

# IMPLEMENTATION OF ISO 50001 TO SUPPORT GHG REDUCTION

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EATON CORPORATION  
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To be a **power management leader**,  
it helps to have a 100 year head start

- **Founded in 1911**
- **Chairman and CEO – Alexander M. Cutler**
- **Key locations in Cleveland, Ohio; Shanghai, China; Morges, Switzerland; Sao Paulo, Brazil**
- **\$22 Billion in sales**
- **Innovation Centers in regions around the world**
- **Customers in more than 175 countries**
- **More than 100,000 employees worldwide**
- **350+ Manufacturing sites globally**
- **50% of sales outside the U.S.**

# Eaton is a power management company

We help the world use electrical, fluid and mechanical power more **reliably, efficiently, safely** and **sustainably**



Aerospace – Electrical – Hydraulics – Vehicle

# Strategic Energy/GHG Reduction Roadmap

- Voluntary / mandatory reporting / ISO 50001
- Internal communications
- External communications

Communicate Results & Performance  
(On-going Quarterly)

- Reduce (energy consumption)
- Renew (renewable energy, recycle, treat & reuse)
- Restore (offset impact, manage credits)

*3% YoY GHG reduction adjusted to sales (tons/M\$) 2006-2018*

Implement Optimization Activities  
(On-going)

- Identify top emitters
- Commit to targets
- Create performance metrics (KPIs)

*2009-2013 - 6% YoY GHG reduction adjusted to sales (tons/M\$)\**

Evaluate Footprint & Prioritize Actions  
(2006 – present)

Determine Baseline Inventory  
(2006)

- Develop management plan (CarbonMap™)
- Establish measurement & reporting structure
- Set baseline with third-party verification

*3% YoY GHG reduction adjusted to sales (tons/M\$)*

Develop Sustainability Strategy  
(2003)

- Determine corporate profile
- Leadership - Set goals & objectives

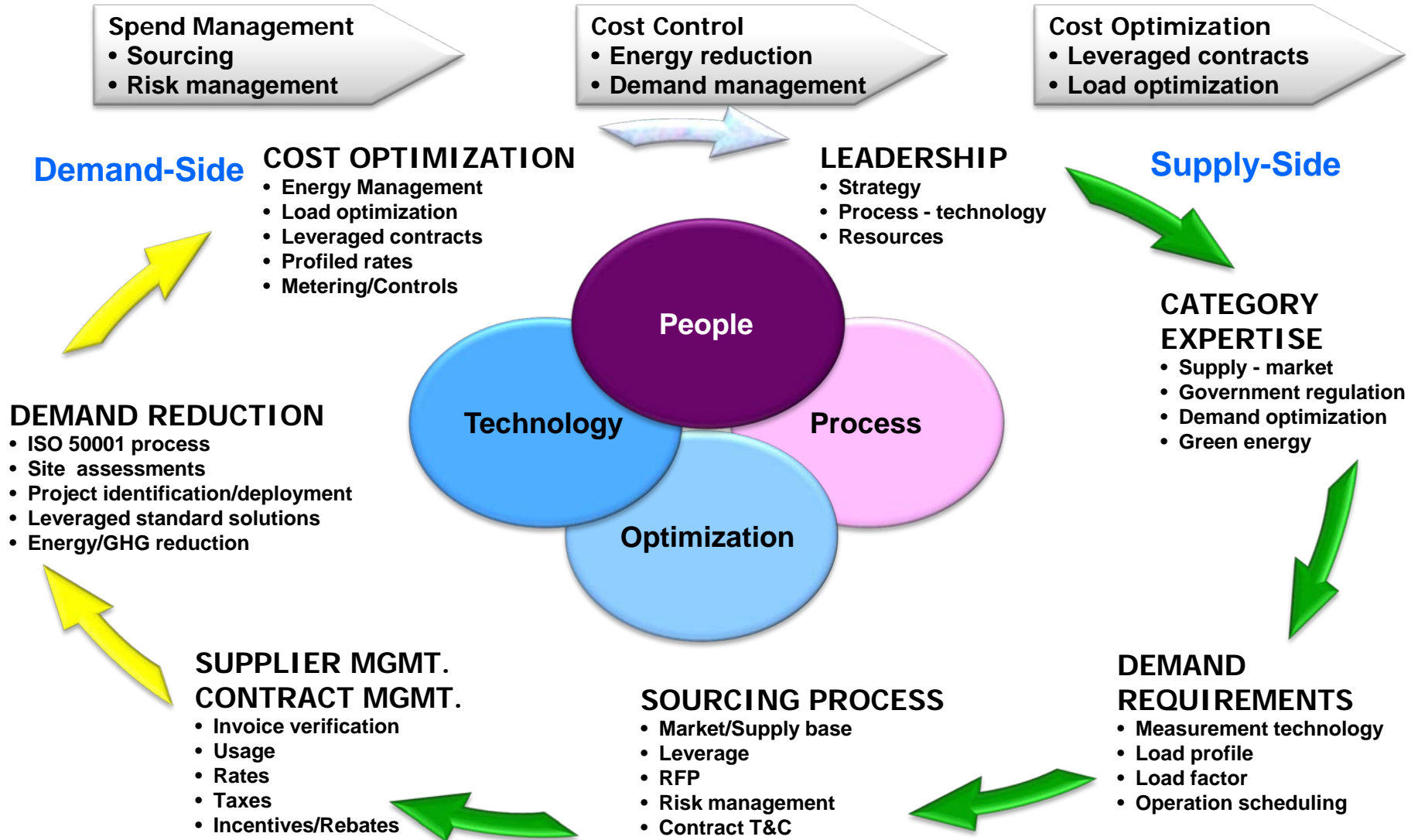
# Energy / GHG – Commitments

External Initiative	Scope	Measure	Timeline	Baseline	Percent Improve (%)	Lead Group(s)
GHG Reduction Target (recent)	Global	GHG Index	2015	2006	25	SCM/Oper./EHS Reporting
DOE 'Better Plants' Program	US	Energy/Index	2016	2006	25	SCM/Oper./ESS EHS Reporting
UK Carbon Reduction Commitment (CRC)	UK	GHG/Index	2015	2011-2012	-	SCM/Oper./EHS Reporting
Carbon Disclosure project (CDP) Reporting function	Global	GHG/Index	2007-pres.	-	-	SCM/EHS Reporting
Energy Efficiency Directive (EED)	EMEA (EU28)	Energy	2020	2015	20	SCM/Oper./EHS Reporting
ISO 50001 EnMS (Spa-EfV)	Germany	Energy	2015	2014	-	SCM/Oper./EHS Reporting

\* Strategic Company Goal

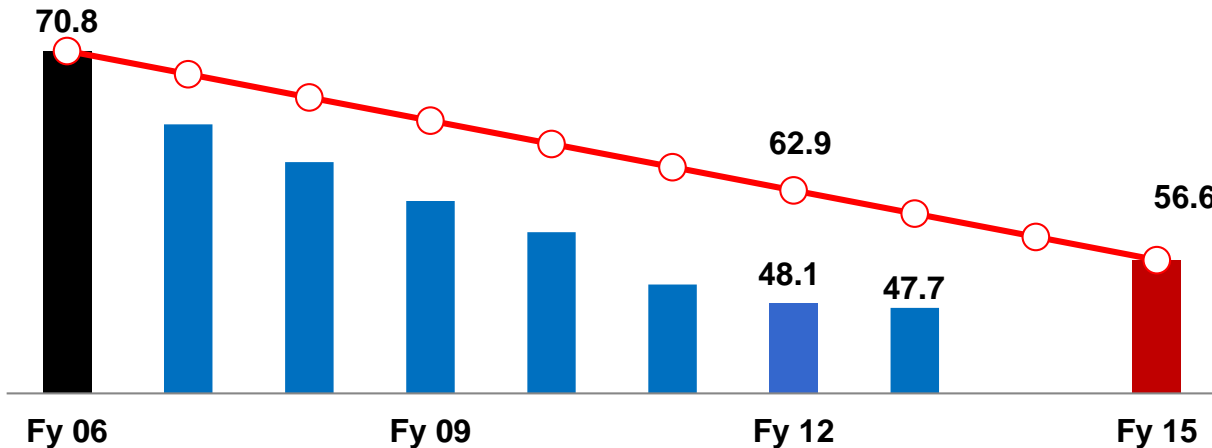
# Energy Management Strategy

Complete  
In process



# Reducing Eaton's Carbon Footprint

Emissions reduction profile (MT/\$M)



- **23%** reduction in absolute emissions
- **32%** reduction in indexed performance
- **272,000 MT** reduced

## Reductions driven by:

1. Facility consolidation
2. Emission reduction projects (ECM's)\*
3. Facility/operations upgrades and optimization

On Track to Achieve 2006-2015 Goal

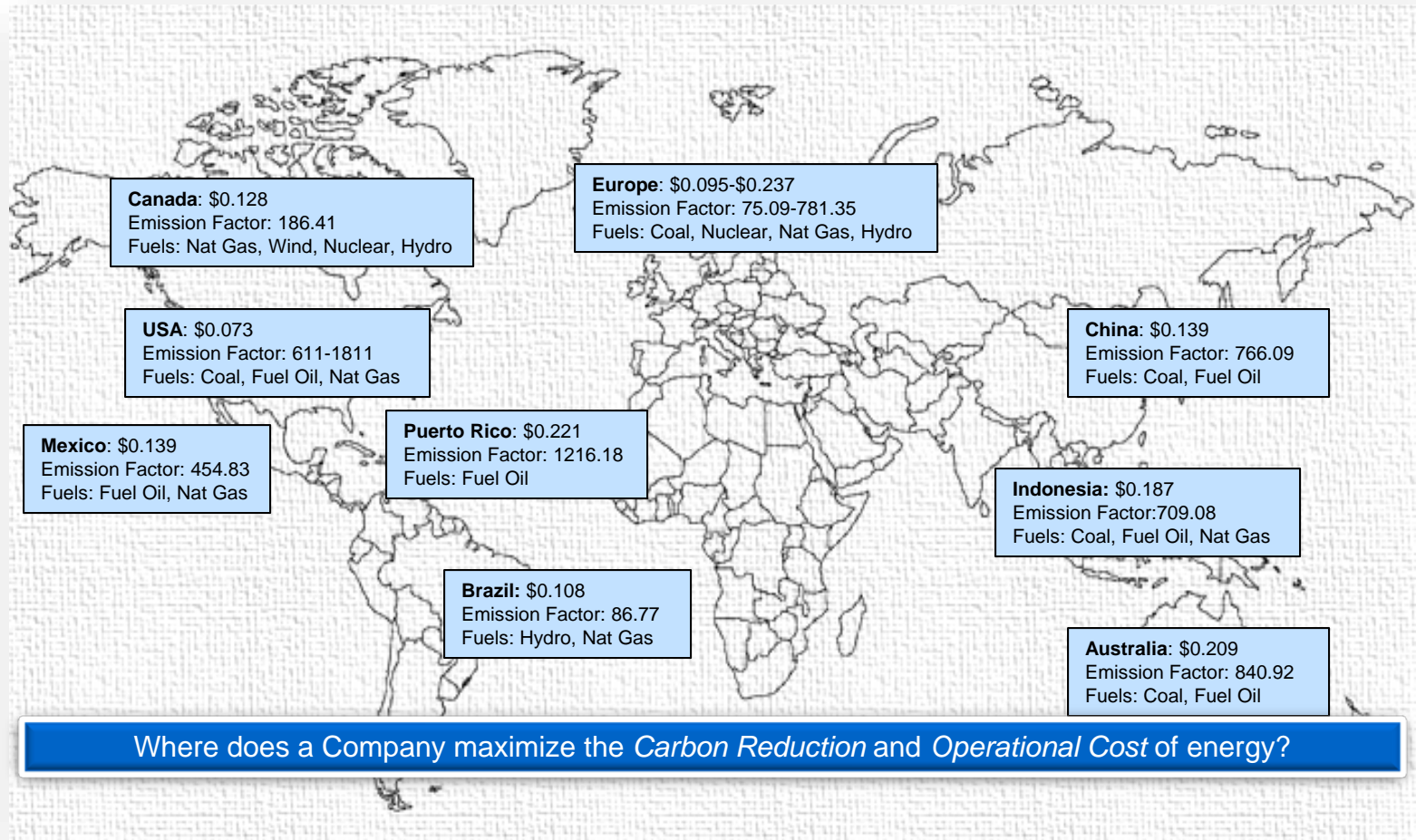


Powering Business Worldwide

# Eaton Profile of Plants – Energy Spend & GHG

- Eaton operates 350+ manufacturing sites globally
- Annual Energy Spend in excess of \$220+ Million
- Diverse plant profiles
  - Typically 1-5 MW in peak demand
  - Average 5.2 Million kWhr annually
- Top 40 Plants represent 65% of GHG Footprint
- Top 20 Plants (11% of sites) represent 50% of our energy use
- Most of Eaton plants are ISO14001

# Global Power Prices & GHG Emission Factors



# Regional - Energy / GHG Impact Comparison

Region	Plant	MWh/Year Usage	Conversion Grams/kWh	CO <sub>2</sub> Tons	Power Unit Cost (US\$/kWh)	Primary Generation Source
North America	Van Wert, IN	48,765	685	19,576	\$0.084	Coal/Mix
EMEA	Bosconero, Italy	31,743	385	11,314	\$0.182	Coal/Nuclear
APAC	Shanghai, China	18,428	734	13,529	\$0.142	Coal
Latin America	Valinhos, Brazil	62,413	98	6,672	\$0.094	Primarily Hydro

Recommendation to place a value on ...Carbon and Energy Cost that aligns with your Companies goals!

# Why ISO 50001 Energy Management (EnMS)?

- ✓ Improve communication between corporate goals to plant level performance energy management
- ✓ Employ addition structure to energy management leading to Energy/GHG reduction
- ✓ Further imbed energy management into plant operations
  - Through process changes and employee engagement
- ✓ Implement ISO 50001 supporting compliance
  - SpaEfV, CRC and EED initiatives in EMEA
- ✓ Obtain the financial tax relief benefits ...*where applicable*

# Eaton - ISO 50001 Overview

- *Current* – 4 Eaton Plants ISO 50001 certified
  - Germany
  - Hungary
  - Taiwan
  - UK
- *Future* – ISO 50001 certification ....*Planned by year end 2015*
  - 17 sites - Germany
  - 1 site – US ...*piloting*
- Utilize ISO 50001 principles support following:
  - MESH Energy Element
  - Based upon ISO 50001 process and procedures
  - Supports EED, SpaEfv, CRC and CCA ....etc.

Corporate Goals → Group → Plant level Goals

# 2015 BU Goals – 3% Reduction

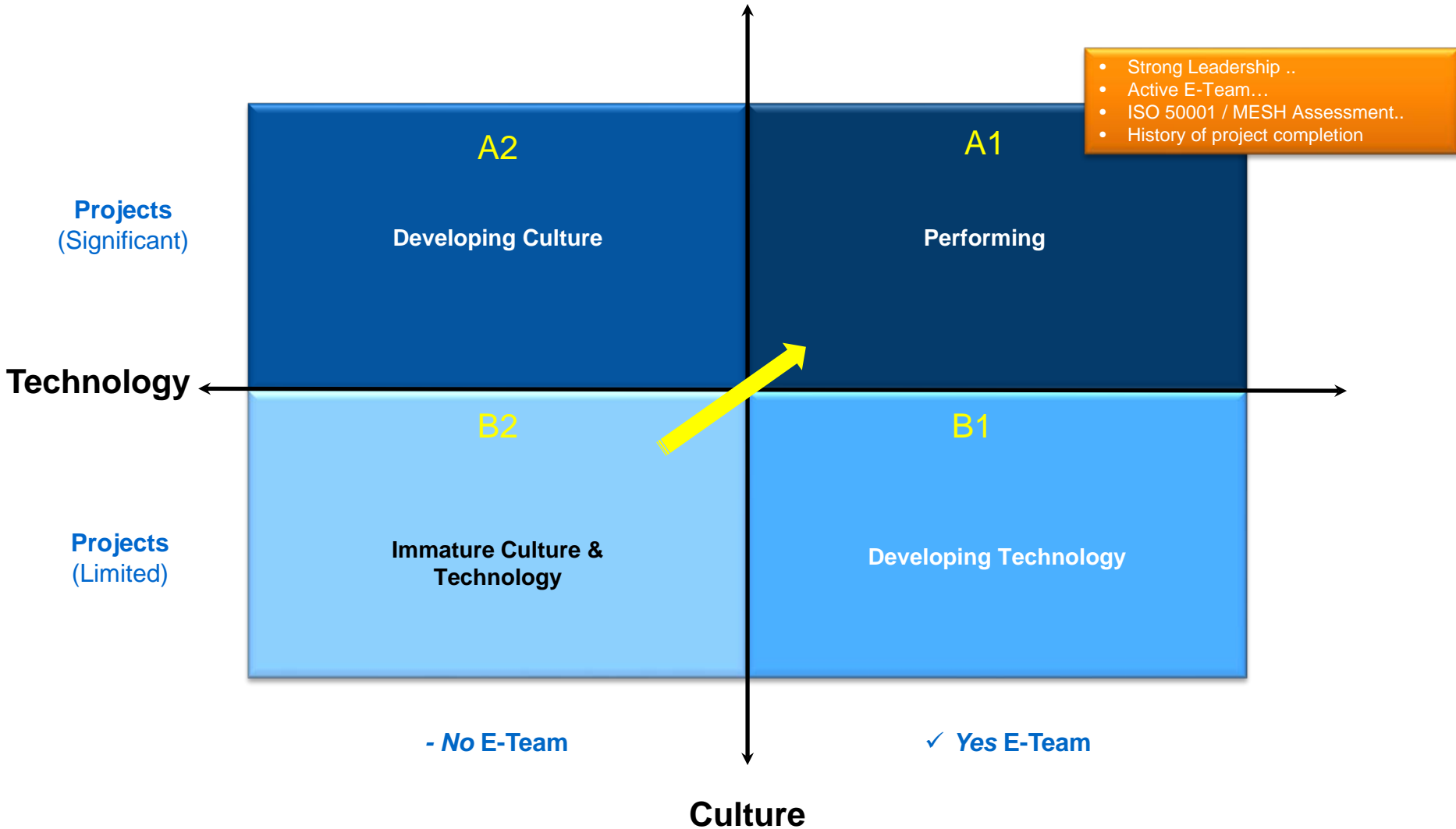
Projected Annual GHG reduction needed = 30,059 mTons CO<sub>2</sub>

Aggregate of 1,002 K mTons CO<sub>2</sub> ...*based upon sales being flat (0%)*

Group	(%) of Goal	Annual GHG (mTons)	GHG Reduction Goal (mTons)	Energy Reduction Goal (kWhr)
Aerospace	6.5%	65,485	1,965	5,006,656
Electrical*	38.5%	384,976	11,549	28,321,550
Hydraulics	19.9%	199,668	5,990	13,700,550
Vehicle	35.1%	351,838	10,555	26,597,753
<b>Total</b>	<b>100%</b>	<b>1,001,967</b>	<b>30,059</b>	<b>73,626,509</b>

\* Incl. former Cooper footprint (68 sites and ~211K mTons CO<sub>2</sub>),

# Targeted Top Emission Sites



# Example...Greenhouse Gas Reduction - 3%

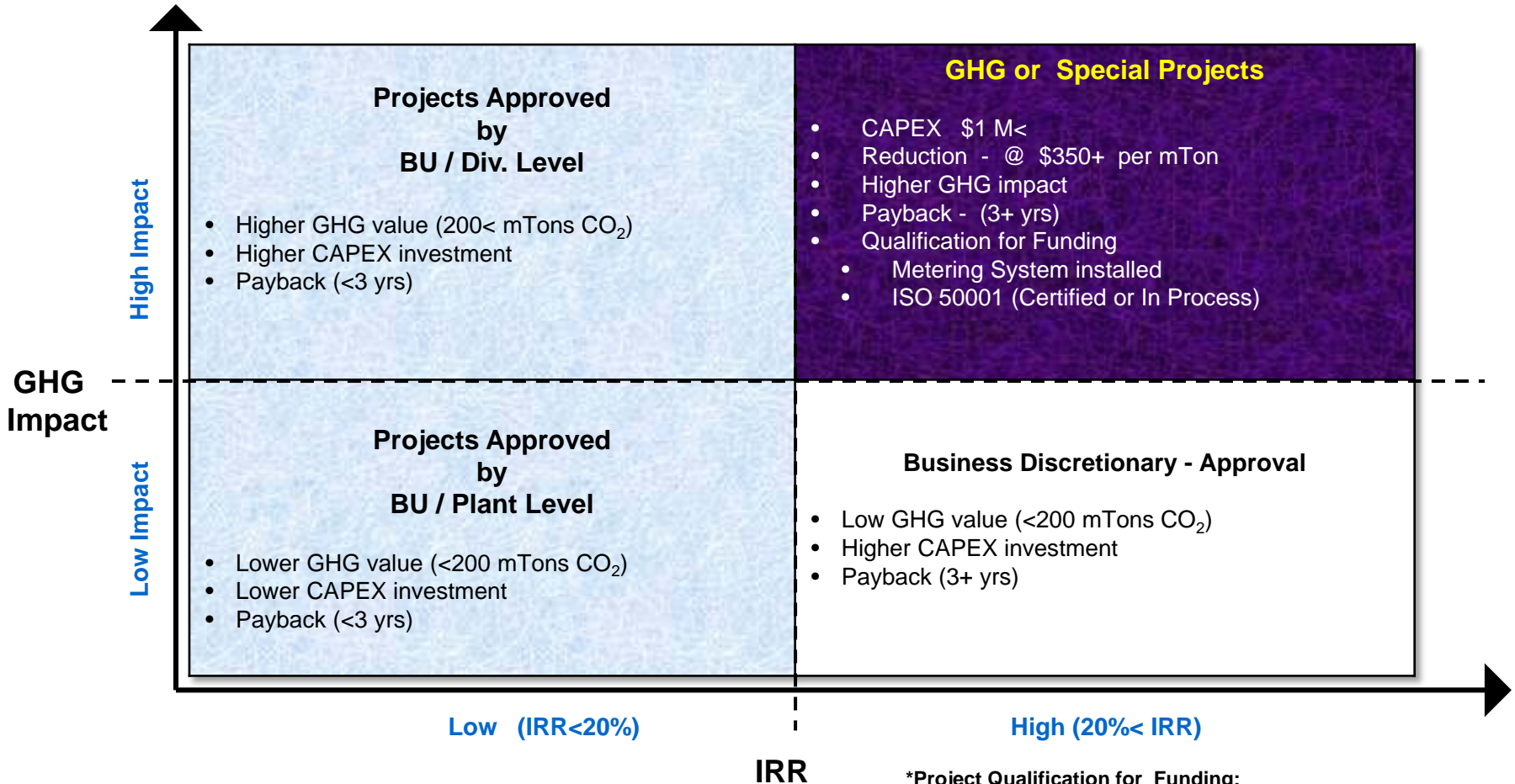
## Eaton Germany GmbH

Eaton Germany GmbH - Total	2015 goal	2014 Emissions (m/Tons)	2015 Reduction Goal (m/Tons)
Green House Gas (GHG) Emissions (metrics Tons/Million \$USD Sales)	3%	22,133	664

	2014 Total GHG Emissions	Reduction Goal	Metrics Tons Reduction Required	Actuals vs. Goal
Baden-Baden	3,812	3%	114	
Hann.-Münden	4,697	3%	141	
Nordhausen	12,124	3%	364	
Rastatt	762	3%	23	
Gilching	111	3%	3	
Wehrheim	290	3%	9	
Lohmar	338	3%	10	
<b>Total</b>			<b>664</b>	

Cascading of Corporate Goals → Plant Level Goals

# GHG Special Projects Evaluation



**\*Project Qualification for Funding:**

- ✓ Projects financials: (20% < IRR)
- ✓ ISO 50001 Certified or In Process
- ✓ Energy Management metering installed
- ✓ History of Identified & Completed energy projects

# Impact of Carbon Cost ...Project Payback

## (ECM) Energy Project - Payback Analysis

Compressor-Air Project	Completed Project Cost (\$USD)	Annual Energy Savings (\$USD)	Cost Per (kWh)	Annual GHG Reduction (metric tons CO2)	Payback (Yrs)	Carbon Penalty (\$/Tons CO2)
North America	\$150,000	\$39,500	\$0.079	261	3.8	-
Europe (UK)	\$150,000	\$115,580	\$0.219	238	1.3	\$6,080
SA Brazil	\$150,000	\$47,000	\$0.094	49	3.2	-
Asia Pacific	\$150,000	\$65,500	\$0.131	367	2.3	-

GHG Cost /Ton (UK)	\$25.60
Annual Reduction (kWh)	500,000

16.4 £ Eng Pounds

WRI / IEA Factor	
North America	522
Europe	475
SA Brazil	98
Asia Pacific	734



Carbon penalties may have limited impact on improving payback...

# Energy / GHG Metrics Offsets

2014		2015				2016
July through September	October through December	January through March	April through June	July through September	October through December	January through March
		Sales for Q1 of 2015	Sales Q2 of 2015	Sales Q3 of 2015	Sales Q4 of 2015	
	Emissions Reported in Q1 of 2015	Emissions Reported in Q2 of 2015	Emissions Reported in Q3 of 2015	Emissions Reported in Q4 of 2015		
Project completed affects Q1 to Q4 Emissions (2014 Profit Plan)	Project completed affects Q2 to Q4 Emissions (2014 Profit Plan)	Project completed affects Q3 to Q4 Emissions (2015 Profit Plan)	Project completed affects Q4 Emissions (2014 Profit Plan)			

Eaton reports 2015/1<sup>st</sup> Quarter results on about April 29th – results show emissions from the time period of October through December of 2014 normalized by sales from January through March of 2015 and reflect projects done in 2014

# Global Energy Management Portal

The screenshot shows the Global Energy Management (GEM) portal. The main content area is titled "Global Energy Management (GEM)" and contains several key sections:

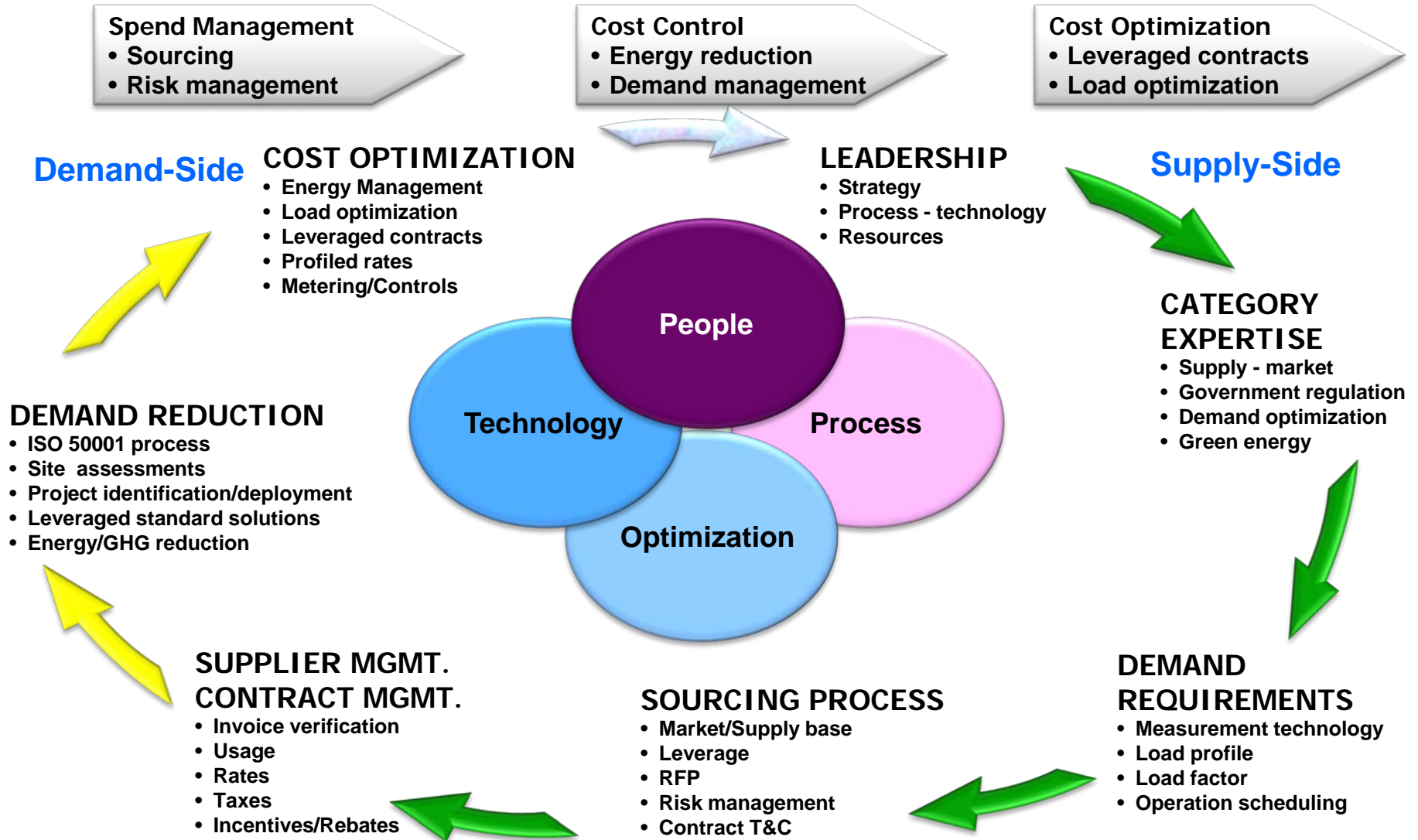
- Strategy:** Includes buttons for "STRATEGIC ENERGY MANAGEMENT" and "TOP 40 PLANTS".
- Goals and Metrics:** Includes buttons for "2014 GOALS", "QUARTERLY METRICS", and "ISO 50001".
- Energy Management System (EnMS):** Includes buttons for "ENERGY ASSESSMENTS", "GHG-CARBON REDUCTION", and "ISO 50001".
- Energy Projects:** Includes buttons for "ENERGY PROJECT DATABASE" and "ADD NEW ENERGY PROJECT".

The right sidebar features the "COOPER Lighting" logo and several red buttons: "LIGHTING ENERGY SOLUTIONS", "UTILITY INCENTIVES", and "EATON (Cooper) LIGHTING CONTACTS". Below these are survey links for "Compressed Air Survey" (with "NEW COMPRESSED AIR SURVEY" and "COMPLETED COMPRESSED AIR SURVEY" buttons) and "Lighting Survey".

- Savings (\$ / kWh)
- Capital (\$)
- GHG (mTons)
- Cost (\$/mTon)
- Technology
- Payback
- BU / Group
- Timing
- GHG Impact
- Implementation

# Energy Management Strategy

Complete  
In process



# *Q & A Period*

*Thank You.....*

**RICHARD GORZE – GLOBAL ENERGY  
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