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Scope 1 and Scope 2

Greenhouse Gas (GHG) Reduction Roadmap

Sustainability Management Group (SMG)

Constellation's Climate Commitments

(1) Any emissions that cannot be technologically reduced by that time will be offset: Constellation commits to reducing methane emissions 30% from 2020 by 2030, aligned with the Administration's global methane pledge.

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What is a Sustainability Roadmap?

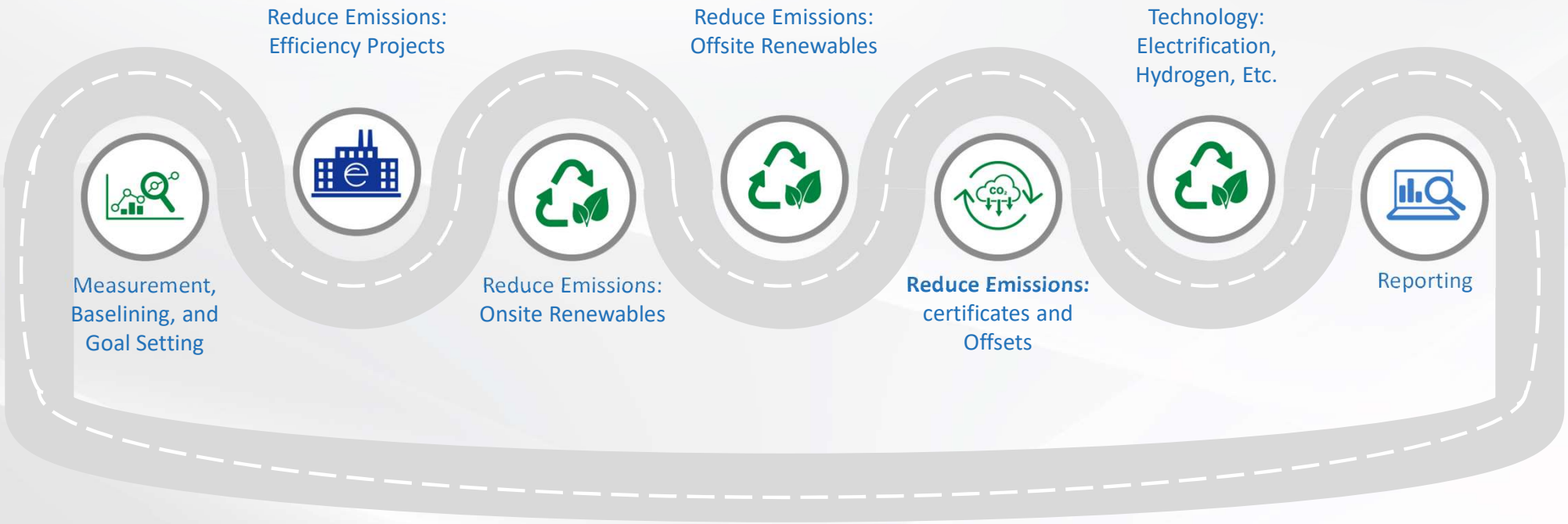
A sustainability roadmap is a strategic plan that outlines a company's goals and actions to become more sustainable over time. It typically involves a comprehensive assessment of a company's current sustainability practices, identification of key sustainability issues and opportunities, and development of a plan to address those issues and opportunities.

To create a sustainability roadmap, a company may begin by conducting a sustainability audit or assessment, which involves evaluating the company's current sustainability practices and identifying areas where improvements can be made. This may include assessing the company's energy use, waste management, water use, supply chain practices, and other sustainability-related activities.

Once the assessment is complete, the company can use the information gathered to develop a sustainability roadmap that outlines specific goals and actions to improve its sustainability performance. This may involve setting targets for reducing energy use or greenhouse gas emissions, increasing the use of renewable energy sources, improving waste management practices, or implementing sustainable sourcing practices.

In addition to setting specific goals, a sustainability roadmap may also include a timeline for achieving those goals, as well as metrics for measuring progress along the way. It may also involve engaging stakeholders, including employees, customers, and suppliers, to ensure that sustainability is integrated throughout the organization.

Roadmap to Reduce Scope 1 and Scope 2 GHG



Your sustainability roadmap is a continuum based on monitoring, progress reports, new information or opportunities becoming available, or initiatives being completed.

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Measurement, Baselining, and Goal-Setting

The first step in a sustainability roadmap is to track GHG emissions and establish goals

- Scope 1:  *Direct* emissions created from fuel consumed on site
- Scope 2:  *Indirect* emissions associated with the purchase of electricity
- Scope 3:  All other emissions, including both up and downstream

There are various types of reduction targets

- *Absolute* – reduction emissions by a set amount
- *Intensity* – reduction normalized to units of sales, production, etc.
- % Renewable or % Carbon-Free
- Net Zero – reducing emissions to zero
- Science-Based Target – reduction goal aligns with the latest climate science to limit global temperature rise

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Energy Efficiency

Energy efficiency is first in the hierarchy of reduction strategies

- *All* forms of energy production have impacts, so strive to permanently reduce usage
- Many win-win scenarios that reduce costs and emissions – “negative cost” carbon reduction
- End-of-life equipment upgrades can achieve 10% - 50% reductions
- Utility rebate programs and other incentives are often available
- More Scope 1 efficiency opportunities exist than renewable options
- Energy efficiency alone will not be able to meet aggressive GHG targets

Onsite Renewable Energy

After energy efficiency, continue to look for behind-the-meter solutions

- Onsite Solar
  - Dual use of already developed spaces (rooftop arrays, solar carports)
  - Roofs must be in good condition before installing equipment with a 25-year life – new roofs *may* be eligible for tax certificates if combined with a new solar array
  - Leased buildings can be complicated with landlord involvement required
  - May require state or local incentives, combined with the federal ITC, to justify financially
  - Available space at a site may not be enough to generate a building's needs, particularly for manufacturing or multi-level buildings
  - Eliminates transmission losses associated with the electric grid
- Biogas can replace natural gas, but opportunities are rare
- Renewables combined with batteries can increase *resiliency* (*microgrids* or *distributed generation*)

Offsite Renewable Energy

After exhausting onsite initiatives, look to offsite sources of renewables

- Allows for larger projects with significant reductions and creates economies of scale
- Multiple o*fftakers* can be bundled for further scale economies
- May have limited opportunities in regulated markets
- Involves more complicated and long-term agreements than standard commodity contracts
- Small- and medium-sized consumers typically not be large enough to qualify for a project
- Includes *Virtual PPAs*, which are utility-scale projects but have inherent risks, and *Community Solar* programs, which support renewable energy but may not allow subscribers to count towards their Scope 2 results (RECs are retained by the solar operator or support State renewable energy goals)
- *Renewable Natural Gas* is injected into the distribution system and environmental attribute certificates are generated, similar to renewable energy certificates

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Credits and Offsets

Carbon offsets can be used as the “last mile” to bridge the gap between reductions achieved and goals

- Include *renewable energy certificates* (RECs), *emission-free energy certificates* (EFECs), and *carbon offsets* such as tree plantings
- Assigns a market price for carbon, which provides an incentive for developers to build more projects
- Are currently widely available and inexpensive
- Need to check compliance with the various greenhouse gas accounting standards
- Must be purchased every year to maintain reductions
- Quality of the certificates/offsets and lack of standards can be a concern
- Concepts can be confusing, leading to skepticism and questions of legitimacy
- As more companies establish GHG goals, increasing demand and price volatility could result
- Need to consider concepts such as *additionality*, *locationality,* and *permanence* MTBG0

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Slide 9

MTBG0 From Brian Megali:

Do we want to get into this? If so, we might need to include an explainer - more than just the definitions included in the glossary slides.

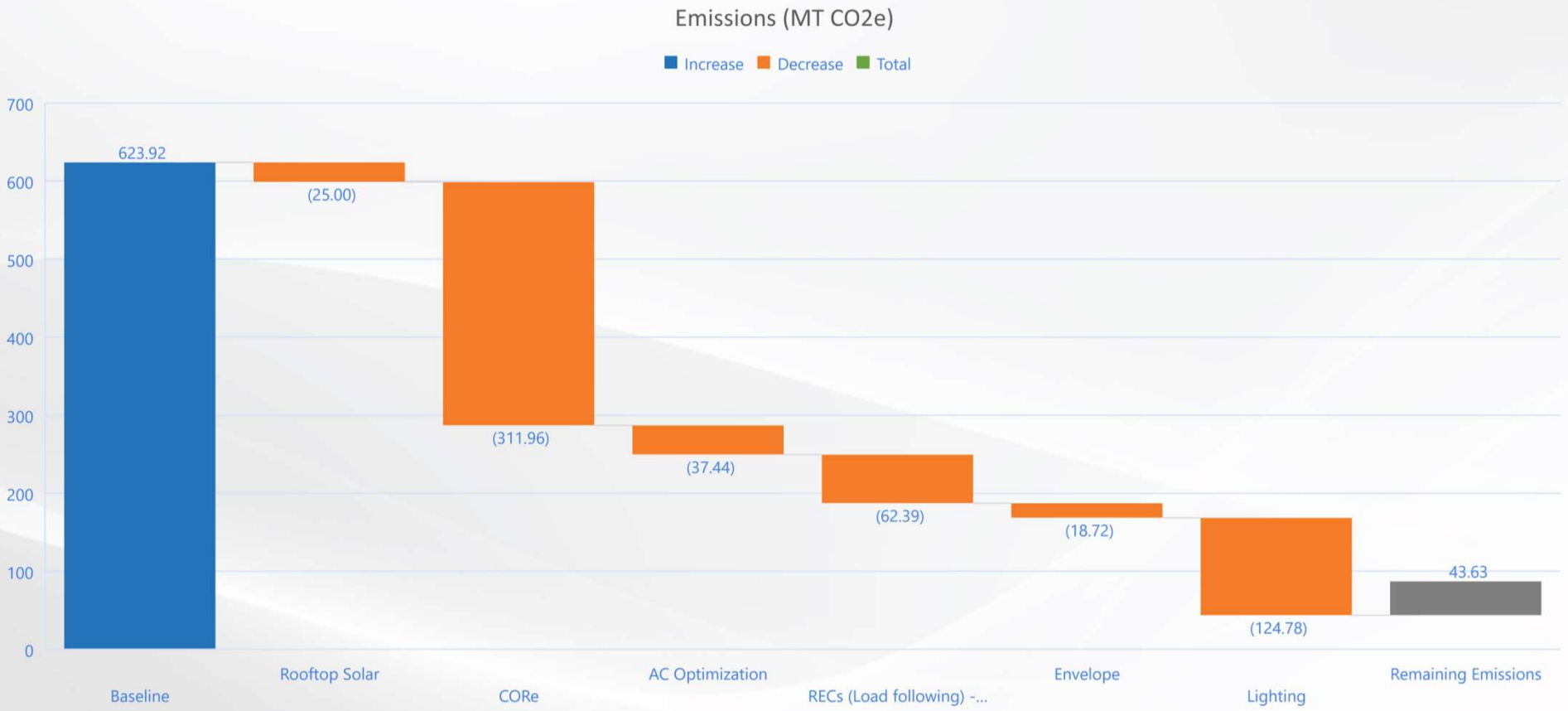
Mattson, Timothy B:(Constellati, 2024-02-12T14:51:31.192

Technology

Electrification replaces processes that rely on the combustion of fossil fuels with electric ones

- Electric vehicles (EVs) and heat pumps provide an immediate GHG reduction
- Steam systems and other industrial process heating can pose several challenges:
  - There may not be a GHG reduction depending on the source of electricity generated
  - Technology may not exist yet
  - Electrical distribution systems may not have the capacity to handle the new load
  - Upfront capital and ongoing energy costs may be prohibitively expensive
- Hydrogen can replace natural gas with lower emissions depending on how it is produced
- Small Modular (Nuclear) Reactors (SMRs) can power a very large facility or small campus but are currently in the pilot stage
- Carbon Capture & Storage removes carbon from the air, but is also in the early stages

The Outcome – A Greenhouse Gas Abatement Chart



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Reporting

Many stakeholders will be interested in the progress being made

- Customers/Consumers
- Employees
- Investors
- Non-Governmental Organizations (NGOs)
- Government

GHG accounting standards establish methods for reporting emissions

- How progress will be communicated
- Dedicated Corporate Social Responsibility (CSR) reports
- Social media/press release
- Company website

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Slide 12

SL0 Should this go on the same slide as our Core products? I don't think this is just a reporting solution.
Signor, Maureen L:(Constellatio, 2024-02-20T20:20:30.442

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Appendix

Customer Solutions Overview

- The following is a high-level overview of Constellation solutions offerings. Solutions are listed in order of ease of effort to implement from Low to High. This information is available as a 1-page document.

Sustainability and Carbon Reduction	Energy Data and Analytics	Managing Budget and Cost	Energy Infrastructure
			

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Product Name and Area of Focus	Available in Regulated Markets	Emissions Impact	Effort	Product Benefits
Emission-Free Electricity Certificates (EFECs) 	Yes	Scope 2[1]	Low	Carbon-free product that helps customers begin their sustainability journey or meet carbon reduction goals through carbon-free electricity supply. EFECs represent the emissions-free attributes of generating sources that do not directly emit greenhouse gases (GHG).
Carbon Offsets 	Yes	Scope 1, Scope 2[1], or Scope 3	Low	Carbon offsets are a quick and easy way to help customers offset Scope 1 or Scope 3 GHG emissions. They can also address Scope 2 emissions but are less frequently used for this. Carbon Offsets provide for an indirect reduction to GHG emissions, but do not allow for the same renewable energy claims that a purchase of RNG, for example, does.[1]
Load Response Programs* 	No		Low	Load response programs can provide cost-savings and/or revenue opportunities for customers who can voluntarily curtail energy demand at a given time.

[1] Based on current World Resources Institute (WRI) guidance. Scope 2 reporting claims of this product may be affected by future changes.

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Product Name and Area of Focus	Available in Regulated Markets	Emissions Impact	Effort	Product Benefits
Green-e® Energy Certified RECs: Blocks Min. $2,500 purchase	Yes	Scope 2[1]	Low	Help your sustainability journey with REC blocks sourced from renewable generating facilities located within the continental US. Available in both competitive and regulated markets.
Green-e® Energy Certified RECs: Load Following*	No	Scope 2[1]	Low	Easy option to leverage existing retail supply contracting process to help customers lower Scope 2 emissions with RECs sources from renewable generation facilities in the continental US.[1]
Efficiency Made Easy® (EME) Min. 1,000 MWhs or 10,000 DTH annually	No	Scope 1	Low-Medium	A simple solution to help implement efficiency measures without upfront capital, allowing great project funding flexibility.
Utility Bill Management	Yes		Low-Medium	Utility expense management platform provides for accurate data collection, reporting, bill pay, and customer insights.

[1] Based on current World Resources Institute (WRI) guidance. Scope 2 reporting claims of this product may be affected by future changes.

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Product Name and Area of Focus		Available in Regulated Markets	Emissions Impact	Effort	Product Benefits
CORe: Existing Offsite Renewables		No	Scope 2[1]	Medium	Provides access to existing, location-specific renewable energy and RECs, from an offsite renewable project through a retail power contract.
CORe+: New Build Offsite Renewables		No	Scope 2[1]	High	Helps achieve renewable energy goals with access to new-build renewable energy and RECs through a physical, retail electric supply agreement.
Renewable Natural Gas (RNG)**		No	Scope 1	High	Customers can claim Scope 1 emission reductions through the purchase of environmental attributes associated with RNG. RNG is pipeline-quality natural gas derived from the decomposition of organic matter, also known as biogas.

[1] Based on current World Resources Institute (WRI) guidance. Scope 2 reporting claims of this product may be affected by future changes.

Additional Solutions Products:

- Hourly Carbon-Free Energy Matching
- Carbon Accounting Platform
- Smart-Building Technology
- Fleet Electrification

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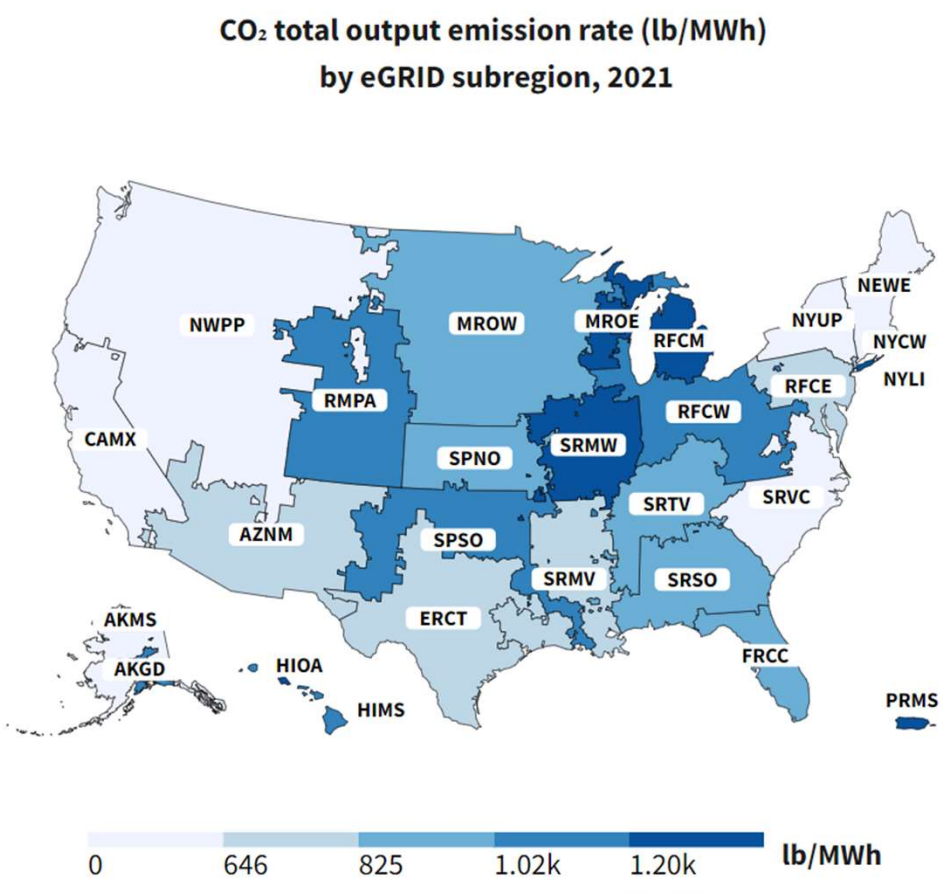
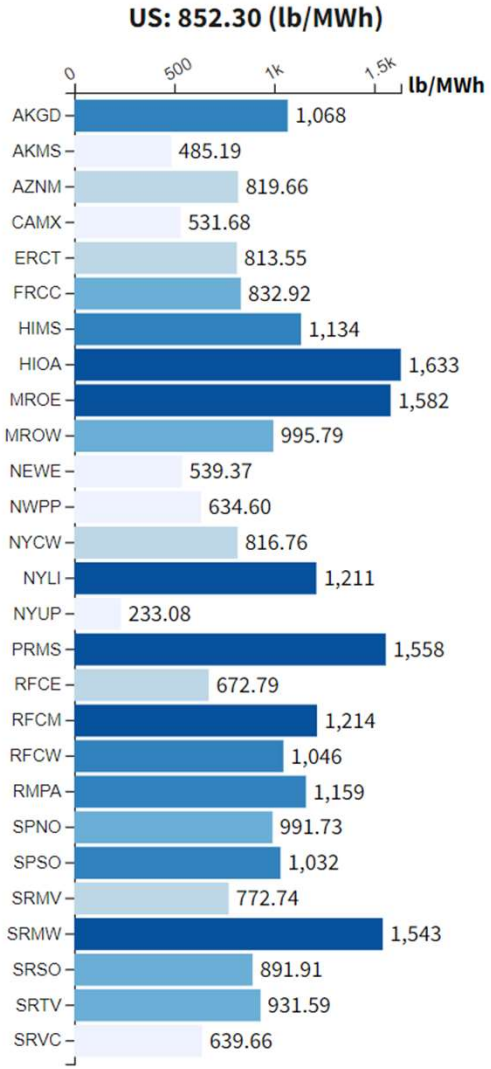
Where to Begin?





Source: Data Explorer | US EPA

Prioritize efforts where:

- Energy usage is highest
- Emissions factors (per kWh) are highest
- Utility costs are high
- Utility or other financial incentives are available
- Green city or other mandates may require organizations to be more sustainable

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Slide 18

MTBG0 From Brian Megali:

I suggest removing this slide.
Mattson, Timothy B:(Constellati, 2024-02-12T14:53:16.956

Glossary

Absolute Reduction Goal	A target that aims to reduce GHG by a set amount, regardless of economic growth.
Additionality	The concept that reductions achieved by a particular project or purchase would not have occurred if the project or purchase had not been implemented.
Carbon Capture & Storage (CCS)	The process of capturing CO2 and permanently storing it underground.
Carbon Offset	An action intended to compensate for the emission of carbon dioxide into the atmosphere as a result of human activity.
Community Solar	An arrangement in which a utility customer agrees to buy a share of a solar power project located with the customer's utility service territory.
Distributed Generation	A variety of technologies that generate electricity at or near where it will be used.
Electrification	The process of converting a machine or system to use electrical power instead of fossil fuels.
Emission-Free Energy Credit	The clean energy attributes of 1 MWh of emission-free electricity.
Greenhouse Gas (GHG)	Any of the seven gases that trap heat in the Earth's atmosphere.
Greenhouse Gas Accounting Standards	The rules for measuring and reporting greenhouse gas emissions that provide a framework for businesses, governments, and other organizations to ensure faithful, true, and fair accounting.
Hydrogen	An alternative to natural gas that can be burned as a fuel source to provide energy.
Intensity Reduction Goal	A normalized target relative to an economic or operational variable, allowing for economic growth.
Locationality	Concept of considering where an emissions reduction occurs vs where the benefit is applied.
Microgrid	A small network of electricity users with a local source of supply than can function independently of the larger, centralized grid.

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Glossary

Negawatt	A play on the word megawatt, energy saved as a result of energy conservation measures.
Net Zero	The concept that the amount of carbon emissions added to the atmosphere is no more than the amount taken away.
Off taker	The entity that contracts to purchase electricity from a renewable energy project.
Permanence	The concept that a GHG reduction can not be reversed.
Power Purchase Agreement (PPA)	A long-term contract between a developer and customer to purchase electricity from a renewable energy project.
Renewable Energy Certificate (REC)	The clean energy attributes of 1 MWh of renewable electricity.
Renewable Natural Gas (RNG)	A pipeline-quality gas that is interchangeable with conventional natural gas that is derived from the decomposition of organic matter.
Resiliency	The ability for a distributed generation system to provide backup power when the electric grid goes down.
Roadmap	A strategic plan that defines a goal and includes the major steps or milestones to reach it.
Science-Based Target	Climate goal that is in alignment with the latest climate science to limit global warming to no more than 1.50C above pre-industrial levels.
Scope 1 Emissions	Direct greenhouse gas emissions resulting from fuel burned on or gases released to the atmosphere on site.
Scope 2 Emissions	Indirect emissions from the generation of purchased energy from a utility provider.
Scope 3 Emissions	All indirect emissions, both upstream and downstream, that are not Scope 2.
Small Modular Reactor (SMR)	A nuclear reactor that can be factory-assembled and transported as a unit for installation.
Virtual PPA	A financial contract between a developer and customer that provides RECs from a specific renewable energy source.

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