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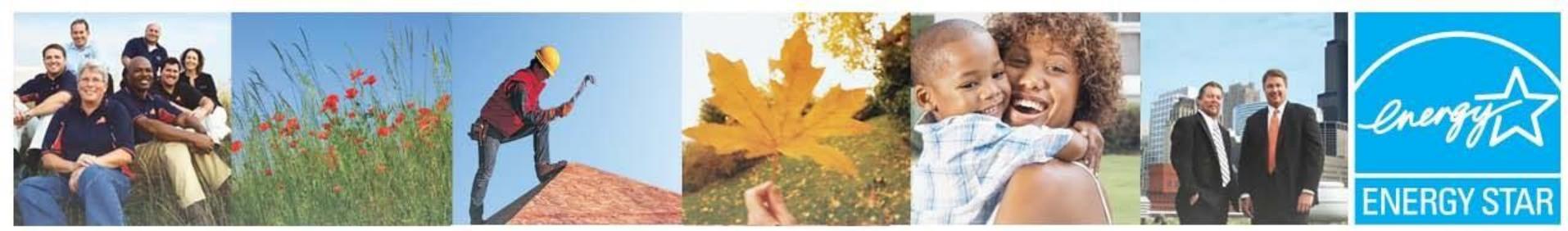


## Sustainability and Energy Efficiency

( Leveraging with ENERGY STAR )



*A Quest for Perfection by Engaging, Inspiring,  
Empowering and Acting*



# How ENERGY STAR Helps Plants & Buildings Improve the Energy Performance of their Operations

# Carolinas Energy Associates and Sustainability Consultants, LLC

*Delivering excellence to create, enhance & sustain!*



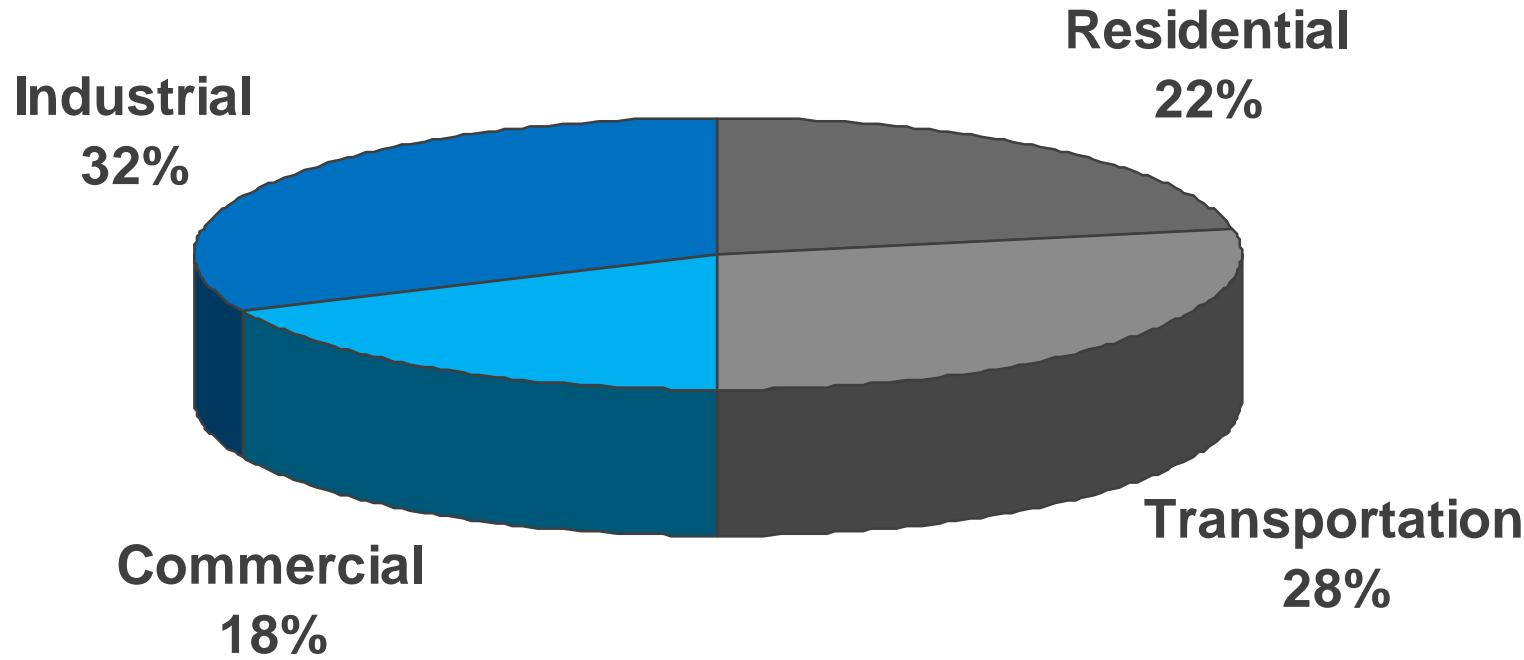
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Companies serious about Sustainability are riding the “*Green Wave*” using strategies such as ENERGY STAR to create value, build competitive advantage and *reduce energy by 35%*.



# The Big Picture: Energy Use in the United States



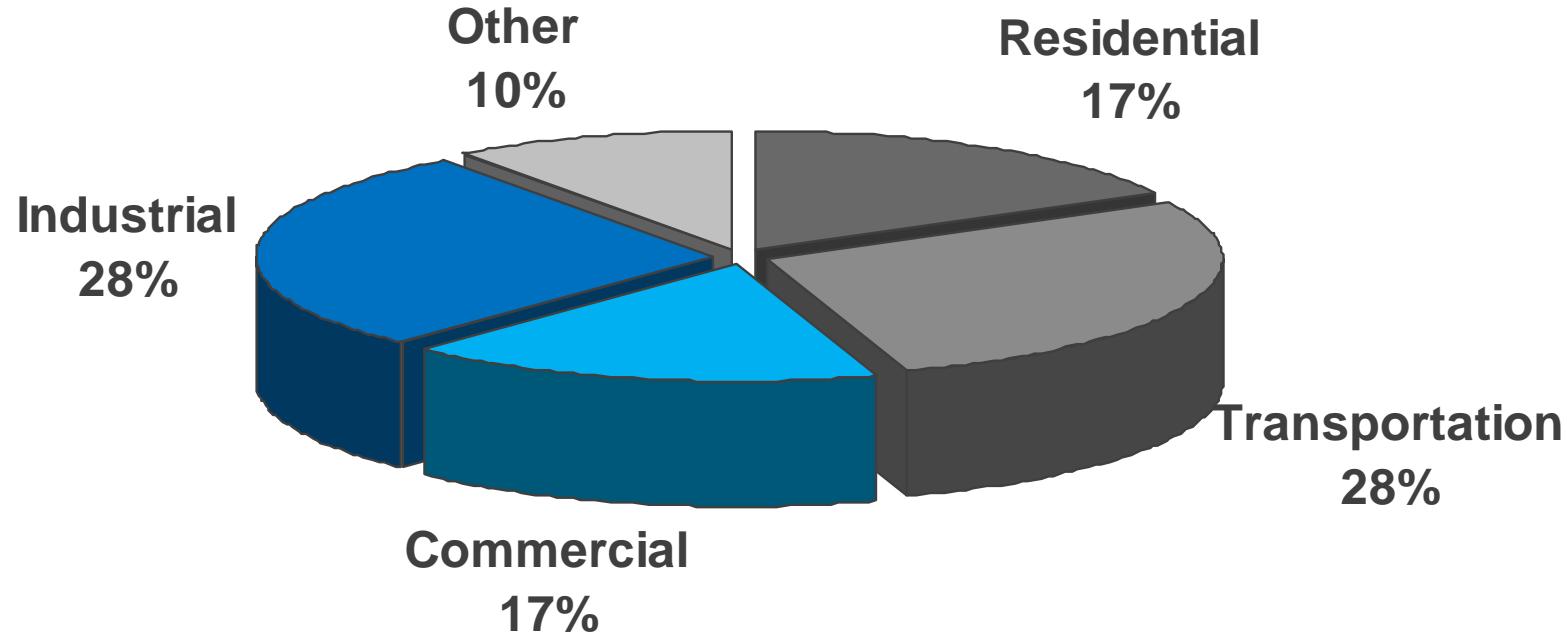
*The buildings where we work, play, and learn are responsible for nearly 50% of our country's energy use at a cost of over \$200 billion a year.*

# Energy and the Environment





# The Big Picture: Greenhouse Gas Emissions in the United States



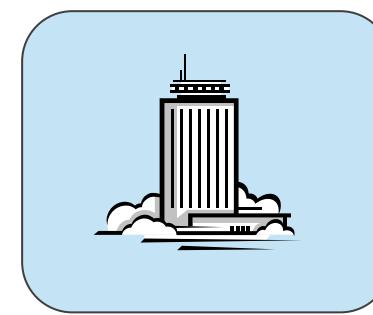
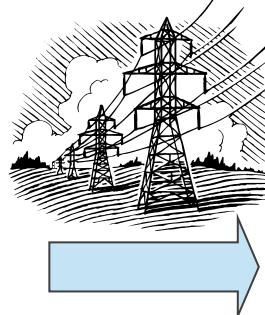
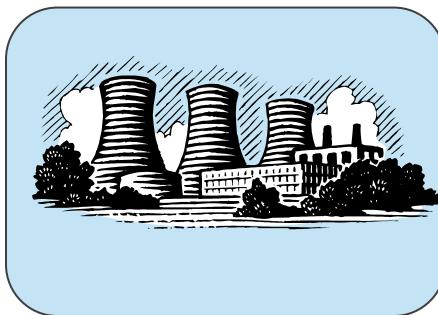
*Commercial buildings and industrial facilities are responsible for 45% of U.S. greenhouse gas emissions.*

*Inventory of U.S. Greenhouse Gas and Sinks: US EPA - 2011*

# The Link Between Energy Use & Greenhouse Gas Emissions



- Every building uses energy, which is most often generated by the burning of fossil fuels.
- Burning fossil fuels, such as coal, releases greenhouse gas emissions into the atmosphere which contribute to climate change.





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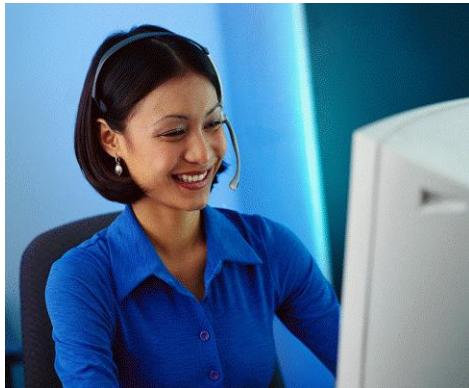


## Some considerations for Energy Efficiency

- Efficiency as an Energy source, has a unique impact on the environment, when compared with other Energy sources.
- Energy efficiency improvements reduces the power demand on Power Companies and helps to offset power interruptions and load shedding.
- "Energy Intensity Index" is the amount of Energy needed to produce 'financial value'. For example; by increasing Energy efficiency at your facility by 10% will result in the same amount of goods to be produced with 10% less Energy.

# Did You Know?

The energy used by a building to support just one office worker for a day causes more than twice as many greenhouse gas emissions as that worker's drive to and from work?





## What the World needs to monitor

Global warming is mainly the result of CO2 levels rising in the Earth's atmosphere. Both atmospheric CO2 and climate change are accelerating. Climate scientists say we have years, not decades, to stabilize CO2 and other greenhouse gases.

**CO2 = 401.30ppm**

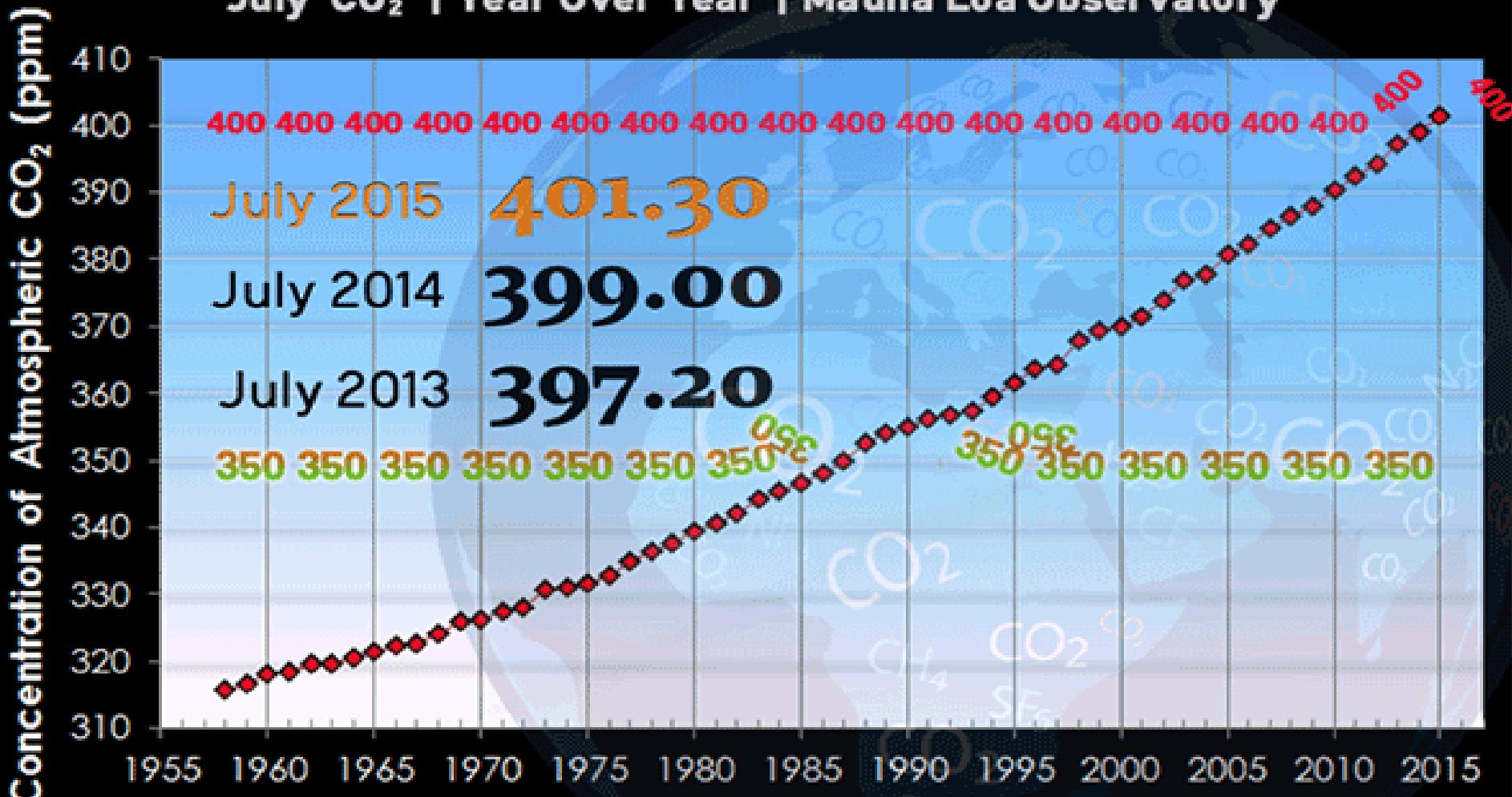
Atmospheric CO2 for July 2015

[www.CO2now.org](http://www.CO2now.org)

August 1958 – July 2015

# Atmospheric CO<sub>2</sub>

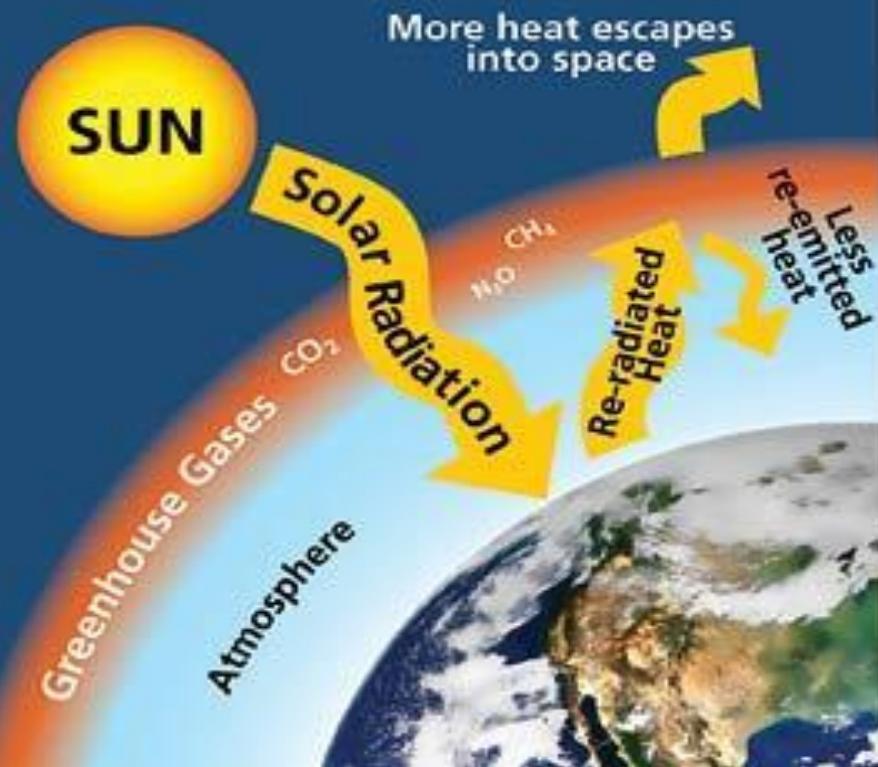
July CO<sub>2</sub> | Year Over Year | Mauna Loa Observatory



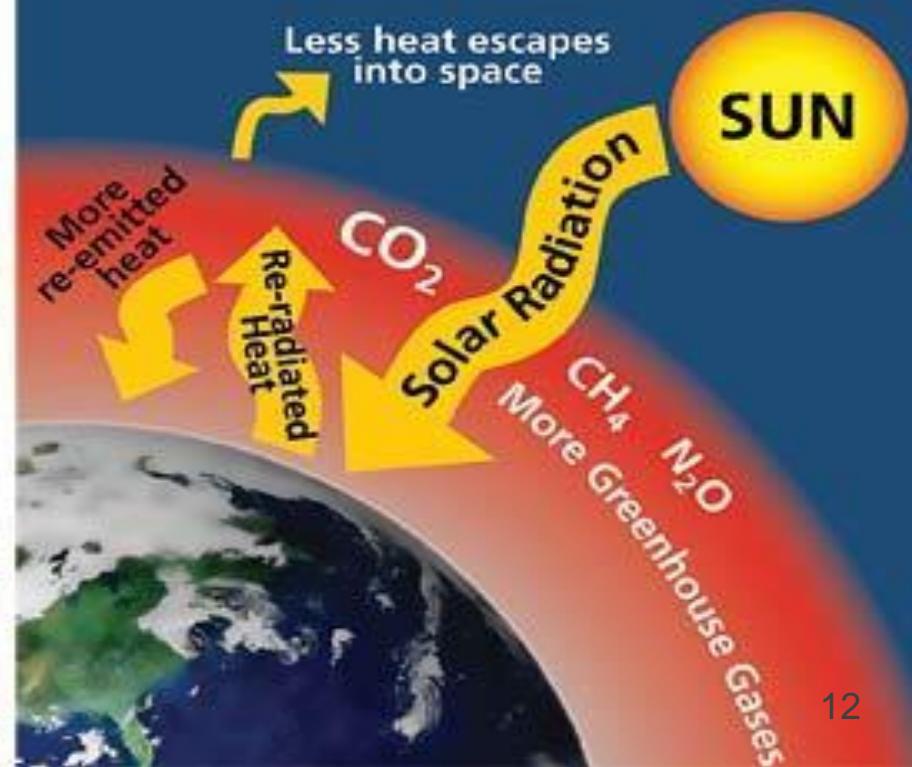


## Greenhouse effect & carbon dioxide (CO<sub>2</sub>)

### Natural Greenhouse Effect



### Human Enhanced Greenhouse Effect



# Where humanity's CO<sub>2</sub> comes from

91% 33.4 billion metric tonnes



photo credit: Koddie

Fossil Fuels & Cement 2010

9% 3.3 billion metric tonnes



Land Use Change 2010

# Where humanity's CO<sub>2</sub> goes

50% 18.4 billion metric tonnes



photo credit: Roger Hall

Atmosphere

2010

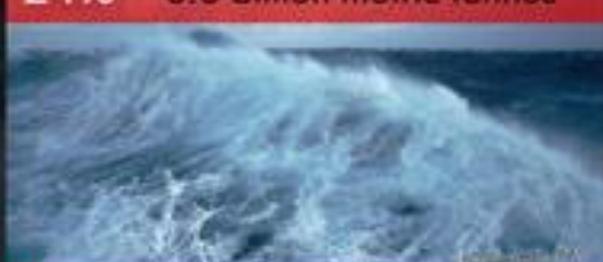
26% 9.5 billion metric tonnes



Land

2010

24% 8.8 billion metric tonnes



Oceans

2010

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## What constitutes a green house gas? (GHG)



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## Every Year an Average Coal Plant Releases

- 3,700,000 tons of CO<sub>2</sub> (carbon dioxide)
- 10,000 tons of SO<sub>2</sub> (sulfur dioxide)
- 500 tons of particulates
- 10,200 tons NOx (nitrogen oxide)
- 720 tons of CO (carbon monoxide)
- 220 tons of VOC (volatile organic compounds)
- 170 pounds of mercury
- 225 pounds of arsenic
- 114 pounds of lead

**And there are over 600 of them in the US.**



*Source: Union of Concerned Scientists: [www.ucsusa.org](http://www.ucsusa.org)*



# Energy Efficiency = Healthy Environment

Energy efficiency



Greenhouse gas emissions



Carbon dioxide in the atmosphere



=

Healthier environment for All

# EPA's ENERGY STAR Program: An Effective Solution

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- Since 1992—good for the environment; good for the bottom line.
- More than 60 different categories of ENERGY STAR qualified products and appliances.
- Tens of thousands of ENERGY STAR certified buildings.
- More than 1 million ENERGY STAR qualified homes.



# How ENERGY STAR Helps Commercial Businesses Improve the Energy Performance of their Operations

# ENERGY STAR and the Buildings Where We Work, Play and Learn

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## ENERGY STAR certified buildings:

- Use 35% less energy.
- Generate 35% fewer greenhouse gas emissions.
- Cost US\$0.50 cents less per square foot to operate (office buildings).
- Energy use in commercial buildings accounts for nearly 20 percent of U.S. greenhouse gas emissions at a cost of more than \$100 billion per year.

# Overview of ENERGY STAR certification process

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- Building stakeholders can apply for ENERGY STAR certification for buildings that score 75 or better on EPA's ENERGY STAR 1-100 energy performance scale.
- A score of 75 means that a building performs better than 75 percent of similar buildings nationwide.
- The first step to certification is entry of data into EPA ENERGY STAR Portfolio Manager.

# Only certain types of buildings are eligible for certification



- Bank branch
- Courthouse
- Data center
- Distribution center
- Financial office
- Hospital (general medical & surgical)
- Hotel
- K-12 school
- Office
- Retail store
- Senior care community
- Supermarket/ grocery store
- Warehouse
- Wholesale club/  
supercenter
- Worship facility

# Some reasons to pursue ENERGY STAR certification

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- Lower operating costs
- More marketable
- Reduced greenhouse gas emissions
- Lease to federal tenants
- Higher rental rates
- Increased asset value
- It's just the right thing to do

# Saving Money is Easy!

**Priority #1 – O&M across all building systems**



**Lighting**



**Plug Loads**



**Building Envelope**



**Air Distribution  
& HVAC  
Systems**





# Save water to save energy

Did you know that water use and energy use in buildings are linked? In most cases, electricity or gas is used to heat water, so the less hot water you use, the less energy is needed to heat the water. In addition, your water company uses energy to purify and pump water to your facility, as well as in the treatment of your sewage. So part of your water and sewage bill is really an energy bill.





# Results

Just like going on a diet, the process of “stepping on the scale” every month has the power to motivate and transform. After all, those extra “pounds” could become extra dollars. A recent study found that commercial buildings that regularly benchmarked their energy performance in EPA’s Portfolio Manager™ tool cut their energy bills by seven percent over three years (2.4 percent per year on average).

**That's equal to:**



That's equal to:

For a 500,000-square-foot office building:

- Cumulative cost savings of \$120,000
- Increase in asset value of over \$1 million

For a medium-box retailer with 500 stores:

- Cumulative cost savings of \$2.5 million
- Increase in sales of 0.89%

For a full-service hotel chain with 100 properties:

- Cumulative cost savings of \$4.1 million
- Increase in revenue per available room of \$1.41

# The ENERGY STAR Partnership



- Over 3000 companies & organizations have joined the ENERGY STAR partnership.
- Partnering offers more opportunities to leverage ENERGY STAR resources.
- Companies join at the corporate level.





# Why Companies Join

- Improve energy performance and competitiveness, and reduce costs
- Learn energy management techniques from the broad network of industrial companies in the partnership
- Launch a new energy management initiative
- Demonstrate commitment to reducing greenhouse gas (GHG) emissions through energy efficiency
- Leverage ENERGY STAR resources
- Earn recognition for energy performance achievements



# How does ENERGY STAR Helps Manufacturers Improve the Energy Performance of their Operations?

# ENERGY STAR for Manufacturers



## ENERGY STAR Plant Label

Recognizes plants that score in the top 25 percent on the ENERGY STAR energy performance scale based on use of an ENERGY STAR Plant Energy Performance Indicator

## ENERGY STAR Challenge for Industry

Recognizes sites that reduce energy intensity by 10%



# ENERGY STAR Plants

- Must have an Energy Performance Indicator (EPI) score of 75 or higher
- Must pass an environmental compliance screen
- Current industries eligible for the



## ENERGY STAR:

- Auto Assembly
- Cement
- Food Processing
- Glass Manufacturing
- Petroleum Refining
- Pharmaceuticals
- Wet Corn Milling



# Challenge for Industry



**ENERGY STAR Challenge  
for Industry**  
**Build a better world 10% at a time**



Environmental Protection Agency's (EPA) ENERGY STAR Challenge for Industry is a tool designed to help energy managers and industrial sites improve energy performance and set goals. Industrial sites participate by committing to the pre-established goal of reducing energy intensity by 10 percent within 5 years or less.

# The steps are easy



# 4 Energy Saving Opportunities





# Energy Treasure Hunt

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Energy Treasure Hunt focuses mostly on day-to-day ***operational*** opportunities, many of which will be low-cost or no-cost efficiency improvements.



# Energy Treasure Hunt Principles

- The core of an Energy Treasure Hunt is an onsite three-day event in which cross-functional teams of employees identify day-to-day operational energy efficiency improvements.
- Treasure Hunts enable employees to build a culture of continuous improvement for implementing energy control measures that reduce use, costs, and associated greenhouse gas emissions.
- Energy Treasure Hunt supports implementation of an energy management program and key components of EPA's ENERGY STAR Guidelines for Energy Management.

# Energy Treasure Hunt

## Which Would You Prefer?



- Energy Treasure Hunts have the objective of finding TREASURE – not problems
  
- Audits & assessments can have negative connotations like the objective of finding “problems”



# Energy Treasure Hunt – Case Study 1

## Intertape Polymer Group

- Intertape volunteered to test the Energy Treasure Hunt guidance at its Danville, Virginia facility
- The Energy Treasure Hunt proved to be an effective method for finding low-cost or no-cost energy saving opportunities
- The Treasure Hunt participants identified nearly \$300,000 in savings opportunities with a reduction of 1,200 metric tons of greenhouse gases
- Participants identified several other longer-term opportunities for energy savings





# Energy Treasure Hunt – Case Study 2

## Hanes Brands

- Hanesbrands, an apparel manufacturer, has successfully rolled out Energy Treasure Hunts across its plants worldwide
- Energy Treasure Hunts have resulted in a behavioral shift in how the organization thinks about energy usage, and helped
- Hanesbrands to reduce energy costs by more than \$4 million dollars in one year

**HANES** *Brands Inc*

# Energy Treasure Hunt – Case Study 3

## General Electric

- At more than 300 sites around the world, GE employees have conducted “Treasure Hunts.”
- To date (2015), participating GE facilities have identified opportunities to reduce energy use by 20% and, overall, the Treasure Hunts have contributed to more than \$150 million in savings and the reduction of more than 250,000 metric tons of CO<sub>2</sub>.

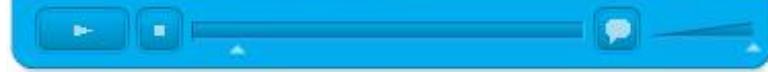


# Energy Treasure Hunt – Case Study



<b>3M Worldwide</b>	20% reduction in energy use per unit product for 2005-2010 19.8% energy reduction per unit achieved through 2009
<b>BOEING</b>	25% energy intensity improvement by 2012 versus 2007 5.3% energy intensity reduction in 2009
<b>CORNING</b>	30% energy productivity improvement by 2012 versus 2006
<b>Ford</b>	15% energy reduction corporate-wide by 2011 versus 2006 13.6% energy reduction through 2009, 38% since 2000
<b>MERCK</b>	25% energy intensity reduction by 2009 versus 2004 30% reduction achieved through 2009, exceeding goals
<b>PEPSICO</b>	20% electricity, 25% fuel consumption reduction for 2006-2015 5.1% electricity reduction in 2009, 36% since 1999
<b>PPG</b>	2.5% energy reduction per year for 10 years versus 2006 <span style="float: right;">41</span>

# Take a Behind-the-Scenes Tour



# Explore Energy-Efficient Workplaces



## Bring Your GREEN TO WORK with ENERGY STAR®

The small steps you take at work to save energy can make a big difference in the fight against global warming.

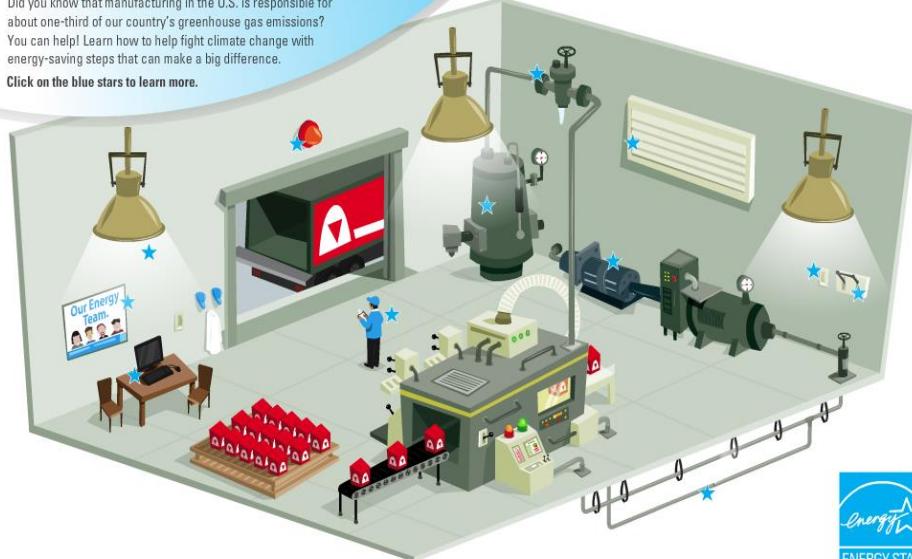
Organizations across the country are working with EPA to improve the energy performance of the buildings where we work, shop, play and learn. You can help!

Click on the blue stars to learn more and start saving energy today.



Did you know that manufacturing in the U.S. is responsible for about one-third of our country's greenhouse gas emissions? You can help! Learn how to help fight climate change with energy-saving steps that can make a big difference.

Click on the blue stars to learn more.



From an office cubicle to a manufacturing plant, these **interactive workplace tools** show the steps we can all take to do our part and save energy!

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## Money Isn't All You're Saving



# Now is the time!

Is 'Your Organization' ready to accept the Energy Star Challenge?



**ENERGY STAR Challenge  
for Industry**  
Build a better world 10% at a time

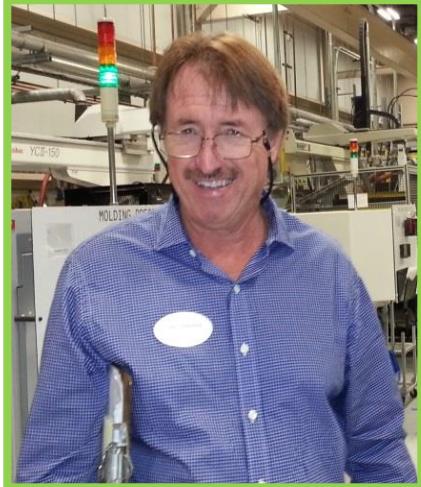


# Serving Your Sustainability Development Needs

*Delivering excellence to create, enhance & sustain!*



## We are here to help YOU!



**Gary Williams**



**Tammy Edens**