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PRESENTATION

SUSTAINABLE INDUSTRIAL PRACTICES

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MOWERY

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- Why Sustainability Matters?
- What is ESG?
- How to tackle sustainability?
- Best Practices
- Q&A



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WHY?

Sustainability in Buildings

Green building refers to both a structure and the application of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition.

Marketing
Commitment to sustainability can strengthen your brand

Compliance
There may be sustainable requirements that you must follow

Profitability
Lower energy costs can improve your business' bottom line

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Site
Limiting the impact on the surrounding environment

Building
Using responsible materials, efficient systems and practices

Operations
Minimize energy, waste, material use and occupant comfort

Future Use
Can your building be re-used or materials re-purposed?

YOUR BUILDING IS A SYSTEM

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BUILDINGS AND THEIR IMPACT ON THE ENVIRONMENT

- Energy Usage
- Material Consumption
- Waste Generation

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Sector	Percentage
Transportation	29%
Electric Generation	25%
Agriculture	10%
Commercial	7%
Industrial	23%
Residential	6%

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GHG EMISSIONS BY INDUSTRY

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Industry	Percentage
Transportation	29%
Electricity Generation	25%
Industry	23%
Agriculture	10%
Commercial	7%
Residential	6%

Pollutant	Percentage
Fluorinated Gases	3%
Nitrous Oxide (N ₂ O)	7%
Methane (CH ₄)	10%
Carbon Dioxide (CO ₂)	80%

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ENVIRONMENTAL, SOCIAL, GOVERNANCE

- Carbon Footprint
- Diversity & Inclusion
- Regulation & Compliance

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Why

- Competitive Advantage
- Investors view companies with strong ESG programs to be less risky
- Vendors of larger companies will be measured based on their ESG performance
- SEC announced potential ESG reporting requirements for large businesses and public companies including downstream vendors

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MAJOR IMPACT AREAS

- Energy
- Transportation
- Materials
- Waste
- Water

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MEASURE & IMPROVE

Identify opportunities to reduce, strategize, implement and measure again.

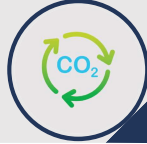
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Year	Value
2024	60
2025	48
2026	25
2027	12
2028	5
2029	2
2030	1

MEASURING CARBON FOOTPRINT AND GHG EMISSIONS

- **Scope 1** – Direct GHG emissions from own sources or assets
- **Scope 2** – Indirect GHG - Emissions that are generated due to the consumption of energy that is generated at external sources.
- **Scope 3** – Other indirect GHG emissions. The remaining greenhouse gas emissions that arise as a result of the organization's activities.

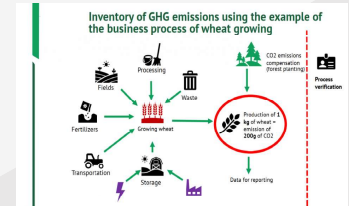


MEASURING CARBON FOOTPRINT AND GHG EMISSIONS

- Energy bills
 - Buildings
 - Fuel
 - Natural gas
- GHG from Materials Used
- Waste stream
- Processing



MEASURING CARBON FOOTPRINT AND GHG EMISSIONS

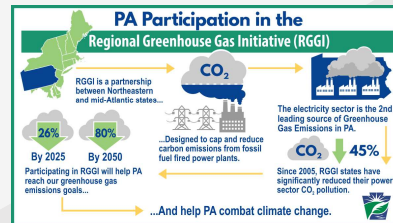


MOVING THE NEEDLE ON GHG

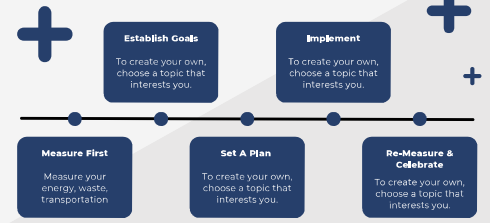
- Reduce energy consumption
- Generating your own energy: Solar + Storage
- Optimizing transportation
- Reducing waste



PENNSYLVANIA AND THE RGGI



YOUR SUSTAINABILITY JOURNEY



BEST PRACTICES & TIPS

- Low Hanging Fruit
- Places to start
- Benefits to exploring green building rating systems



ADMINISTRATIVE

- Engage with company leadership
- Form a committee with representatives from all sectors of the business
- If starting a new project, incorporate sustainability goals into the project
- Review the sustainability checklist
- Set goals, budget and action items
- Educate employees, clients and vendors
- Have an energy audit completed
- Explore LEED for existing buildings
- Have a comprehensive maintenance plan



NEW CONSTRUCTION: RATING SYSTEMS AND CERTIFICATIONS



WHY I LOVE LEED?

In the United States alone:
Buildings account for almost 40 percent of national CO2 emissions and out-consume both the industrial and transportation sectors

Category	Percentage
LOWER CO2 EMISSIONS	34%
LESS ENERGY	25%
LESS WASTE	75%
LESS WATER	11%

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Buildings account for a [most 40 percent of national] CO2 emissions and out-consume both the industrial and transportation sectors

34% LOWER CO2 EMISSIONS

25% LESS ENERGY

75% LESS WASTE

11% LESS WATER

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Project Overview

Category	Value
Project Name	Project 404 - 2014-15
Project Manager	John Doe
Project Start Date	2014-01-01
Project End Date	2015-12-31
Project Budget	\$1,000,000
Project Status	On Track

Project Details

Task	Status	Completion %
Task 1: Project Planning	Completed	100%
Task 2: Project Execution	In Progress	75%
Task 3: Project Monitoring	Not Started	0%
Task 4: Project Closure	Not Started	0%

Project Performance

Metric	Target	Actual
Project Budget	\$1,000,000	\$950,000
Project Status	On Track	On Track
Project Completion	100%	75%

Project Financials

Category	Value
Project Budget	\$1,000,000
Project Actual	\$950,000
Project Variance	\$50,000

Project Risks

Risk	Severity	Likelihood
Risk 1: Project Delay	High	Medium
Risk 2: Project Cost Overrun	Medium	Low
Risk 3: Project Quality Issues	Low	High

Project History

Date	Description
2014-01-01	Project 404 - 2014-15
2014-06-01	Project 404 - 2014-15
2015-01-01	Project 404 - 2014-15

LEED TIPS FOR WAREHOUSES

- Solar & EV or Ready (N7 Law > 100,000 sf - 40% of roof area for solar)
- Increase insulation in the roof and walls
- Explore Alternative HVAC Units
- Explore ways to store energy - battery storage, super capacitors
- Rain water collection
- Take advantage of regional priority credits

An aerial photograph of a large industrial warehouse with a flat roof. A significant portion of the roof is covered with solar panels, arranged in a grid pattern. The surrounding area includes parking lots, roads, and some greenery. The image is framed within a circular graphic element with a blue border.

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WHAT ABOUT COSTS?

- Most energy improvement projects have paybacks from 0-10 years
- Special funding streams
- Grants & Loans
- DCED Programs:
 - High Performance Building Program (HPB)
 - Renewable Energy Program (REP)
 - Solar Energy Program (SEP)
 - Alternative & Clean Energy Program
- Community Solar coming to PA

The logo for the Pennsylvania Department of Community & Economic Development is located in the bottom right corner. It features a stylized orange and white 'PA' monogram to the left of the text 'pennsylvania' in a bold, sans-serif font. Below 'pennsylvania' is the text 'DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT' in a smaller, all-caps, sans-serif font.

- Most energy improvement projects have paybacks from 0-10 years
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ENERGY

- *Energy Star Portfolio: Enter Energy Bills*
- *Form a committee with representatives from all sectors of the business*
- *Review the sustainability checklist*
- *If planning a new project, incorporate sustainability goals into the project*
- *Set goals, budget and action items*
- *Educate employees, clients and vendors*
- *Transportation, fleet, deliveries*

The Energy Star logo is located in the bottom right corner. It consists of a blue square containing a white star with the word "energy" written in a white script font across it. Below the square is a white rectangular box with the words "ENERGY STAR" in blue, bold, sans-serif capital letters.

- **Energy Star Portfolio: Enter Energy Bills**
- **Form a committee with representatives from all sectors of the business**
- **Review the sustainability checklist**
- **If planning a new project, incorporate sustainability goals into the project**
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- **Transportation, fleet, deliveries**



LIGHTING

- Install LED Lights or UPDATE
- Install Light Timers, Occupancy Sensors or Lighting Control System
- Exterior lighting on timers



- *Install LED Lights or UPDATE*
- *Install Light Timers, Occupancy Sensors or Lighting Control System*
- *Exterior lighting on timers*



MATERIALS

- Improve Insulation (Envelope, Pipes that transfer heat)
- Use LOW VOC paints, adhesives, materials
- Use FSC Certified Wood
- Buy from local vendors, manufacturers

A circular inset image showing a cross-section of a building envelope. It features a vertical wall with a yellow marker or tape applied to its surface, likely indicating a specific material or construction detail. The background of the inset shows a dirt area and some greenery.

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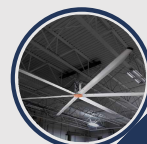


HVAC

- Heat Pumps are an untapped market for industrial
- High velocity, low speed fans to move air and make systems run more efficiently
- Smart controls
- Unoccupied settings
- If waste heat is available, use it for other uses
- Preventative maintenance!

A circular inset image showing a close-up of industrial HVAC equipment, likely a fan or motor assembly, with various components and wiring visible.

- Heat Pumps are an untapped market for industrial
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- 



WATER

- Waterless Urinals
- Low flow faucets and fixtures
- Reuse gray water
- Capture & use rain water
- Install water bottle dispensers



WASTE STREAM

- Implement a recycling program, starting with paper
- Look at current waste stream and begin to reduce, reuse, recycle what you can
- Compost food waste
- Recycling containers
- Measure & improve



MAINTENANCE

- Non-toxic cleaning supplies
- Refillable, reusable containers
- Cleanable filters



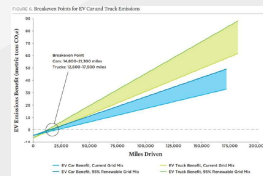
OCCUPANT COMFORT AND EDUCATION

- Survey your team on their comfort (temperature, noise, lighting)
- Install signage to educate about measures being taken
- Improved ventilation & filtration
- Cleaning services
- Fresh air, integration with HVAC systems
- Occupant driven Lighting



PROCESS IMPROVEMENT

- Supply Chain Management
- Process improvement
- Fleet conversion
 - EV - 57% less GHG



LANDSCAPING

- Plants and Trees
- Native & Adaptive Species
- Eliminate Irrigation if possible
- Incorporate rain gardens



QUESTIONS?

