

Chemistry 321

The Sustainable World

## 2. ECONOMICS & BUSINESS ASPECTS OF SUSTAINABILITY

Note: References to Dorf are from "Technology, Humans and Society: Towards a Sustainable World" by Richard C. Dorf, Academic Press, 2001

# A Brief History of Industry & the Environment

- Pre-1945: Ignore problems except for those that are immediate and local.
- 1945-1970: Widespread/long-term environmental problems begin to be noticed- Minamata Bay, London smog, etc.
- 1970 onwards: Environmental legislation- treated in a reactive way as an added cost.
- 1980 onwards: Environmentalism goes mainstream, affects consumer demand.



# Corporate Environmentalism- fact or just PR?

- 1985: Companies begin to be proactive about environmental issues (e.g., CFCs, PFOS)
- 1993: Companies begin to look at sustainability.
- Most major corporations today ([such as BP](#)) try to present themselves as “green.” Many now report basic “green facts” about their activities, e.g., [Sigma-Aldrich](#)
- Yet a survey shows that most companies would not replace their toxic product with a non-toxic one if it raised costs as little as 1%\*.



\* Dorf, p 44.

# Resources- infinite or finite?

- “Only about 1% of all the materials mobilized to serve America is actually made into products and still in use six months after sale.”
- “The world can, in effect, get along without natural resources.”  
[Robert Solow, 1974]
- There is no danger from the exhaustion of physical resources.”  
[Peter T. Bauer, 1981]
- On average, human beings create more than they use in their lifetimes.....This process....applies to all metals, all fuels, all food..” [Julian Simon, 1994]

# ABCs of Capitalist Economics

- PROFIT from an activity or enterprise is “what remains out of total revenue after all costs have been paid.” This is often DISCOUNTED to offset interest paid on capital.
- EXTERNALITIES are external to the buyer & seller. Traditionally environmental costs are considered externalities. For example the cost of running a coal-fired power plant does not include the costs of damage from acid rain or carbon dioxide produced by the plant.
- THE MARKET balances supply and demand by lowering prices when demand is too low, or by raising prices when demand outstrips supply. COMPETITION ensures that the most efficient company survives to supply the product at the lowest cost.

# What are some flaws in capitalism?

- Externalities

- These occur when an economic transaction causes an impact on an outside party. Example: The price you pay for your gasoline does not include the environmental costs of using it in a car.

- Short-term viewpoint

- Sustainability concerns itself with the quality of life and ecosystems in 20-100 years time. Investors frequently only care about 0-2 years time, and so short term choices may be made that cause harm in the long term, both economically and environmentally.

# What are some flaws in capitalism?

- Imperfect markets- not “free”
  - Monopolies, e.g. in electricity supply
  - Unmeasurable costs & benefits, e.g. the environmental cost of a particular type of ink
  - Inequalities in buyer/seller bargaining power
  - Inequalities between different products or services (e.g. road vs. rail) or between companies.
  - Political effects (tax subsidy for a senator’s own state)



# Alternatives to pure capitalism

- **Communism**- based on common ownership. Unlike socialism, it carries a connotation of militancy.
- **Socialism**- claims to share wealth more equitably. Based on cooperation rather than competition. May involve nationalization or worker co-ops.
- **Democratic socialism**- A form of socialism achieved by reform of capitalism, with truly democratic elections used to hold government accountable. Small-scale private enterprise allowed.
- **Social democracy**- Both state and capitalist enterprises- whichever is more appropriate, along with a welfare state- designed to deliver a fair but productive society.
- **Liberalism**- Capitalist economics, with government programs to compensate for inequalities.

## 2.2. The Challenge Ahead

Creating a *sustainable* economy

# Capitalism vs. Environmentalism?

- “Environmentalism is the product of the collapse of socialism” From *Environmentalism Refuted*, by George Reisman, economist.
- “environmentalism is, at its core, the hatred of human life.” *Capitalism* magazine, 2002.
- “Industry and technology are critical to human life and yet they are under attack.” *Center for the Advancement of Capitalism*

- “the capitalist private profit system is the root cause of the environmental crisis. With its inherently anarchic exploitation of both human labour and natural resources for short-term profits, capitalism is incapable of utilising natural resources in a way that meets not only the current needs of all members of society but those of future generations as well” *Environmentalism, Capitalism and Socialism*, Resistance Books, 1999.
- “the 'free market' is unsuitable means to ensure people safeguard the environment” [www.altruists.org](http://www.altruists.org)

# Unit 2 readings

- Bjørn Lomborg (right), in his essay “[Cheap Fossil Fuels for the Poor](#)”, argues we should help the poor of the world by allowing them access to cheap fossil fuels; to force them to use alternatives would cost more and only serve to keep them in poverty.



[Picture](#) by [Morten](#)  
Public domain

## Unit 2 readings

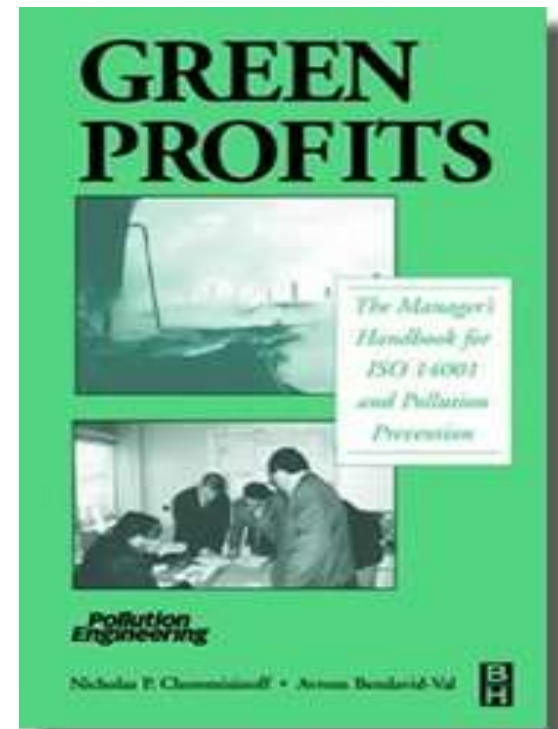


Picture by [Moizsyed](#)  
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- In her essay “[Capitalism vs the Climate](#),” Naomi Klein (left) argues that catastrophic climate change can be avoided “only by radically reordering our economic and political systems in ways antithetical to (the) “free market” belief system.”
- This idea is central in her recent book, “This Changes Everything”.

# Economic benefits?

- In some cases green processes, because they avoid waste, turn out to be more efficient and therefore more profitable.
- New eco-industries will provide jobs & profits.
- If corporations ignore the environment, they will destroy themselves in the long term.
- Some believe that capitalism and environmentalism can work together successfully.
- (See also eco-economy, [slide #29](#))



# Sustainability Indexes

- The [Dow Jones Sustainability Indexes](#) (DJSIs) are “the first global indexes tracking the financial performance of the leading sustainability-driven companies worldwide.”
- The [FTSE4Good index series](#) is a similar UK index, which combines sustainability with human rights.
- The “[Global 100](#)” claims to list the world’s most sustainable companies.
- These indexes allow asset managers to channel investment into the companies that lead the field in terms of sustainability. But ranking is difficult and may seem fairly arbitrary.



# DJSI and FTSE4Good

- Companies can “brag” about their presence on an index, but when companies’ standards slip, they are removed from indexes.
- Elizabeth Elliott McGeveran, Vice President, Governance & Socially Responsible Investment at ISIS Asset Management [said](#), “FTSE4Good indexes have served as a positive catalyst for corporate change and FTSE's engagement program with FTSE4Good constituents has made a substantial contribution to encouraging greater environmental commitment from a larger number of companies.”



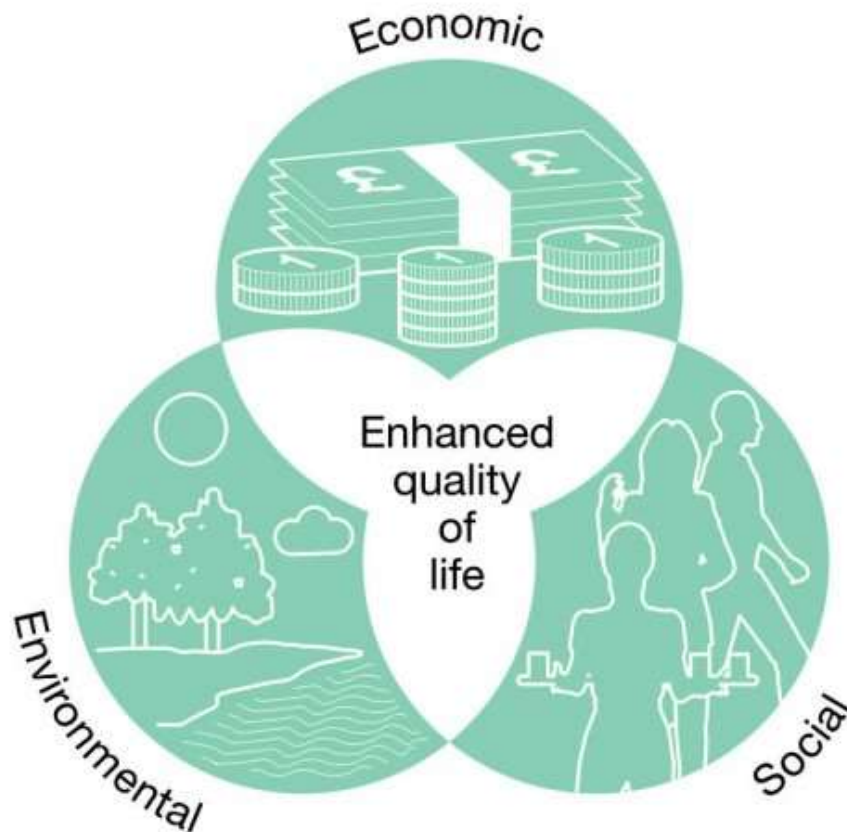
FTSE4Good



Ms McGeveran  
[fandc.com](http://fandc.com)

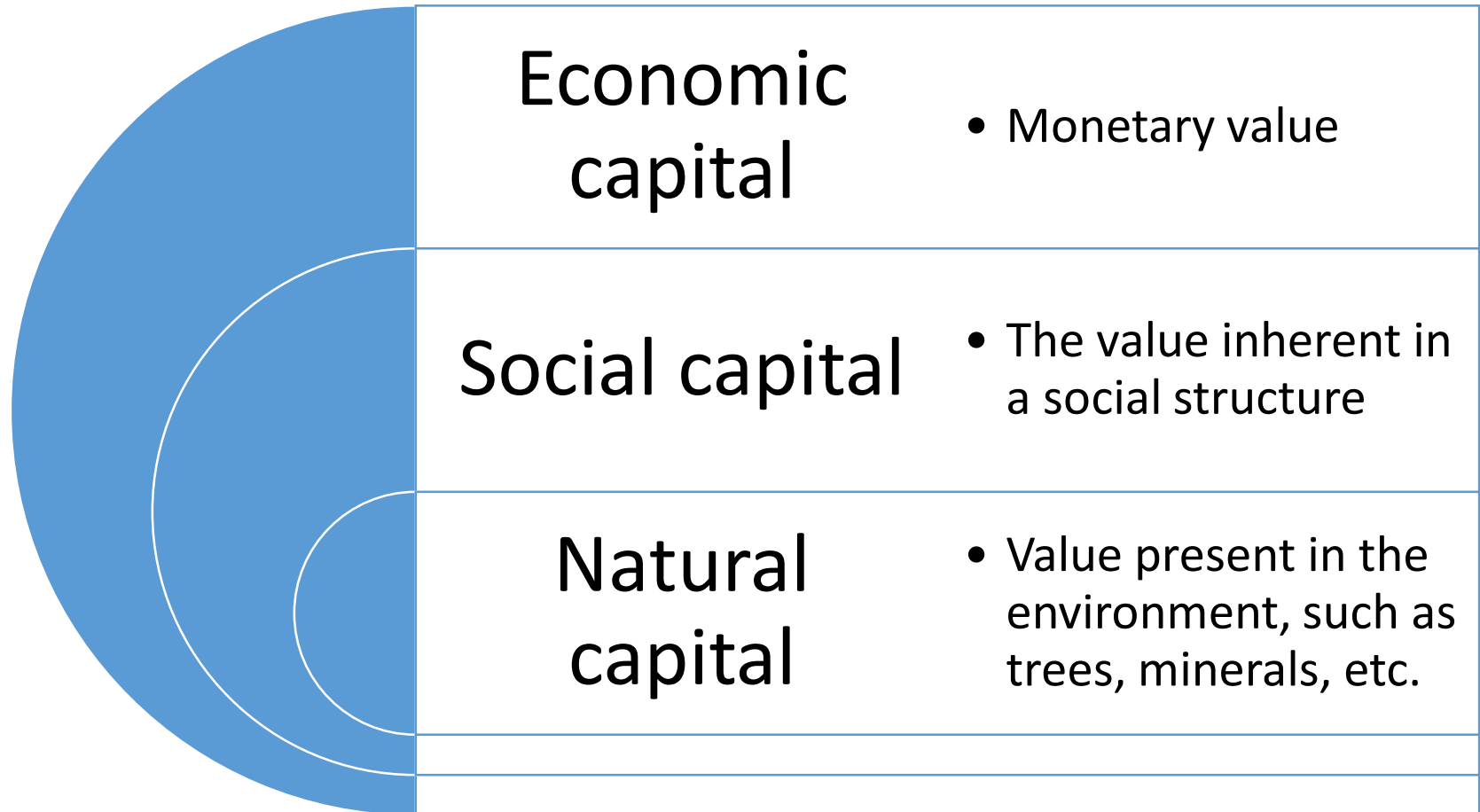


# The Triple Bottom Line



- Traditional economics determines quality of life using only monetary measures (e.g., GDP)- **economic capital**.
- Marxism & liberalism seek to include social factors- **social capital**.
- Environmentalism also includes **natural capital**.
- Sometimes referred to as "People, planet and profit"

# The Triple Bottom Line



# Full cost accounting

- This seeks to solve the problem of externalities by including these in the market price of the product.

EXAMPLE: The cost of a gallon of gasoline includes the cost of the crude oil, the refining, the transportation and the tax. It does *not* include the cost of global warming, acid rain, road repair & construction, etc., that result from its use.

Proponents suggest ideas such as a *carbon tax* on all fossil fuels to ensure motorists pay for these externalities.

# These externalities are not minor...

The International Monetary Fund (IMF) [estimated](#) that the global [subsidy](#) for fossil fuels for 2015 is around \$5.3 trillion – that's around \$4000 per household across the entire planet; alternatively, it is more than the world's governments spend on healthcare!



[Picture](#) of coal power station in Michigan by EPA, public domain

# Alternative descriptions of capital

- “Triple bottom line” is probably commonest, but Hill’s book lists *four* types of capital. Looks at capital in terms of resources rather than money.
- **Natural capital:** (as above)
- **Social capital:** institutions and culture that help society function
- **Human capital:** investment in health, education, etc.
- **Human-created capital:** buildings, machinery, infrastructure

# Eco-labeling & Standards



- Eco-labeling allows “green” companies to charge a premium for their products.
- Without it, such products will never become mainstream.
- The label has to mean something, i.e., there must be standards, unlike with other words such as “fresh.”

<http://ec.europa.eu/environment/ecolabel/>

# Eco-labeling

- Purpose is to identify the green products in a product category.
- Many (not all) schemes are linked to life-cycle assessment (LCA) – see Unit 4.
- Polls show it to be effective if the public is well informed and all stakeholders participate in developing the scheme.
- ISO 14020 (part of ISO 14000, unit 10) deals with eco-labeling.
- The [Global Ecolabelling Network](#) aims to develop ecolabeling worldwide.

## Some examples

- Blue Angel (Germany):

- Begun in 1977, the oldest scheme
- 3850 products from ~550 label users
- Only focuses on environmental impact at disposal.



- Energy Star (US)

- Begun in 1992 by US EPA and Dept. of Energy, to promote energy efficiency
- Applies mainly to household appliances, but complete homes can receive Energy Star certification





# ISO 14000

The traditional approach to environmental issues is *reactive*- nothing is done until

- a new regulation comes into force
- competitors steal a lead by using a cleaner process that is more efficient
- an embarrassing incident forces the issue, perhaps involving lawsuits.

- By contrast, an EMS (like a quality management system) is *strategic*- progress is made through a deliberate and continual process of analysis, planning and implementation. The process can be summed up in four words: ***plan, act, review & revise.***
- Covered fully in [Unit 10](#).

## 2.3. Responses to the challenge

# Some responses to the challenge

- Natural capitalism
- Benefit-Cost Analysis
- The Precautionary Principle
- Using resources from space

# Natural Capitalism

- Is “a set of trends and economic reforms designed to reward energy and material efficiency, and to remove professional standards and accounting conventions that prevent such efficiencies.” [From [Wikipedia](#)]
- Advocated by the [Rocky Mountain Institute](#), a US organization committed to developing methods for sustainable use of resources.

# Can we create an “eco-economy?”

- Some believe that the economic benefits of a new “eco-economy” – of companies producing goods to help the environment – will help to offset the costs of moving to a sustainable society.
- Also see [slide 14](#), “economic benefits.”



The World Trade Center in Bahrain derives around [11-15%](#) of its energy from the wind.

[Picture](#): Omar Chatriwala (Creative Commons Lic.)

# Benefit-Cost Analysis

- The response of neoclassical economists.
- [This view](#) believes that technology and markets will provide substitutes when resources run out, citing previous shortage scares.
- Future costs & benefits (discounted) are calculated using economic methods, to judge whether environmental investments are worthwhile.
- However in some cases this approach leads to “silly” results, since not all benefits/costs are measurable and predictable.

# The Precautionary Principle

- A common response of “ecological” economists: The proponent of an action or policy that may be harmful should prove its safety before it is adopted.
  - Traditionally harmful actions/policies have only been reversed after damage has been shown to be done
  - However, proof may not always be possible – stifling progress that may even help the environment
- “Natural capital should be protected unless the cost of doing so is prohibitively high.”

# The Precautionary Principle

- After the 1992 Rio summit, [Principle 15](#) was adopted which states that: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."
- This principle has influenced the European Union's legislation such as [REACH](#), which requires manufacturers to perform register and assess many chemicals in order to continue trading them.



# Expanding natural capital: Using resources from space?

- If the Earth is running out of resources, why not harvest the resources of other planets? John Lewis argues that the Solar System alone can support a human population 1 million times bigger than our current population.

Taken from [Mining the Sky](#) by [John Lewis](#).



Internal view of the [Stanford torus](#) space station design.  
Image by [Donald Davis](#)

# Asteroid mines?



The proposed  
Arkyd  
Series 200  
Interceptor

Picture from  
Planetaryresources.com

- A [new company](#) (in 2012), backed by large capital, [plans to mine rare metals](#) from asteroid, as described in Lewis's book.

# Test yourself

1. What are some of the limitations with traditional capitalist economics as applied to gasoline pricing. How could the traditional approach be modified to incorporate the environmental costs?
2. What three types of “capital” need to be considered in the “triple bottom line?”
3. What is eco-labeling, and how can it help the environment?
4. How is Dow Jones promoting environmental investment? How does this work?

ANSWERS ON THE NEXT FEW PAGES

## Answers to “Test yourself” (1)

- In traditional capitalism, the environmental costs from gasoline use are not borne directly by either the seller or buyer, but they are treated as an externality. The impact is on the planet as a whole, not on any one individual.
- “Natural capitalism” claims to have a viable model for estimating environmental costs. If these costs can be included, the “true” cost of the gasoline can be estimated.

# Answers to “Test yourself” (2)

- The three types of capital are:
  - Economic capital: Traditional monetary resources
  - Social capital: Quality of life, equity, justice
  - Natural capital: Environmental resources.
- See slide 17, the “Triple Bottom Line”

## Answers to “Test yourself” (3)

- [Eco-labeling](#) (sometimes spelled “ecolabelling”) allows customers to see the green products in a particular product line. Such labels are typically awarded by an independent body, such as a government agency.
- The label allows customers to make informed choices. They can (if they wish) easily select those products that are the most sustainable, even if they cost more. They may also receive tax benefits.
- This provides a low cost market-based method to drive environmental improvements in products.

## Answers to “Test yourself” (4)

- The [Dow Jones Sustainability Index](#) (DJSI) allows investors to choose to put their capital into companies that are leading in the area of sustainability.
- This causes an extra flow of money to sustainable companies to “reward” them.
- It encourages all companies to invest in sustainability, since they can now receive a market-based monetary reward for doing so.

# End of Unit 2 Presentation

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