Evolution of Carbon Credit Markets
Climate Change
Insurance

October 14, 2010

Overview

- ICF International
- Climate Change
- Carbon Market
- Policy Trends
- Why Should Insurers Care?
- New Market Linkages

ICF History, Experience and Climate Services

ICF History

- Founded in 1969 – Forty years of experience
- Headquarters in the Washington, D.C. area; global presence with 50 offices throughout the world
- Working throughout the energy and environment space
  - Fuel and emission markets, environmental assessment and compliance, policy analysis
  - Air, water, waste
- More than 3,500 employees

Highlights of Climate Experience

- Over 230 professionals with climate-related expertise
- Provided climate policy advice to > 60 governments
- Providing climate strategy advice to > 65 companies in the FT Global 500

Climate Service Offerings

- **Carbon market pricing analysis**
- **Compliance analysis**—how will legislation/regulation affect a company's operations/business
- **Energy efficiency**—portfolio assessment
- **Voluntary strategy support**—companies not likely to face compliance constraints
- **Value-at-risk**—how will various lines of business be affected by action on climate?
- **Financial industry**—investment portfolios, carbon offset businesses, etc. they are/have been developing
- **Carbon offset projects**—project feasibility, project support (PDDs), due diligence, market analysis
- **Carbon footprinting**—initial entrée leading to broader environmental/sustainability strategy

Award-Winning Performance

- Recognized year after year for excellent client support by *Environmental Finance* readers survey
- Best Advisor in four categories plus one Runner-Up in 2009

TWO YEARS RUNNING

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FOUR YEARS RUNNING

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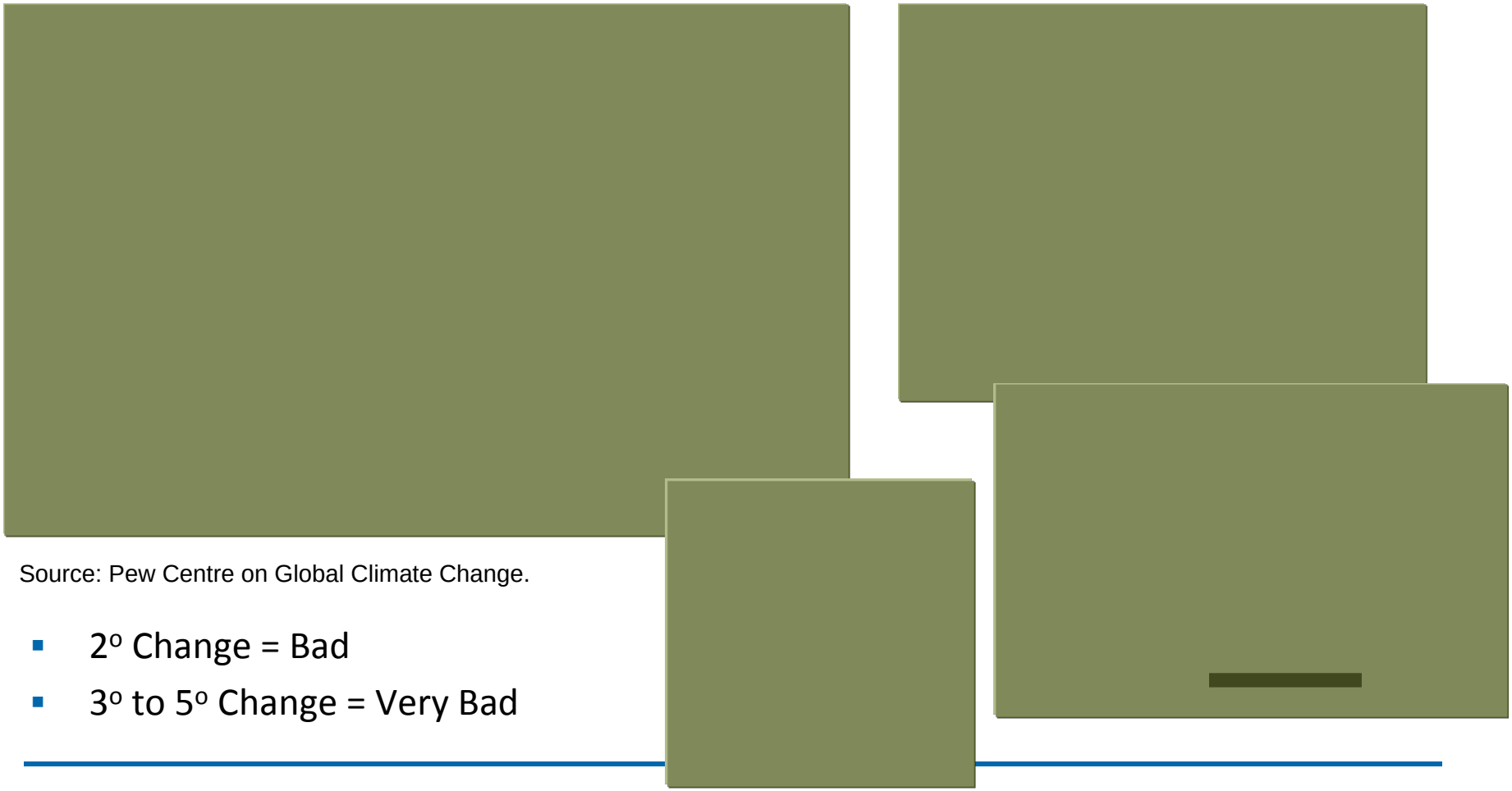
Climate Change : The Science of Scary

Source: Pew Centre on Global Climate Change.
http://www.pewclimate.org/docUploads/Climate101-Science-Jan09.pdf

- Over 800,000 years, global surface temperature and CO_2 concentration in the atmosphere are intrinsically linked
- The blip in time that represents western industrialization shows dramatic trend deviation in CO_2 concentration

Climate Change: Everyone has Seen This

- Evidence suggests we are heading towards problems!



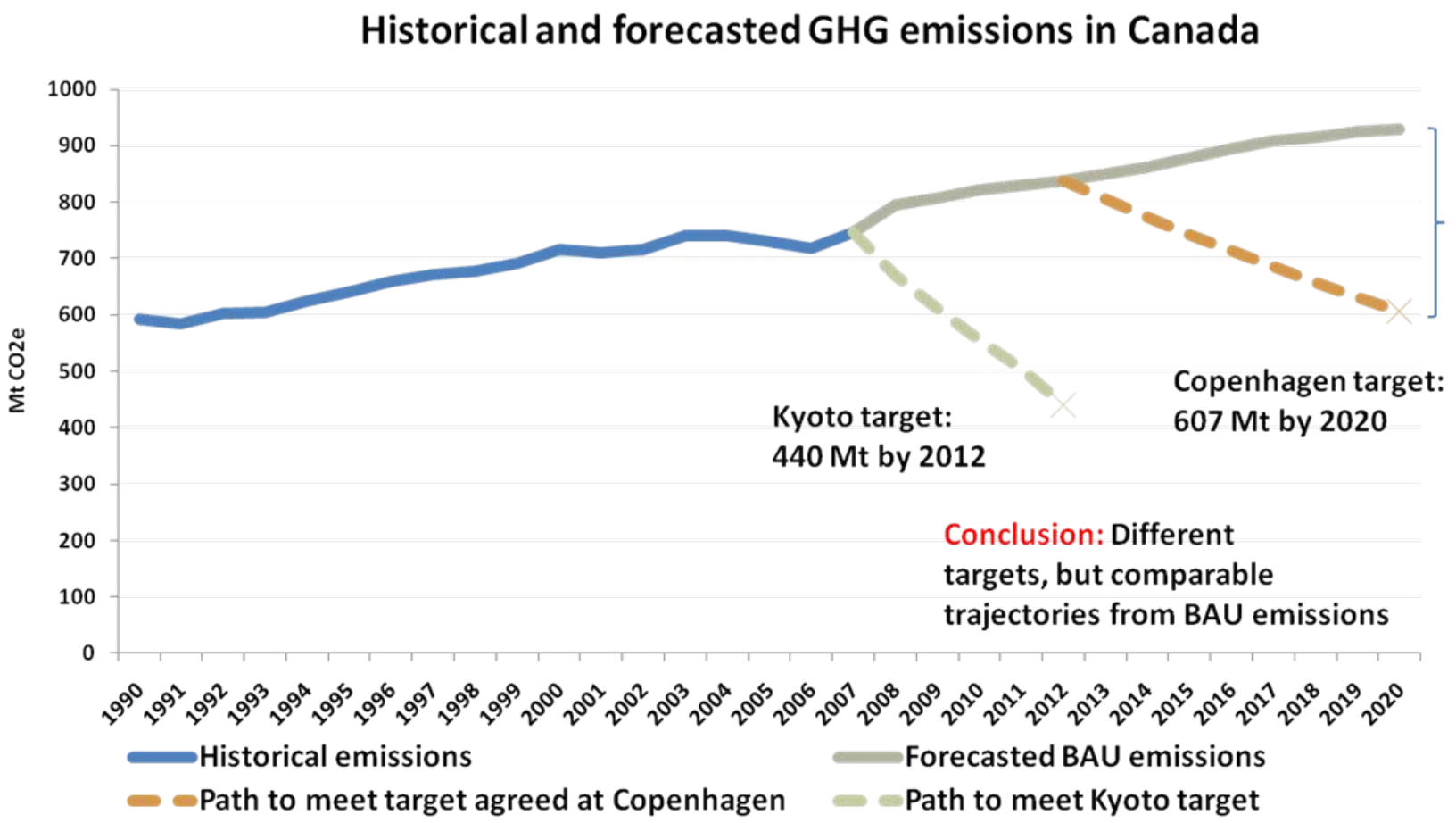
Source: Pew Centre on Global Climate Change.

- 2^{o} Change = Bad
- 3^{o} to 5^{o} Change = Very Bad

The Response - Kyoto

- United Nations Framework Convention on Climate Change (UNFCCC) – Entered Force in 1994
  - Stabilize CO_2 concentrations in the atmosphere somewhere below the danger zone
  - No real limits or enforcement mechanism
  - Platform for protocols
  - National Inventories
- Kyoto Protocol – Adopted 1997, Entered Force 2005
  - Set binding national reduction targets for signatories
  - Annex I countries commit to collective reduction of 5% below 1990 level
  - Mechanisms available include, market-based mechanisms

10 years, 5 climate change plans (and counting) – Canada's ambitions astound….



Who has Stepped up to the Plate?

- Kyoto itself does no set a mitigation strategy or a demand market for carbon trading
- Up to countries to meet their targets
- European Union (EU ETS)
  - Implements binding caps on several industrial sectors
  - Allocates EUAs to be traded in the marketplace
  - Compliance can also be met through Kyoto derived mechanisms Clean Development Mechanism (CERs) and Joint Implementation
- 2007 to 2012 – We have a Demand Market
- Regional and Voluntary markets also pop up elsewhere
- U.S., China, Canada, others; do not dive in

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Global Carbon Market Nearly $140 Billion

- The global recession has tempered market value
- However, Volume grew by 68% from 2008
- In North America, RGGI grew ten fold in 2009, trading nearly $2 billion

Excerpts from Point Carbon, 2010.

Current Market Activity

- CDM Pipline
  - 2,918 Projects At Validation
  - 43 Requesting Registration
  - 2,306 Total Registered
  - CERs Issued for 748
- ECX Monthly Volume = 58 Million Tonnes
  - EUAs ~14 euros (3 Month Futures)
  - EUAs ~17 euros (3 Year Futures)
  - CERs ~12 euros (3 Month Futures)
- Spot Price Volume = 23 Million Tonnes
  - ~15 euros

Markets Have Gained Robustness

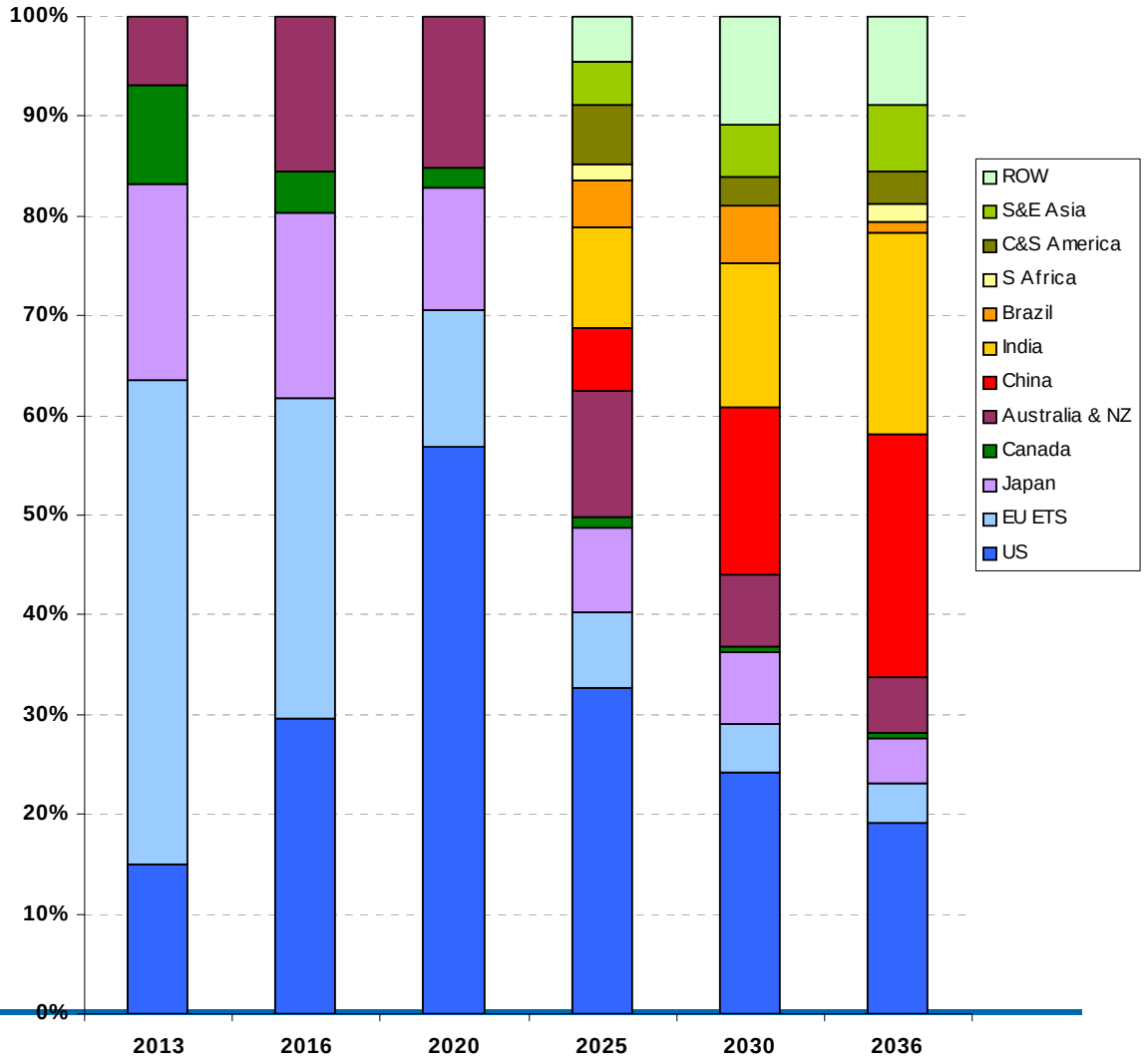
- EU ETS developed broad and international infrastructure
- Private Equity
- Hedge Funds
- Insurance Products
- SEC Requirements
- Carbon Disclosure/Corporate Sustainability
- Public Relations
- Voluntary Carbon Standard

European Experience

- Without the EU ETS, the Kyoto mechanisms would have been wasted.
- As it stands, supply markets have tended to get out ahead of demand markets
- Policy hurdles get in the way of setting demand
- What happens post 2012?
  - EU ETS likely to proceed
  - Self declared obligation under Kyoto was reasonable for them
  - Percolate, or Boil with Copenhagen-esque commitment
  - US? China?

International Competition for Global Abatement Intensifies over Time…it has to

- Technical abatement potential is vast
- How much will reach market as compliance-grade offsets, once it factors in project and eligibility risks as well as transaction costs
- Ag and REDD are critical to even flirt with demand
- But - Uncertainty on "compliance" availability of international avoided deforestation offsets
- Starting post 2020, China, Brazil, India and Indonesia may take on emission targets of their own, reducing supply



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North American Climate Change Commitments & Alignment

Main Challenge – Different Country Profiles:

- Relative differences between the size, cost and composition of the emissions reduction challenges between Canada and the US.
- Canada exposed to higher costs within certain sectors and industries than the US (e.g. oil sands).

Canada-US Policy Alignment:

- If Canada and the US fail to properly align policy designs, there exist significant risks to competitiveness, particularly for trade-exposed sectors.
- Without appropriate policy alignment, or opportunities for alignment, valid concern around the imposition of border tax adjustments and "green protectionism".
- Clean Energy Dialogue: CCS; Clean Energy Systems; and Smart Grid.
- Low-Carbon Fuel Standard (LCFS): CA and US Federal entities focused on reduction in the carbon intensity of fuel mix.

Policy: if we are "Taking" and not "Making" we need to appreciate Future US Policy Scenarios

- Federal GHG legislation – Off the agenda until well after the election
  - Progress in 2011 might lead to passage by 2012 (Kerry-Graham-Lieberman)
  - Most likely driver is industry desire for an alternative to direct regulation
- Clean Air Act regulation – EPA has authority
  - Could be very costly/disruptive to large emitters
  - Could drive support for a legislative solution - power sector
  - There are legal and legislative challenges to these regulations
- Intermediate options
  - Power sector only cap
  - Energy bill only
  - Four-P power sector bill (NSR and plant by plant basis)
- Delay/continued uncertainty could be most difficult outcome

Supply

In order to comply with the cap covered emitters (with perfect economic foresight) chose to ABATE or AQUIRE;

Compliance Option	Supply Certainty	Volume Drivers
Allowance	High	By design equal to national target
Technology Fund	High	By design defined and constrained as PRV
Domestic Offsets	Med	Typically only available to domestic emitters Constrained due to broad scope of cap Credit period, start date, rules,
International Offsets	Low	Not defined (CERs, ERUs, VERs, …) Available to all national buyers Unconstrained as host countries un-capped CDM – "additionality" constrained JI – irrelevant as Kyoto

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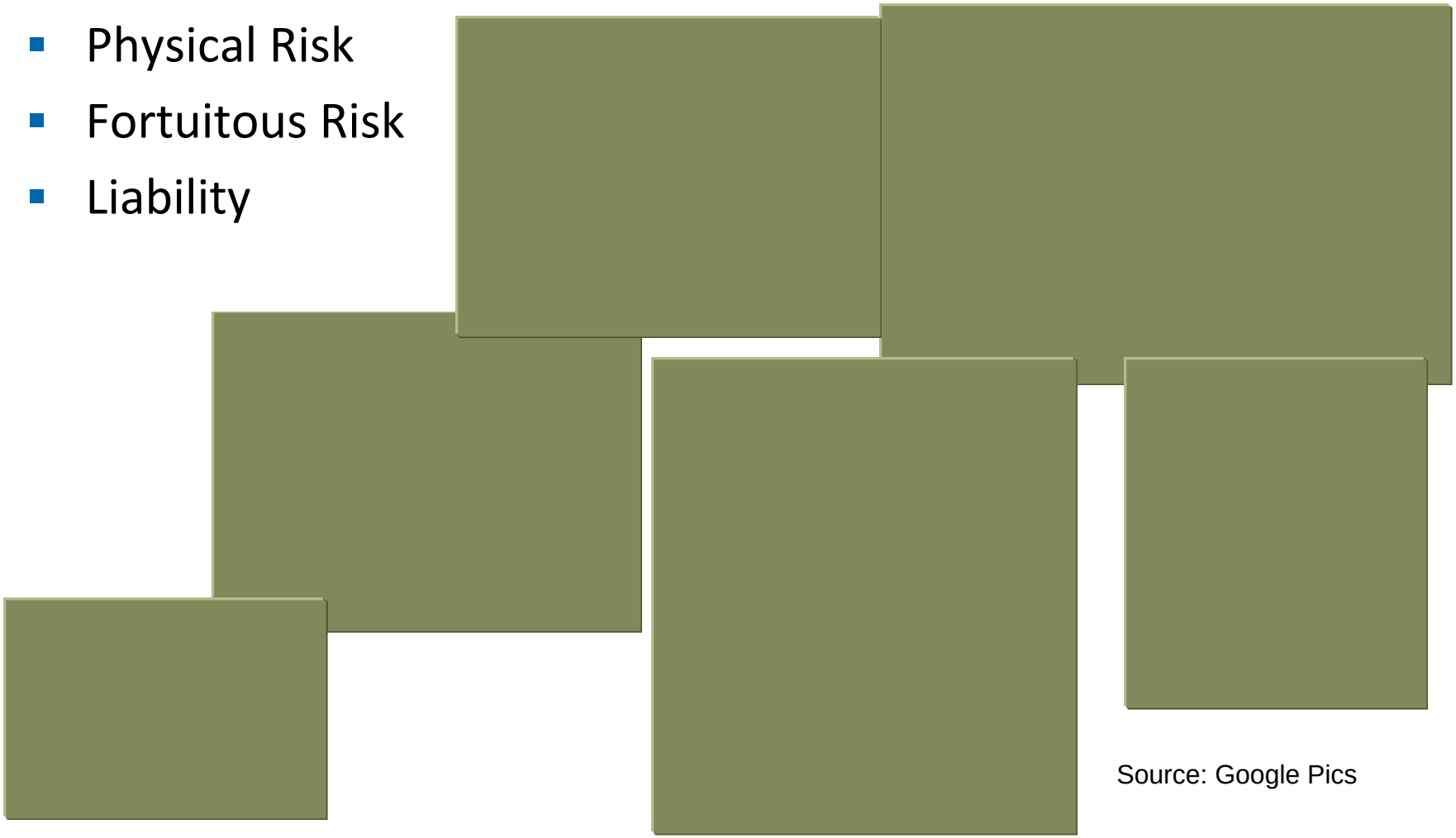
The Obvious

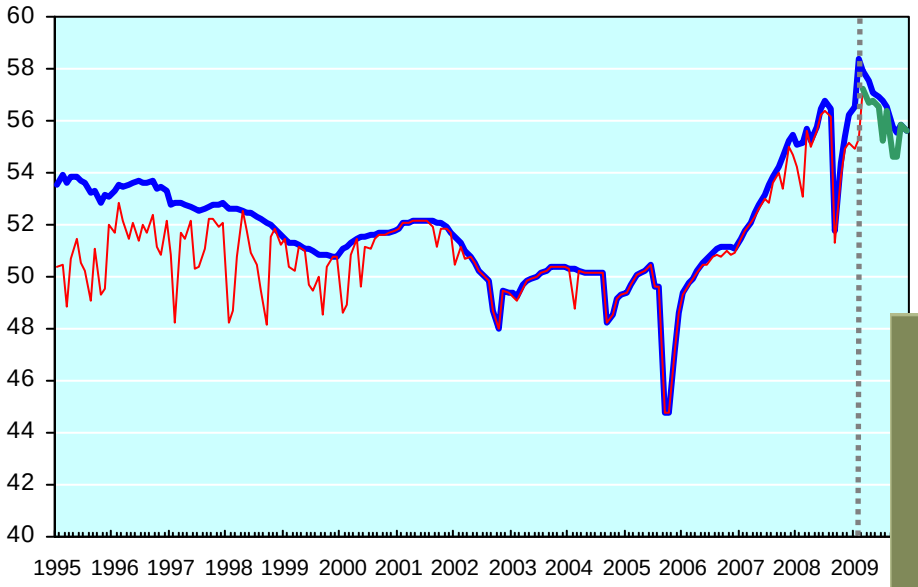
- Physical Risk
- Fortuitous Risk
- Liability



Source: Google Pics

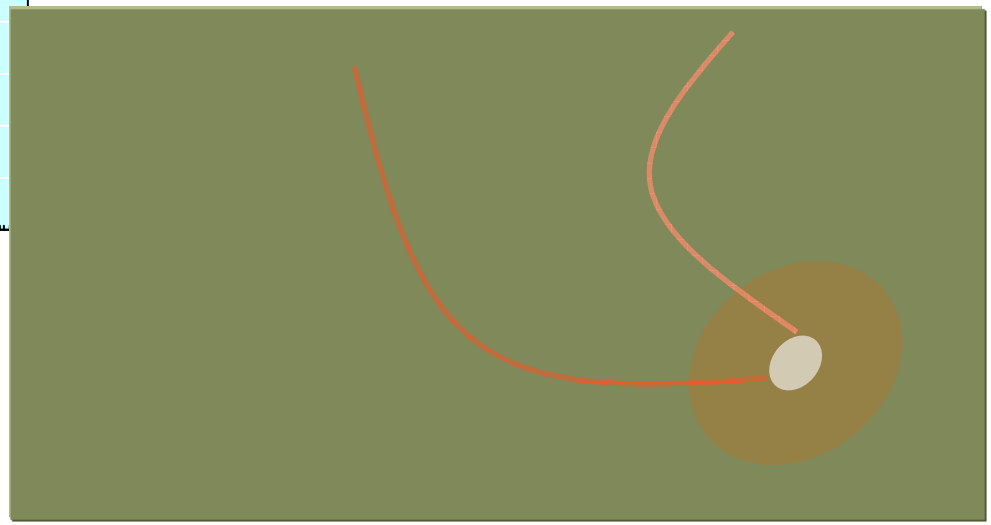
Energy Asset Risk

Lower-48 Dry Gas Production Vs. Dry Gas Capacity (BCFD)



9 hurricanes between 2002 and 2008 caused 10% per annum loss in gas production (Pipeline and Gas Journal, 2009)

Gulf Of Mexico Rig and Oil Platforms



New Sustainability Paradigm

Focus on physical risks may miss a host of opportunities

- Climate Change is changing the way we:
  - Power our economies
  - Travel
  - Evaluate where we live and work
  - Interact with the Environment
- Globally
  - Public Policy
  - Consumer Demand
  - Technology

A Tool to Increase Competitive Advantage and Achieve Corporate Social Responsibility

Risk Management Products

- Help Businesses and Policy Makers Adapt
- Increase Businesses' Ability to Attract Investment
- Facilitate Public Policy Goals To Mitigate Climate Change
  - Facilitate market entrance of businesses aligned with these goals
  - Promote investor confidence
- Facilitate the Adaptation of Existing Businesses
- Mitigation of Business Interruption
- Execution of Specific Policy and Business Goals
- Cap and Trade – Compliance and Price Exposure

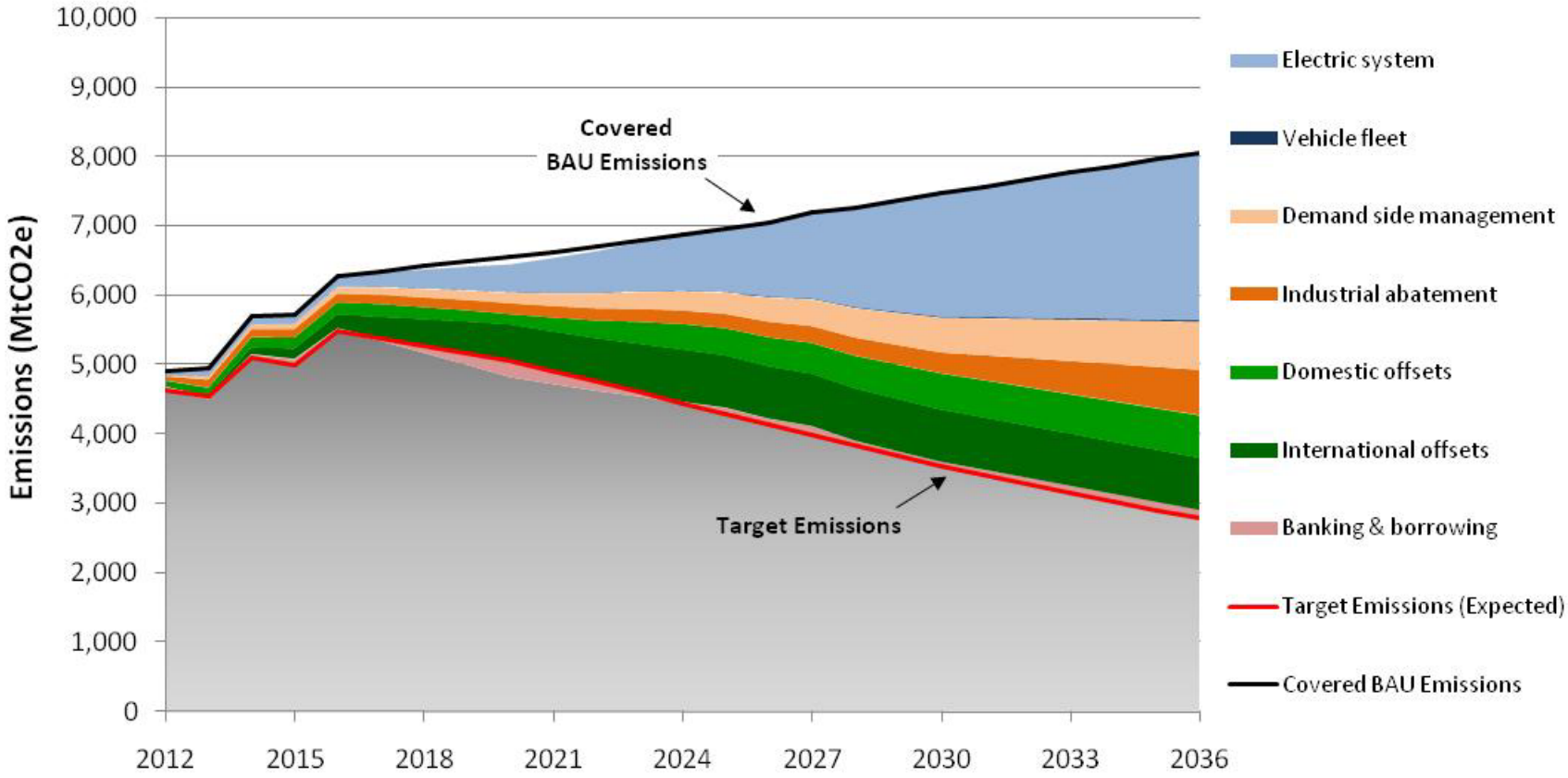
New Paradigm = New Underwriting Exposures

- Traditional Energy Insurance Operations
  - Fossil Fuels
  - Exploration to Consumption Supply Chains

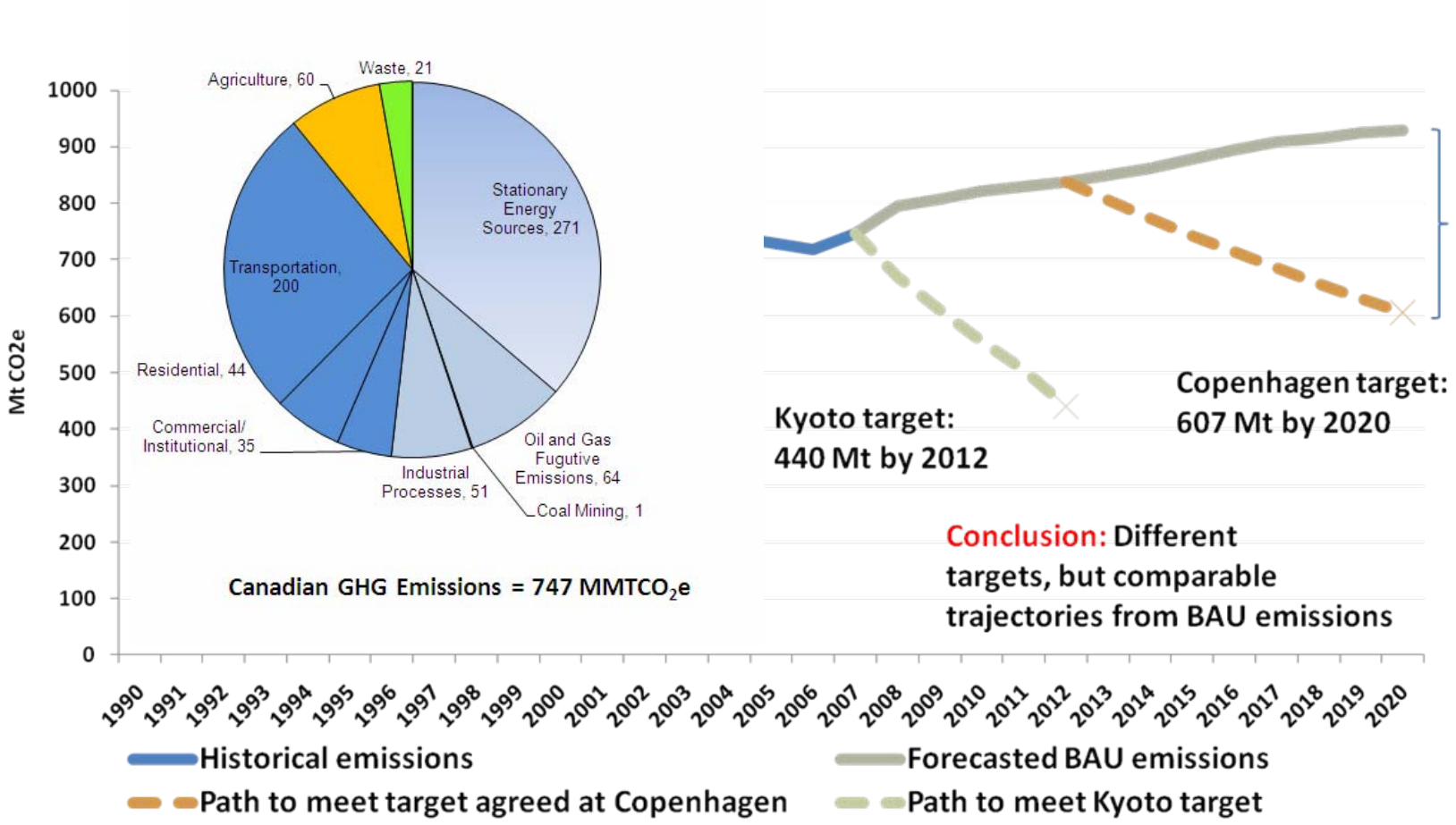
- The Traditional is Becoming Untraditional
  - New supply chains (Regionalized economy vs. Globalized)
  - New challenges
  - New exposures to evaluate

U.S.: Electric Sector will be Responsible for Producing the Majority of the Reductions

- The electricity sector leads the abatement effort on the long run, followed by the offset sector, which makes the largest contribution in the medium term

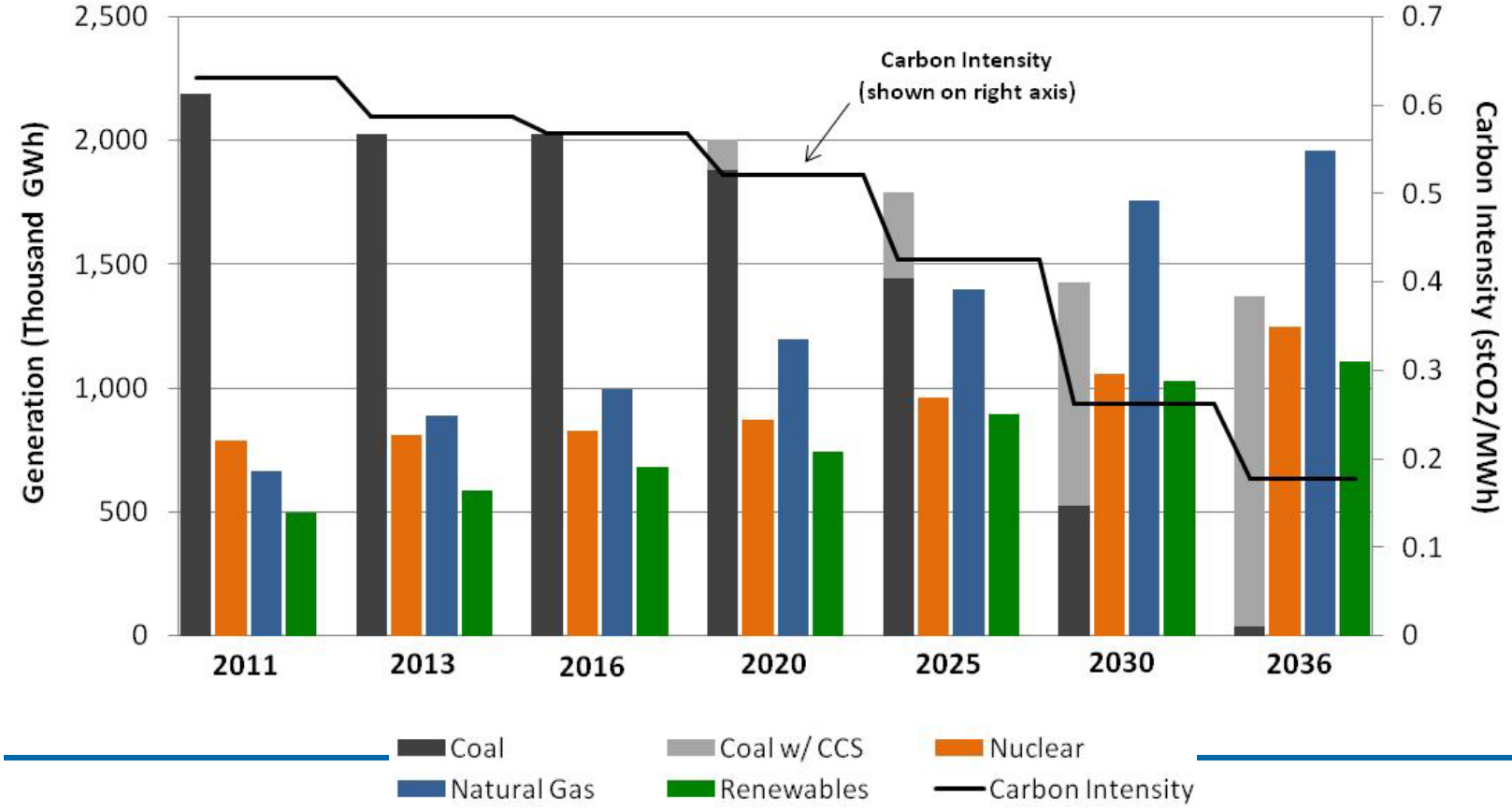


Canada - 350MT of abatement in 9½ years…



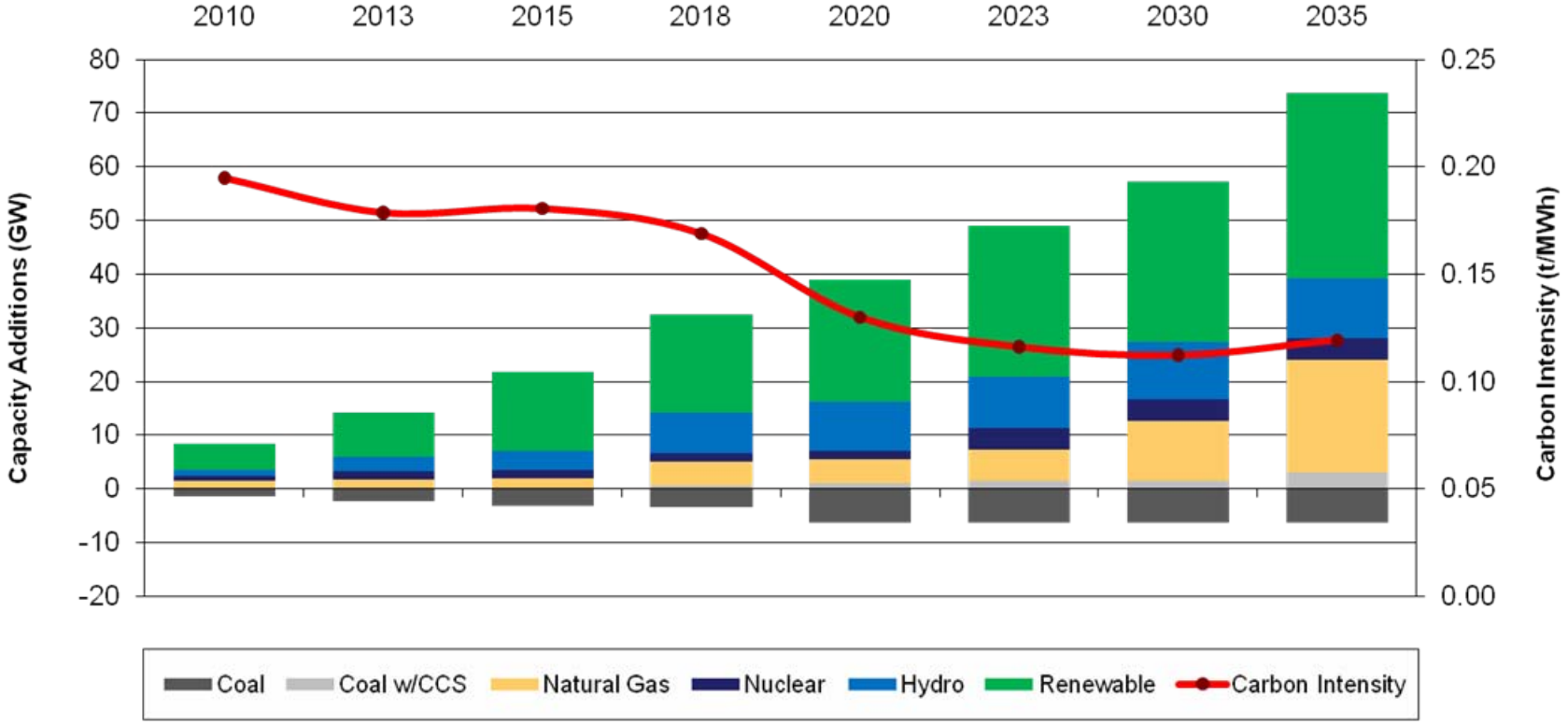
Case Study - Carbon Fundamentally Changes Electric Generation Mix and Carbon Intensity

- Carbon intensity plummets with the expectation of a rising carbon price, which incites investment in more nuclear and renewables capacity, accelerates coal retirements, and leads to cleaner dispatch
- Total generation declines (by 17% in 2036) as a result of energy conservation measures taken in response to higher wholesale electricity prices



Case Study – Similar Story in Canada

- Currently, policy initiatives are projected to drive a nearly 50% reduction as capital stock turns over and more investment is directed toward lower or non-emitting sources



What Will be Around to Insure Anyway?

- Large Coal
- Large Gas Combined Cycle
- Smaller Wind and Solar

- Large Centralized Power Plants
- Smaller Decentralized Facilities

- Far from Load Centres
- Urban Deployment of Generation

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Climate Change and Insurance Linkages

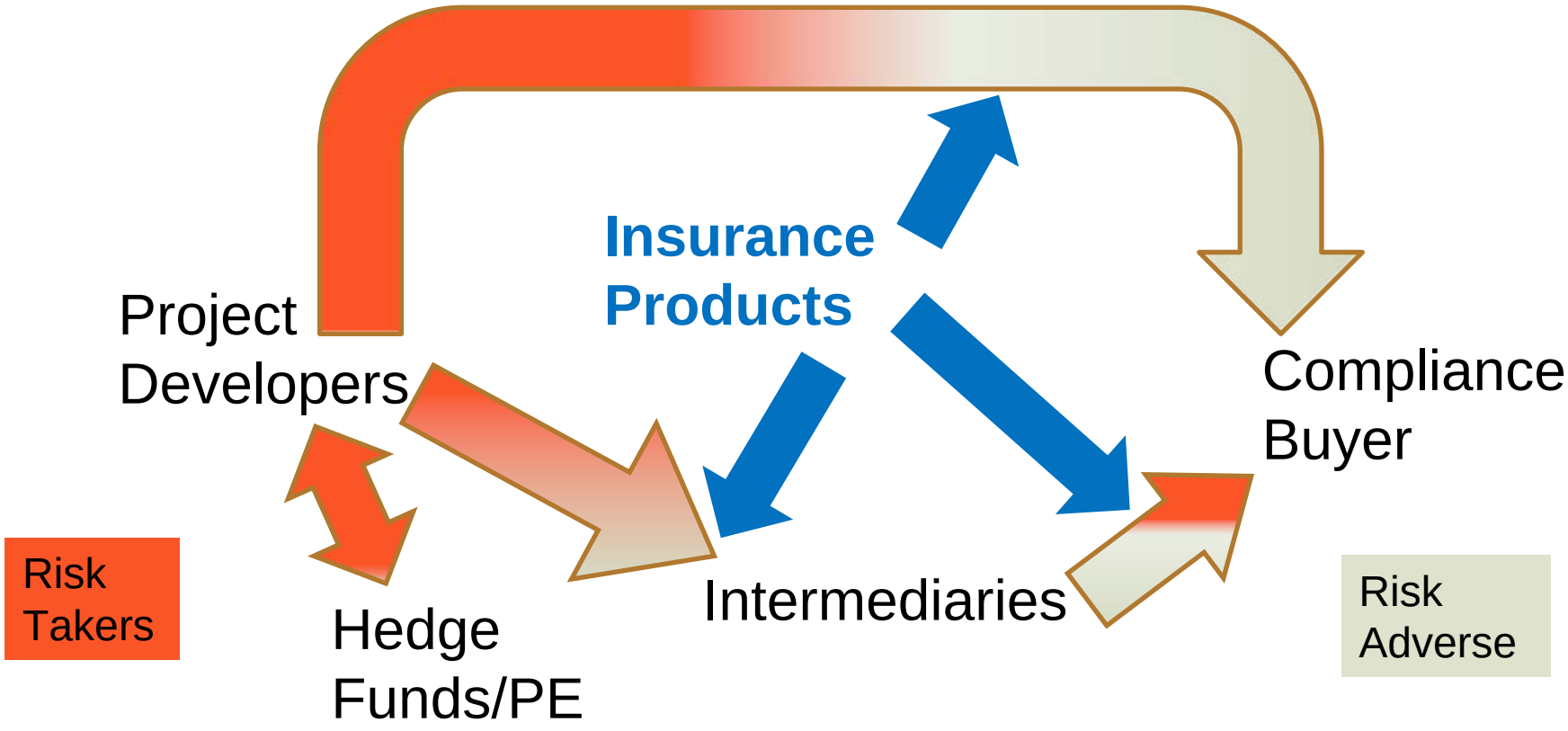
Infrastructure and Consumer

- Climate Change Impacts Risk Management (Loss Prevention)
- Adaptation Risk Management
- Policies specialized for properties with “Green Tech”
- Renewable Energy Hedging
- Mitigation Technology Risk Management (ex; **CCS**)
- Crop Insurance
- New Infrastructure – New Risks

Carbon Finance

- Offset Project Risk – Market Delivery/Delay Risks
- Delivery Volume Hedge (Estimated tonnes vs. Issued)
- CDM – Policy/Country Risk
- Verified tonnes Approval Risk
- Impacts of Policy Development – Delivery Guarantees
- Compliance Shortage Hedges
- Portfolio Risk Backups

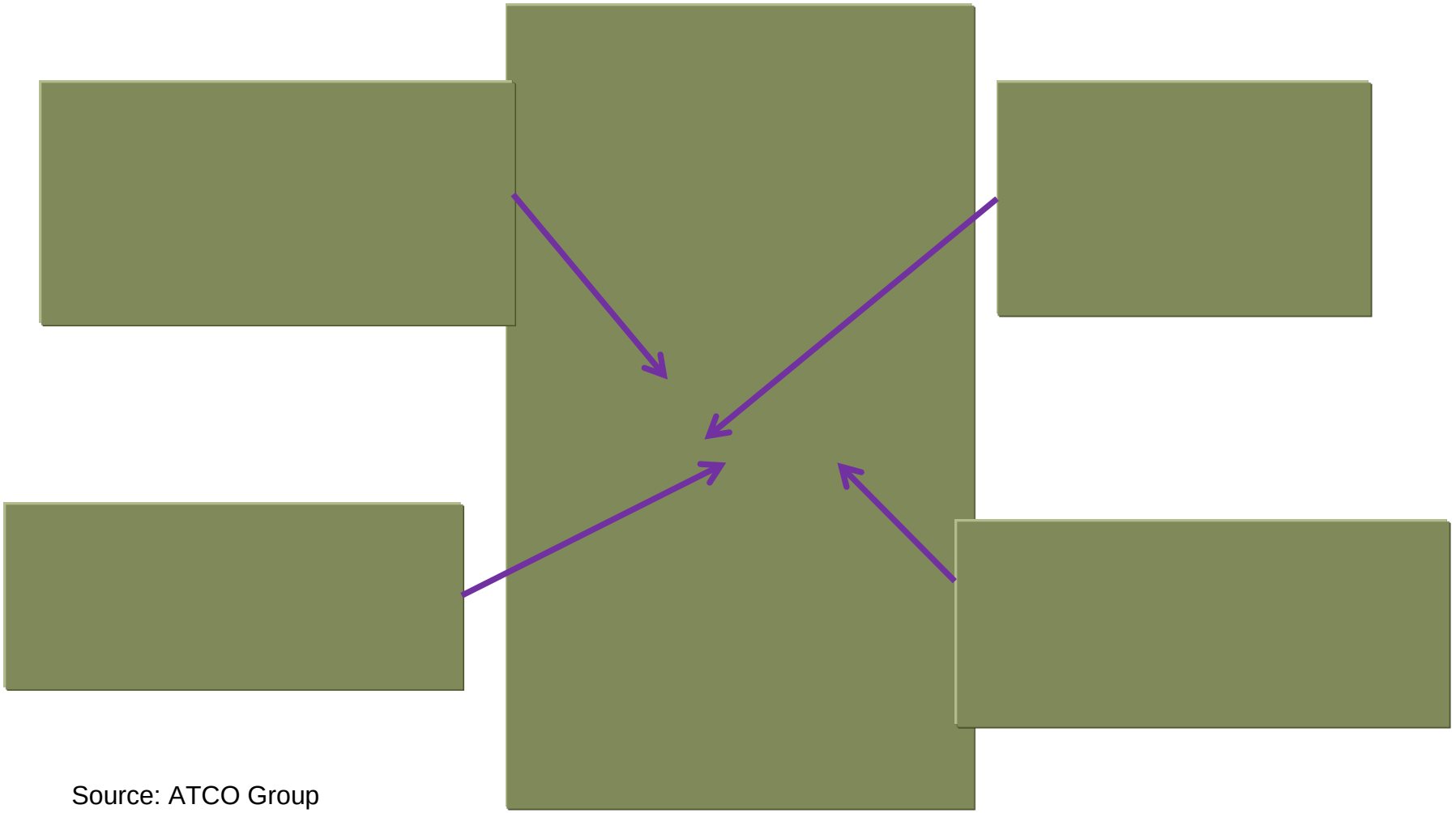
Mitigation Projects and Investment Barriers



Case Study - Carbon Capture and Sequestration (CCS)

Source: ATCO Group

CCS Technology Commercialization:

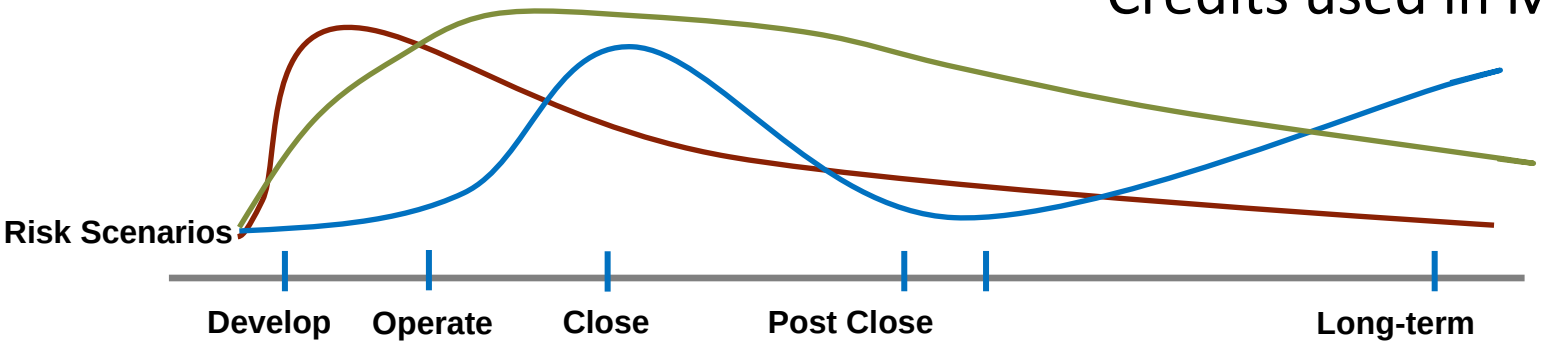


Source: ATCO Group

Hedging CCS Reversal Risks

- Development
- Operational
- Closure
- Post Closure
- Long-term
- Liability Transfer??

- Population
- Ground Water
- Subsurface Resources
- Sensitive Habitat
- Financial Consequence
- Market Exposure (CCS Credits used in Market)



Questions

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