ClearCarbon

The GIC Ag Carbon Index (GIC-ACI)

Development, Design, Value Proposition, and Applications

A Presentation for USDA Economists Group
July 16, 2009

Presentation Overview

Introduction of GIC Group and Clear Carbon Consulting

Agriculture, the Carbon Market, and New Opportunities

GIC's Ag Carbon Index (GIC-ACI)

The New Roadmap for Agribusiness in a Carbon Economy

ClearCarbon

Introductions

The GIC Group: Company Overview

The GIC Group is a 28-year old international agribusiness consulting company

GIC's Carbon Advisory Services

Three Core Areas

Market Consulting & Policy Analysis

- Climate Change Policy
- Kyoto Protocol
- US & International Legislation
- Carbon Markets
- Carbon Credit/Allowance Trading Schemes

Financial & Advisory Services

- Risk Management
- Investment Strategies
- Due Diligence
- Valuation Analysis
- Carbon Credit Offset Transaction Services
- Carbon Market Indexes

Clear Carbon Consulting Partnership

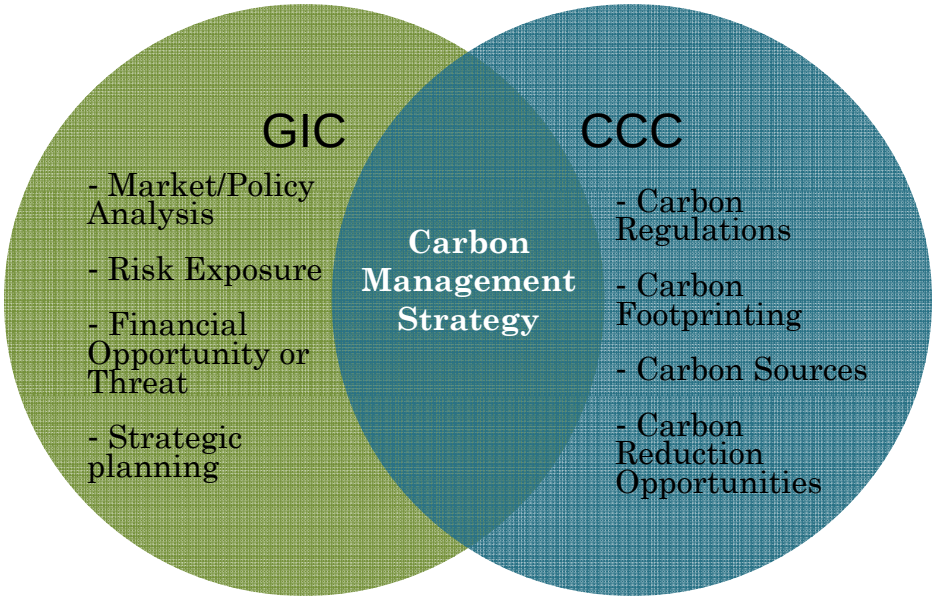
- Carbon Footprint Measurement
- Carbon Emissions Monitoring & Tracking
- Mitigation Strategies
- Analysis & Valuation of Carbon Mitigation Technologies & Products

Clear Carbon Consulting: Company Overview

Clear Carbon Inc. is the first full-service carbon services firm dedicated to creating competitive advantage for companies through measuring, mitigating, and managing their greenhouse gas footprints. Our track record of delivering projects with a strong return on investment serves as evidence of our dedication to implementing practical and valuable solutions.

ClearCarbon

GIC's Partnership with Clear Carbon Consulting

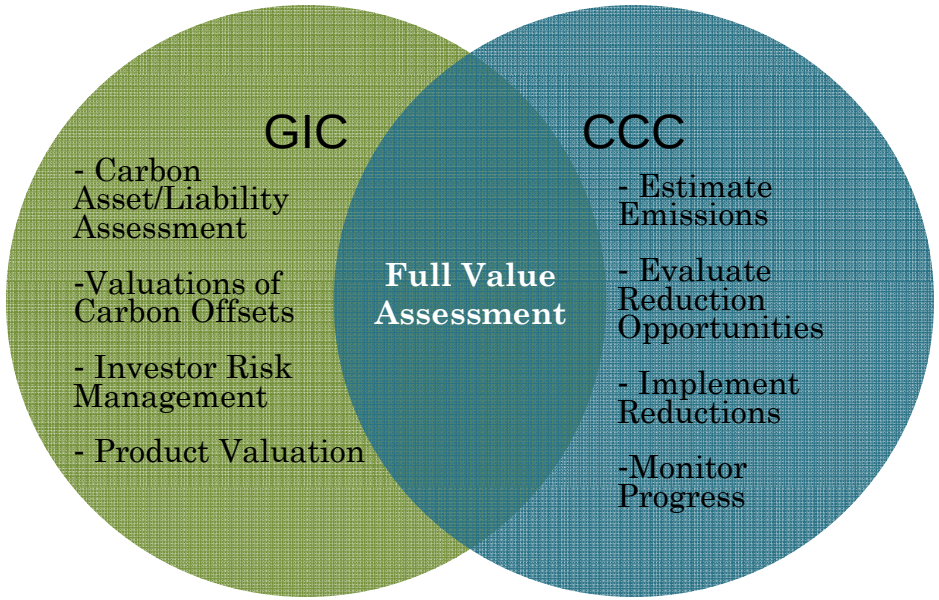


Target Audience

- Producers
- Food & Beverage Manufacturers
- Agri-Chemical & Fertilizer Firms
- Biofuels Producers
- Biotech, Feed, and Seed firms
- Financial/Market Analysts
- Project Developers/Investors

Applications

- Valuation & Market Assessment of Carbon Mitigation Products & Technologies.
- Sector & Cross-Sector Hedging Strategies for Project Developers/ Investors.
- Market Assessment of Reduction Potential for Individual Ag Sub-Sectors, like Ag-Chemical Firms.
- Due Diligence & M&A Evaluations Based on Carbon Assets/Liabilities.



ClearCarbon

Agriculture, the Carbon Market, & New Opportunities

GIC-ACI: Agribusiness & Carbon

Defining Agribusiness and its GHG Emissions' Profile
(Two sub-segments: Production Agriculture and Secondary, Value-added Industries)

	Developed Countries	Advanced Developing Countries
Production Agriculture Ex: Livestock, crop cultivation	5 to 25 percent	20 to 35 percent
Secondary Industries (Production Enhancement & Value-Added) Ex: Chemical manufacturers, food and beverage producers, pulp and paper mills, biofuels	5 to 15 percent	5 to 15 percent

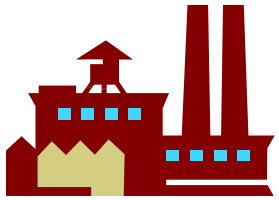
Production agriculture and related secondary agro-industries are significant sources of greenhouse gas emissions (Methane, Carbon Dioxide and Nitrous Oxide).

GIC-ACI: Forestry & Land Use

- **Forest products industry also integrated and consists of primary production (timber) and secondary value-added industries (flooring, lumber, pulp and paper, and biofuels).**
- Land use, land use change, and forestry (LULUCF) management of crop lands, forest lands, and grasslands/pasture offer significant GHG sequestration potential.
- In the US land-based carbon sinks reduces net emissions by 1.1 gigatons of CO2 equivalent.
- By contrast, massive deforestation in Brazil and Indonesia accounts for 62% and 84% of each country's GHG emissions, respectively.
- The GIC-ACI index incorporates both the primary and secondary components of the forest products industry and LULUCF.

GIC-ACI: Agribusiness's Emissions Map

Industry Inputs

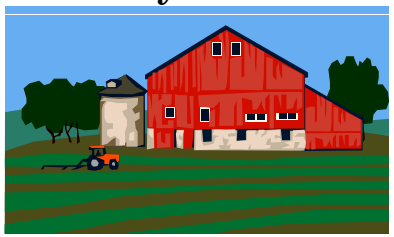


Emissions Sources
Chemical & Fertilizer Producers
- Waste/by-products
- Energy consumption
- Chemical inputs

Seed, Feed & Biotech Companies
- Contribute to animal waste
- Require pesticides/fertilizers
- Energy consumption

Energy Suppliers
- Carbon intensive sources
- Waste/by-products (coal)

Primary Producer



Emissions Sources
- Animal waste
- Chemical use fertilizers/nitrogen
- Fuel/energy consumption
- Land use change
- Soil tillage
- Waste water
- Field burning of crop residues
- Rice cultivation

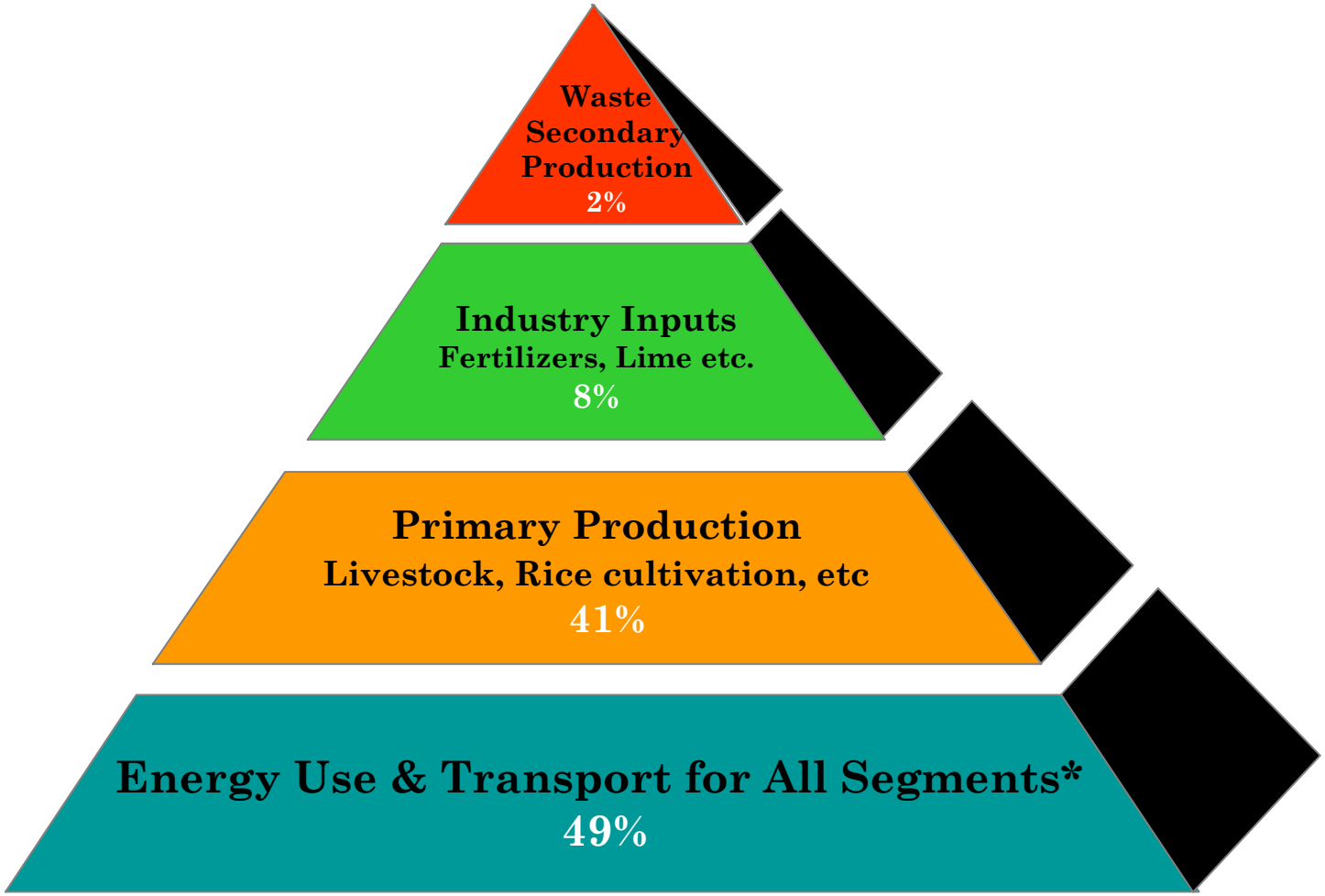
Secondary Production

Emissions Sources
Food & Beverage Producers
- Energy consumption
- Biomass waste/by products
- Chemical inputs

Biofuel Manufacturers
- Energy consumption
- Biomass waste/by-products

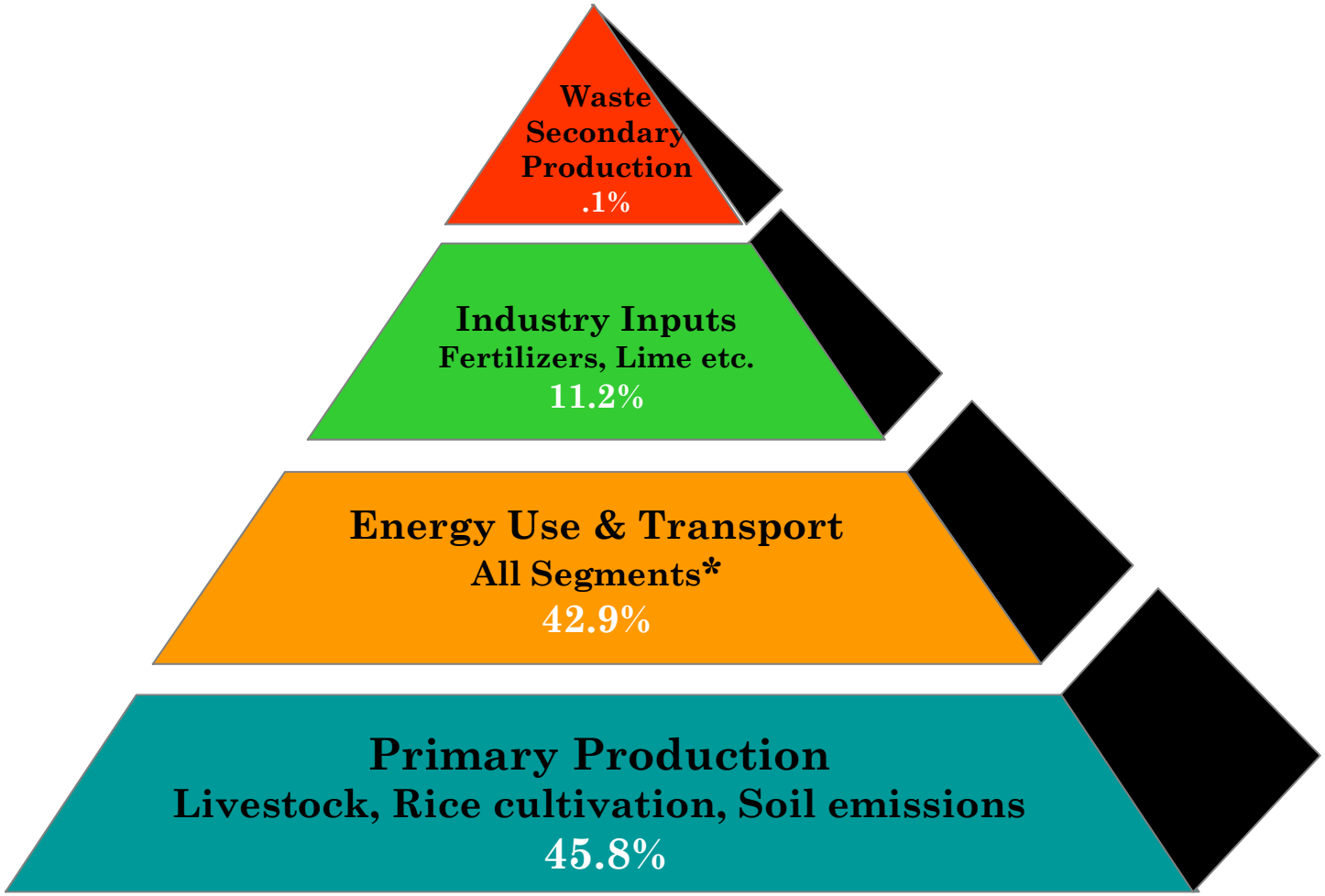
Slaughterhouse/Processors
- Biomass waste/by-products
- Energy consumption

GIC-ACI: Ag Emissions Pyramid



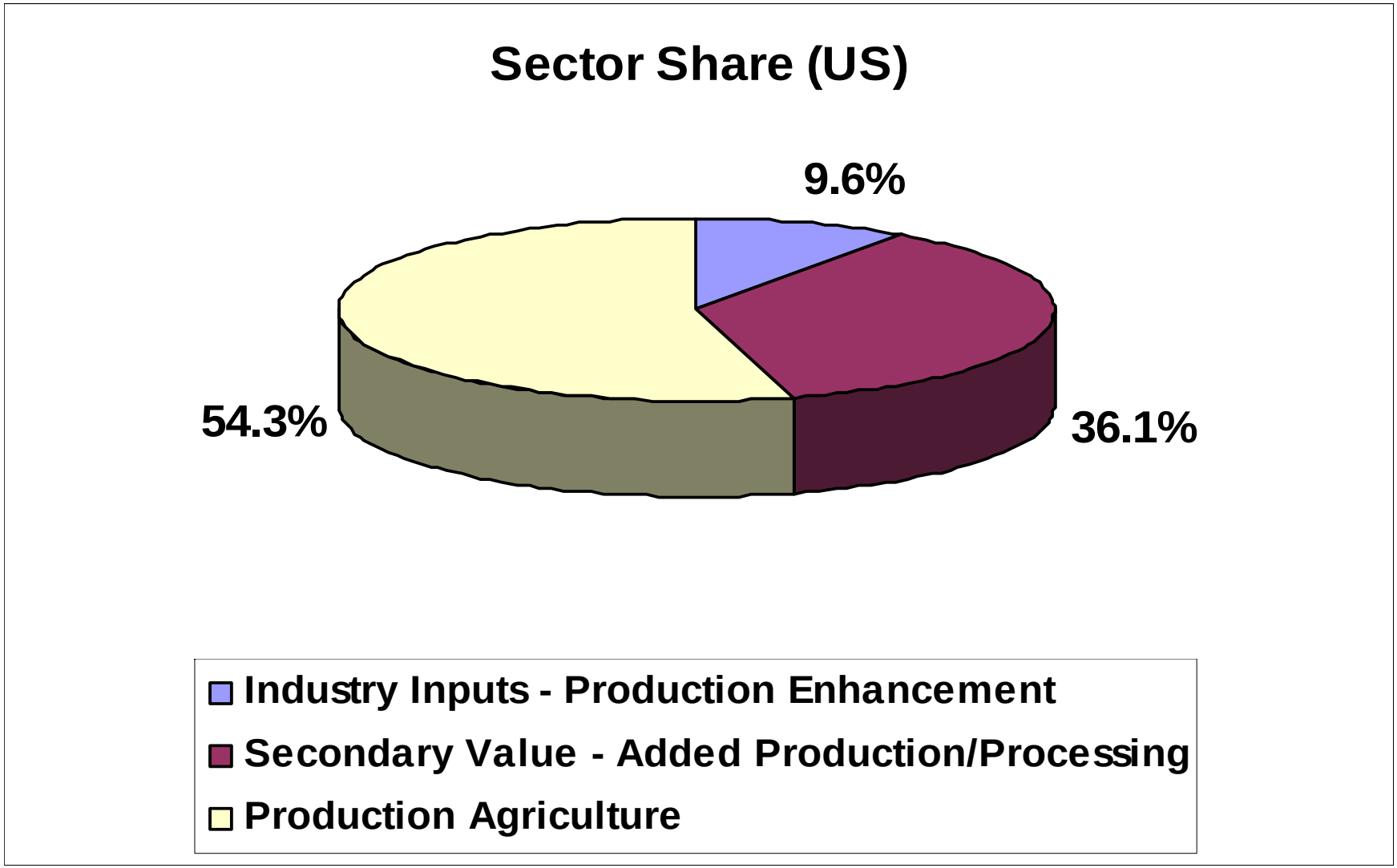
**Includes the carbon emissions from biofuels and ethanol production and usage*

GIC-ACI: EU-27 Agribusiness Emissions Pyramid

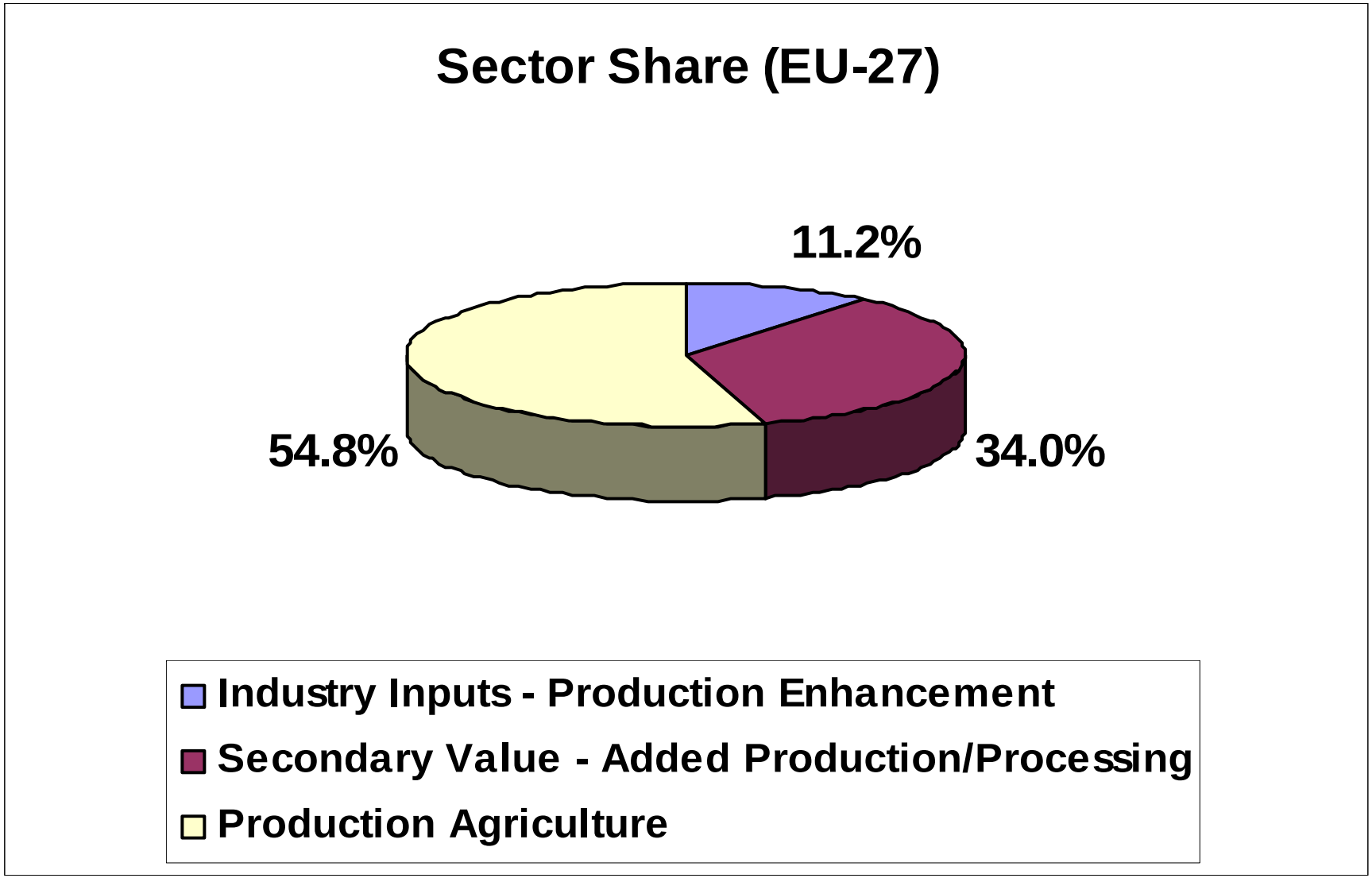


**Includes the carbon emissions from biofuels and ethanol production and usage*

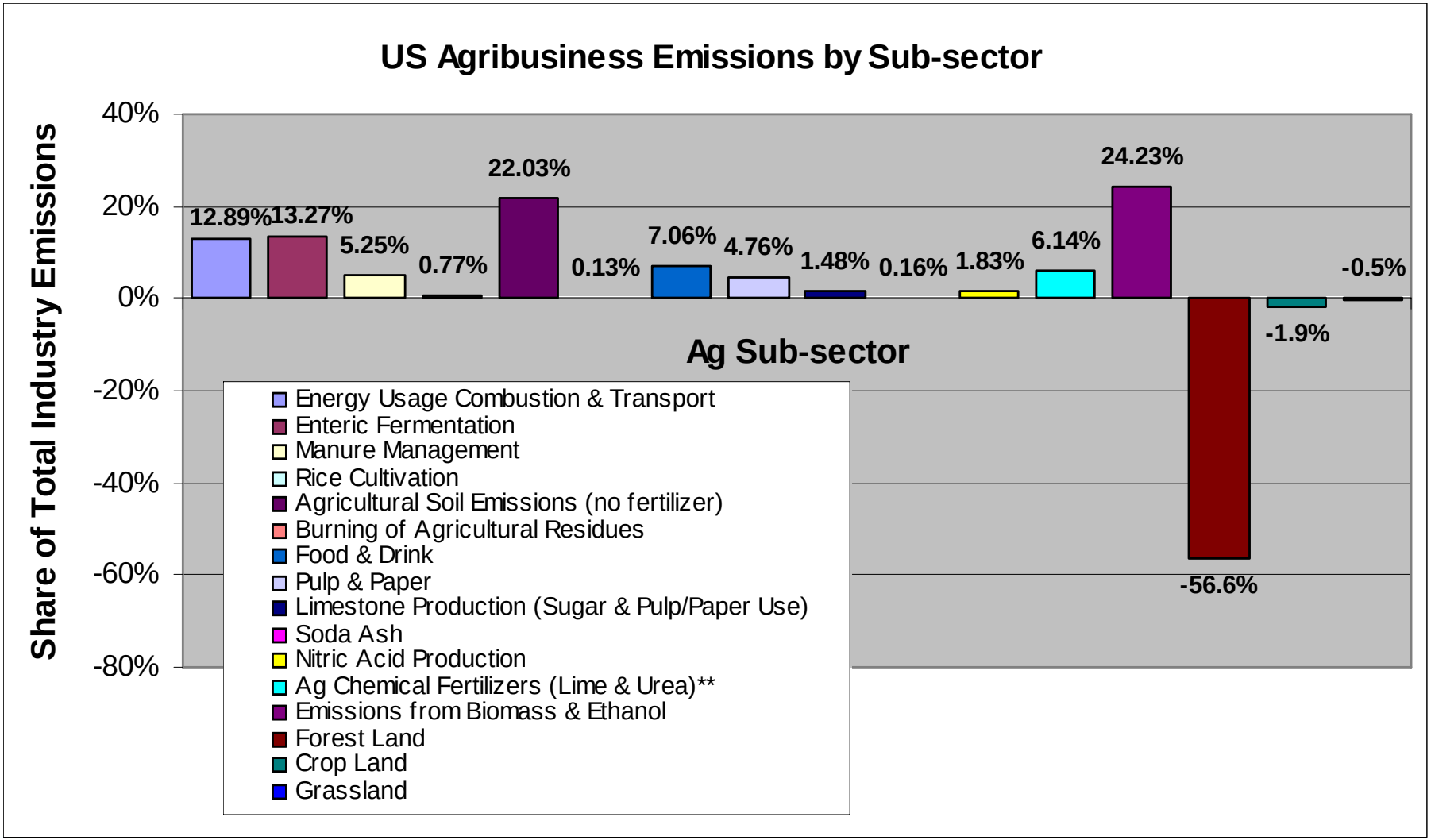
Breakdown of US Agribusiness Admissions



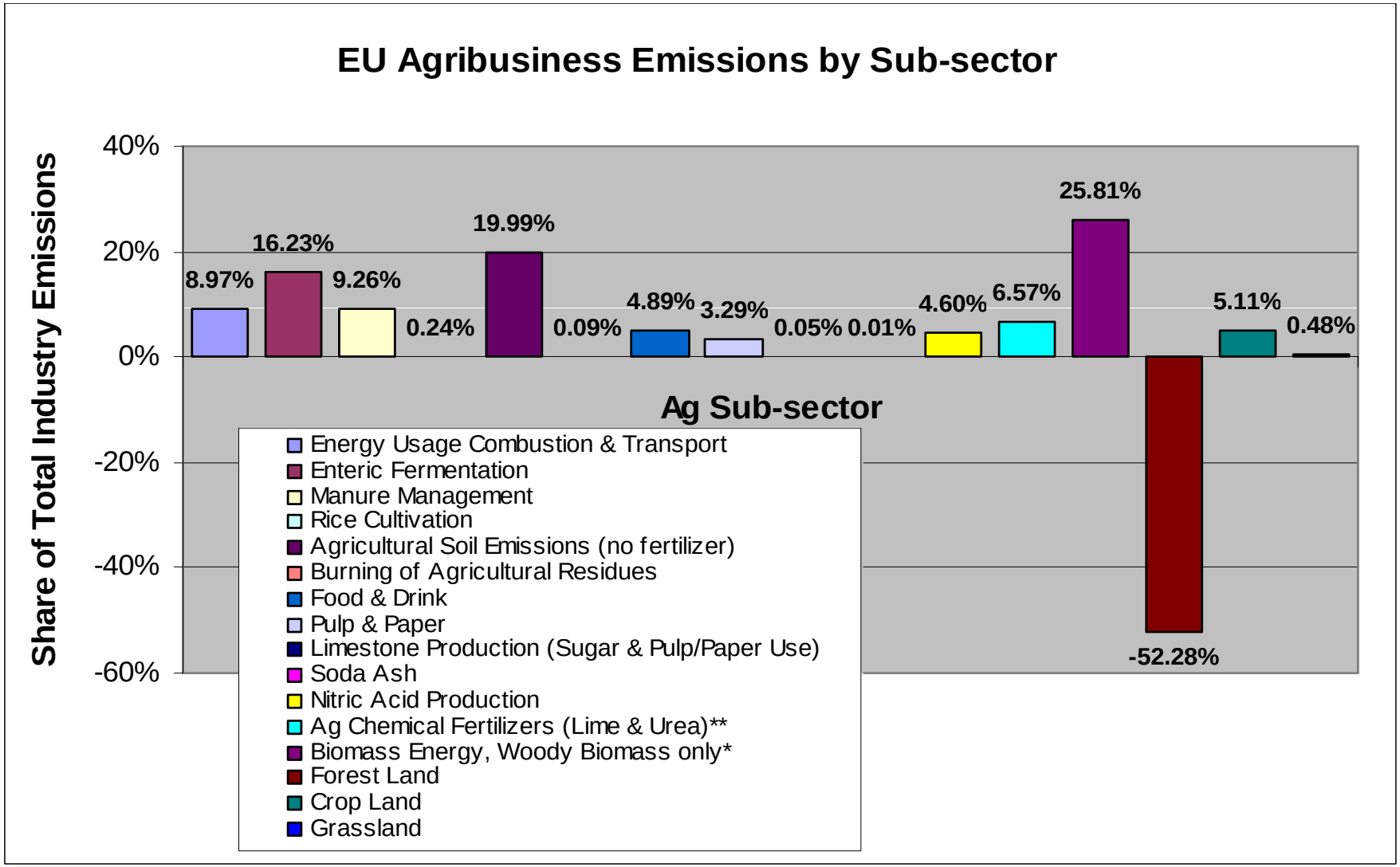
Breakdown of EU-27 Agribusiness Emissions



GIC-ACI: US Ag Emissions by Sector

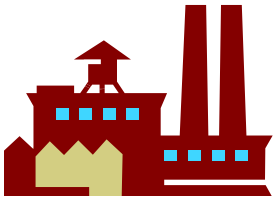


GIC-ACI: EU Ag Emissions by Sector



GIC-ACI: Agribusiness's Opportunity

Industry Inputs

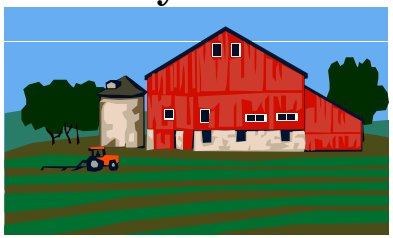


Emissions Reductions
Chemical & Fertilizer Producers
- Mitigation of waste products: nitric acid
- Improved energy efficiency
- Lower nitrogen chemicals

Seed, Feed & Biotech Companies
- Alternative feeds, lowers methane
- Nitrogen efficient seeds, low tillage crops
- Improved energy efficiency
- Develop waste management products

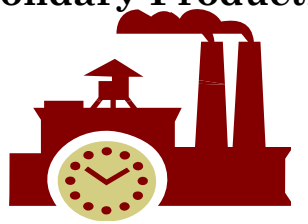
Energy Suppliers
- Fuel switch to low carbon sources
- Utilize on-farm sources
- Biomass, cellulosic alternatives

Primary Producer



Emissions Reductions
- Improved waste management
- Crop/seed switch
- Organic chemicals/fertilizer
- Animal waste to biogas
- Biomass energy generation
- Low tillage of soils
- Carbon sequestration/land use
- Improved energy efficiency

Secondary Production



Emissions Sources
Food & Beverage Producers
- Improved energy efficiency
- Biomass energy generation
- Adopt waste management products/ technologies

Biofuel Manufacturers
- Improved energy efficiency
- Second generation biofuels
- Biomass energy generation
- Improved waste management

Slaughterhouse/Processors
- Improved energy efficiency
- Convert waste products into biomass for energy generation
- Adopt waste management products/ technologies

Overview of Established Carbon Markets

Kyoto & Clean Development Mechanism Overview

Agriculture—major sector for CDMs. Examples:

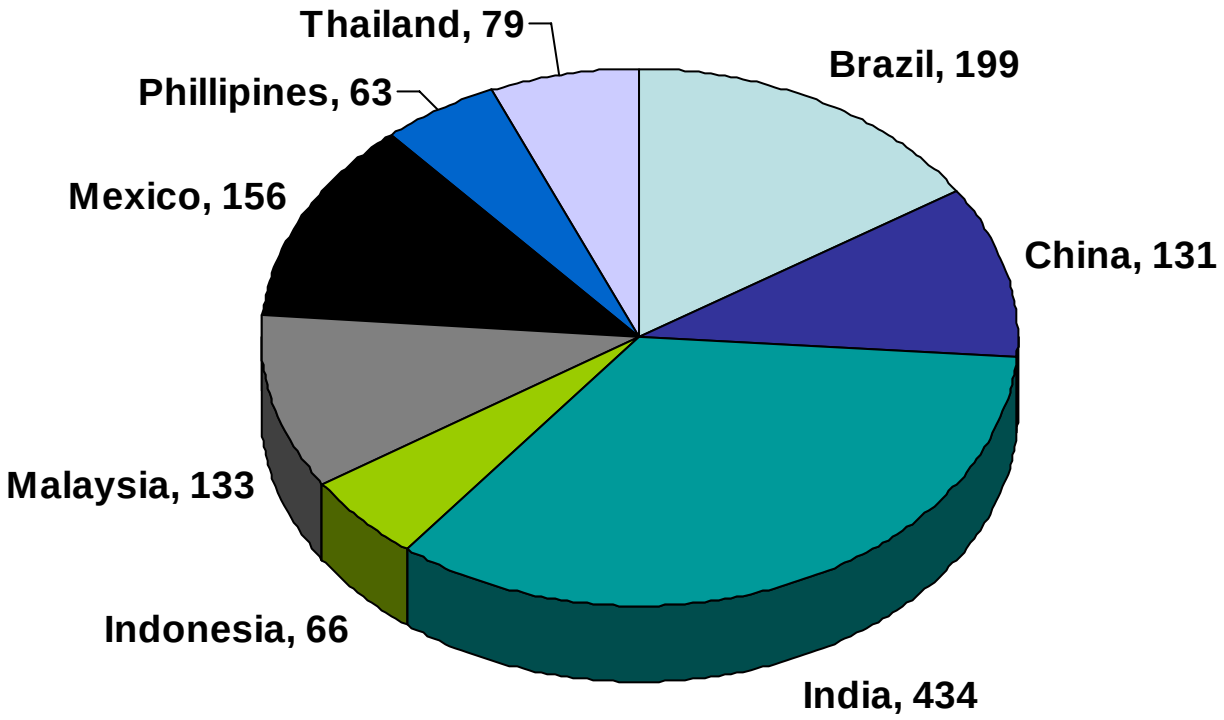
1. Methane mitigation through gas flaring
2. Biofuel/biomass power generation from animal/plant waste, including palm oil & bagasse.
3. Biogas power generation from swine, dairy cattle and other animal waste.
4. Composting of agricultural waste for organic fertilizers.
5. Food/feed processing plants, including sugar mills, starch mills, and breweries.
6. Fertilizer and chemical manufacturers.
7. Pulp/Paper and related biomass waste.
8. Afforestation & Reforestation.

Agribusiness in the CER Market & Recent Trends

- **CDM project pipeline has 1460 ag-related projects as of 3/1/2009**
  - A total of 471 have been registered, of which 159 have received CERs.
  - Total issued CERs ag projects amount to 17.6 million or 8.1% of the total.
  - Estimated value at spot price of 11.20 Euro is over 197 million Euro.
- **Long-term trends and projections for Ag-related CERs by 2012**
  - Cumulative Ag-CERs by 2012 is 457 million and by 2020 1.1 billion Euro.
  - Est. cumulative value by 2012 is 5.2 billion Euro & 12.2 billion Euro by 2020.
  - Ag-related CERs will grow to 15% of the total value of the CDM pipeline.

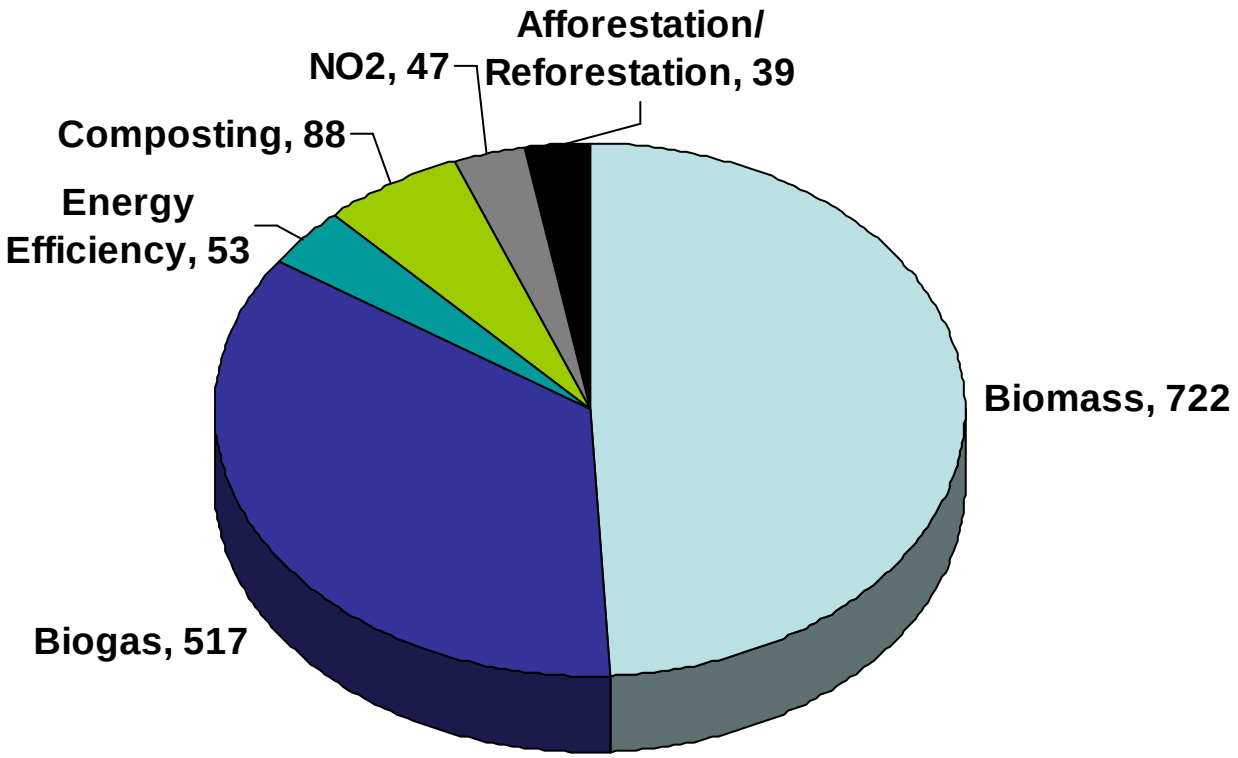
Agribusiness in the CER Market: Breakdown by Country

Eight countries account for 86% of the ag-related projects in the CDM Pipeline



Agribusiness in the CER Market: Project Types

Biomass and Biogas Projects Dominate Ag Sector



Agribusiness in the EUA Market: Overview

- European Union Emissions Trading Scheme (EU-ETS)
  - Primarily covers CO2 emissions*

    *Netherlands added allocations for 3 nitric acid plants in Phase II
  - Only secondary agro-industries (food and beverage, pulp and paper, and chemical manufacturing), in the scheme.

    *Account for about 4% of EU emissions.
  - Production agriculture (**not covered**) accounts for 10% of all EU GHG emissions and other GHGs from secondary ag industries are about 5% of total EU GHG emissions.
  - In Ireland, France, Denmark, Spain and Sweden, production agriculture accounts for more than 10% of all GHG emissions.

New International Opportunities for Agriculture & Carbon

- Mexico, a major destination for CDMs, has called for binding emissions targets at the national level, as well as the creation of a NAFTA-wide cap & trade system.
  - California-based Climate Action Reserve (C-CAR) recently authorized new protocols that allow for Mexican based landfill and livestock methane destruction projects to register for offset credits.
  - Mexico has also pushed forward the idea of developing a $10 billion global climate fund to support offset activities and technology transfers to developing economies.
- Canada's new baseline and credit system allows for purchase of international offsets of up to 10% of emission reduction requirements.

US Marketplace: Current Opportunities and Cap & Trade

- **RGGI, first US regional cap & trade scheme**
  - 110 million allowances sold in four auctions worth more than $366 million
  - Just power sector is covered.
  - Offsets projects in production agriculture: livestock, biomass/fuel switch projects, afforestation
- **US Cap & Trade:** American Clean Energy & Security Act (ACES)
  - Up to 2 billion offsets for compliance. 1 billion domestic & up to 1.5 billion international. International offsets discounted 1.25/1.
  - USDA responsible for offset categories and requirements.
  - A five-year moratorium on including an indirect land-use charge for biofuels. The USDA, EPA, and DOE will study and calculate impact of indirect land-use in the lifecycle GHG emissions profile of biofuels.

ClearCarbon

GIC's Ag Carbon Index (GIC-ACI)

GIC-ACI: Index Introduction

- **GIC-ACI (GIC Ag Carbon Index)** is a global carbon price discovery mechanism for valuing the price of ag-related GHG emissions and offset credits, as measured in million metric tons of carbon dioxide equivalent (MMtCO2e).

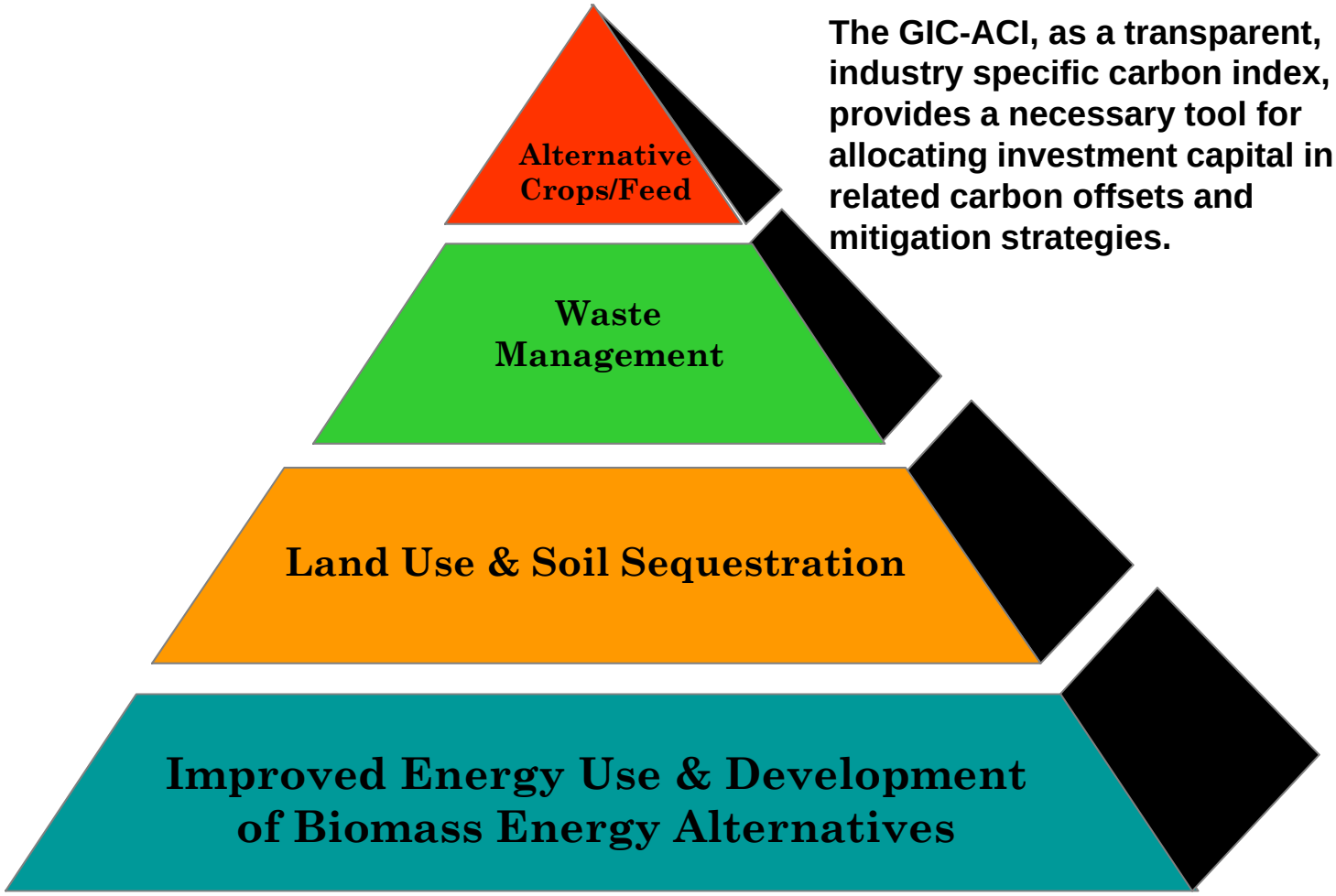
- GIC-ACI provides forward pricing of carbon credits and allowances for production agriculture and secondary agro industries through hedging and cross-hedging on exchanges where carbon credits are traded.

- Companies and financial analysts can use GICACI as a benchmark for performance in defined sub-sectors of the global agricultural economy and as a balance sheet valuation tool.

GIC-ACI: Why Create a Specific Carbon Index for Ag?

- European scheme limited to just CO2 emissions and does not include production agriculture.
- Kyoto Protocol lacks a sectoral approach. US legislation allows for up to 1.5 billion foreign offsets annually. Yet CDMs are projected to generate just 1.4 billion by 2013. Economies of scale, i.e. “game changers” are missing.
- Current system a patchwork approach for agribusiness companies. Risk management and strategic planning for integrated firms a significant challenge without a transparent valuation instrument.
- Production agricultural and secondary agro-industries significant emitters of GHGs and both have substantial mitigation potential.
- An industry specific carbon price discovery instrument helps identify and value the best opportunities and, in turn, directs capital to the most successful reduction strategies in agribusiness.
- Advanced developing countries offer substantial opportunities for cross-boarder investment, in terms of addressing agribusiness related emissions.
- China—leading emitter among developing countries, has the majority of CDMs, but only 111 out of the 1460 are ag-related projects. Yet, emissions from production agriculture and secondary agro industries account for 30% of the country’s GHG emissions.

GIC-ACI: Ag Opportunity Pyramid



The GIC-ACI, as a transparent, industry specific carbon index, provides a necessary tool for allocating investment capital in ag-related carbon offsets and mitigation strategies.

Order of Pyramid and Size/Value of Mitigation Opportunities Need to Be Determined

GIC-ACI: Index Regional & Sector Weightings

Sector Weights	**Production Agriculture**: Ex. Crops & Livestock	Secondary Industries: **Enhancement Sector** Ex. Fertilizers & Seed	Secondary Industries: **Value-Added Sector** Ex. Food, Biofuels	**LULUCF** – Forest, Crop, Grazing and Pasture Land Acreage
Regional Weights	EU-27	US	Large Advanced Developing Countries Brazil, China, India, Indonesia, Malaysia, & Mexico*	Rest of World – Developing & Developed Countries**

Account for nearly 90% of ag related projects in the CDM pipeline

****Future versions will include weightings for Australia, New Zealand, Norway, Japan, and Russia and ROW (rest of world), as other regional components.**

GIC-ACI: Market Projections/Assumptions

- EU-27 modeled to 2020 with applied goal of 20% emissions reduction.
- US reduction targets to year 2020, conforming to current legislation at 17% below 2005 levels by 2020.
- Advanced Developing Countries (ADCs) modeled emissions to 2020 with reduction target set at current emissions levels for 2008 - base year.
- Developed the scenarios based on inclusion of production agriculture being covered/uncovered in cap and trade schemes in the EU-27 and US and the creation of cap and trade schemes in ADCs versus continuing credit scheme through the Kyoto Clean Development Mechanism or similar program.

GIC-ACI: Three Scenarios for Index

Conservative

- ADCs continue on Kyoto type program.
- EU continues policy of limiting CDM offsets to 10% of emissions targets.
- EU expands coverage of allowance system to include all GHGs, which extends more allowances to secondary agribusiness segment.
- Production agriculture remains uncovered by EU system. However, production agriculture now eligible for offsets up to 15% (based on response to proposed US legislation).
- EU allows up to 15% in offsets for LULUCF domestic projects.
- US begins cap and trade scheme in 2012 either through legislation or the EPA implementation of finding that carbon dioxide “endangers the health and welfare of current and future generations”. Limits CDM offsets to 10% of emissions targets.
- US only includes 80% of all industries in cap and trade scheme. Production agriculture left uncovered. Only secondary agro-industries are included.
- Production agriculture can be a source for offset projects and provide up to 15% in carbon offsets.
- US allows up to 15% in offsets for LULUCF projects.

GIC-ACI: Three Scenarios for Index

Moderate

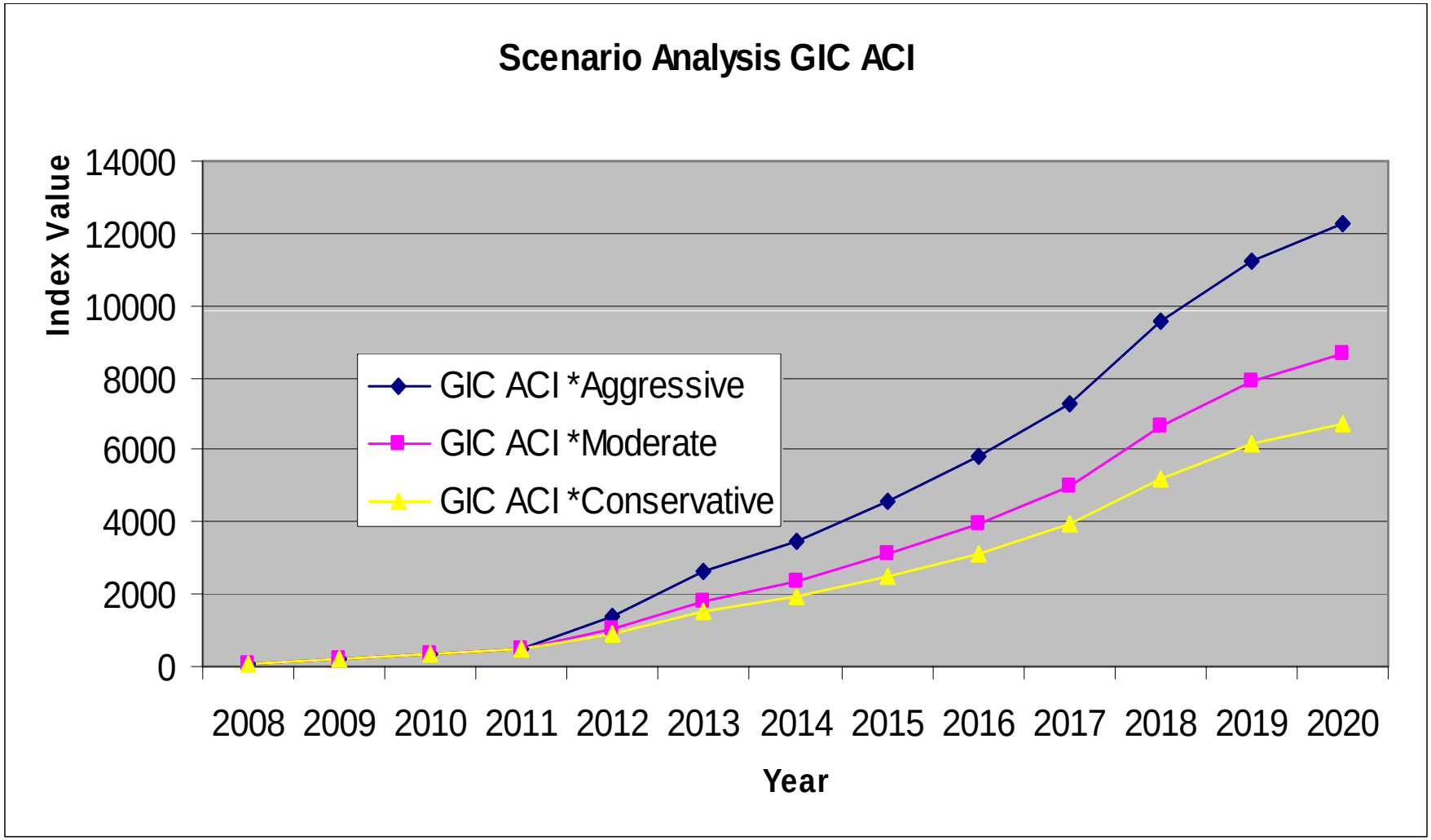
- ADCs continue on Kyoto type program.
- EU expands policy on CDM offsets to 15% of emissions targets.
- EU allows an additional 5% of allowances for LULUCF projects in developing countries. This would mirror proposed US legislation.
- EU expands coverage of allowance system to include all GHGs, which extends more allowances to the secondary agro-industries segment.
- Production agriculture remains uncovered by EU system. However, production agriculture is eligible for offsets up to 15% (based on proposed US legislation).
- EU allows up to 15% in offsets for domestic LULUCF projects.
- US begins cap and trade scheme in 2012 either through legislation or the EPA implementation of finding that carbon dioxide “endangers the health and welfare of current and future generations”. Limits CDM offsets to 15% of emissions targets and includes an additional 5% of allowances for LULUCF in developing countries.
- US only includes 80% of all industries in cap and trade scheme. Production agriculture still left uncovered. Only secondary value-added industries are included.
- Production agriculture is a source for offset projects and provide up to 15% of the country’s emissions reduction target.
- US allows up to 15% in offsets for LULUCF projects.

GIC-ACI: Three Scenarios for Index

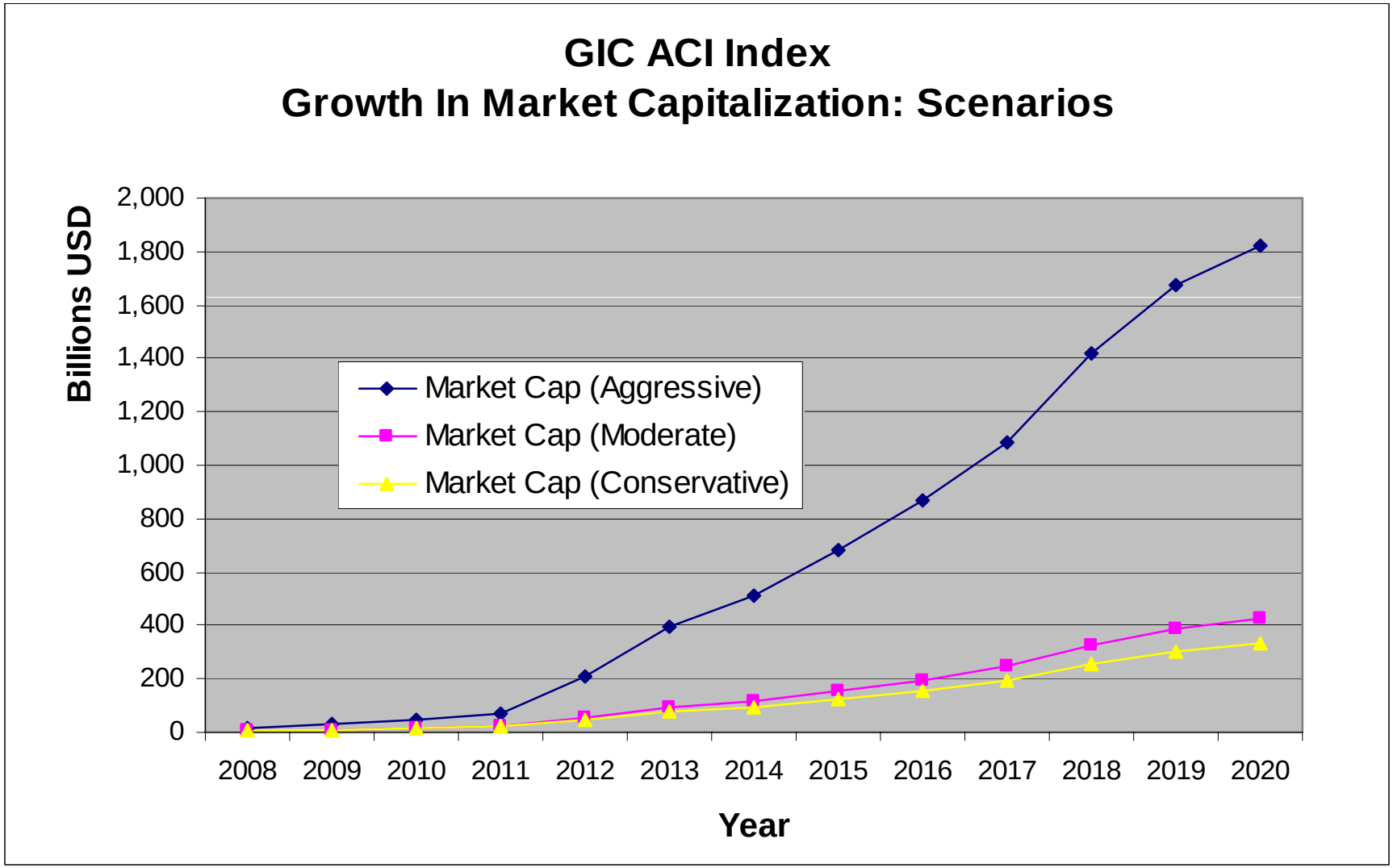
Aggressive

- Kyoto revised after 2012. Large ADCs launch their own national cap and trade schemes. LULUCF offsets are not limited.
- EU establishes bi-lateral trade with large ADCs. Allowances can be exchanged across borders if cap and trade systems are harmonized.
- EU expands coverage of allowance system to include all GHGs from all economic sectors, including production agriculture.
- EU allows up to 30% in offsets for domestic LULUCF projects.
- US begins cap and trade scheme in 2012. Establishes bi-lateral allowance trade scheme with individual large ADCs that have harmonized systems.
- US cover 100% of all industries in cap and trade scheme. Production agriculture is included.
- US allows up to 30% in offsets for LULUCF projects.

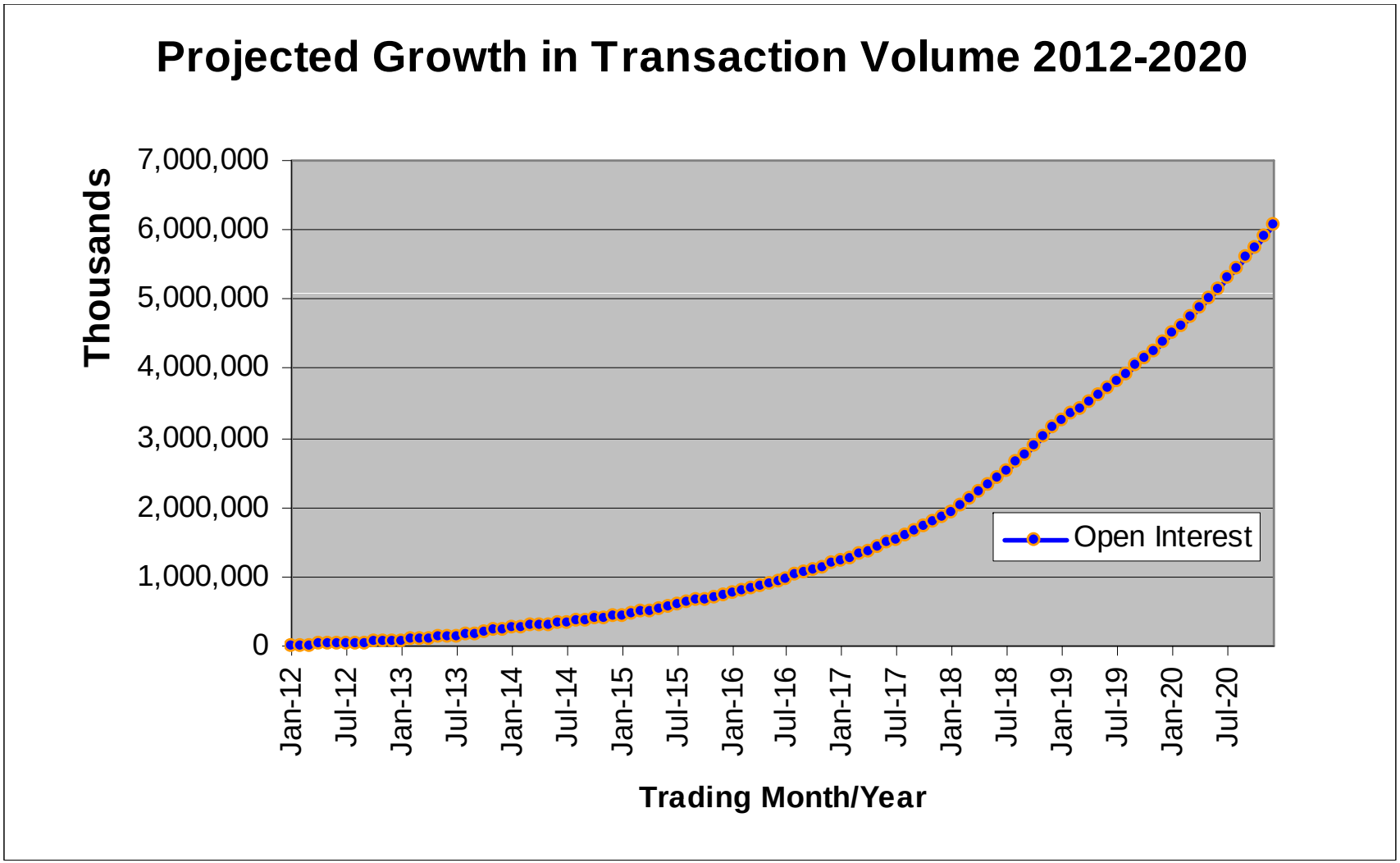
GIC ACI: Index Scenario Performance



GIC ACI: Index Scenario Performance



GIC-ACI: Index Scenario Performance



GIC-ACI: Cumulative Valuation Analysis US & EU-27

Figures in Billions of USD ***Discount Rate: 8.5%***

EU-27 Moderate & Conservative Scenarios (80% Coverage)	NPV: $684,890.73 USD Credits and Offsets
US Moderate & Conservative Scenarios (80% Coverage)	NPV: $428,529.12 USD Credits & Offsets
EU-27 Aggressive Scenario	NPV: $1,364,324.11 USD Credits & Offsets
US Aggressive Scenario	NPV: $692,831.83 USD Credits & Offsets

GIC-ACI: Cumulative Valuation Analysis ADCs

Figures in Billions of USD ***Discount Rate: 12.00%***

Advanced Developing Countries Conservative Scenario	NPV: $115,045.48 USD Only Offsets
Advanced Developing Countries Moderate Scenario	NPV: $172,717.62 USD Only Offsets
Advanced Developing Countries Aggressive Scenario	NPV: $2,159.563.76 USD Credits & Offsets

GIC-ACI: Index Applications

Applications

1. GIC-ACI allows project developers, carbon credit investors, market analysts, and mutual funds to examine the potential value of carbon liabilities/exposure and assets/offsets for agribusiness at the product, firm, industry sub-sector, and industry-wide levels.

   Example 1) Given the emissions profiles and/or reductions efforts of a group of companies in a particular ag-related sub-sector, for example fertilizer manufacturers and the weighted value of their emissions in the GIC-ACI, the potential value of reductions by other ag-chemical manufacturers can be projected and valued and the entire sub-sector profiled and valued.

   Example 2) Biotech firms that have developed mitigation technologies to reduce methane emissions or reliance on chemical fertilizers can utilize the GIC-ACI to value the offset potential of the product based on its ability to reduce GHG emissions in a given ag-sector, like the swine industry.

2. Provide effective benchmarks for U.S. agribusiness entities to value their carbon exposure and offset potential and/or liabilities in anticipation of the US Cap & Trade scheme.

3. The index also serves as a benchmark, which can be used to hedge the price of carbon offsets in the primary market from ag and non-ag projects, as well as provides an alternative investment vehicle to equity instruments.

4. Individual agribusiness firms can utilize the index to assess the risk/opportunity of acquiring/merging with a rival or complementary firm based on the firm's carbon emissions profile.

GIC-ACI: Index Value Proposition

Value Proposition

- The GIC-ACI, inclusive of all agriculture based industries, offers an independent price discovery vehicles that can be traded worldwide.
- The GIC-ACI will help agricultural producers maximize the value of their carbon offset revenue by providing them with a more accurate, industry-specific carbon pricing tool.
- Agribusiness is a key component of the large developing countries' economies (BRICs) and understanding the ramifications for this sector will play a critical role in global trade and the reduction of trade barriers.
- The Index will be updated and expanded as new cap & trade schemes come online to reflect changes in the demand for allowances and offsets from agribusiness worldwide.
- The GIC-ACI, as a representative of the global carbon emissions sector, accounts for an estimated 15% of all allowances and credits currently in the marketplace and this share is likely to increase as more cap & trade programs come online and as more of agribusiness is covered under existing schemes.

GIC-ACI: Evolution & Future Development of Index

- GIC will continue to apply its GHG factor growth model as it incorporates additional countries and regions into the weighted index calculation. The holding weights of the current components will be adjusted to account for the new regions and the issuance of new allowances and credits.
- The factor growth model will be updated every six months as new forecasts and official data become available for the five factor components.
- The weights for each sector (production, secondary, and LULUCF) will be updated annually based on official emissions report data.
- The weights for issued allowances and credits will be updated quarterly.
- The factor model will become the basis for a project based risk analytical framework for analyzing and valuing the risk exposure of a particular business or sector given its emissions profile and agricultural sub-sector. The index will provide the financial valuation component to support the diagnostic analysis.

GIC-ACI: Evolution & Future Development of Index

- GIC is also working on the creation of a companion index, known as the GIC Ag Carbon Intensity Index (GIC-ACII) which would consist of an international top 100 list of publicly traded agribusiness companies (food, beverage, chemical, forestry/timber/pulp & paper, tobacco, grain, livestock/protein, etc.) and be based on their greenhouse gas emissions intensities and market capitalizations.

- The intensity figure is calculated by dividing a firm's total GHG emissions (accounting for all six GHGs defined by Kyoto) by its annual revenue.

- Identification and classification of publicly traded agribusiness/forestry companies will be done utilizing the Global Industrial Classification System.

- Weighting of individual members of the index based on their market capitalization (calculated in USD) according to share price multiplied by total outstanding shares.

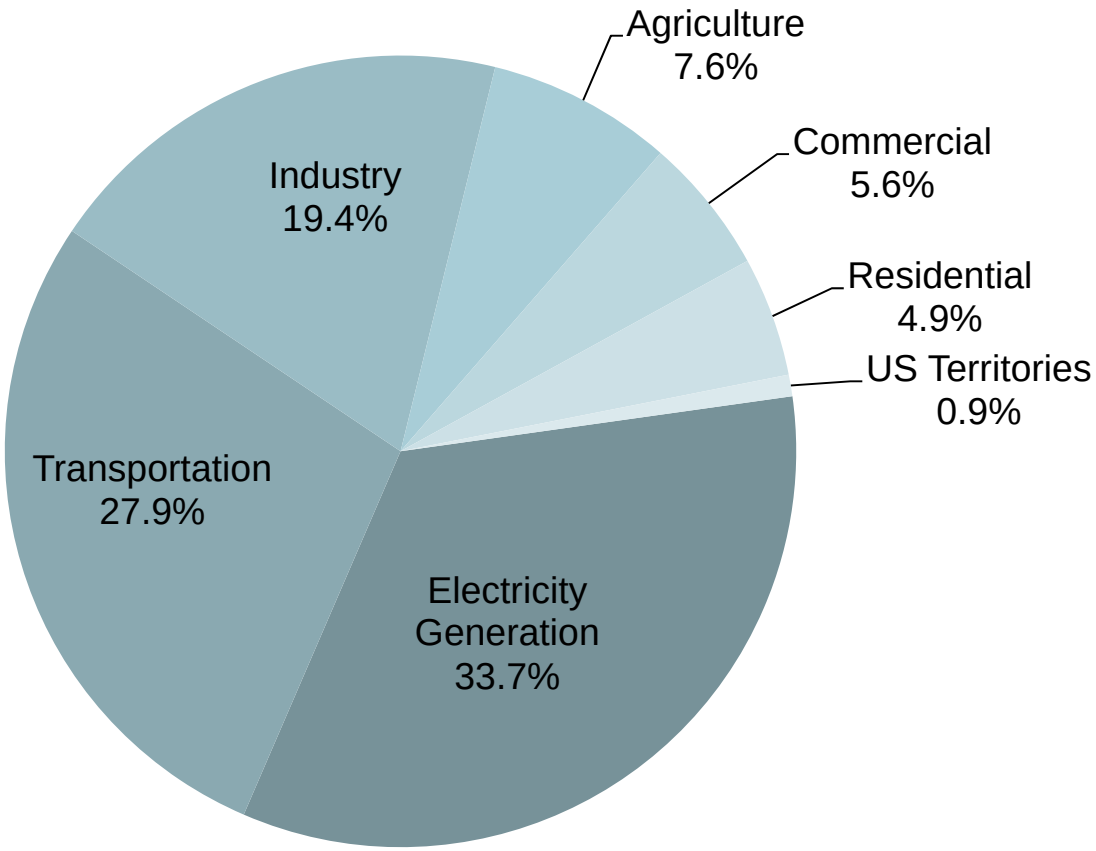
- Index rebalanced every quarter to account for mergers and acquisitions, delistings, and initial public offerings.

- GHG intensities for individual companies calculated on an individual basis. GHG data drawn from public information sources, i.e. EUAs allocated to agribusiness firms covered by EU-ETS and proprietary data compiled by GIC's partner Clear Carbon Consulting.

ClearCarbon

The New Roadmap for Agribusiness in a Carbon Economy

Defining the New Roadmap for Agribusiness



Source: Chart created from Table 2-12 in U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006. April 15, 2008.

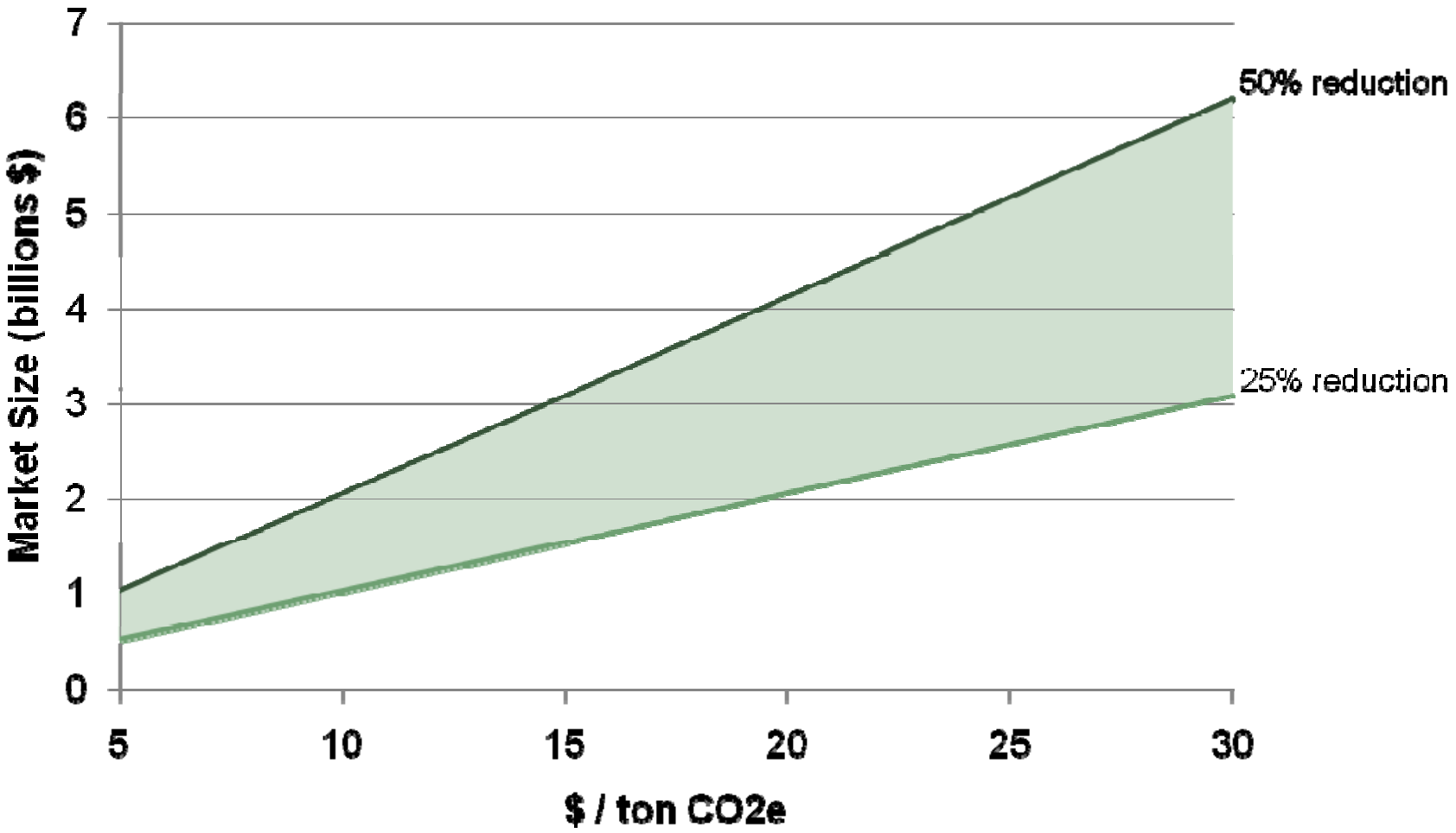
The Need for New Protocols

- As noted, Waxman-Markey calls for up to **2 Billion tons** of offsets and favors domestic sources.
- **Quantity does not exist** under current offset protocol and categories in production agriculture and forestry.
- US production agriculture **emits 518,000,000*** metric tons of CO2e annually.

  ***(Including emissions from energy consumption for combustion & transportation)**

- Estimates claim maybe **25-50% of these are avoidable** with the right financial incentive.
- At a **projected 2012 price of $22**, based on the index's model, **production agriculture** could generate **$3 to $5 billion worth of offsets**.

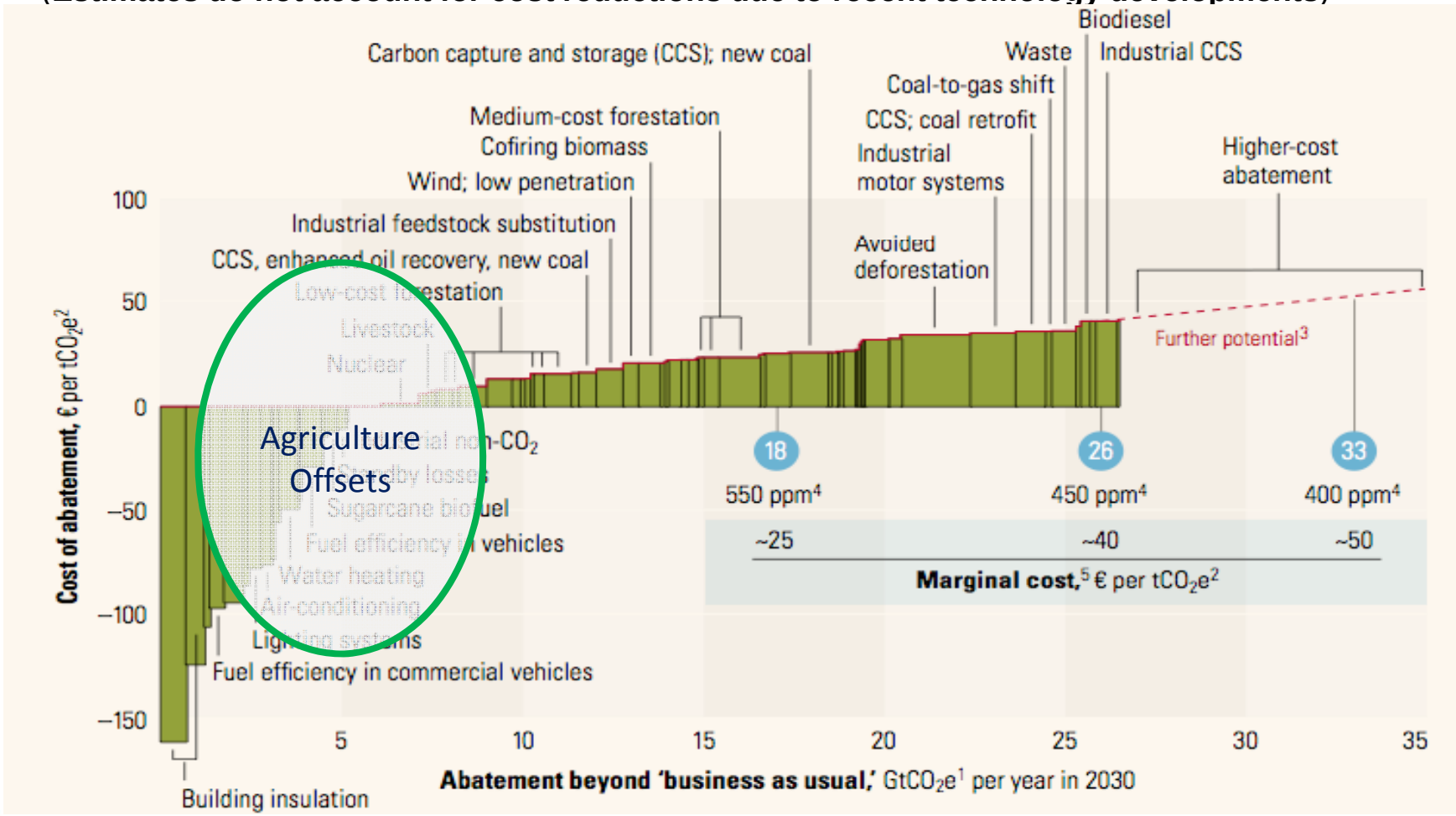
Potential Size of Offset Market for Production Ag in US



Agribusiness's a Low-cost Source of Offsets

Sample Marginal Cost of Carbon Abatement*

(Estimates do not account for cost reductions due to recent technology developments)



*Adapted from: *A cost curve for greenhouse gas reduction,* The McKinsey Quarterly, 2007 Number 1.

Thank you

Rick Gilmore & Dawson Williams

GIC Group

1434 Duke Street
Alexandria, VA 22314 USA
Tel. 703-684-1366
Fax: 703-684-1369
web: www.gicgroup.com

Kyle Tanger

Clear Carbon Consulting

2000 N. 14th St., Suite 730
Arlington, VA 22201
Tel. 571-527-4180
Fax: 571-527-4181
web: www.clearcarboninc.com

ClearCarbon

©2008 GIC Group- Proprietary and confidential