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# The New Sustainable Frontier

## PRINCIPLES OF SUSTAINABLE DEVELOPMENT

September 2009





*"South San Francisco Bay, California." Photo Credit: Jonathan Herz*

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# The New Sustainable Frontier

## PRINCIPLES OF SUSTAINABLE DEVELOPMENT

U.S. General Services Administration  
Office of Governmentwide Policy  
Office of Real Property Management

September 2009

# acknowledgements

“The New Sustainable Frontier” is a publication of the Office of Governmentwide Policy’s (OGP) Office of Real Property Management of the U.S. General Services Administration (GSA), Washington, DC. OGP is led by Associate Administrator Michael J. Robertson, and Principal Deputy Associate Administrator Stanley F. Kaczmarczyk.

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The following contributors from the private sector, the Federal Government and the academic community, helped make this publication possible:

Ray Anderson, Interface, Inc.; Corey Buffo, District of Columbia Department of the Environment; Lynn Desautels, U.S. Environmental Protection Agency (US EPA); Matthew Gray, U.S. Department of Energy; James E. Hartzfeld, InterfaceRAISE; Haydee Iglesias, OGP; Alison Kinn-Bennett, US EPA; Steven C. Hill, PhD; Crystall Merlino, U.S. Department of Defense; Richard Ornburn, OGP; Richard Paradis, Sustainable Buildings Industry Council; Christopher T. Payne, Lawrence Berkeley National Laboratory.

Appendices were prepared by the HOK Team: Alesia Call, Todd Pedersen; the University of Maryland Team: Laurel Ball, Matthias Ruth; and Jonathan Herz, GSA. Graphic Design provided by Kerry Aucamp, HOK.

Our mission in GSA is to develop, promote, and assess conformance with management policies and regulations for the effective and efficient stewardship of Federal real property assets and alternative workplaces. OGP is a governmentwide leader in asset management, best practices, inventory reporting, legislative reform, performance measurement, sustainability, and telework/alternative work arrangements.

For more information about the Office of Real Property Management and sustainable development, visit our websites: [www.gsa.gov/realpropertypolicy](http://www.gsa.gov/realpropertypolicy) and [www.gsa.gov/sustainabledevelopment](http://www.gsa.gov/sustainabledevelopment).



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# foreword

By Ray C. Anderson

I once heard a state environmental official quip, “The solution to pollution is dilution.” The pithiness of the statement was quite catchy, but the substance was dead wrong. It reflected a fundamentally flawed mindset that has plagued humankind for as long as our kind has been aware of our place in the universe: We act as if the earth were infinite, not only as a sink to assimilate our waste and pollution, but as a source to supply all our wants, not needs, wants.

Environmental protection has evolved a lot since that misguided official made that unfortunate statement. Given a finite Earth, we know that the solution to pollution is prevention; and sustainability is about a lot more than just pollution prevention.

But, to press the point further: It should be clear to any thoughtful person that a finite Earth cannot support the current take-make-waste industrial system indefinitely. Digging up the earth for materials and energy to produce products with limited life spans and then relegating them to landfills and incinerators (read pollution) perforce cannot go on and on and on. Relying on “the market” to continually find substitutes ultimately is a fool’s dream, because there is just so much of anything on a finite Earth.

Further, when we hear commonly used definitions of sustainability that incorporate the notion of leaving enough to meet the needs of future generations, we should always ask, “Just how many generations is that?” Because the answer is, “All future generations – as long as homo sapiens walk the face of the earth.” Barring calamity, natural or man-made, that could be a very long time.

So, here is the challenge and opportunity facing humankind: How to live sustainably as a species on a finite Earth into the indefinite future. Which brings us to this document.

The GSA Office of Governmentwide Policy has advanced the Federal Government’s position on environmental sustainability in a most remarkable way with this revised GSA Sustainable Development Guide. It raises the bar. It sets the stage for a new, higher level of awareness and intensity in the Government’s taking responsibility for its own actions and its role as leader, setting the right example for all of society and using its purchasing power to further sustainability.

As a grandfather, soon to be a great grandfather, I say, “Thank you and well done,” to GSA’s leadership.

Ray C. Anderson founded Interface in 1973 and served as Chairman and Chief Executive Officer until his retirement in 2001. He now chairs the Executive Committee of the Board. He and his company are working to eliminate any negative impact they may have on the environment by redesigning processes and products and pioneering new technologies. The company is also making a concerted effort to reduce or eliminate waste and harmful emissions while increasing the use of renewable materials and sources of energy. Mr. Anderson was appointed by President Clinton to the President’s Council on Sustainable Development where he served as Co-Chair. In 1999, he published a book, “Mid-Course Correction: Toward a Sustainable Enterprise -- The Interface Model,” about his conversion to sustainability. In 2007, he was named one of TIME magazine’s Heroes of the Environment, and received a similar honor from Elle Magazine that year.

“The recognition of the false is already the arising of the real.” Eckhart Tolle





# executive summary

## Our world is a closed system.

There is a finite quantity of energy and matter on the Earth, with fixed imports of energy (primarily sunlight), and minimal imports of matter. What we consume is taken from this closed system and, in one form or another, eventually returns to that system.<sup>1</sup> Flows of matter from the environment and back into it are what support all life and ecosystems on our planet.

Our current industrial economic system started in an era when the scale and efficiency of human activity was small, compared to the seemingly limitless bounty of nature. Countless decisions resulting from this “open” world mindset have improved the many lives, while causing vast negative, mostly unintended, consequences. Today, these decisions have resulted in an increasingly negative impact on nature and human well-being as the scale, inequity and inefficiency of our economy system have surpassed nature's limits.

To sustain life within the Earth's closed system, we need to restore, protect, and maintain the natural systems, services, and resources that make life possible, including clean air, clean water, and clean soil. The Government cannot do the job alone, but it can lead the way for others.

## Government operations must reflect closed system limitations.

Sustaining the Government's operations within the scale of the Earth's closed system requires applying the same principles that sustain our ecosystem. Unfortunately, many of our daily decisions reflect the same “open” world” assumptions that have contributed to depletion and toxification of natural resources and reductions in the planet's capacity to sustain our lives and those in nature. Sustainable operations are those that respect the constraints of the natural world and its physical laws, and use only those goods and services that, in their production, use and disposal allow all to live with respect and maintain the critical ecosystems that provide essential life support.

Today, the Government's operations are not sustainable. As the single largest consumer of goods and services in the United States, in 2008, the Government used almost as much energy as the nation of Hungary<sup>2</sup> - over 1,100 Trillion Btu.<sup>3</sup> Government operations generate tons of toxic and non-toxic wastes.





"Okefenokee Swamp Habitat."  
Photo Credit: Ryan Hagerty

## The Government's operations can be sustainable.

Government operations can be sustainable, but it will require a better understanding of where our goods, services and facilities came from - and where they are going when we are done with them.

The conceptual and legal mandate for sustainability, already in place in the Government's laws, Executive Orders and regulations, are best stated in the National Environmental Policy Act of 1969 (NEPA):

*"[It] is the continuing policy of the federal Government... to use all practicable means and measures... to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."*<sup>4</sup>

### *NEPA Declaration of National Environmental Policy*

Supporting that policy, existing U.S. Environmental Protection Agency (EPA) programs work to eliminate toxics, promote recycling, and identify life-cycle-cost-effective goods, services and building practices that protect human health and the environment. The EPA identifies energy efficient products, technologies and systems that reduce energy consumption and greenhouse gas generation.

The Department of Labor promotes economic well-being and just distribution through oversight of wage and working conditions, and the Small Business Administration helps promote advancement of small and historically disadvantaged businesses.

But while these and many other programs support progress towards the goal of sustainable government operations, existing economic decision-making models can sometimes undermine that progress. New tools, such as multi-criteria analysis and backcasting can help identify sustainability goals and the strategies needed to reach those goals. If the Government is to operate sustainably, existing policies, that work, need to be strengthened, and economic decision-making models need to be changed to reflect the realities of a closed world.

## It's time for a new paradigm.

Over the years, the Triple-Bottom-Line of "the simultaneous pursuit of economic prosperity, environmental quality and social equity"<sup>5</sup> has gained acceptance in the public and private sectors as the theoretical framework for sustainable decision-making. However, its operationalization has remained elusive.



Operationalizing sustainability requires a new paradigm based on the closed-world system concepts of sustainable scale, just distribution, and efficient allocation. Concepts that, when put into practice, restore, protect, and maintain the natural systems, services, and resources that make life possible on our planet.

This report is not a practical “how-to” guide, but an attempt to critically assess previous efforts to promote sustainable strategies, identify their possible shortcomings, and identify the principles that will lead towards sustainability. Once we understand the principles of sustainability, we can build on our day-to-day practices that support those principles, and revise those practices that do not.

Additional information on the principles and practice of sustainability, case studies, tools, and strategies, is available in the on-line appendices.

### **Achieving sustainability depends upon crossing a new frontier in government operations.**

To operate sustainably, the Government should use only those products and services that eliminate waste and toxics, while using materials that are recycled and recyclable, or sustainably renewable, and renewable sources of energy. We also need to be sure that those involved in the life cycle of those products and services can live with respect.

And, the Government's economic decision-making tools should be used in a manner that supports environmentally and socially responsible operations in programs and major acquisitions extending into the future.

If our goal is a sustainably operating government, we cannot rely solely on policies and regulations to get us there; we need to change the way we interact with our world. Fulfilling the Government's mandate to operate sustainably will require changing the way we function and setting the bar higher for those we do business with. Tools and policies must support sustainable government operations, so that we can make the most preferable environmental and social choice when purchasing goods and services. We must start today to make the world whole again.

Much work is needed if we are to meet the challenges before us and avert the worst consequences of our current practices.

“...we can no longer afford indifference to the suffering outside our borders, nor can we consume the world's resources without regard to effect. For the world has changed, and we must change with it.”<sup>6</sup>

President Barack Obama



# introduction

The 2000 “GSA Real Property Sustainable Development Guide” introduced federal agencies to the principles of sustainable development and explained how it was fundamental to effective government operations. A GSA workshop brought agency decision-makers together with public and private sector leaders in sustainability to explore new strategies and ideas. One of those leaders, the architect William McDonough, called for “a new revolution,” and challenged those present to:

- recognize our interdependence with nature and our responsibility to protect it, both locally and across the globe,
- link long-term sustainable considerations with ethical responsibility,
- eliminate the concept of waste by considering the full, life-cycle consequences of what we create or use, and
- understand the limitations of design, treating nature as a model, not as an inconvenience to be evaded or controlled.

Ray Anderson, of Interface, Inc., told us of his personal “journey to sustainability,” and of the need to reinvent commerce so that it restored the life-supporting natural systems needed to ensure future life on this planet. For many of those present, this workshop was a turning point in their thinking.

## Why do we need a new Guide?

Our original “GSA Real Property Sustainable Development Guide” looked primarily at the private sector and the idea that sustainable development meant “doing well by doing good,” with more effective business practices that evolved incrementally over time. It also helped to introduce the U.S. Green Building Council’s new LEED® Green Building Rating System.

Since then, scientific findings have increased public understanding and added a sense of urgency to the idea that sustainability is not just a better way to do business, but an absolute necessity if we are to maintain life on this planet. While the private sector’s voluntary, incremental improvements have resulted in relatively more efficient consumption; such a selective approach will not take us where we need to go unless the improvements also reflect the realities of our closed-world system.

We have also learned that new product and building rating systems are helping to transform the way we live and work, but none of them is truly sustainable.

## **The Government needs to lead the way, with new strategies that are based on achieving truly sustainable goals.**

This new Guide introduces you to new concepts, tools and strategies that have evolved over the past decade. It will help you to move beyond existing strategies, based on improving the status quo, to new strategies, based on achieving truly sustainable goals. In addition, it introduces decision-making models and concepts that acknowledge our closed-world system and the risk and uncertainty inherent in choices that will have consequences that span long-term horizons and large geographic areas.

And, it celebrates the Government’s fundamental role, which is to lead the way towards sustainability.

# what does a sustainable world look like?

Our previous guide introduced the idea of sustainability in terms of sustainable development, citing two popular definitions. The first, from the United Nation's 1987 "Report of the World Commission on Environment and Development," the "Brundtland Principles," linked environmental and social responsibility to development:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."<sup>7</sup>

The "Report" also recognized the importance of moving from unsustainable physical growth towards "a new era of economic growth," in which widespread poverty, prone to ecological and other catastrophes, is no longer inevitable.<sup>8</sup>

The second definition, from John Elkington's 1997 book, "Cannibals with Forks," promoted the idea that the traditional economic model needed to consider environmental and social factors on an equal basis:

*"Sustainable development involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Companies aiming for sustainability need to perform not against a single, financial bottom line, but against [this] triple bottom line."*<sup>9</sup>

Both the "Brundtland Principles" and the "Triple Bottom Line" have captured the imagination of those determined to make the world sustainable, but progress has been limited.



## Life in today's world is not sustainable.

*"Humanity's demand on the planet's living resources, its Ecological Footprint, now exceeds the planet's regenerative capacity by about 30 per cent [Figure 1]. This global overshoot is growing and, as a consequence, ecosystems are being run down and waste is accumulating in the air, land and water. The resulting deforestation, water shortages, declining biodiversity and climate change are putting the well-being and development of all nations at increasing risk. ...*

*In 1961, almost all countries in the world had more than enough capacity to meet their own demand; by 2005, the situation had changed radically, with many countries able to meet their needs only by importing resources from other nations and by using the global atmosphere as a dumping ground for carbon dioxide and other greenhouse gases. In an overexploited world, ecological debtor nations are particularly at risk from local and global overshoot, and from the associated decline in ecosystem services, the life support system on which humanity depends. If we continue with business as usual, by the early 2030s we will need two planets to keep up with humanity's demand for goods and services."*<sup>10</sup>

*The World Wide Fund for Nature, "Living Planet Report 2008"*

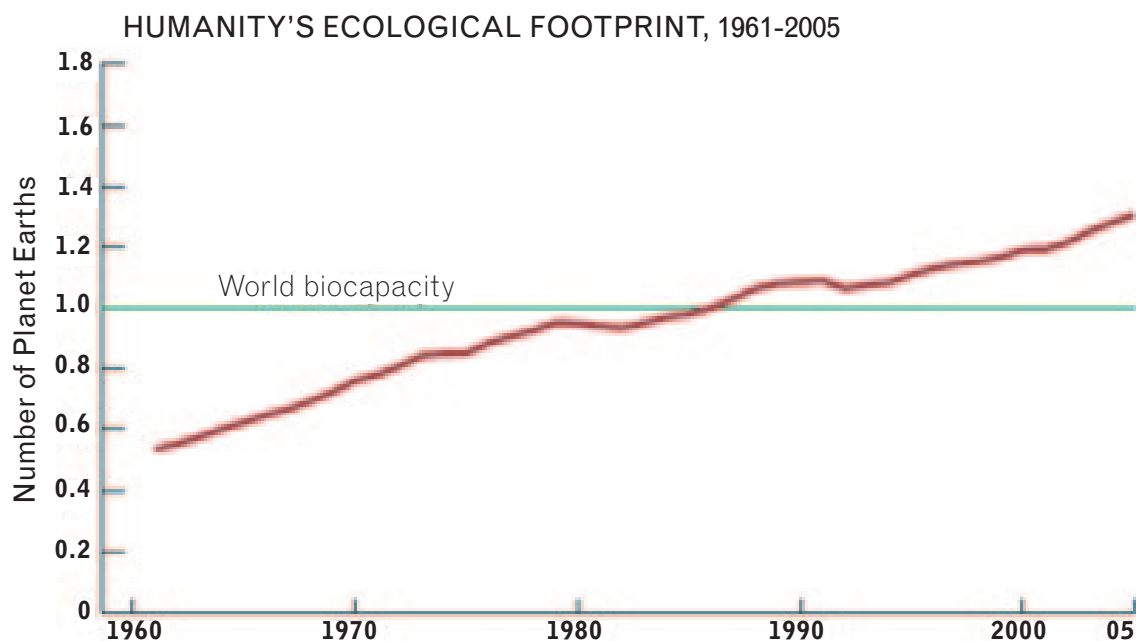


Figure 1 - Humanity's Ecological Footprint Now Exceeds the Earth's Regenerative Capacity (Source WWF)<sup>11</sup>



## Natural Resources

We are consuming renewable resources faster than they are regenerated, and are consuming non-renewable resources faster than they can be recycled or replaced by renewable substitutes, if any. These resources include the ecosystem services (for example, flood control by wetlands and sea grass beds and assimilation of air pollutants by forests and lakes) that provide essential life support.

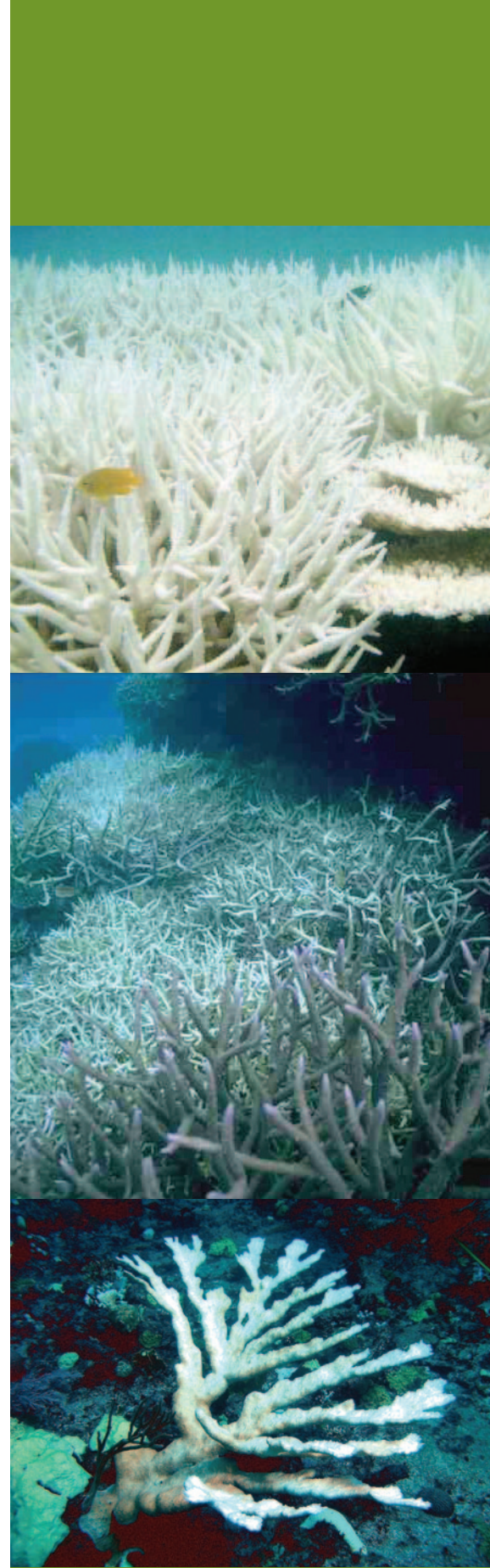
Today, on average, a person on Earth uses 2.3 hectares (5.7 acres) of biologically productive land to supply resources and absorb wastes, but only 1.9 hectares (4.7 acres) per person exists.<sup>12</sup> This means that we are consuming not just our natural “income,” (i.e., the services provided by nature) but also our “natural capital” (i.e., the natural assets themselves). This can lead to permanent degradation and loss of ecosystem services.

*“...driven by the relentless growth in human population and in individual consumption. Our global footprint now exceeds the world’s capacity to regenerate by about 30 per cent. If our demands on the planet continue at the same rate, by the mid-2030s we will need the equivalent of two planets to maintain our lifestyles.”<sup>13</sup>*

*James P. Leape, Director-General, WWF International*

Population growth and urbanization of greenfields, worsened by higher consumption levels as wealth grows, accelerates resource depletion and waste production. From 1800 to 1910, the world’s population increased from about 970 million to 1.75 billion. By 1960, it reached 3 billion; today, the population is estimated at 6.7 billion people, with 9 billion expected by 2040.<sup>14</sup>

In a sustainable world, operations will use only those goods and services that, in their production, use and distribution, conserve, recover, and continuously recycle natural resources and restore ecosystem services in a closed-loop manner.



*“Bleached Coral Reefs.” Photo Credits: NOAA*



## Climate and Energy

Our ecosystem has a finite capability to assimilate wastes. This is evident in the overwhelming amount of greenhouse gases (GHG) that we generate, primarily through consumption of fossil fuels. Between 1970 and 2004, GHG emissions due to human activities increased by 70%, with carbon dioxide (CO<sub>2</sub>) emissions rising by 80%.<sup>15</sup>

*“Used fuel does not disappear; it must return to the ecosystem as waste. Acid rain, global warming, carbon monoxide, heat pollution, and oil spills are unavoidably associated with the use of fossil fuels. On a small scale; some of these wastes could be readily processed by natural systems, but on the current scale, they pose serious threats. Indeed, the growing accumulation of waste products from fossil fuel use and the negative impacts these have on planetary ecosystems is probably a far more imminent threat to human welfare than depletion; the sink will be full before the source is empty.”<sup>16</sup>*

*Joshua Farley, Herman E. Daly*

*“Suburbia.” Photo Credit: David Shankbone*



Fossil fuel is used not just in transportation and electrical power, but also in many of the goods and services we take for granted today, including commercial food production and medical care.

The current and anticipated impacts of climate change resulting from global GHG emissions include adverse effects on water scarcity and quality, warming and acidification of the world's oceans, sea level rise and coastal impacts, extreme weather events, public health, forests and wildfires, diminished wildlife and endangered species, and national security.<sup>17</sup> While everyone is affected by these impacts, those most affected are the ones least responsible for this devastation - the world's poor.<sup>18</sup>

If we are going to avoid the worst consequences of climate change, the United Nations Development Programme calculates that the entire world will have to cut its GHG emissions in half by 2050, relative to 1990 levels. To achieve this reduction, rich nations, which continue to produce most of the emissions, will have to cut their releases by at least 30% by 2020, and 80% by 2050. Developing countries would ultimately need to cut their emissions by 20 percent.<sup>19</sup>

In a sustainable world, operations will use only those goods and services that, in their production, use and distribution, minimize GHG emissions thereby helping to restore atmospheric greenhouse gases to levels that will minimize the adverse effects of climate change.<sup>20</sup>

## Non-toxic Substances

*"[So] much of what comes into our factories, into our homes, into our offices, is replete with materials that never, ever should have been taken from the earth's crust. It took nature 3.8 billion years to put some of it there. In its presence, we never would have evolved into homo sapiens, but now we're bringing that very stuff right into our living rooms, so to speak. It's very much suicidal."*<sup>21</sup>

*Ray Anderson, Interface*

Preventing exposure to hazardous substances is at the core of sustainability. The reason is simple: toxics can cause severe illness, poisoning, birth defects, disease, or death for humans or other species. Yet, every day we use products that contain toxics, or that generate them through their production, use and disposal.

Persistent bioaccumulative toxic (PBT) chemicals remain in the environment for long periods and accumulate in body tissues in concentrations that can increase along food chains. In 2007, 506 million pounds of PBT chemicals were disposed of or otherwise released into the environment, including lead, mercury, polychlorinated biphenyls (PCBs), and dioxins.<sup>22</sup> Some toxics also disrupt the endocrine systems that regulate biological processes in humans, domestic animals, and fish and wildlife species.<sup>23</sup>

Sustainable operations are those that, in all life-cycle stages, use only those goods and services that, in their production, use and distribution, minimize or eliminate hazardous substances. Finding and using safer alternatives protects our health and our air, water, soil, and food chain.



## Distribution of Resource Use

Across the world, disproportionate consumption of resources means that the basic needs of all people are not being met. Of the 6.4 billion people in the world in 2004, the 2.3 billion residents of low-income countries (36% of total population) accounted for less than 3% of public and private consumption. The 3.1 billion people in middle-income countries (48%) were responsible for 17% of consumption, and the 1 billion residents of high-income countries (15.6%) consumed more than 80%.<sup>24</sup> Of these, the United States with 4.6% of the world's population, accounted for 33% of global consumption, including over 25% of the world's fossil fuel resources, nearly 25% of the coal, 26% of the oil, and 27% of the natural gas.<sup>25</sup>

The average American uses 9.7 hectares (24 acres) of the world's biologically productive land to supply resources and absorb wastes. If everyone, today, used as much land as Americans, more than five earths would be required.<sup>26</sup>

In a sustainable world, operations will acquire only those goods and services that are produced, used and distributed within the finite limits of consumption and in a manner that provides all with sufficient means to survive with respect.

## Sustainable operations respect the natural world's constraints.

"Sustainable," "green," and "high performance," are not synonymous.

"Sustainable" means: capable of being carried on for a prolonged duration, or for the foreseeable future and beyond. "Green" and "high performance" usually imply improved attributes relative to the status quo, and may or may not be sustainable.

*"Indonesian Men Collect Plastic Rubbish for Recycling on the Citarum River." Photo Credit: Dadang Trij|Reuters*





Sustainable operations are those that:

- support the ability of all to live with respect,
- maintain critical ecosystems that provide essential life support,
- use only recycled and recyclable materials, and
- eliminate waste and prevent pollution.

Sustainable operations function within the constraints of the natural world rather than attempting to overcome them,<sup>27</sup> and respect its physical laws:

- Matter's quantity is finite and constant. Its quality is not. Matter changes both in nature, and as it moves through the economic system (this is the 1st Law of Thermodynamics). This means that any interaction we have with the world and the ecosystems that support life, such as waste disposal, must be accounted for, sooner or later.
- As matter moves through nature and the economic system, its intrinsic properties change and it becomes less useful and usable (this is the 2nd Law of Thermodynamics), requiring more and more resources to make them useful, once again. Very useful (low-entropy) goods, such as mineral ore or fuels, eventually produce less useful (high-entropy) matter, such as scrap metals and greenhouse gas, as they move through the economic system.

*"Tea Pickers, Iyerpadi, India." Photo Credit: TransFair USA*





## We need a new paradigm.

Since issuing our previous Guide, more companies have made a commitment to corporate social responsibility (CSR), and have started to report on their “sustainability” or social, ethical and environmental performance, in addition to their financial performance. Tools such as the “Global Reporting Initiative Reporting Framework” have contributed to greater awareness of “Triple Bottom Line” (3BL) non-financial impacts, but the 3BL’s use is limited. In the U.S. Government, only the Army has started to report on these issues.

Moreover, the use of the 3BL to operationalize sustainability has proven elusive, if not impossible.

*“The concept of a Triple Bottom Line in fact turns out to be a “Good old-fashioned Single Bottom Line plus Vague Commitments to Social and Environmental Concerns”. And it so happens that this is exceedingly easy for almost any firm to embrace. By committing themselves to the principles of the 3BL, it sounds like companies are making a more concrete, verifiable commitment to CSR and sustainability. And no doubt, many are. But it also allows them to make almost no commitment whatsoever...*

*At best, a commitment to 3BL requires merely that the firm report a number of data points of its own choosing that are potentially relevant to different stakeholder groups – typically in the form of a glossy 3BL report full of platitudinous text and soft-focus photos of happy people and colourful flora.”<sup>28</sup>*

*Wayne Norman and Chris MacDonald,  
“Getting to the Bottom of “Triple Bottom Line”*

The Triple Bottom Line tries to improve the traditional economic paradigm upon which our financial decision-making is based. This traditional paradigm assumes that the economy functions independent of the natural world, with the environment as a subset of no value except as a source of resources and a “sink” for wastes (Figure 2). Social inputs beyond labor costs are not considered at all.

The 3BL diagram (Figure 3) elevates consideration of society and the environment, but its limited areas of overlap suggest that there are areas of each subset that are not related to the others. Large areas of the economy, for example, appear to have no relationship to environmental or social concerns.

Although the Triple Bottom Line improves upon the traditional economic paradigm, it will not guide us toward sustainability; since it, like the traditional paradigm, does not reflect the finite limitations of our closed world system.



Figure 2 - The Traditional Economic Paradigm

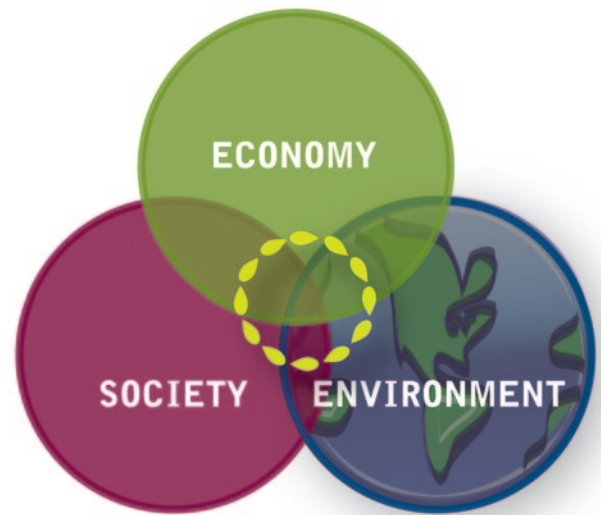


Figure 3 - The "Triple Bottom Line" Paradigm

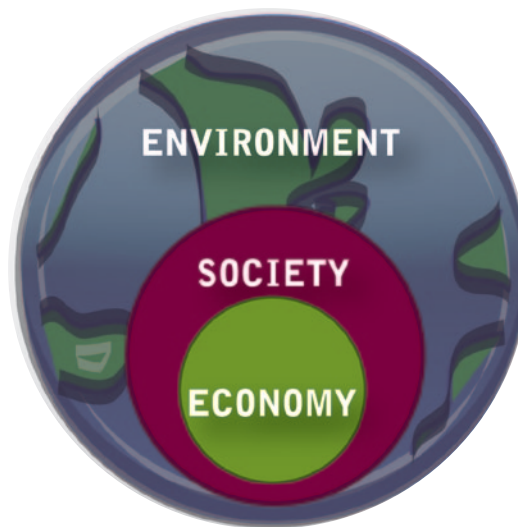


Figure 4 - The New Ecological Economic Paradigm

## A New Economic Paradigm

The traditional economic paradigm - which was developed well over a century ago – no longer fits today's realities. As economists Jeremy B. Williams and Judith M. McNeill, write:

*“This made sense at the time when the theory was being developed, when labour and natural resources were relatively plentiful, and the means of capturing and using these resources to meet basic human needs were quite primitive. As a result, human technical ingenuity has focused on better and better machines, and has improved the productivity of labour using those machines on an extraordinary scale. The work of two hundred workers in 1770 could be done by a single spinner in 1812 (Hawken et al 1999:7). One can scarcely guess by what order of magnitude modern technology has improved labour productivity since 1812.”<sup>29</sup>*

Our economy consumes resources and expels waste as it grows, until it exhausts the Earth's natural systems and “economic growth” becomes “uneconomic growth.” Sustainability, as Williams and McNeil write, needs a new economic paradigm:

*“It is now recognized that natural capital is becoming increasingly scarce, relative to man-made capital. It is no longer the ability to catch fish that is the limiting factor, it is the fish themselves. It is no longer our know-how and the means of irrigating crops that is constrained, but the amount of water available. It is not the power to pump, but the groundwater in the aquifers; not the number of chain saws, but the available trees, and so on. Therefore, in the same way that the remarkable increase in productivity of labour has been achieved over the last 200 years, ecological economists argue that it is time to switch our ingenuity towards achieving increases in the productivity of natural resources. This means devising new technologies and redesigning existing techniques so that present levels of output can be achieved with much lower use of natural resources. That human ingenuity is capable of achieving this seems beyond any doubt.”<sup>30</sup>*

Human imagination and ingenuity may be limitless, but our planet is not. If we are to sustain life for the foreseeable future, we need a new economic paradigm and a definition of sustainability that reflects those limits:

*“Sustainability is a relationship between dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems, in which 1) human life can continue indefinitely, 2) human individuals can flourish, and 3) human cultures can develop; but in which effects of human activities remain within bounds, so as not to destroy the diversity, complexity, and function of the ecological life support system.”<sup>31</sup>*

*Costanza, Daly, and Bartholomew*

This new *ecological* economic paradigm nests the economy within the environment, rather than independent of it. And, rather than shortchanging the role of society, as in the traditional economic model, this paradigm defines the economy as a construct of society that moves goods and services (matter and energy) through it while determining what has value and is economically viable (Figure 4).

In this paradigm, solar energy sustains the ecosystem, whose products are used as factors of economic production. The economy then sends its wastes back into the ecosystem, to be broken down by natural processes. The economy can only be sustained if there are healthy societies, living in healthy ecosystems that furnish renewable resources and assimilate wastes.

To operationalize sustainability, we need a new paradigm, based on the three basic principles of ecological economics:

1. **Sustainable Scale** – defined by the Earth's finite limits, in which efficient allocation and just distribution must be maintained, if a stable, steady-state economy is to be attained.
2. **Just Distribution** – that allocates the Earth's finite resources so that all can live with respect.
3. **Efficient Allocation** – the basis of traditional economics, which maximizes the utility of resources through a properly functioning marketplace.

Understanding these principles will give a new focus to the sustainability policies and practices we already have, and give us confidence that the work we do and the decisions we make are moving us towards a sustainable world.

## Economic decision-making tools must support environmentally and socially responsible operations.

*"Efficiency and effectiveness are preconditions for any morally acceptable resource use—inefficiency and ineffectiveness imply waste. In turn, wasteful behaviour implies we fail as accountable custodians and responsible stewards. Since the concepts of efficiency and effectiveness fall within the purview of economics, concepts from economics are central when trying to understand and guide human activity. However, because modern economics concentrates more on efficiency than on effectiveness, and only addresses a subset of issues relevant to achieving sustainability, its approach and methods must be revised."<sup>32</sup>*

*Matthias Ruth*







*"Polar Bear Walking Along the Coast."*

*Photo Credit: Susanne Miller U.S. Fish and Wildlife Service*

We do not need to understand every aspect of economic theory in order to operate sustainably.

In day-to-day operations, it may be enough to simply use only those products and services that eliminate waste and toxics, while using materials that are recycled and recyclable, or sustainably renewable, and renewable sources of energy. We also need to be sure that those involved in the lifecycle of those products and services can live with respect, meeting their basic human needs and fulfilling their aspirations for a better life.

Nevertheless, some knowledge of the principles and theory behind our existing decision-making tools is required when making major acquisitions and for analyzing programs or projects extending into the future. This knowledge will help us to ask questions and to make certain that these tools are used in a manner that supports environmentally and socially responsible operations.

Understanding these principles will give a new focus to the sustainability policies and practices we already have, and give us confidence that the work we do and the decisions we make are moving us towards a sustainable world.

**When markets are not functioning properly, resources are not likely to be optimally allocated.**

In the traditional economic model, a properly functioning market will efficiently allocate all resources without waste or pollution, and all goods and services will be distributed so that no one can be made better off without making anyone worse off. Economists believe that these "socially optimal" conditions will emerge when all of these conditions are present:

1. consumers are perfectly informed about all products,
2. there is competition (i.e., multiple buyers or sellers),
3. households and firms are rational, with households maximizing their well-being and firms maximizing their profits, and
4. production and consumption of products affects only those directly involved.

In the real world, all of these conditions are almost never present, together. Consequently, the marketplace is not efficient and socially optimal resource allocation does not occur. When this happens, other non-market policy and regulatory approaches may be required to deal with the resulting negative outcomes.

### Market Failures

When the marketplace is not functioning properly, prices do not reflect true costs. This is what economists call a “market failure.” This can lead to overuse of ecosystem services, natural resource depletion, toxification, irreversible species and habitat loss, and unjust distribution of resources. The consequences can be dire. A British Government report calls climate change “the greatest market failure the world has ever seen.”<sup>33</sup>

### Externalities

When the cost of a good or service does not reflect its full impacts on others, a market failure, known as an “externality,” occurs. These “externalities” can be both positive and negative.

A positive externality occurs when a building owner installs a green roof to protect the roofing membrane, add insulation, and reduce storm-sewer charges; and in so doing also improves local air quality, provides habitat, and reduces the burden on storm water systems and local waterways. The cost of the roofing system and the benefit of the reduced sewer charges are calculated in the decision-making process; but because the owner does not directly receive the value of the positive externalities, they are not considered. Features generating positive externalities are sometimes mandated by regulations or encouraged by incentives like tax rebates.

Negative externalities can occur when a building owner sites a facility in a remote area to save land costs, but in so doing increases tenant and local government transportation costs and air pollution from vehicles. The additional costs are generated by the owner, but they are borne by society as a whole. Negative externalities can sometimes be corrected if one party compensates the other (such as by offering workers a transportation subsidy). Regulations or fines can discourage generation of negative externalities. However, negative externalities are extremely difficult to correct when they are distributed across time (as in the case of resource depletion) or across wide geographic distances (as in the case of air or water-borne pollution).

Externalities are important to understand in the context of sustainable development since economic analyses – when not omitting them altogether - often weigh non-market benefits, like ecosystem services that are difficult or impossible to price, against easily priced costs such as industrial or other production.

### Public Goods

Without financial incentives, the marketplace does not supply essential goods and services such as clean air and water, and ecosystem services. These goods and services are called “public,” rather than “private,” because everyone can use them and often, government action is necessary for their creation or protection.

*“The market cannot tell us how much clean air, clean water, healthy wetland, or healthy forests we should have, or what risk is acceptable when the welfare of future generations is at stake.”<sup>34</sup>*

*Joshua Farley, Herman E. Daly*

Society relies on public goods for essential life support. Unless their use is restricted, public goods are susceptible to degradation that results in serious negative impacts on sustainability and society.

### Free Rider Problem

Consumers and businesses get a “free ride” on public goods and services and are able to benefit from their use without having to pay for the goods or contribute to their upkeep or generation.

Unregulated use of a public good can result in its overconsumption until the good is depleted without regard to the limits of sustainable scale or just distribution – this the so-called “tragedy of the commons.” For example, if there is no cost or limit to graze sheep on public land, “rational” shepherds will maximize flock size in order to maximize their profits. Eventually, the public land, or commons’ ability to sustain the sheep is overwhelmed and it becomes a wasteland.

Taking a free ride on non-renewable resources and ecosystem services has real costs to society. While a few receive a disproportionate share of free-riding benefits, society as a whole pays the cost. Failure to account for “free riders” that take advantage of ecosystem and social services can have tragic consequences. Eventually, corrective action becomes unavoidable. As President Richard Nixon told Congress in 1970:

*“We still think of air as free. But clean air is not free, and neither is clean water. The price tag on pollution control is high. Through our years of past carelessness we incurred a debt to nature, and now that debt is being called.”<sup>35</sup>*

### **Cost Benefit Analysis is a tool that can support efficiency and sustainability if used appropriately.**

How do we promote efficient resource allocation through well-informed decision-making? The Office of Management and Budget uses cost benefit analysis (CBA).<sup>36</sup> If properly applied, CBA can integrate complex policies in a neutral methodology to make an “apples-to-apples” comparison of all benefits and all costs, in terms of money. In this way, CBA identifies the most desirable project or solution with one easy-to-grasp aggregate metric (such as a Cost-Benefit ratio or net benefit in terms of money).

Since the early 1800’s, the Federal Government has used CBAs to help make investment decisions, with a wide range of criteria and methodologies. CBA was required in the 1902 River and Harbor Act, to make sure that the U.S. Army Corps of Engineers’ projects “paid their way.” In 1965, the Defense Department’s “Planning-Programming-Budgeting System” (PPBS) became the standard CBA method for all agencies.<sup>37</sup> The PPBS was superseded in 1972 by OMB Circular A-104, “Comparative Cost Analysis for Decisions to Lease or Purchase General Purpose Real Property” (eventually superseded by OMB Circular A-94, “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs”). In 1981, CBA became a requirement in every regulatory-impact analysis.<sup>38</sup> Since then, CBA has been applied to almost every type of government acquisition.

### **Appropriate discounting can improve the usefulness of Cost Benefit Analysis.**

In cost benefit analysis, “discounting” is used to estimate the present day value of benefits and costs that accrue over time. It makes sense in a purely financial decision, such as when we consider the present day value of interest that could be obtained by investing money over time, rather than spending it now. When applied to things that are not easy to price, such as ecosystem services, discounting can jeopardize sustainability goals by favoring actions in the present whose cost impacts are mainly in the



future. Furthermore, choosing discount rates beyond a single generation raises questions about equity, since it assumes that the same resource, or an identical substitute, will always be available and that future generations will be able to absorb the costs of our actions today.

### **Life Cycle Cost Analysis can improve economic decision-making.**

Basing an economic choice on the first cost, alone, may be sufficient for something simple: like choosing the cheaper of two seemingly identical pencils. However, where future costs associated with that decision may make a significant difference in the total cost of ownership, basing investment decisions on first cost alone is inadequate. For these decisions, Life Cycle Cost Analysis (LCCA) is used to consider not just the initial cost, but also other costs that may accrue over time.

Use of LCCA is required by OMB Circular A-94, the Code of Federal Regulations 10 (CFR) 436A and the Federal Acquisition Regulations (FAR) Part 7—Acquisition Planning.<sup>39</sup>

LCCA, as we know it, came into being in 1933, when the U.S. Department of Agriculture decided to purchase tractors based on the lowest predicted total cost after 8,000 hours of operation - not just on the lowest first cost.<sup>40</sup>

The National Energy Conservation Policy Act of 1978 (NECPA) applied life cycle cost methods to the design of new federal buildings and major renovations.<sup>41</sup> The current Federal Government's LCCA methodology considers first costs (including capital investment, purchase, and installation costs), operating costs (including energy, operating, maintenance, capital replacement, and financing costs), and any resale, salvage, or disposal costs.<sup>42</sup>



“We still think of air as free.  
But clean air is not free, and  
neither is clean water...”

*“Gavins Point Dam Spillway, South Dakota.” Photo Credit: Office of History, Headquarters, U.S. Army Corps of Engineers*



Because this approach to LCCA does not directly consider impacts before acquisition (i.e., upstream), nor after disposal (i.e., downstream), unsustainable choices with negative social and environmental consequences, as well as future costs can be the result. One example is the extensive use of polychlorinated biphenyls (PCBs) to insulate electrical equipment from 1929 until 1979, when they were banned under the Toxic Substances Control Act. For 50 years, hundreds of millions of gallons of PCB-contaminated liquids were released into the environment during manufacturing and after disposal. Today, billions of dollars are being spent to mitigate the effects of and dispose of PCBs, which have reproductive and other toxic effects in fish, birds, and mammals.<sup>43</sup>

### **Life Cycle Assessment can help reduce the unintended consequences of LCCA.**

By identifying and evaluating a product's impacts throughout its life cycle, not just during its period of ownership, Life Cycle Assessment (LCA) tries to account all health and environmental impacts, regardless of where they occur and whom they affect. LCA does not specify or account for the timing of impacts, and it adopts a practically unlimited time horizon.

If applied transparently, LCA can help us to move toward sustainable choices. However, LCA is limited by our understanding of life cycles. Even ecologists admit that it is impossible to identify every component of the Earth's ecosystem and understand its function. Even if we could, establishing their market value for use in LCCA, particularly in an intergenerational context, is highly subjective and problematic, at best.

The Clean Air Act passes a cost-benefit test today, but it would not have in 1970, when it was adopted. Forty years ago, we did not know the extent of the damage caused by fine particulate matter and thus could not accurately measure the benefits of clean air. Still, without precisely quantified costs and benefits, in the 1970s we knew that the air was polluted, that pollution damaged human health, and that we needed to do something about it.<sup>44</sup>

### **Economic decision-making tools must respond to the workings of a closed system if they are to support sustainability goals.**

Cost benefit analysis, life cycle cost analysis, and life cycle assessment can be used effectively, as tools that inform the decision-making process that ultimately leads us to sustainability. However, these analyses and assessments must be used in a manner that reflects the limitations of our closed-world system.



Historically, cost benefit analysis has hindered sustainability goals, because it favors things that can be easily and accurately priced, such as industry and jobs; and ignores or offers speculative values for things that are not easily priced, such as healthy ecosystems, culture, and even human life.

*"[Cost] benefit analysis ignores the question of who suffers as a result of environmental problems and, therefore, threatens to reinforce existing patterns of economic and social inequality. Cost benefit analysis treats questions about equity as, at best, side issues, contradicting the widely shared view that equity should count in public policy."*<sup>45</sup>

*Lisa Heinzerling and Frank Ackerman*

## Sustainability cannot be priced.

What may appear to be the most economically efficient approach does not always meet the needs of society over time. Notwithstanding its "economic" efficiency, the Government no longer uses slave or child labor and forbids their use by those with whom it does business. When cost benefit analyses use extrapolated values rather than those set by an existing market, as in the case of human lives, the results can be perverse. A Harvard professor of law and economics suggested that cigarette smoking should be subsidized rather than taxed by states, since smokers do not live as long as non-smokers, thereby lowering nursing home and retirement pension costs.

While it seems sensible to ensure that the benefits of investments exceed their costs, it may not always be possible to estimate their worth, particularly when dealing with under-valued societal needs and the irreplaceable ecosystem services that sustain our lives.

Our economic decision-making tools must respond to the workings of our closed system if they are to support sustainability goals. And, these tools should also build on the new ecological economic paradigm of sustainable scale, just distribution, and efficient allocation.





# how do we sustain government operations in a closed-world system?

**The Government must operate in a manner that minimizes the negative effects of its activities on the environment.**

The conceptual foundations for sustainable government operations are already in place.

In 1965, President Johnson called for protection against threats to the health of the Nation and the world:

*“The air we breathe, our water, our soil and wildlife, are being blighted by the poisons and chemicals which are the by-products of technology and industry... The same society which receives the rewards of technology, must...take responsibility for control.*

*Our conservation must be not just the classic conservation of protection and development, but a creative conservation of restoration and innovation... Its concern is not with nature alone, but with the total relation between man and the world around him. Its object is not just man's welfare but the dignity of man's spirit.”<sup>46</sup>*

As a result, laws were passed to improve air and water quality, land and water conservation, and solid waste disposal; and to protect and preserve endangered species and our national heritage.

Perhaps the greatest accomplishment of that era was the National Environmental Policy Act of 1969 (NEPA), which anticipated the Brundtland Principles by almost 20 years. NEPA established a broad national framework, “to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.”<sup>47</sup> Under NEPA, the Government must acknowledge and mitigate the negative effects of its activities on the environment and society, including the cumulative effects of its acquisitions.

Since 1984, federal agencies have been required to procure items composed of the highest percentage of recycled materials practicable and eliminate any requirement for “virgin” materials.<sup>48</sup> Current requirements include purchasing office paper with at least 30% post-consumer fiber and reducing or eliminating use of EPA-designated toxic chemicals. Priority is given to eliminating cadmium, lead, polychlorinated biphenyls (PCBs), mercury, and naphthalene. This is a step towards eliminating toxics and using 100% post-consumer content.

Federal Acquisition Regulations (FAR) require agencies to use available government inventory before making any new purchases. Furthermore, it is the Government's policy to (1) maximize the use of environmentally preferable products and services, (2) promote energy-efficiency and water conservation, (3) eliminate or reduce the generation of hazardous waste and the need for special material processing, and (4) promote the use of nonhazardous and recovered materials.<sup>49</sup>

Today, the Government's laws, programs and policies for acquisition of goods, services, and buildings seek to reduce natural resources depletion, greenhouse gas emissions' climate change impacts, and toxification of the planet. Unfortunately, these requirements are not always put into practice as required. However, compliance with these mandates will substantially lessen the Government's negative environmental and social impacts.

Much more is needed. The Government must scrutinize its procurement practices to ensure compliance with existing requirements that restore and preserve life-sustaining ecosystem services and take the necessary steps to change or revoke those practices that do not.

### **We must support the ability of all people to live with dignity and respect.**

Sustainable operations do more than just protect the environment. They also support the social equity goals of just distribution, enhancing people's well-being, quality of life and self-respect. This ability to live with respect, as Frederick Douglass, wrote in 1881, is essential:

*"Neither we, nor any other people, will ever be respected till we respect ourselves and we will never respect ourselves till we have the means to live respectfully."*<sup>50</sup>



*"Construction Training at The Challenge Program." Photo Credit: ChallengeProgram.org*

As important as mitigating the Government's negative impact on the environment is support of those who provide it with labor. As professor Stephanie Luce, at the University of Massachusetts-Amherst writes:

*“When policymakers talk about sustainable development, the emphasis is often on factors such as the impact of new building on the environment, the use of recyclable and renewable resources, and designing communities in order to minimize excessive transportation requirements and other sources of pollution. Often, the piece that gets ignored in the conversation is labor: the labor that is required in the actual building or production, as well as the working conditions of people who inhabit the community in question.”<sup>51</sup>*

There has been dramatic progress in the promotion of social equity in government acquisitions since more than four hundred slaves were used to construct the U.S. Capitol building.<sup>52</sup> In 1901, President Theodore Roosevelt committed the Government to being a good employer:

“[Provision] should be made to render the enforcement of the eight-hour law easy and certain... The Government should provide in its contracts that all work should be done under “fair” conditions, and in addition to setting a high standard should uphold it by proper inspection, extending if necessary to the subcontractors.”<sup>53</sup>

Today, the Government invests in and supports a well-trained and stable workforce by requiring payment of locally prevailing wages and fringe benefits. The Davis-Bacon and related Acts apply these principles to construction, supplies, and services, and other contracts. Paying locally prevailing wages, as the U.S. Supreme Court wrote in 1940, “[obviates] the possibility that any part of our tremendous national expenditures would go to forces tending to depress wages and purchasing power and offending fair social standards of employment.”<sup>54</sup> In this manner, the Government also reduces local dependence on financial assistance like food stamps and Medicaid and benefits local businesses by adding more money to the local economy.

The Government also supports socially and economically disadvantaged individuals, minority and women-owned small businesses, and service-disabled veterans. The goals of these mandates is to





help ensure that these businesses become viable for the long term, promote economy and efficiency in federal procurement, and help to empower those communities.<sup>55</sup> FAR Part 7—Acquisition Planning, requires purchase of supplies and services through programs that provide job training to federal prison inmates and for people who are blind or severely disabled. It is only if those suppliers cannot satisfy the Government's requirements that Agencies may use the federal supply schedules and commercial sources.<sup>56</sup>

Additional policies promote environmental justice, and prohibit discrimination based on race, sex, color, national origin, disability, religion, age, sexual orientation, and parental status.

However, social welfare is not just about wages and inclusion, but also making sure that the workplace is safe, and through the Occupational Safety and Health Administration (OSHA), the Government seeks to assure safe and healthful working conditions for all workers.

### **We must operate efficiently, in a manner that supports environmental and social goals.**

Once the ideas of sustainable scale (i.e., living within the finite limits of the Earth's closed system) and just distribution (i.e., allowing all to live with respect) are at the core of how we do business, we need to be certain that the economic decision-making tools that help us to allocate resources efficiently, support sustainability.

With a multidisciplinary approach and reconsideration of how it is applied, Cost Benefit Analysis can be applied so that it supports the new ecological economic paradigm.

### **Government operations must build upon existing mandates for sustainability.**

Many of the new ecological economic paradigm concepts are already in place in government operations. Federal Acquisition Regulations require agencies to operate in ways that minimize consumption of natural resources, conserve energy, and support the Government's environmental and social goals. OMB guidelines call for efficient resource allocation through well-informed decision-making, but if we are to achieve sustainable government operations, these policies and tools must be reexamined and revised to strengthen and enforce those that contribute to sustainability, and eliminate those that do not.



*"Geothermal Power Plant, São Miguel Island, Azores, Portugal." Photo credit: Jonathan Herz*

# the new sustainable frontier

Today's world is decidedly not sustainable, and neither are the Government's operations. But both of them can be, if we take the steps necessary to reach the new sustainable frontier.

Operationalizing sustainability will require revising our tools and methodologies, and applying multi-disciplinary approaches that do not rely on economic models removed from the reality of natural systems.

**Backcasting and Multi Criteria Analysis are tools and methods that can identify sustainability goals and the strategies needed to achieve them.**

## Backcasting

How can we make sure that our policies are taking us where we want to go? If we are trying to create a sustainable world, we must develop strategies that are directly connected to those goals. This approach is known as “backcasting,” which is best understood in contrast to “forecasting.”

While forecasting seems like a logical way to reach a desired goal, it bases future actions on past practices that may actually have contributed to the problem in the first place. These past practices, such as high consumption of materials, energy, water, and land, to support sprawling land-use and dependence on automobiles, have taken decades to develop and will likely take decades to overcome, especially if proposed solution relies on incremental improvements, not the desired future.<sup>57</sup>



*"In Washington DC, Thousands Gathered to Create a 'Human Postcard' Calling for a Cut in Carbon Emissions of 80% by 2050."*  
Photo Credit: John Quigley/Spectral Q

A green product or building rating system based on improving past practices, rather than achieving a virgin material, energy, water, and carbon-neutral goal is not sustainable.

In contrast, backcasting approaches the issue of current practices and desired long-term outcomes from the opposite perspective, linking the present to the desired future with effective policies. In the case of global warming mitigation, for example, effective strategies must begin with a backcasting goal (such as 350 parts per million of CO<sub>2</sub> in the atmosphere) and then identification of reduction targets that will achieve that goal.

This approach is now increasingly applied by organizations, corporations, municipalities, government agencies and others to ensure they reach desirable strategic goals within a realistic and achievable time horizon.

Peter Head, a Director of the engineering firm Arup, sees an “Ecological Age” ahead of us, but getting there will require a full awareness of our impacts on the world’s closed systems, along with concrete action that results in real change. He writes that, by 2050, we could move to “a sustainable way of living within environmental limits... allowing for continued human development and population growth, whilst adapting to climate change impacts,” by linking present actions to three, desired future goals:

1. 80% reduction in CO<sub>2</sub> emissions from 1990 levels by 2050, to avoid the worst consequences of climate change,
2. 47% reduction in our over-consumption of biologically productive land and sea that provide resources and absorb our waste, in order to reach a sustainable level, and
3. an increase in the “Human Development Index,” which measures life expectancy, literacy, educational attainment, and gross domestic product per capita for countries worldwide.

An “Ecological Age”, Mr. Head writes, “acknowledges different socio-economic levels for countries and aims to provide concrete solutions which will release human development potential with much lower use of non-renewable resources.”<sup>58</sup>

## **Multi Criteria Analysis**

Multi Criteria Analysis (MCA) is a multi-disciplinary method that uses qualitative as well as quantitative measuring scales to resolve problems with multiple value systems and objectives, which cannot be easily quantified (e.g. environmental issues) or translated in monetary terms due to their intangible nature (e.g. social, cultural or psychological issues). Unlike cost benefit analysis, MCA does not require all factors to be priced in order to be considered.

Starting with the desired goals identified by backcasting, MCA brings a wide range of views and knowledge into decision-making. Alternative solutions and strategies are presented to stakeholders, who apply a variety of tools, including policy and cost benefit analysis, to make consensus-based recommendations.

Both backcasting and MCA can strengthen NEPA's sustainability framework, and can be used to support a broad environmental and social equity baseline in the Government's economic decision-making processes.



## We must be aware of how our everyday decisions affect sustainability.

Sustainable development isn't just about good business and "doing well by doing good," or even about personal virtue, it is about survival on this planet. Developing effective tools and strategies for survival requires an understanding of sustainability, and how we affect it through our everyday decisions.

*"How do we create an environment in which change can occur? People need to get beyond the current, all-too-prevalent attitude of "just tell me what to do and I'll do it" coupled with "I don't have time for this." We need to provide a context that encourages people to ask questions. When people are willing to ask questions, they are ready to explore new frameworks and see themselves and their work from a different perspective. In general, people truly learn when they are curious enough to ask. They then become "available" to listen or find the answers themselves."<sup>59</sup>*

*GSA Publication, "Expanding Our Approach to Sustainable Design—An Invitation"*

To be sustainable, we must all take responsibility for protecting the environment and supporting the ability of all to live with respect, for the foreseeable future.

## In the long run, there is no free ride on ecosystem services.

While it may seem cheaper in the short-term to purchase goods and services which externalize their environmental and social impacts by taking a "free ride," this practice is not sustainable. If it is to continue operating for the foreseeable future, the Government's operations must respect our closed-world system and not exceed its sustainable ecological and social footprints. This means using, to the greatest extent practicable, only those goods and services that:

- maintain critical ecosystems that provide essential life support,
- prevent pollution or generate waste at rates below the ecosphere's assimilative capacity,
- eliminate virgin material requirements and "close the loop" by using materials that have been recycled and are recyclable, and
- consume non-renewable resources at a rate below that at which they can be replaced by renewable substitutes, if any.

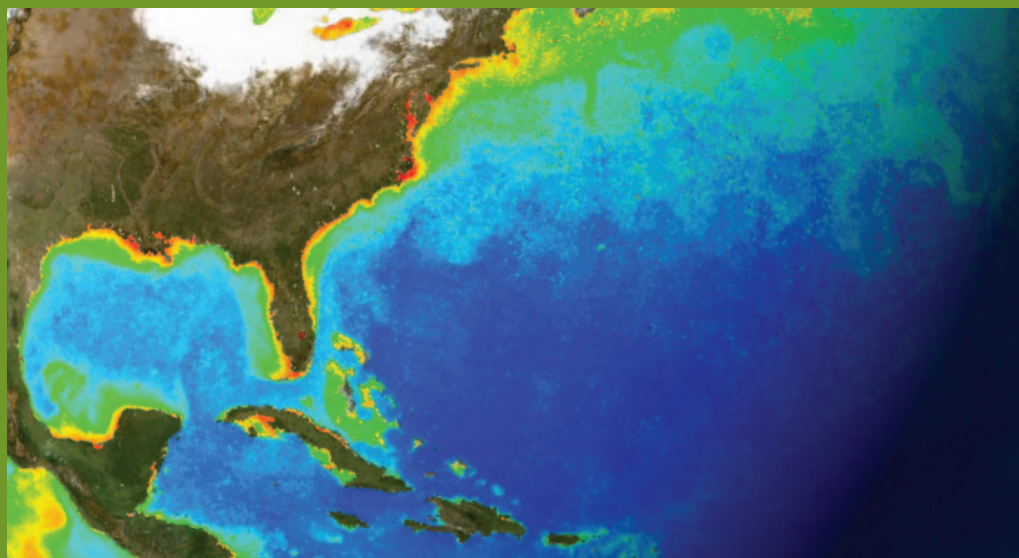
## Government operations must be based on real world limitations, measuring progress against a desired, sustainable steady state.

If our goal is a sustainably operating government, we need to take positive steps to change the way we do business. We need to know where our goods, services, and facilities came from, and where they are going. Those at the policy-making level should provide those at the working level with the tools and policies that support sustainable government operations, so that every good or service purchased is the most environmentally and socially preferable available.

The Government can promote closed-world, efficient allocation by basing product and building standards on sustainability goals and giving preference to those who meet or exceed them; acquiring only those goods, services and facilities that support a sustainable scale (i.e., non-toxic, recycled and recyclable), and that promote just distribution (i.e., fair and safe to those who produce and use them).

But more is needed than just strengthened operating policies and regulations. We also need economic decision-making tools that help us make the right choices along the way. With a multidisciplinary approach and reconsideration of how it is applied, cost benefit analysis can be applied so that it reinforces the conceptual foundation for sustainable government operations, already in place.

And, we must start today to make the world whole again.



*"Apollo 17, Earth." Photo Credit: NASA*

# operating sustainably

The Government's mission is to serve the people of the United States. The operations that support that mission are large in scale, but their adverse impacts can be small - if sustainable principles and practices are rigorously implemented at every level. Incremental change will not be sufficient. Existing policies, programs and rating systems must be examined in a closed-world context; their limitations understood, and their applicability reconsidered.

Achieving sustainable government operations and a sustainable world, depends on eliminating our adverse impacts on the environment – getting to “net zero” - by reducing natural resource and energy use, eliminating toxics and greenhouse gas emissions, and restoring public goods such as ecosystem services. It also depends on achieving environmental goals in a manner that supports the Government's social goals.

Once we understand the principles of sustainability, we can begin to incorporate them into our daily practices. This does not mean that we must have a complete knowledge of every aspect of every product or service we use, but it does require that we understand the principles of sustainable development, articulate our goals clearly, and ask the right questions of those who should know every aspect of every product or service: the producers and providers.

## TO OPERATE SUSTAINABLY:

1. LOOK FOR AN ALTERNATIVE to consuming additional natural resources and generating greenhouse gases, by asking:
  - a. How can we support operations efficiently, and with just distribution of resources, while reducing the Government's ecological footprint?
  - b. Are we using existing stocks?
  - c. Can we use a service instead of owning this product?
  - d. Can we reuse and an existing facility rather than building a new one?
2. KNOW WHAT YOU ARE BUYING, when there is no alternative to consumption. Make sure that the acquisition is consistent with the Government's environmental and social goals by asking:
  - a. WHO MADE IT? Does its production and use allow all to live with respect?
  - b. WHAT'S IN IT? Is there a third party assessment of contents available to help us make informed decisions, such as an Environmental Product Declaration (EPD)<sup>60</sup> or ASTM International “Sustainability Assessment of Building Products”?<sup>61</sup>
  - c. HOW DOES ITS PRODUCTION AND USE AFFECT THE EARTH'S CRITICAL ECOSYSTEMS?
    - i. Are public goods, like clean air and water, being exploited?
    - ii. Is use of energy and water, and generation of toxics, wastes and greenhouse gases minimized?



- iii. Is use of virgin materials minimized and use of recycled materials maximized?
- iv. Can it be recycled rather than “down-cycled”?
- v. Is there environmental accountability along the product supply chain?
- vi. Are the local context and conditions appropriately addressed when we build facilities?
- d. WHERE DOES IT GO WHEN IT IS NO LONGER NEEDED?
  - i. Is there a complete life cycle plan?
  - ii. Is it designed for deconstruction?
- 3. SHARE THE GOVERNMENT’S VISION FOR SUSTAINABILITY WITH SUPPLIERS, AND FAVOR THOSE THAT SUPPORT THAT VISION.

### Every one of us is responsible.

If our goal is a sustainably operating government, we can’t rely just on policies and regulations to get us there; we need to change the way we think about our world.

“Every last one of us is part of the web of life. Every one of us. And we have a decision to make while we’re here in our very brief visit to this beautiful blue planet, we can either hurt it, or we can help it. It’s that simple. And it is every human being’s choice.”<sup>62</sup>

Ray Anderson

# notes

Additional information on the principles and practice of sustainability is available on-line at [www.gsa.gov/sustainabledevelopment](http://www.gsa.gov/sustainabledevelopment).

## Appendix

**Section One:** Operating Sustainably – Case Studies

**Section Two:** Economic Decision-Making – An Outline of Ecological Economics

**Section Three:** The State of the World

**Section Four:** The Government Mandate for Sustainability

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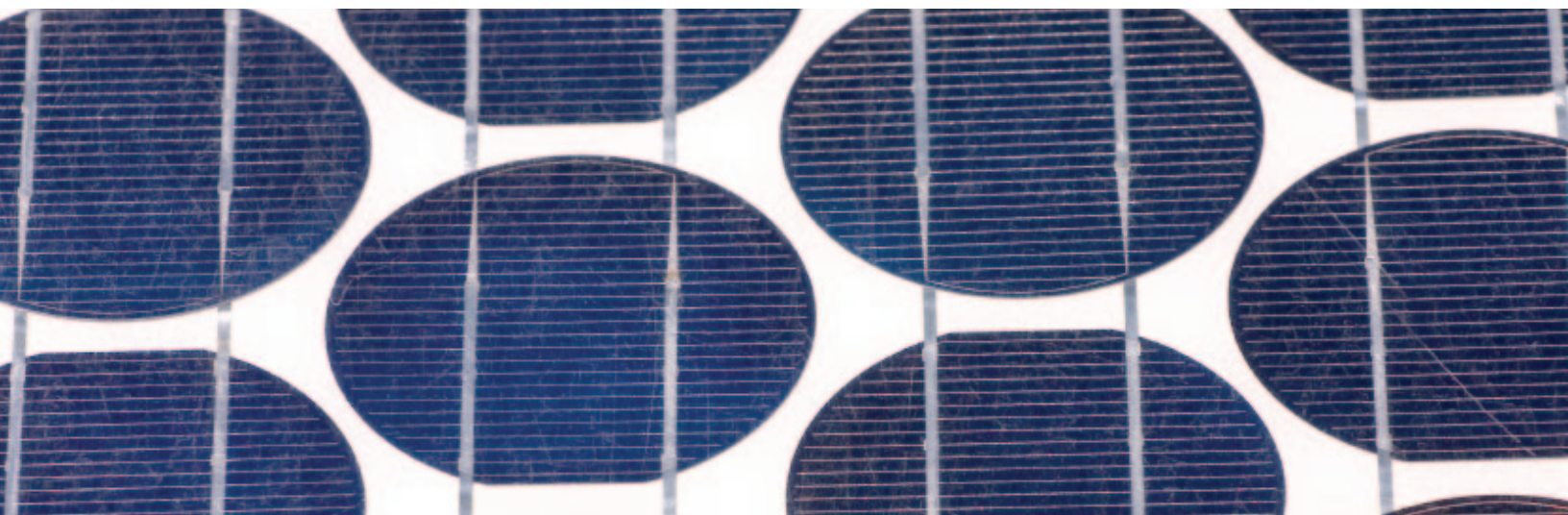
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