Environmentally preferrable purchasing

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has contributed to increased food prices. When degraded land is restored for agricultural activity, biofuel production may increase biodiversity. However, in many cases biofuels are grown on land that has been converted from biologically rich forests or grasslands. Biofuel production can be made more sustainable through the adoption of good practices in soil and nutrient protection, water management, agrochemical management, and landscape and biodiversity conservation. Engaging in more environmentally friendly harvesting, processing, and distribution practices can also contribute to more sustainable bioenergy production.

Water Pollution

Water is required throughout the exploration, processing, and distribution of energy. Water is particularly important for cooling processes in the generation of thermal electricity. The availability of adequate water has an impact on the types of generation options that are selected. For example, nuclear power generation is particularly water intensive, while wind-powered generation uses very little water. Approaches that reduce CO_2 emissions may create other environmental impacts. For example, carbon capture and storage or sequestration (CCS) uses more water per energy output than conventional technologies. In some cases, water use in power plants can increase by between 46 and 90 percent when combined with CCS. There is a growing need to plan energy options with an understanding of the integrated environmental impacts of different supply options, including water needs, pollution events, and biodiversity impacts.

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See Also: Environmentally Preferable Purchasing; Green Energy Certification; Green Power; Public Transportation; Renewable Energy Credits; Sustainable Development.

Environmentally Preferable Purchasing

Category: Environmentalism.

Summary: Environmentally preferable purchasing places responsibility on both manufacturers and consumers to understand the environmental impact of a product and restrict purchases to those products that have a minimal negative impact on the environment.

Throughout most of human history, the environment was treated as powerful and its resources as inexhaustible. By contrast, at the onset of the 20th century, the environment was recognized as fragile and subject to human impact. Until then, human civilization embraced many innovative

technologies and products but rarely considered the source of the production of certain goods and the effects of production or the total life cycle of a product on the surrounding environment.

Environmentally preferable purchasing (EPP) refers to the procurement of a set of products that cause minimal harm to living beings and environment. The fundamental concept of EPP has emerged from growing environmental degradation in the wake of human development and the resultant release of pollution worldwide. EPP involves comparing products based on some notable characteristics. To apply EPP, one must consider the product from the following standpoints: how its raw materials were acquired, how it was produced or manufactured, how it is packaged, how it is distributed, what impact it has during operation, how it is maintained, whether and how the product or its materials will be reused, and how it ultimately will be disposed of at the end of its life. EPP combines consideration of the environment, price, and performance. These three pillars of EPP require that the product is both good for the environment and provides a high quality of performance.

EPP products are long-lasting, of high quality, low in toxicity, reusable, and easy to recycle. Key characteristics of EPP products, therefore, are the following:

- Energy efficiency
- Durability
- Recycled or recyclable content
- Low or zero emissions of air pollutants and other hazardous substances
- Water efficiency
- Easy, nonhazardous maintenance
- Low life-cycle cost
- Packaging and distribution efficiency
- End-of-life management that keeps materials out of landfills (through reuse, recycling, or return to the manufacturer)

Some examples of EPP products are the following:

- 100 percent postconsumer-recycled, processed-chlorine-free (PCF) paper
- Energy Star equipment and appliances
- Liquid crystal display (LCD) computer monitors
- Remanufactured, low-emission paints
- Water-based adhesives and paints that are low in volatile organic compounds (VOCs)
- Zero-formaldehyde-emitting composite wood products
- Odorless and nontoxic water-based markers and correction fluids
- Low-mercury fluorescent lighting
- Solar calculators (requiring no batteries)
- Upholstery and electronic equipment free from polybrominated diphenyl ethers (PBDEs)
- Cleaning products with the Green Seal approval
- Furniture listed on the state's Open Office Panel Systems Furniture contract
- Services, such as "green lodging," that meet or exceed a threshold of environmental performance

The key benefit of purchasing environmentally preferable products is protected and sustainable environmental quality. However, consumers can realize a number of other benefits from EPP: lower risk to human health, increased energy and water efficiency, reduced toxic chemicals, low amounts of waste, support for markets for green products and jobs, and economic gains due to increased product life and lower maintenance and disposal costs. EPP also provides numerous benefits, beyond environmental protection, for producers and sellers of products: technology that requires fewer raw materials, lower cost in water and energy used during manufacture, and less maintenance to produce high-quality goods. Recyclable products may benefit a producer by limiting extra investment for producing the same goods. Consumers' satisfaction with the products can promote the business and extend it, as well as build the business's positive reputation as an innovative, "green" business.

Any effort toward EPP depends on the responsibility of producers and sellers as well as purchasers. Product manufacturers play a significant

role, because they must first comply with environmental regulations to ensure that their products adhere to standards of quality and do not contain undesirable substances that cause harm to the environment. Producers must also provide consumers with information to instruct them in the proper use of the product and protect them from any hazards it might pose if improperly operated, including warnings, cautions, and recycling instructions or methods of disposal.

Governments and public agencies play a vital role in regulating manufacturing to ensure that products meet environmentally preferable standards. Regular monitoring can reveal whether a company is in compliance with environmental laws and regulations: for example, whether the firm is keeping records on equipment maintenance, avoiding incinerated intermediate waste, properly disposing of effluents, and responding to customer complaints. Environmentally preferable purchasing is policy in numerous places in the United States and abroad. As certain nations and jurisdictions demand environmentally preferable products, others that have not set similar standards will risk becoming dumping grounds for products with less desirable environmental attributes. Californians, for example, benefit from policies that help keep products with harmful constituents out of homes and workplaces, and an increase in demand for environmentally preferable products helps encourage manufacturers to create more of them.

Environmentally preferable purchasing programs need widespread support to maintain continual enthusiasm and participation. The main reason to track a program's environmental benefits is to be able to communicate them to colleagues, supervisors, and the community at large. Data provided by vendors, government agencies, and researchers can be used to promote EPP to others and for external publicity. Regular publicity on EPP can encourage continuous enthusiasm and mass participation. Research institutes, government, and vendors can develop innovative ideas to create suitably designed products and establish rules to be followed internally and externally in support of EPP. Awards for organizations or employees who are innovating environmentally preferable products may encourage other promotional campaigns.

Slogans and educational efforts can also draw support for EPP. For instance, a hospital can implement a program to use recycle paper, encouraging its adoption by advertising to employees and the public that it is saving a certain number of trees. A manufacturer can tout its paper products as prepared from 100 percent recycled paper. A laboratory can announce that replacement of a histology reagent has saved dollars that would have been spent disposing of hazardous waste. Making this type of information available to the public can also encourage consumers to choose the organization's EPP products or services.

Unbleached paper napkins made from 100 percent recycled materials like these are an example of environmentally preferable purchasing. Photos.com

In North America, the Canadian-based EcoLogo is the largest and most respected environmental standard and certification mark. The EcoLogo assures customers from the corporate to the consumer level that a product or service meets stringent standards of environmental leadership. EcoLogo has certified thousands of products for EPP, covering a large variety of categories, helping consumers to find and trust the world's most sustainable products. The EcoLogo certification is a Type I eco-label, as defined by the International Orga-

nization for Standardization (ISO). As EcoLogo states on its Website, "This means that the program compares products/services with others in the same category, develops rigorous and scientifically relevant criteria that reflect the entire lifecycle of the product, and awards the EcoLogo to those that are verified by an independent third party as complying with the criteria."

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See Also: Environmental Stewardship; Green Energy Certification; Green Pricing; Plug-in Hybrid Vehicles; Renewable Energy Credits; Smart Grids; Sustainability.

Equatorial Guinea

Official Name: Republic of Equatorial Guinea.
Category: Geography of Energy.
Summary: Equatorial Guinea is a small nation with offshore oil reserves and has become the third-largest oil exporter in sub-Saharan Africa.

Equatorial Guinea is a small nation, with an area of 17,430 square miles, located in West Africa. It has a coastline of 184 miles on the Gulf of Guinea in the South Atlantic Ocean and shares borders with Cameroon and Gabon. It is located on both the mainland of Africa and five inhabited islands. The capital city, Malabo, is on the Isla de Bioko (Fernando Po). The islands are volcanic, although only one, Santa Isabel, is historically active.

In the 1990s, Equatorial Guinea discovered and began exploiting its large offshore oil reserves in the Gulf of Guinea, and the country has experienced rapid economic growth in recent years, becoming the third-largest oil exporter in sub-Saharan Africa. However, living standards and indices of the population's well-being have been slower to improve, and Equatorial Guinea resembles many developing countries in terms of its infant mortality rate (77.3 deaths per 1,000 live births, 15th-highest in the world), life expectancy (62.37 years, 181st in the world), total fertility rate (4.91 children per woman, 22nd in the world), and educational expenditures (0.6 percent of gross domestic product or GDP, 164th in the world). The estimated per capita GDP for 2010 is $37,900, 26th-highest in the world, but may be substantially lower given uncertainty about the size of the country's population; the official July 2011 estimate was 668,225, but other estimates placed it as high as 1.2 million.

Most of Equatorial Guinea's government revenues (90 percent) and export earnings (98 percent) are based on the hydrocarbon sector. As of 2011, the country had 1.1 billion barrels of proven oil reserves, and in 2010 it produced 330,000 barrels per day while consuming 2,000 barrels per day. Equatorial Guinea also has 232 billion cubic feet of natural gas reserves and in 2009 produced 232 billion cubic feet of natural gas while consuming 55 billion cubic feet. All oil production is exported, mostly in the form of crude oil and lease condensates from natural gas, because Equatorial Guinea lacks refining capacity. Domestic consumption is supplied by imports of refined petroleum products, primarily motor fuel. Electricity generation and consumption constituted 90 million kilowatt-hours in 2008, although distribution is inconsistent because of an aging infrastructure. Energy-related carbon dioxide emissions in 2008 were