

# CARBON FOOTPRINT 101: A GUIDE FOR FOOD RETAILERS

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Food Marketing Institute (FMI) conducts programs in public affairs, food safety, research, education and industry relations on behalf of its 1,500 member companies — food retailers and wholesalers — in the United States and around the world. FMI's U.S. members operate approximately 26,000 retail food stores and 14,000 pharmacies. Their combined annual sales volume of \$680 billion represents three-quarters of all retail food store sales in the United States. FMI's retail membership is composed of large multi-store chains, regional firms and independent supermarkets. Its international membership includes 200 companies from more than 50 countries. FMI's associate members include the supplier partners of its retail and wholesale members.

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# Executive Summary

Greenhouse gas (GHG) emissions and their potential impact on global climate change are drawing increased attention among lawmakers, regulators, businesses and consumers. Many companies are calculating and tracking their carbon footprint as one measure to gauge the effectiveness of sustainability initiatives to reduce these emissions.

Customers respond well to sustainability programs. In fact, 60 percent said it is important for supermarkets to have recycling and sustainability initiatives, according to FMI's *U.S. Grocery Shopper Trends 2009* report. In addition, 19 percent said this is a very important factor when selecting their primary store.

This report seeks to show food retailers how to develop proactive greenhouse gas-management strategies that reduce emissions and benefit the environment and the bottom line. It is divided into three sections:

**Section 1: Calculating Your Corporate Carbon Footprint** — Defines the components of a carbon footprint and presents a five-step process to calculate your company's greenhouse gas emissions.

**Section 2: Industry Benchmarking and Snapshot** — Shows how to set aggressive carbon emissions reduction goals that are used by some in the retail food industry.

**Section 3: Legislative and Regulatory Approaches to Controlling Greenhouse Gas Emissions** — Outlines legislative efforts, such as cap-and-trade measures and carbon taxes, designed to reduce greenhouse gas emissions and explores how these could affect the industry. To learn the most current information about these laws and regulations, visit [www.fmi.org](http://www.fmi.org).

Additional resources, including a carbon calculator that facilitates efforts to measure a company's footprint, are available on the Sustainability page of the FMI website ([www.fmi.org/sustainability/](http://www.fmi.org/sustainability/)).



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# Calculating Your Corporate Carbon Footprint

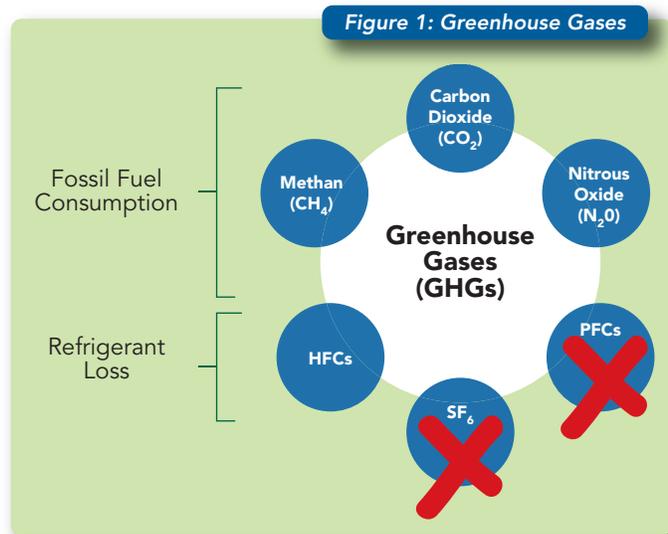
The definition of “carbon footprint” varies. In this guide, the term refers to the quantity of greenhouse gas (GHG) emissions directly and indirectly caused by a company’s operations. This includes the emissions released when burning fossil fuels for transportation, heating and electricity, as well as the leakage of refrigerants into the environment. A carbon footprint is one measure of a company’s impact on global climate change.<sup>1</sup>

## COMPONENTS OF A CARBON FOOTPRINT

While six gases are internationally recognized by the Kyoto Protocol as greenhouse gases for emissions-reporting purposes (see Figure 1), only four are relevant to most food retailers:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)

The first three are byproducts of burning fossil fuels. HFCs are the gases that make up a growing portion of refrigerants.<sup>2</sup> Perfluorocarbons (PFCs) and sulfur hexafluoride (SF<sub>6</sub>) are typically associated with electronics and manufacturing.



### Global Warming Potential (GWP)

Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310
HFC-134a (HFC)	1,300
HFC-23 (HFC)	11,700

## CARBON DIOXIDE EQUIVALENT (CO<sub>2</sub>-E) UNITS OF MEASUREMENT

GHGs have different abilities to trap heat (infrared radiation) in the atmosphere, including the amount they absorb and length of time for which the heat is absorbed. A “global warming potential” (GWP) number is assigned to each and converted to carbon dioxide equivalent (CO<sub>2</sub>-e) units. For example, methane can trap atmospheric heat 21 times more effectively than carbon dioxide. Therefore, methane’s GWP is 21. In other words, releasing one pound of methane into the air is considered to have the same GWP as releasing 21 pounds of carbon dioxide (21 pounds of CO<sub>2</sub>-e). The table below shows some greenhouse gases and their associated GWPs.<sup>3</sup>

<sup>1</sup> Carbon Footprint Ltd., “What is a Carbon Footprint?” [www.carbonfootprint.com/carbonfootprint.html](http://www.carbonfootprint.com/carbonfootprint.html).

<sup>2</sup> The Montreal Protocol encourages retailers to convert to refrigerants with lower ozone-depleting potential, such as HFCs, which ironically have a higher global warming potential.

<sup>3</sup> Environmental Protection Agency (EPA), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, Executive Summary, April 2008, [http://epa.gov/climatechange/emissions/downloads/08\\_ES.pdf](http://epa.gov/climatechange/emissions/downloads/08_ES.pdf).

Companies can use the FMI Carbon Calculator, developed by Verisae, to derive comparable GWPs for the emissions in their carbon footprint. To use this tool, go to [www.fmi.org/sustainability/](http://www.fmi.org/sustainability/) and click on “FMI Carbon Calculator.”

## WHAT ONE METRIC TON OF CO<sub>2</sub>-E LOOKS LIKE

A carbon footprint is typically measured in metric tons of CO<sub>2</sub>-e (MT CO<sub>2</sub>-e) to maintain consistency with international standards. Even small locations can produce significant emissions. Figure 2 lists activities and energy use that generate GHG emissions equaling one MT CO<sub>2</sub>-e:<sup>4</sup>



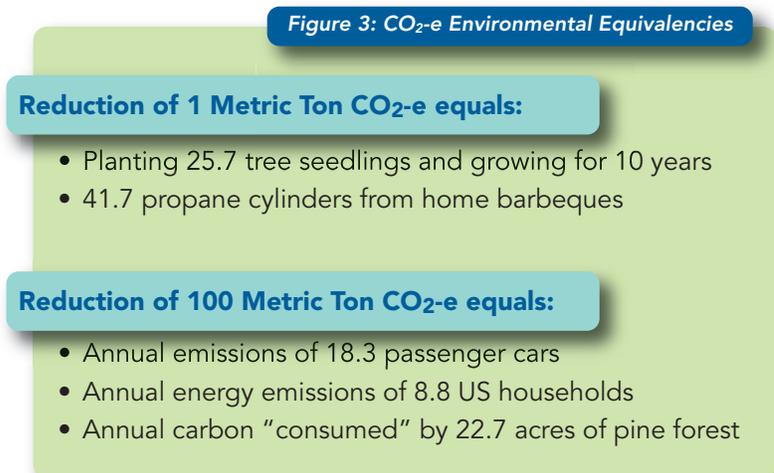
Conversely, even relatively small reductions can have a big impact. For example, reducing HFC-404a refrigerant leakage by a single pound is equivalent to reducing the GHGs in the atmosphere by the amount of exhaust that is produced by a 2,670 mile car trip.

## COMMUNICATING THE ENVIRONMENTAL IMPACT OF REDUCTIONS

Since most consumers do not discuss or even understand the CO<sub>2</sub>-e, how can you explain the environmental impact of your emission-reduction efforts?

The Greenhouse Gas Equivalencies Calculator developed by the Environmental Protection Agency (EPA) provides a solution. It is an online tool that converts GHG emission reductions into commonly understood terms that can be used for internal and external communications.<sup>5</sup>

For example, reducing carbon emissions by one MT CO<sub>2</sub>-e has the same impact as planting 25.7 tree seedlings and letting them grow for 10 years (trees consume these emissions). Figure 3 shows more examples.



<sup>4</sup> These estimates are based on EPA’s Calculator for Low Emitters, available at EPA, Climate Leaders: Climate Change Management Tools for Low Emitters, [www.epa.gov/stateply/resources/lowemitters.html](http://www.epa.gov/stateply/resources/lowemitters.html).

<sup>5</sup> These estimates are based on EPA’s Greenhouse Gas Equivalencies Calculator, available at [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html).

## CURRENT INTERNATIONAL STANDARD FOR GHG EMISSIONS REPORTING

Like financial accounting, greenhouse gas emissions accounting has standard principles that define which and how emissions should be counted.

To determine credible GHG emissions data, an inventory should follow recognized international standards, such as those of *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (Figure 4).<sup>6</sup> The standards in this protocol were developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) in 2001. They are used globally by governments, businesses and third-party greenhouse gas registries (including The Climate Registry and California Climate Action Registry). The guidance below is based on the Greenhouse Gas Protocol.

### THE FIVE-STEP PROCESS TO CALCULATE A CARBON FOOTPRINT

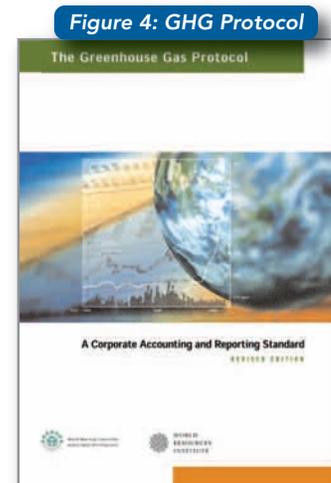
Since food retailers are diverse in size and type, each company must create its own GHG inventory management plan. Any food retailer or wholesaler may calculate its carbon footprint following the five steps below.

#### Step 1: Establish an Organizational Boundary

An organizational boundary defines where to measure emissions based on operations that a company legally owns or controls. Since these can vary among retailers, organizational boundaries can be established using either the “control” or “equity share” approach.

Through the control approach, 100 percent of the emissions are counted for operations over which a company has either full control (i.e., authority to implement operational policies) or financial control (i.e., authority to set financial policies and benefit from the performance).

Through the equity share approach, a portion of emissions equivalent to the percentage ownership (or equity share) of a joint venture/partnership/subsidiary is counted. For example, if retailer A owns 70 percent of retailer B, then retailer A would count 70 percent of B’s emissions as its own.



<sup>6</sup> The full version is available at [http://pdf.wri.org/ghg\\_protocol\\_2004.pdf](http://pdf.wri.org/ghg_protocol_2004.pdf).

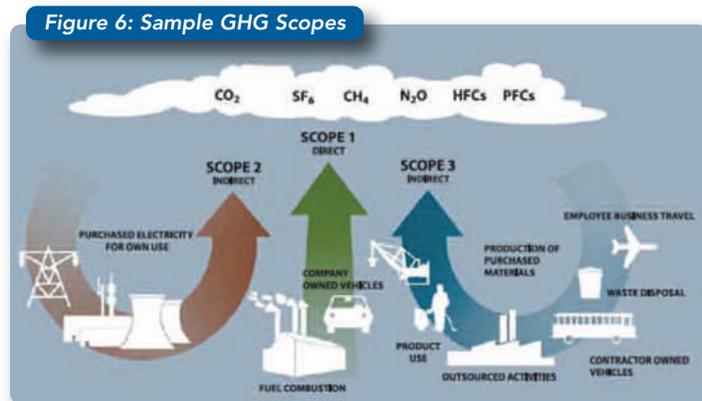
## Step 2: Define an Operational Boundary

An operational boundary consists of the specific activities (such as refrigerant loss) that comprise a company's GHG emissions inventory. Emissions are grouped into three "scopes," based on a company's ability to control particular emissions, the source of the emissions and the ownership of the source. They are defined as follows:

**Scope 1. Direct Emissions** — from activities controlled completely by the company, such as burning natural gas in a store, consuming fuel in a company-owned car or truck or refrigerants leaking from a freezer.

**Scope 2. Indirect Emissions** — from activities a company can influence but cannot control directly, such as using

electricity from power plants owned by a utility. A retailer can help reduce these emissions by cutting electricity use, but the utility controls the plant and how GHGs are released into the atmosphere.



Scope 3 emissions are optional for most GHG reporting purposes, but are sometimes included to show the greenhouse gas reduction benefits of specific initiatives. For example, an employee working from home once a week would reduce a company's Scope 3 commute emissions for this person by approximately 20 percent.

**Figure 5: Emission Scopes**

### Scope 1 (Direct)

- Natural Gas
- Refrigerant Loss
- Logistics Fleet
- Corporate Fleet

### Scope 2 (Indirect)

- Purchased Electricity

### Scope 3 (Optional)

- Waste Disposal
- Employee Commute
- Customer Travel
- Inbound Deliveries

**Scope 3. Optional Emissions** — from sources a retailer has little ability to control, such as the distance customers or employees travel and the type of transportation they use.

The typical carbon footprint of any organization includes Scope 1 and 2 emissions for reporting purposes.

Scope 3 emissions are optional for most GHG reporting purposes, but are sometimes included to show the

### Step 3: Collect Necessary Data

While data collection requirements vary slightly from one retailer to the next (for example, depending on the amount of manufacturing it does), the following graph shows the data that every food retailer should collect annually to create a complete carbon footprint:

**Figure 7: Scope 1 and 2 Data**

#### Scope 1 (Direct)

- Cubic feet of natural gas combusted
- Actual/calculated pounds of refrigerant lost for each type of refrigerant
- Amount of vehicle fuel consumed and types of vehicles

#### Scope 2 (Indirect)

- Annual kilowatt hour energy consumption for all locations
- Electricity grid (eGRID) factors for each utility company/location\*
- Type of green power purchased and its emission factor

\* The EPA's electricity grid (eGRID) factors compensate for different power generation methods in different parts of the country. For example, coal-intensive regions like Ohio generate more CO<sub>2</sub>-e per kilowatt-hour than renewable-intensive regions like the Pacific Northwest. To download maps of the eGRID regions and to view summary tables showing the CO<sub>2</sub>-e/kWh conversions, visit: <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>

### Step 4: Convert the Data Into a Carbon Footprint

Once emissions levels are collected, the raw data must be converted into CO<sub>2</sub>-e values. Companies should use a single system to convert emissions to CO<sub>2</sub>-e values. While the Intergovernmental Panel on Climate Change (IPCC) and the EPA define proper conversion factors, software-based calculations will save significant time and allow for timely and consistent emissions tracking.<sup>7</sup>

#### *A Simple Tool: FMI Carbon Calculator for Food Retailers*

The FMI Carbon Calculator can be used to make basic calculations, such as converting raw data (refrigerant use, fossil fuel consumption and electricity use) into carbon emissions equivalents. (See [www.fmi.org/sustainability/](http://www.fmi.org/sustainability/) and click on the “FMI Carbon Calculator”).<sup>8</sup>

### Step 5: Establish a Baseline Year and Set an Emissions-Reduction Goal

The baseline year is the first year in which GHG data can be completely and confidently determined. Reduction goals are then created for each subsequent year. Since the retail food industry has not established formal guidelines for setting GHG reduction goals, Section 2 of this report suggests how to design an aggressive reduction goal for your company.

<sup>7</sup> IPCC Synthesis Report: [http://www.grida.no/publications/other/ipcc\\_tar/?src=/CLIMATE/IPCC\\_TAR/vol4/](http://www.grida.no/publications/other/ipcc_tar/?src=/CLIMATE/IPCC_TAR/vol4/)

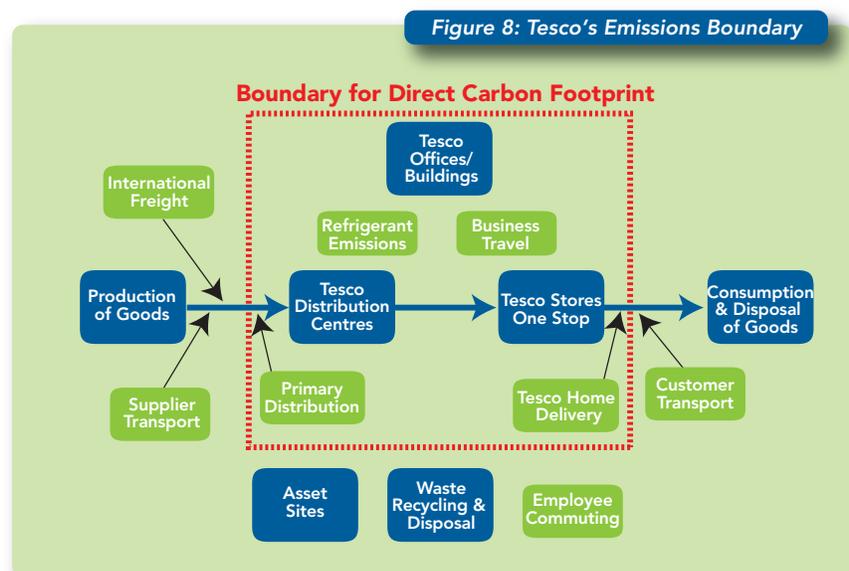
<sup>8</sup> The FMI Carbon Calculator was developed by Verisae, a private consulting firm, that offers more sophisticated analytical tools as well. See, eg, at <http://www.verisae.com/enterprise-emissions-tracking.html>.

## MINI CASE STUDY: TESCO'S CARBON FOOTPRINT MANAGEMENT

Tesco began measuring its carbon footprint in 2005.<sup>9</sup> With help from a consultant and in accordance with the Greenhouse Gas Protocol, Tesco has quantified its Scope 1 and Scope 2 emissions.

Within the operational boundary outlined in red (Figure 8), Tesco calculated that it emitted approximately 4.13 million MT of CO<sub>2</sub>-e in 2007. Over time, Tesco has expanded its business while reducing its GHG emission intensity. For example, Tesco's emissions from 2006 to 2007 remained constant even though sales and selling area increased by 10.9 percent and 17.4 percent, respectively.

In addition, Tesco has used the information from its carbon footprint measurements to set a goal of reducing electricity use in 2010 by 50 percent (against a year 2000 baseline). Tesco intends to use more efficient lighting and HVAC systems, to phase out HFCs from its large-scale refrigeration systems to boost the fuel efficiency of its distribution system and to create a green building blueprint for the construction of all new stores.



## USING OFFSETS AND CREDITS TO REDUCE A CARBON FOOTPRINT

**Figure 9: Examples of Offsets and Credits**

### Renewable Energy Credits

- Invest in renewable energy to displace electricity generated from fossil fuels

### Methane Reduction Credits

- Capture and combust methane from landfills and farm animals

### Forestry and Land-Use Change Projects

- Prevent deforestation and promote soil management

While increasing operational efficiencies is the most direct way to reduce GHG emissions, offsets and credits are another method (Figure 9). Purchasing an offset or renewable energy credit (REC) consists of investing in a GHG reduction project that someone else will perform. These tools were established under the Kyoto

Protocol as a way for companies to “pay to pollute” if they were unable to meet the legally binding requirements of a cap-and-trade program such as Europe’s Emissions Trading Scheme. GHG offset projects will only be eligible for credits if they meet the criteria of the given program. One common criterion is based on the principle of “additionality,” meaning it is reducing emissions beyond business as

<sup>9</sup> Tesco, “Measuring Our Carbon Footprint,” <http://www.tesco.com/climatechange/carbonFootprint.asp>.

usual. Independent certifications such as The Gold Standard ensure projects are third-party verified and use “renewable energy and energy efficiency technologies that promise sustainable development for the local community.”<sup>10</sup> Information about RECs can also be found by consulting with state regulatory utility commissions.<sup>11</sup>

## OUTSIDE HELP: PARTNERSHIPS

Collecting data to track, measure and manage a GHG inventory can be difficult and time-intensive. However, many government agencies, nonprofits and consultants have the expertise to help companies develop a carbon management strategy. Two examples are discussed below.

For a comprehensive list of partnership organizations and resources, see the “Carbon Footprint Resource List,” which can be downloaded free from the FMI website ([www.fmi.org/sustainability/](http://www.fmi.org/sustainability/)).

### Government Partnerships: EPA Climate Leaders

The Climate Leaders Program is an EPA-sponsored partnership through which companies develop and execute a GHG Inventory Management Plan (IMP).<sup>12</sup> Similar to EPA’s GreenChill Program (for refrigerant loss) and ENERGY STAR Partnerships (for energy management), Climate Leaders is free to join and includes 60 hours of free technical assistance.<sup>13</sup>

An EPA Climate Leaders partnership is an easy way to establish credibility for GHG reduction actions and receive free publicity through the EPA’s frequent marketing of partner success stories in press releases and case studies. Emissions are reported annually to the EPA using a free Microsoft Excel-based calculation tool, which is available at the EPA Climate Leaders website.<sup>14</sup>

Figure 10: EPA Climate Leaders Free Assistance



#### 60 Hours of Free Assistance:

- Identify data needed for inventory
- Define operational and organizational boundaries
- Conduct baseline year inventory
- Set a long-term reduction goal

### Environmental Organization Partnerships: World Wildlife Fund Climate Savers

The World Wildlife Fund’s Climate Savers program partners with large corporations to develop industry-leading absolute emissions reduction goals.<sup>15</sup> Experts will work with a corporation to develop an inventory plan, identify energy-saving (and carbon-cutting) investments and activities and measure progress toward ambitious goals.

Collectively, Climate Savers partners cut 14 million MT of CO<sub>2</sub>-e annually, the equivalent of removing 2.5 million cars from the road.<sup>16</sup>

10 The Gold Standard Foundation. “Frequently Asked Questions”. <http://www.cdmgoldstandard.org/faqs.php>

11 Links to state commission websites are on the “State Commissions” page of the National Association of Regulatory Utility Commissioners site, <http://www.naruc.org/commissions.cfm>. Click on the state on the U.S. map.

12 For Climate Leaders Program Guide with detailed information, see EPA, “A Program Guide for Climate Leaders,” March 2007, [www.epa.gov/stateply/documents/cl\\_programguide\\_508.pdf](http://www.epa.gov/stateply/documents/cl_programguide_508.pdf).

13 Comprehensive list of technical resources can be found at EPA, “Climate Leaders: Technical Resources.” December 2008. [www.epa.gov/stateply/resources/index.html](http://www.epa.gov/stateply/resources/index.html).

14 This calculator is available for free download at: EPA. “Climate Leaders: Climate Change Management Tools for Low Emitters.” [www.epa.gov/stateply/resources/lowemitters.html](http://www.epa.gov/stateply/resources/lowemitters.html).

15 WWF. “Climate Savers – Mobilizing Companies to cut carbon dioxide.” <http://www.worldwildlife.org/climatesavers>.

16 *Ibid.*

# Industry Benchmarking and Snapshot

## ESTABLISHING A BASELINE YEAR

A baseline year provides a snapshot in time of a company's energy usage and is used as the standard against which future progress is measured. The baseline year should be the earliest year in which Scope 1 and Scope 2 emissions were reliably measured.

Ideally, a baseline year will be at least three to five years in the past so you can:

- Show how significantly your annual emissions have historically been increasing or decreasing.
- Analyze how past performance will help you set aggressive but achievable reduction goals.
- Use past energy efficiency investments as a barometer for understanding how future investments will impact progress toward established goals.

## REDUCTION GOALS: ABSOLUTE VS. RELATIVE EMISSIONS

Reduction goals can fall into one of two categories: absolute or relative (intensity-based). The proper method for a company will depend on the nature of its emissions strategy and goals. For example, retailers that want to communicate their emissions reductions to consumers may prefer the absolute method, while companies that want to compare locations with one another may prefer the relative method. The key characteristics of each method are summarized below:<sup>17</sup>

Table 2: Absolute vs. Relative Emissions Reduction Goals

	Absolute	Relative (Intensity Based)
<b>Definition</b>	Reduce absolute annual emissions from a baseline year.	Reduce ratio of annual emissions relative to a business metric from a baseline year.
<b>Process to Determine</b>	Calculate all emissions for all sites within your boundary for a baseline year and all subsequent years.	Start with absolute emissions and then divide by a normalizing factor such as the total square feet of all operations.
<b>Measurement Unit</b>	Metric Tons of CO <sub>2</sub> -e (MT CO <sub>2</sub> -e).	Metric Tons of CO <sub>2</sub> -e per square foot.
<b>Advantages</b>	Goals and reductions made are easier to communicate to consumers and media.	Emissions can be compared among locations and against competitors to measure energy use efficiency.
<b>Challenges</b>	More challenging to achieve since baseline year is not adjusted for growth or new construction.	Purchasing new locations that were historically high emitters will immediately increase emissions intensity for that year.

<sup>17</sup> For a more comprehensive explanation of the advantages and disadvantages of absolute versus relative emissions, see the following article: EPA, "Comparing Absolute and Intensity Targets," [www.epa.gov/stateply/resources/comparing.html](http://www.epa.gov/stateply/resources/comparing.html).

## REDUCTION GOALS: RETAILER EXAMPLES

The majority of food retailers have not formulated concrete goals, and many are still in the early stages of conducting a baseline inventory. Below are some examples of published benchmarks (Table 3).<sup>18</sup>

### Industry Goal-Setting Benchmarks

The following are examples of benchmarks for some individual retailers who have published them.

In addition, Giant Eagle, Publix Super Markets, Target and Whole Foods are working with EPA Climate Leaders to measure their carbon emissions and develop a reduction goal. Under the EPA Climate Leaders program, a typical goal is usually a 1 percent to 1.5 percent per year reduction for five consecutive years and an aggressive goal might be a 2 percent per year reduction for 5-10 years. The EPA works directly with retailers to set either an absolute or relative goal that is specific to their operations and starting level of efficiency.

As with all organizations that are seeking change, goals should be aggressive but realistic. Aggressive stretch goals motivate better than weak ones, and greater operational efficiencies may lead to bigger bottom-line savings. Since every company starts at its own level of energy-intensity efficiency, its goals will be unique. Third-party assistance can be very helpful in setting the right.

### MINI CASE STUDY: TESCO'S AGGRESSIVE GHG-REDUCTION GOALS<sup>19</sup>

Tesco has been a forerunner of retailer sustainability efforts. The company's GHG reduction goals are among the most aggressive in the industry. In response to inquiries from the Carbon Disclosure Project, an independent nonprofit organization that requests emissions

Table 3: Retailer Reduction Goals

	Reduction Goal
Best Buy	8% per square foot from 2005 to 2012
Gap	11% per square foot from 2003 to 2008
Safeway	6% absolute from 2000 to 2011
Staples	7% absolute from 2001 to 2010
Tesco	50% absolute from 2006 to 2020
Tetra Pak	10% absolute over the next 5 years
Wal-Mart	20% absolute from 2005 to 2012



Table 4: Tesco Emissions Reduction Goals

Existing Building Emissions	Decrease by 5% in 2009 (from 2008)
Fleet Emissions (per case delivered)	Decrease by 10% in 2009 (from 2008)
All Buildings and Fleet Emissions	Decrease by 50% by 2020 (from 2006 baseline)
Energy Use (per square foot)	Decrease by 50% by 2010 (from 2006 baseline)

<sup>18</sup> These goals have been compiled from the following sources:

EPA, "Climate Leaders Partners," [www.epa.gov/stateply/partners/index.html](http://www.epa.gov/stateply/partners/index.html); Doug Cogan, et. al., "Corporate Governance and Climate Change: Consumer and Technology Companies." Ceres, Inc., December, 2008, [www.ceres.org/Document.Doc?id=398](http://www.ceres.org/Document.Doc?id=398); WWF. "Climate Savers-Mobilizing Companies to Cut Carbon Dioxide," [www.worldwildlife.org/climatesavers](http://www.worldwildlife.org/climatesavers). We recommend that you check the sources directly for more information on these goals, how they were determined and the steps the companies intend to use to achieve them.

<sup>19</sup> Carbon Disclosure Project 2008, "CDP6 Greenhouse Gas Emissions Questionnaire – Tesco," [www.cdproject.net/responses/public/Tesco\\_9107\\_Corporate\\_GHG\\_Emissions\\_Response\\_CDP6\\_2008.asp](http://www.cdproject.net/responses/public/Tesco_9107_Corporate_GHG_Emissions_Response_CDP6_2008.asp).

information for public disclosure, Tesco explained its short- and long-term goals (Table 4). Tesco's goal of a 50 percent emissions reduction by 2010 is unusual and may be the most aggressive publicly disclosed goal in the retail food industry.

In addition, the Carbon Disclosure Project reports Tesco has committed more than £650 million<sup>20</sup> over the next five years for energy efficiency projects, a Sustainable Technology Fund to promote wind and biomass energy development and the Sustainable Consumption Institute at Manchester University to accelerate research promoting a low-carbon society.

## MINI CASE STUDY: SAFEWAY AND THE CHICAGO CLIMATE EXCHANGE

Figure 12: Safeway and the CCX



### To achieve its emissions goal, Safeway:

- Became California's largest corporate wind energy buyer
- Implemented LED and high-efficiency lighting
- Installed no-heat freeze case doors

Safeway is the first retailer to join the Chicago Climate Exchange (CCE) (Figure 12). As a CCE member, Safeway has agreed to reduce its greenhouse gas emissions by 6 percent from its year 2000 baseline emissions, by the year 2011, which will mean a reduction of an estimated 390,000 tons of CO<sub>2</sub> per year (equivalent to the emissions from the electricity used by almost 47,000 US homes in one year).<sup>21</sup> If Safeway does not reach its target goals each year, it will purchase GHG emissions offsets or credits to make up the difference.<sup>22</sup>

## PROVIDING THE RIGHT INCENTIVES TO THE TEAM

Some firms have been able to reduce their carbon footprint by giving employees incentives to reduce carbon emissions for the benefit of the company.

The Carbon Disclosure Project's 2008 Report found that nearly 29 percent of S&P 500 survey respondents "have begun building environmental responsibility and climate awareness into executive incentives."<sup>23</sup> These companies cite economic savings (via improved efficiency), investor risk disclosure, product differentiation and pending legislation as their key motivations for linking GHG emissions with executive compensation.

### Panasonic: The Top Down Approach

Panasonic has implemented an "environmental performance system," which relies on a mix of GHG emissions, sales volume and cost controls to determine management pay and bonuses. Linking compensation to carbon emissions at more than 297 manufacturing sites is part of the company's goal to reduce annual greenhouse gas emissions by 50 percent between now and 2050.<sup>24</sup>



<sup>20</sup> The equivalent of \$970 million, using the currency conversion rate on April 16, 2009.

<sup>21</sup> EPA, "Clean Energy: Greenhouse Gas Equivalencies Calculator," [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html).

<sup>22</sup> CSR Wire, "Safeway Leads Retail Sector in Fighting Greenhouse Gas Emissions," [www.csrwire.com/News/7341.html](http://www.csrwire.com/News/7341.html).

<sup>23</sup> Anne Moore Odell, "Executive Bonuses for Making the CO<sub>2</sub> Cut," ClimateBiz, December 2008, [www.climatebiz.com/feature/2008/12/11/executive-bonuses-those-who-make-co2-cut](http://www.climatebiz.com/feature/2008/12/11/executive-bonuses-those-who-make-co2-cut)

<sup>24</sup> Associated Press, "Emissions goals to determine Panasonic managers' pay," The Japan Times Online, <http://search.japantimes.co.jp/cgi-bin/nb20081213a5.html>.

## Walmart: The Bottom Up Approach

Walmart's Personal Sustainability Project (PSP) initiative is a voluntary initiative that provides training and encouragement for all associates to integrate sustainability into their personal lives and communities.<sup>25</sup> Associates develop personal goals and work as a group to monitor progress. To show the benefits of engaging associates in sustainability and energy-efficiency programs, Walmart literature cites the following story:



Darryl Meyers, from Burlington, NC, noticed that the vending machines in the breakrooms glowed with lights around the clock. He suggested to Walmart's energy division that those lights be removed to reduce energy consumption. Darryl not only made a suggestion that was good for the environment, but his idea also helped the company save nearly \$1 million in electricity bills every year.<sup>26</sup>

That reduction of more than 10,800,000 kWh per year is the equivalent of 7,685 metric tons of CO<sub>2</sub>—the same impact as planting 197,000 trees and letting them grow for 10 years.<sup>27</sup>

<sup>25</sup> Walmart, "The Personal Sustainability Project." <http://walmartfacts.com/reports/2006/sustainability/associatesPersonal.html>.

<sup>26</sup> Walmart, "Walmart Associates Develop Personal Sustainability Projects," [www.walmartstores.com/download/2254.pdf](http://www.walmartstores.com/download/2254.pdf).

<sup>27</sup> Based on EPA Estimates, "Clean Energy: Greenhouse Gas Equivalencies Calculator," [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html).

# Legislative and Regulatory Approaches to Controlling Greenhouse Gas Emissions

## INTRODUCTION

Over the past three decades, concerns about the potential role greenhouse gas emissions (GHG) may play in climate change and their overall impact on the environment have moved beyond the scientific community where they originated and into the larger public arena. The discussion surrounding this issue has evolved to include the media, governments, NGOs, businesses and the public-at-large.<sup>28</sup> It seems unlikely that this attention will fade any time soon.

Many industries (including the supermarket industry) have proactively engaged in this debate and worked to reduce their overall footprint for both competitive and public interest reasons. But even as these efforts have won praise, legislators and regulators have stepped-up their involvement in the issue and begun to push for a more centralized effort to reduce the overall level of emissions on a national basis.<sup>29</sup> This pushes the debate surrounding the impact of carbon footprints permanently out of the realm of company-level competitiveness into the arena of public policy. The potential impact of a significantly expanded government role in regulating what are, in many cases, the unavoidable byproducts of business operations, significantly changes the complexion of efforts at emission reductions and holds the opportunity for fresh pitfalls and opportunities. Within this new paradigm, understanding and accurately calculating a carbon footprint takes on a new importance.

## LEGISLATIVE LIMITS ON GREENHOUSE GAS EMISSIONS IN THE UNITED STATES<sup>30</sup>

The United States Congress has passed a number of pieces of legislation over the years to help reduce air pollution and to promote the development of new technologies. The Clean Air Act of 1963 was the first piece of national legislation to provide for comprehensive controls on air pollution. Congress followed up seven years later with the Clean Air Act of 1970, which “authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources.”<sup>31</sup>

By the late 1970s, Congress had begun to explicitly address the role of carbon and other greenhouse gases in global warming. The National Climate Program Act of 1978 was the first serious attempt to wrestle with the impact of climate change and it directed the Department of Commerce to conduct “assessments of the effect of climate change on the natural environment, agricultural production, energy supply and demand, land and

28 An interesting examination of this increasing public sector awareness of climate change can be found in Rabe, Barry G. 2004. *Statehouse and Greenhouse: The Emerging Politics of American Climate Change Policy*. Washington, D.C.: Brookings.

29 These efforts actually date as far back as 1970, with the passage of the Clean Air Act. See the Environmental Protection Agency’s “History of the Clean Air Act” at [http://www.epa.gov/air/caa/caa\\_history.html](http://www.epa.gov/air/caa/caa_history.html).

30 For up-to-the-minute updates of environmental and carbon related legislation, please visit the FMI website at [www.fmi.org](http://www.fmi.org).

31 See “History of the Clean Air Act”.

water resources, transportation, human health and national security.”<sup>32</sup> This was followed by a host of other pieces of legislation including the Global Climate Protection Act of 1987 and the Global Change Research Act of 1990. Each of these laws are landmark pieces of legislation that have been periodically updated over the years<sup>33</sup>, but critics argue that they have failed to keep up with the state of climate science and the changing structure of the U.S. economy. Many legislators seem inclined to agree and want to move beyond the current regulatory structure’s focus on overall pollution, increased efficiency and voluntary programs to limit directly and comprehensively the amount of GHGs released by the United States every year. Senator Joseph Lieberman (ID-CT) summed up this new legislative determination in a 2005 op-ed:

*Consider the costs and consequences of inaction, for they will ruin the economy with a far more destructive certainty than any greenhouse-gas control programme ever could. . . Our nation and, indeed, our planet cannot wait for us to stumble toward an answer. The consequences and costs of inaction are too great. We know there is a long and menacing shadow marching toward our shores – toward our cities and towns. But we know that if we act now, global warming is not a conqueror to be feared – but a challenge to be met.*<sup>34</sup>

As the debate about limiting GHGs has evolved from if to how, myriad proposals for the best means of achieving this goal have been put forward. Over the past decade, it has hardened into a focus on two very distinct approaches:

- A cap and trade system;
- A carbon tax.

### Cap-and-Trade

A cap and trade approach to restricting GHGs is based on several other successful programs run by the EPA, including the acid rain reduction program.<sup>35</sup> It begins with the U.S. government placing a firm limit (“the cap”) on the amount of greenhouse gases that may be emitted by all US-based entities. While in theory this cap could extend from the largest industrial emitters all the way down to individuals, in practice, most proposals have taken a “trickle down” approach that focuses on large upstream emitters like power generators and heavy manufacturing.

Once the cap has been set, the remaining amount of GHGs that may be emitted in a given year are monetized into tradable credits (i.e. 1 mt of CO<sub>2</sub>e = 1 credit). These credits can then be auctioned off or distributed to the regulated industry sectors (or a combination of both). Each regulated business is responsible for accumulating credits equal to its total emissions. Companies that are able to reduce their emissions below current levels are able to either save money (by not having to purchase additional auctioned credits) or in some cases make money (companies can sell off extra credits in a carbon credit market).

32 John C. Dernbach, “U.S. Policy”, Global Climate Change and U.S. Law, American Bar Association, pp. 75.

33 The last significant update to the Clean Air Act was in 1990, though there have been other pieces of energy and environment-related legislation that impact on the Clean Air Act.

34 Senator Joseph Lieberman, “No Procrastination on Climate Change,” Our Planet, February 25, 2005. Available at <http://www.unep.org/ourplanet/imgversn/154/lieberman.html>.

35 See the EPA’s Cap and Trade homepage at <http://www.epa.gov/captrade/index.html>.

The government ratchets the cap downward on an annual basis, reducing the amount of emissions and making the act of emitting more expensive. This creates incentives to lower overall emission levels.

Proponents of cap and trade often focus on the fact that it uses a market-based structure to create the “right” price for emissions, instead of an arbitrary figure set by Congress or a regulatory agency.<sup>36</sup> Critics have countered that it also creates the possibility for wildly fluctuating prices and even market manipulation.<sup>37</sup>

### A Carbon Tax

Congress has also, at times, considered pursuing a carbon tax as a possible means of regulating greenhouse gas emissions. A carbon tax is a direct tax placed at the point where the emissions are put into the stream of commerce, so large-scale emitters, like power generators, bear the brunt of the impact.<sup>38</sup> In most legislative proposals, the tax is placed directly on emissions on a “per pound” basis.

Again, the goal of this proposal is to find the “right price” for carbon emissions – i.e., one that takes into account not only the cost of generating them but also their long-term downstream impact on the environment and public health. A number of economists have cited it as the most direct and efficient means of reducing emissions, and one that easily builds upon existing structures for collecting revenues. Critics of the tax have countered that it does not necessarily reduce overall emissions levels – companies hit by the tax can merely pass on added costs to consumers without having to undertake any serious efficiency measures. Ultimately, for a carbon tax to be successful, the rate of the tax needs to be set high enough that passing it through will impact consumers to the point that they use less energy and thus have the net effect of reducing consumption.<sup>39</sup> Whether Americans would ultimately accept a tax being imposed at the necessary levels remains at the center of the debate surrounding a carbon tax.

### Regulatory Efforts at Controlling Emissions

The existing statutes (discussed above) were written before the impact of greenhouse gases on the environment was fully understood, consequently, EPA has limited authority to regulate the use and emission of these substances. Nonetheless, the Supreme Court recently interpreted a provision of the Clean Air Act to require EPA to determine the impact of GHGs on climate change and public health, thereby setting the regulatory table for EPA regulation of GHG emissions from motor vehicles. In addition, this year EPA proposed to establish GHG reporting and recordkeeping obligations on heavy GHG emitters. Even the most aggressive interpretation of existing legislative authorities, however, will not permit EPA to establish the type of comprehensive regulation of GHGs that is envisioned under pending legislation.

Regulatory agencies like the EPA and Department of Energy, in addition to implementing and enforcing Congress’ legislative approach to emissions, have also been active in promoting awareness of climate change and ways to combat it. Joint industry-government projects, such as the Energy Star program, are focused on reducing energy use through increasing the efficiency of homes and businesses. With roots

36 See, e.g., Pew Center on Global Climate Change and the Pew Center on the States, *Climate Change 101: Understanding and Responding to Global Climate Change* 2008. Available at <http://www.pewclimate.org/docUploads/Cap-Trade-101-02-2008.pdf>.

37 Ben Stein, “The Dangers of Cap and Trade,” *The New York Times*, February 21, 2009. Available at <http://www.nytimes.com/2009/02/22/business/22every.html>.

38 See the Carbon Tax Center’s “What is a Carbon Tax?” available at <http://www.carbontax.org/introduction/#what> for more information.

39 World Resources Institute, “The Bottom Line on Carbon Taxes,” June 2008. Available at [http://pdf.wri.org/bottom\\_line\\_carbon\\_taxes.pdf](http://pdf.wri.org/bottom_line_carbon_taxes.pdf).

reaching all the way back to 1992, over 4,100 commercial facilities and manufacturing plants now bear the Energy Star label, and it is widely considered one of the most successful voluntary programs in place today.<sup>40</sup>

In addition to emissions themselves, the federal government also regulates the claims that businesses can make about their emissions. In particular, the Federal Trade Commission Act prohibits unfair or deceptive trade practices. “Green” claims, including claims regarding carbon offsets and marketing energy certificates RECs, must be crafted carefully to ensure that they are not false or misleading and that they are adequately substantiated. The FTC is conducting ongoing proceedings to determine the acceptable basis and scope of “green” claims in the GHG emissions context.

## STATE AND LOCAL EFFORTS

Despite the federal government’s legislative and regulatory actions on the issue of greenhouse gases, states have often been frustrated by what they perceive as inadequate efforts. A number of them have responded by taking on an active role in combating greenhouse gas emissions and developing plans to lower their overall carbon footprints. For example, in 2006, California passed the Global Warming Solutions Act which sets a goal of returning overall state emissions to 1990 levels by 2020 (a 25 percent overall reduction).<sup>41</sup>

States have also formed regional initiatives that operate as mini-cap and trade zones. The three largest of these – the Regional Greenhouse Gas Initiative, the Midwestern Regional GHG Reduction Accord and the Western Climate Initiative – collectively cover more than half the population of the U.S. and Canada. All of them set ambitious GHG reduction goals and several follow a cap and trade model complete with enforcement provisions.<sup>42</sup>

But even states that have decided to forego hard targets have taken action to begin mitigating the impact of GHGs. In 1999, Tennessee published an extensive policy proposal that laid out a series of steps ranging from conservation to telecommuting.<sup>43</sup>

Taken in combination, laws and regulations at the federal, state and regional level have already begun to impact the business conditions faced by our industry every day. As noted at the beginning of this section, food retailers have a history of engaging on this issue and working aggressively to reduce their carbon footprint. But it is clear that the government is going to play a more active role in this area and that a new round of regulation is on the way. Under the new restrictions that are likely to emerge, past successes will need to be augmented by new and sometimes costly efficiency and mitigation regimes. The first step to moving forward is knowing where your company stands now. Capturing a broad-based and accurate carbon footprint on a company-wide basis can be an important tool in making this evaluation.

40 For more information on the program visit <http://www.energystar.gov/>.

41 A summary of the bill can be found at <http://gov.ca.gov/press-release/4111/>.

42 Alan Durning, “Cap and Trade 101: A Climate Policy Primer,” Sightline Institute, September 2008, [http://www.climatebiz.com/files/document/Cap-Trade\\_online.pdf](http://www.climatebiz.com/files/document/Cap-Trade_online.pdf).

43 “Tennessee Greenhouse Gas Emissions: Mitigation Strategies,” April 1999. Available at <http://www.tennessee.gov/ece/pdf/greenhouse/entiredocument.pdf>.

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## VOLUNTARY AND PRIVATE PROGRAMS

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Forward-thinking organizations and businesses are also taking steps to remain competitive in the future low-carbon economy. Two such efforts are highlighted below

### *Chicago Climate Exchange<sup>44</sup>*

The Chicago Climate Exchange (CCX) is the only cap-and-trade program covering all of North America. Its 350 members include municipalities, corporations, universities and other organizations. Membership is voluntary, but once an entity joins, it commits to a legally binding agreement to reduce GHG emissions below absolute annual targets. Each year, emissions are third party-verified by the Financial Industry Regulatory Authority (FINRA), and entities that emit less than their targets can sell excess allowances.

### *U.S. Climate Action Partnership (USCAP)*

Made up of an alliance between BP, DuPont, GE, Johnson & Johnson, PepsiCo, other major businesses and environmental advocacy groups, the U.S. Climate Action Partnership (USCAP) is lobbying the federal government for national GHG cap-and-trade legislation. USCAP asserts such actions “will create more economic opportunities than risks for the U.S. economy” and advocates an 80 percent GHG reduction by 2050.<sup>45</sup>

<sup>44</sup> Chicago Climate Exchange, “Overview,” [www.chicagoclimatex.com/content.jsf?id=821](http://www.chicagoclimatex.com/content.jsf?id=821).

<sup>45</sup> US Climate Action Partnership, “A Call For Action,” [www.us-cap.org/about/report.asp](http://www.us-cap.org/about/report.asp).

# Grocery Retailer Case Studies

The following case studies are adapted from partnership reports by Clean Air-Cool Planet (CA-CP), a New Hampshire-based nonprofit dedicated to “developing economically efficient and innovative climate policies and mobilizing civic engagement to implement practical climate solutions.”<sup>46</sup> These reports explain how Shaw’s Supermarkets and The Stop & Shop Supermarket Company improved operational efficiencies and received positive publicity for forming greenhouse gas reduction partnerships with CA-CP.



## CASE STUDY: SHAW’S SUPERMARKETS<sup>47</sup>



This New England retailer has made significant advancements in reducing its carbon footprint over the last decade. The company started small and formulated a plan to scale up to companywide Computerized Energy Monitoring and Lighting Retrofits.

### Computerized Energy Monitoring

Shaw’s began by simply monitoring monthly energy bills. This simple practice allowed the firm to collect historical data and develop a plan. Next, Shaw’s installed sub-metering equipment to collect data daily on multiple circuits on a per-store basis. The system monitored electrical use by tracking multiple variables in conjunction with consumption (for example, historical data, retail volume by day and weather tracking). Ultimately, the system sent an alert if utility use jumped outside of an average defined level. This allowed management to diagnose the problem and decide whether the problem could be remedied by software or required a maintenance call.

### Lighting Retrofit

Shaw’s recognized the tremendous opportunity for improvement in lighting usage. First, they replaced existing lighting fixtures with T-8 lamps and electronic ballasts in aisles where lighting could be dimmed when foot traffic decreased. Second, Shaw’s installed lighting retrofits in cooler units and found that the lamps used less electricity and generated less heat than previous equipment, which reduced cooling energy costs.

### Results

The CA-CP web site does not provide estimates for the costs associated with these initiatives but CA-CP estimates that the two initiatives will save approximately 43 million kWh of electricity per year across all of their stores.

<sup>46</sup> For more information about this organization, see Clean Air-Cool Planet “About CA-CP,” [www.cleanair-coolplanet.org/about/](http://www.cleanair-coolplanet.org/about/).

<sup>47</sup> Clean Air-Cool Planet, “Shaw’s Supermarkets: A Comprehensive Environmental Commitment,” [www.cleanair-coolplanet.org/information/pdf/shaws-supermarkets.pdf](http://www.cleanair-coolplanet.org/information/pdf/shaws-supermarkets.pdf).

## Key Finding

Start small and operate within your means, but be ambitious. Formulating a plan and getting senior-management buy-in are keys for success. To facilitate its efforts, Shaw's hired an energy & environmental manager, a new position that bridged gaps between real estate, store operations and merchandising while working closely with equipment vendors to request more efficient lighting, compressors and coolers. As a result, a simple practice of monitoring monthly bills evolved into a corporatewide initiative with a significant bottom-line impact.

## CASE STUDY: THE STOP & SHOP SUPERMARKET COMPANY<sup>48</sup>



Stop & Shop's "All In" plan demonstrated a significant commitment to push the industry forward. Through a LESS (Low Energy Super Stores) construction and building strategy, Stop & Shop saw tremendous results and highlighted a promising future in eco-friendly building design.

### Low-Energy Superstore

Stop & Shop's efforts started with a cross-functional team composed of members representing management, construction, design and operations. The team formulated an action plan and focused on three main areas

- Indoor Environment / Air Quality
- Energy Conservation / Efficiency
- Waste Reduction / Minimized Damage to the Natural Environment

After modeling small prototypes in a vacant building to demonstrate proof-of-concept to key stakeholders, the team executed its strategy in 2001 with the opening of the industry-leading Foxboro, Massachusetts location. The site features light tubes, solar panels, fuel cells, expansive sky lights and building materials made of high recycled content. The refrigeration practices are designed to the needs of individual products. For example, cold cases used energy-saving doors, anti-sweat heaters and efficient lighting practices.

### Results

Stop & Shop estimates that the Foxboro store cost an additional \$500,000 to built but it will use 27 percent less electricity (saving 800,000 kWh per year) compared with a traditional location

### Key Finding

Stop & Shop believes that its cross-functional team — which conducted extensive planning and modeled new technologies to key stakeholders to show proof-of-concept — was the key to this initiative's success. The company realized it could move the entire industry forward, and the group could devote the necessary attention and resources for the project.

<sup>48</sup> Clean Air-Cool Planet, "Stop & Shop Supermarkets – LESS is more...", [www.cleanair-coolplanet.org/information/pdf/StopShop.pdf](http://www.cleanair-coolplanet.org/information/pdf/StopShop.pdf).

# About Verisae, Inc.

## Sustainable Resource Planning (SRP) Product Suite from Verisae, Inc.

Verisae's software and services can provide a full suite of site, asset, procurement, enterprise energy management, and maintenance functionality. We can also easily integrate with your existing enterprise management applications and data sources.



Combining information in multi-site facilities to review asset procurement, maintenance on those assets, energy consumption of the assets and the entire building, and developing and lowering the carbon footprint of the enterprise defines Verisae's goal. By combining a robust site and equipment asset database, call center dispatching, and work order automation, Verisae has built an integrated, retail-focused, Service Process Network. This network links customer sites with the teams that monitor their performance and keep them maintained. The Verisae solution delivers cost savings whether the customer maintains their sites with in-house maintenance, outsourced maintenance, or a combination of the two.

Verisae, Inc. empowers organizations to engage in energy management initiatives in a localized facility or across a global enterprise. Our core offerings allow distributed organizations across the globe to effectively track and manage assets from the usage, cost to run, energy consumption, and carbon consequence perspectives. They are uniquely positioned to help organizations prove return on investment (ROI) on Greenhouse Gas management and reporting. Their solutions are delivered via a common web browser so that organizations with thousands of locations and 10's of thousands of assets can be implemented in a manner of months.

Given the heightened priority of corporate sustainability, energy efficiency, and carbon reduction, Verisae is positioned right now to enable organizations to establish a carbon footprint baseline and outline energy management options. All of which can be implemented with metrics in place to highlight bottom-line cost savings and return on investment timelines.

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