

# GHG and Energy Management for Industrial Applications

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# Recent Regulatory Changes



- 100Mt emitters require 15% reduction and \$20/tCO<sub>2</sub>E by Jan 1, 2016 and \$30/tCO<sub>2</sub>E and 20% as of Jan 1, 2017
- New plan covers 78-90% of emissions
- 45% methane reduction 2020
- Specified Gas Emitters Regulations to cover more operations

- 2030 target to reduce emissions from Industry by 30%, from 2007 levels.
- Expanding carbon tax to include non-combustion sources of carbon pollution
- 33% methane reduction from 2007 levels by 2020
- More compliance reporting

# Federal Upstream GHG Regulations

“We have an opportunity to make history in Paris - an agreement that supports a transition to a low-carbon economy that is necessary for our collective health, security, and prosperity.”  
- Prime Minister Justin Trudeau



- “New” evaluation of GHG’s for proposed energy projects, including during exploration and production
  - Jan. 27, 2016: TransMountain oil pipeline in BC and TransCanada Energy East subject to new transitional policy
- President Obama and Prime Minister Trudeau commit 40-45% methane emission reduction in oil and gas sector below 2012 levels by 2025.

Anticipated that further Federal and Provincial Regulations are coming

## Anticipated Regulations: EPA, Calif. & Colo.

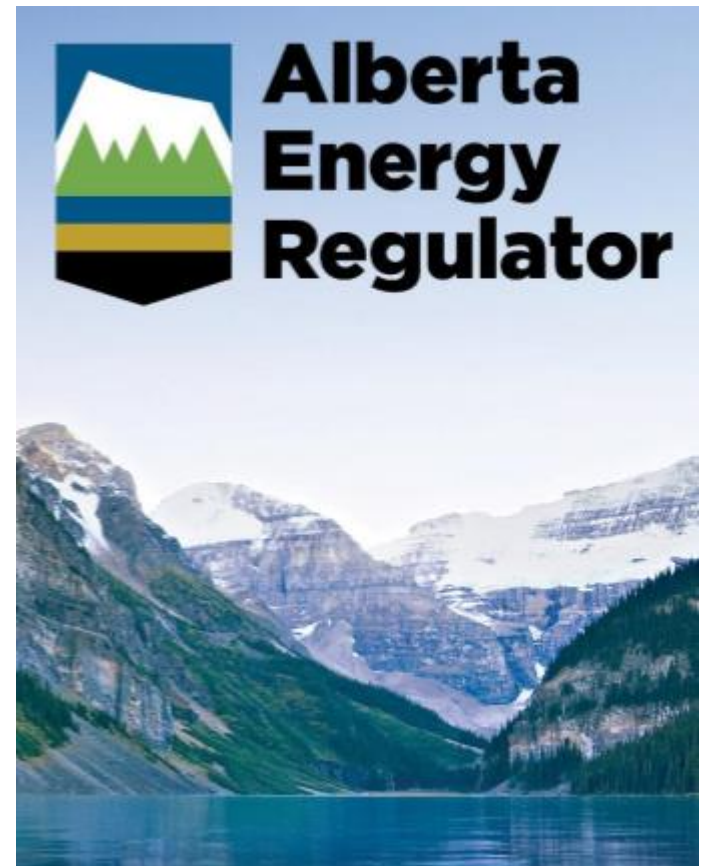
- AER regulations may follow EPA standards for methane
- Possible compliance with California and Colorado to form the basis for policy
- CA and CO policy follow:
  - Real-time well monitoring requirements
  - Possible monthly fugitive emission assessment



## AER Next Steps

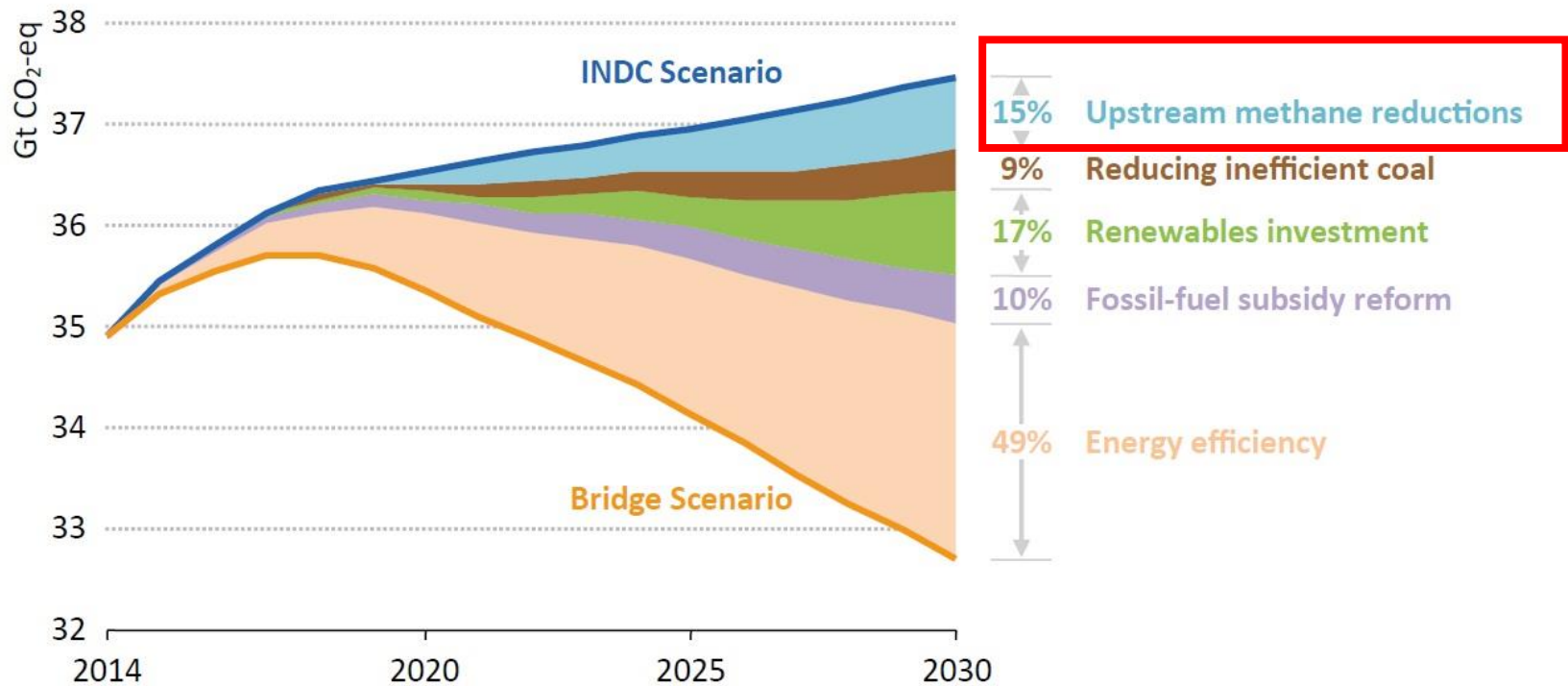
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- Excessive venting compliance initiative
- Measurement and Reporting
- Regulatory Enhancement and New Standards
- Leak Detection and Repair
- Methane regulations for existing equipment

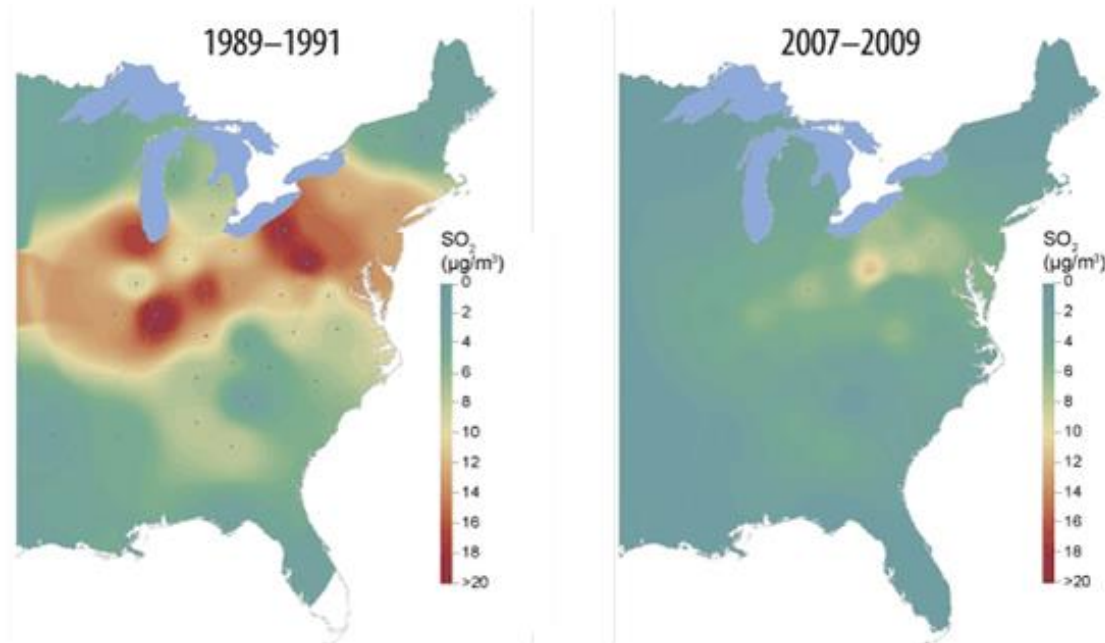


# Methane Emissions Targeted – IEA

**Figure 3.2** ▷ Global energy-related GHG emissions reduction by policy measure in the Bridge Scenario relative to the INDC Scenario

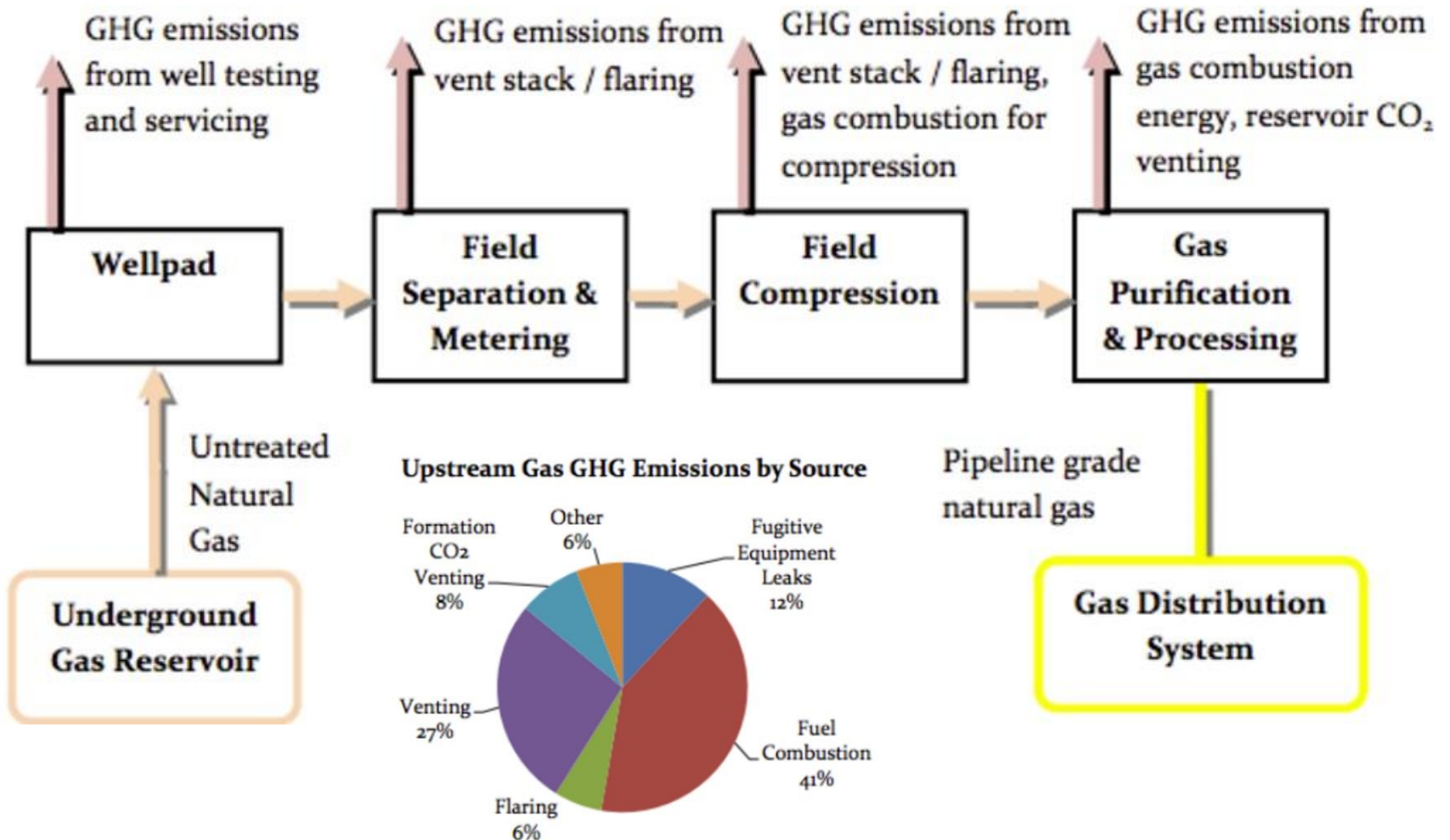


# Acid Rain Program: 1990 Clean Air Act



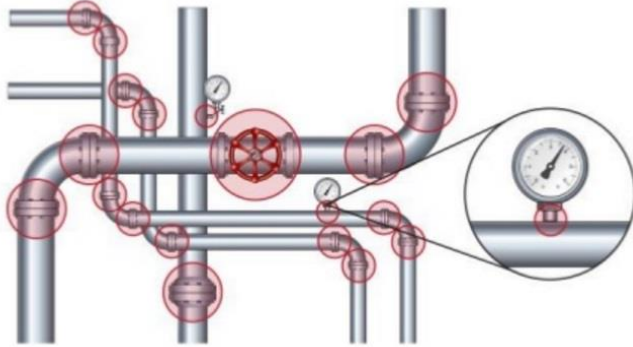
- SO<sub>2</sub> from 17.3 million tons in 1980 to 3.2 million tons in 2013
- Significant industry changes
- Compliance cost now \$1-2 billion/yr, one-quarter of original predicted cost
- Regulations are set; the winners respond proactively and in advance

# Upstream GHG Emissions



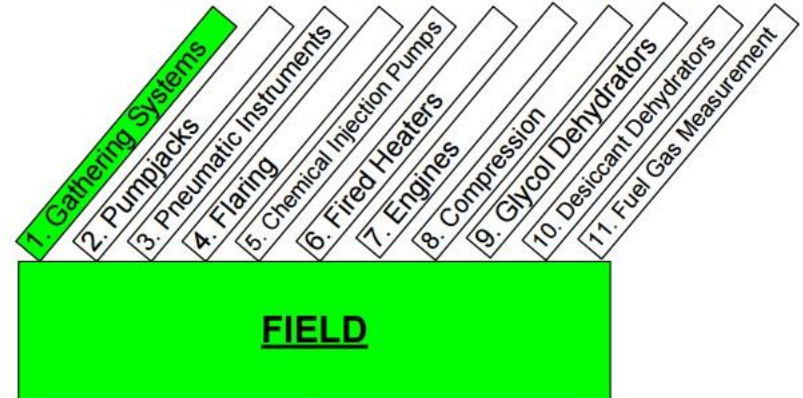


## CH<sub>4</sub> and GHG – Difficult to Measure



- Specialized detection equipment
- Typical plant has 300,000 potential emission points
- Combustible and dangerous to employee health

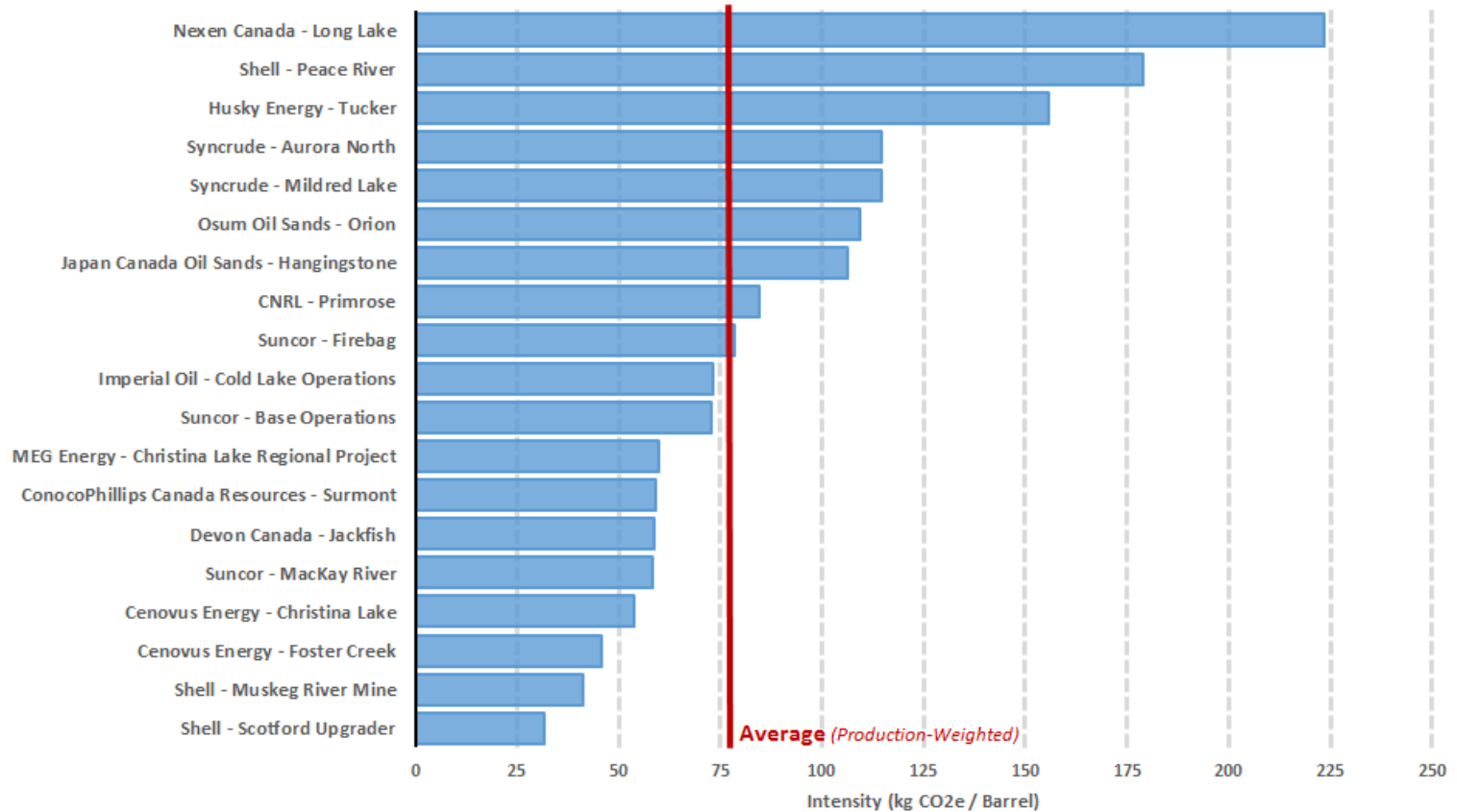
### MODULE 1 of 17: Gathering Systems



# Various Cost Associated – GHG, Compliance...

## Greenhouse Gas Intensity of Selected Oil Sands Facilities in 2011

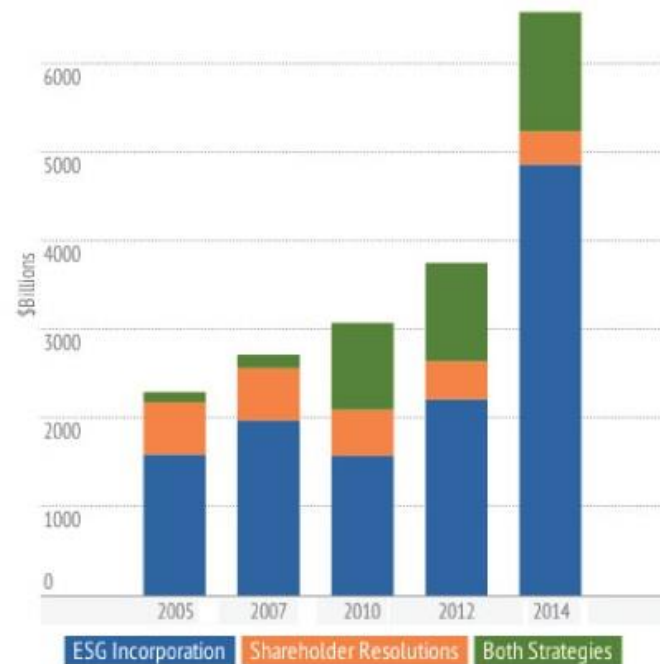
Source: Alberta Government Oil Sands Information Portal, the User Friendly Map is at <http://osip.alberta.ca/map/>



# Investors Increasingly Supporting Sustainable and Responsible Investment (SRI)

- Lower business risk
  - Carbon tax
  - High fugitive emissions are an indication of future leak/spill problems
- Shareholder demands
- Transparency
- Trend accelerating since COP21

**Growth of SRI 2005–2014**



## Four Key Questions

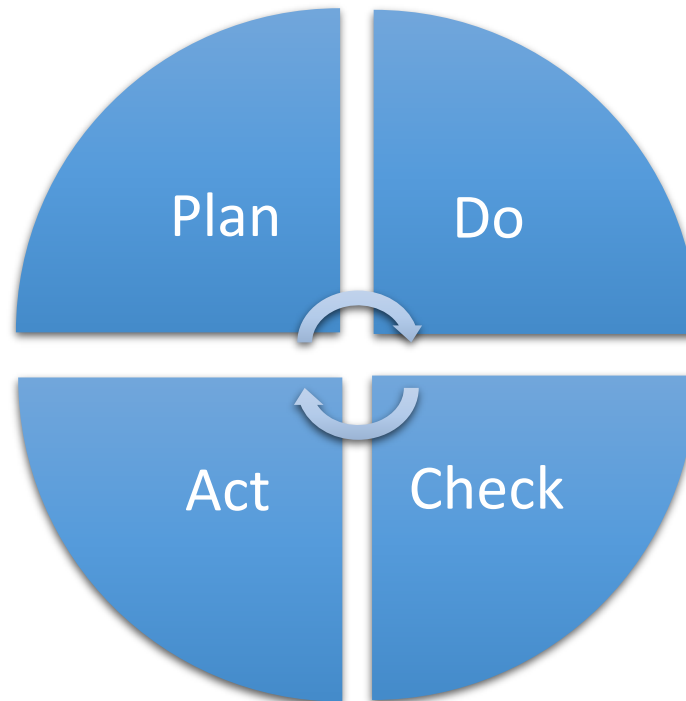
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- Is your GHG and Energy Management Program **going as well as it needs to**?
- These efforts are **cross-functional**, and include both **sites** and **head office**. Do you have **good engagement**?
- Are you incorporating **best practices** in approach, IT, and site engineering?
- Do you have the **right processes** to ensure the **right bottom-line financial** performance?

# GHG and Energy Management Program

- Policy/goals/targets/risks
- Establish team
- Carbon and all-fuels energy review
- Data management
- Baseline model
- Identify reduction and efficiency opportunities
- Government incentive programs

- GHG report
- Performance and efficiency report
- Management review
- Ensure continual improvement



- Measurement and Verification plans
- Implementation – site and corporate
- Communication – internal and External
- Optimize operational controls
- Training
- Procurement

- Monitor, measure and analyze key characteristics
- Calibrate monitoring and measuring equipment
- Evaluate legal and other compliance
- Plan and conduct internal audits
- Take action, correct, and prevent non-conformities