



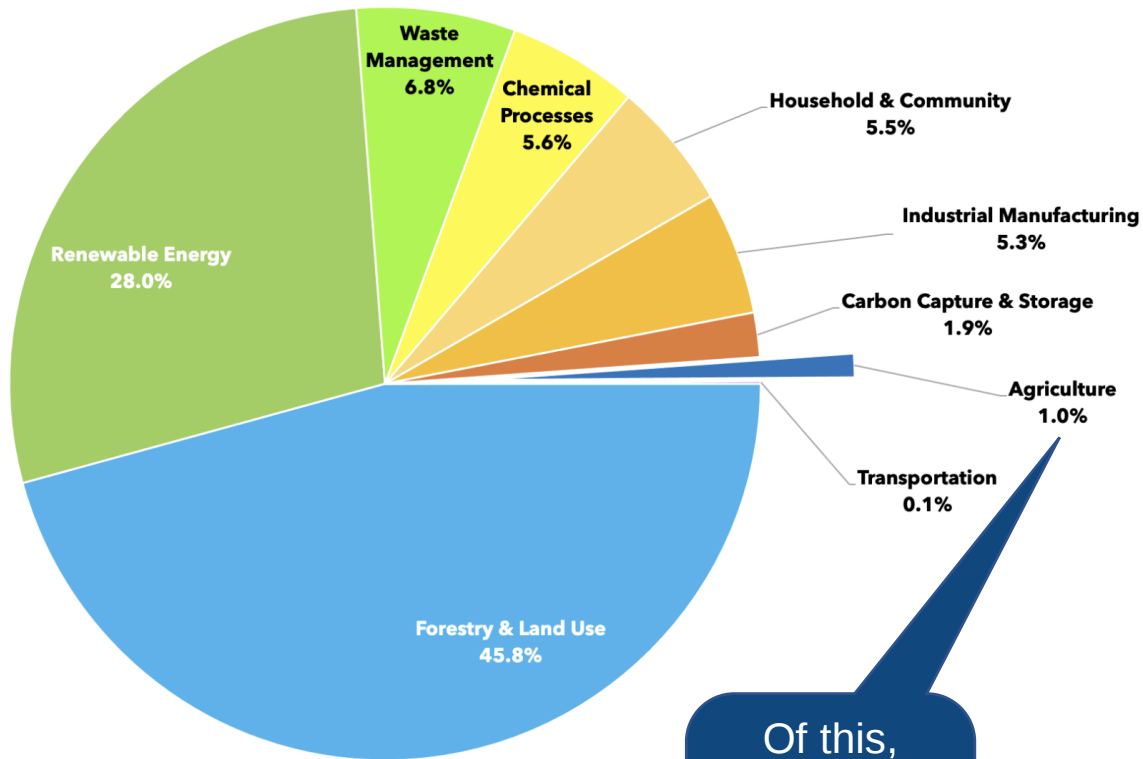
Intro to Climate-Smart Programs – Public Share



Terms and Definitions

CO₂e	Carbon dioxide (CO ₂) equivalent. Also referred to as “carbon”. In climate science and policy all greenhouse gasses (GHG) are converted to a standard based on 1 molecule of CO ₂ . 1 molecule of CO ₂ 28 molecules of CH ₄ and 265 molecules of N ₂ O.	Carbon (CO₂e) removal	Practice that “removes” carbon from the atmosphere and stores it long-term (soil, trees, ocean, rocks, buildings, etc.).
Scope 3	Company’s indirect upstream or downstream emissions.	Carbon (CO₂e) emission reduction	Practice that reduces CO ₂ e emissions from what would otherwise happen.
Carbon offset (carbon credit)	The tradable unit of carbon offset projects. A company replaces their continued emissions by buying carbon removals outside their supply chain.	Climate-smart practice	For our purposes, an agricultural practice that either results in carbon removals or carbon emission reductions.
Carbon inset	When a company invests in emission reductions within its supply chain. Focused on reducing company’s scope 3 emissions.	Additionality	A policy requirement of voluntary carbon programs requiring additional emissions removals/reductions that would not have otherwise happened.
Nitrous oxide (N₂O)	Greenhouse gas that is 250-310 times more powerful than CO ₂ .	Permanence	Carbon projects require that carbon is stored for 100 years or more.
		Reversal	Carbon from a project that is released back.

What is the Agriculture Carbon Opportunity?



<https://agfundernews.com/carbon-credits-just-one-percent-from-agriculture>



Of this,
only 0.03%
comes
from field
row crop
agriculture

- **Agriculture currently generates only 1% of the US carbon offset credits. Nitrogen reduction is less than 0.01% of these carbon credits.**
 - US cultivated hectares = 129,904,091
 - There is a 7,619,000,000 MT of potential carbon sequestration (based on US agriculture soil carbon averages)
 - There is a 32,476,023 MT of potential CO₂e for a 10% N reduction per year
- **Why such low agricultural participation in carbon offset credit markets?**
 - Too much perceived risk around climate-smart interventions
 - Price per hectare/acre the farmer receives for their carbon stock is too low
 - Carbon offset program regulations are burdensome and not aligned with sustainable farming

The Carbon Source and Need

Carbon Balance Source

- Air
- Soil
- Water
- Animals

The world will need to reduce or remove carbon emissions by over 25 billion tons by 2050 To limit global warming to less than 2 °C above pre-industrial temperatures.

To reach this, Fortune 500 Companies are increasingly setting ambitious climate targets to reach this goal. Their estimated emissions of 5.6 billion t CO₂e/yr.* today would likely need to decrease by **5 billion t CO₂e/yr.** by 2050**

* Based on estimate by Climate Impact Partners:
<https://ifnotnowwhen.climateimpact.com>

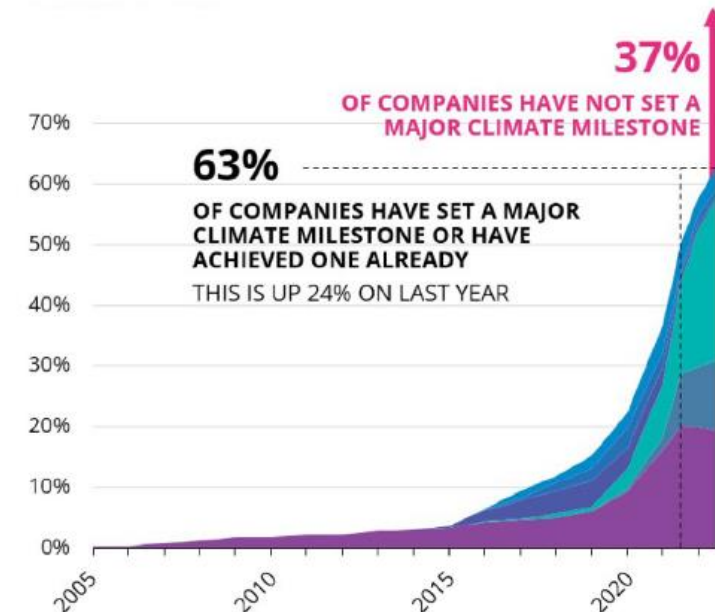
** Based on estimate by Science-Based Targets Initiative:
<https://sciencebasedtargets.org/net-zero>



how can Co2e be reduced in atmosphere



Percentage of companies that have achieved a significant climate milestone or have a target to achieve one





Global food demand is expected to rise 60% by 2050.



Based on current yield trends, agriculture would require an additional 67% of cropland to meet future food demand.



As stewards of our land, farmers lack the tools to be diligent in their quest to improve the effects of inorganic fertilizer on air, soil, and water quality



Municipalities across the globe are setting increasingly strict regulations on fertilizer use and production.

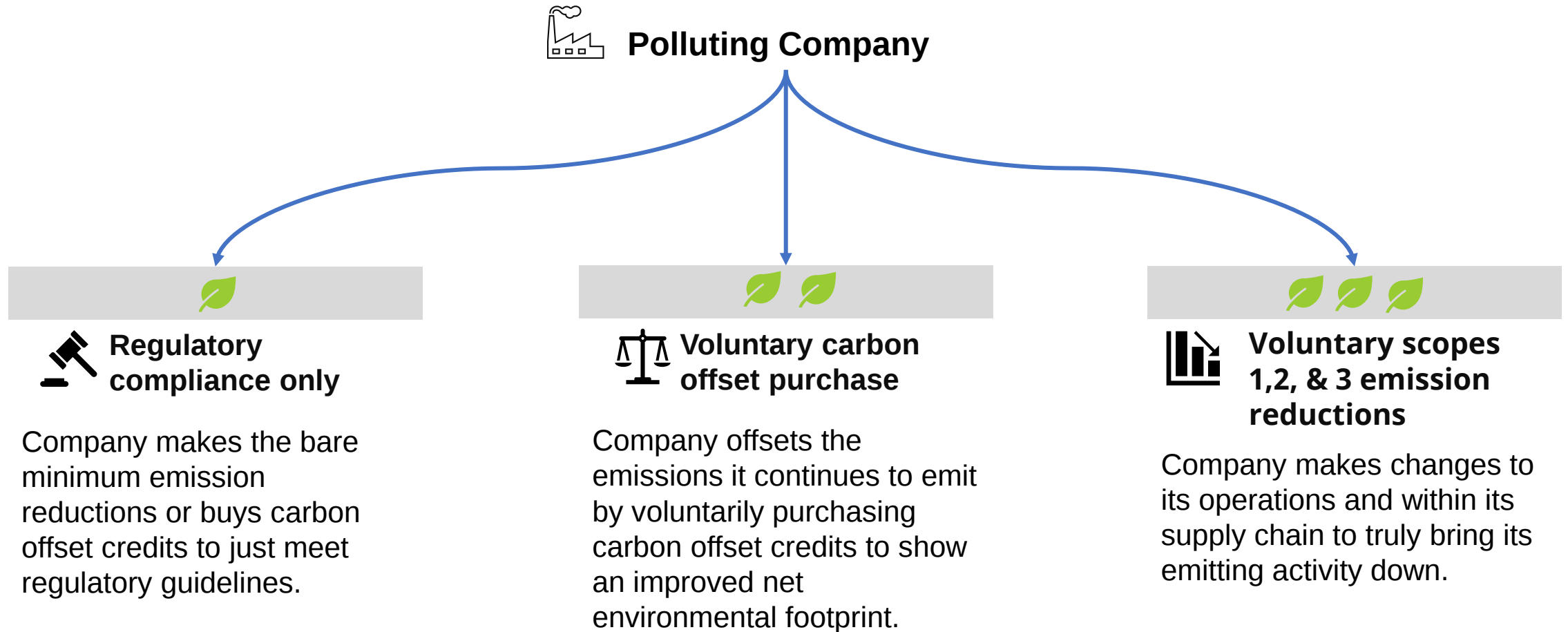
Sustainability Challenges for Fertilizer Manufacturers

The operating environment for the fertilizer industry will become less industry-neutral and more prone to rising criticisms.

Industry will face rising pressures for responsible fertilizer production and application to prove its actions are environmentally sound.

International Fertilizer Association, 2018

Sustainability Compliance and Choices



Agricultural Carbon Sustainability Programs – What are They?

 Offset Markets		 Scope 3 Initiatives
Company continues emitting but reduces its net greenhouse gas (GHG) emissions by buying “ carbon credits ” from outside of their supply chain from an entity that avoids, removes (sequesters), or reduces GHG.		Company works with upstream and downstream stakeholders within its own supply chain to incentivize reduction, removal, and/or avoidance of GHG within their supply chain.
Both provide value to a company and a farmer – just in different ways		
	Rigorous reporting standards require a lot of in-field sampling.	 More flexible reporting standards mean less in-field sampling is required, although these programs are becoming more strict.
	Focused on carbon removal (sequestration) practices: cover cropping, tillage reduction, agroforestry, pasturelands. GHG reducing practices have little value.	 Focused on GHG reduction and avoidance (i.e., reduced in-field N2O emissions), but increasing inclusion of carbon removals as well.
	“Carbon credit” created and monetized on open market.	 Scope 3 “claims” can only be applied within the supply chain. Not monetized traded on open market.

Advantages and Disadvantages of Agricultural Carbon Sustainability Programs

 Carbon Offset (Credit) Markets	
Advantages	Disadvantages
• Can be a source of cash flow for the program developer. • Agricultural protocols have been established for a longer period of time. • A company can develop carbon projects outside of its supply chain. • Offsets can be used by program developer or sold on voluntary market. • Makes it possible to offset emissions for industries with limited ability to reduce emissions within their supply chains (airlines, for example).	• Buyers want credits certified by registries, which have complicated protocols. • Negative press about carbon offsetting enabling a “pay to pollute” model. • Takes at least 3 years from project implementation to generate carbon offsets. • Rigid focus on factors, like additionality, that exclude many early technology adopters. • Low value for N2O reductions, with no commercially viable sampling protocol. • High and laborious sampling requirements for soil carbon. • High deductions due to prediction error. • Reversal challenge, 20% goes for permanence buffer pool deducted from project. • Low monetary return for farmer.

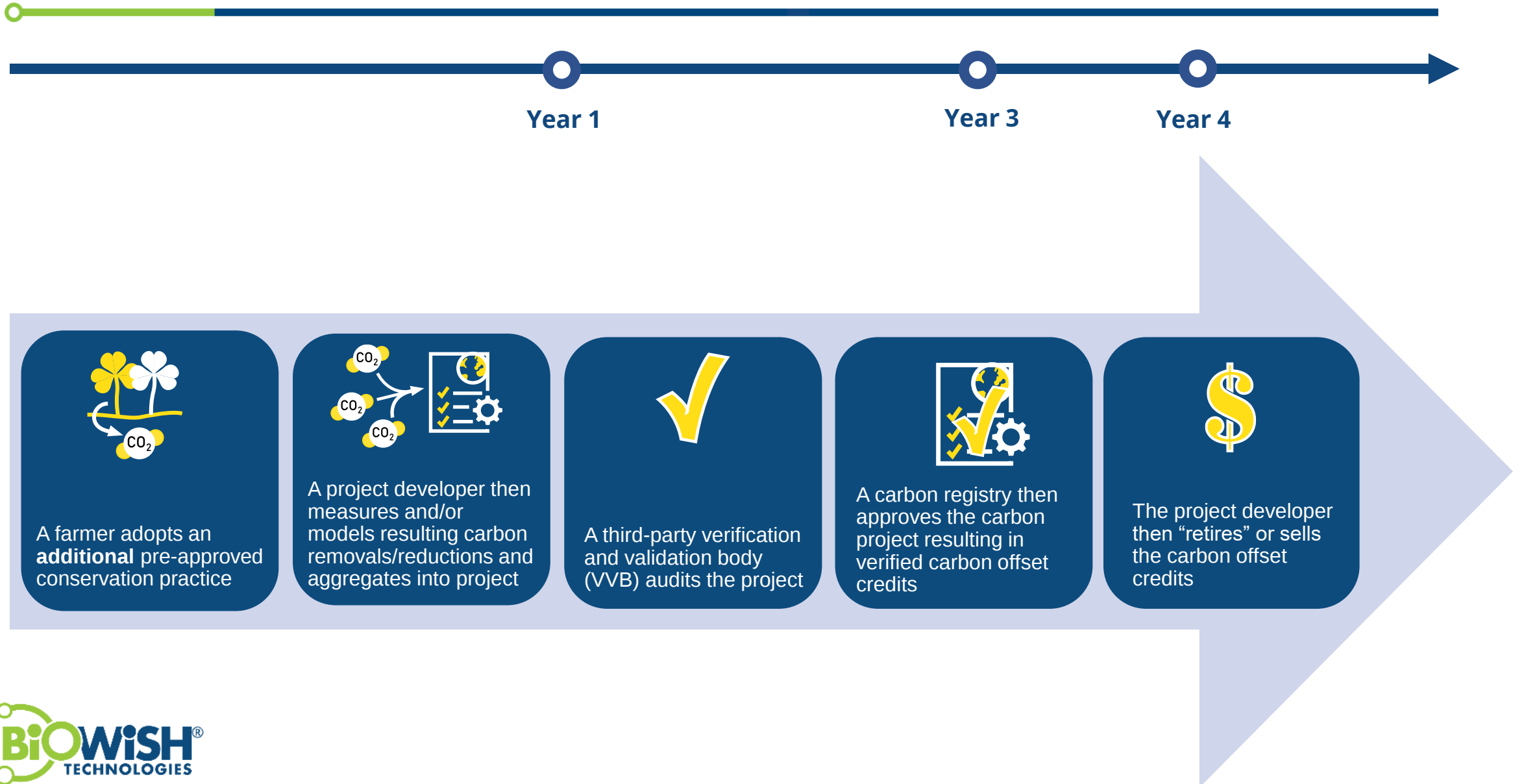


 Carbon Scope 3 (Inset) Initiatives	
Advantages	Disadvantages
• More positive societal view as organization is reducing its own pollution. • Simple, more intuitive accounting standards. • An organization can invest in and apply resulting emission reductions within its own supply chain. • Can be implemented in a much shorter timeframe than offset markets. • Not focused on additionality, which means early adopters can still be rewarded financially. • Emissions reduction doesn't require permanence and therefore no reversals or project buffer pool. • Can increase the value of its supply chain.	• Brand new protocols, some which are still under development, means that there is still some unsurety about guidelines. • Can't be sold.

Carbon Offset Program Overview



Steps to Create Carbon Offsets



Advantages and Disadvantages of Carbon Offset Markets

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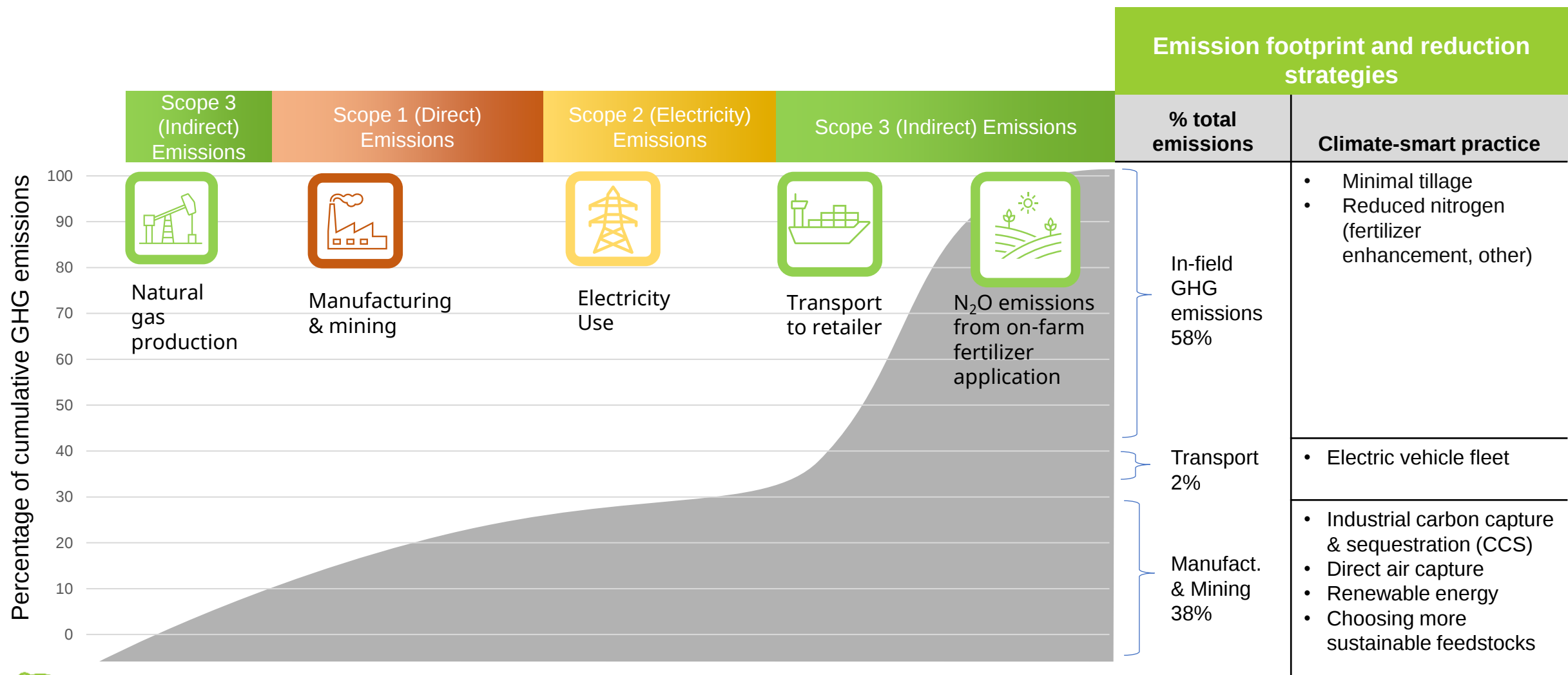
Scope 3 Program Overview



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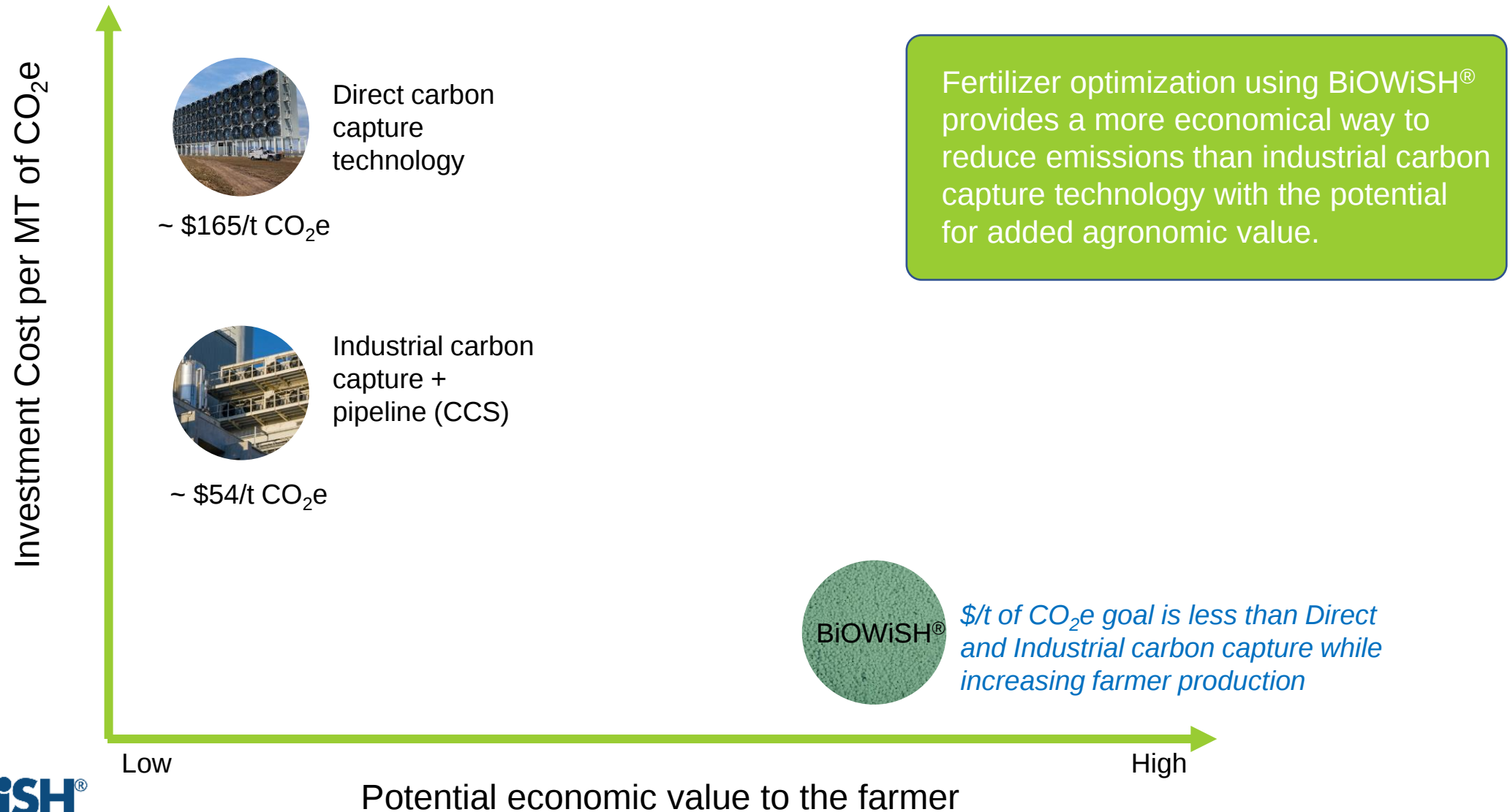
CO₂e Emissions of a Manufacturer for GHG Accounting



Steps for a Company to Claim Scope 3 (Inset) Emission Reductions



How U.S. Fertilizer Companies are Reducing Carbon Emissions



A background image of three scientists in a laboratory setting, overlaid with a blue tint. A man in the center is looking at a petri dish, a woman to his right is wearing safety glasses, and another woman on the far right is looking down. Laboratory equipment like a microscope and glassware are visible on the left.

Thank You



BiOWiSH Technologies

2717 Erie Avenue
Cincinnati, Ohio 45208

P: +1 312 572 6700

biowishtech.com

contact@biowishtech.com