

Global Warming Initiatives
"Helping Companies Reduce Greenhouse Gases."

The Green PDF : Reducing Greenhouse Gas Emissions One Ream at a Time

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Topics

Important World Facts

The Carbon Cycle, Trees, Paper

The Paper Making Process

The Paper Industry and the Environment

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Important World Facts



- There are over 6.5 billion people living on planet Earth.
- Of these people, 4.2 billion are considered to be the world's labor force.

Important World Facts

- Almost 30% of the world is either unemployed or underemployed.
- Nearly 40% of the world's labor force works in agriculture, skilled trades, or manufacturing.
- This means that roughly one billion people attend work in a office environment each day.



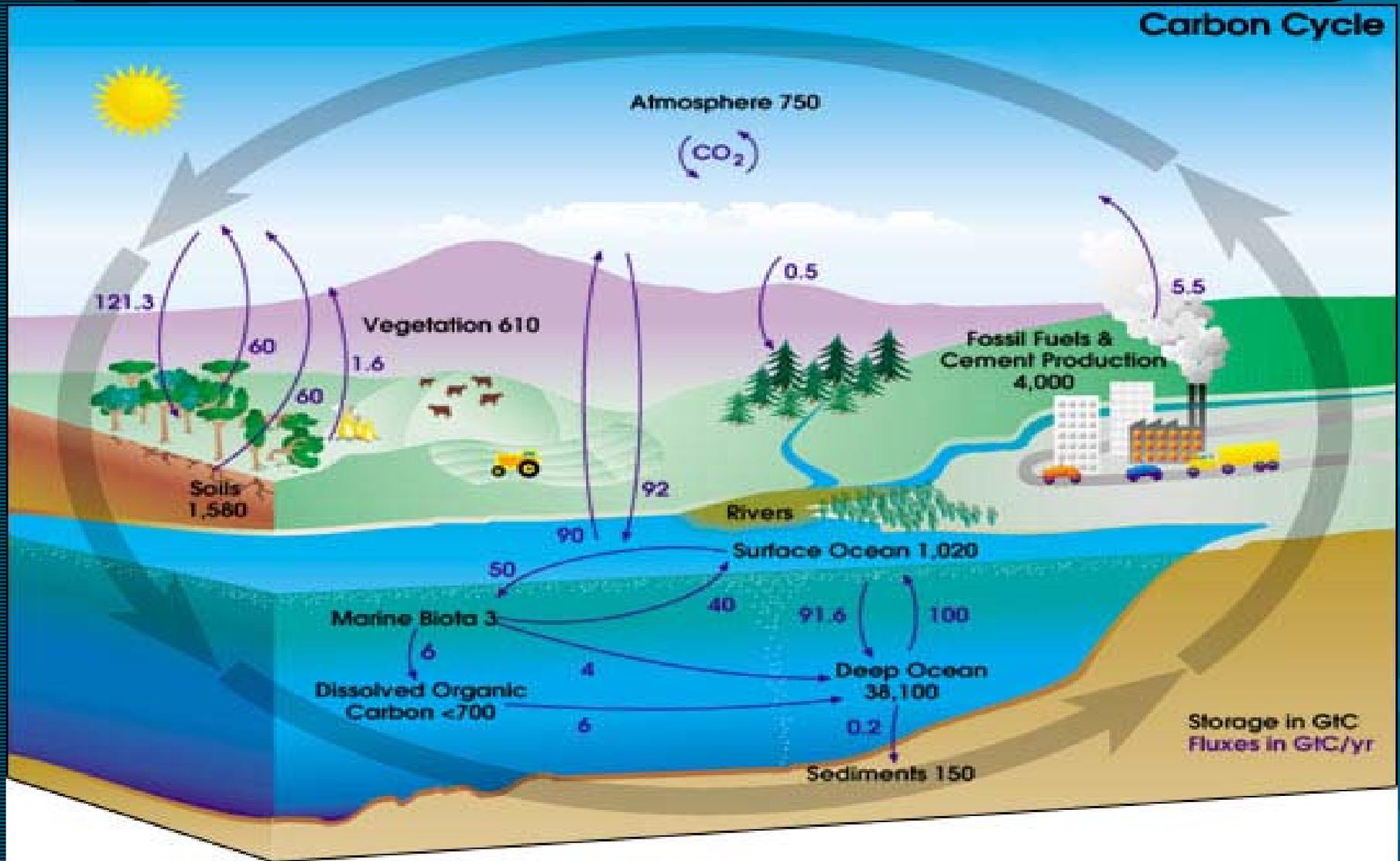
Important World Facts

- The world average paper consumption per person is an estimated 123 pounds of paper each year.
- Approximately 28% of this average paper consumption is used in printing documents.
- Since a ream of paper weighs about 5 pounds, the average world office employee uses around 7 reams of copy or printing paper each year.

Important World Facts

- Every year, more than 1.1 billion trees are cut down in order to satisfy the needs of office workers around the world.
- The world's paper consumption has reached 350 million metric tons per year.
- Within the last fifteen years, the paper consumption has increased almost 3% per year, due for the most part to the increased accessibility of printers.
- In the future paper consumption is still estimated to grow more than 2% annually.

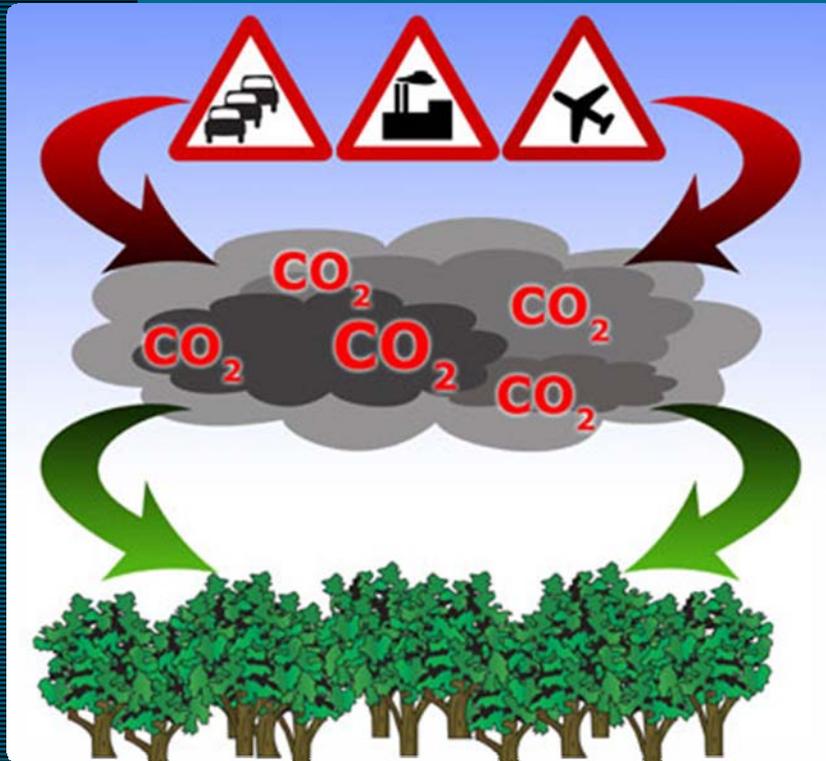
The Carbon Cycle, Trees, and Paper



The Carbon Cycle, Trees, and Paper

- The “carbon cycle” is the biogeochemical cycle by which carbon is exchanged between the biosphere, geosphere, hydrosphere, and atmosphere of the Earth.
- The cycle is usually thought of as four major reservoirs of carbon interconnected by pathways of exchange.
- The reservoirs are the atmosphere, the terrestrial biosphere, the oceans, and the sediments, which include fossil fuels.

The Carbon Cycle, Trees, and Paper

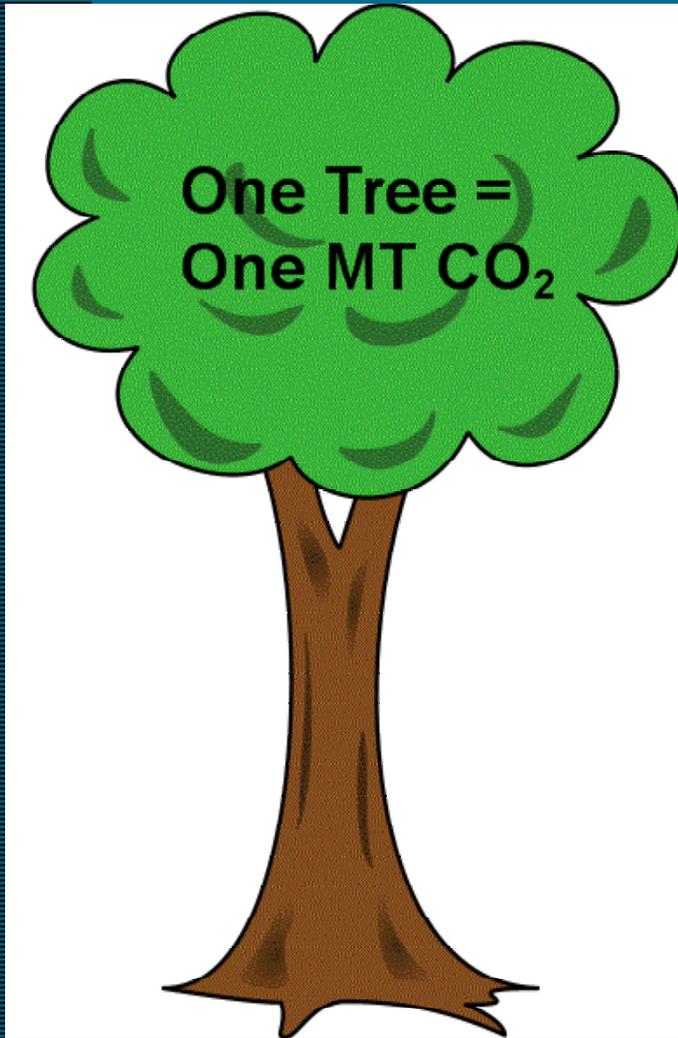


- Through the process of photosynthesis, trees remove 100 to 120 billion tons of carbon each year.
- Trees help to remove carbon dioxide from man-made sources (i.e. automobiles, manufacturing, airplanes, etc.)

The Carbon Cycle, Trees, and Paper

- The most important waste product of photosynthesis is oxygen.
- Oxygen is ubiquitous for life on earth. Molecular oxygen is diatomic (O-O) existing as a gas and is what sustains most life on earth.
- Chemical oxygen is found incorporated in pretty much everything else such as metal oxides, minerals, proteins, water, etc.
- Therefore, oxygen is fundamental to life on this planet.

The Carbon Cycle, Trees, and Paper



- Each tree used in making paper removes about one metric ton of carbon dioxide from the atmosphere every year.
- When a tree is cut down, the Earth loses a “carbon sink.”

The Carbon Cycle, Trees, and Paper

- Each tree on average produces 173 reams of paper.
- Therefore, each ream of paper is the equal to roughly 12 pounds of carbon dioxide not removed from the atmosphere.

A stack of crumpled paper is shown in a 3D perspective. Overlaid on the paper is the text: "One Ream = 12 pounds CO₂ Not Removed from Atmosphere".

**One Ream = 12
pounds CO₂
Not Removed
from
Atmosphere**

The Carbon Cycle, Trees, and Paper

- Trees also hold in groundwater. Significant logging can lead to desertification.
- Trees alter the environment in which we live by moderating climate, improving air quality, conserving water, and harboring wildlife.
- Tropical forest environments serve as the home for nearly half of all species that inhabit the Earth.
- Trees are also aesthetically pleasing and forest environments an important source of recreation.

The Carbon Cycle, Trees, and Paper



- The economic benefits of trees can be both direct and indirect.
- Direct economic benefits are usually associated with energy costs.
- Air-conditioning costs are lower in a tree-shaded home.
- Heating costs are reduced when a home has a windbreak.

The Carbon Cycle, Trees, and Paper

- The indirect economic benefits of trees are even greater.
- When customers use less energy, power companies are able to use less water in their cooling towers, build fewer new facilities to meet peak demands, and use reduced amounts of fossil fuel in their furnaces.
- The most important indirect benefit is that less energy use means less carbon dioxide emissions.

The Paper Making Process



- There are 12 major steps in the paper making process.
- Step 1 – Take trees from forest and transport them to the paper mill.
- Carbon dioxide emitted during logging and transport due to use of petrochemical, i.e. diesel or gasoline.

The Paper Making Process

- Step 2 – Cut logs into desired length.
- Carbon dioxide emitted offsite through coal used to generate electricity.



The Paper Making Process



- Step 3 – Strip bark from logs.
- Carbon dioxide emitted offsite through coal used to generate electricity.

The Paper Making Process

- Step 4 - Grind wood into large chunks.
- Step 5 – Chip wood into smaller sizes, about one inch cubed.
- Carbon dioxide emitted offsite through coal used to generate electricity.



The Paper Making Process

- Step 6 – Inspect the chips to ensure they are correct size, also known as chip screening.
- Carbon dioxide emitted offsite through use of electricity.



The Paper Making Process

- Step 7 – In chemical pulping, wood is cooked in a “digester” at elevated pressure with a solution of the appropriate chemicals which dissolve the lignin and leave behind the cellulose.
- The cooking process results in emissions of a variety of hazardous air pollutants including formaldehyde, methanol, acetaldehyde, and methyl ethyl ketone.
- Carbon dioxide also emitted onsite though use of natural gas, propane, coal, or fuel oil.

The Paper Making Process

- Step 8 – Wash the cooked wood chips, which are now in pulp form.
- Step 9 – Screen the pulp to ensure uniformity.
- Step 10 – Bleach the pulp, which usually includes using chlorine and various other hazardous chemicals.
- These processes involve both on and off site carbon emissions.

The Paper Making Process

- Step 11 – Beat the pulp until desired consistency is reached.
- Heavy use of water.
- Carbon dioxide emitted on and off site through either petrochemicals or electricity.



The Paper Making Process



- Step 12 – Drying the paper and then rolling it into easily moveable rolls.
- Natural gas used in drying. Electricity used in mechanical processes.
- This is the most energy intensive process.

The Paper Industry and the Environment

- In 2004, the world paper industry produced 359 million tons of paper.
- Considering the U.S. paper industry emitted around 17.2 million metric tons of carbon dioxide to produce 83 million tons, we can infer that the world paper industry emits over 74 million metric tons of carbon dioxide each year.

The Paper Industry and the Environment

- Since 28% of paper produced is copy or print paper, then we can infer that the 7 billion reams of paper used each year are responsible for 20 millions metric tons of carbon dioxide released into the atmosphere.
- This is the equivalent of about 6.5 pounds of carbon dioxide per ream during the industrial process.



The Paper Industry and the Environment

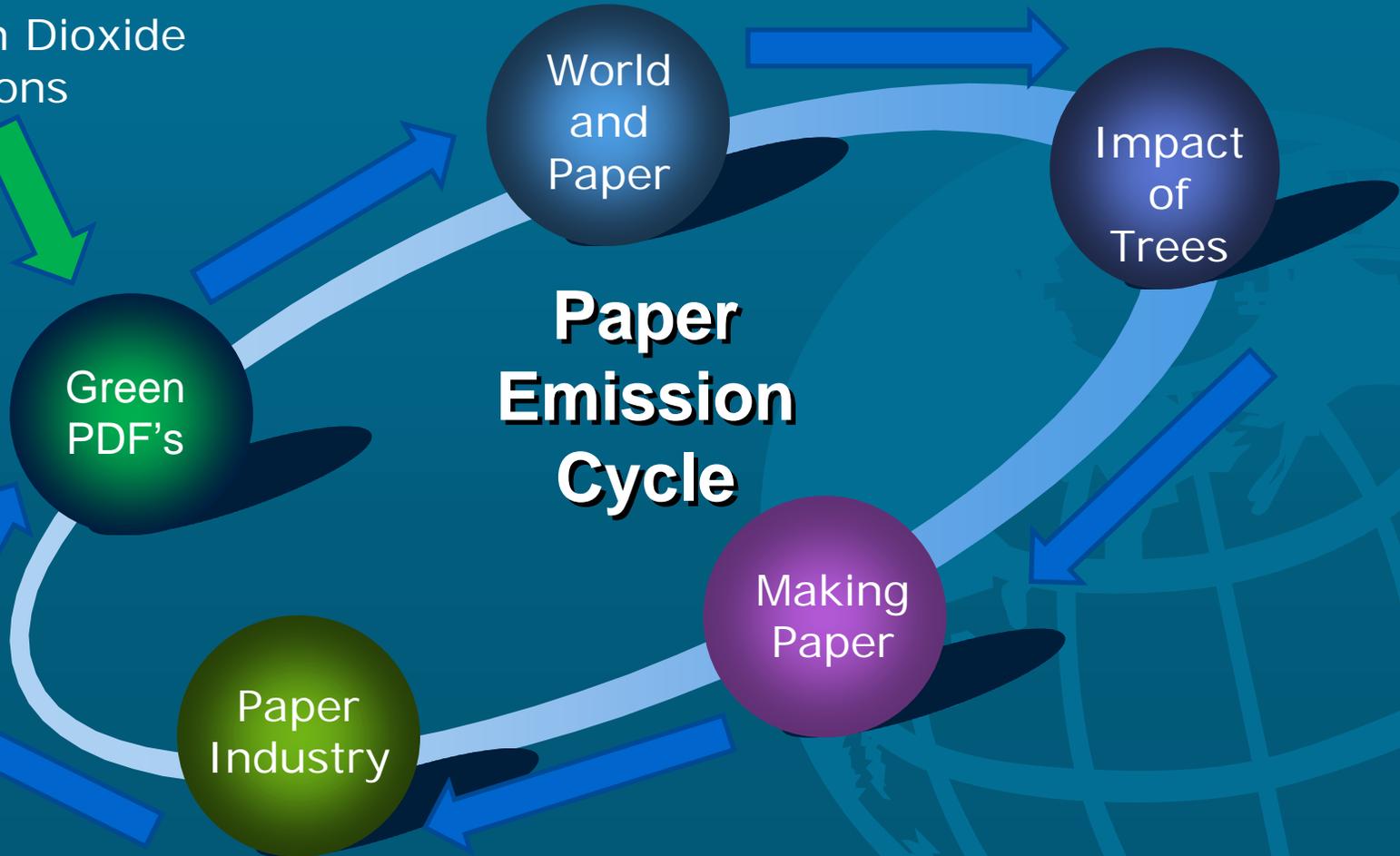
- This pulp and paper industry represents around 10% of all global emissions.
- The pulp and paper industry is also expected to increase paper production by 2 % per year for the next 5 years.
- This does not include the emissions from the logging industry, the shipping industry, or simply the consumer's car on the way to the store to purchase paper.

The Paper Industry and the Environment

- The pulp and paper industry in the world uses more than 23.5 billion kilowatt hours (kWh) of electricity each year.
- Energy consumption by the pulp and paper industry is projected at 25.8 billion kWh of electricity and 54.3 billion BTU's of fossil fuels in 2010.
- This will increase carbon dioxide emissions from the pulp and paper industry to over 80 million metric tons of carbon dioxide per year.

Paper and Carbon Dioxide Emissions

You Can Reduce
Carbon Dioxide
Emissions



Adobe Statistics

- Adobe has distributed over 525 million copies of Adobe Reader in the last two years.
- Adobe Reader and Adobe Flash Player are installed on over 700 million connected PC's and devices worldwide.
- There are more than 200 million PDF documents on the web today.

Green PDF's and Reducing Emissions

- A Green PDF is a PDF that is circulated electronically and not printed.
- Each ream of paper not printed due to Green PDF's equals 18.5 less pounds of carbon dioxide in the atmosphere.
- It takes only 173 reams of paper not printed of Green PDF's to save a tree and lessen atmospheric carbon dioxide levels by more than 2 metric tons.
- In America, 173 reams of paper are used about every 5 seconds.

Green PDF's and Reducing Emissions

- If all 700 million users of Adobe Reader decided not to print just one 10-page PDF each year, there would be three environmental effects.
- **ONE:** Less waste due to fourteen million reams of copy or print paper not used.
- **TWO:** 80,000 trees would not be cut down annually.
- **THREE:** 118,000 less tons of carbon dioxide in the atmosphere.

Green PDF's and Reducing Emissions

- Green PDF's also save money in several different areas.
- Considering the average cost of a ream of copy or print paper is around \$5.00, reducing printing worldwide by just 10% would save companies \$3.5 billion dollars
- General Electric estimates an up to \$10 billion cost reduction in the coming years through digitizing many of its processes.

Green PDF's and Reducing Emissions

- There are also several hidden costs associated with using paper. They include:
- Printer and Copier maintenance and breakdown;
- Storage - To store 2 million paper documents, an organization can expect to spend between \$40,000 and \$60,000 on filing cabinets alone, whereas this data could be stored electronically and circulated as Green PDF's;
- Lost documents postage;
- Document obsolescence;
- Labor inefficiency.

What You Can Do

- Support the Green PDF Initiative.
- You will be helping to reduce greenhouse gas emissions by cutting back worldwide office paper consumption.
- You will also be helping to provide research into the best ways to help companies reduce their emissions.
- Through your efforts, together we can save countless trees each year.

What You Can Do

- Use programs like Adobe Acrobat to combine multiple files from multiple sources, i.e. Microsoft Word, Excel, PowerPoint and countless others.
- Circulate these documents with the request that they are not to be printed and are considered a Green PDF.
- Suggest a company initiative to reduce paper use by a certain goal through the use of Green PDF's, for instance 10%.
- Reduce paper use in your office by switching to electronic forms and reports.

Conclusions

- Trees are perhaps the most important natural resource, providing life giving oxygen and reducing carbon dioxide levels in the atmosphere by more than 100 billion tons each year.
- The pulp and paper industry represents 10% of all global greenhouse gas emissions and uses more water than any other industry.

Conclusions

- When you make a PDF and declare it a “**Green PDF**,” you help to reduce carbon dioxide in the atmosphere.
- After just one ream not printed due to Green PDF’s, you have reduced carbon dioxide levels by 18.5 pounds and saved your company \$5.00.
- Reducing worldwide paper usage by 10% would save over 100 million trees, 100 million metric tons of carbon dioxide in the atmosphere, and a staggering \$3.5 billion in paper costs.

Conclusions

- So next time you make a PDF, make it a **Green PDF**, and do your bit for a better, cleaner, greener Earth.

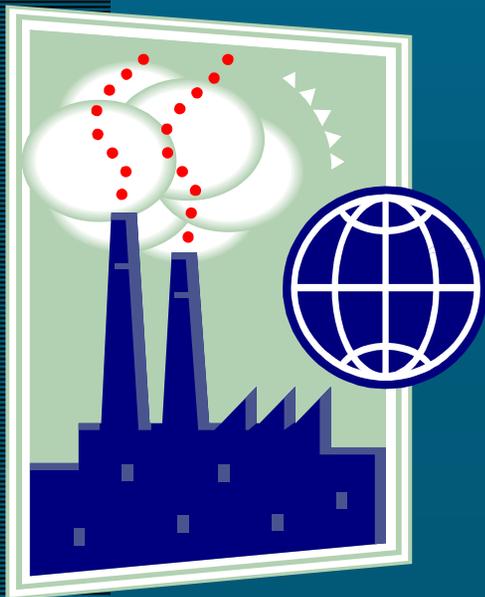
Thank you

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Conclusions

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