



Australian Government

Department of Education, Employment and Workplace Relations

ICTSUS8238A Conduct and manage a life cycle assessment for sustainability

Release: 1

ICTSUS8238A Conduct and manage a life cycle assessment for sustainability

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to conduct a life cycle assessment (LCA) to investigate and evaluate the human health and environmental impacts arising from the provision of a product, process or service. A LCA is a systematic process that provides an estimation of the cumulative impacts and trade-offs resulting from all stages in the entire life cycle of the product, process or service, thereby facilitating informed decision-making to improve performance. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.
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Application of the Unit

Application of the unit	Technical managers, supervising technicians, project managers, consultants or contractors who have responsibility for conducting a LCA or managing those who conduct an LCA apply the skills and knowledge in this unit.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Define and scope project goal	1.1. Access appropriate sources of information relevant to the LCA project 1.2. Define the goal of the project 1.3. Specify information needed to inform decision-makers 1.4. Determine required level of specificity 1.5. Determine data organisation and display of results 1.6. Define scope of the study 1.7. Determine ground rules for performing the work
2. Conduct a life cycle inventory (LCI)	2.1. Generate a life cycle flow diagram 2.2. Develop a data collection plan for the LCI 2.3. Collect the actual data 2.4. Evaluate and document the LCI results
3. Conduct a life cycle impact assessment (LCIA)	3.1. Select and define impact categories 3.2. Classify LCI results to the impact categories 3.3. Model LCI impacts within impact categories using science-based conversion factors 3.4. Normalise potential impacts in ways that can be compared 3.5. Assign impact categories by grouping into one or more sets to facilitate the interpretation of the results 3.6. Assign weighting factors to emphasise the most important potential impacts
4. Interpret and evaluate results from the LCI and the LCIA and communicate them	4.1. Identify the significant issues based on the LCI and the LCIA 4.2. Evaluate completeness check, consistency check and sensitivity check 4.3. Make recommendations for improving the product, process or service life cycle
5. Report results of the LCA study	5.1. Document the results of the LCA study 5.2. Finalise the report with a conclusion and make recommendations as a result of the LCA study

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

REQUIRED SKILLS AND KNOWLEDGE

- analytical skills to compare and evaluate effective technical solutions involving life cycle aspects of sustainability, and to critically evaluate data quality
- communication skills to:
 - prepare a press release regarding the level of achievement of sustainability benchmarks, environmental targets and performance highlights
 - liaise with customers to outline the resulting sustainability benefits
 - adjust communication to suit different audiences
 - respond effectively to diversity
 - work as a member of a team
 - consult on and validate policy
- literacy skills to:
 - evaluate complex and formal documents such as policy and legislation
 - interpret technical specifications and related sustainability documentation
 - document technical requirements and procedures
 - prepare written reports requiring precise expression, language and structures suited to the intended audience
- numeracy skills to:
 - determine workforce requirements
 - analyse and confirm capacity requirements
 - calculate budget requirements and limitations
 - perform calculations related to LCA
 - estimate carbon dioxide (CO₂) emissions
- planning and organisational skills to:
 - set out project requirements and priorities
 - make site access and equipment delivery arrangements
 - arrange relevant documentation and approvals
- problem solving skills to account for unexpected variations to requirements, and to effectively manage different points of view and dissenting stakeholders
- research skills to:
 - research and present information
 - examine statistical databases
 - gain and maintain relevant and current technical product knowledge
- technical skills to utilise life cycle assessment software
- project management skills to undertake or manage a complex LCA project

Required knowledge

- best practice approaches relevant to own work area
- environmental and sustainability legislation, regulations and codes of practice applicable to industry and organisation

REQUIRED SKILLS AND KNOWLEDGE

- equal employment opportunity, equity and diversity principles and occupational health and safety (OHS) implications of policy being developed
- policy development processes and practices
- principles, practices and available tools and techniques of sustainability management relevant to the telecommunications industry
- quality assurance systems relevant to own organisation
- relevant industry competency
- relevant organisational policies, procedures and protocols
- relevant systems and procedures to aid in the achievement of workplace sustainability
- ICT power consumption calculations
- power consumption and energy audit methodology
- CO2 emissions estimation
- environmental impacts of products, processes, systems and services

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- undertake a LCA for sustainability
- undertake scoping and definition of goals of a LCA for sustainability
- produce a LCI using relevant software and data collection strategies
- use life cycle assessment and other software for researching and interpreting charts, flowcharts, graphs and other visual data and information
- evaluate LCI and LCIA results, using completeness, consistency and sensitivity checks
- make recommendations based on the results of the LCA study.

Context of and specific resources for assessment

Assessment must ensure:

- sites on which planning, design and integration of sustainability may be carried out
- relevant legislation, standards, guidelines, reports and equipment specifications and drawings
- a range of workplace documentation and personnel, information and resources (such as compliance obligations, organisational plans, work responsibilities).

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate
- review of projects relating to conducting applied research conducted by the candidate
- direct observation of candidate applying research skills
- oral or written questioning to assess knowledge of applied research.

EVIDENCE GUIDE**Guidance information for assessment**

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- ICTSUS8237A Lead applied research in ICT sustainability.

Aboriginal people and other people from a non-English speaking background may have second language issues.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed.

In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.

Where applicable, physical resources should include equipment modified for people with special needs.

Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Appropriate sources of information may include:

- AS/NZS 3598:2000
- BS EN 16001:2009
- Dow Jones Sustainability Index (DJSI)
- International standards for environmental management - Life cycle assessment

RANGE STATEMENT	
	• AS/NZS ISO 14040:1998 • AS/NZS ISO 14041:1999 • AS/NZS ISO 14042:2001 • AS/NZS ISO 14043:2001 • AS/NZS ISO 14048:2003 • United States Environmental Protection Agency (EPA) - Life Cycle Assessment: Principles and Practice EPA/600/R-06/060 May 2006.

RANGE STATEMENT	
Goal may include:	• establishing baseline information for a process • guiding new product development to reduction of resources and emissions • identifying gaps in data • providing information on trade-offs of alternative processes, products and materials • ranking relative contribution of individual processes • selecting best product, process or service with least effect on human health and the environment • supporting product certification.
Information may include:	• changes to be made to reduce specific environmental impacts • impacts relevant to stakeholders and interested parties • products or processes which cause the least environmental impact • technologies or processes which cause least detrimental impact: • smog • acid rain • particulates • aquatic pollution.
Specificity may relate to:	• enterprise-specific versus generic products • internal enterprise use or public purposes • product-specific data versus generic data • product-specific versus generic study.
Data organisation may include:	• equivalent use as the basis for comparison • a functional unit that appropriately describes the function of the product or process being studied • volume or weight as the basis for comparison.
Scope of the study may include:	• manufacturing • materials manufacture • packaging and distribution • product fabrication • raw materials acquisition • recycling and waste management • use, re-use and maintenance • variants:

RANGE STATEMENT	
	• cradle-to-grave • cradle-to-gate • economic input-output life cycle assessment (EIO LCA) • gate-to-gate • well-to-wheel.

RANGE STATEMENT	
Ground rules may include:	• define the systems analysed • documenting assumptions or decisions made throughout the project • methodology used • quality assurance procedures: • available time and level of resources • internal review • external review • formal review process • reporting requirements • setting of boundaries • software used for modelling: • EcoLab • GaBi Software • SimaPro • stating the basis for comparison.
Flow diagram may include:	• all alternatives under consideration: • baseline system • alternative systems • boundaries • mapping inputs and outputs (material and energy) to a process or system • subsystems.
Data collection plan may include	• defining the data quality goals • developing a data collection worksheet or spreadsheet: • data collection procedures • data quality measures • geographic scope • presentation of results • purpose of the inventory • system boundaries • types of data used • identifying data sources and types: • equipment and process specifications • equipment logs • journals • laboratory test results

RANGE STATEMENT	
	• meter readings from equipment • identifying data types: • measured • modelled • non-LCI data (data not intended for use in LCI) • non-site specific • sampled • vendor data • identifying data quality indicators: • completeness • consistency • precision.

RANGE STATEMENT

Collect the actual data may include:

- atmospheric emissions
- conversion of fuel units into energy units
- co-product allocation
- data categories:
 - CO₂ emissions
 - reporting emissions required by regulatory agencies
 - reporting of all emissions
- direct contact with experts
- efficiency of transportation mode:
 - conversion of tonne-kilometres into fuel units
 - litres (gallons) of diesel fuel
- emissions generated from combustion of the fuels
- energy input data
- energy sources
- illegal waste disposal included if data is available
- industrial scrap
- ISO 14041:6.5.3 (2004) allocation procedure
- obtain non-specific inventory data
- products
- purchase LCI data
- research
- specific data versus composite data
- site visits
- solid wastes
- transportation data:
 - conversion to ton-miles or tonne-kilometres
 - distance shipped
 - weight of shipment
- waterborne wastes.

Evaluate and document may include:

- air emissions
- data parameter groups within a category
- data parameters within a group:
 - carbon dioxide (CO₂)
 - chlorine (Cl)
 - sulphur dioxide (SO₂)

RANGE STATEMENT

- define boundaries set
- define systems analysed
- describing the methodology used in analysis
- presentation of information:
 - graphical format
 - tabular format
- water borne waste solid wastes.

RANGE STATEMENT	
Impact categories may include:	• acidification • aquatic toxicity • global warming • resource depletion • stratospheric ozone depletion • terrestrial toxicity.
Classify LCI results may include:	• assigning LCI results to impact categories: • CO₂ emissions attributed to global warming • NO₂ emissions attributed to ozone formation • SO₂ emissions attributed to acidification.
Grouping may include:	• sorting of indicators by characteristics, such as: • emissions: • air • water • location: • global • local • regional • sorting of indicators by a ranking system, such as: • high priority • medium priority • low priority.
Weighting may include:	• determining weights to place on impacts • identifying the underlying values of the stakeholders • weighting methods: • analytic hierarchy process • modified Delphi technique • decision analysis using multi-attribute theory.
Evaluate and report LCIA results may include:	• definition of systems analysed • description of methodology used in the analysis • description of the boundaries that were set • documentation of limitations • verify accuracy of LCIA results.
Significant issues may include:	• essential contributions for life cycle stages to LCI or LCIA results:

RANGE STATEMENT	
	• individual unit processes • groups of processes • impact category indicators: • emissions • resource use • waste • inventory parameters: • emissions • energy use • waste.
Completeness check may include:	• all relevant information and data needed for the interpretation are available and complete • develop checklist to indicate each significant area represented in results • organise data by: • life cycle stage • processes • type of data represented: • environmental release to air • raw materials energy • transportation.
Consistency check may include:	• comparisons made on inconsistent data sources • comparisons made on data from different eras • data from plants using different technologies • data from technology based on different standards: • European • US.
Sensitivity check may include:	• evaluation of the reliability of results using: • contribution analysis • sensitivity analysis • uncertainty analysis.
Results of the LCA study may include:	• administrative Information • details of the practitioner who conducted the LCA study • date of report • definition of goal and scope • life cycle inventory analysis:

RANGE STATEMENT

	• data collection • calculation procedures • life cycle impact assessment: • methodology • results of the impact assessment performed • life cycle interpretation: • results • assumptions and limitations • data quality assessment • critical review (internal and external): • details of reviewers and their affiliation • critical review reports • responses to recommendations.
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Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Sustainability
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