Indicators are useful proxies that indicate the economic, environmental and social impact of doing business. They are said to be proxies because they can only stand for or approximate the actual impact. For example, climate change might be one of the environmental impacts of doing business; greenhouse gas emissions can be used as a proxy for climate change. Similarly well-being may be a social impact of doing business; income and employment may be proxies that indicate, or point towards, social well-being.

The indicators below are used in the 2005 CSIRO/University of Sydney publication *Balancing Act* to benchmark 135 sectors of the Australian economy providing a snapshot of Australia’s TBL performance (see table over page for details).

For an indication of economic impact *Balancing Act* used:

- gross operating surplus (or profits)
- dependence on imports
- exports earnings.

An indication of social impact was gained from:

- family income
- tax contributed by the organisation to the ‘Commons’ (government revenue)
- job/employment generation.

Environmental impact was indicated by:

- greenhouse gas emissions
- primary energy use
- managed water use
- land disturbance.

Organisations report on indicators that reflect their objectives and that are relevant to stakeholders. ISA provides a suite of detailed indicators. However, if you or your stakeholders do not require such detail, you can choose aggregate indicators. For example water use can either be reported on as a single (top level) indicator or it can be broken down into the categories mains water, self-supplied water, reuse water, and in-stream water.

Other indicators in the ISA suite have far more detail. For example the indicator energy consumption includes more than 480 separate components aggregated into 28 categories that can be accounted for either at the top level (energy consumption), aggregate level (e.g. black coal) or individual component level (e.g. black coal, used in boilers) if necessary. The level of detail you choose will reflect the needs and interests of your organisation and its stakeholders. The ISA reporting framework has over a thousand detailed indicators aggregated into over 180 categories which in turn are aggregated into more than 20 top-level indicators like water use and energy use. Top-level indicators include such items as: imports, employment, greenhouse gas emissions, land disturbance, land use and material flow.

An ISA indicator is referred to as positive if more of it is generally thought to be a good thing, for example, employment. An ISA indicator is referred to as negative if more of it is generally thought to be a bad thing, for example, greenhouse gas emissions.

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### ISA Information Sheet 6

#### Sample of indicators available in the ISA TBL accounting framework

<table>
<thead>
<tr>
<th>Economic indicator</th>
<th>Category (can be reported separately or aggregated into Indicator)</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components of GDP</td>
<td>Gross operating surplus</td>
<td>Gross operating surplus is defined as the residual of an industry's total inputs, after subtracting all intermediate inputs, compensation of employees, and net taxes and subsidies. It consists of operating profits, and consumption of fixed capital for capacity growth and replacement (depreciation). Unit: A$. Data source: Australian Bureau of Statistics. Interpretation: This is a positive indicator because it indicates the capacity to invest in innovation and technological progress through turnover of the capital stock as well as the capacity for expansion and investment in other sectors. Link: <a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/C76B1D3A58A3F5CF6CA2570B000CB3A7?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/C76B1D3A58A3F5CF6CA2570B000CB3A7?OpenDocument</a></td>
</tr>
<tr>
<td>Businesses</td>
<td></td>
<td>This reports the number of businesses supported directly and indirectly through all purchases. Unit: number. Data source: Australian Business Register: Interpretation: This is a positive indicator that shows whether either a large number of small businesses are supported through purchases, or a small number of large businesses. Link: <a href="http://www.abr.business.gov.au">www.abr.business.gov.au</a></td>
</tr>
<tr>
<td>Exports</td>
<td></td>
<td>Exports represent the Australian production of primary commodities that are destined for final demand outside Australia. Units A$million. Data source: Australian input-output tables. Interpretation: The level of export propensity positively reflects the comparative economic advantage and resource availability of Australian industries. This indicator however requires further comment and explanation on a sector-by-sector basis, because there is evidence to suggest that Australia’s export profile is generally heavily reliant on primary goods that cause resource depletion and possibly environmental stress. Moreover, unlike all other TBL factors, there is no causal relationship between the output of an industry sector and the export of upstream industry sectors. This is because exports are not an input into domestic production and are therefore not needed to increase output. For example, an expansion of the fisheries sector requires, or causes an increase in the economic activity (and hence energy consumption, water use, employment, imports etc) in key upstream sectors such as ship building. It does not however cause an increase in upstream exports. For this reason we describe upstream exports as accompanying a sector’s output, but not required for this output. Link: <a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/C76B1D3A58A3F5CF6CA2570B000CB3A7?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/C76B1D3A58A3F5CF6CA2570B000CB3A7?OpenDocument</a></td>
</tr>
<tr>
<td>Social indicator</td>
<td>Category (can be reported separately or aggregated into Indicator)</td>
<td>Employment means full-time-equivalent employment measured as full-time employment plus 50% part-time employment of employees, including employers, own account workers, and contributing family workers. Units: employment-years (e-y) and employment minutes (min) are used. Data source: Australian labour statistics. Interpretation: Employment is a critical TBL factor with its implications for social cohesion, government, transfer payments, international credit ratings and taxation. It is a positive TBL factor and one for which there are demonstrable trade-offs with material and energy use. Link: <a href="http://www.abs.gov.au/ausstats/abs@.nsf/mlf/6202.0">http://www.abs.gov.au/ausstats/abs@.nsf/mlf/6202.0</a></td>
</tr>
</tbody>
</table>
### Components of GDP (cont.)


### Environmental indicator

<table>
<thead>
<tr>
<th>Category (can be reported separately or aggregated into Indicator)</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material flow</td>
<td>Material flow describes the mass of resources and other biomass extracted from the natural environment in order to produce industrial output. Unit: tonnes. Data source: Australian Bureau of Agricultural and Resource Economics. Interpretation: This is a negative indicator because it shows for example how much iron ore has to be initially extracted in order to make steel, and ultimately for example, cars. Because it deals in mass extracted from the natural environment, material flow can be used as an indicator of resource depletion. Link: <a href="http://abareonlineshop.com/product.asp?prodid=13315">http://abareonlineshop.com/product.asp?prodid=13315</a>.</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>Primary energy consumption is the combustion of non-renewable fossil fuels, in units of megajoules (MJ). This definition covers fuels such as coal, natural gas, fuel petrol, diesel and kerosene. Items such as crude oil for refinery feedstock and wood are not included, since they are either not combusted or renewable. Data source: Australian Bureau of Agricultural and Resource Economics’ (ABARE) annual energy consumption statistics, broken down into more than 30 fuels. Interpretation: Energy consumption serves as a good proxy for a wide range of other pollutants such as emissions of SO(_2). As a measure of non-renewable fossil fuels this indicator is crucial to an understanding of resource depletion. This is especially important to oil dependent economies. Link: <a href="http://abareonlineshop.com/product.asp?prodid=13272">http://abareonlineshop.com/product.asp?prodid=13272</a>.</td>
</tr>
<tr>
<td>Water use</td>
<td>Managed water use denotes the consumption of self-extracted and in-stream water (from rivers, lakes and aquifers, mainly extracted by farmers for irrigation) as well as mains water. Collected rainfall such as in livestock dams on grazing properties is not included. Units: litres (L). Data source: ABS Australian Water Accounts. Interpretation: This is a negative indicator. Australia’s highly variable climate, including periodic drought, leads to an unpredictable water supply. Net water demand is increasing (e.g. for use of pastures, cotton and rice growing). In the Murray-Darling Basin significant environmental damage has occurred because of water diversion from the Murray and Snowy Rivers, and widespread soil and water salinisation. Irrigation-based industries are likely to face further environmental degradation as well as income losses, unless a number of adaptive initiatives in water management are pursued. Links: <a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/9F319397D7A9BDB9CA2570BB0007095D?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/9F319397D7A9BDB9CA2570BB0007095D?OpenDocument</a> and <a href="http://www.mdbc.gov.au">www.mdbc.gov.au</a>.</td>
</tr>
<tr>
<td>Land use</td>
<td>Area of land occupied for use. Unit: hectares. Data source: Integrated Regional Database (IRDB). Interpretation: this is a negative indicator because it reflects the amount of land used because of pressure from domestic consumption and exports.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Land disturbance</td>
<td>Conservation and natural environments, Production from relatively natural environments, Production from dryland agriculture and plantations, Production from irrigated agriculture and plantations, Intensive uses, Water, plus 48 sub-categories thereof.</td>
</tr>
<tr>
<td>Greenhouse gas emissions</td>
<td>CO₂, CH₄, N₂O, CO, NMVOC, PFC, SF₆, HFC, plus further detail by 7 sources.</td>
</tr>
<tr>
<td>SO₂ emissions</td>
<td>by 7 sources.</td>
</tr>
<tr>
<td>NOₓ emissions</td>
<td>by 7 sources.</td>
</tr>
<tr>
<td>Emissions to air</td>
<td>TSP, PM₁₀, PM₂.₅, As, Cd, Cr, Cu, Hg, Ni, Pb, Se, Zn, Dioxin, Fluoranthene, Benzo(a)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Indeno(1,2,3-c,d)pyrene</td>
</tr>
</tbody>
</table>
### National Pollutant Inventory (NPI)


Types and amounts of pollutants being emitted to the Australian environment — air, water and land, determined by consideration of health and environment risks. Data source: the Department of Environment and Heritage National Pollutant Inventory (NPI) ([http://www.npi.gov.au/](http://www.npi.gov.au/)) free access. Units: tonnes. Interpretation: The NPI comprises estimated emissions. The techniques used to estimate emissions have been variously approved by Australian, State and Territory environment agencies but it should be noted that the accuracy of these estimates is likely to vary according to the technique used.

### Ecological Footprint — bioproductivity

This indicator is an aggregate of bioproductivity and greenhouse gas emissions.

The original global Ecological Footprint approach (Rees and Wackernagel 1992), incorporating a bioproductivity and a greenhouse gas component. Unit: global hectares. Data source: ISA and Global Footprint Network report ([http://www.isa.org.usyd.edu.au/publications/documents/GFN-UnivSyd_report_on_Vic_eco-footprint.pdf](http://www.isa.org.usyd.edu.au/publications/documents/GFN-UnivSyd_report_on_Vic_eco-footprint.pdf)). Interpretation: This is a negative indicator because it reflects the amount of global bioproductivity appropriated through consumption. In order to be able to make international comparisons of consumption irrespective of local yields, this approach adjusts agricultural yields to global averages, so that consuming one tonne of wheat grown on large areas in arid climates has the same ecological footprint as one tonne of wheat grown on smaller areas in temperate moist climates. For information on greenhouse gas emissions, see indicator listing above.


### Ecological Footprint — land use

This indicator is an aggregate of land use and greenhouse gas emissions.

The New Zealand Ecological Footprint approach, incorporating a land use and a greenhouse gas component. Bicknell et al. (1998) and Patterson and McDonald (2003). Unit: hectares. Data source: Integrated Regional Database (IRDB). Interpretation: This is a negative indicator because it reflects the amount of land used through consumption. This approach adds grazing land directly to built land, without weighting. For information on land use and greenhouse gas emissions, see indicator listings above.


### Ecological Footprint — disturbance

This indicator is an aggregate of land disturbance and greenhouse gas emissions.

The Australian Ecological Footprint approach, incorporating a land disturbance and a greenhouse gas component, Lenzen and Murray (2001). Unit: disturbance-weighted hectares. Data source: CSIRO Landcover disturbance report. Interpretation: This is a negative indicator because it reflects the amount of land disturbed through consumption. This approach uses a weighting based on land condition and species density, and therefore reflect impacts on biodiversity. For information on land disturbance and greenhouse gas emissions, see indicator listings above.

## LCA midpoint

| Resource depletion, Land use impacts, Global Warming Potential, Ozone layer depletion, Toxicity potential (human and ecosystem, aquatic freshwater and marine, terrestrial), Photochemical Oxidation Potential, Acidification, Eutrophication, Waste heat, Odour. | CML’s “problem-oriented” LCA midpoint approach (Guinée et al. 2001). Aggregated burden of resource depletion, land impacts, and chemical substances weighted by potential to cause impacts in the respective environment. Data source: the Department of Environment and Heritage National Pollutant Inventory (NPI) (http://www.npi.gov.au/), and CML database (http://www.leidenuniv.nl/cml/ssp/databases/cmlia/), free access. Units: micropoints. Interpretation: a negative indicator related to the extent and level of damage and risk to humans and ecosystems from all environmental impacts. For example, ozone-depleting substances break down stratospheric ozone, causing an increase in UV radiation levels at the earth's surface. Several different systems of equivalence factors have been developed to calculate the potential contribution of ozone depleting substances to depletion of ozone layer on a global scale. Photochemical oxidant formation addresses the formation of reactive substances that can damage human and ecosystem health. Usually photo-oxidant formation takes place in the troposphere, but it can also take place in urban areas. The photo-oxidants are formed by oxidation of volatile organic compounds or by carbon monoxide in the presence of nitrogen oxides and the influence of ultraviolet light. Formed photo-oxidants can significantly differ in concentration depending on the location and time. High concentrations of photo-oxidants are called photochemical smog. Eutrophication covers aquatic environmental impacts and is caused by a high level of macronutrients. Nitrogen and phosphorus are the most important substances contributing to eutrophication. Enrichment in these macronutrients may cause a shift in the composition of species, an increase of biomass production in aquatic and terrestrial ecosystems, and high nutrient concentrations in surface water. Acidification of soil or aquatic ecosystems is defined as an impact that leads to a decrease in a soil's acid neutralising capacity. A reduction of the acid neutralising capacity of a soil leads to a reduction in the quantity of substances in the soil that are able to neutralise hydrogen ions. The reasons for acidification of soil are quite different depending on the geographical region. In Australia, age and superimposing agricultural production result in acid soils. For information on the NPI see indicator listing above. Link: http://www.leidenuniv.nl/cml/ssp/projects/lca7/lca2.html#g. |}

## LCA Eco-indicator99

| Hierarchist, egalitarian and individualist perspectives. Carcinogenic effects on humans, Respiratory effects on humans caused by organic substances, Respiratory effects on humans caused by inorganic substances, Damages to human health caused by climate change, Human health effects caused by ionizing radiation, Human health effects caused by ozone layer depletion, Damage to Ecosystem Quality caused by acidotic emissions, Damage to Ecosystem Quality caused by the combined effect of acidification and eutrophication, Damage to Ecosystem Quality caused by land occupation, Damage to Resources caused by extraction of minerals, Damage to Resources caused by extraction of fossil fuels. | PRé’s LCA endpoint approach (Goedkoop and Spriensma 2001). Aggregate of substances in the NPI that cause ozone depletion. Data source: the Department of Environment and Heritage National Pollutant Inventory (NPI) (http://www.npi.gov.au/) and CML database (http://www.leidenuniv.nl/cml/ssp/databases/cmlia/), free access. Units: micropoints. Interpretation: a negative indicator related to the extent and level of damage to humans and ecosystems from all environmental impacts. For example, see LCA midpoint suite above. The Eco-indicator 99 is a damage oriented impact assessment method for LCA, featuring a top-down weighting method. For information on the NPI see indicator listing above. Link: http://www.pre.nl/eco-indicator99/ei99-reports.htm. |}

## LCA Environmental Priority Strategies (EPS)

| Chalmers University LCA approach (Steen 1999). Data source: the Department of Environment and Heritage National Pollutant Inventory (NPI) (http://www.npi.gov.au/) and CML database (http://www.leidenuniv.nl/cml/ssp/databases/cmlia/), free access. Units: environmental load units (elu). Interpretation: a negative indicator related to the extent and level of damage to humans and ecosystems from all environmental impacts. For example, see LCA midpoint suite above. The EPS system was developed to meet the requirements of an everyday product development process, where the environmental concern is just one among several others. The development of the EPS system started during 1989 on a request from Volvo and as a co-operation between Volvo, the Swedish Environmental Research Institute (IVL) and the Swedish Federation of Industries. The last modification was made during 1999 within the Centre for Environmental Assessment of Products and Material Systems, CPM. Link: http://eps.esa.chalmers.se/introduction.htm. |
Centre for ISA Information Sheet 6

Reference List


Useful websites

Intergovernmental Panel on Climate Change http://www.ipcc.ch/
Integrated Regional Database http://www.psma.com.au