



**Life Cycle Inventory**

**Reviewer**

**Qualifications**

**Applicable to**

**Verification Reports on**

**Life Cycle Assessment for**

**Environmental Product Declarations**

## Life Cycle Inventory Reviewer Qualification

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## Life Cycle Inventory Reviewer Qualification

### Introduction

This report was compiled about reviewer qualifications applicable to Life Cycle Inventory (LCI) verification reports for Life Cycle Assessment (LCA) used in environmental product declarations (EPDs).

### Aim

The purpose was to document selection criteria of reviewer qualifications in verification of LCI developed by Ecquate Pty Ltd: The Evah Institute & or Global GreenTag International Pty Ltd & EPDs issue by either company.

### Method

Table 1 lists prerequisites for LCI data reviewers from the International Reference Life Cycle Data System (ILCD) Handbook developed by Institute for Environment & Sustainability in the European Commission Joint Research Centre (JRC) in co-operation with the Directorate-General for the Environment<sup>1</sup>.

**Table 1 Essential Requirements for Eligible EPD Reviewers**

Topic knowledge	Criteria
1. Generally of environmental matters	Industry related
	Product-related
2. Good on process & product	Infrastructure & Industrial Operation & or Manufacture Building Product
	Property Development Expertise & or Asset Management Experience
3. in depth of ISO 14040 LCA	Experienced >5 years in ISO 14040 LCA method series related practice
4. In-depth on standards relevant to	ISO 14025:2006 & EN15804:2012+A1:2013
	Environmental labelling & EPD declarations
5. Undertaken ≥3 independent 3rd party LCA reviews compliant ISO 14044:2006 Sect 6 requirements	>1 LCA study involving assessment of multiple environmental impacts
	Shown by evidence of critical independent review of in/ external studies
	In panel review according to ISO 14044 Section 6.2 & 6.3
6. Overall regulatory framework in EPD introduced	Refer General Program Instructions, Section 5.7.3.
	Compliance with Relevant Environmental Legislation
7. In-depth International & Australasian EPD Programs	Globally recognised programs including the International EPD® System
	Australasian EPD Program General Program Instructions
8. Auditing management systems	Following ISO 19011 Guidelines criteria for auditor skills & competences

Table 2 lists the eligibility scoring system also extracted from the ILCD Handbook<sup>2</sup>. It shows the minimum LCI reviewer's qualifications score of 5 points & maximum LCI reviewer's qualifications score of 32 points.

These two preceding qualification tables were compared to professional attributes of professionals currently involved in LCA related work in global supply chain assessment of submissions for attainment of 3<sup>rd</sup> party certified ecolabels & to develop 3<sup>rd</sup> party certified Environmental Product Declarations (EPDs).

<sup>1</sup> European Commission - Joint Research Centre - Institute for Environment & Sustainability: International Reference Life Cycle Data System (ILCD) Handbook - Reviewer qualification for Life Cycle Inventory data sets. 1<sup>st</sup> Ed March 2010 EUR 24379 EN Luxembourg Publications Office of the European Union; 2010 page 10 [http://eplca.jrc.ec.europa.eu/?page\\_id=86](http://eplca.jrc.ec.europa.eu/?page_id=86)

<sup>2</sup> ILCD Handbook: First edition 3 Reviewer qualification for Life Cycle Inventory data sets page 10

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**Table 2 LCI Data Reviewer Qualifications Scoring System**

Topic		Experience Criteria	Barrier to	score				Max	Min
Metrics	Scoring	minimum	Pass entry	1	2	3	4	score	score
1. Verification & Audit Practice	Mandatory	Years' work <sup>3</sup>	3 years	3-4	5-8	9-14	>14	4	1
		Number Reviews <sup>4</sup>	3 reviews	3-5	6-15	16-30	>30	4	1
	Optional	Scores <sup>5</sup> for EPD Scheme, ISO14001 or other EMS	Accredited 3rd party reviewer for >1 EPD Scheme				2		
			Attended courses on environmental audits >40 hrs				1		
			Chair >1 review panel for LCA study or Enviro app				1		
			Qualified trainer in environmental audit course				1		
2. LCA methodology & Practice work	Mandatory	Years' work <sup>6</sup>	3 years	3-4	5-8	9-14	>14	4	1
		LCI datasets <sup>7</sup>	5*(10 LCI)	5-8	9-15	16-30	>30	4	1
	Optional	LCA projects & papers	> 5 articles in peer-review journals or books				1		
			Worked >3 research projects on issue/case study				1		
3. Technology <sup>8</sup> or experience represented by LCI datasets	Mandatory	Recent years <sup>9</sup>	3 years	3-5	6-10	11-20	>20	4	1
	Optional	Formal Scientific Qualification	At least one PhD obtained				1		
			≥1 Master thesis or equivalent completed				0.5		
		Ex Private Sector	≥ 3 years' experience in professional work				1.0		
In Private Sector	0.5 point for each added industry sector up to 5				2.5	0.5			
Point Score			Overall Maximum Possible				32	5	

<sup>3</sup> Years of experience in the field of review & audit in the environmental field

<sup>4</sup> Number of reviews as a reviewer, or ISO 14025 compliant verifications of EPDs, or LCI data sets

<sup>5</sup> Additional scores are complementary & scores are maxima unless otherwise stated e.g. 1 point not 5 for peer-reviewed LCA papers

<sup>6</sup> Years of experience in LCA work, starting from University Masters or Bachelor degree if Master thesis on LCA

<sup>7</sup> Participant in LCI dataset development/modelling in LCI database as verified or documented. 10 data sets = 1 "experience"

<sup>8</sup> Qualification of technologies or activities knowledge is according to NACE code classes (*Regulation (EC) No 1893/2006 of the European Parliament & of the Council of 20 December 2006*). Equivalent classifications may be used. Experience in sub-sector is valid for whole sector

<sup>9</sup> Years of professional production, R&D or environmental work in private sector, technology or system of LCI under review

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**Jill Jing**

Table 3 lists this LCI data reviewer's eligibility score of 12 out of a possible 32 points.

**Table 3 Jill Jing LCI Reviewer Eligibility Score 2023**

	Score Topic	metrics	Minimum Experience Criteria	Score	
Mandatory	Verification & Audit Practice	Year's work	>3 years at GHD & Global GreenTag International (GGTI)	1.0	
		No. Reviews	>3 GGTI LCARate & EPD Commissions review	1.0	
	LCA method & Practice work	Year's work	2 years GGTI in last 20 years & >1 years at GHD on GWP, NGER etc	1.0	
		LCI recipes	>50 LCI recipes scoping reviewed	1.0	
	Activity	Years recently	>3 years GHD & GGTI Scoping & Reviewing LCARate and EPD projects	1.0	
Optional	Verification & Environmental Audit Practice in last 20 years	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag Int. EPD Scheme	2.0	
			Attended courses on environmental audits >40 hrs	1.0	
			Chair >1 review panel for LCA study or Enviro app	0	
			Qualified trainer in environmental audit course	0	
	LCA method & Practice	LCA projects & papers <10 yrs old	> 5 articles in peer-review journals or books	0	
			>3 LCARate and EPD research projects on issue/case study	1.0	
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	At least one PhD obtained	0	
			≥1 Master thesis or equivalent completed	0.5	
		Ex Private Sector ≥3 year	M - Professional, scientific & technical: Professional groups, conferences papers and posters, probono and government work	0	
		NACE Codes		Company & Project 0.5 point for each added industry sector up to 2.5	
		C – Manufacturing		Scoping LCARate & EPDs of fitout products	0.5
		Q – Health		Scoping and Assessing product Health Ratings	0.5
		I – Accommodation & food		Knowledgeable of Green Star®, LEED® and BREEAM®	0.5
		Q - Human health & social work		Product Health & Modern Slavery Declarations	0.5
	S - Other services		Wastewater and water engineering	0.5	
Total	Point Score			12	

## Life Cycle Inventory Reviewer Qualification

**Yasmin Kelly**

Table 4 lists this LCI data reviewer's eligibility score of 12.5 out of a possible 32 points.

**Table 4 Yasmin Kelly LCI Reviewer Eligibility Score 2023**

	Score Topic	metrics	Minimum Experience Criteria	Score
	Mandatory	Verification & Audit Practice	Year's work	>3 years: 2 in laboratory and 1 at Global GreenTag International (GGTI)
No. Reviews			>3 reviews GGTI	1.0
LCA method & Practice work		Year's work	>3 years: laboratory and at GGTI	1.0
		LCI recipes	>50 LCI recipes scoped and checked	1.0
Activity		Years recently	>3 years in laboratory and GGTI	1.0
Optional	Verification & Environmental Audit Practice in last 20 years	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for GGTI EPD Scheme	2.0
			Attended courses on environmental audits >40 hrs	1.0
			Chair >1 review panel for LCA study or Enviro app	0.0
			Qualified trainer in environmental audit course	0.0
	LCA method & Practice	LCA projects & papers <10 yrs old	> 5 articles in peer-review journals or books	0.0
			Worked >3 LCARate and EPD research projects on issue/case study	1.0
		Formal Scientific Qualification	At least one PhD obtained	0.0
			≥1 Master thesis or equivalent completed	0.0
		Ex Private Sector ≥3 year	M - Professional, scientific & technical: Professional groups, conferences papers and posters, probono and government work	1.0
			NACE Codes	Company & Project 0.5 point for each added industry sector up to 2.5
	Technology or experience represented by LCI datasets	A - Farming, forestry & fishing	Scoping LCARate & EPDs of forest & wildlife products	0.5
		C – Manufacturing	Scoping LCARate & EPDs of fitout products	0.5
	Global GreenTag International	F - Construction	Scoping LCARate & EPDs of building products	0.5
		Q – Health	Scoping and Assessing product Health Ratings	0.5
		N - Administrative & support service	Scoping and Assessing ecolabeling systems, and PCRs	0.5
Total	Point Score		12.5	

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### Bambang Riyadi Koproto

Table 5 lists this LCI data reviewer's eligibility score of 16 out of a possible 32 points.

**Table 5 Bambang Riyadi Koproto LCI Reviewer Eligibility Score 2023**

	Score Topic	metrics	Minimum Experience Criteria	Score
	Mandatory	Verification & Audit Practice	years' work	3 years at Global GreenTag International GGTI
No. Reviews			>20 reviews at GGTI of client LCI Data and EPD	3.0
LCA method & Practice work		Year's work	3 years Global GreenTag International in last 20 years <sup>10</sup>	1.0
		LCI recipes	> 20 recipes reviews at Global GreenTag International	3.0
Activity		Years recently	3 years at Global GreenTag International	1.0
Optional	Verification & Environmental Audit Practice in last 20 years	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag Int. EPD Scheme	1.0
			Attended courses on environmental audits >40 hrs	1.0
			Chair >1 review panel for LCA study or Enviro app. LCIA Certificate: MIT Professional Education, 2023	0.0
			Qualified trainer in environmental audit course Lead Auditor EMS Certificate, Auditor Training Online, 2021	0.0
	LCA method & Practice	LCA projects & papers <10 yrs old	> 5 articles in peer-review journals or books	0.0
			Worked >3 LCARate and EPD research projects on issue/case study	1.0
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	At least one PhD obtained	0.0
			1. Master of Environmental Management (Majoring in Environmental Management in Mining), The University of Queensland, Australia	0.5
			2. Bachelor of Biological Science, Pelita Harapan University, Indonesia	
	GIS People and General Electric	Ex Private Sector	M - Professional, scientific & technical: Certificates in <ul style="list-style-type: none"> <li>• PowerOn Advantage Cartography, General Electric, 2020</li> <li>• Python Masterclass, Udemy, 2020</li> <li>• ArcPy Python Developers ArcGIS-Pro workshop, Udemy, 2020</li> <li>• Advanced Spatial Analysis for ArcGIS, Udemy, 202</li> <li>• QGIS 3.0 for GIS professional, Udemy, 2020</li> <li>• Georeference &amp; Digitize in QGIS3 certification, Udemy, 2020</li> <li>• Spatial Data Analysis using QGIS &amp; R Course, Udemy, 2020</li> <li>• MapInfo for Professional workshop, Udemy, 2020</li> <li>• Python for Geospatial application online training, Udemy,2020</li> <li>• Web programming for GIS application, Udemy, 2020</li> <li>• Complete Web Development Bootcamp, 2020</li> </ul>	1.0
			Private Sector	
	Global GreenTag International	NACE Codes	Company & Project 0.5 point for each added industry sector up to 2.5	
		A - Agriculture, forestry & fishing	Land Suitability Analysis D'Aguilar National Park A7 Stamford Conservation Parks. SEQ Weed Distribution and Management of African Lovegrass and Parthenium re Agriculture	0.5
		C – Manufacturing	Scoping LCARate & EPDs of fitout products	0.5
		F - Construction	Scoping LCARate & EPDs of building products	0.5
J - Information & communication		3D model of UQ St Lucia campus building for analysis. Flood Risk GIS mapping for the University of Queensland	0.5	
	Q – Health	Scoping and Assessing product Health Ratings	0.5	
	Total	Point Score		16

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**Direshni Naiker**

Table 6 lists Direshni's LCI data reviewer eligibility score of 21 out of a possible 32 points.

**Table 6 Direshni Naiker LCI Reviewer Eligibility Score 2022**

Score Topic	metrics	Minimum Experience Criteria	Score		
Mandatory	Verification & Audit Practice in last 20 years	Year's work	9 years	3.0	
		No. Reviews	6 reviews	1.0	
	LCA methodology & Practice work	Year's work in last 20 years	5 to 8 years, Carpet, Ecolabelling, Consulting, Evah	2.0	
		LCI recipes	Artificial turf, carpet, Xypex concrete, Vertilux fabric	1.0	
	Technology or activity	Year in recent years	5 to 8 years, Carpet, Ecolabelling, Consulting, Evah	2.0	
Optional	Verification & Environmental Audit Practice		Accredited 3rd party reviewer for Evah and GGT EPD Scheme	2.0	
			Accredited ISO14001 Assessor. Peer reviewed 6 EPDs. Courses: Environmental Management System; Environmental Strategy	1.0	
		EPD, EMS or ISO14001 Scheme	Coursework: <ul style="list-style-type: none"> <li>• Carbon Footprint Analyst LEMA–UK &amp; SETA Registered.</li> <li>• Life Cycle Capability Maturity Modelling,</li> <li>• Life Cycle Analysis.</li> <li>• Water Footprinting, Product Environmental Footprint.</li> <li>• Green Star SA- Interiors and</li> <li>• Net Zero/Positive Courses. business Management</li> </ul>	1.0	
	LCA method & Practice	LCA projects & papers in last 10 years	<ul style="list-style-type: none"> <li>• Belgotex LCA data collation for EPD 4/5 years;</li> <li>• Green Product and Green Building Projects;</li> <li>• Carbon Footprinting x 3 textile industry projects.</li> <li>• Public sector: Construction industry Eco-labelling Project.</li> <li>• Public sector Course Facilitator on LCA, LCCMM &amp; sustainability.</li> </ul>	2.0	
			Belgotex carpets, water footprint, Van Dyk Carpets. Papers? Facilitating NCPD LCA course	1.0	
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	BSc Microbiology and Environmental Science. BSc Honours Environmental Management	0.5	
		Ex Private Sector ≥ 3 year	8 years first at Belgotex, then as an independent consultant Gaia consultancy GRI Sustainability Reports	2.0	
		NACE Codes		Company & Project	
		C – Manufacturing	Belgotex Van Dyk Carpets Carpet, Artificial Turf	0.5	
		E – Water & waste	Carbon Footprint Water footprint	0.5	
D - Electricity, gas supply		ZA Power grid LCI development	0.5		
F - Construction		Bird Haven LCI	0.5		
O - Government	Established SA ecolabelling schema	0.5			
Total	Point Score		21		



## Life Cycle Inventory Reviewer Qualification

**Murray Jones**

Table 7 lists Murray Jones LCI data reviewer eligibility score of 23.5 out of a maximum 32 points.

**Table 7 Murray Jones LCI Reviewer Eligibility Score 2016**

	Score Topic	metrics	Minimum Experience Criteria	Score		
	Mandatory	Verification & Audit Practice in last 20 years	Year's work	>9 <14 years in BIM LCA software audit at CRC CI <sup>11</sup> , CSIRO <sup>12</sup> & Ecquate Pty Ltd <sup>13</sup> , also PCR Moderator for Global GreenTag EPD Program Operator, ISO 14024 Type 1 Ecolabelling, & ISO 140040, 14044 & 14067 compliant LCA	3.0	
Number of Reviews			>16 <30 reviews of LCA software documented for CRC CI & Ecquate; of LCA BAU product for The Evah Institute, as PCR Moderator for Global GreenTag Program Operator ISO 14025, 21930 & EN 15804 compliant EPDs	3.0		
LCA methodology & Practice work		Year's work in last 20 years	>14 years LCA software development at CRC CI & CSIRO; LCA practice at Ecquate & Evah on LCA Buildings & Business as Usual (BAU) products	4.0		
		LCI recipes done	50-80 building product LCI modelled at Ecquate with Evah for whole building LCA in Greenhouse Emission Reports Compiled >30 LCA reports on BAU products including scoping, supply chain mapping for all key LCI recipes. All are recorded in LCI databases the system operator has evidence of them	2.0		
Technology or activity		Year in recent years	>6 <10 years participant in LCI >30 BAU product in Global GreenTag LCI databases	2.0		
Optional	Verification & Environmental Audit Practice	EPD, EMS or ISO14001 Scheme	Chaired >1 LCA BIM environmental app study review panel for CRC CI	1.0		
			Audits Evah LCA reports & EPDs. Audits of LCIA algorithm in software development. Audit of BIM LCA software malfunctions & user issues	1.0		
	LCA method & Practice	LCA projects & papers in last 10 years	Experience>9 <14 Years in LCI database & LCIA Software development	3.0		
			Participant in >3 LCADesign research projects & issues & Project on whole building greenhouse gas emissions & product LCA case studies	1.0		
	Technology or experience represented by LCI datasets	Ex Private Sector ≥ 3 year	CRC CI & CSIRO, Taught >100 LCADesign 1&2 days courses at Universities of NSW & Wollongong: J - Information & communication. ALCAS member.		1.0	
		Company	LCA Study of	NACE Codes		
		Ecquate Pty Ltd	Dormitory Buildings	P – Education O - Government,		0.5
			Hospital Buildings	Q – Health		
		Evah Institute	Global Aluminium	F - Construction		0.5
			National Concrete Market	B - Mining & quarrying		
			Building Products	I – Accommodation,		
		National Building Sector	E – Water & waste, H: Transport & storage			
	For Global GreenTag Pty Ltd	BAU Products	C – Manufacturing		0.5	
Victorian Power		D - Electricity, gas & air supply				
Fitout of Timber		A - Agriculture, forestry & fishing		0.5		
National Steel Supply		B - Mining & quarrying				
Total		Point Score	23.5			

<sup>11</sup> Australian National Cooperative Research Centre for Construction Innovation

<sup>12</sup> Australian Commonwealth Science & Industrial Research Organisation

<sup>13</sup> LCA Software Licensee & developer of LCIA automated off Building Information Modelling (BIM) & LCI databases

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**Dr Sharmina Begum**

Table 8 lists Dr Sharmina Begum's LCI data reviewer eligibility score of 23.5 out of a possible 32 points.

**Table 8 Dr Sharmina Begum LCI Reviewer Eligibility Score 2022**

	Score Topic	metrics	Minimum Experience Criteria	Score	
	Mandatory	Verification & Audit Practice in last 20 years	Year's work	6 years	2.0
No. Reviews			2 NGER and NPI reviews, 1 industry review, one LCI review.	1.0	
LCA method & Practice work		Years in last 20	6 years - LCA and EPD for Brickworks products of Tasmania	2.0	
		LCI recipes	5-8 years	1.0	
Technology or activity		Years recently	>9years	3.0	
Optional	Verification & Environmental Audit Practice	EPD, EMS or ISO14001 Scheme	<ul style="list-style-type: none"> <li>• Energy &amp; emission (Scope 1, 2 &amp; 3) analyst</li> <li>• NGER and NPI reporting for brickwork's national plants</li> <li>• Measuring Carbon footprint</li> <li>• Climate Active inventory and PDS development</li> <li>• Brickworks USA plants &amp; quarries Energy, Emission &amp; Carbon worksheet</li> <li>• Investigating carbon offsets and carbon credits for net zero emission target and carbon neutral products of Brickworks</li> </ul>	1.0	
	LCA method & Practice	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for Evah & GGT EPD Schemes	2.0	
			Academic courses on environmental audits >40 hours	1.0	
			Chair review panel for Brickworks LCA of Energy, Emission & Carbon	1.0	
			Qualified trainer in environmental audit course	0	
		LCA projects & paper last 10 yrs	Project work at Brickworks and in Bangladesh	2.0	
		>16 -30 LCI datasets	3.0		
	Formal Scientific Qualification	PhD Solid Waste technologies for energy recovery in Australia	1.0		
		Ex Private Sector ≥ 3 year	Bangladesh Institute of water modelling: inventory & d-base development	1.0	
	Technology or experience represented by LCI datasets	NACE Codes		Company & Project	
		B - Mining & quarrying	Quarrying Austral Bricks -Inventory analyst		0.5
		C – Manufacturing	Longford (TAS) brick product LCA and EPD		0.5
		D - Electricity, gas supply	Gas use Brickworks – USA & Australia LCA and EPD		0.5
		E – Water & waste	C-M Concrete Pty Ltd & Institute of water modelling investigation of Green Gully stormwater quality improvement device Corky's Carbon and Combustion P/L plant - experimental investigation and collect data from the waste to energy treatment plant to develop dataset and numerical model		0.5
		P – Education	Central Queensland University – Researcher & academic		0.5
Total	Point Score		23.5		

## Life Cycle Inventory Reviewer Qualification

### Mathilde Vlieg

Table 9 summarises Mathilde Vlieg's LCI data reviewer eligibility score of 27 out of a possible 32 points.

**Table 9 Mathilde Vlieg LCI Reviewer Eligibility Score Jan 2016**

	Topic	metrics	Minimum Experience Criteria	Score		
Mandatory	Verification & Audit Practice in last 20 years	Years' work	>9 years in last 10 in The Netherlands for clients & in Australia at: <ul style="list-style-type: none"> <li>• Certifier Global GreenTagCert™ EPD Program Operator, ISO 14024 Type 1 Ecolabelling, &amp; ISO 140040, 14044 &amp; 14067 compliant LCA;</li> <li>• The Evah Institute review of certifier &amp; 3rd party audited LCI allocation.</li> <li>• VliegLCA 3rd party reviewer whole building LCA report for Ecquate</li> </ul>	3.0		
		Number Reviews	>30 reviews in Australia at: <ul style="list-style-type: none"> <li>• Global GreenTag of PCRs &amp; methods for EPDs &amp; client LCI recipes</li> <li>• The Evah Institute LCI, LCIA &amp; PCR methods for ISO compliant EPDs.</li> <li>• VliegLCA reviewer of 7 story building &amp; GWP LCA for Ecquate Pty Ltd</li> </ul>	4.0		
	LCA methodology & Practice work	Years' work in last 20	>9 years from The Netherlands for clients & in Australia working at: <ul style="list-style-type: none"> <li>• ecospecifier in Life Cycle Thinking (LCT);</li> <li>• Global GreenTag in LCA, Type 1 Ecolabeling and ISO 14025, 21930 &amp; EN 15804 compliant EPDs;</li> <li>• Evah Institute: LCI, LCIA &amp; Life Cycle Benefit Assessment plus PCR and EPD standards and method. Contributor to LCI &amp; LCIA software coding for OpenLCA OzLCI database &amp; Intern training</li> <li>• VliegLCA on methodology for building &amp; greenhouse gas modelling.</li> </ul>	3.0		
		LCI recipes done	Developer >900 LCI recipes for product & supply chains at The Evah Institute South African, VliegLCA global & OpenLCA OzLCI databases.	4.0		
	Technology or action		9 years' work in NL, ecospecifier, Global GreenTag & The Evah Institute		2.0	
	Optional	Verification & Environmental Audit Practice	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag & Evah EPD Scheme	2.0	
Attended courses on environmental audits >40 hrs at Global GreenTag				1.0		
Chair >1 review panel for LCA study by Ecquate Dormitory Buildings LCA				1.0		
Qualified trainer in environmental audit course guest trainer at QUT				1.0		
LCA method & Practice		LCA projects & papers	Participant in >30 LCARate case studies @ The Evah Institute in last 8 years. Written papers & platform presentations of new forest LCA methods		2.0	
Technology or experience represented by LCI datasets in NACE codes		Formal Scientific Qualification	Master thesis in The Netherlands & internships at Global GreenTag & The Evah Institute in Australia on LCI database development. NACE: J - ICT		0.5	
			Ex Private Sector ≥ 3 years	<ul style="list-style-type: none"> <li>• Australasian OpenLCA facilitator &amp; recoded LCI population; co-develop Life Cycle Benefit Assessment, LCADesignStudio. On FSLCI board;</li> <li>• Session Co-chair SETAC 2023;</li> <li>• ALCAS, SETAC and FSLCI papers, posters and presentations;</li> <li>• Australasian OpenLCA freeware facilitator; Coding OzLCI databases;</li> <li>• QUT lectures and workshops, Mentoring associates,</li> <li>• Dutch wood-build advice, Kistkruk stool in social workshops;</li> <li>• Musicians for climate. NACE M - Professional, scientific &amp; technical.</li> </ul>		1.0
		Company		LCA Study of	NACE:	
		Evah Institute		South Africa Coal	B - Mining & quarrying	0.5
			South Africa Power Supply	D - Electricity, gas & air supply		
		VliegLCA Consultant & Evah Associate for GGT	South African Carpet	C - Manufacturing	0.5	
			Insulation	H - Transport & storage		
			Australian Forestry 4 states	A - Agriculture, forestry & fishing	0.5	
			Australian MDF 3 states	F - Construction		
			Compactus & Shelving	N - Administrative & support service	0.5	
	Ceiling Tiles		P - Education Q - Health O - Government			
Hot & chill Water Urn	I : Accommodation & food service		0.5			
Waste Diverter	E - Water; sewerage; waste					
Total	Point Score			27		

## Life Cycle Inventory Reviewer Qualification

**Dr Nana Bortsie-Aryee**

Table 10 lists Dr Nana Bortsie-Aryee's LCI reviewer eligibility score of 27 from a maximum 32 points.

**Table 10 Dr Nana Bortsie-Aryee LCI Reviewer Eligibility Score 2022**

	Score Topic	metrics	Minimum Experience Criteria	Score	
Mandatory	Verification & Audit Practice in last 20 years	Year's work >14 years	<ul style="list-style-type: none"> <li>Australia for Certifier GGT EPD Program Operator, ISO 14024 Type 1 Ecolabelling, &amp; ISO 140040, 14044 &amp; 14067 compliant LCA.</li> <li>New Zealand Abacus Bio Ltd, Water footprint of livestock farms;</li> <li>Germany Kocks Consult water &amp; environment in Africa, EU &amp; Asia;</li> <li>German Institute: Applied Material Flow Management Projects Africa;</li> <li>Ghana U of Ghana, Agricultural Professorial Research Assistant</li> </ul>	4.0	
		No. Reviews	16-30 reviews at GGT of client LCI recipes.	3.0	
	LCA method & Practice work in last 20 years	Year's work	>14 years LCA work in USA, Europe, Africa & Australasia as above	4.0	
		LCI recipes	Scoping & compiler >50 <80 individual LCI recipes for product & supply chains as client contact for Global and National LCI database for GGT	1.0	
	Experience in LCA datasets	Recent years	>14 years' work to date in US and Australia, Global GreenTag	4.0	
Optional	Verification & Environmental Audit Practice	EPD, EMS or ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag EPD Scheme	2.0	
			Attended courses on environmental audits >40 hrs	1.0	
			Chair >1 review panel for LCA study at Global GreenTag	1.0	
			Qualified trainer in environmental audit course	0.0	
	LCA method & Practice	last 10yrs papers & projects	Participant in >3 LCARate case studies @ GGT in last year.	1.0	
			<ul style="list-style-type: none"> <li>Water footprint management-theory to reality. Water management and performance of New Zealand livestock agribusiness 2020 U Otago;</li> <li>Ecological Footprint: Pragmatic Approach to Understanding and Building Sustainable Cities,2019, Sustainable Cities and Communities;</li> <li>How supply chain choices affect the life cycle impacts of medical products, 2018, JCP 182, 1095-1106;</li> <li>Resource synergies for on-farm water management: a study of New Zealand agribusinesses, 2018, Australasian J E M 25 (4), 398-419;</li> <li>The need for integrated life cycle sustainability analysis of biofuel supply chains, 2013, Biofuels-Economy, Env &amp; Sust;</li> <li>Environmental Assessment of a Forest Derived "Drop-in" Biofuel, 2013 Biofuels - Economy, Env &amp; Sust, 386 pp</li> </ul>	1.0	
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	PhD U of Otago, New Zealand 2013/6	1.0	
			M. Eng. U Trier, Germany. M. Sc. RAP U, Japan Advanced Diploma Complexity & Sustainability (2012) U Potsdam, Germany; Cert Regional Material Flow, ICETT, Japan	0.5	
	In Private Sector Australia & International @ Global GreenTag International	Ex Private Sector ≥ 3 year		<ul style="list-style-type: none"> <li>New Zealand Govt Award, Robert Bosch Stiftung Fellowship, NE States Research Award; SETAC &amp; IS for Industrial Ecology;</li> <li>USA U of Maine, forest-based economy,</li> <li>Applied Material Flow Management Africa; U Ghana,</li> <li>BSc in Agriculture 2004/7</li> </ul>	1.0
				NACE Codes	
		A - Farming, forestry & fishing		NZ livestock; USA forest; Ghana Agriculture	0.5
		C – Manufacturing		USA biofuel supply chain	0.5
E – Water, sewerage & waste		On farm New Zealand, Africa, Europe & Asia	0.5		
N - Administrative & support service		Managed Projects in Africa, Europe & Asia	0.5		
O - Public administration		Material Flow Management projects in Africa	0.5		
Q –Human health & social		Water in Kosovo & Afghanistan conflict areas			
Total	Point Score			27.0	

## Life Cycle Inventory Reviewer Qualification

**Shloka Ashar**

Table 11 lists Shloka's LCI data reviewer eligibility score of 30 out of a possible 32 points.

**Table 11 Shloka Ashar LCI Reviewer Eligibility Score 2016**

	Score Topic	metrics	Minimum Experience Criteria	Score		
	<b>Mandatory</b>	Verification & Audit Practice in last 20 years	Years' work	>5 <8 years in last 10 as Verifier & Lead Auditor at Global GreenTag (GGT) Product verification Program & standard operating procedures	2.0	
Number Reviews			>30 LCARate, Streamlined LCA & EPD Reviews, Manages team in GGT: Externally verified compliant ISO 170665 Conformance Assessment Body	4.0		
LCA methodology & Practice work		Years' work in last 10 years	>9 years e.g manages team using GGT LCARate; ISO 14024 Type 1 Ecolabelling program standards; ISO 140040, 14044 & 14067 compliant LCA program standards & applies EPD Program Operator General Program Rules	2.0		
		LCI recipes done	Reviewed & signed >300 product LCARate reports e.g Best Available Technology (BAT) & ecolabelled building, fitout, personal & cleaning products	4.0		
Technology or activity		Recent years	>6 <10 years in LCI dataset Global GreenTag ecolabelling e.g participant in: LCI >300 product LCA Global, Australia, South Africa & Malaysia Complies, Assesses & Reviews ISO 14025 compliant PCR & EPDs	2.0		
<b>Optional</b>	Verification & Environmental Audit Practice	EPD, ISO14001 or EMS Scheme	Accredited 3rd party reviewer for GGT EPD Scheme. Applies Program Rules	2.0		
			Attended courses on environmental audits >40 hrs. Environmental Management Systems Lead Auditor SIA Global RABQSA	1.0		
			Chair of LCA study review research team of Certified Ecolabellers	1.0		
			qualified Certified Type 1 ecolabelling program in-house audit trainer	1.0		
	LCA method & Practice	LCA projects & papers in last 10 years	>5 <8 Years' Experience in LCARate	2.0		
			Reviewed >300 LCI recipe LCARate in Streamlined LCA	4.0		
			Participant in >3 research projects on issues or case studies including: Biomass & Solar Project reports on water, energy & greenhouse emissions	1.0		
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	2 Master thesis completed in Environmental Science; Master of Environmental Protection Sardar Patel University India & Master of Environmental Science & Technology Sardar Patel University		0.5	
			Ex Private Sector	≥ 3 years: Joint Government Industry Funded Clean energy Projects for Greenhouse gas under Kyoto Protocol; Social Resilience Projects.		1.0
		Company	LCA Studies of	NACE Codes		
		Abellon Clean Energy Ltd	Greenhouse Gas	Biomass & solar D - Electricity, gas & air supply		0.5
			Buildings all types	C – Manufacturing, F - Construction		0.5
				Built Fitout all types including Offices	H - Transport & storage, O - Government, P – Education, N - Administrative & support service	
			Global GreenTag Pty Ltd	LCI Australia, South Africa, global all primary sectors	A - Agriculture, forestry & fishing, B - Mining & quarrying, E - Water; sewerage; waste,	
		Personal Care & Cleaning for all asset types		I – Accommodation, Pharmaceuticals Q - Human health, R – Arts, entertainment,		0.5
Total		Point Score	30			



## Life Cycle Inventory Reviewer Qualification

David Baggs

Table 12 lists David Baggs' LCI data reviewer eligibility score of 31 out of a possible 32 points.

**Table 12 David Baggs LCI Reviewers Eligibility Score 2017**

Score Topic	metrics	Minimum Experience Criteria	Score			
Mandatory	Verification & Audit Practice in last 20 years	Year's work	>14 years Audits at Ecospecifier & Global GreenTag (GGT) developed GGT: Product component verification & Supply Chain Audit Program & Product verification & Supply Chain Audit standard operating procedures.	4.0		
		No. Reviews	>30 Reviews of LCARate, LCA & EPDs. Developed GGT: Externally verified compliant ISO 170665 Conformance Assessment Body & GGT ISO 9001 certified Quality Management System LCA R&D Program.	4.0		
	LCA methodology & Practice work	Year's work in last 20 years	>14 years e.g as principal or co-developer of GGT LCARate; ISO 14024 Type 1 Ecolabelling program standards; ISO 140040, 14044 & 14067 compliant LCA program standards & EPD Program Operator General Program Rules	4.0		
		LCI recipes	Commissioned, reviewed & or signed >300 product LCARate reports on BAU & Best Available Technology building, fitout, personal care & cleaning products	4.0		
	Experience represented by LCA datasets	Recent years	>20 years across building industry LCI datasets, including participation in: LCI >300 product LCA Global, Australia, Sth Africa & Malaysia, plus Developing model ISO 14025, 21930 & EN 15804 compliant PCR & EPD.	4.0		
Optional	Verification & Environmental Audit Practice	EPD, EMS or ISO14001 Scheme	Accredited 3rd party GGT EPD Scheme reviewer. Australasian EPD Program Inaugural Chair. Aided International EPD Program Rules review & adoption.	2.0		
			Attended courses on environmental audits >40 hrs	1.0		
			Chair of >1 LCA study review panel or environmental app	1.0		
			Audit course Trainer. Exemplar Global Qualified Lead Auditor	1.0		
	LCA method & Practice	last 10yrs papers & projects	>12 articles in peer-review journals; 9 Chapters on LCA/EPD/ Life Cycle Thinking in Books, >85 Articles, 32 LCT Education Course Modules	1.0		
			Participant in >3 research projects on issues or case studies including: Government Advisory Reports on water, energy & greenhouse emissions, Architectural Project reports on water, energy & greenhouse emissions & Estidama Pearl Rating Scheme Whole Building LCA Rating Project.	1.0		
	Technology or experience represented by LCI datasets	Formal Scientific Qualification	≥1 Master thesis equivalent completed in Architectural & Building Science. Internationally Recognised Expertise		0.5	
		Ex Private Sector	M: Professional, scientific & technical ≥ 3 years e.g as President Australian LCA Society 2013-2014 & Vice President 2011-2013		1.0	
		NACE Codes		Company & Project		
		A - Farming, forestry etc		Global forest product board & paper. Farm biomass		0.5
		B - Mining & quarrying		Global minerals & aggregates for building		
		C – Manufacturing		Fitout Product for S Africa & Australasia		
		D - Electricity, gas supply		Global, National & State power & fuel supply		0.5
		E – Water & waste		Australian & S Africa water & waste systems		
		F - Construction		International Buildings; Bushfire Shelter & Earth Covered Homes		
		G - Repair motor vehicles		Hybrid car repair & vintage car restoration		0.5
		H: Transport & storage		Insulation freight & packing in China & Australia		
I – Accommodation,		Fitout, cleaning, greasetrap & garbage diversion				
J: ICT		Global database development for LCA Software		0.5		
M: Professional, Scientific		New method development for Carbon sinks				
O: Government & defence		National & State Buildings and Facilities				
P – Education		School, TAFE & University Fitout		0.5		
Q – Health		Personal Care, Disinfection & Hospital Products				
R – Arts, entertainment		2000 Olympics Sports Venues & Buildings				
Total	Point Score			31		

## Life Cycle Inventory Reviewer Qualification

**Delwyn Jones**

Table 13 summarises Delwyn Jones' LCI data reviewer score of 31 points out of the maximum 32 points.

**Table 13 Delwyn Jones LCI Reviewer Eligibility Score 2021**

	Score Topic	metrics	Experience Criteria in last 20 years	Score	
	Mandatory	Verification & Audit Practice	Years' work	Industry, Government & CASE studies >21yr environmental review & site audit	4
No. Review			>100 LCARate >30 reviews of ISO1400 compliant EPDs & LCAs Public & Private	4	
LCA method & Practice work		Years' work	Government Principal Scientist & private specialist in LCA >21 Years since 199y	4	
		LCI recipes	>8,000 recipes done building LCI database developer 20 years' experience	4	
Technology or activity		Recent years	40 years Scientific advisor on built environment Property issues including: 14yrs Principal LCA Consultant @ Olympics & construction industry. >20 years senior scientist resolving environmental issues: industry & market.	4	
Optional	Verification & Environmental Audit Practice	EPD, ISO14001 or EMS Scheme	1 year Auditor of EMS & LCA for NSW Govt Supply ISO14001	2	
			1 year Auditor for NSW Govt Olympics 2000 Development ISO14001 LCA		
			10 years verify EMS, building & procurement QLD Govt Public Works		
			1 year verify ecolabelling: Australasian Procurement & Construction Council		
			4 years 3 <sup>rd</sup> party reviewer for Global GreenTag (GGT) certified EPD & PCR Schemes		1
			15 years Guest Lecturer in environmental audit & LCT courses at 4 Universities		1
	LCA method & Practice	LCA projects & papers	>5 articles written for & published in peer-review journals	1	
			>5 Chapters written & published in peer-review books & National Guideline		
			>3 Government & CSIRO research projects on issues or case studies		1
	Technology or experience represented by LCI datasets in NACE codes	Qualification	≥1 Master's thesis equivalent completed at the University of Wollongong	0.5	
		Public	>20-year Global Academic, Professional Body & Government LCA practitioner	1	
		Private Sector		Global building sector @ BHPI, NSWDPW, CRC CI, CSIRO & Evah: Steels, polymers, refractories, cements, concrete, enamels, ceramics, alkalis, acids, water treatment, waste treatment, scrap recovery, power supply & control, IT, coal industry, freight.	0.5
				BHPI Global refractory, metal & inductor industry inventor & author: Aluminium. Copper, Ceramics, Zinc, Lead, Brass, Steel, Iron, Electromagnetic Levitation, Radio frequency	
				Global polymer & metal coating R&D analysis, inventor & author @ BHPI: all elements, solids, non-conductors, powders, metals, ceramics, fibres, fractures, microstructure. Author global material GDOES handbook & quantification algorithm: surface elemental environmental & forensic analysis of contaminants, substrates, enamels, complex organic & metallic coatings, gas phase contaminants plus metals & river shells.	0.5
				Pacific Rim food technology, canning & tinsplate industry @ AI&S: Vegetables, fruit, meat, beer, soft drink, ice cream, corrosion resistance & shelf life.	0.5
State Public Works LCA Developer, State Supply, Sydney 2000 Olympics LCA Auditor. Public Works Asset Capital Works & National Fitout & Procurement Guideline & Policy.				0.5	
CRCI Software developed for building LCA with Stanford U USA, Salford U UK, CSTB France, Finland, Slavenburg, Dutch, German, Californian supply chain LCI. CSIRO CRCI Federal Govt funded software development for Commercial building LCA with Australian, Queensland, New South Wales & Victorian Supply chain LCI.				0.5	
Total			Pont Score	31	

## Life Cycle Inventory Reviewer Qualification

### Results

In the following sections qualifications are tabled for each of the following people to act as LCI reviewers.

Table 14 lists practitioners scores out of a maximum of 32 possible points and contact details.

**Table 14 LCI Data Reviewer contact and track record details**

Professional	Score/32	Email Contact	<a href="https://www.linkedin.com/in/">https://www.linkedin.com/in/</a>
Jill Jing	12.0	certification5@globalgreentag.com	guannan-jing-73888435/?originalSubdomain=au
Yasmin Kelly	12.5	certification9@globalgreentag.com	/yasminkelly/
Bambang Koproto	16.0	certification3@globalgreentag.com	bambangkoprote/?originalSubdomain=id
Direshni Naiker	21.0	direshni.naiker@gmail.com	direshni-naiker-2b3b8538/?originalSubdomain=za
Murray Jones	23.5	murrayjones@ecquate.com	murrayj/
Dr Sharmina Begum	23.5	sharmina628@gmail.com	<a href="https://scholar.google.com.au/citations?user=rmwn7BAAAAAJ&amp;hl=en">https://scholar.google.com.au/citations?user=rmwn7BAAAAAJ&amp;hl=en</a>
Dr Nana Bortsie-Aryee	27.0	certification@globalgreentag.com	awuah-bortsie-aryee-phd-43065019/?locale=es_ES
Mathilde Vlieg	27.0	mathilde@evah.com.au	mathildevlieg/
Shloka Ashar	30.0	shloka@evah.com.au	shloka-ashar-89878223
Delwyn Jones	31.0	delwyn@evah.com.au	delwyn-jones-42473a29
David Baggs	31.0	david.baggs@globalgreentag.com	ecolabelling-green-product-certification-transparency/?trk=public_profile

### Discussion of Results

Qualifications & experience of the following people were compared. All were found to exceed the minimum ILCD Handbook prerequisites for LCI data reviewers. All exceeded the lowest minimum score of 5 points.

The following parties have reviewed the required evidence and accepted the validity of these scores:

- All Reviewers listed in this report,
- PCR Moderator: Ecquate Pty Ltd and
- LCA Methodology Developer: The Evah Institute.

All persons nominated herein as reviewers have reviewed evidence required and accepted the veracity of these scores. Therefore, their names are to be posted & scores declared on the World Wide Web.

### Conclusions

All persons nominated herein are each considered eligible to be commissioned to submit verifier reports on the LCA used to develop 3<sup>rd</sup> party certified EPDs.

Each is eligible to submit verifier reports on the LCA used to develop 3<sup>rd</sup> party certified EPDs.

To facilitate program & system transparency the name, score & qualifications of Jill Jing, Yasmin Kelly, Bambang Riyadi Koproto, Direshni Naiker, Murray Jones, Dr Sharmina Begum, Mathilde Vlieg, Dr Nana Bortsie-Aryee, Shloka Ashar, David Baggs and Delwyn Jones are to be posted & declared on the World Wide Web.

Stakeholders may then examine them & respond to all concerned & interested parties as deemed fit.