



Making the Business Case for Climate Action: A Practical Approach

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Overview

- Climate Action – Why Act?
- Market Drivers
- Climate Action Planning
- Greenhouse Gas Inventory
- Energy Assessment
- Barriers/Incentives/Funding

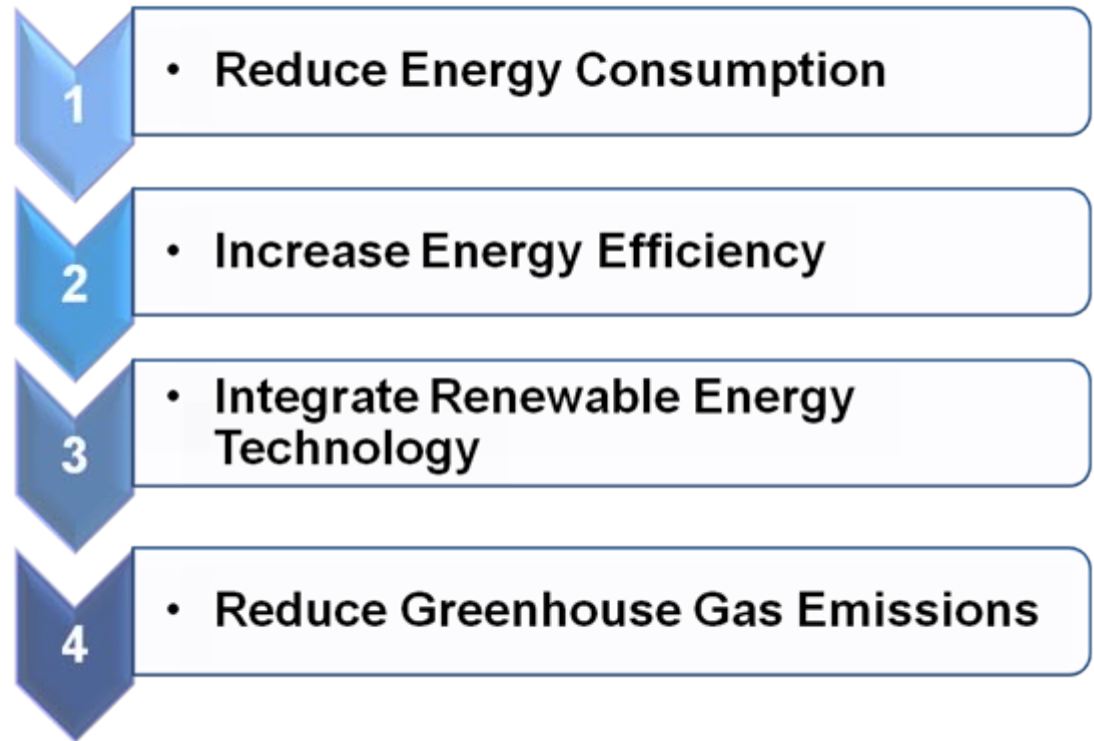


What is Climate Action?

- Climate change presents a fundamental challenge to the way in which organizations use energy and resources

Managing Multiple Priorities

- *Productivity*
- *Growth*
- *Profitability*
- *Sustainability*



Climate Action Principles

- Climate change fundamentally challenges the way institutions manage energy and resources
- Climate action requires a balanced approach
 - **Culture change**
 - **Infrastructure change**
- Climate change is not a fad



Market Drivers

➤ Federal Level

- *April 24, 2009* - Proposed Endangerment Finding and Cause or Contribute Findings for GHG
- *June 26, 2009* – HOR Waxman-Markey Climate Bill – American Clean Energy and Security Act
- *September 22, 2009* – Mandatory GHG Reporting Rule
- *September 28, 2009* - Proposed Light Duty Vehicle CAFE and GHG Emissions Standards for the 2012-2016 Model Years
- *September 30, 2009* – Draft Senate Boxer-Kerry Climate Bill

➤ State Level

- *September 24, 2004* – Renewable Portfolio Standard
- *June 23, 2008* – Energy Efficiency Portfolio Standard (15 by 15)
- Regional Greenhouse Gas Initiative, Inc. (RGGI) - Ten participating states' CO₂ Budget Trading Programs
- *August 6, 2009* – Executive Order 24 – GHG Reduction Goal
- *August 15, 2009* – New NYSDEC GHG Review Policy under SEQRA



Market Drivers

➤ Voluntary Programs

- American College & Universities President's Climate Commitment
- U.S. Mayors Climate Protection Agreement
- ICLEI: Local Governments for Sustainability
- The Climate Registry – Common GHG Reporting System
- The Carbon Disclosure Project
- EPA Climate Leaders

➤ Recent Actions

- September 24, 2009, Business Week, “Carbon Curbs: It's Business vs. Business”
 - Exelon, GE, Alcoa: Pushing for Congress Action
 - PG&E: Pulls from Chamber of Commerce

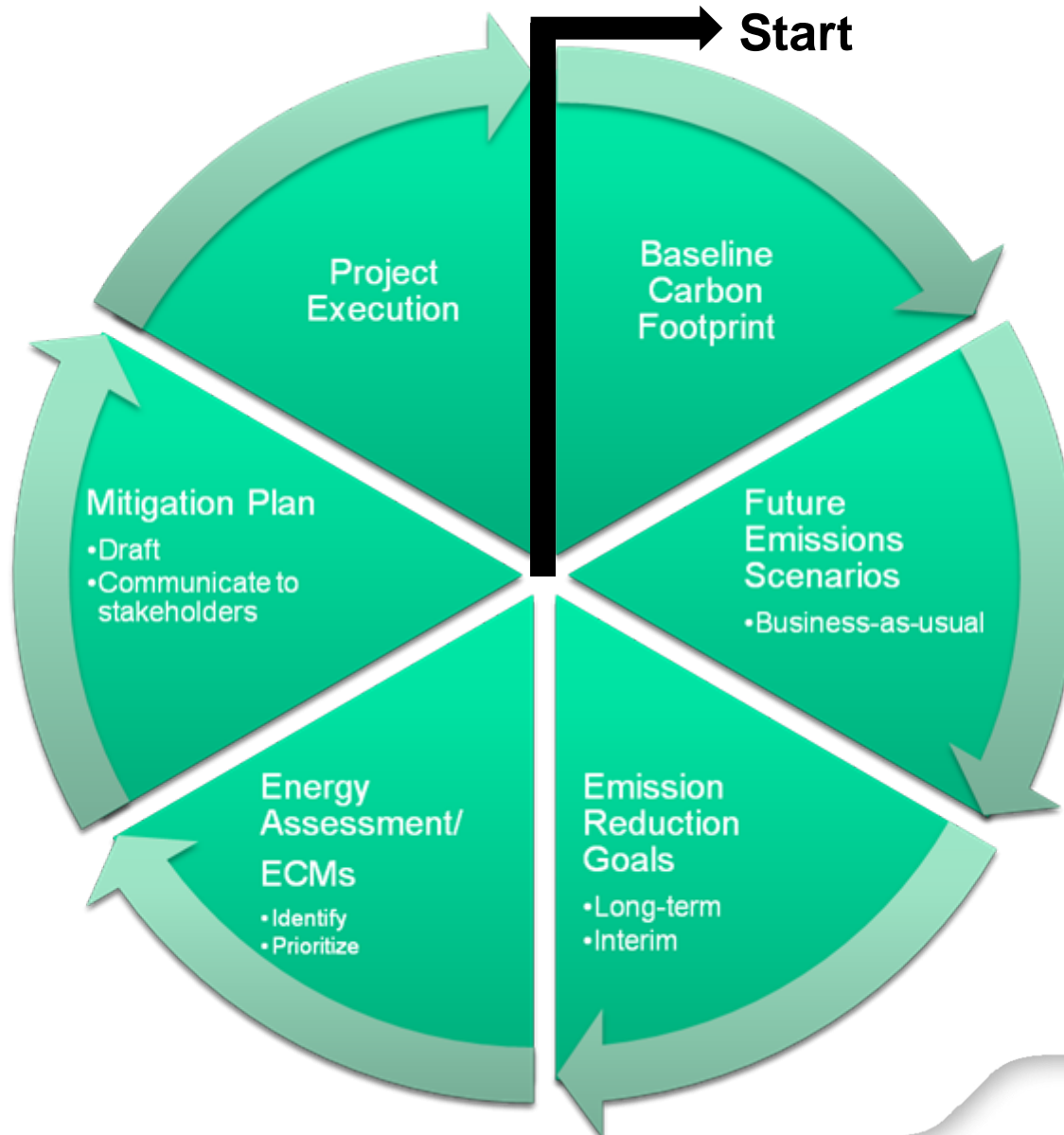


Market Drivers

- Motivations and Stakeholders
 - Reduce Operating Costs
 - Brand Protection, Image, Reputation, Recognition
 - Investor / Shareholder Interest
 - Leadership Opportunity
 - Recruit and Retain Top Talent
 - Increase Employee Satisfaction
 - Better Management of Business Risks
 - Product/Service Differentiation
 - Workforce / Community Expectations
 - Reduce Foreign Oil Dependency
 - Corporate Social Responsibility
 - Greening of Supply Chains



Climate Action Planning

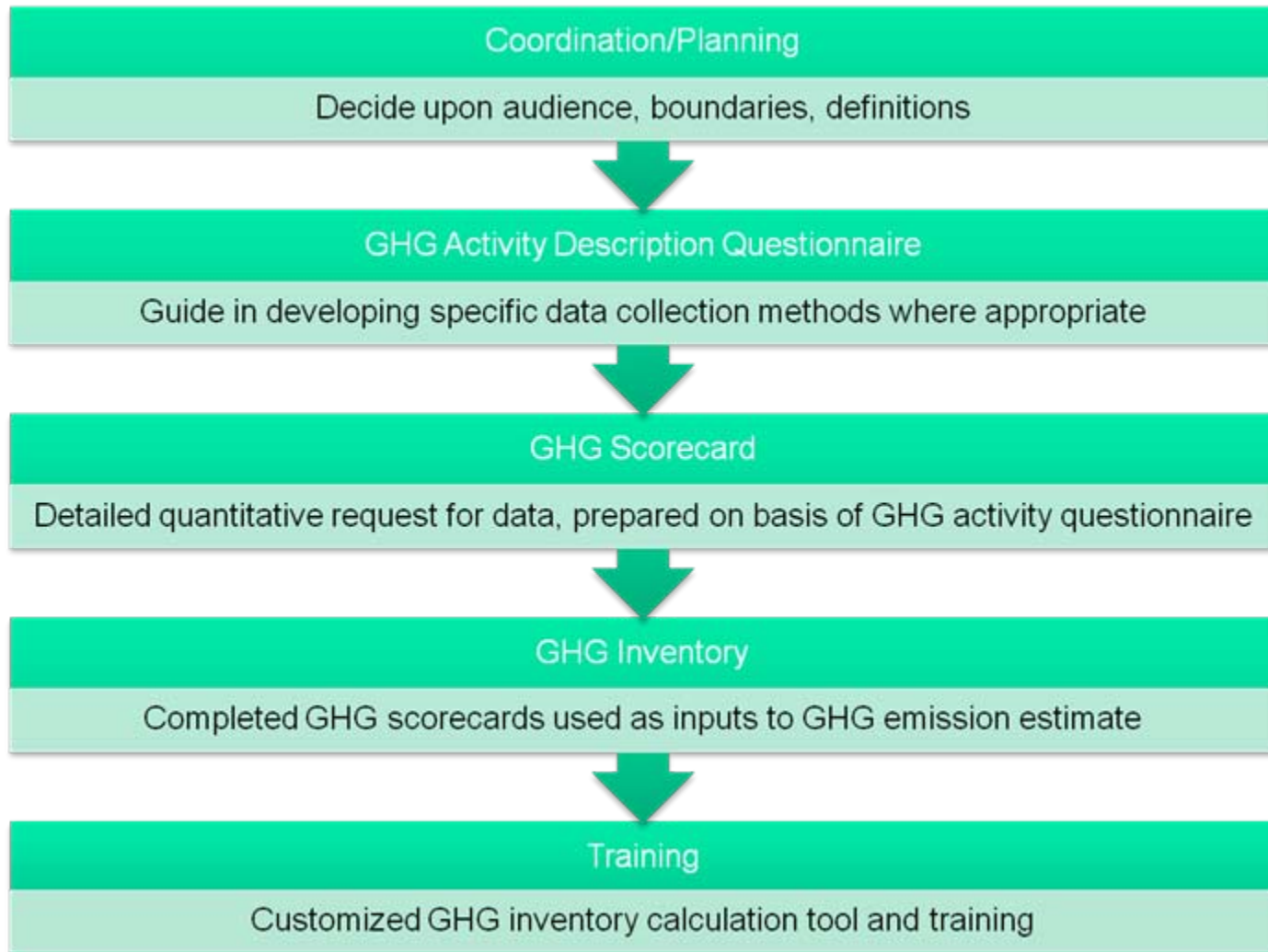


Project Team

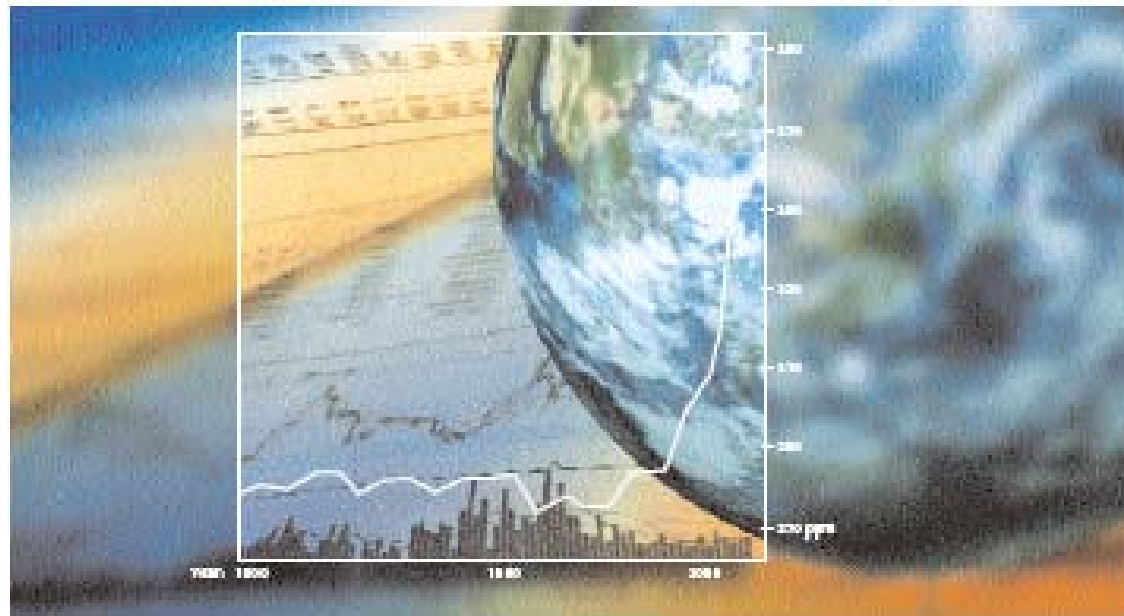
- Energy/Sustainability Officer
- Plant/Production Manager
- Plant/Facilities Engineer
- Environmental Health and Safety Officer
- Corporate Communications
- Purchasing
- Financial
- Legal
- Human Resources



Greenhouse Gas Inventory Program



Establishing a GHG Baseline

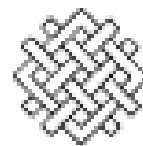


A Corporate Accounting and Reporting Standard

REVISED EDITION



World Business Council for
Sustainable Development



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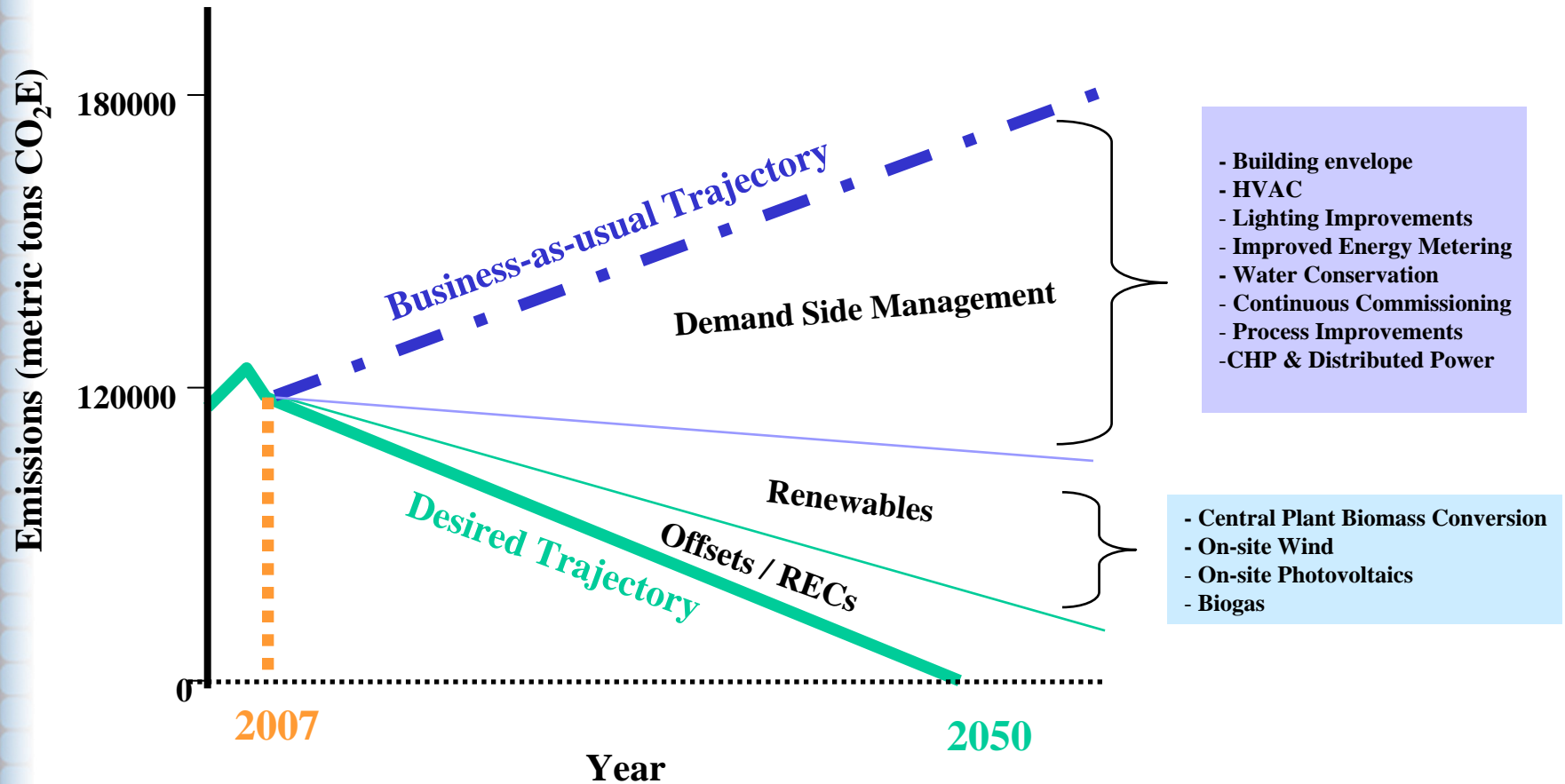
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Boundaries and Definitions

- Operational boundary
 - Scope 1 direct emissions (w/in org. boundary)
 - Stationary sources (boilers, heaters, generators)
 - Mobile sources (cars, vans, trucks, forklifts)
 - Process sources (cryogenic CO₂, SF₆, PFC)
 - Fugitive sources (refrigerant leakage)
 - Scope 2 indirect emissions (outside org. boundary)
 - Purchased electricity, steam, heat, chilled water
 - Scope 3 indirect emissions (outside org. boundary; *optional*)
 - Commuting
 - Business travel
 - Landfilled waste
 - Supply chain of purchased chemicals



Emissions Forecasting



Goal Setting



What are the Fundamental Barriers?

- Capital outlay required
- Fragmented implementation potential (100 million locations)
- Energy efficiency in existing buildings and facilities is nobody's highest priority
- Measurement of energy savings may be difficult

What's the Potential?

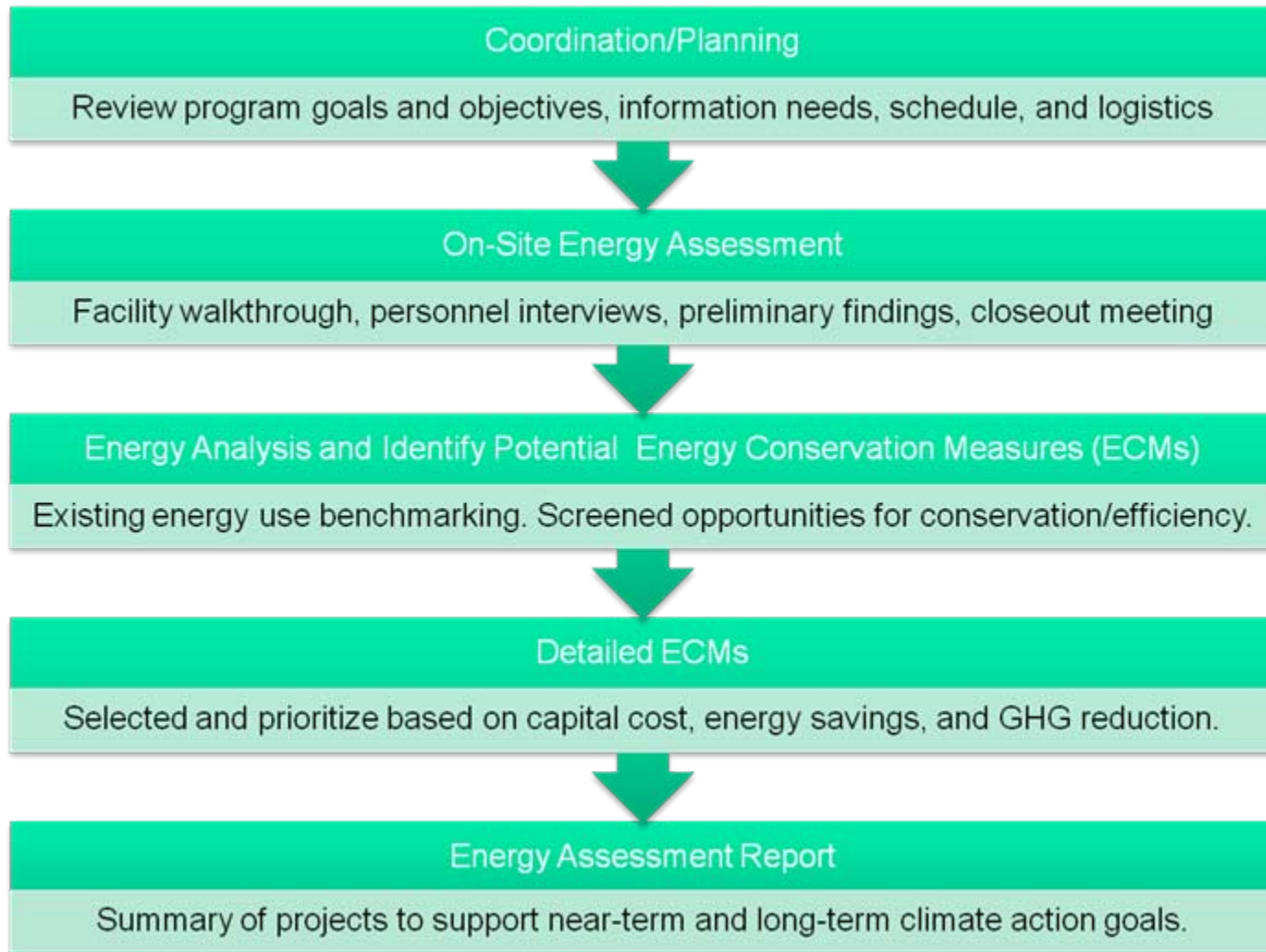
- Energy efficiency opportunities are present in 100 million buildings and facilities
- 9.1 quadrillion BTU of potential energy savings
- \$1.2 trillion/yr. in potential energy cost savings
- \$520 billion investment required to realize these savings
- Projected energy demand reduced by 23%
- 1.1 gigaton of greenhouse gas reduction annually

Unlocking Energy Efficiency in the US Economy, McKinsey Global Energy and Materials, July 2009

What are the Benefits?

- Energy Savings
- GHG Emission Reductions
- Emissions Compliance
- Equipment Replacement/Renewal
- Improved Reliability (reduced downtime)
- Improved Productivity
- Financial Return on Investment

Energy Assessment Process



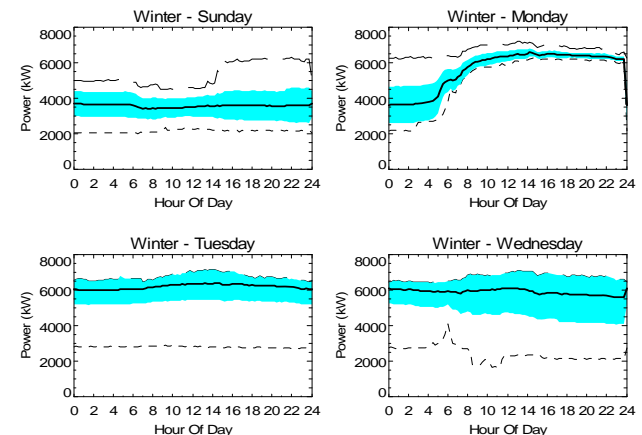
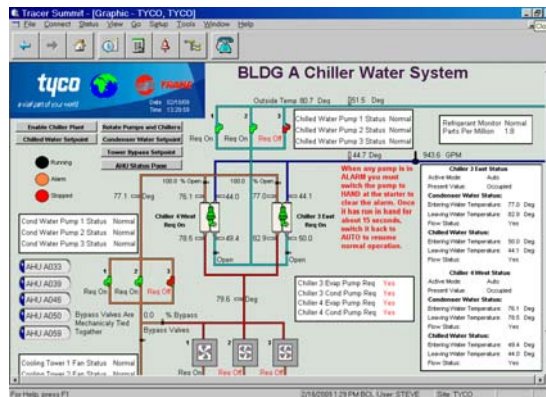
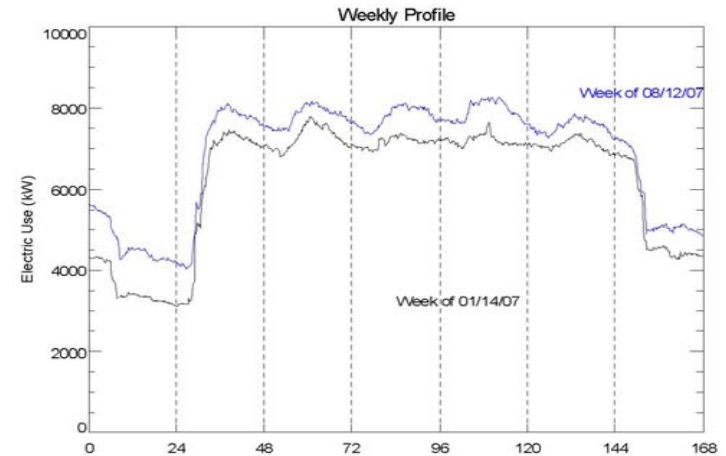
Energy Assessment Process

➤ On-Site Audit

- Plant Walkthrough
- Interview Operation and Maintenance Personnel
- Review Prior Studies/Projects

➤ Utility Data Collection

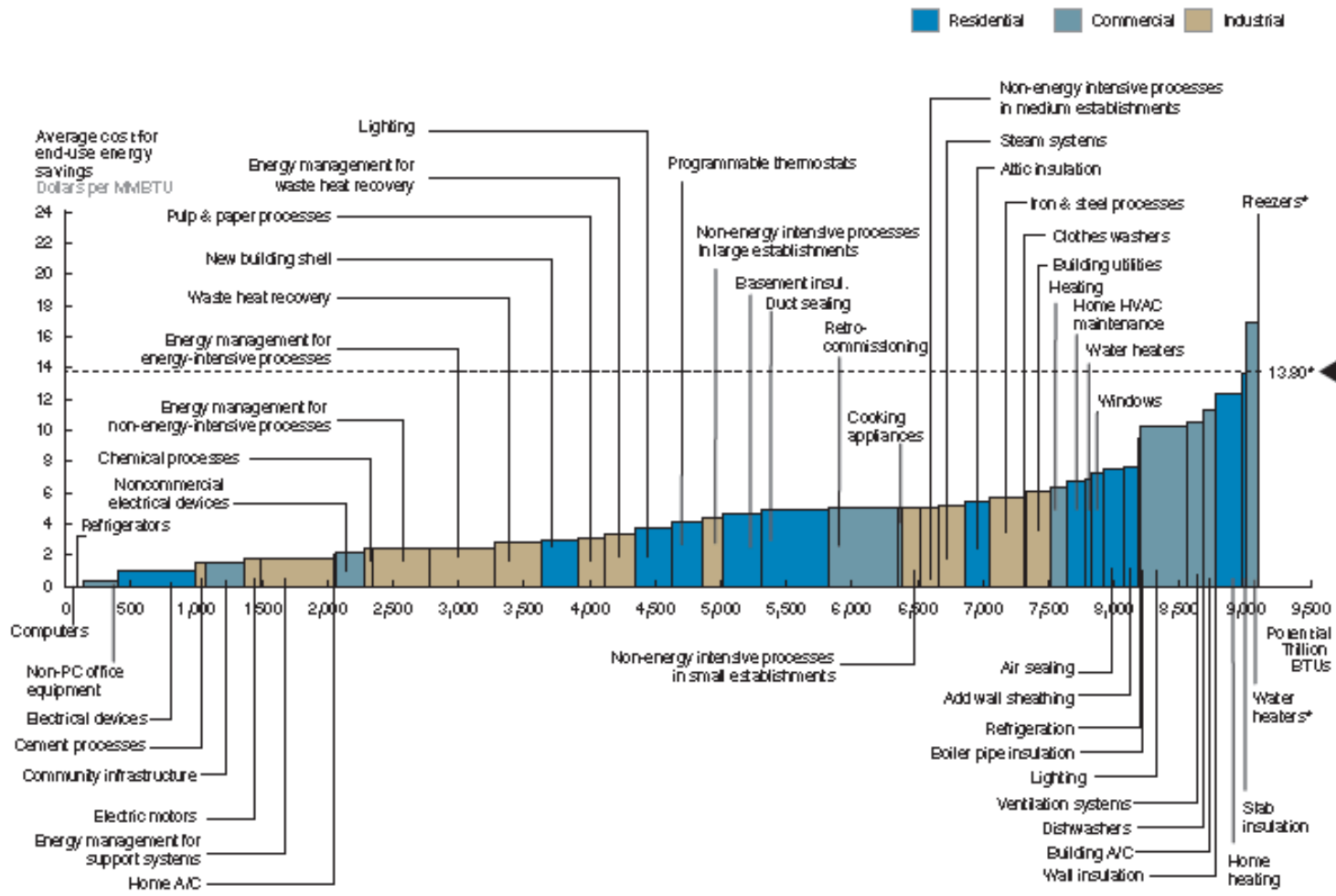
- Metered Data and Purchase Records
- Building Automation/Control System Data
- Handheld Meters/Data Loggers



Identify Potential Energy Conservation Measures

- Central heating/cooling plants
- HVAC
- Lighting
- Advanced energy control systems (smart buildings)
- Motors/drives
- Compressed air
- Waste heat recovery
- Retro-commissioning
- Process Improvements
- Building envelope improvements

What is the cost vs, the benefit?



* Average price of avoided energy consumption at the industrial price; \$35.60/MMBTU represents the highest regional electricity price used; new build cost based on AEO 2008 future construction costs

Source: EIA AEO 2008, McKinsey analysis

Investigate Alternative/Renewable Energy Opportunities

- Waste Heat Recovery
- Cogeneration/CHP
- Backpressure Steam Turbines
- Absorption Chillers
- Solar Photovoltaics (PV)
- Solar Thermal
- Wind Energy
- Biogas



Project Identification and Prioritization



Project Tasks to Identify Opportunities

- Review of Capital Plans
- Benchmarking with peers
- Energy and Utilities Management
 - Auditing, procurement, metering, utility projects
 - Additional assessment as needed
- On-site renewable energy evaluation

Basis for Prioritizing

- Payback
- NPV
- ROI
- \$/MTCO₂E
- Other?

Prioritize ECMs – Example 1

Project Description	Annual Elect. Saving (kWh)	% of Annual Elect. Use	Annual Cost Saving	Estimated Capital Cost	GHG Emission Reduction (metric tons CO2)	Simple Payback (Yrs.)
Eliminate Exhaust Air from Grinding Area	132,061	0.25	\$13,866	\$30,000	80	2.2
New Chilled Water Plant to Serve Old/New Plastics Areas	848,000	1.64	\$89,040	\$666,000	514	7.5
Install VSDs on Environmental Chilled Water Plant Pumps (three 30 HP pumps)	314,972	0.61	\$33,072	\$23,000	191	0.7
Install VSDs on Process Chilled Water Plant Pumps (two 125 HP pumps)	663,051	1.28	\$69,620	\$100,000	402	1.4
Chiller Cooling Tower Control	20,000	0.04	\$2,100	\$0	12	0
Chiller Lead - Lag Control	60,000	0.12	\$6,300	\$0	36	0
Reinstate/Revamp Compressed Air System Controller	323,244	0.62	\$33,941	\$40,000	196	1.2
New Variable Speed Drive 700 HP Ingersoll Rand Air Compressor	378,432	0.73	\$39,735	\$87,500	229	2.2
Replace 200 PSIG Compressor with Multiple Smaller Units	120,000	0.23	\$12,600	\$20,000	73	1.6
Heat Rejection Savings, Compressed Air Cooling Towers Operational Measures to Reduced Compressed Air Load / Implement SMC Recommendations	216,865	0.42	\$22,771	\$22,000	131	1
Regenerative Blower for Wash Tank	1,832,857	3.54	\$192,450	\$100,000	1,111	0.5
Air Compressor Air Intake	38,638	0.07	\$4,057	\$1,500	23	0.4
Lighting ; Replace Metal Halide Light New New T5 High Bay Fluorescent Fixtures in Manufacturing Area	240,000	0.46	\$25,200	\$20,000	145	0.8
Fluorescent Fixtures in Manufacturing Area	102,720	0.2	\$10,786	\$20,400	62	1.9
Total	5,290,840	10.01	\$580,726	\$1,230,400	3,205	2.1

Identify Other GHG Reduction Opportunities

Demand Side Management (Technology)	Demand Side Management (Behavior)	Supply Side Management	Offset Projects
"Smart" Buildings	Work-From-Home Programs	Fuel Switching	Forestry / Wetland Sequestration
LEED Design Standards	Behavioral Protocols for Equipment Idling	Combined Heat and Power	Green Space Conservation Easements
High Mileage Vehicles	Broadening Acceptable Temperature Range	Biofuel – Biodiesel, Ethanol	Geological Sequestration
Sub Metering	Recycling	Biogas	Chemical Sequestration
Efficient Lighting and Controls	Education and Awareness	Renewable Power – Solar	
Continuous & Retro Commissioning		Purchasing RECs	
High Performance Heating/Cooling Plants			
Data Centers			
Heat Recovery			

Prioritize GHG Opportunities – Example 2

Project	Type	Simple Payback	NPV	Project Cost	Annual \$ Savings	Annual GHG Savings (MTCO2e)	Cost-Benefit Index	Doability	Achievability
Campus-Wide DSM Projects	Technology	4.76	\$7,407,435	\$7,125,000	\$1,496,300	4,863	1,021.24	●	●
Central Plant Boiler Controls	Technology	2.85	\$2,287,416	\$ 950,000	\$ 333,333	1,535	538.46	●	●
Expanded Energy Management System Control Points	Technology	5.39	\$2,281,682	\$2,850,000	\$ 528,372	2,246	416.36	●	●
Usage Based Controls	Technology	7.55	\$1,087,316	\$3,800,000	\$ 503,212	2,139	283.23	●	●
Increase Parking Rates	Behavior	0.95	\$1,314,337	\$ 142,500	\$ 150,000	600	631.18	●	●
Transportation Initiatives	Behavior	7.13	\$1,034,900	\$2,850,000	\$ 400,000	4,500	631.58	●	●
New Biomass Central Plant Cogen	Technology	14.87	\$(2,402,336)	\$17,100,000	\$1,149,750	30,827	2,072.74	●	●
Ice Rink Optimization	Technology	7.60	\$ 396,047	\$1,425,000	\$ 187,500	743	97.78	●	●
Ground Source Heat Pumps	Supply	12.35	\$(811,616)	\$3,800,000	\$ 307,692	1,220	98.75	●	●
Energy Efficient Windows	Technology	27.27	\$(2,523,646)	\$4,750,000	\$ 174,160	814	29.84	●	●
Pool Paks	Technology	12.73	\$(225,076)	\$ 950,000	\$ 74,640	349	27.40	●	●
Water Conservation	Technology	11.63	\$(156,789)	\$ 950,000	\$ 81,671	344	29.61	●	●
Hybrid & Electric Vehicles	Supply	11.40	\$(35,161)	\$ 237,500	\$ 20,833	603	52.92	●	●

Financial Incentives

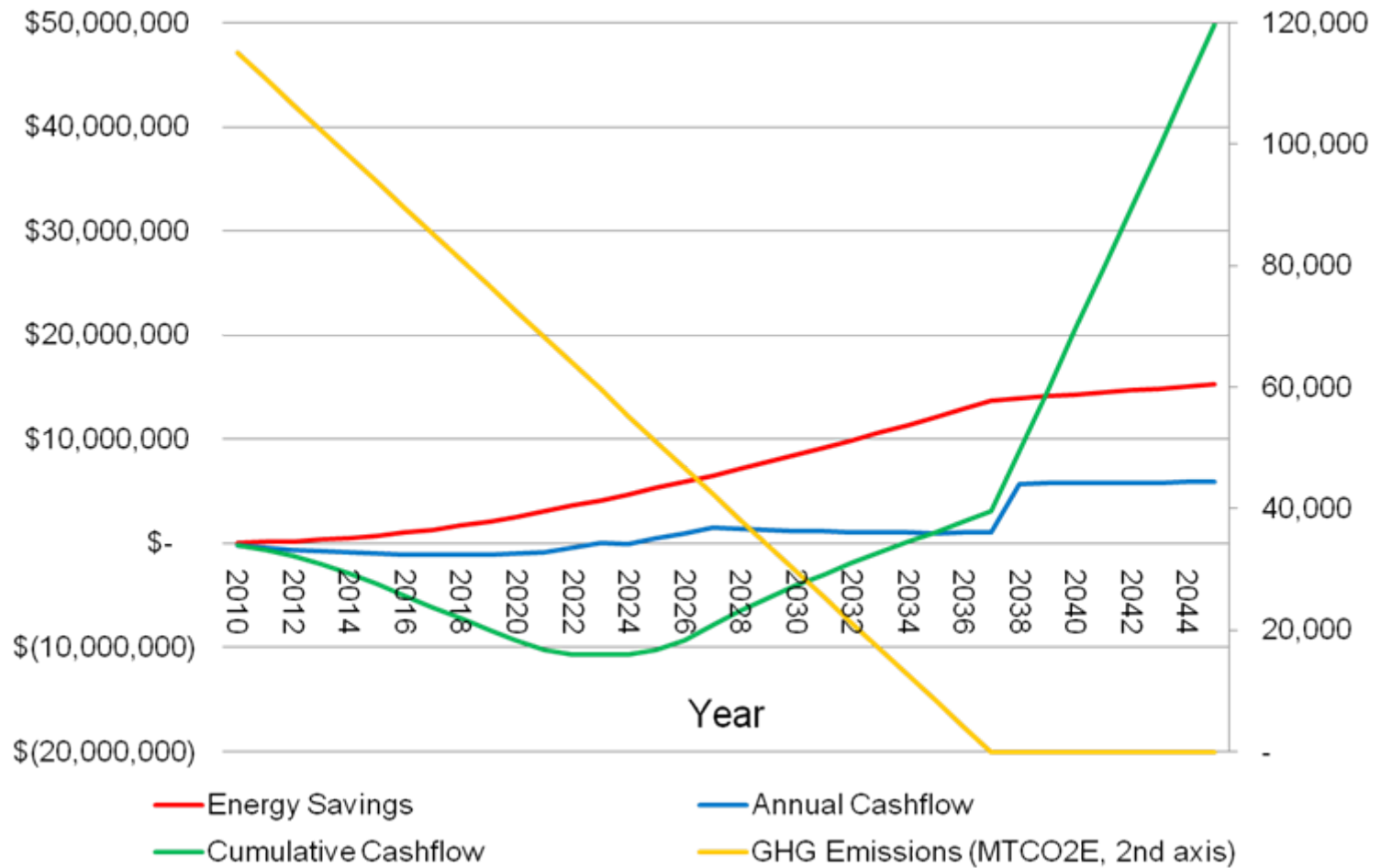
- Federal Tax Credits
- Federal Energy Grants
- Accelerated Depreciation
- State Grants/Credits/Rebates
- Utility Grants/Credits/Rebates
- Renewable Energy Incentives
- NYSERDA

<http://www.dsireusa.org/>

Funding Mechanisms

- Capital Projects
- Maintenance Projects
- Project Bundling
- Energy Performance Contract
- Corporate Programs

Financial Model Example



What are the Institutional Barriers?

- Lack of Top Level Support
- Lack of Awareness (*GHG = Energy = Money*)
- Lack of Cross-Departmental Cooperation
- Competition for Capital
- Outdated Accounting Standards
- Restrictive Budgeting Practices
- First Cost vs. Life-cycle Cost Procurement Bias
- Lack of Staff Resources
- Organizational Inertia

Climate Action Planning Process





Questions and Open Discussion

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