

# Sustainability 101

GSA, Northwest/Arctic Region  
Facilities Green Team Program

## What is Sustainability?

In the context of the *human* environment...

*...the ability of the present generation to provide for themselves without compromising the ability of future generations to meet their own needs.*

This is an often used statement from the U.N. Report on Sustainability aka the “Bruntland Report.” This is an industry agreed upon definition.

Sustainability touches every aspect of our lives – not just buildings. In general terms, sustainability is about preserving our “natural capital” so that each subsequent generation has equal access to resources and opportunity that previous generations have had.

There is a tendency in the U.S. to limit the discussion of sustainability to energy, water, buildings, and natural resources – and then tie it all together with the economy. There is seldom much attention given to the social equity component of sustainability. The Bruntland Report, on the other hand, includes the social conditions of all people as a key component of reaching a truer state of sustainability.

## What is Sustainability?

- CONGRESSIONAL DECLARATION OF NATIONAL ENVIRONMENTAL POLICY

*“...to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations.”*

*EO 13514*

*NEPA Declaration of National Environmental Policy - 1969*

A definition for the term Sustainability is implied in the National Environmental Policy Act (NEPA). This same text is also used in both EOs 13423 (Bush) and 13514 (Obama) to formally define Sustainability.

The National Environmental Policy Act was one of the first laws ever written that establishes the broad national framework for protecting our environment.

NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

<http://ceq.hss.doe.gov/nepa/regs/nepa/nepaeqia.htm>

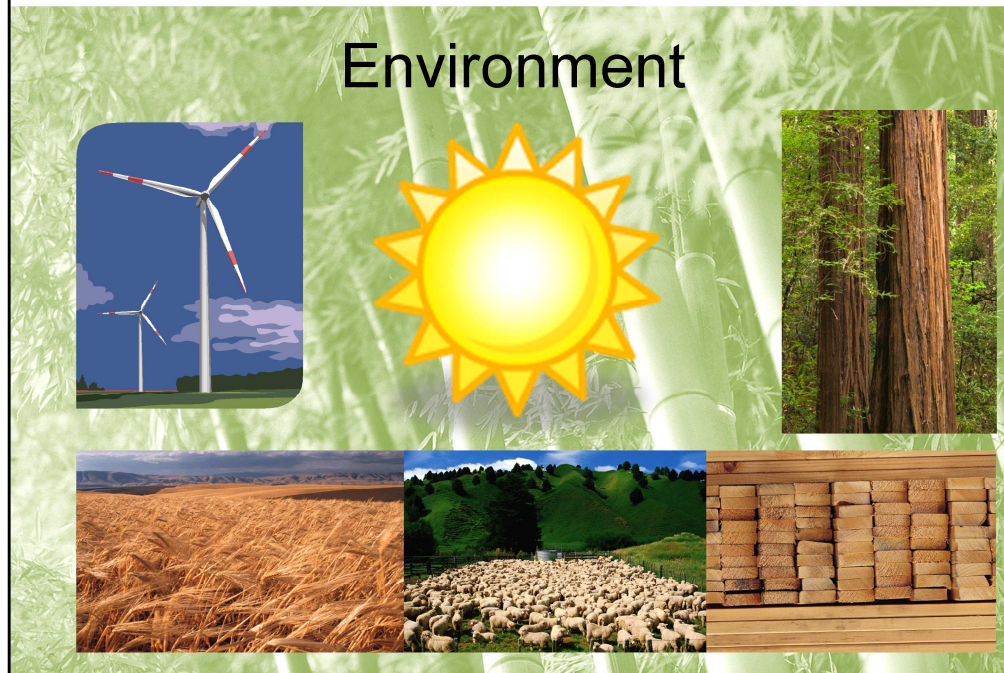
## The “Triple Bottom Line”



From GSA's  
*New Sustainable Frontier*

Many people are familiar with this concept of the “Triple Bottom Line” (TBL). It is a useful place to begin the sustainability conversation.

This visual has been used as a tool to describe the interrelationships between our environment, economy and society (social justice) – thus defining what it means to be sustainable. When each of these components is in balance with one another, we are able to move toward a more sustainable condition. When they aren't in equilibrium, we move further from a sustainable state. For example, when attention and resources are focused on the environment and the economy, but not in the area of social justice, sustainability is not possible. This idea of sustainability uses the “3-legged stool” metaphor to illustrate the importance of keeping everything in balance. If any leg of the stool is longer or shorter than the others, the more difficult it is to achieve sustainability.



The “Environment” leg of the stool addresses the natural resources and essential services that provide us with most of what we need to live. The environment provides food and shelter, along with fresh air, clean water, and clean energy.

The environment also absorbs our waste. In nature, our waste often becomes food for other living organisms (in nature, there is no such thing as waste).



Historically, the world's economies have their roots in the manufacturing and cultivation of products made or grown from resources found in the environment. When the world's population was less than what it is now, the ratio of people to products was very small. The environment, was able to continually provide raw materials for a new industrial economy. However, when we use materials faster than nature can replenish them, there is imbalance.

## Society



The “Society” leg of the three-legged stool is a bit more difficult to define. It’s something that affects all people on the planet, but can vary widely depending on what part of the world we’re talking about.

In general, though, it’s about the wellbeing of individuals, communities, and the work environment.

Communities are holding more farmers markets and promoting the local growing and selling of produce.

In the developing world, there is concern about working conditions including exposure to toxic chemicals and fair compensation for a day’s work. Fair trade certifications validate whether a company is exploiting workers or treating them fairly. While many products imported to the U.S. are less expensive, some of them take a toll on the health of people in the developing countries where these products originate.

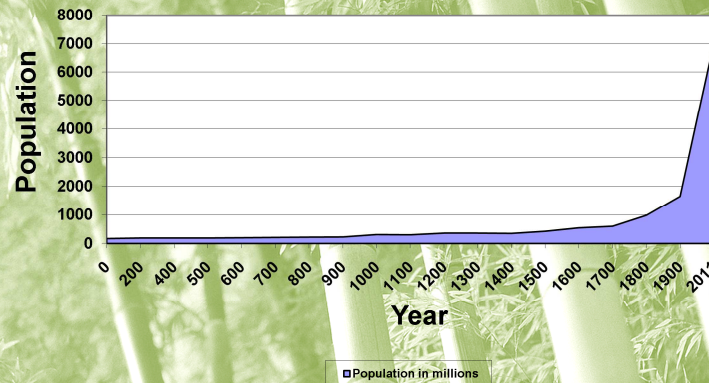


So is our triple bottom line in balance?



# Population Growth

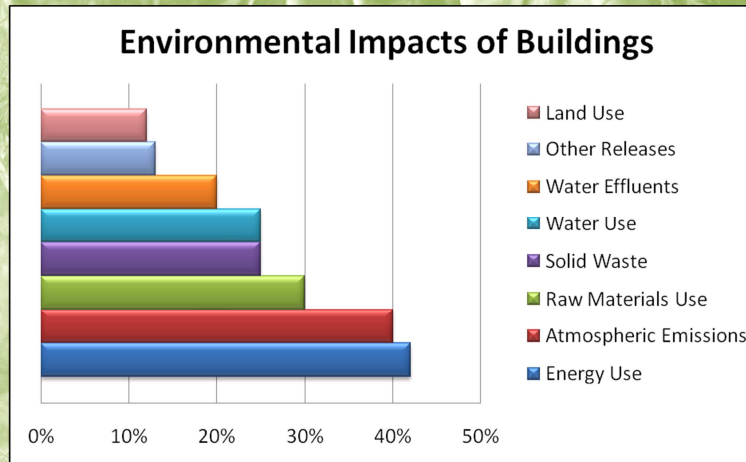
World Population Growth  
from year 0 to 2011



The exponential growth in the world's population has been prolific because of our ability to develop technology and apply it to growing food, improving health care, and creating wealth. However, today is the first time in the history of man that our ability to sustain healthy and prosperous societies has come up against the physical limits of growth.

As more people in the developing world aspire to live like those in the industrialized world, the demand for resources, products, healthcare and more, puts an ever-increasing stress on our ability to sustain a high standard of living for everyone.

## Environmental Impacts from Building Construction & Operations



This chart represents the relative impacts that buildings have on the environment. In the U.S., buildings (both commercial and residential combined) are responsible for over 40% our energy consumption. That's more energy than from either the transportation or industrial sectors. 25% of this country's solid waste is associated with building use and operations.

Data from Whole Building Design Guide. [www.wbdg.org](http://www.wbdg.org)

## Finite Resources



Natural resources provide us our comfortable planet.

We know that fish, trees, plants, and minerals such as oil and coal are being depleted at a rate faster than the planet can replenish them.

By some estimates, we would need the resources from over 5 planet earths if everyone were to live the way we do in the in U.S.

For energy alone, the U.S. uses 25% of the world's energy's resources, but we make up only 4.5% of the total world population.

## Environmental Degradation

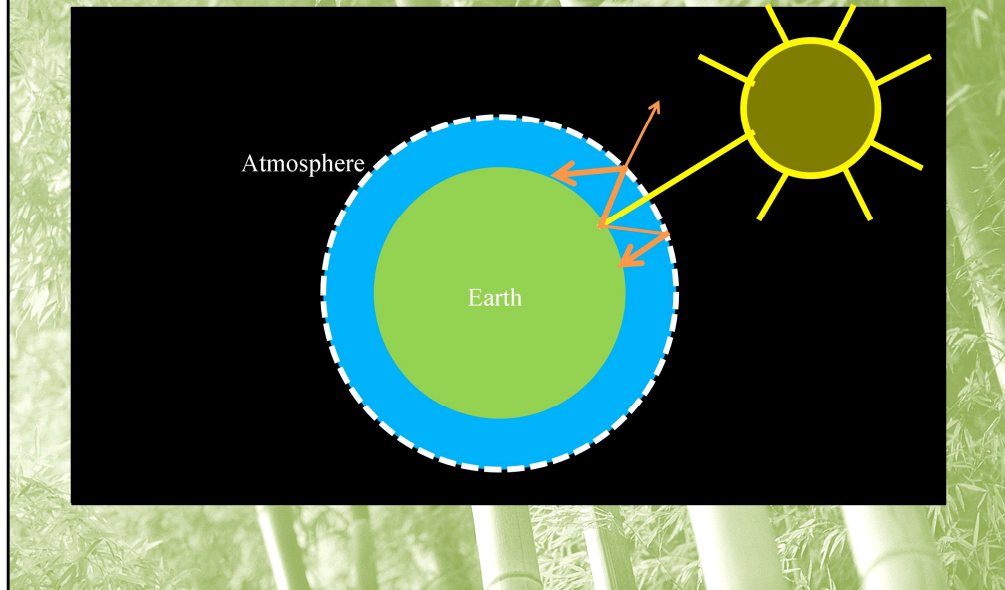


In our quest to increase our standard of living, accumulate wealth, and to meet the needs of an increasing global population, there has been a toll taken on the environment.

Clockwise from top left:

- Discharge from industrial facilities pollute waterways all over the world.
- The clear-cutting of forests causes silt and pollution problems. Eroding topsoil adversely affects fish spawning grounds and water quality. Clear-cutting also destroys wildlife habitat and reduces a forest's ability to sequester carbon dioxide.
- Emissions from burning fossil fuels pollute the air, resulting in increased health problems, acid rain (killing aquatic life in the process), increased mercury in the atmosphere, and more.
- Garbage in a river in China
- Dead birds as a result of an oil spill
- Burning surface oil from the BP oil spill in the Gulf of Mexico
- Soil erosion repair project
- The results of what happened to a turtle's growth after getting stuck in a plastic ring

## Greenhouse Gas Emissions



When we extract fossil (non-renewable) fuels and burn them to create energy to heat, cool, and light our buildings, the carbon dioxide (CO<sub>2</sub>) generated from burning these fossil fuels is emitted into the atmosphere where it stays for hundreds of years. The added CO<sub>2</sub> has no effect on incoming solar radiation that heats the planet, but makes it more difficult for lower level energy radiated from the earth to escape back into space. The result is a heating of the planet. Or what by now, most of us have heard the terms *climate change*, *global warming*, or the *greenhouse effect*.

Since the construction and operation of buildings are responsible for 42% of the energy used in this country, most of which is non-renewable (fossil fuels), buildings have a direct link to the amount of carbon dioxide emitted into the atmosphere that is causing the increase in temperatures and the Greenhouse Effect.



We have defined sustainability and we've suggested that our triple bottom is out of balance.

You may be wondering then, so what does this mean to me? What do I really have control or influence over in terms of sustainability? Isn't this bigger than me?

## Sustainability at Home

- Reduce discretionary driving
- Thermostat settings
- Buy local



You may notice the changes you can make first at home.

Vehicle use creates pollution, costs money both personally and for road construction/maintenance, creates greenhouse gas emissions, and increases dependence on foreign oil.

Thermostat settings – Adjusting thermostat settings while away from the house can save energy and money. When at home, expand the “comfort zone” by lowering heat settings and raising air-conditioning settings. Dress appropriately for better comfort.

Buy local – This reduces energy costs for transporting food and products; supports local businesses, which keeps more money in the local communities.

## Sustainability at Home

- Use compact fluorescent bulbs
- Recycle
- Buy “used” instead of new
- Native plant species for landscaping



Use compact fluorescent bulbs – CFLs use less energy and last longer than incandescent bulbs.

Recycle – This reduces waste going to landfills and provides resources for the manufacturing of new products.

Buy “used” instead of new – This reduces all of the environmental impacts associated with the manufacturing of new products including: material extraction, energy for manufacturing and shipping, and waste disposal.

Native plant species for landscaping – Native plants don’t require any extra water once established and provide habitat for local creatures (birds, insects, and other organisms).



## Sustainability on the way to Work

- Automobile, bus, train, tele-work
- Miles traveled (choosing where to live)
- Greenhouse gases generated – per person



Let's not just think driving to work in a car.

There's the bus, train, even telework – Most options that replace the “single-occupancy” commute vehicle will result in reduced energy use. This can also reduce stress levels.

Miles traveled (choosing where to live) – When looking for a place to live, consider how far it is to the workplace, shopping, and amenities.

The more people in the car, the better. Four people that rideshare generate one quarter the amount of greenhouse gas emissions per person than if everyone drove alone.

How fast do you drive? – Driving 75 mph instead of 60 mph can reduce your gas mileage by approximately 23%.

Federal agencies often have access to transportation subsidies for use of mass transit.

And of course the money saved in other choices beyond the single car, single driver.

## Sustainability in the Office

- Use of space
- Daylighting and Views
- Plug loads



Here's where we're getting to the role Green Teams play in terms of influencing culture and behaviors of building occupants.

Use of the workspace— Creating ways to make better use of the space we already have, instead of acquiring or building new space. Increasing the number of people per square foot of space also decreases the amount of energy used per person, per square foot of space. Use of space also includes consideration for mobile work, creating collaborative work areas, and moving from paper document storage to digital storage.

Daylighting and Views – Studies have shown that employees are healthier, more productive, and happier when they have a visual connection to the outdoors and natural lighting is employed.

Daylighting – the use of natural light instead of artificial lighting reduces energy use.

Plug loads – Plug loads account for energy use by computers, printers, copiers, appliances, cell phone chargers, task lights, and any other electrical device used in the office. **Plug loads are something that we have more control over.** We can also buy green products - Energy Star appliances as they can help minimize plug loads.

## Sustainability in the Office

- Electronic files vs. paper
- Heating and cooling
- Task lighting



Electronic files vs. paper – of course to be more efficient, but also about to save more office space.

Heating and cooling – again whenever possible, thermostats should be adjusted to save energy. Wearing appropriate clothes (in layers) increases one's ability to be comfortable from season to season while allowing for thermostat settings to cover a wider range of temperatures.

Task lighting – It takes far less energy to illuminate a work surface with a light source that is 1.5 feet away, than it is with a light that is 4-5 feet away. That's the difference between using a task light (close to the work), vs. the general office lighting. Using task lighting can contribute to reduced energy use.

Implementing any or all of these ideas are just the tip of the iceberg so speak about what can be done in our workspace.

## What is the Federal Government Doing?

- Executive Order 13514
  - Agency Strategic Sustainability Performance Plans
  - Greenhouse gas reduction targets
  - Reduce energy, water, and waste
  - Sustainable Acquisition



As mentioned earlier with NEPA, and other Federal laws and regulations that support sustainability, there is President Obama's EO 13514, which requires over 50 agencies in the Executive Branch to adopt targets for greenhouse gas reductions.

In addition, the EO order also requires each agency to develop a Strategic Sustainability Performance Plan (SSPP).

While goals for each agency may be different, all agencies are required to reduce ghgs, energy, water, and increase waste diversion and green purchasing.



## Sustainability Makes Good Business Sense

- Using less energy means financial resources can be reinvested back into businesses
- “Green” buildings enhance worker productivity, reduce absenteeism, and increase health and well-being
- Using recycled and renewable materials provides a more stable resource base

So even if you're not inclined to agree with climate change, etc. What we're talking about in terms of changes for the way we live and work, just plain makes good business sense. Who doesn't want to save money and resources? That impacts the bottom line.

### Example

The experience of an auto plant in Indiana helps illustrate how re-engineering processes with green principles and greater efficiency in mind can not only improve a company's standing with nature, but increase its profits and give it competitive advantages as well.

Subaru of Indiana Automotive Inc., a factory of more than 3,000 workers who make roughly 800 automobiles a day, has pursued green initiatives since its launch 20 years ago in Lafayette, Ind., by Japan's Fuji Heavy Industries Ltd. With employees at every level of the plant looking for ways to save energy, reduce waste and generally make processes more efficient, one measure of its success is a 14% reduction in electricity consumption on a per-car basis since 2000. **An even bigger achievement: It has not shipped any waste to a landfill since May 2004.**

The preceding text was retrieved on 2/25/2011 from <http://online.wsj.com/article/SB123739309941072501.html>

## Sustainability Supports National Security



- Reducing overall energy use reduces dependency on foreign oil
- Social, economic, and environmental sustainability in the developing world increase chances for more stable states
- The Dept of Defense has identified global climate change as one of the largest threats to our national security

In 2007, the Energy Independence and Security Act (EISA) was passed – acknowledging the connection between energy use and our nation’s security.

Instability in the mideast & north Africa - and as well all know - increasing gas prices.

Climate Change Impacts National Security - DoD works cooperatively with foreign militaries to promote regional stability and integrate environmental goals into defense operations.

The preceding text was retrieved on 2/25/2011 from <http://www.p2pays.org/ref/21/20958.htm>

## The Future



- An environmental footprint that considers future generations
- Waste as a resource
- A world that balances the interests of society, the economy and the environment

So in closing, ask what can I do differently to positively influence sustainability in my work and personal life?



[www.gsa.gov/r10greenteams](http://www.gsa.gov/r10greenteams)