

Global GreenTag^{Cert™}

Certification Program

EPD PROGRAM: REVIEWER QUALIFICATIONS
FOR VERIFICATION REPORTS - PUBLIC v1.1



GLOBAL
GREEN TAG
INTERNATIONAL PTY LTD

green product certification
trust brands

**Life Cycle Inventory
Reviewer
Qualifications**

Applicable to

Verification Reports

for

**The Global GreenTag
Environmental Product Declaration (EPD)
Program**

prepared for

Global GreenTag International Pty Ltd

by

The Evah Institute

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Introduction

This report was compiled by the Evah Institute on behalf of Global GreenTag about reviewer qualifications applicable to Life Cycle Inventory (LCI) verification reports for Life Cycle Assessment (LCA) used in environmental product declarations (EPDs) issued under the Global GreenTag EPD Program.

Aim

The purpose was to document selection criteria of reviewer qualifications in verification of LCI developed by Ecquate Pty Ltd, The Evah Institute and/or Global GreenTag International Pty Ltd or Global GreenTag Pty Ltd and EPDs issued by any of these entities.

Method

Table 1 lists prerequisites for LCI data reviewers from the International Reference Life Cycle Data System (ILCD) Handbook developed by Institute for Environment and Sustainability in the European Commission Joint Research Centre (JRC) in co-operation with the Directorate-General for the Environment¹.

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	>5 years experience 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	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 Handbook². It shows the minimum LCI reviewer's qualifications score is 5 points and the maximum LCI reviewer's qualifications score is 32 points.

¹ 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. 1st 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

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

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 ³	3 years	3-4	5-8	9-14	>14	4	1
		Number Reviews ⁴	3 reviews	3-5	6-15	16-30	>30	4	1
	Optional	Scores ⁵ 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 ⁶	3 years	3-4	5-8	9-14	>14	4	1
		LCI datasets ⁷	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 ⁸ or experience represented by LCI datasets	Mandatory	Recent years ⁹	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	

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 3rd party certified ecolabels and to develop 3rd party certified Environmental Product Declarations (EPDs).

Results

In the following sections qualifications are tabled for each of the following people to act as LCI reviewers. Table 3 lists practitioners contact details. Dr Judy Luo; Omar Biaz; Nana Bortsie-Aryee

Table 3 LCI Data Reviewers Qualification Scores

Professional	Email Contact	https://www.linkedin.com/in/
Omar Biaz	certification4@globalgreentag.com	omarbiaz/
Nana Bortsie-Aryee	certification@globalgreentag.com	nana-bortsie-aryee-43065019/
Judy Luo	certification2@globalgreentag.com	dr-judy-luo-54497a73/
Mathilde Vlieg	mathildevlieg@gmail.com	mathildevlieg/
Murray Jones	murrayjones@internode.on.net	murrayj/
Shloka Ashar	shloka2803@gmail.com	shloka-parikh-89878223/
David Baggs	david.baggs@globalGreenTaq.com	davidbaggs/
Delwyn Jones	delwyn@evah.com.au	delwyn-jones-42473a29/

3 Years of experience in the field of review & audit in the environmental field

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

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

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

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

8 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 apply. Experience in sub-sector valid for sector

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

Omar Biaz

Table 4 summarises Omar Biaz LCI data reviewer eligibility score of 16 out of 32 points.

Table 4 Omar Biaz LCI Reviewers Eligibility Score Jan 2017

	Score Topic	metrics	Minimum Experience Criteria	Score	
Mandatory	Verification & Audit Practice in last 20 years	Years work ¹⁰	3 to 4 years in Australia for clients of Certifier Global GreenTag ^{Cert} ™ (GGT) EPD Program Operator, ISO 14024 Type 1 Ecolabelling, & ISO 140040, 14044 & 14067 compliant LCA.	1.0	
		No. Reviews ¹¹	>30 reviews at GGT of PCRs & EPD method & client LCI recipes.	4.0	
	LCA methodology & Practice work	Years work ¹²	3 to 4 years in Australia for clients working at ecospecifier in Life Cycle Thinking (LCT) and Global GreenTag in LCA, Type 1 Ecolabelling and ISO 14025, 21930 & EN 15804 compliant EPDs.	1.0	
		LCI recipes done ¹³	Scoping & compiler >90 <150 individual LCI recipes for product & supply chains as client contact, auditor for GGT Global and National LCI databases	2.0	
	Technology/action	Year s work ¹⁴	3 to 4 years work to date in Ecospecifier and Global GreenTag	1.0	
Optional	Verification & Environmental Audit Practice	EPD, EMS ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag EPD Scheme	2.0	
			Attended courses on environmental audits >40 hrs	1.0	
	LCA method & Practice	LCA projects & papers	Participant in >3 LCARate case studies @ GGT & The Evah Institute in last 3 years. Written platform presentations on LCA Practice & fibre systems	1.0	
	Technology ¹⁵ or experience represented by LCI datasets	Formal Scientific Qualification	Education	≥1 Master thesis or equivalent completed	0.5
			Internships	ecospecifier on eco assessment	
		Global GreenTag on ecolabelling			
		In Private Sector Australia & International @ Global GreenTag Pty Ltd	A – Agriculture & forestry	Forestry for MDF, Sugar Cane for Fabric	0.5
			B - Mining & quarrying	USA Coal & Limestone, Italian Quartz	
			C - Manufacturing	USA & China Carpets	0.5
			D - Electricity, gas supply	US & Pacific Rim, Australian States	
			E - Water supply, waste	Pacific Rim PET Recyclate	0.5
			F - Construction	Pacific Rim building products	0.5
			H - Transport & storage	Global Freight & Packaging for carpet	
I - Accommodation & food	Pacific Rim PVC & Stainless for drainage				
J - ICT	Database & Software competencies	0.5			
O - Public administration	Blind fabrics for Government Offices				
Total		Point Score	16		

¹⁰ Years of experience in the last 10 years in the field of review & audit in the environmental field

¹¹ Number of reviews of ISO 14025 compliant LCI data sets

¹² Years of experience in the last 20 years in LCA work, starting from University Masters or Bachelor degree if Master thesis on LCA

¹³ Participant in LCI dataset development/modelling in LCI database as verified or documented. 10 data sets = 1 "experience

¹⁴ Years of professional production, R&D or environmental work in private sector, technology or system of LCI under review

¹⁵ Qualification of technologies or activities knowledge is according to NACE code classes listed in Appendix 1

Mathilde Vlieg

Table 5 summarises Mathilde Vlieg's LCI data reviewer eligibility score of 19 out of 32 points.

Table 5 Mathilde Vlieg LCI Reviewers Eligibility Score Jan 2017

	Score Topic	metrics	Minimum Experience Criteria	Score	
Mandatory	Verification & Audit Practice in last 20 years	Years work ¹⁶	3 years in last 10 in The Netherlands for clients & in Australia at: <ul style="list-style-type: none"> • Certifier Global GreenTagCert™ EPD Program Operator, ISO 14024 Type 1 Ecolabelling, & ISO 140040, 14044 & 14067 compliant LCA; • The Evah Institute review of certifier & 3rd party audited LCI allocation. • VliegLCA 3rd party reviewer whole building LCA report for Ecquate 	1.0	
		Number Reviews ¹⁷	>30 reviews in Australia at: <ul style="list-style-type: none"> • Global GreenTag of PCRs & methodology for EPDs & client LCI recipes • The Evah Institute LCI, LCIA & PCR methods for ISO compliant EPDs. • VliegLCA reviewer of 7 story building & greenhouse LCA for Ecquate¹⁸. 	4.0	
	LCA methodology & Practice work	Years work in last 20	3 years in The Netherlands for clients & in Australia working at: <ul style="list-style-type: none"> • Ecospecifier in Life Cycle Thinking (LCT); • Global GreenTag in LCA, Type 1 Ecolabelling and ISO 14025, 21930 & EN 15804 compliant EPDs; • Evah Institute: LCI, LCIA & Life Cycle Benefit Assessment plus PCR and EPD standards and method. • VliegLCA on methodology for building & greenhouse gas modelling. 	1.0	
		LCI recipes done	Compiler >300 individual LCI recipes for product & supply chains as primary: <ul style="list-style-type: none"> • developer of the South African LCI database at The Evah Institute & • developer of the VliegLCA global LCI database 	4.0	
	Technology/action	Recent year	3 years work in NL, Ecospecifier, Global GreenTag & The Evah Institute	1.0	
Optional	Verification & Environmental Audit	EPD, EMS or ISO14001	Accredited 3rd party reviewer for Global GreenTag & Evah EPD Scheme	2.0	
			Audits of Dormitory Buildings LCA reports & EPDs.	1.0	
	LCA method & Practice	LCA projects & papers	Participant in >3 LCARate case studies @ The Evah Institute in last 3 years. Written Papers & platform presentations of New LCA Forest Methodology	1.0	
	Technology ¹⁹ or experience represented by LCI datasets	Formal Scientific Qualification	Education	Master thesis in The Netherlands	0.5
			Workshops	Kistkruk stool in social workshops	
			J - ICT	intern Global GreenTag on ecolabelling	
				intern at The Evah Institute LCI Developer	
		Ex Private Sector ≥ 3 years	M - Professional, scientific & technical.	Recoded LCI population for Simapro	1.0
				Recoding LCIA Algorithms for OpenLCA	
				Australasian OpenLCA facilitator	
				Co-develop Life Cycle Benefit Assessment Co-develop LCASudio Incubator for SME's	
		In Private Sector Evah	B - Mining & quarrying D - Electricity, gas supply	South Africa Coal	0.5
				South Africa Power	
		In Private Sector @ VliegLCA & Evah Associate for GGT& clients	A - Agriculture, forestry C – Manufacturing E - Water; sewerage; waste F - Construction H - Transport & storage I - Accommodation & food N - Administrative O - Government P – Education Q – Health	Australian Forestry 4 states	0.5
				South African Carpet	
				Australian Waste Diverter Chute	0.5
	Australian MDF 3 states				
	Insulation China			0.5	
	Australian Hot & Chilled Water Urn				
	Compactus & Shelving			0.5	
South African Carpet					
Floor coverings for Schools					
South African Ceiling Tiles					
Total		Point Score	19		

¹⁶ Years of experience in the field of review & audit in the environmental field

¹⁷ Number of reviews of ISO 14025 compliant LCI data sets

¹⁸ LCI database & LCA method developer, Division of Ecquate Software developer LCIA automated off Building Information Model (BIM)

¹⁹ Qualification of technologies or activities knowledge is according to NACE code classes listed in Appendix 1

Murray Jones

Table 6 lists Murray Jones LCI data reviewer eligibility score of 20.5 out of a maximum 32 points.

Table 6 Murray Jones LCI Reviewers Eligibility Score 2017

Score Topic	metrics	Minimum Experience Criteria	Score		
Mandatory	Verification & Audit Practice in last 20 years	Years work ²⁰	>9 <14 years in BIM LCA software audit at CRC CI ²¹ , CSIRO ²² & Ecquate ²³	3.0	
		Number Reviews ²⁴	>1 year PCR Moderator for Global GreenTag EPD Program Operator, ISO 14024 Type 1 Ecolabelling, & ISO 140040, 14044 & 14067 compliant LCA	2.0	
	LCA methodology & Practice work	Years work in last 20 ²⁵	9 to 14 years LCA software development at CRC CI & CSIRO; LCA practice at Ecquate & Evah on LCA Buildings & Business as Usual (BAU) products	3.0	
		LCI recipes done ²⁶	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	Recent year ²⁷	>6 <10 years participant in LCI >30 BAU product in Global GreenTag LCI database development	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	>5 <8 Years Experience in LCI database & LCIA Software development	2.0	
			Participant in >3 LCADesign research projects & issues & Project on whole building greenhouse gas emissions & product LCA case studies	1.0	
	Technology ²⁸ or experience represented by LCI datasets	Ex Public Sector ≥ 3 year	ALCAS member	CRC CI Project Leader for CSIRO LCA software development Taught > 100 LCADesign 1 & 2 Day courses at UNSW, UOW and user sites	1.0
			J - Information & communication		
		In Private Sector for Global GreenTag Pty Ltd	A - Agriculture, forestry	Timber Fitout	0.5
			B - Mining & quarrying	For National Steel Supply	
			C - Manufacturing	BAU Products	
			D - Electricity, gas supply	Victorian Power	
		In Private Sector for Evah Institute Div of Ecquate Pty Ltd	B - Mining & quarrying	National Concrete Market	0.5
			E - Water & waste	National Building Sector	
			F - Construction	Global Aluminium	
			H: Transport & storage	National Supply Chain	
In Private Sector @ Ecquate Pty Ltd		I - Accommodation	Building Products	0.5	
		P - Education	School Dormitory Buildings		
	O - Government	TAFE & University Buildings			
	Q - Health	Hospital Buildings			
Total		Point Score	20.5		

²⁰ Years of experience in the field of review & audit in the environmental field

²¹ Australian National Cooperative Research Centre for Construction Innovation

²² Australian Commonwealth Science & Industrial Research Organisation

²³ Ecquate Pty Ltd is LCA Software Licensee & developer of LCIA automated off Building Information Modelling (BIM) & LCI databases

²⁴ Number of reviews as a reviewer, or ISO 14025 compliant verifications of EPDs, or LCI data sets

²⁵ Years of experience in LCA work, starting from University Masters or Bachelor degree if Master thesis on LCA.

²⁶ Participant in LCI dataset development documented in private database. 10 sets = 1 "experience". The system operator has evidence.

²⁷ Years of professional experience in the private sector, technology or system of LCI unit process dataset that has been reviewed.

²⁸ Qualification of technologies or activities knowledge is according to NACE code classes listed in Appendix 1

Dr Judy Luo

Table 7 summarises Dr Judy Luo's LCI data reviewer eligibility score of 21 out of 32 points.

Table 7 Dr Judy Luo LCI Reviewers Eligibility Score Jan 2017

	Score Topic	metrics	Minimum Experience Criteria	Score			
	Mandatory	Verification & Audit Practice in last 20 years	Years work ²⁹	5-8 years in Australia at ecospecifier & Certifier Global GreenTag ^{Cert} ™ (GGT) EPD Program Operator, ISO14024 Type 1 Ecolabel & ISO 140/40/44/67 compliant LCA.	1.0		
No. Reviews ³⁰			16 - 30 reviews at GGT of PCRs & EPD method & client LCI recipes.	3.0			
LCA methodology & Practice work		Years work in last 10 years ³¹	5-8 years in Australia for clients working at ecospecifier in Life Cycle Thinking (LCT) and Global GreenTag in LCA, Type 1 Ecolabelling and ISO 14025, 21930 & EN 15804 compliant EPDs.	2.0			
		LCI recipes done ³²	Scoping & compiler >200 individual LCI recipes for product & supply chains as client contact, auditor for Global and National LCI database for GGT	4.0			
Technology/action		Year s work ³³	6-10 years work to date in ecospecifier and Global GreenTag	2.0			
Optional	Verification & Environmental Audit Practice	EPD, EMS ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag EPD Scheme	2.0			
			Attended courses on environmental audits >40 hrs	1.0			
	LCA method & Practice	LCA projects & papers	Participant in >3 LCARate case studies @ GGT & The Evah Institute in last 3 years. Written platform presentations on LCA Practice & fibre systems	1.0			
	Technology ³⁴ or experience represented by LCI datasets	Formal Scientific Qualification	Education	At least one PhD obtained	1.0		
				≥1 Master thesis completed	0.5		
		Ex Private Sector ≥ 3 year	Internships	Ecospecifier on eco-assessment	Global GreenTag on ecolabelling	1.0	
				M - Professional & technical			Project Management in Building Energy
				T - Households for own use			Apiary Products
				R – Arts & entertainment			Personal Care Skin Care
		In Private Sector Australia & International @ Family Business & @ Global GreenTag Pty Ltd	S - Other services	Landscape Architecture Academic projects	1.0		
				A – Agriculture &forestry		Sources for timber lockers & benches	
				B - Mining & quarrying		Minerals & Aggregates in Fitout Product	
				C - Manufacturing		Fitout & Personal Care Products	
				D - Electricity, gas, supply		Chinese & Australian States	
				F - Construction		Home Design & Construction	
				H - Transport & storage		Flooring, Shelving, Cupboards, Compactus	
				I - Accommodation & food		Steel Lockers, Polymer Grease Traps	
J - Information & ICT		Database & Software competencies					
P – Education	School fitout Floor coverings	0.5					
Q - Human health & social	Hospital & clean room fitout products	0.5					
Total		Point Score	21				

²⁹ Years of experience in the field of review & audit in the environmental field

³⁰ Number of reviews of ISO 14025 compliant LCI data sets

³¹ Years of experience in LCA work, starting from University Masters or Bachelor degree if Master thesis on LCA

³² Participant in LCI dataset development/modelling in LCI database as verified or documented. 10 data sets = 1 "experience

³³ Years of professional production, R&D or environmental work in private sector, technology or system of LCI under review

³⁴ Qualification of technologies or activities knowledge is according to NACE code classes listed in Appendix 1

Nana Bortsie-Aryee

Table 8 summarises Nana Bortsie-Aryee's LCI data reviewer eligibility score of 23.5 out of 32 points.

Table 8 Nana Bortsie-Aryee LCI Reviewers Eligibility Score Jan 2017

Score Topic	metrics	Minimum Experience Criteria	Score		
Mandatory	Verification & Audit Practice in last 20 years	Years work in last 10 years ³⁵	>9 <14 years in <ul style="list-style-type: none"> • New Zealand Abacus Bio Ltd, Water footprint of livestock farms • Germany Kocks Consult water & environment in Africa, EU & Asia • Germany Institute: Applied Material Flow Management Projects Africa • Ghana U of Ghana, Agricultural Professorial Research Assistant • Australia for Certifier GGT EPD Program Operator, ISO 14024 Type 1 Ecolabelling, & ISO 140040, 14044 & 14067 compliant LCA. 	3.0	
		No. Reviews ³⁶	16-30 reviews at GGT of client LCI recipes.	3.0	
	LCA methodology & Practice work	Years work ³⁷	>9 <14 years in USA, Europe, Africa & Australasia as above in LCA.	3.0	
		LCI recipes done ³⁸	Scoping & compiler >50 <80 individual LCI recipes for product & supply chains as client contact for Global and National LCI database for GGT	1.0	
	Technology/action	Year s work ³⁹	>9 <14 years work to date in US and Australia, Global GreenTag	3.0	
Optional	Verification & Environmental Audit Practice	EPD, EMS ISO14001 Scheme	Accredited 3rd party reviewer for Global GreenTag EPD Scheme	2.0	
			Attended courses on environmental audits >40 hrs	1.0	
	LCA method & Practice	LCA projects & papers	Participant in >3 LCARate case studies @ GGT in last year.	1.0	
			> 5 articles in peer-review journals or Book Chapters. Written posters & presentations on LCA Practice & Forestry, Fuel & Biomass systems	1.0	
	Technology ⁴⁰ or experience represented by LCI datasets	Formal Scientific Qualification	Education	U of Otago, New Zealand PhD 2013/6	1.0
				U Trier, Germany & RAP U, Japan M. Eng. & M. Sc. Advanced Diploma in Complexity & Sustainability (2012) U Potsdam, Germany	0.5
				ICETT, Japan Cert Regional Material Flow	
		Ex Private Sector ≥ 3 year	M - Professional, scientific & technical.	U Ghana, BSc in Agriculture 2004/7,	1.0
				USA U of Maine, forest-based economy	
				Applied Material Flow Management Africa	
				New Zealand Govt Award, Robert Bosch Stiftung Fellowship, NE States Research Award; SETAC & IS for Industrial Ecology	
		In Private Sector Australia & International @ Global GreenTag Pty Ltd	A – Agriculture & forestry	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		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	0.5			
Total		Point Score	23.5		

³⁵ Years of experience in the field of review & audit in the environmental field

³⁶ Number of reviews of ISO 14025 compliant LCI data sets

³⁷ Years experience in last 20 of LCA work, starting from University Masters or Bachelor degree if Master thesis on LCA

³⁸ Participant in LCI dataset development/modelling in LCI database as verified or documented. 10 data sets = 1 "experience

³⁹ Years of professional production, R&D or environmental work in private sector, technology or system of LCI under review

⁴⁰ Qualification of technologies or activities knowledge is according to NACE code classes listed in Appendix 1

David Baggs

Table 9 lists David Baggs' LCI data reviewer eligibility score of 29 out of a possible 32 points.

Table 9 David Baggs LCI Reviewers Eligibility Score 2017

Score Topic	metrics	Minimum Experience Criteria	Score		
Mandatory	Verification & Audit Practice in last 20 years	Years work	>9 <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.	3	
		Number Reviews	>30 Reviews of LCARate, Streamlined LCA & EPDs. Developed GGT: Externally verified compliant ISO 170665 Conformance Assessment Body & GGT ISO 9001 certified Quality Management System LCA R&D Program.	4	
	LCA methodology & Practice work	Years work in last 10 years	>9 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	3	
		LCI recipes done	Commissioned, reviewed & or signed >300 product LCARate reports on BAU & Best Available Technology building, fitout, personal care & cleaning products	4	
	Technology or activity	Recent years	>20 years across building industry LCI datasets ⁴¹ , including participation in: LCI >300 product LCA Global, Australia, Sth Africa & Malaysia, plus Developing model ISO 14025, 21930 & EN 15804 compliant PCR & EPD.	4	
Optional	Verification & Environmental Audit Practice	EPD, ISO14001 or EMS Scheme	Accredited 3rd party GGT EPD Scheme reviewer. Australasian EPD Program Inaugural Chair. Assisted review & adoption of International EPD Program Rules.	2	
			Attended courses on environmental audits >40 hrs	1	
			Chair of >1 LCA study review panel or environmental app	1	
			Audit course Trainer. Exemplar Global Qualified Lead Auditor	1	
	LCA method & Practice	LCA projects & papers in past 9 years	>12 articles in peer-review journals; 9 Chapters on LCA/EPD/ Life Cycle Thinking (LCT) in Books, >85 Articles, 32 LCT Education Course Modules	1	
			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	
	Technology ⁴² or experience represented by LCI datasets	Qualificat-ion	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
		In Private Sector Practice		F: Construction	National & International Buildings
			O: Government & defence	National & State Buildings	
			R: Art & recreation	2000 Olympics Sports Venues & Buildings	
		In Private Sector Australia & International @ Global Greentag	A: Agriculture, forestry	Global forest product board & paper. Farm biomass	0.5
			B: Mines/quarries	Global minerals & aggregates for building	
			C: Manufacturing	Fitout Product for S Africa & Australasia	0.5
			D: Power, gas supply	Global, National & State power & fuel supply	
			E: Water; sewer; waste	Australian & S Africa water & waste systems	
			F: Construction	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	0.5
		I: Accommodation & food	Fitout, cleaning, greasetrap & garbage diversion		
J: ICT	Global database development for LCA Software				
M: Professional, Scientific	New method development for Carbon sinks				
P: Education	School, TAFE & University Fitout	0.5			
Q: Human health	Personal Care, Disinfection & Hospital Products				
Total		Point Score	29		

41 Participant in LCI dataset development/modelling documented in private database (1 experience = 10 recipes). Each line = >10 recipes

42 Qualification of technologies or activities knowledge is according to NACE code classes.

Shloka Ashar

Table 10 lists Shloka's LCI data reviewer eligibility score of 30 out of a possible 32 points.

Table 10 Shloka Ashar LCI Reviewers Eligibility Score 2017

	Score Topic	metrics	Minimum Experience Criteria		
Mandatory	Verification & Audit Practice in last 20 years	Years work ⁴³	>5 <8 years in last 10 as Verifier & Lead Auditor at Global GreenTag (GGT) Product verification Program & standard operating procedures	2.0	
		Number Reviews ⁴⁴	>30 LCARate, Streamlined LCA & EPD Reviews, Manages team in GGT: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> LCI >300 product LCA Global, Australia, Sth Africa & Malaysia Complies, Assesses & Reviews ISO 14025 compliant PCR & EPDs 	2.0	
Optional	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 ⁴⁵	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 India	≥ 3 years: Joint Government Industry Funded Clean energy Projects for Greenhouse gas under Kyoto Protocol; Social Resilience Projects.	
		In Private Sector Australia & International @ Global GreenTag Pty Ltd	A - Agriculture, forestry	Australia & global forestry for boards	0.5
			B - Mining & quarrying	Global minerals for metals	
			C - Manufacturing	Personal Care product & packaging	
			D - Electricity, gas & air supply	Global National & Local Power Grid	
			E - Water; sewerage; waste	Waster diverter, Grease diverter & traps	
			F - Construction	Base Building Products	0.5
			H - Transport & storage	Insulation Products	
			I - Accommodation	Cleaning for assets for all sector types	
J: ICT			Local & Global database development		
N - Administrative			Quality Control & Office Furniture		
In Private Sector Abellon Clean Energy Ltd India			D - Electricity, gas & air supply	Biomass & solar Greenhouse Gas	0.5
	Q - Human health	Pharmaceuticals Greenhouse Gas			
	Q - Health	Hospital Fitout, Clean rooms, Disinfection	0.5		
		R - Arts, entertainment		Boiling & chilled water urn	
Total		Point Score	30		

43 Years of experience in the field of review & audit in the environmental field

44 Number of reviews as a reviewer, or ISO 14025 compliant verifications of EPDs, or LCI data sets

45 Qualification of technologies or activities knowledge is according to NACE code classes. Experience in sub-sector is valid for sector.

Delwyn Jones

Table 11 summarises Delwyn Jones' LCI data reviewer score of 31 points from a maximum 32 points.

Table 11 Delwyn Jones LCI Reviewers Eligibility Score 2017

	Score Topic	metrics	Experience Criteria in last 20 years	Score	
Mandatory	Verification & Audit Practice	Work years	Industry, Government & CASE studies >21yr environmental review & site audit	4	
		Reviews	>100 LCARate >30 reviews of ISO1400 compliant EPDs & LCAs Public & Private	4	
	LCA method & Practice work	Work years	Government Principal Scientist & private specialist in LCA >21 Years since 1994	4	
		LCI recipes	>8,000 recipes done building LCI database developer 20 years experience	4	
	Technology or activity	Work years recently	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		
			6 years 3 rd party reviewer for Global GreenTag (GGT) certified EPD & PCR		1
			15 years Guest lecturer in environmental audit & LCT courses at 4 Universities		1
			6yr Chair GGT PCR review panel & 4 yr BHP Research Chair ISO14001 E&OHMS		1
	5 years University course lecturer in year 4 built environment & LCT verification				
	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 ⁴⁶ or experience represented by LCI datasets cradle to fate (C ₂ F)	Qualification	≥1 Master's thesis equivalent completed at the University of Wollongong	0.5	
		Public Service	>20 year Global Academic, Professional Body & Government LCA practitioner	1	
		In Private Sector @ AI&S, Lysaght, BHPI, NSW DPW, Qld DPW, CRC CI, CSIRO, Evah ⁴⁷ & Global GreenTag	A: Agriculture, Forestry & Fishing: forestry, ovine, bovine, caprine, cereal, vegetable & fruit supply for timber, paper, polymers, fibre, flooring, roofing & food C ₂ F. B: Mining & Quarrying: bauxite, limestone, iron, sand, clay, coal, chalcopyrite C: Manufacturing: aluminium, iron, zinc, steel, copper, brass, lead, refractories, ceramic, cements, concretes, enamels, solvents, fuel, polymers, alkalis & acids C ₂ F D: Electricity & Gas supply: inductor power supply & control, electromagnetic levitation, radio frequency design, inventor & author of control guides & algorithms E: Water Supply; Sewerage; Waste Management & Remediation: water & scrap plus Queensland (Qld) government asset "blue water" remediation policy & guidelines F: Construction: Industry & Government funded LCI development for Qld, New South Wales, Victorian, Dutch, German & Californian building supply chains H: Transport & Storage: food technology, canning & tinplate corrosion & shelf life I: Accommodation: Sustainable Office Accommodation Fitout Policy & Guideline J: Information & Communication: LCA software development with Australian CRC M: Professional, Scientific & Technical: mineral, ceramic, metal, polymer, biomass, powder, coatings & fibres in surface, environmental, interfacial & forensic R&D analysis: Author GDOES handbook & inventor quantification algorithms all elements O: Public Administration & Defence: Commonwealth, NSW & Qld State Government Asset Management & Procurement Policy, LCA auditor & LCI database developer P: Education: University, TAFE & Public Schools Capital Works & Fitout LCI C ₂ F Q: Human Health: Public Hospitals Capital Works; Fitout & Disinfection LCI C ₂ F R: Recreation: NSW Sydney Olympics LCA Auditor LCI database developer C ₂ F	0.5	
				0.5	
				0.5	
				0.5	
				0.5	
				0.5	
				0.5	
0.5					
0.5					
0.5					
0.5					
0.5					
Total		Point Score	31		

⁴⁶ Qualification of technologies or activities knowledge is according to NACE code classes.

⁴⁷ AI&S= Australian Iron & Steel, BHPI= BHP International, NSWDPW= NSW Public Works, QDPI= QLD Public Works CRC CI= CRC for Construction Innovation, CSIRO Commonwealth Scientific Research & Technology Organisation & Evah= Ecquate Div: The Evah Institute

Discussion of Results

Qualifications and experience of the following people were compared. All were found to exceed the minimum ILCD Handbook prerequisites for LCI data reviewers. Out of a maximum of 32 possible points:

- Omar Biaz scored 16.0
- Mathilde Vlieg scored 19.0
- Dr Judy Luo scored 21.0
- Murray Jones scored 20.5
- Nana Bortsie-Aryee scored 23.5
- David Baggs scored 29.0
- Shloka Ashar scored 30.0
- Delwyn Jones scored 31.0.

The lowest two scores exceeded the minimum score of 5 points by a factor >3. All other scores were over 4 to 5 times greater than the minimum. The following parties have reviewed the required evidence and accepted the validity of these scores:

- Program Operator: Global GreenTag International Pty Ltd,
- PCR Moderator: Ecquate Pty Ltd and
- LCI 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 and scores declared on the World Wide Web.

Conclusions

Omar Biaz, Mathilde Vlieg, Nana Bortsie-Aryee, Dr Judy Luo, Murray Jones, Shloka Ashar, David Baggs and Delwyn Jones are each considered eligible to be commissioned to submit verifier reports on the LCA used to develop 3rd party certified EPDs.

Recommendations

Each is eligible to submit verifier reports on the LCA used to develop 3rd party certified EPDs. To facilitate program and system transparency names, score and resume of the following are to be posted and declared on the World Wide Web.

- Nana Bortsie-Aryee,
- Mathilde Vlieg,
- Omar Biaz,
- Dr Judy Luo,
- Murray Jones,
- Shloka Ashar,
- David Baggs and
- Delwyn Jones

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

Appendix NACE code classes.

- A - Agriculture, forestry & fishing
- B - Mining & quarrying
- C - Manufacturing
- D - Electricity, gas, steam & air conditioning supply
- E - Water supply; sewerage; waste management & remediation
- F - Construction
- G - Wholesale & retail trade; repair of motor vehicles & cycles
- H - Transport & storage
- I - Accommodation & food service
- J - Information & communication
- K - Financial & insurance
- L - Real estate
- M - Professional, scientific & technical
- N - Administrative & support service
- O - Public administration & defence;
- P – Education
- Q - Human health & social work
- R - Arts, entertainment & recreation
- S - Other services
- T - Households as employers; goods & services for own use

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