

Module 1: An Introduction to Sustainable Consumption and Production

Objectives of the Module: To familiarise users with key concepts pertaining to sustainable consumption and production.

Whenever a product or service is produced or consumed, natural resources are used (water, energy, material, etc.) and pollutants or emissions are dumped in the **biosphere**. But the inconvenient truth is that ecosystems can only absorb a certain amount of pollutants before they break down. Therefore, there are natural limits to how much each person can consume and produce. As a matter of fact, with an expected world population of about 9 billion in 2050, our allocation of resources will be even more constrained in the future. It is with this in mind that there is a clear and very crucial need for more sustainable patterns of consumption and production.

Humankind's current **ecological footprint** exceeds the carrying capacity of the Earth by 1.3 times! This means that production and consumption patterns must become sustainable in order to ensure sufficient resources for subsequent generations.

This Module is arranged into three Subsections:

1. What is Sustainable Consumption and Production?
2. Economic Growth and SCP: A Holistic Perspective
3. Linking Consumption and Production

Key Concepts:

- Sustainable Consumption and Production
- Gross National Happiness
- Macro-level Eco-efficiency

What is Sustainable Consumption and Production?

In 1987, the World Commission on Environment and Development (Brundtland Commission) of the United Nations (UN) defined sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." Most definitions of sustainable consumption and production (SCP) are going beyond this understanding and include aspects of economic and social development. Sustainability in consumption and production activities means to use natural resources and absorption capacity of the biosphere at a rate at which replenishment and restoration is possible.

Given that there are limits to the capacity of the Earth's ecosystems to absorb pollution and provide natural resources, the only way to maintain economic progress in the long term without approaching these limits is to decouple economic growth from environmental degradation.

In practical terms this means getting more from less:

- More efficient and cleaner production, using less raw materials, to foster competitive advantage;
- More value-added to a product, with less pollution and waste used across the supply chain;
- More consumer needs fulfilled, with less energy, water and waste

With this in mind, the Norwegian Ministry of Environment defines SCP as: "the production and use of goods and services that responds to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the **life cycle**, so as not to jeopardise the needs of future generations."

Ecological footprint:

Measures how much land and water area a human population/individual requires to produce the resources it consumes and to absorb its wastes, using prevailing technology.

Biosphere:

The areas of the surface, atmosphere, and hydrosphere of the earth, where living organisms exist.



SCP

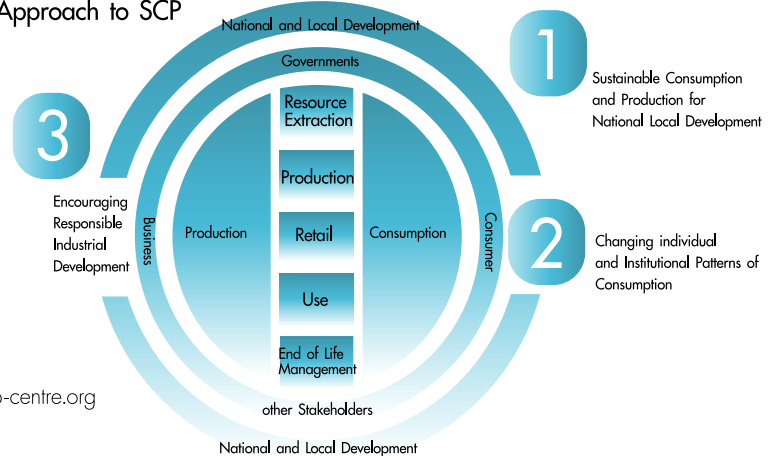


The United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) **promotes** the concept of **eco-efficiency** in production and consumption cycles because there is a need to expand the scope of the SCP debate beyond products to encompass infrastructure and services as well. In line with this ESCAP pushes for public policy that provides for improved, eco-efficient infrastructure with increased access to resources in order to improve the eco-efficiency of consumption.

SCP indicates:

- A holistic perspective that integrates economic, social and environmental aspects, as well as technological and behavioural innovation, along the whole life cycle;
- A set of practical implementation strategies and practices that address one or more phases of the life cycle of a product or service;
- A political agenda on how the production and use of goods and services can be better aligned with the goals of sustainable development.

The Thematic Approach to SCP



Source: www.scp-centre.org

Many practices and approaches are important and contribute to the concept of SCP, for instance Eco-Efficiency, 3R (Reduce, Reuse, Recycle), Circular Economy, Cleaner and Factor-4 Production, Sustainable Product Design, Standards and eco-labeling, Renewable Raw Materials, CSR or Energy Management Systems, as well as Green Consumerism and Sustainable Public Procurement, Sustainable Lifestyles and Marketing for Sustainability. The major innovation and strength of SCP is to provide a holistic perspective that integrates the whole life-cycle of products and services, combines production and consumption-related practices, covers the triple bottom line of economic, environmental and social aspects, and follows an interdisciplinary perspective to offer a framework for a consistent policy approach.

Macro-level Eco-efficiency

While eco-efficiency can be implemented on a business level to improve the triple bottom line, the concept can also be adapted to the whole economy, in order to cover rebound effects. As the progress obtained in production processes of individual products can easily be outstripped by the absolute increase of the social demand for goods and resources, it is important to apply the eco-efficiency concept to the economy-wide level.

In this context ESCAP is developing a framework for eco-efficiency indicators (EEI) to assess the macro-level environmental impacts of a society and identify policy measures that can improve the eco-efficiency of the economy to achieve greater ecological, economic and social benefits. EEIs will also allow the measuring of the eco-efficiency of economic growth of different countries. This can be used for performance comparison to enhance regional and/or sectoral eco-efficiency.

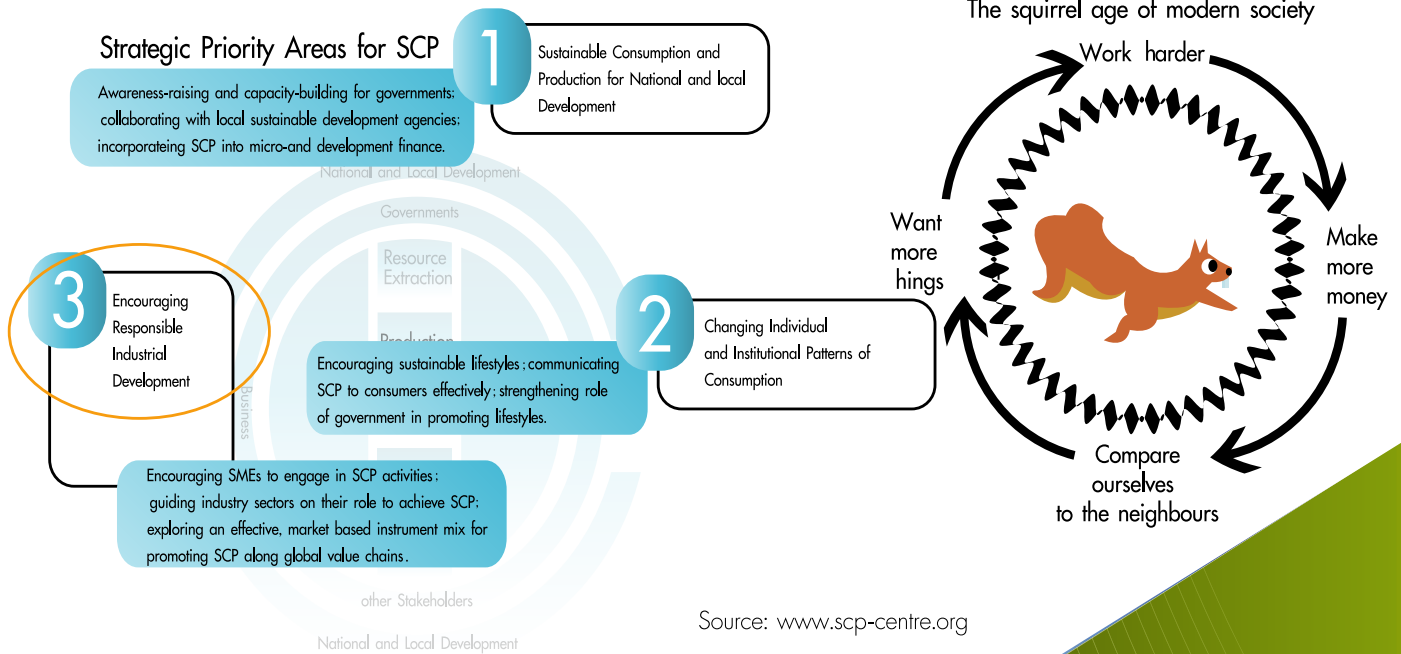
Material vs. Spiritual Wealth

The 'traditional' resource intensive and inefficient approach to production and consumption is detrimental to the environment and to economic growth in the long run. Additionally, other negative side effects of the resource and waste intensive organisation of economies include the lack of focus on happiness, and well-being, the quality of life, and the spiritual dimension of society.

Life cycle:

Refers to the notion that a holistic perspective requires the assessment of raw material production, manufacture, distribution, use and disposal including all intervening transportation steps necessary or caused by the product's existence.

The sum of all those steps - or phases - is the life cycle of the product.



The materialistic way of life that industrial capitalism has fostered may have created a more convenient life for many. An undeniable benefit of economic development is the improvement of infrastructure, the availability of potable water, sanitation, and electricity. However, the increasingly fast pace of urban working life, wasteful consumption of material goods, and a lifestyle characterized by a high level of consumption may actually have a negative effect on our well-being. This is evident in the increasing rates of obesity, psychological disorders, and substance abuse in developed countries.

The high rate of production and consumption can satisfy many peoples' material needs, there is no proof whether a life saturated with goods, services and material gadgets is really more fulfilling. In fact, the GDP of economies only indicates the rate of economic growth; it is not at all concerned with the overall well-being and happiness of citizens.

The market is not an ethical construct, and without adequate regulation, the market itself will not seek to distribute goods and wealth equally. Unregulated capitalism has a way of running rampant, because while the overall access to material wealth may have increased on a global scale, the gap between haves and have-nots- the wealth divide- is widening.

Revisiting Economic Value

The concept of Economic value often dominates the sustainability debate. On a macro-economic level economic value, often used as a synonym for the (economic) progress of a society, is measured according to the concept of Gross Domestic Product (GDP), which is based on the monetary value of the outputs from given economic activities.

This system however, does not fully account for the real value of the "human and natural capital" and a broad range of its services. For some time progressive ecological economists have been working on developing alternative indexes to measure and compare benefits and costs of growth, such as the **Index of Sustainable Economic Welfare (ISEW)** and the **Genuine Progress Indicator**. ISEW is compensating for the loss of natural capital and provides an effective measure of welfare, adding some measures of untraded benefits and by correcting for income inequality.

Genuine Progress Indicator:

This measures the state of health care, safety, the environment, and other indicators of well-being as a more holistic alternative to the Gross Domestic Product (GDP).

Index of Sustainable Economic Welfare (ISEW):

Refers to an economic indicator that goes beyond simply using GDP as a benchmark of progress by also including important factors such as income distribution and the negative costs of pollution or waste.

Gross National Happiness (GNH)

Some countries in Asia and the Pacific have recognised the importance of using GNH as a means to measure the welfare of society. For the last two decades the Kingdom of Bhutan has followed the guiding principle enunciated by His Majesty King Jigme Siongye Wangchuck, who stated that "Gross National Happiness is more important than Gross National Product". The principle describes development as a continuous process towards a balance between material and non-material needs of individuals and society. The country's philosophy of development, while recognising the importance of economic growth as essential to support and nurture the spiritual and social needs of the community, is not an end in itself, but one among many means of achieving sustainable development.

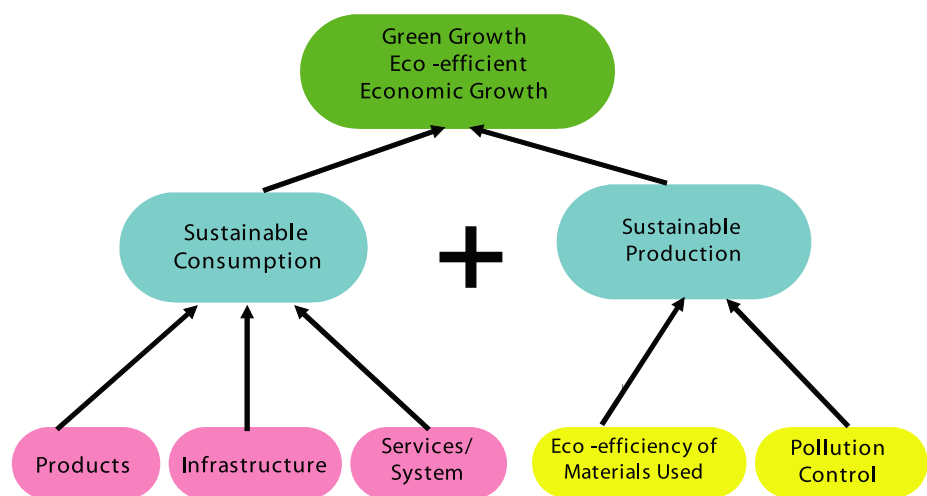
Economic Growth and SCP: A Holistic Perspective

Consumption and production patterns are the basic drivers of any economy and play an important role in shaping the sustainability of economic growth. With increased industrialisation, conditions and incentives for cleaner, more environmentally sustainable production processes evolve driven by regulatory frameworks, increased prices of raw materials, including of energy and water, and a demand for a better quality of life.

Efficiency of consumption:
includes purchasing less, purchasing sustainable products that use renewable raw materials and are produced in a resource and energy efficient way with proper waste management (to induce an incentive to the supply side), using products that use less energy, using products for longer, repairing products and the proper disposal of products.

Demand-side management:
Refers to the process of managing the consumption of resources for efficient utilisation.

Green Growth & Sustainable Consumption and Production Patterns



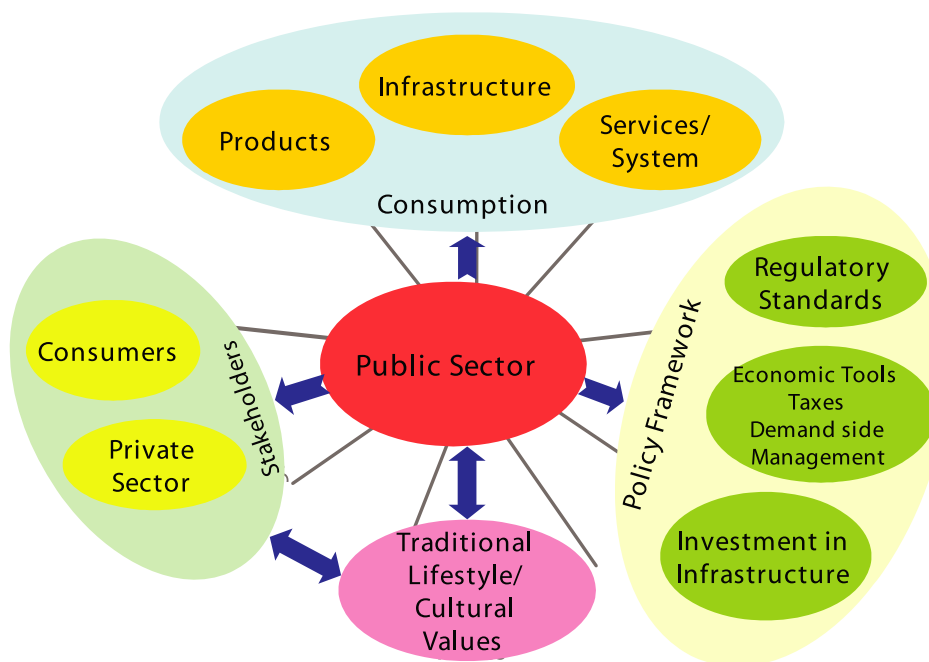
Conventional environmental management has been focused primarily on pollution control. However, in view of the limited ecological carrying capacity of the region and the large population, improving the ecological efficiency of economic growth will become increasingly important over the coming years.

Conventional economic development planning has primarily focused on the supply side of the economy: emphasising the building of more power plants, dams and highways to increase the supply capacity for energy, water and roads as opposed to improving the efficiency of energy and water consumption. The promotion of eco-efficiency, however, requires policy options for **demand-side management**, such as expanding public transportation and railroads, licensing the right to purchase private passenger cars, and regulating water and energy prices to improve society's **efficiency of consumption**. This is all the more pressing in view of the limited ecological carrying capacity of the region and the prospect of continued rapid economic growth in the Asia and the Pacific.

Consumption: In simple terms, sustainable consumption means adopting an alternative way of consumption that results in reduced material and energy intensity per unit of functional utility. Consumption relates to all phases of the life-cycle (utilisation, reuse, repair, recycle, recovery, disposal) and includes all purchasing decisions involved in the process. Governments, industry and private households are all consumers. Actions to foster sustainable consumption include purchasing decisions (green purchasing, **green public procurement**, etc.) and incorporating **resource efficiency** measures across the life of a product or service.

Production: The production side includes the production related phases of the life-cycle (extraction of raw material, production, manufacturing, distribution). Sustainable production includes the application of technological innovation and improvement of production processes. Sustainable production practices, especially waste prevention approaches such as cleaner production, pollution prevention, eco-efficiency or green productivity need to be mainstreamed in all sectors including in the increasingly important service sector.

Role of Public Sector



Green public procurement: Roughly defined as a policy of incorporating environmental and social criteria alongside other conventional criteria of price and quality criteria into purchasing decisions.

Rebound effect: A rebound effect generally offsets benefits achieved by an improvement. An example of a rebound effect could be a driver who replaces a car with a fuel-efficient model, only to take advantage of its cheaper running costs to drive further and more often.

SCP: Linking Consumption and Production

In line with the above, SCP describes this entire process. Producers can influence consumption through product designs and marketing with consumers. In turn, consumers can influence production processes, as well as supply and design of products through their market choices.

Ironically, efforts to improve the environmental compatibility of products and services or to enhance their economic performance have opened up opportunities to consume more of them, negating the benefits derived from the original improvements (aka the "**rebound effect**"). To deal with these rebound effects, both consumption and production need to be taken into consideration.



Triple Bottom Line:

In practical terms, triple bottom line accounting means expanding the traditional reporting framework to take into account ecological and social performance in addition to financial performance.

For these reasons, it is necessary for the public sector to provide consistent policy interventions to steer and enhance the eco-efficiency of consumption patterns. In addition to regulating and stimulating sustainable consumption, the public sector can create a conducive environment for more investments into sustainable consumption choices, such as into sustainable infrastructure.

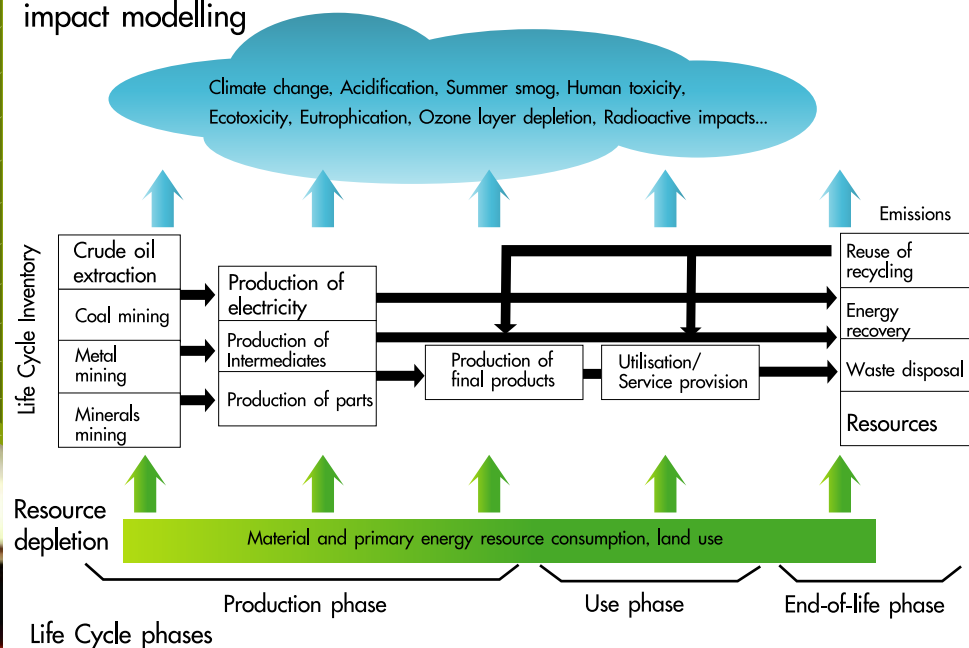
Seen in this way, sustainable consumption is an opportunity for improving the eco-efficiency of economic growth. Economic incentives and pricing policy are important tools: pricing policy can include reform of taxes and subsidies, economic incentives for renewable energy, energy price policy, polluter/ user fees, and/or higher interest rates for poor environmental performers. These measures can be useful in changing consumption patterns of society, such as lifestyle and consumer behaviour.

An integrated SCP methodology takes these factors into account. Effective SCP practices take into account the whole life-cycle, by minimising environmental impact and resource consumption of products in the design stage at the beginning of the production process.

All sectors and consumption domains: SCP is not limited to any consumption domain or industry sector; it is especially applied to those demand segments and production sectors which are resource intensive or highly damaging to health and to environment. Priority consumption domains include: mobility, housing, nutrition, tourism, clothing, etc.

Micro- to Macro-Level: SCP is relevant on the micro-level for the individual consumer and company as well as on the macro level of production systems, such as the enterprise, local and provincial level, the national level, and of course, the regional and international level.

Environmental and health impact modelling



Global Dimension of SCP

SCP works to consolidate the activities of the entire supply (from the extraction of raw materials, to the production, consumption and recycling) to promote sustainability. As international supply chains currently link countries of all continents and regions, taking a global perspective is vital to achieving SCP.

Example: GPS Car Navigation Device

The copper to produce printed circuit boards is mined and processed in Africa and shipped to China where the Chip producer is located. The chip, made in China, is shipped to a manufacturer in Vietnam, together with a dozen of other components that passed several production steps in various countries. Finally from the sum of components, assembled in Vietnam, a GPS navigation device appears, which is shipped to Germany. In the German city of Ruesselsheim it is installed at the production line in the newest model of OPEL Zafira. The car finally is shipped to Slovakia where it is sold, including components from all over the world.

Review questions:

1. Please consider the three most important reasons for aligning consumption and production with sustainability objectives.
2. Please mention some of the main practices that the private sector can implement to improve their triple bottom line.
3. What are some of the alternative indicators of societal progress?

Further Readings

Porrit, J. 2006, Capitalism as if the World Matters, Earthscan, UK

ESCAP (2006). State of the Environment in Asia and the Pacific 2005: Economic growth and sustainability New York, United Nations



The Scope of SCP:

Sustainable consumption and production is cross-cutting in character and includes disciplines such as economics, social and cultural sciences, engineering as well as ecology and other natural sciences. SCP needs the active involvement of all stakeholders and requires a wide range of locally-adapted policy responses. The scope of SCP also covers the Triple Bottom Line.



SCP



Module 2: The Need for Sustainable Consumption and Production in Asia and the Pacific

Objectives of the Module: To introduce users to the region specific facts and findings supporting the need for sustainable consumption and production.

Many Asian-Pacific countries have made stunning progress over recent years in reducing poverty and enhancing the quality of life for millions of their citizens. However, as prices of natural resources and commodities fluctuate, as climate change deepens and accelerates, and as mountains of waste overflow landfills and stretch municipal budgets, sustainable consumption is emerging as a crucial necessity for sustained economic growth.

Asia and the Pacific, with the lowest per capita access to natural resources, cannot afford to use its natural resources wastefully. As incomes in the region grow, consumption patterns become less eco-efficient and threaten to exhaust the environmental carrying capacity.

This module is arranged into four Subsections:

- Economic and Social Costs of "Business as Usual" Growth in Asia and the Pacific
- Unexplored Opportunities for Sustainable Consumption and Production
- Ecological Inefficiency: A Failure of the Market and Price System
- Sustainable Consumption and the Role of Various Actors

Key Concepts:

- Sustainable Consumption and Production
- Biocapacity/carrying capacity
- Climate change

"...We [developing nations] are imitating the world which created pollution. So our lifestyle is imitating the lifestyle of the people who have already led the way. That is the most dangerous part of it ...So, we have to find lifestyle which is consistent with our principle or decision -- we should leave the world safer than we found it", Muhammad Yunus, winner of the 2006 Nobel Peace Prize.

Economic and Social Cost of "Business as Usual" Growth in Asia and the Pacific

The speed of economic growth in Asia-Pacific developing countries has been surpassing global growth rates for several years. The region's contribution to global GDP has been steadily rising over the last decade, but its role as a global production centre has also brought about major environmental pressures. Due to industrialization and trade, fast-growing Asian and Pacific developing countries are shouldering an increasingly greater share of regional and global environmental production-related burdens. Evolving production patterns and their impacts are both driving, and driven by, changes in consumption patterns. Despite the region's high poverty levels, current consumption pressures, as measured by the ecological footprint, exceed the available bio-productive area (or the productive natural resource endowment) per capita in at least 18 countries.

While this may be a global problem, the Asia-Pacific region in particular is growing beyond its given bio-capacity. It is estimated that the region will be unable to sustain its current economic growth rates over the long-term. The increasing pressure on the environment can be observed using the Ecological Footprint (EF) method.



Table 1: Ecological footprint by region

Source: WWF Study 2006	Biocapacity (global ha/person)	Ecological Footprint (global ha/person)	Ecological Deficit (global ha/person)
Asia and Pacific	0.7	1.3	-0.6
Africa*	1.3	1.1	+0.2
Latin America	5.4	2.0	+3.4
North America	5.7	9.4	-3.7
EU (25)**	2.2	4.8	-2.6
World	1.8	2.2	-0.5

* Excluding Central Asia and Caucasus

** Excluding the latest accession countries

ESCAP's regional environmental report indicates that the environmental pressures as gauged by its ecological footprint are real and mounting. Examining the link between economic growth and environmental sustainability, the report stresses that these environmental pressures are beginning to limit the region's long-term prospects for economic growth.

The key issues for the national economies of Asia-Pacific are related to water and water availability, which will affect billions of people. Changes in the water cycle will cause severe draughts in some parts of the region, while other parts will encounter flooding. In particular, the report points out that water is already a limiting factor for not only agricultural, but also for industrial production. India's industrial water use, for example, is expected to almost quadruple by 2050, but water shortages at the height of drought have temporarily slowed industrial activity in parts of the country. In China, water shortages have been responsible for an estimated annual loss of some US\$28 billion in industrial output in recent years.

The number of people affected by drought in Asia and the Pacific between 1995 and 2004 is almost equalled by the number affected by flooding in the same time period. Climate change is predicted to result in even more highly differentiated temporal and spatial variations in the distribution of water resources across the region.

This threat points to the need for new investments into infrastructure. Yet, urban centres, the engines of regional growth, continue to be poorly equipped to meet these challenges. Increasingly extreme weather events serve as a sinister reminder of the importance of incorporating climatic vulnerability assessments into infrastructure planning.

Fortunately, these goals can be achieved synonymously with action to adapt and mitigate climate change, and are becoming increasingly compatible with overall economic objectives. One of the ways to achieve the double objective of climate and energy security can be achieved by moving towards sustainable consumption and production.



SCP



Unexplored Opportunities of Sustainable Consumption and Production

Sustainable consumption is embedded in Asian and Pacific cultural values and traditions, which are still in evidence today despite rapidly changing economies and societies. Strong symbols of sustainability remain important to Asian and Pacific citizens and institutions, such as the nourishment of rice paddies, the everlasting power of rivers and watersheds, and the importance of family and self-sufficiency. These symbols epitomize the enduring values of quality over quantity, natural over artificial, organic over chemical and durability over obsolescence.

In line with the with above, in 2007, two separate polls found that Chinese consumers are more willing than people in other countries to support climate change taxes (85 per cent in favour) and buy products from environmentally responsible companies (67 per cent). In the Philippines, Indonesia and the Republic of Korea, more than two thirds support climate change taxes (if used to finance climate change solutions), higher percentage than for nearly every other of the 21 nations surveyed.

Table 2 : Consumer Attitudes towards Sustainable Consumption

	It is necessary to increase energy cost (%)	Implement CO ₂ taxes if used for alternative energy sources (%)	More likely to purchase from business with a good environmental reputation (%)	Average "green indicator" response (%)
Australia	81	87	52	65
China	83	97	67	68
India	49	60	-	-
Indonesia	83	79	-	-
Philippines	48	69	-	-
Republic of Korea	49	70	-	-
Canada	72	80	34	59
United Kingdom	76	76	27	49
United States of America	65	74	42	55

Source: TANDBERG and Ipsos MORI, "corporate environmental behaviour and the impact on brand values", 2007, accessed at www.ivci.com/pdf/corporate-environmental-behaviour-and-the-impact-on-brand-values.pdf in November 2007.

This points to the unrecognised market and therefore untapped economic potential for sustainably produced and delivered goods and services. This potential is evident not only in regional markets: there is a rising demand for organically produced and nature-inspired goods and services in the West, some with a basis in Asian traditional practices, such as organically and sustainably cultivated cotton clothes from India and herbal medicines from Thailand.

Such international appreciation for Asian and Pacific traditions can eventually drive the rediscovery, and search for a better understanding, of Asian and Pacific spiritual and cultural wealth within countries in the region. This search is also facilitated by a growing unease among consumers, even in Asia and the Pacific, about the environmental impact of their lifestyles and the limited possibilities for change. The view that consumption, particularly conspicuous consumption, has a dominant role in improving human well-being is also being questioned.

The substantial economic potential represented by these markets can be realised by strengthening environmentally beneficial cultural values and traditions, and "mainstreaming" them within the economy. This is similar to the "sufficiency economy" principles in Thailand, which set the cultural tone that sustainability is not only the preferred future, it is the only viable future.

Ecological Inefficiency: A Failure of the Market and Price System

Today, with 3.9 billion people or two thirds of the global population, 1.5 times the global population density, and the most limited access to natural resources per capita, the Asian and Pacific region must make cleaner and more thoughtful use of its scarce natural wealth.

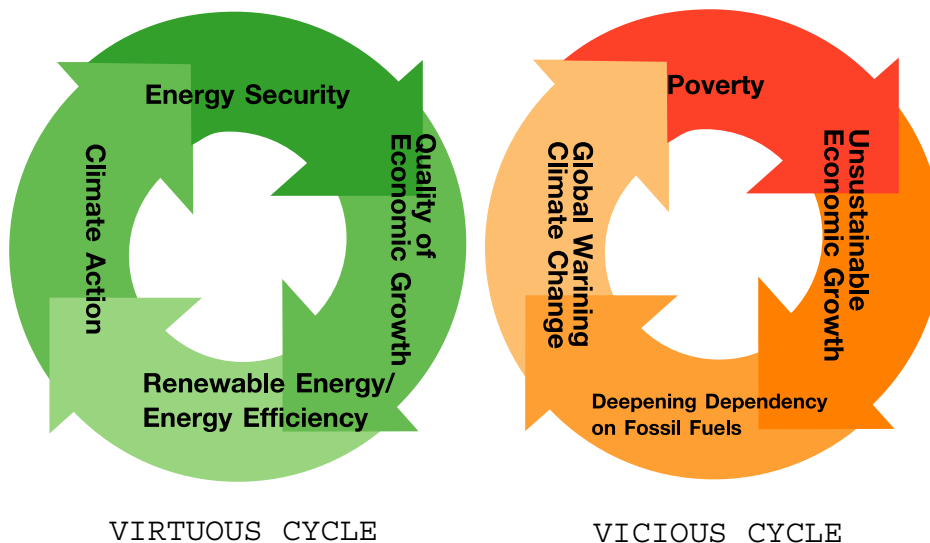
Ecological efficiency not only requires internalising the costs of extraction and processing, but also the ecological costs of usage of natural resources in the prices of goods, in order to make them more subject to the processes governing the markets.

Efficiency of resource use is one of the important variables for computing market price in the current economic system. This price, however, does not reflect the full costs of the processing of inputs (natural resources) and outputs (wastes, effluents, emissions). For instance, if the effects on the natural system from the use of hydrocarbons were internalised into the cost of production, then a transition into renewables could be more effectively facilitated and the impact on the environment could be reduced. This transition has yet to occur.

As long as the environmental costs are considered as social costs and externalities, they will remain outside the workings of every transaction occurring in the market. This distorts the market and creates an ecological deficit, which in turn has a causal effect on the natural systems balance, often resulting in natural disasters and calamities. Uncalculated, these consequences bring additional market distortion by increased and unplanned costs for dealing with the aftermaths of such natural disasters. To make matters worse, a multifold increase of payments for losses and compensations creates further disruptions in the functioning of the market forces.

This vicious circle could be reversed mostly through adopting the ecological efficiency as shown in the diagram below. This strategy does not require much additional costs and funding, as investments are recouped through improvements in efficiency. For example, opting for eco-efficient modes of transport has the potential to substantially ameliorate congestion costs, which at present in some mega-cities is consuming a considerable percentage of the GDP. Once these externalities become internalised figures in production cost, the private sector will have much more incentive to develop cleaner production methods, resource efficient production methods, full life-cycle production strategies, and so on.

Since the economic system is a sub-system of human society and is functionally designed to support its existence, the current economic system has reached the boundaries of the encompassing biological ecosystem, which on its own cannot grow. Due to the thermal dynamics of the Earth, the expansion of the economic system is virtually impossible. Society today needs to embrace the approach of ecological efficiency in the use of natural resources.



SCP



Sustainable consumption and the role of various actors

Production and consumption patterns are the basic drivers of any economy and play an important role in shaping the sustainability of economic growth. With increased industrialisation, conditions and incentives for cleaner, more environmentally sustainable production processes are provided by both evolving regulatory frameworks and increasing the prices of raw materials, such as energy and water, to further Green Growth objectives.

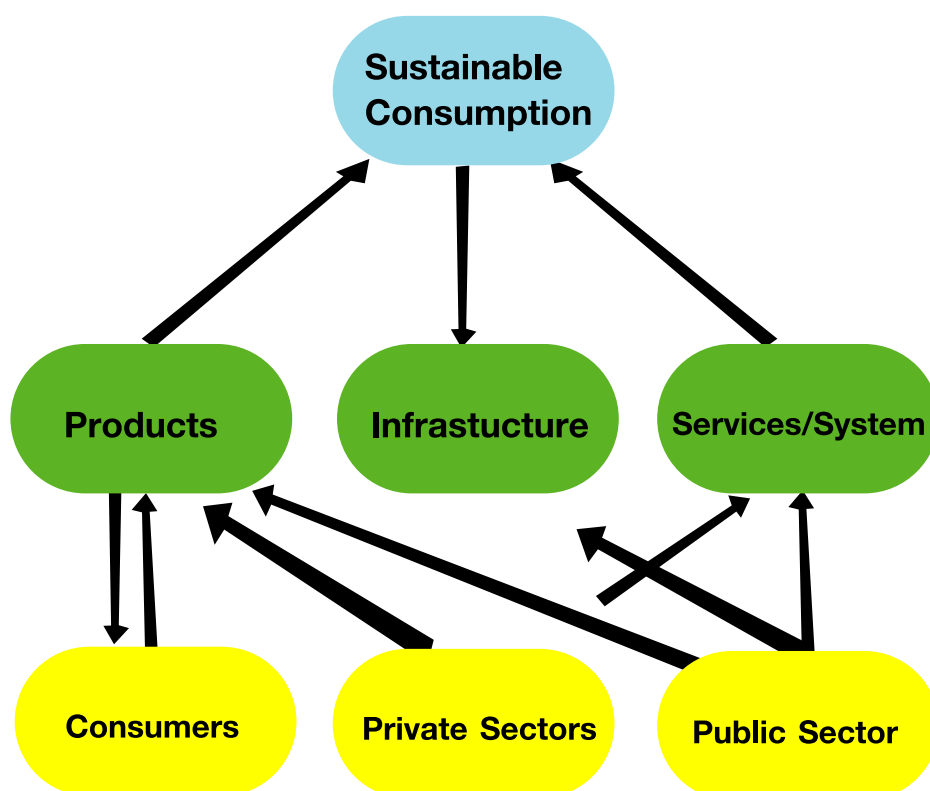
However, there are no similar price signals within the economy that will move society towards achieving sustainable consumption; Governments must actively promote this. It requires a whole-system approach in addressing consumption patterns, involving all three major actors of an economy: Government, consumers and producers.

Government policy

The ESCAP Second Green Growth Policy Dialogue, held in Beijing in May 2006, underlined the important role that public policy plays. Presentations and discussions at the forum pointed out that Governments' roles should include:

- Developing policy frameworks for regulatory standards; infrastructure development and demand-side consumption management
- Demand side management using appropriate economic instruments and pricing systems
- Nurturing stakeholder engagement - both consumers and businesses
- Promoting sustainable consumption of products and services, via public procurement processes and infrastructure development
- Re-enforcing the linkages between traditional lifestyles, cultural values and consumption patterns
- Supporting energy efficiency progress with policies and standards.

Sustainable Consumption - Stakeholders



The underlying principle of SCP is the need to reduce the ecological impact of consumer patterns, rather than reduce the well-being that consumption is intended to produce; in other words, to improve the quality of consumption, by reducing the quantity of resources used in production. Making the "business case" for a sustainable consumption ethic is a great challenge and requires courageous political and cultural leaders. Compelling arguments for sustainable consumption must appeal to both the humanity (that is, "it is the right thing to do") and the collective desire to remain globally competitive on all fronts. Farsighted leaders will recognize the innate competitive advantages presented by cultural values and traditional resource management practices, and engage them for building greener, more competitive economies.

Examples: Sustainable Consumption and Production Policies

* Focusing efforts on the upper waste stream, Cebu City in the Philippines has achieved waste minimization activities such as recycling, composting, proper management of medical waste, and a good landfill system.

With the help of, among others, its sister city Haarlemmermeer of the Netherlands, Cebu has (i) undertaken institutional capacity building, (ii) increased public information on the matter of municipal solid waste management, (iii) improved the working and health conditions of waste pickers, and (iv) reached a better management of medical waste. Furthermore, the compost/organic fertilizer facility at the city nursery, has allowed the city to practice waste segregation and organic farming.

Source: APFED, 2005

* The Ministry of Economy, Trade and Industry in Japan is promoting the "3Rs" in order to create a sustainable society : one that has balance between the environment and the economy:

Source: <http://www.meti.go.jp/policy/recycle/main/english/index.html>

* Since its establishment in 1992, the Cleaner Production Programme in Russia jointly funded by the Russian and Norwegian Governments has targeted more than 1700 engineers and specialists from 500 industrial and agricultural production entities, who have been trained to develop and implement projects focused on resource saving for green development. Projects developed range from waste management to alternative energy resources. The annual economic benefits of the initiation projects alone amount to 5-7 times value of the donor investment.

Source: Russian Cleaner Production and Sustainable Development Centre;

<http://www.ruscp.ru/maineng.htm>

Role of Consumers

As the originators of economic activity, consumers include both individuals and organisations. Successful companies will quickly and effectively respond to changes in consumer demand. Ultimately a sustainability-oriented and well-informed consumer is the root driver of progress towards a sustainable economy.

Few financial incentives currently exist for consumers to adopt sustainable consumption patterns. This is partly because so many of the environmental and social costs involved in making products and services are not included in the price. As **externalities**, they distort consumer choices because the market prices do not reflect the sustainability performance of the product. It must be remembered that if there were no externalities, sustainable products would consistently be the least expensive.

Externalities:

Environmental or social costs not normally figuring in the balance sheet of production or consumption.



SCP



Consumer demands are often instead shaped by artificially low prices for unsustainable products or services, widely publicised unsustainable consumption habits (mainly through advertising and the Western media), and lack of information about the quality of products, the resources used for their production and their end-of-life disposal.

As a result of these market distortions, many developed countries face massive waste management costs. Policy innovations such as **extended producer responsibility**, sustainable product service systems and waste and pollution pricing are several ways these distortions can be addressed.

Consumption is driven strongly by symbols. Material goods that lead to the unsustainably high consumption of energy and resources, such as large cars, remain an important symbol of achievement. Accordingly, consumer education and public disclosure systems are critical tools that can create a well-informed and conscientious consumer with the ability to act independently of social and cultural pressures. Information about the quality of products and services, resource use and intensity, and life after use, or product and service life cycles, are all necessary prerequisites to allow consumers to make conscientious choices towards sustainable consumption.

Role of Businesses (producers)

A global paradigm shift is guiding business and investment, based on the profits that sustainability strategies can generate. Around the world, rising consciousness and political will for developing a more sustainable global economy is evidenced by the more than \$100 billion in annual capital flows generated by pioneering entrepreneurs, organizations, and governments in renewable and alternative energy production to reduce CO₂ emissions.

Some of the most powerful players in today's economy, including Citigroup Inc, The Goldman Sachs Group, Inc., McKinsey & Company, Marks and Spencer, and Wal-Mart Stores, Inc., many of which have an important role in Asia-Pacific economies, have announced breakthrough environmental initiatives in the past two years. These innovations will assist in formulating a new sustainable business culture in the Asian and Pacific region. Businesses have shown they can move quickly towards offering more sustainable products and services when the demand for them is clearly evident. Incentives for innovation in sustainable products may help, but ultimately it is Governments that must set the example through their procurement policies.

To support these actions in the region, in May 2006, ESCAP- partnering with the China Standard Certification Centre and UNEP- established the Regional Help Desk on Sustainable Consumption and Production in Asia and the Pacific. This is just one step towards assisting Governments to forge strong partnerships with NGOs and sustainability-aware businesses: dispelling the false notion that carbon and materially intensive economies and life styles will lead to higher levels of well-being.



Courtesy of Alex Sokolowski

The following are leading examples that show the way forward and demonstrate that such an approach is attainable:

- The Chinese resource-saving society concept has been introduced into their current eleventh five-year plan.
- The 3R (**reduce, reuse and recycle**) concept, which aims to achieve integration of the environment and the economy through the effective use of resources, is being actively supported by various ministries in Japan.
- The Thai concept of self-sufficiency economy, exemplified by the numerous Royal Projects in Thailand, is a good example of reviving local knowledge in order to achieve a decoupling of the economy and the environment, while at the same time building the self-reliance and resilience of local communities.
- The concept of Gross National Happiness by the Royal Government of Bhutan has provided a strategy for the transition to a constitutional monarchy, as well as for developing appropriate investment and business growth. Based on Buddhist philosophy, GNH provides for preserving social welfare, strengthening the Bhutanese culture, preserving national resources and increasing the national pride of the Bhutanese people.

Conclusion

Today, people in the Asian and Pacific region are looking for ways to revive and reinstate traditional cultural values in ways that promote the sustainable, eco-efficient use of natural resources and enhance the competitiveness of enterprises. The revival and strengthening of such values have been described as actions underpinning societal change, and are often complementary to ideals related to social justice and harmony. Ms. Vandana Shiva, an Indian scientist and sustainability activist, for example, calls for a new model of "Earth Democracy", which is grounded on living economies and "compassion, justice and sustainability".

Other regional leaders are coming forward to lead their countries towards adopting more sustainable development patterns. Globalisation is beginning to play a conducive role in spreading ideas that can contribute to enhancing the environmental and social sustainability of the region. Taken together, sustainable consumption strategies are gaining momentum and their potential for success is becoming greater than ever.

Reduce:

Reducing the amount of waste by increasing the efficiency of resource use and extending the useful life of products.

Reuse:

Using the "recyclable resources" from used items again, as products or parts, after giving them proper treatment. ("Recyclable resources" are the useful parts or components of waste, used products and by products).



SCP



Further Reading

Hawken, Lovins and Lovins 2000. *Natural Capitalism: Creating the Next Industrial Revolution*. New York, Boston: Little, Brown and Company

Worldwatch Institute, *State of the World 2008: Innovations for a Sustainable Economy*, (W.W. Norton, 2008) accessed from www.insnet.org/ins_headlines.xml?id=5845&photo= in December 2007

Vandana Shiva, *Earth Democracy: Justice, Sustainability, and Peace*, (Cambridge, Massachusetts, South End Press, 2005), p. 11. See also Vandana Shiva, "Earth democracy paradigm shift", *Resurgence Magazine*, No. 214, accessed at www.resurgence.org/resurgence/issues/shiva214.htm in December 2007

Glossary

Externalities: Environmental or social costs not normally figuring in the balance sheet of production or consumption

Extended producer responsibility: Extended Producer Responsibility means responsibility by the manufacturer for the entire product life-cycle. It is embodied as a concept in the EU Waste Electrical and Electronic Equipment WEEE Directive, and various legislative approaches are under consideration in the US.

Reduce: Reducing the amount of waste by increasing the efficiency of resource use and extending the useful life of products.

Reuse: Using the "recyclable resources" from used items again, as products or parts, after giving them proper treatment. ("Recyclable resources" are the useful parts or components of waste, used products and by products.)

Sustainable product service systems: Refers to a new idea for less-resource intensive and quality centred business that improves sustainability performance and invites business to shift the focus from selling products to selling utility so it can fulfil the same client demands with less environmental and social impacts.



Courtesy of Alex Sokolowski

How to Do SCP: Green Public Procurement

The practice "Green Public Procurement" focuses on consumption related to all phases of the life cycle. However, as the government is one of the most powerful consumers Green Public Procurement can also encourage the market transformation towards more sustainable products and services.

1. Overview

Procurement is the acquisition of goods and services to meet the needs on the best possible terms. Traditional procurement is based on the core concept of maximising the benefits regarding the two pillars: quality and price. Green public procurement broadens its focus and takes environmental and social aspects into consideration. Public procurement, which applies sustainability criteria in addition to the main indicators of price and quality, is promoted by ESCAP to be one of the most important policy tools in the move to SCP.

Publicly funded procurement represents the biggest single buyer in market economies. The expenditure from the all levels of government (including direct consumption and investment expenditure) accounts for about 20 per cent of the GDP in many OECD countries, and roughly 15 per cent in non-OECD countries.

Sustainable procurement should consider the environmental, social and economic consequences of:

- Design;
 - Non-renewable material use;
 - Manufacture and production methods;
 - Logistics;
 - Service delivery;
 - Use;
 - Operation;
 - Maintenance;
 - Reuse;
 - Recycling options;
 - Disposal; and
 - Suppliers' capabilities to address these consequences throughout the supply chain.
- Green public procurement is an umbrella concept such as any public procurement that manages to meet the main objectives of sustainability can be considered as sustainable procurement.

Objectives of sustainable public procurement:

- **Reduce environmental impacts:** cut green house gas emission; reduce air and water pollution; improve energy and water usage efficiency; reduce waste and support the reuse and recycling; reduce hazardous and toxic waste; promote the usage of renewable resources.
- **Promote social and economic development:** provide a market for local SMEs; expand the market for efficient products and promote technology innovation; reduce unemployment; promote gender, racial and ethnic equity; create job opportunities for disabled persons; and strengthen the implementation of the labor standards.
- **Cut the public consumption expenditure and improve the organizational efficiency.**

Defining Green Public Procurement:

Green public procurement is not a new concept and has been introduced to promote a market transformation towards more sustainable products and services. The UK Sustainable Procurement Task Force and the Marrakech Task Force on Sustainable Public Procurement define sustainable public procurement as: "a process whereby the organisations meet their needs for goods, services, works and utilities in the way that achieves value of money on a whole life basis in terms of generating benefits not only to the organisations, but also to the society and economy, whilst reducing damage to the environment".



Why Green Public Procurement is a powerful practice

Green public Procurement provides win-win situations as it helps to optimise life cycle costs for the consumers, cut the bills for governments and improves social and environmental outcomes at the same time.

Although CSR campaigns have already started to set the foundation to integrate social aspects of production and consumption, the criteria to evaluate whether a product or service is socially sustainable or not, are still not generally accepted. As a result, green public procurement is often narrowed to a focus strictly on environmental aspects, expressed in concepts such as green purchasing, energy conservation procurement, or environmentally friendly product procurement. A large number of countries have adopted relevant policies to make their public procurement more efficient, greener or more sustainable:

European Union: Communication on Integrated Product Policy (IPP)

United States of America: Federal Government Procurement for ENERGY STAR labeled and FEMP designated products

China: Energy Conservation Government Procurement and Environmental-friendly Products Procurement

Japan: Green Public Purchasing

Korea: Public Procurement for Energy Efficient Labeled products, High Efficiency Appliances and e-Standby certified products

Chinese Taipei: Procurement for Energy Labeled Products

Thailand: Procurement for Energy Efficiency Products

Sustainable Public Procurement:

- Brings real cost-benefits: In many cases, the upfront investment of the green products is higher, but the total cost in the whole life-cycle is less than the base line scenario. This has been proved by numerous examples, such as the highly efficient light bulbs, air conditioners and so on.
- Reduces the environmental and social impacts: Green products are given higher priority in the procurement procedure, because they have to meet higher and stricter environmental criteria and standards. Their performance has been proven by third-party organisations, so they will bring real environmental and social benefits.
- Promotes market transformation: The market power of publicly-funded purchasing expands the market for the green products significantly. This can influence producers to invest more in process and product innovation. Green public procurement also raises awareness, shows leadership of the government and demonstrates to consumers how to reduce environmental impacts by utilising their purchasing power.

2. Best practices

Government Procurement for Energy-efficient Products, China.

In 2005, the Chinese government spent roughly about 450 billion USD for purchasing consumable goods: these expenditures have increased by 20 per cent annually. Energy bills from government agencies also represent a significant share of the public budget. The average energy and electricity consumption in the government is 2.5 to 4 times higher than in the residential sector.



How does energy conservation procurement work in China?

Component 1: Identify energy conservation products:

The eco-label is one of the most popular tools in the sustainable public procurement process. Trustworthy third-party organizations take the responsibility to set the efficient performance standards, the products and award the labels to show the energy efficient qualification of the products. This makes it much easier for the purchasers to find the qualified products. In China, the energy saving labeling program (labels shown below) started with computers, monitors and so on in 1998, this was expanded to include additional product categories. This labeling programme ensure that there are energy conservation products in the market for the purchasers. An energy conservation product list is published and updated twice a year, including the brand, manufacturer information and product model characteristics as important reference.



Green Public Procurement:

"a process whereby the organizations meet their needs for goods, services, works and utilities in the way that achieves value of money on a whole life basis in terms of generating benefits not only to the organizations, but also to the society and economy, whilst reduce damage to the environment".

Component 2: Put the energy conservation on requirement in the bid

In the public procurement bids, the energy performance requirements are indicated clearly. The energy conservation products will be put on a higher position in the bids granting evaluation process.

Component 3: On-line procurement

For the decentralised procurement, the government developed an on-line procurement system. It integrates all the information about the products, manufacturers and the pre-selected qualified vendors. The purchaser proposes the request on-line and the request is processed by technical staff.

Component 4: Financial audit

Every year, the financial department audits the procurement processes. The energy conservation performance of the products is checked.

Policy options

Although public procurement activity has existed for a long time, the 1st government procurement law was implemented in 2003. Since then, the government procurement has gained higher attention from the public.

China started the process to establish the government procurement for energy-efficient products (often also called energy conservation procurement) mechanism within 5 years.



China's Road to energy conservation procurement:

1998: The first Energy Conservation Law was put into force

1998: The voluntary Energy Conservation Labeling Program was established in the same year, according to relevant articles in the Energy Conservation Law

2003: The first Government Procurement Law was enacted

2004: The "Implementation of Government Procurement on Energy Conservation Products" was enacted and set the Energy Conservation labeled products as voluntary criteria

2005: The first energy conservation products for government procurement list was published, in which the water conservation products are also included

2007: "Building Governmental Mandatory Procurement System for the Energy Conservation Products" was published by the State Council. The energy conservation products list published in the same year indicated 9 mandatory products, which are air conditioners, double-capped fluorescent lamps and self-ballasted fluorescent lamps, TVs, electric heaters, computers, printers, monitors, urinals and water faucets.

2008: The revised Energy Conservation Law was put into force, which highlighted the energy conservation in the state funded institutions and the government procurement for energy-efficient procurement.

2008: The Energy Conservation Regulation for State Funded Institutions put the energy conservation products in high priority

2009: The fifth edition of the energy conservation products list is updated, to be updated twice a year.

Principles of Green Purchasing from GPN:

Principle 1 - Consider necessity before purchasing.

Principle 2 - Note the environmental impacts of a product over its whole life cycle; from raw material extraction to disposal.

Principle 3 - Select suppliers and distributors making conscious efforts to care for the environment.

Principle 4 - Collect environmental information on the products and suppliers.

How does GPN work?

- Green purchasing guidelines. For each product category, a specific purchasing guideline is developed. Each guideline addresses different issues. For instance, the "Copying Machine" guideline focuses on energy consumption, two-side copy function, collection and recycling of used products and cartridges, the use of reusable parts and recycled materials and avoiding use of the hazardous substance.
- On-line green products database. The database collects all the green products in the market. It provides the function of listing and comparing the green performance of each product according to the indicators specified in the corresponding Green Purchasing Guideline. The database is updated 4 times a year. Thus far the database has stored information of more than 11,000 products of 16 categories.
- Promotion of Green Purchasing. To mainstream the idea of Green Purchasing, the following activities are conducted: hosting national and regional seminars and exhibitions; awarding best performance members practicing green procurement; advertising on public media such as TV, newspaper, etc.



The Green Purchasing Network, Japan

The Green Purchasing Network (GPN) was established in February 1996 to promote green purchasing among consumers, businesses and governmental organisations. It's a non-profit independent organisation consisting of more than 2,800 members including the Japanese Ministry of Environment, local governments, major businesses, small and medium enterprises and civil society organizations. The International Green Purchasing Network was founded in 2006 as the outreach organisation.

GPN's targets are divided into two groups: Individual consumers and organisations.



SCP



Policy support for the public green purchasing

In 2000, the "Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Law on Promoting Green Purchasing)" was enacted in Japan setting green purchasing as a national policy. All the government bodies are required to carry out green purchasing. Each body is responsible for developing and publishing its green procurement action plan, tracking green purchasing records and reporting on the green purchasing annually. The "Basic Policy for the Promotion of Procurement of Eco-Friendly Goods and Services" indicates the designated procurement item, evaluation criteria and basic matters of the procurement. Unlike a typical green procurement system, the Japanese green purchasing doesn't adopt one single eco-label as its procurement criteria but specifies the criteria in its technical files.



Figure * Mechanism of Green Purchasing Law

For the GPN, its share of the purchased green products is shown below:


Eco Mark ISO Type Label		88%
GPN Guidelines/Database		48%
Symbols from Third parties		43%
Criteria of Green Purchasing Law		33%
Self Declaration Label		23%
ISO Type Label e.g Eco-Leaf		7%

Figure *: Product Related Information Used by Green Institutional Purchasers

3. Policy options

There are numerous policy options to enhance Green Public Procurement, including; standards and labeling programmes; basic laws and regulations; guideline development; as well as financial and/or budget system reform. Some typical policies promoting the sustainable public procurement are listed below:

Economy	Details
European Union	<ul style="list-style-type: none"> ➤ Communication on Integrated Product Policy (IPP) ➤ National Green Action Plan (in 9 member states)
China	<ul style="list-style-type: none"> ➤ Energy Conservation Law ➤ Government Procurement Law ➤ Implementation Suggestion of Government Procurement for Energy-efficient Products
USA	<ul style="list-style-type: none"> ➤ President Executive Order 13221 ➤ Energy Policy Act of 2005
Japan	<ul style="list-style-type: none"> ➤ Law Concerning the Rational Use of Energy ➤ Law on Promoting Green Purchasing ➤ Action Plan for Green Purchasing Operations
Republic of Korea	<ul style="list-style-type: none"> ➤ Purchase and Operation Standard of the Energy Consuming Products ➤ Act on the Promotion of the Purchase of Environment-Friendly Products ➤ The Instruction of Public Procurement Service No. 1346
Chinese Taipei	<ul style="list-style-type: none"> ➤ Government Procurement Act of 1998 (article 96) ➤ Measures for Priority of Environmentally Preferable Products by the ROC Government Agencies
Australia	➤ Energy Efficiency in Government Operations Policy
Hong Kong	➤ Stores and Procurement Regulations (SPR)
Thailand	➤ Cabinet Resolution for government procurement for energy-efficient products

Resources and further reading

UNEP (2008), Public procurement as a tool for promoting more Sustainable Consumption and Production patterns,
http://esa.un.org/marrakechprocess/pdf/InnovationBriefs_no5.pdf

UK Government (2007), UK Government Sustainable Procurement Action Plan,
http://www.eauc.org.uk/uk_government_sustainable_procurement_action_plan

Hu Bo A Hasanbeigi (2008), Harmonization Road-map Development on Government Procurement for Energy-efficient Products among APEC economies

Ministry of Environment, Japan, Law on Promoting Green Purchasing,
<http://www.env.go.jp/en/laws/policy/green/1.pdf>

Ministry of Environment, Japan, Basic Policy on Promoting Green Purchasing,
<http://www.env.go.jp/en/laws/policy/green/2.pdf>

China Quality Certification Center (2008), 5th Energy Conservation Product List,
<http://www.cqc.com.cn/Chinese/Upfiles/2009/2/200921013472153.pdf>

Laura Van Wie McGrory, Philip Coleman, David Fridley, and Jeffrey Harris (2006), Two Paths to Transforming Markets through Public Sector Energy Efficiency: Bottom Up versus Top Down

How to Do SCP: Circular Economy Approach

The practice of a "Circular Economy" can potentially cover the whole life cycle of products and therefore is a core practice of SCP. Circular economy concepts generally focus on production, such as cleaner production, eco industrial park development and integrated resource-based planning.

1. Overview

After extensive environment protection campaigns, which became necessary in developed countries in the 1960s, rethinking the economic development pattern of the industrialised countries followed and stimulated various new ideas for sustainable industrial development. One of the pioneering thoughts was circular economy. As opposed to a traditional linear system, it treats the economy as a closed system - and its three pillars are: reduce, reuse and recycle (3R). The most tangible and visible examples of a circular economy are eco-industrial parks.

Governments around the world continue to face challengers in addressing unsustainable patterns of consumption and production. Despite limited improvements in energy efficiency and resource productivity in recent years, overall resource consumption and waste has continued to increase. Within this context, circular economy is a useful concept to address these challenges, providing rapidly growing developing countries the opportunity to follow new and innovative development pathways.

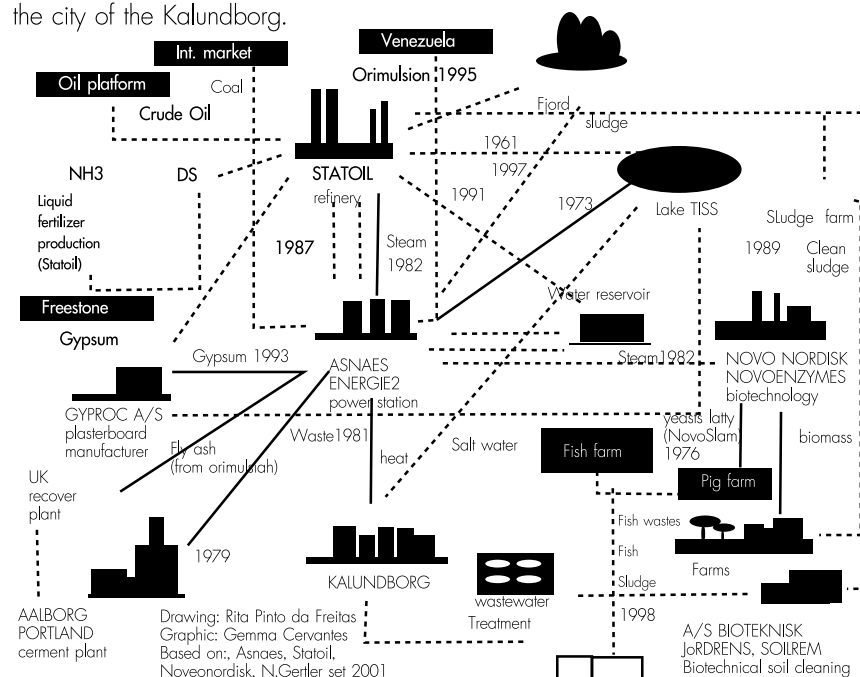
What is a Circular Economy?

A Circular Economy is an economy which balances economic development with environmental and resource protection. It places emphasis on the most efficient use and recycling of resources, and environmental protection. A Circular Economy works towards low consumption of energy, low emissions of pollutants and high efficiency. It involves applying Cleaner Production in companies, eco-industrial park development and integrated resource-based planning for development in industry, as well in agriculture and urban areas.

2. Best Practices

Flows in the Kalundborg Eco-Industrial Park

There are five core nodes in the network of the industrial park: Asneas power plant, Statoil refinery, Gyproc plastic factory, Novo Nordisk biotechnological company and the city of the Kalundborg.



Circular Economy:

Is an economy which balances economic development with environmental and resources protection.

Energy Flows

- The coal-fired Asnaes CHP plant is the main energy source of the park
- The Statoil refinery factory provides excess gas to Gyproc plastic factory
- Asnaes supplies the steam to the city for district heating and to Novo Nordisk and Statoil for production processes.
- The power plant substituted its primary energy source coal by the gas from Statoil, after Statoil built a sulfur recovery unit.

Materials Flows

- Sludge from Novo Nordisk's processes and the fish farm's water treatment plant is used as fertilizer on nearby farms. In total over 1 million tons per year are reused.
- Asnaes reacts the SO₂ in its stack gas with calcium carbonate to make calcium sulfate (gypsum), which supplies 2/3 of the Gyproc's needs.
- The refinery's liquid sulfur is trucked to Kemira to produce sulfuric acid.
- Surplus yeast from insulin production at Novo Nordisk goes to farmers as pig food.

The results:

In 1993 only, the US\$60 million investment in the infrastructure (to transport the energy and material) produced more than US\$160 million revenues. And the close connections among the companies make the production consortium much stronger and minimize the risks. The closed water, energy and material chains brought significant extra environmental and ecological benefits.

The government's participation

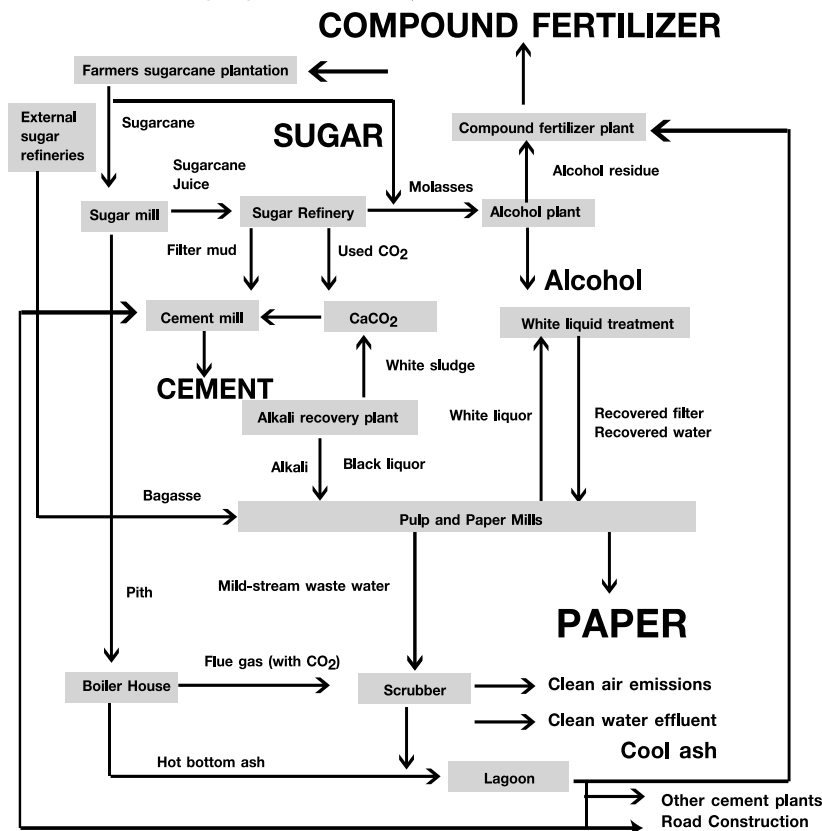
Encouraged by the city of Kalundborg and the Danish government, the local residents replaced about 3,500 oil furnaces (a significant non-point source of air pollution) to match the new district heating system, whose main steam source is from the power plant.



Guigang Eco-industrial Park in Guangxi Province, China

Network and processes of Guigang eco-industrial park (Zhou, 2007)

Guitang Group (GG) located in Guigang City, Guangxin Province, is one of the biggest sugar refineries in China. With support from the local and national government, GG took the lead to develop the first eco-industrial park in China. In 2001, the Guigang eco-industrial park was officially recognised as the State Eco-Industrial (Sugar Refinery) Demonstration Park. The diagram above illustrates the network of the Guigang eco-industrial park.



Key subsystems in the eco-park

- Sugar cane farming system: It provides a high quality and steady sugar cane source for the eco-park from the local sugar cane farmers
- Sugar refinery system: Through continuous technical upgrading, purified sugar and high added value organic sugar and oligofructose are produced
- Alcohol manufacturing system: Based on the waste of the sugar refining process - molasses, fuel ethanol and yeastex are produced by the alcohol plant
- Pulp and paper manufacturing system: By using the bagasses from the refining plant, the pulp and paper mills produce paper and high added value carboxymethylcellulose sodium (cMc)
- Combined heat and power generation system: Through substituting the coal with the bagasse pith, the power plant produces electricity and steam to meet the energy demand of the whole industrial park.
- Integrated waste treatment system: It provides the general solid waste and waste water treatment and recycling service for the whole park and produces cement and composite fertilizer.

These six systems are internally connected by an exchange of their by-products, waste and energy. The main concept is: sugar cane'sugar refinery'alcohol'pulp and paper 'CHP 'cement' fertiliser.

This process chain allocates resources in rational way and compensates disadvantages with the existing facilities within the park while significantly cutting the wastes and emissions.

The results

- Paper manufacturing with 200,000 tons of sugar cane bagasse can save 600,000 - 660,000 m3 of lumber consumption;
- For 200,000 tons of fuel alcohol manufacturing, an annual saving of 600,000 tons of corns can be achieved;
- Reuse of white water from paper mill can save about 16 million tons of fresh water annually, and reduce water pollution substantially;
- In the park, around 93% of waste molasses in Guangxi is used for energy alcohol manufacturing, which can reduce emission of about 93% of alcohol wastes in Guangxi;
- According to preliminary assessment, it will directly reduce the emissions of 134,000 tons of toxic substance and 22,000 - 30,000 tons of COD every year;
- Offset the increased costs due to the sugar quality improvement and a related higher price of US\$37;
- Utilising the molasses and bagasses from other small and medium sugar producing enterprises could further reduce the waste emissions and environment pollution;

Government participation

The sugar cane refinery industry is the fundamental industry in the region. The local government established a series of policies to promote the sugar cane refinery industry:

- Set the floor price annually for the sugar cane to protect the farmers. In 2004-2005, the price was set at US\$20.50 per ton, while the world market price was about US\$13 per ton.
- Set up policies to encourage the symbiotic relationship between the eco-park with other sugar refinery SMEs. These policies require the smaller producers to send their by-products to the eco-park reusing facilities to produce paper and energy, etc.
- Set up targets on environmentally relevant flows, such as 80 per cent bagasse utilisation rate, 100% molasses utilization rate and 100% alcohol residue rate.

PRODEV

The project "Policy Reinforcement for Environmentally Sound and Socially Responsible Economic Development in China" (PRODEV) was a project financed by the European Commission, coordinated by the United Nations Environment Programme and carried out in partnerships with the Wuppertal

Institute Collaborating Centre on Sustainable Consumption and Production (CSCP) and the Municipal Government of Guiyang, to improve the policy framework and promote a more integrated decision-making process in the local government to foster environmentally sound and socially responsible economic development ("Circular Economy") in Guiyang City, China.

The target group consisted primarily of Guiyang local government policy-makers. Chinese government trainers, mayors from other Chinese cities and other Asian developing countries also benefited from the project.

Results

- Implementation and adoption of pilot policy measures supporting a Circular Economy/SCP approach in Guiyang
- A tested and proven approach for implementing Circular Economy/SCP approaches that can be applied in other Chinese municipalities and regions
- The introduction and dissemination of European experiences and best practices most suitable to China. The knowledge obtained through training workshops on various policy instruments will enable the government to effectively promote the economic development while reducing negative environmental and social impacts.
- Improved know-how and linkages between European and Chinese decision makers on how to pursue sustainable development

3. Policy Options

The first legislations on circular economy were initiated in the early 1990s. From that time, Japan, Germany and China have taken the lead in integrating circular economy concepts into their national development strategies.

Fact Box: Laws for the circular economy in Japan

Law	Enacted in
Law for Promotion of Effective Utilization of Recyclables	1991
Basic Environment Law	1993
Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (LColRec)	1995
Specified Home Appliances Recycling Law was implemented in 1998. Food Recycling Law	2000
Green Purchasing Law	2000
End-of-life Vehicle Law	2002
Basic Law for Establishing the Recycling-based Society*	2000

*The "Basic Law for Establishing the Recycling-based Society" implemented in 2000, became the foundation of the Japanese circular economy initiative. Combined with the 1991's recyclables effective utilization law, they are known as the "Law for Promotion of Effective Utilization of Resources" (LPEUR) as a whole.

Japan

The Japanese framework legislation typically spells out specific roles for government, businesses, non-governmental organisations, and the public. The roles may simply be to "encourage" or "promote" certain policies, such as recycling or re-use of materials. The implemented regulations set specific and enforceable targets.

Germany

Ordinance on the Avoidance of the Packaging Waste (VERPACKVO) was approved by the German Cabinet in 1991. Closed Substance Cycle Waste Management Act was evolved from the VERPACKVO in 1994 and was considered as the fundamental driver of German circular economy legislation framework.

VERPACKVO imposed a duty on industry to reclaim packaging materials without charge and to reuse or recycle them. However, it exempted those manufacturers and distributors who agreed to participate in a system that guarantees regular collection of packaging materials. The exemption gave birth to the famous "Grüne Punkt" collection system, which achieves very high rates of recovery and reuse of packaging materials. The ordinances for implementation offer a useful model of an overarching framework statute that sets out material-specific formulations.

China

It took years for the circular economy to evolve from the imported sustainable development concept to an actual project and national development strategy. Most of the countries establishing the circular economy legislation framework took early steps to implement specific laws dealing with packaging, specific products and materials, etc. In contrast, China went the opposite way to set ambitious and comprehensive targets for the circular economy, setting high expectations for implementation.

Japanese framework legislation typically spells out specific roles for government, businesses, non-governmental organizations, and the public.

In 2002, the "Cleaner Production Law " was put into practice. The National Development and Reform Commission (NDRC) published the "The Announcement on the Pilot Work in Circular Economy" in 2005. The State Environment Protection Administration (SEPA) (now Ministry of Environment Protection - MEP) published "The Notions to Promote the Development of Circular Economy" and "The Prescription on the Management of Ecological Industry parks and Circular Economy Demonstration Regions" in 2005. A series of eco-industrial park assessment and operation standards were produced by SEPA in 2006. The State Council published the "Several Advisement to Promote the Development of Circular Economy" in the same year. In the past several years, ministerial and provincial level regulations have been published and put into implementation. Such policies stimulated the development of eco-industrial parks covering nearly every industry. As of 2007, 24 national eco-industrial parks have been approved by the central government.

The policy and implementation activities mentioned above set the solid foundation for the national legislation of the circular economy law. From 2006, the Environment and Natural Resource Committee of the National People's Congress started the process of drafting the "Circular Economy Law". After 2 years drafting and calling for comments, the "Circular Economy Law " was passed in August 2008 and put into force on 1st, January, 2009. It will be the fundamental law of all circular economy related policies. The related implementation regulations will be developed in the next years.

Resources and Further reading

Zhu Qinghua, Lowe Ernest A., Wei Yuan-an (2007), Industrial Symbiosis in China, A Case Study of the Guitang Group

Zhu Dajian (2007), Circular economy and China's New Industrialization
CSCP (2006), Policy Reinforcement for Environmentally Sound and Socially Responsible Economic Development in China,
<http://www.scp-centre.org/en/projects/ongoing-projects/prodev.html>

UNEP and CSCP (2006), Circular Economy - An alternative model for economic development,
<http://www.unep.fr/scp/nap/circular/pdf/prodev-summary.pdf>

Ministry of Environment, Japan,
<http://www.env.go.jp/en/laws/policy/index.html>

G. Gordon Davis (2006), Circular Economy Legislation --The International Experience
http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/CircularEconomy_Legal_IntExperience_ExecSummary_EN.doc

VERPACKVO, http://www.european-bioplastics.org/media/files/docs/de-berichte/Pack%20Ordinance_complete.pdf

KrW-/AbfG , <http://www.iuscomp.org/gla/statutes/KrW-AbfG.htm>

Cleaner Production Law, Ministry of Environmental Protection (MEP),
http://www.sepa.gov.cn/law/law/200206/t20020629_84834.htm

Circular Economy Law (2008), <http://www.chinaenvironmentallaw.com/wp-content/uploads/2008/09/circular-economy-law-cn-en-final.pdf>