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Practical Aspects of Managing Carbon Assets & Liabilities

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Are We Prepared?

- What percentage of US companies may be impacted by climate change regulation / legislation?

100%

Either directly or via their supply
chain – Kiplinger Letter

- What percentage of companies integrate (or plan to) climate-change strategies into their business model?

16%

Treasury & Risk
Survey

Topics

- I. Environmental Markets – The Basics
- II. Measuring & Reporting Emissions Liability
- III. Hedging & Acquisition of Allowance / Offset Assets
- IV. Summary
- V. Appendix - Additional Information

THE BASICS

Six types of Regulated Greenhouse Gases (GHG)

- Each GHG has a different impact on global warming and it's regulated emissions
- A gas' impact is defined as its Global Warming Potential (GWP)
 - GWP is measured as compared to the impact of CO₂, which has a GWP of one

List of Greenhouse Gases

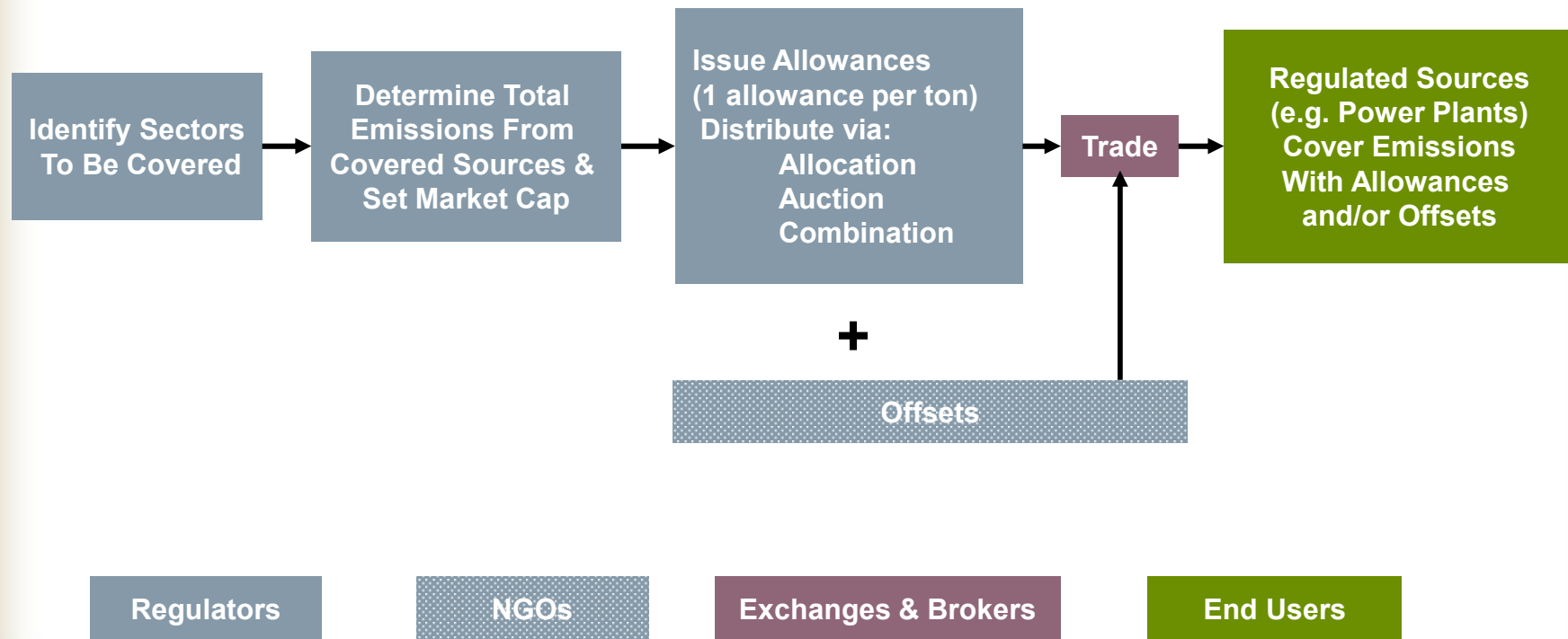
Chemical Symbol	Name	Produced From	GWP *
CO ₂	Carbon Dioxide	fossil fuel combustion	1
CH ₄	Methane	coal mining, landfill gas, biomass, waste water	25
N ₂ O	Nitrous Oxide	aerosol propellant, adipic acid plants (used to make polyester)	298
ODS	Ozone Depleting Substances	refrigerants / fire suppression agents	1,000 - 10,000
PFC	Perfluorocarbons	dry cleaning, polyester production	7,390 - 12,200
SF ₆	Sulphur Hexafluoride	cover gas in electrical switchgear equipment	22,800

File: K: FPLE Portfolio \ Renewable \ Carbon \ FPLE-GHGS \ List of GHGs

* Global Warming Potential relative to CO₂

Environmental Markets

The Basics



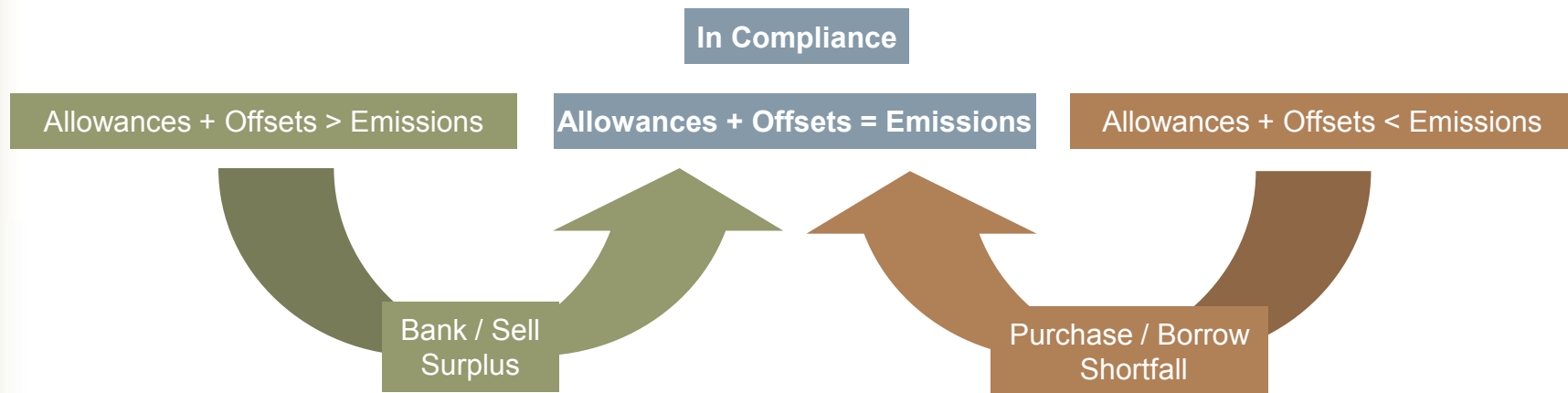
Offset Project Types



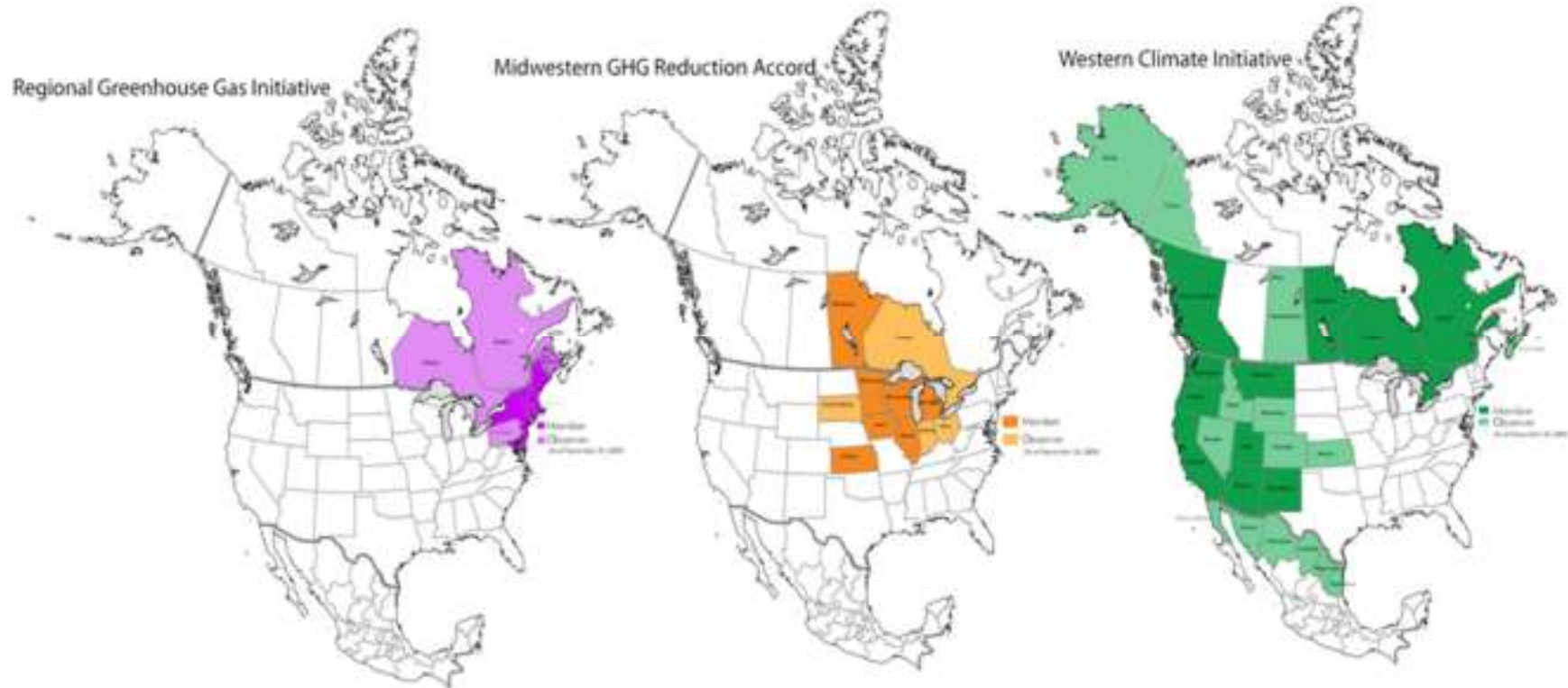
Renewable Energy	Energy Efficiency	HFC & N ₂ O	Waste	Afforestation & Reforestation
Hydropower project producing electricity replacing coal fired power in China	Replacing inefficient light bulbs with efficient ones in Polish government buildings, using less fossil-based electricity	Installing equipment decomposing byproduct from refrigeration processes	Installing equipment capturing methane generated at a landfill and using it to produce electricity	Avoiding deforestation of rainforest and hence maintaining its ability to store carbon, Brazil.

The Role of Carbon Trading

- Emitters will choose least cost option:
 - Internal abatement (reduce emissions)
(scale back output, relocate, alter mode of operation, fuel switching, new technology/investments)
 - Buy surplus emission allowances
 - Invest in verified GHG reduction projects = buy offsets
 - Pay penalty for non-compliance
- Carbon trading unleashes the creativity & economic incentives of markets in allocating capital to the least cost emission reduction options.



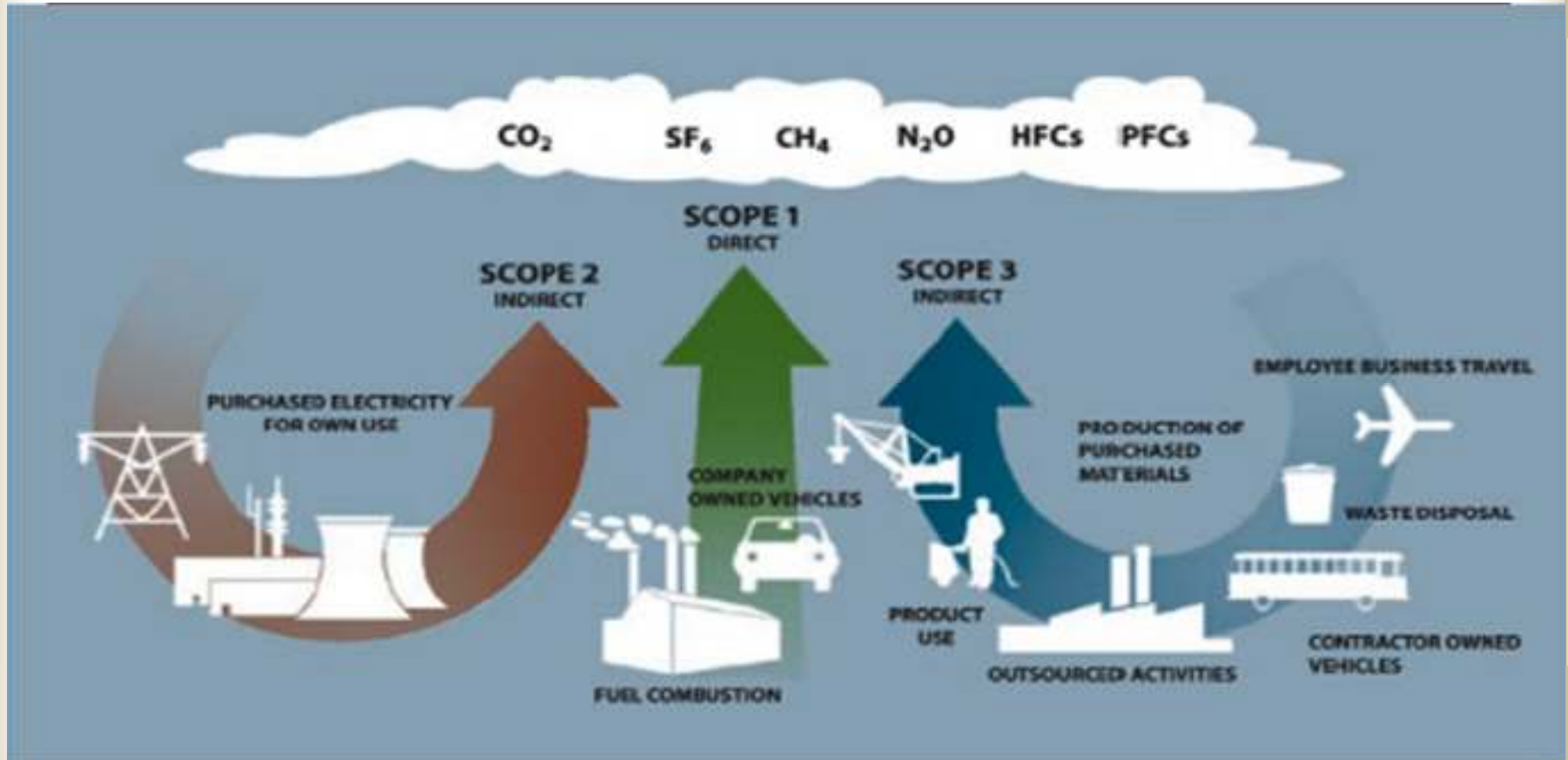
Regional North American Programs



Source: KPMG

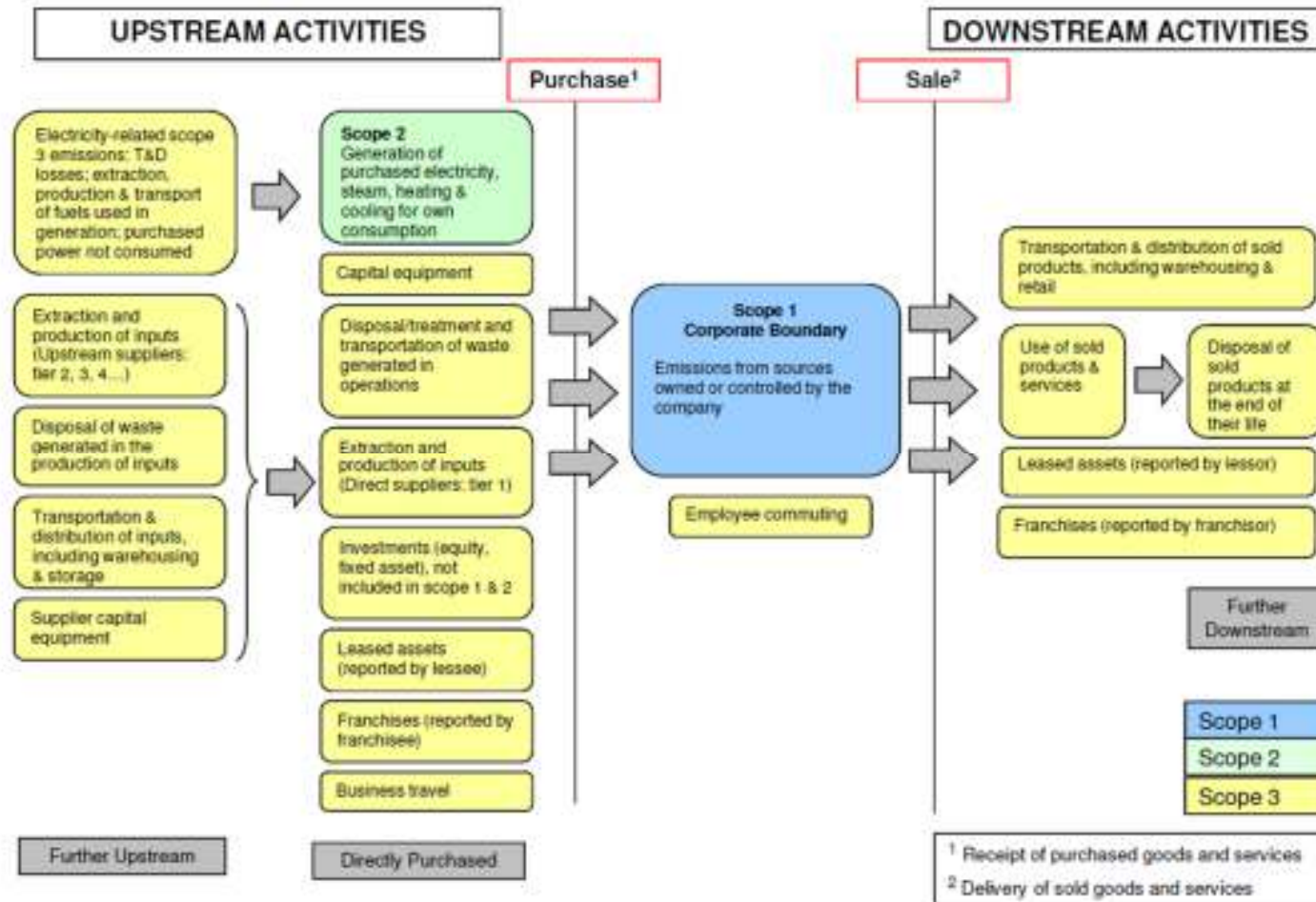
MEASURING & REPORTING

GHG Protocol & Scopes



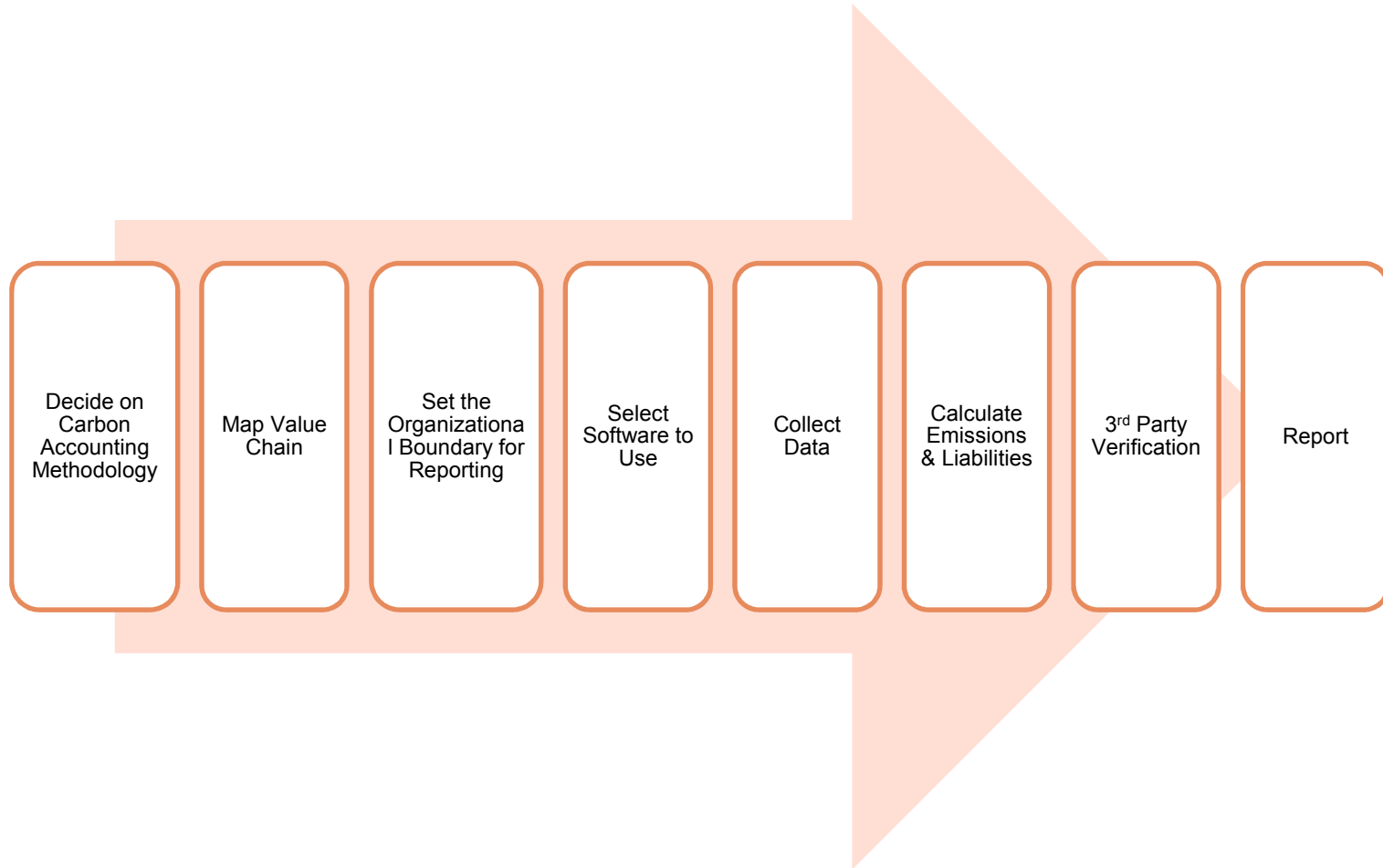
Source: GHG Protocol Corporate Accounting and Reporting Standard

GHG & Your Value Chain



Source : GHG Protocol Initiative World Resources Institute

Steps in Accounting & Reporting



Key GHG Reporting Standards

Jurisdiction	Guidance or Standard	Focus	GHGs Covered	Scope 1	Scope 2	Scope 3
International	GHG Protocol: Accounting and Reporting Standard	Published 2004. Internationally recognized procedure for preparing verifiable emission reports. Supported by calculation tools.	All 6 Kyoto gases	Yes	Yes	Optional
International	ISO 14064-1, 2 & 3 : GHG Accounting & Verification	Published 2006. Modeled on the GHG Protocol. Used to quantify, report and verify GHG emissions at organization and project level.	All 6 Kyoto gases	Yes	Yes	Optional
North America	The Climate Registry (TCR): General Reporting Protocol	First published 2008. Guidelines and calculation tools for voluntary emissions reporting programs.	All 6 Kyoto gases plus optional gases	Yes	Yes	Optional
International	BSI PAS 2050 : Specification for the Assessment of Life Cycle GHG Emissions of Goods & Services	Published 2008. Detailed technical spec to be used with a guide that presents worked examples of the carbon footprint of goods and services.	All	Yes	Yes	Yes
US	GHG Reporting Rule, 40 CFR Section 98	Federal reporting program introduced by the EPA in 2010. Mandatory for all installations emitting >25,000 CO2e tonnes per annum. Includes mobile sources.	All 6 Kyoto gases plus additional fluorinated gases	Yes	-	-

Software to Measure & Manage

Energy & Fuel Efficiency

- Monitor stationary and mobile asset operating performance for
 - Energy,
 - Fuel
 - water
 - Travel
 - Freight
- Optimize supply chain for fuel, energy cost, miles and emissions

Carbon Management

- Gain Carbon intelligence like CO₂ hotspots by facilities, assets, products, suppliers & customers
- Build carbon price into minds of employees
- Goal setting and reduction tracking

Compliance & Accounting

- Manage exposure to carbon-related regulatory, brand & financial risk
- Carbon accounting for enterprise & suppliers
- US EPA & Climate Registry reporting

Key Issues & Challenges

- What do you include / exclude in your GHG inventory?
- How to collect data from multiple facilities?
- How to track asset level energy usage/emissions?
- How to ensure consistent data collection ?
- How do get reporting in the supply chain?
- How to account downstream emissions (e.g., product transport, disposal)?
- What level of accuracy is needed?
- How to calculate and scope 3 emissions?

HEDGING & ACQUISITION

Carbon Market Transaction

- Carbon allowances offset credits are bought and sold in units of equivalent tons of CO₂ (tCO₂e)
- Almost all carbon markets use metric tons as the unit of measure
 - 1 metric ton = 1,000 kg = 2,204 lbs
 - The Regional Greenhouse Gas (RGGI) market in the northeast U.S. trades in short tons (2,000 lbs)
- Approximately 90% of all *compliance market* transaction are Futures
 - only 10% spot trades
- Approximately 90% of *voluntary market* transactions are OTC or bilateral spot trades

Acquiring Allowances

- Zero cost allocation directly from Regulator
 - To non-emitters in order to reduce economic impact (a.k.a immunization)
 - To emitters to reduce cost of compliance
- Market auctions
 - Uniform price, sealed bid (single round) format is typical
 - Double auction also a common feature
 - Sellers of previously issued allowances may elect to add their allowances to new allowances being sold by the regulator
- Open market purchases
 - Spot & Futures

Acquiring Offsets

- Open market purchases
 - Spot
 - Futures
 - Bilateral
- In-direct participation in Offset projects
 - Long term (typically 3 to 5 year) Emission Reduction Purchase Agreements (ERPAs) via agreement with Offset Project Developer (e.g. Landfill methane capture)
- Direct ownership of Offset projects
 - Many utilities now pursuing

Why Invest In Carbon Offset Projects?

There are economic and strategic reasons for entering the carbon offset market at an early stage

- Economic
 - Most carbon project developers do not have ready access to investment capital
 - Delay in legislative progress has dampened appetite for capital deployed in US based projects
 - Early stage participation in carbon projects may generate returns above other project opportunities
- Strategic
 - Investment diversification
 - Growth opportunity
 - Hedge against future compliance obligations

Process to Create Carbon Offset Credits

There is a defined process for projects to go through to create carbon offset credits

- Project developer chooses a Standard and the appropriate protocol within that Standard for the project type – e.g., VCS, Landfill Gas
 - Developer writes a project description document (PDD)
 - Follows the format prescribed by the protocol
 - Identifies and calculates the quantity of GHG reductions in tCO₂e
 - Correctly answers other questions posed by the protocol
 - Developer hires an independent third party to “validate” the PDD – this is a “qualification” of the project
 - Developer hires an independent third party to “verify” the actual reduction in emissions
 - Standard entity issues offsets
-

Carbon Offset Project Risks

While each specific carbon offset project has its own set of risks, some risks are shared across offset project types

- Merchant risk
 - There are no guaranteed buyers in the voluntary market
 - Price for offsets fluctuates with regulatory / protocol changes
- Regulatory risk
 - Federal carbon legislation will determine offset project type eligibility for carbon allowance substitution
 - If a GHG is required to be controlled / destroyed (regulated), then a project undertaken to abate the GHG does not produce eligible offsets since it is “business as usual”
- Quantity risk
 - The project may produce fewer offsets than projected
 - This has been a problem for many Kyoto offset projects
- Protocol risk
 - Protocols governing a offset project type may not be approved

SUMMARY

Steps to understanding your position

As suggested by Evolution Markets:

- Develop internal GHG reporting processes, controls, identify personnel
- Quantify emissions using the GHG Reporting Tool
- Inventory internal facility measures available to achieve reductions/estimate internal reduction potential and costs – energy efficiency, fuel switching/consumption reduction, retrofits, process changes, etc.
- Assess most cost effective pathway to compliance
- Project medium to long term emissions growth considering fuel consumption patterns, economic growth, and other variables driving emissions at facility
- Monitor regulatory developments affecting position, specifically:
 - Allowance allocation strategy - % free vs. % auction ? ARB expects to auction a greater amount than WCI minimum requirements
 - Cap setting – it will be linear and declining but how tight ?
 - Offsets system – types, vintage, location, caps, etc. (extremely dynamic)

Developing A Market Strategy

As suggested by Evolution Markets:

- Define your risk appetite and budget capital expenditures
- Develop market intelligence – current pricing, deal structures, market trends, risks and menu of trade options
- Tailor a market strategy consistent with risk appetite and capital expenditures, considering market conditions
- Assess risk-reward of putting on early action offsets position, taking into consideration different regulatory scenarios
- Execute

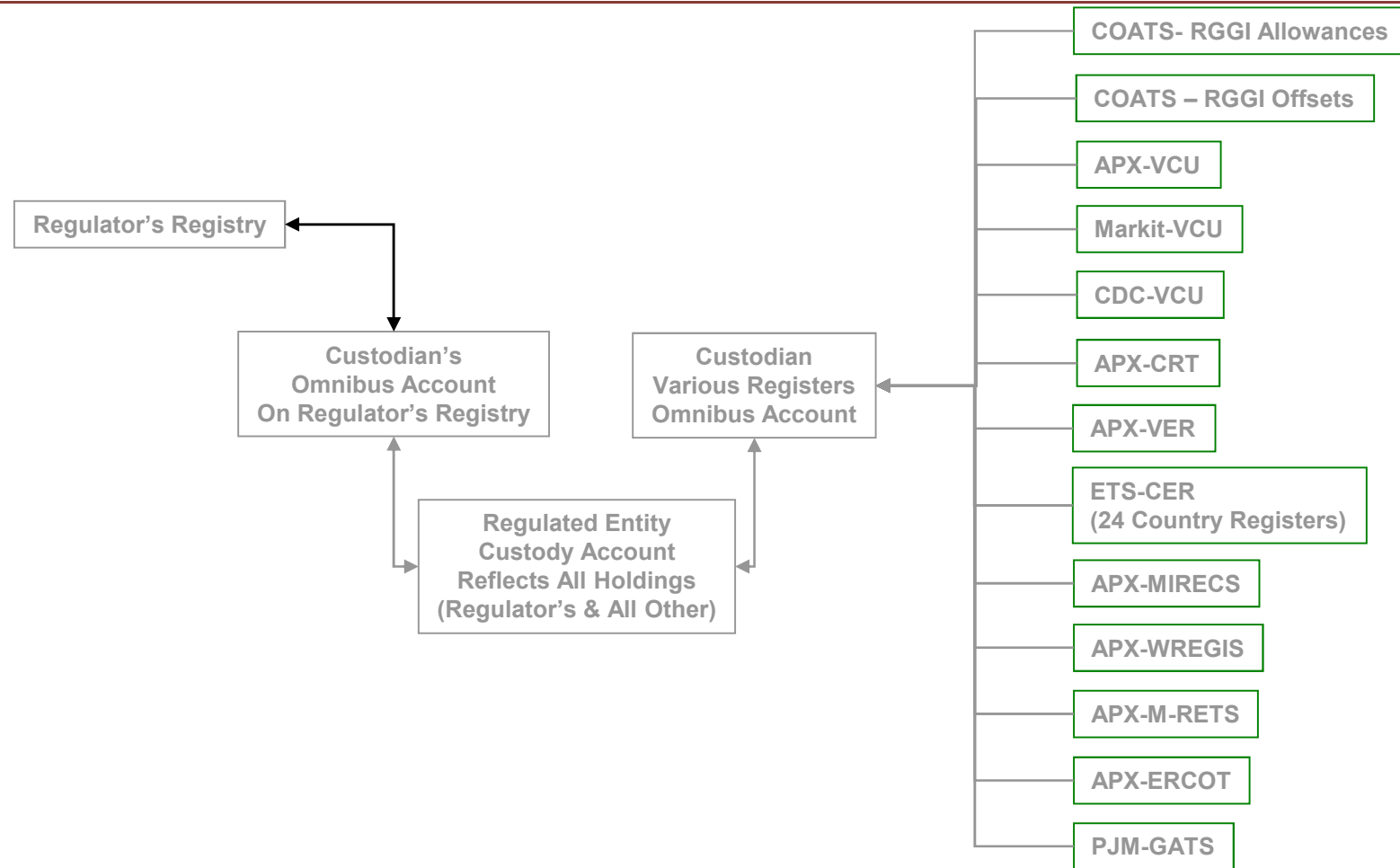
QUESTIONS

APPENDIX

More About Allowances & Offsets

- Allowances
 - Regulating entity (e.g. EPA) issues allowances. Regulator determines:
 - The number of allowances they will issue and
 - The number of offsets permitted per annum
 - Total allowances issued and Offsets permitted decreases over time to prompt reduction in emissions
 - » Decreasing supply of allowances (given a constant demand) will make the carbon “input” more expensive. This will result in making cleaner technologies and carbon avoidance economically viable.
- Offsets
 - Issuance of offsets by recognized NGOs for approved projects
 - Projects must prove that they are **additional** (BOTH environmentally and economically)
 - Either UN Certified Emissions Reductions (CER) or voluntary offsets certified by approved entities (VCU, CRT, ACR, etc)
 - Not all offsets are created equally
 - Regulator caps percentage of Offsets that can be used to cover emissions liability. AB 32 currently envisions 4%. EU countries average 13%

Recordkeeping & Reporting



It's Not Just Carbon

State RPS Standards

State	Amount	Year	Organization Administering RPS
Arizona	15%	2025	Arizona Corporation Commission
California	33%	2030	California Energy Commission
Colorado	20%	2020	Colorado Public Utilities Commission
Connecticut	23%	2020	Department of Public Utility Control
District of Columbia	20%	2020	DC Public Service Commission
Delaware	20%	2019	Delaware Energy Office
Hawaii	20%	2020	Hawaii Strategic Industries Division
Iowa	105 MW		Iowa Utilities Board
Illinois	25%	2025	Illinois Department of Commerce
Massachusetts	15%	2020	Massachusetts Division of Energy Resources
Maryland	20%	2022	Maryland Public Service Commission
Maine	40%	2017	Maine Public Utilities Commission
Michigan	10%	2015	Michigan Public Service Commission
Minnesota	25%	2025	Minnesota Department of Commerce
Missouri	15%	2021	Missouri Public Service Commission
Montana	15%	2015	Montana Public Service Commission
New Hampshire	23.80%	2025	New Hampshire Office of Energy and Planning
New Jersey	22.50%	2021	New Jersey Board of Public Utilities
New Mexico	20%	2020	New Mexico Public Regulation Commission
Nevada	20%	2015	Public Utilities Commission of Nevada
New York	24%	2013	New York Public Service Commission
North Carolina	12.50%	2021	North Carolina Utilities Commission
North Dakota*	10%	2015	North Dakota Public Service Commission
Oregon	25%	2025	Oregon Energy Office
Pennsylvania	8%	2020	Pennsylvania Public Utility Commission
Rhode Island	16%	2019	Rhode Island Public Utilities Commission
South Dakota*	10%	2015	South Dakota Public Utility Commission
Texas	5,880 MW	2015	Public Utility Commission of Texas
Utah*	20%	2025	Utah Department of Environmental Quality
Vermont*	10%	2013	Vermont Department of Public Service
Virginia*	12%	2022	Virginia Department of Mines, Minerals, and Energy
Washington	15%	2020	Washington Secretary of State
Wisconsin	10%	2015	Public Service Commission of Wisconsin

Renewable Portfolio Standards (RPS) are legislated requirements imposed on electricity producers to generate a minimum amount of their output from renewable sources. In lieu of generating from renewable sources the producers can purchase Renewable Energy Credits (RECs).

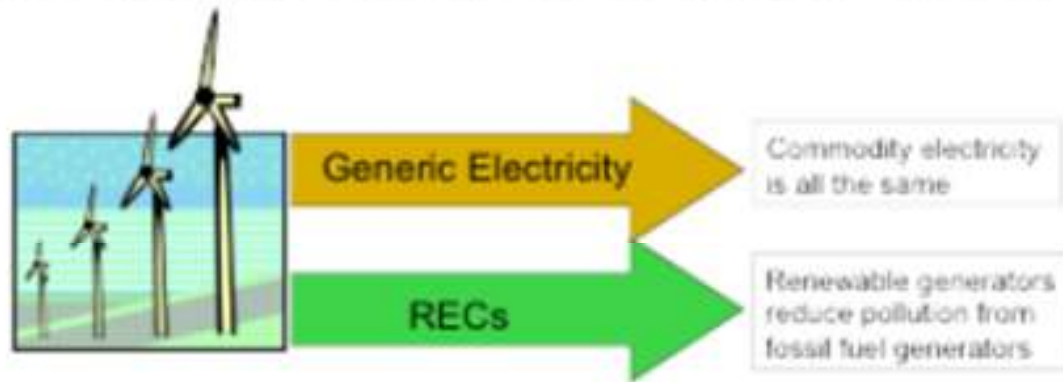
NOTE: *Five states, North Dakota, South Dakota, Utah, Virginia, and Vermont, have set voluntary goals for adopting renewable energy instead of portfolio standards with binding targets.

What Are RECs (Renewable Energy Credits)?

For every kilowatt hour of electricity a renewable generator generates, it also generates a one-kilowatt hour renewable energy credit. The generator can sell both commodities together as "renewable electricity" or sell the electricity as "generic" electricity to one buyer and the RECs to other buyers. **Legally, it's all about who owns the RECs**

[See a picture at the retail utility level](#)

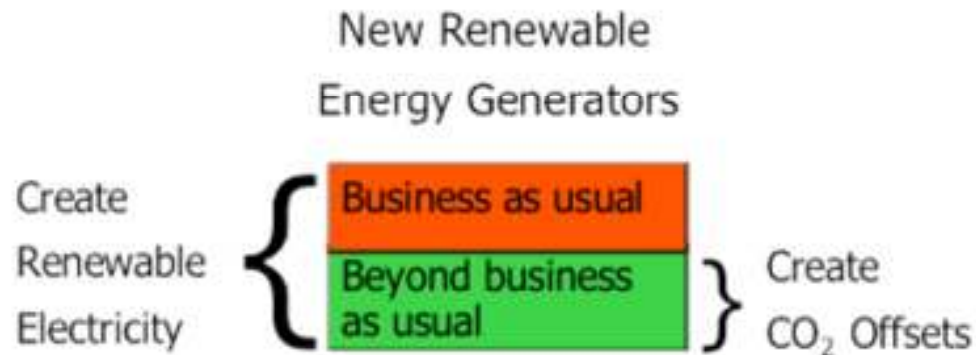
Renewable generators produce two commodities:



RECs - the exclusive legal right to claim that a unit of electricity is renewable, and to claim responsibility for the environmental benefits it produces

Difference Between REC's and Carbon Offsets

All RECs from qualifying new generators represent the environmental attributes of renewable power, principally the fact that producing that power causes less, or no, pollution. When you buy an amount of wind-generated RECs equal to your electricity consumption, you are legally entitled to claim that you are wind powered, and that your electricity use does not contribute to global warming. In other words, all wind RECs can convert your electricity to wind power. However, for a REC to be used to offset emissions from driving, flying or heating your home, it must be from a project that would not have been implemented without the opportunity to realize revenues for the carbon reductions (in other words, it must be "additional" to business-as-usual - see "what's the importance of additionality, below"), and not all renewable energy projects can say that.



The other difference is that carbon offsets can be from non-electric sources, such as using heat given off by electric generators to reduce fossil fuel use, stopping emissions of methane (a powerful greenhouse gas) from stored manure or landfills, or sequestering carbon in forests.

**An important additional distinction is that RECs have a term set by each state.
The term is typically three years.**

Additional Resources

- *EPA Write-Up on Cap & Trade*
 - <http://www.epa.gov/capandtrade/>
- *Carbon Disclosure Project reports*
 - <https://www.cdproject.net/CDPResults/CDP%202009%20SandP500%20Report.pdf>
- *BNY Mellon Environmental Home Page*
 - <http://www.bnymellon.com/environmentalsolutions/index.html>
- *Carbeion Home Page*
 - <http://www.carbeion.com/index.php>
- *NextEra Energy Home Page*
 - <http://nexteraenergyresources.com/>
- *Database of State Incentives For Renewable Energy*
 - <http://www.dsireusa.org/>
- *Western Climate Initiative*
 - <http://westernclimateinitiative.org/>
- *Regional Greenhouse Gas Initiative*
 - <http://www.rggi.org/home>