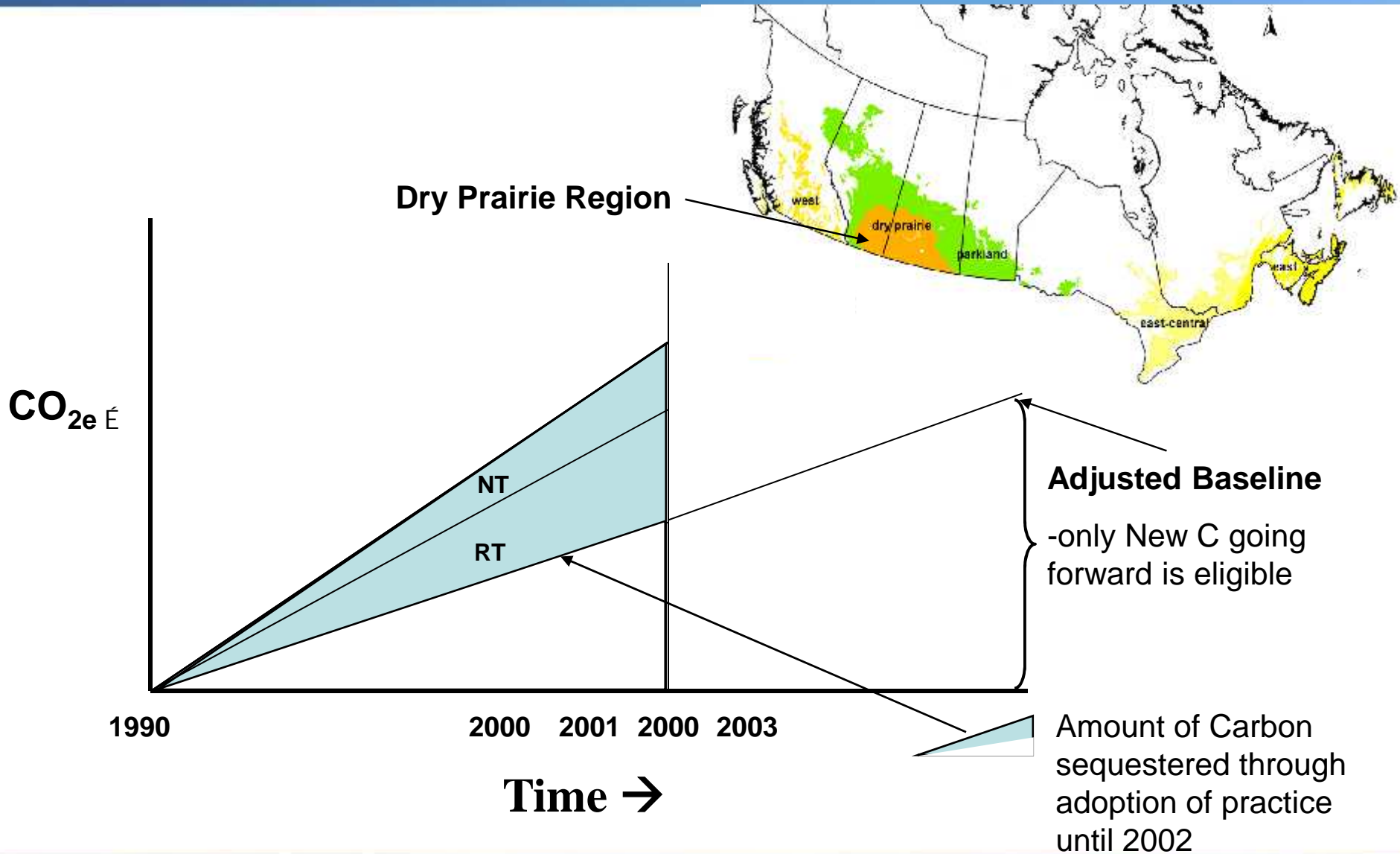
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# Meeting Additionality



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- Must ensure carbon stays in the ground
- Federal context:
  - Reversal coefficients
  - Permanent Offset Credit (20 to 25 year liability period) – producer liable
  - Temporary Credit (expires after 1 year) – buyer liable

# Permanence - Alberta Climate Change Central

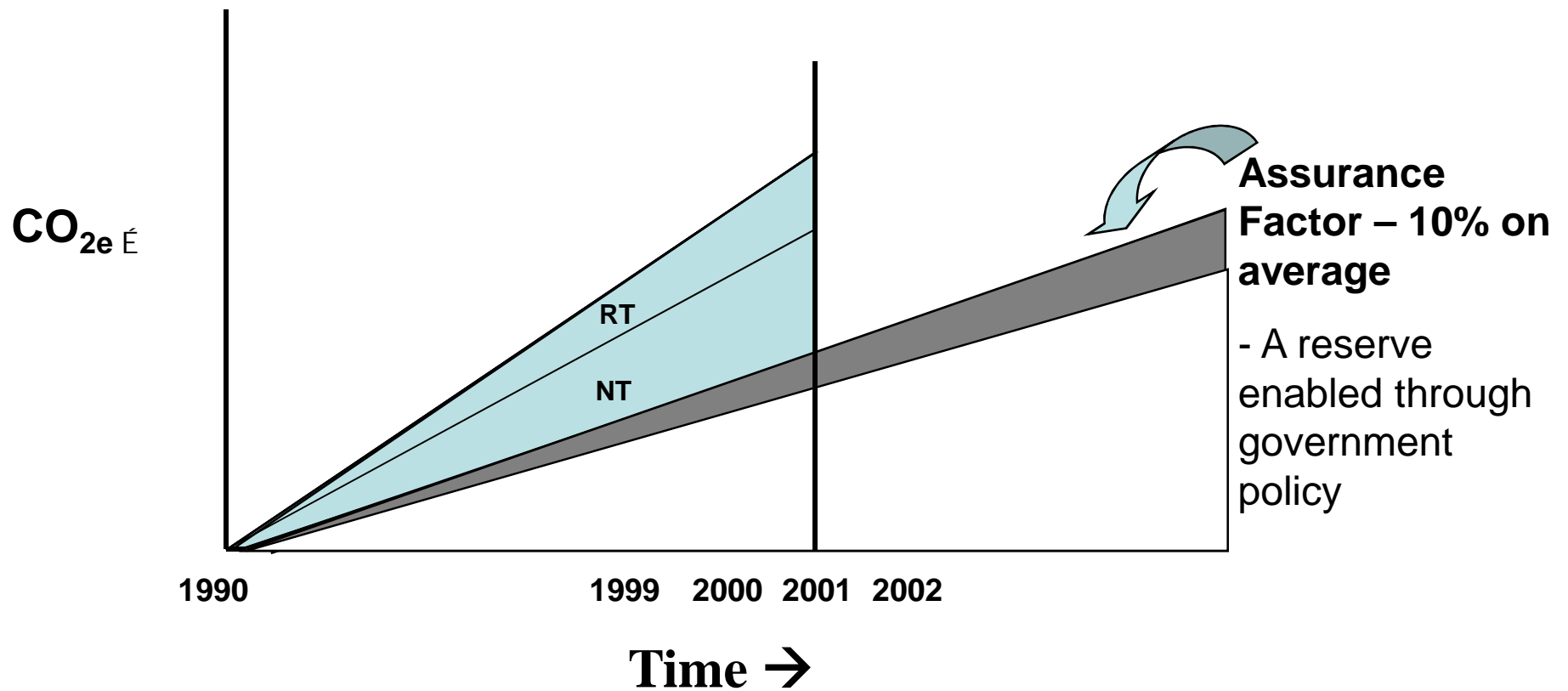
- Government underwrites the reversals
- Assurance Factor
  - Based on expert opinion
  - Risk Assessments - frequency of reversal of tillage practices in Dry Prairie and Parkland
  - Reversal risk – shaves off C for every tonne created – into Reserve-Holdback enabled by government policy
  - Backs the liability of a reversal of Soil C
  - Farmers must disclose reversal of practice - no credits earned for that year (no liability on farmer/project developer)

***Takes a Time-discount problem and solves it with a volume-discount reflecting historical reversal frequency***

# Alberta – Assurance Factor



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- Energy efficiency
- Labour saving
- Increased biodiversity
- Water conservation
- Drives further adoption and maintenance of the sink
- System awareness & understanding
- Industry development
- Increased public recognition to agriculture

*“Recognize, Respect and Reward”*





- C3 Review in March 2008 for Environment Canada:
  - Over 420 Protocols/Standards/Methodologies
  - 10 Landfill Gas Protocols (???)
- Different groups are positioning:
  - Voluntary Carbon Standard
  - Duke University (Nicholas school of environment) is informing CCAR/CAR to prepare the development of an Ag protocol.
  - The Earth Partners (in collaboration with EKO) soil carbon quantification methodology
  - Novecta/Iowa-Illinois Corn Growers - Terravista
  - California Cattlemen's Beef Association
  - Society of American Foresters/AFP
  - Rangeland management: Holistic Management International and others
  - CA Climate Action Registry (CCAR)
- Need a Coordinating Mechanism -similar to Canada
- Consistent Frameworks

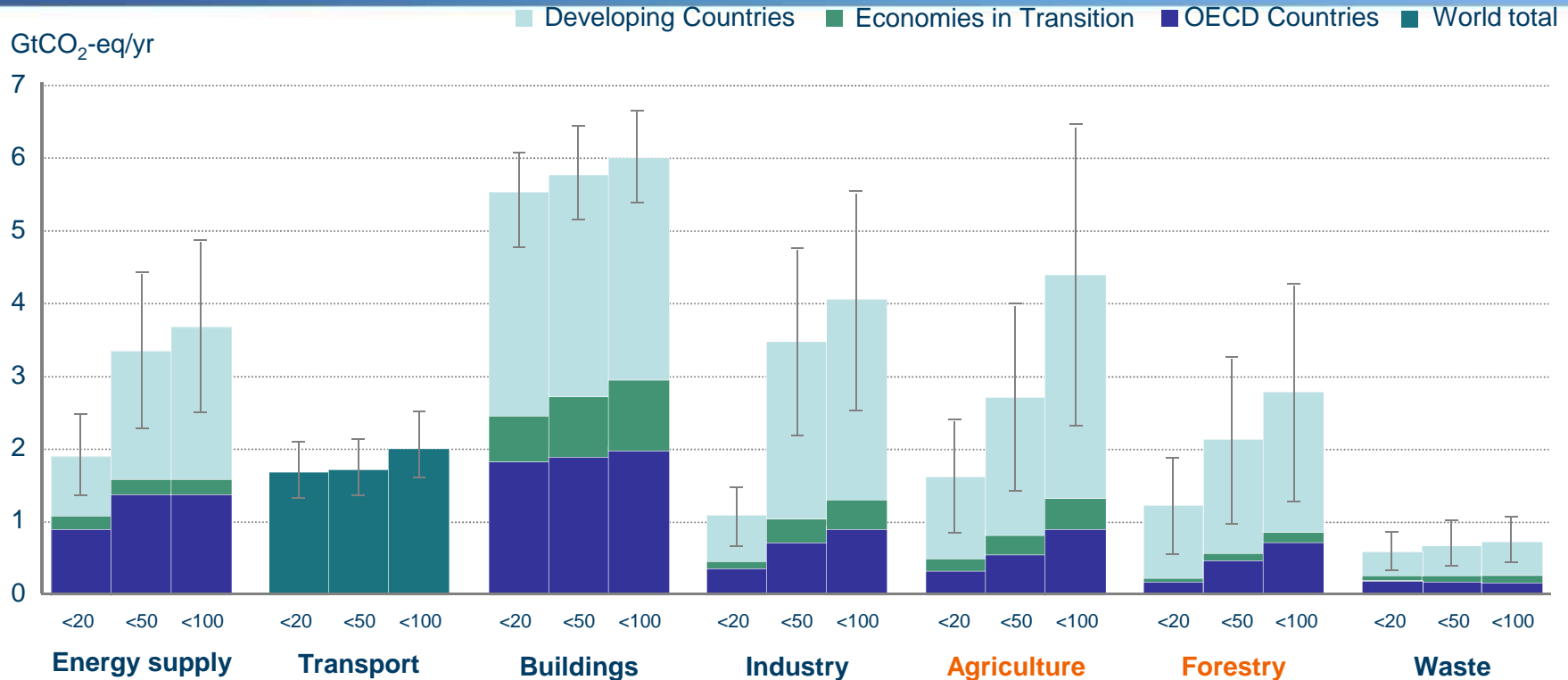


- Last Friday in San Diego: North American Ad Hoc Working Group on Protocols
- WCI, CCAR, OQI, CERP, COPC, C3, Pew, IPOG (Canada)
- Propose to begin a Process for Moving Forward...
- Engage USDA; USEPA

# Mitigation Potentials by Sector



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**Relative contribution of Agriculture + Forestry to total mitigation potential\***

**US\$ 20/tCO<sub>2</sub> – 21%**

**US\$ 50/tCO<sub>2</sub> – 32%**

**US\$ 100/tCO<sub>2</sub> – 45%**

\*D. Martino, 2008; Note, in Canada, Agriculture can contribute more than 20% of Canada's target at \$50 per tonne

# A Mitigation Potential Largely Missed by Kyoto\*

Mitigation Practice	Emission Reductions (GtCO <sub>2</sub> -eq/yr)	
	Economic Potential	Kyoto Mechanisms
<b>C sequestration in agricultural lands</b>	<b>4.0</b> (2.8/1.2)	<b>~0</b> (three AI Parties)
<b>Afforestation / Reforestation / Agroforestry</b>	<b>0.8</b> (0.6/0.2)	<b>n/e</b> (nil in NAI Parties)
<b>Reduced emissions from deforestation</b>	<b>0.8</b> (0.7/0.1)	<b>n/e</b> (nil in NAI Parties)
<b>Forest management</b>	<b>1.3</b> (0.7/0.6)	<b>0.2</b> (20 AI Parties)
<b>Total</b>	<b>6.9</b> (4.8/2.1)	<b>&lt;0.5</b>

Developed Countries: net sink of **1.2 Gt CO<sub>2</sub>** in 2004

\*Slide courtesy of D. Martino,

# Global Carbon Cycle Tipping Point (Gt carbon)



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