Production, Consumption and Waste

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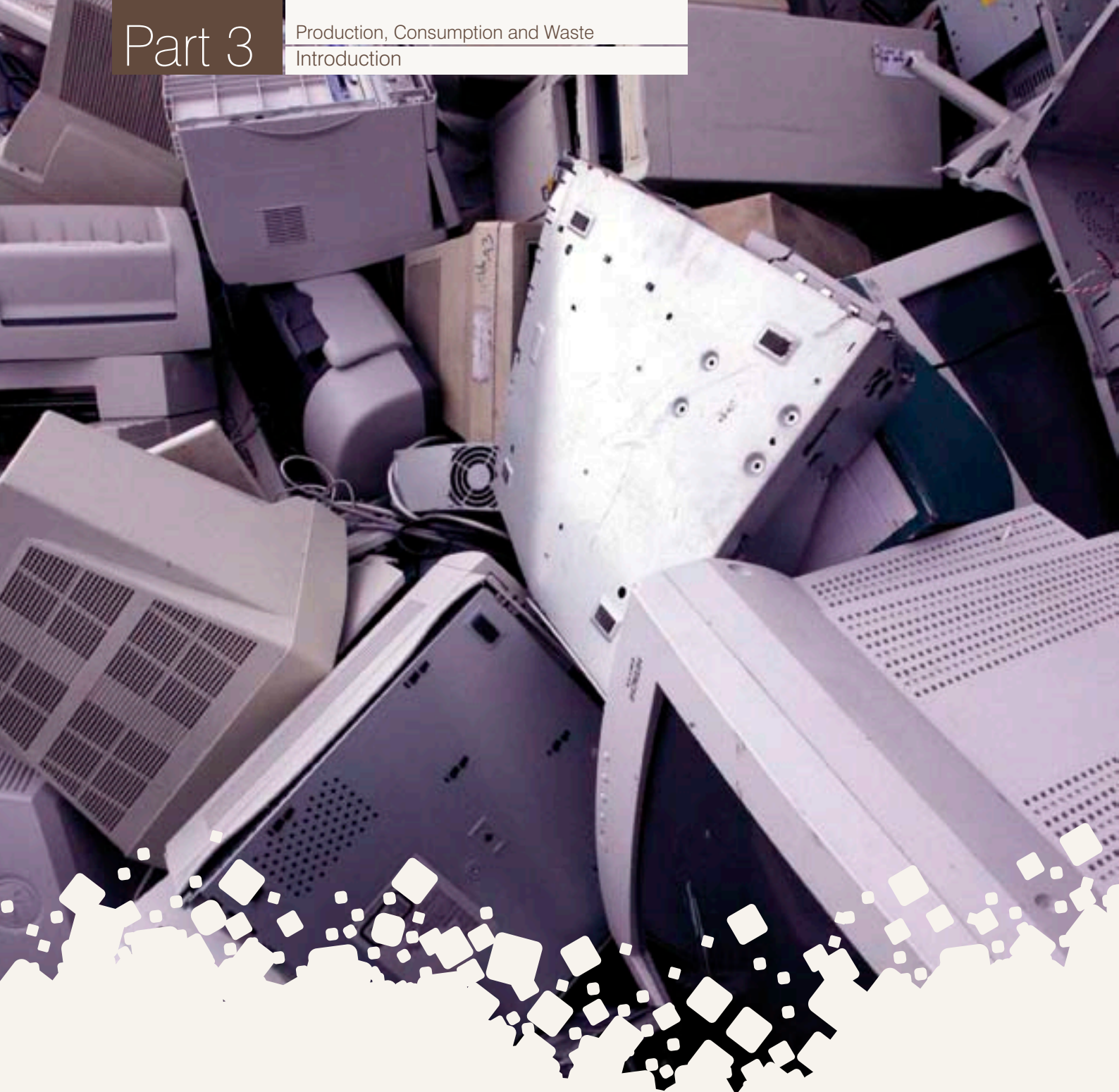
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Production, Consumption and Waste Introduction

PCW0 Introduction

Key Findings

- Current patterns of resource use in Victoria are unsustainable. The way many resources are used, and the amount that is used, is placing stress on natural systems.

- The Victorian Ecological Footprint is three times larger than the world average. Energy generation and consumption has the single biggest impact on Victoria's ecological footprint.

- To date resource efficiency gains have generally fed into higher economic productivity, not environmental benefits. Increasing the efficiency of resource use is essential but insufficient unless it can demonstrate a reduction in absolute environmental impacts/pressures.

- To address sustainable consumption and production requires significant technological research and development with an increased emphasis on appropriate governance frameworks, industry partnerships and behavioural change.

What are production, consumption and waste?

This section represents Victoria as an integrated system having inputs of energy, water and materials and outputs of goods and services, pollution and waste. The way these resources are produced, used and discarded can place a direct pressure on the natural environment. The specific focus in this section of the report is in identifying pressures that result from production and consumption of the key resources of energy, water and materials, and the waste generated from using those resources.

Energy, water and material resources are fundamental to human well-being and economic prosperity. The way in which resources are used and the amount used has created pressures on the environment. Current patterns of production and consumption have resulted from a narrow historical focus of exploiting resources for human needs and to maximise economic utility. However, ecosystems have been under-valued and mostly un-priced in societal decision-making and damage to the natural environment has occurred as costs have been externalised.

In the previous section broad level driving forces affecting environmental change were identified. The socio-economic drivers, population and settlements, and economic growth and consumption, have important implications for production and consumption processes, which in turn have direct impacts on the natural environment. In order to promote more sustainable behaviour patterns, it is critical to improve understanding of those processes that lead to depletion or degradation of natural resources. This part of the report examines in more detail the key human activities driving natural resource consumption and waste generation in Victoria.

A range of activities and processes have been identified as having the potential to significantly impact on the environment, and include both the natural resource or primary industry sectors, such as agriculture, forestry, fishing and mining, and other activities and processes such as energy generation and consumption, manufacturing, transport, water usage, urbanisation, tourism and waste generation and disposal. The impacts of these activities and processes can be both positive and negative for the environment. While they can include many 'risks' or 'pressures' there are also potential 'opportunities' for better managing the environment and changing behaviour.

The consumption choices we make as individuals, and as a wider community, can result in a significant impact on the natural environment. In 2005 a study found that Australian household wasteful consumption, that is, annual spending on unused goods and services, amounts to over \$10.5 billion per year, of which food accounts for \$5.3 billion[1]. Household energy consumption patterns, production of waste, as well as our choices about modes of transport are all part of a chain of decision making which has implications that are identified here and further explored in Part 4 of the report.

To a large extent the activities analysed here encompass the physical processes resulting from the driving forces, upon which Victoria's industrial economy depends. Physical processes are understood to mean the energy, water and material 'stocks and flows' involved in maintaining our livelihoods. Victorians, and the Victorian economy, are reliant on the natural environment; it is the very basis for our way of life and as such should be managed well, not only for its own intrinsic value but also for the essential services a healthy environment provides for Victoria.

Potential approaches to encourage more sustainable production and consumption are outlined. This includes recommendations on how management responses could be further enhanced or scoped for implementation in light of international, national and state policy approaches (including approaches undertaken in partnership with industry).

Key resources

This section examines the key resources of energy, water and materials. These resources were chosen as their use has a direct impact on the natural environment. Energy is the major source of greenhouse gases associated with climate change, and in Victoria is a particularly difficult issue to deal with as the State places such reliance on energy supplied from brown coal, one of the most greenhouse intensive of all energy options. Water is also a key issue for Victoria as with ongoing drought and significantly reduced flows, maintaining security of supply must be balanced against critical base flows needed to maintain river health. Materials are the physical substance that provides the basis for Victoria's economy. As shown in the previous section on driving forces as population and affluence increases consumption of material resources and manufactured goods also increases. This places pressure on the natural environment through resource depletion, disturbance of ecosystems and also through the water and energy needed to produce and transport those goods.

Energy

The Energy section explores the fundamental issues relating to the supply of and demand for stationary and transport energy in Victoria, and the key implications of the extraction, processing, distribution and use of energy for the environment, such as greenhouse gas emissions, land disturbance, water extraction and emission of air pollutants. Key issues reported include the range of fuels used, the efficiency of conversion and processing of fossil fuels into a useable form; the efficiency of distribution; as well as the level of demand for energy. Also covered is the influence of population growth, economic activity, and consumer choices.

Water resources

The Water section examines the trends in water storages, consumption across different industry sectors and the Victorian community. It identifies key pressures on the natural environment resulting from the water extraction, storage, supply and consumption system. Governance and the structure of the industry are described. Demand management tools, used at least in part to reduce pressure on rivers, such as the water market and pricing are also discussed.

Materials

The Materials section provides an overview of the use of natural resources used for production of goods and services, which can ultimately become waste released to the environment. The potential of *Material Flow Accounting* tools is explored, and through use of case studies, the flow of the natural resources used to produce goods and services are highlighted as they are used, recycled or enter the waste stream.

Resource consumption in Victoria

Due to significant commodity exports, Australia has one of the highest material resource requirements per capita in the world. Victorians are one of the highest per capita users of energy in the world. Victorian water consumption per capita has historically been one of the highest in the world, although through a combination of efficiency and scarcity (restrictions), consumption has dropped in recent years.

Connections are being made. There is now an increasing recognition that human resource use has been detrimental to the natural environment. Improving humanity's stewardship of the environment requires a fundamental change in the way in which natural resources are exploited to ensure a sustainable environment both now and into the future. Governments are increasingly taking environmental policy to their centre, however, the extent of degradation, creates increased urgency for stronger action. More forceful measures need to be adopted including internalising impacts (polluter pays and price signalling), a step-change in investment in technology, and the re-design of production and consumption patterns in society to drive those with less environmental impacts.
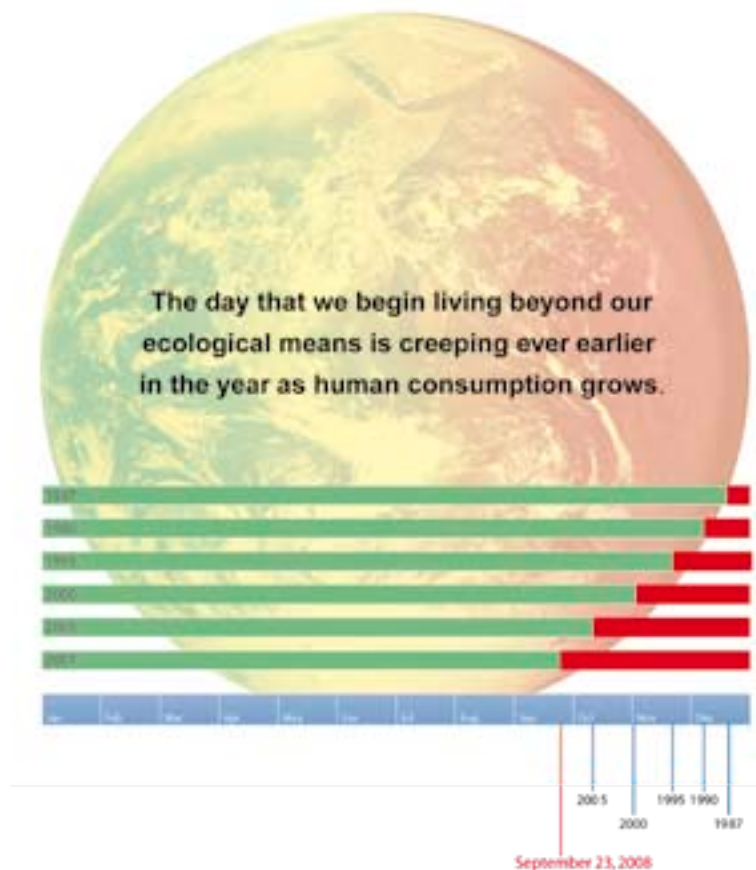
Smarter production and consumption, whereby resource intensity decreases, and forging optimal policy and process solutions to these are essential. However, efficiency is not enough unless it can demonstrate a reduction in absolute environmental pressures. If this cannot be demonstrated then strong demand management is required. Energy and material use is increasing as a trend and water use exceeds that available to ensure healthy inland waters and ecosystems. However, in many cases, the current economic value of resources does not reflect the 'true value' of the resource and so costs to the environment are externalised. Society generally recognises that it cannot continue to exploit its natural resources as if there is no impact on the environment, yet actions to address these have, to date, been insufficient.

Measuring consumption

There are various tools for measuring consumption. Victoria's Ecological Footprint is a 'snapshot' indicator for understanding resource use and implications, with the size of the footprint reflecting the impact attributable to resources used to satisfy needs such as food, shelter, health, energy and mobility. An updated Ecological Footprint report for Victoria illustrates the level of resource use compared to the world's available resources. Ecological Footprints are used as a tool to communicate overall resource use, however they are limited in their capacity to measure the impact of policy changes discretely. They do, however provide information that can be used to illustrate where excessive levels of resource are being consumed.

September 23rd in 2008 marked an unfortunate milestone: the day humanity used all the resources nature will regenerate in the year, according to Global Footprint Network data. Earth Overshoot Day marks the day when humanity begins living beyond its ecological means. Beyond that day, we move into the ecological equivalent of deficit spending, utilising resources at a rate faster than what the planet can regenerate in a calendar year.

Figure PCW1 Increasing Global Ecological Overshoot (2008)
Source: Global Footprint Network

The day that we begin living beyond our ecological means is creeping ever earlier in the year as human consumption grows.

September 23, 2008

Victoria's Ecological Footprint

Australia as a rich nation has a footprint higher than the average but Victoria's own footprint is even higher such that if everyone lived like Victorians, almost four planets would be needed. There is only one available. This indicates that - in the global context – Victorians' way of life is not sustainable.

The Ecological Footprint measures biocapacity in global hectares (gha), which represent the average yield of all biologically productive areas on Earth. There are currently 1.8 gha available per person. Since the 1980s the planet has been in "ecological overshoot" as the world's population uses resources at a faster rate than they can be replaced. This pressure drives habitat destruction or degradation, threatening natural systems and human well-being, see Figure PCW1.

On average Victorians consume 6.8 gha to support their lifestyle for one year. This equates to a total Footprint of 33 million gha, or one and a half times the land area of Victoria. Victoria's Footprint is three times higher than the world average of 2.2 gha per person. The impact of energy is the biggest contributor to Victoria's footprint. This is largely due to Victoria's reliance on emissions-intensive electricity generation and use.

On a global scale it is important to note that it is mostly developing nations that have footprints below the global average biocapacity of 1.8 gha, although a number of large developing countries, most notably but by no means the only countries, China and India, are dramatically increasing their consumption profiles. On a global scale a small number of rich nations are currently consuming well in excess of global and even local biocapacity.

Figure PCW2 shows the twelve largest Ecological Footprints and Victoria far exceeding the 1.8 gha available. The graph also compares the footprints of China at 1.6 gha and India at 0.8 gha indicating that although these are fast developing countries their footprints are currently still well below the global average biocapacity of 1.8 gha. It is clear that Victorians need to reduce their Ecological Footprint. Ways in which Victorians could reduce their environmental impact are to live 'smarter' by choosing goods and services that have a small footprint, reducing their overall electricity consumption and switching to less emissions intensive electricity (GreenPower).

For information on the specific findings of Victoria's Ecological Footprint refer to Office of the Commissioner for Environmental Sustainability website www.ces.vic.gov.au.

Figure PCW2 Twelve largest Ecological Footprints by country compared to Victoria, China and India (2006)[2]
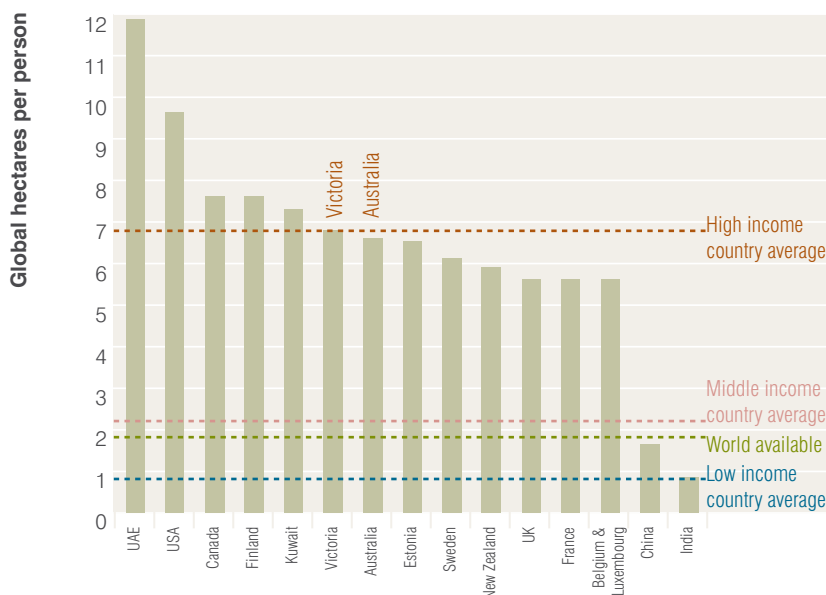
The impacts of production and consumption on the environment

As seen in the previous section on Driving Forces, both the inefficiency and the absolute levels of consumption and production are two of the major drivers influencing environmental change. Consumption in particular bears many direct and indirect impacts on the environment, both local and global. The United Nations Environment Program (UNEP) considers "unsustainable patterns of consumption and production (to be) a primary cause of climate change and (this) leads to other ecological and social challenges. These include: land degradation, air and water pollution, and resource depletion"[3] and risks to social cohesion, economic growth and geo-political security.

UNEP is encouraging the development of integrated national programs on Sustainable Consumption and Production (SCP). Recently guidance was developed drawing on several case studies from participating nations. This has enabled the UNEP to develop guidelines on SCP[4]. The guidance provides advice to government on how to plan, develop, implement and monitor a national SCP program aimed at taking an integrated approach to accelerating the shift toward decoupling economic growth from environmental degradation.

The current Commonwealth Government approach to sustainable consumption and production has highlighted a number of strengths and weaknesses. A recent review of national policy approaches on the resource efficiency of Australian industry was undertaken. The report's analysis identified "clear evidence of market, policy and organisational failures in regard to the uptake of resource efficiency. Markets insufficiently convert society's expectations for a clean environment into business opportunities for clean and resource-efficient products and services. To achieve resource efficiency, businesses need to look beyond cost savings through minimisation of process wastes, and include value adding, innovation and flexibility"[5].

Specific recommendations for action included:

- Identifying and eliminating perverse subsidies.

- Internalising environmental costs (due to lack of policy frameworks to provide signals to business).

- Shifting tax from labour and profit to resource use and pollution.

- Developing and implementing economic instruments.

- Promoting voluntary initiatives and negotiated agreements[6].

The total level of material and energy consumed in Victoria is increasing due to a range of factors, including population growth and societal affluence. Within both national and state (and indeed international) governments' policy measures to date, there remains a lack of certainty around their capacity to deliver the gains required to reduce absolute environmental pressures. Key national and State policy measures supporting sustainable consumption and production are the proposed Carbon Pollution Reduction Scheme (CPRS) along with a range of complementary and sectoral measures including technological development, water supply efficiency and demand management programs and waste minimisation through resource use efficiency.

However commentators[7] argue that the current focus on technological and big project solutions misses out on other solutions with lesser economic and environmental costs. Market-oriented solutions are seen as critical in that they seek to internalise environmental impacts through pricing mechanisms, both incentive and penalty-based. However, for a range of reasons their efficacy is constrained and strong complementary measures continue to be required.

As discussed earlier, high levels of optimism with respect to technological advances and efficiency fail to acknowledge the risks involved and the potential for efficiency rebounds, (see Part 2: Driving Forces and Part 5: Living Well Within Our Environment).

The implications of the pressures resulting from resource use and consumption on different aspects of the natural environment are explored in Part 4 of this report.

Recommendation

PCW1 The Victorian Government should form and implement the Sustainable Production and Consumption Taskforce, as detailed within the Environmental Sustainability Action Statement (ESAS), 2006.