Supplementary information for: Comparing sources and analysis of uncertainty in consequential and attributional life cycle assessment: Review of current practice and recommendations

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Supplementary information A: Citations for systematic review

1. International Journal of Life Cycle Assessment
1.1 Attributional life cycle assessment studies
1.1.1 Uncertainty analysis performed
1.1.1a Monte Carlo-like approaches

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1.1.1e Qualitative/pedigree

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1.1.1f Sensitivity analysis

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1.1.1g Fuzzy logic
None.

1.1.1h Bayesian
None.

1.1.1i Regression
None.

1.1.1j Not indicated/other
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1.2 Consequential life cycle assessment studies

1.2.1 Uncertainty analysis performed

1.2.1a Monte Carlo-like approaches

Ponsioen TC, Vieira MDM, Goedkoop MJ (2014) Surplus cost as a life cycle impact indicator for fossil resource scarcity. Int J Life Cycle Assess 19:872–881 . doi: 10.1007/s11367-013-0676-z

1.2.1b Probabilistic (other than Monte Carlo)
None.

1.2.1c Taylor series
None.

1.2.1d Scenario analysis

Alvarez-Gaitan JP, Short MD, Peters GM, et al (2014) Consequential cradle-to-gate carbon footprint of water treatment chemicals using simple and complex marginal technologies for electricity supply. Int J Life Cycle Assess 19:1974–1984 . doi: 10.1007/s11367-014-0799-x

1.2.1e Qualitative/pedigree
None.

1.2.1f Sensitivity analysis

Höglmeier K, Weber-Blaschke G, Richter K (2014) Utilization of recovered wood in cascades versus utilization of primary wood—a comparison with life cycle assessment using system expansion. Int J Life Cycle Assess 19:1755–1766 . doi: 10.1007/s11367-014-0774-6

1.2.1g Fuzzy logic
None.

1.2.1h Bayesian
None.

1.2.1i Regression
None.

1.2.1j Not indicated/other
None.

1.2.2 Uncertainty analysis reported as not performed
None.

1.2.3 Uncertainty mentioned but no analysis performed

Buyle M, Pizzol M, Audenaert A (2018) Identifying marginal suppliers of construction materials: consistent modeling and sensitivity analysis on a Belgian case. Int J Life Cycle Assess 23:1624–1640. doi: 10.1007/s11367-017-1389-5

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Yang Y, Suh S (2015) Marginal yield, technological advances, and emissions timing in corn ethanol's carbon payback time. Int J Life Cycle Assess 20:226–232. doi: 10.1007/s11367-014-0827-x
Zink T, Maker F, Geyer R, Amirtharajah R, Akella V (2014) Comparative life cycle assessment of smartphone reuse: Repurposing vs. refurbishment. Int J Life Cycle Assess 19:1099–1109. doi: 10.1007/s11367-014-0720-7

1.2.4 No mention of uncertainty

de Marco I, Iannone R, Miranda S, Riemma S (2018) An environmental study on starch aerogel for drug delivery applications: effect of plant scale-up. Int J Life Cycle Assess 23:1228–1239. doi: 10.1007/s11367-017-1351-6
Hicks AL, Theis TL (2014) An agent based approach to the potential for rebound resulting from evolution of residential lighting technologies. Int J Life Cycle Assess 19:370–376. doi: 10.1007/s11367-013-0643-8
Kirschbaum MUF (2017) Assessing the merits of bioenergy by estimating marginal climate-change impacts. Int J Life Cycle Assess 22:841–852. doi: 10.1007/s11367-016-1196-4
Tehrani Nejad M. A, Saint-Antonin V (2014) Factors driving refinery CO_2 intensity, with allocation into products: Comment. Int J Life Cycle Assess 19:24–28. doi: 10.1007/s11367-013-0634-9

1.3 Combination attributional and consequential life cycle assessment studies

1.3.1 Uncertainty analysis performed

1.3.1a Monte Carlo-like approaches

Roux C, Schalbart P, Peuportier B (2017) Development of an electricity system model allowing dynamic and marginal approaches in LCA—tested in the French context of space heating in buildings. Int J Life Cycle Assess 22:1177–1190 . doi: 10.1007/s11367-016-1229-z

1.3.1b Probabilistic (other than Monte Carlo)

None.

1.3.1c Taylor series

None.

1.3.1d Scenario analysis

Sandin G, Peters GM, Svanström M (2014) Life cycle assessment of construction materials: The influence of assumptions in end-of-life modelling. Int J Life Cycle Assess 19:723–731 . doi: 10.1007/s11367-013-0686-x

1.3.1e Qualitative/pedigree

None.

1.3.1f Sensitivity analysis

None.

1.3.1g Fuzzy logic

None.

1.3.1h Bayesian

None.

1.3.1i Regression
None.

1.3.1j Not indicated/other
Cao V, Margni M, Favis BD, Deschênes L (2017) Choice of land reference situation in life cycle impact assessment. Int J Life Cycle Assess 22:1220–1231 . doi: 10.1007/s11367-016-1242-2

1.3.2 Uncertainty analysis reported as not performed
None.

1.3.3 Uncertainty mentioned but no analysis performed
Karka P, Papadokonstantakis S, Kokossis A (2017) Cradle-to-gate assessment of environmental impacts for a broad set of biomass-to-product process chains. Int J Life Cycle Assess 22:1418–1440. doi: 10.1007/s11367-017-1262-6
van Zanten HHE, Bikker P, Meerburg BG, de Boer IJM (2018) Attributional versus consequential life cycle assessment and feed optimization: alternative protein sources in pig diets. Int J Life Cycle Assess 23:1–11. doi: 10.1007/s11367-017-1299-6

1.3.4 No mention of uncertainty
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Prapaspongsa T, Gheewala SH (2017) Consequential and attributional environmental assessment of biofuels: implications of modelling choices on climate change mitigation strategies. Int J Life Cycle Assess 22:1644–1657. doi: 10.1007/s11367-017-1355-2
Wiedemann SG, Ledgard SF, Henry BK, Yan M-J, Mao N, Russel SJ (2015) Application of life cycle assessment to sheep production systems: investigating co-production of wool and meat using case studies from major global producers. Int J Life Cycle Assess 20:463–476. doi: 10.1007/s11367-015-0849-z

1.4 Non-LCA studies (reviews, methodology, etc.)
1.4.1 Uncertainty analysis performed/discussed
1.4.1a Monte Carlo-like approaches
Benini L, Sala S (2016) Uncertainty and sensitivity analysis of normalization factors to methodological assumptions. Int J Life Cycle Assess 21:224–236 . doi: 10.1007/s11367-015-1013-5
Bisinella V, Conradsen K, Christensen TH, Astrup TF (2016) A global approach for sparse representation of uncertainty in Life Cycle Assessments of waste management systems. Int J Life Cycle Assess 21:378–394 . doi: 10.1007/s11367-015-1014-4
Groen EA, Bokkers EAM, Heijungs R, de Boer IJM (2017) Methods for global sensitivity analysis in life cycle assessment. Int J Life Cycle Assess 22:1125–1137 . doi: 10.1007/s11367-016-1217-3
Heijungs R, Henriksson PJG, Guinée JB (2017) Pre-calculated LCI systems with uncertainties cannot be used in comparative LCA. Int J Life Cycle Assess 22:461 . doi: 10.1007/s11367-017-1265-3
Heijungs R, Lenzen M (2014) Error propagation methods for LCA - A comparison. Int J Life Cycle Assess 19:1445–1461 . doi: 10.1007/s11367-014-0751-0
Herrmann IT, Lundberg-Jensen M, Jørgensen A, et al (2014) Enabling optimization in LCA: From “ad hoc” to “structural” LCA approach - Based on a biodiesel well-to-wheel case study. Int J Life Cycle Assess 19:194–205 . doi: 10.1007/s11367-013-0615-z
Mendoza Beltran A, Heijungs R, Guinée J, Tukker A (2016) A pseudo-statistical approach to treat choice uncertainty: the example of partitioning allocation methods. Int J Life Cycle Assess 21:252–264 . doi: 10.1007/s11367-015-0994-4

Núñez M, Pfister S, Vargas M, Antón A (2015) Spatial and temporal specific characterisation factors for water use impact assessment in Spain. Int J Life Cycle Assess 20:128–138 . doi: 10.1007/s11367-014-0803-5
Qin Y, Suh S (2017) What distribution function do life cycle inventories follow? Int J Life Cycle Assess 22:1138–1145 . doi: 10.1007/s11367-016-1224-4
Tang L, Nakajima K, Murakami S, et al (2016) Estimating land transformation area caused by nickel mining considering regional variation. Int J Life Cycle Assess 21:51–59 . doi: 10.1007/s11367-015-0987-3
Wender BA, Prado V, Fantke P, et al (2018) Sensitivity-based research prioritization through stochastic characterization modeling. Int J Life Cycle Assess 23:324–332 . doi: 10.1007/s11367-017-1322-y

1.4.1b Probabilistic (other than Monte Carlo)

Boulay A-M, Motoshita M, Pfister S, et al (2015) Analysis of water use impact assessment methods (part A): evaluation of modeling choices based on a quantitative comparison of scarcity and human health indicators. Int J Life Cycle Assess 20:139–160 . doi: 10.1007/s11367-014-0814-2
Ciroth A, Muller S, Weidema B, Lesage P (2016) Empirically based uncertainty factors for the pedigree matrix in ecoinvent. Int J Life Cycle Assess 21:1338–1348 . doi: 10.1007/s11367-013-0670-5
Deng Y, Li J, Qiu M, et al (2017) Deriving characterization factors on freshwater ecotoxicity of graphene oxide nanomaterial for life cycle impact assessment. Int J Life Cycle Assess 22:222–236 . doi: 10.1007/s11367-016-1151-4
Henriksson PJG, Guinée JB, Heijungs R, et al (2014) A protocol for horizontal averaging of unit process data - Including estimates for uncertainty. Int J Life Cycle Assess 19:429–436 . doi: 10.1007/s11367-013-0647-4
Muller S, Lesage P, Ciroth A, et al (2016) The application of the pedigree approach to the distributions foreseen in ecoinvent v3. Int J Life Cycle Assess 21:1327–1337 . doi: 10.1007/s11367-014-0759-5
Pahri SDR, Mohamed AF, Samat A (2015) LCA for open systems: a review of the influence of natural and anthropogenic factors on aquaculture systems. Int J Life Cycle Assess 20:1324–1337 . doi: 10.1007/s11367-015-0929-0
Passer A, Wall J, Kreiner H, et al (2015) Sustainable buildings, construction products and technologies: linking research and construction practice. Int J Life Cycle Assess 20:1–8 . doi: 10.1007/s11367-014-0820-4
Scope C, Ilg P, Muench S, Guenther E (2016) Uncertainty in life cycle costing for long-range infrastructure. Part II: guidance and suitability of applied methods to address uncertainty. Int J Life Cycle Assess 21:1170–1184 . doi: 10.1007/s11367-016-1086-9

1.4.1c Taylor series

Heijungs R, Lenzen M (2014) Error propagation methods for LCA - A comparison. Int J Life Cycle Assess 19:1445–1461 . doi: 10.1007/s11367-014-0751-0
Jung J, Von Der Assen N, Bardow A (2014) Sensitivity coefficient-based uncertainty analysis for multi-functionality in LCA. Int J Life Cycle Assess 19:661–676 . doi: 10.1007/s11367-013-0655-4
Torres CM, Antón A, Ferrer F, Castells F (2017) Greenhouse gas calculator at farm level addressed to the growers. Int J Life Cycle Assess 22:537–545 . doi: 10.1007/s11367-016-1068-y

1.4.1d Scenario analysis

Weidema BP (2017) Estimation of the size of error introduced into consequential models by using attributional background datasets. Int J Life Cycle Assess 22:1241–1246 . doi: 10.1007/s11367-016-1239-x

1.4.1e Qualitative/pedigree

None.

1.4.1f Sensitivity analysis

Cosme N, Hauschild MZ (2017) Characterization of waterborne nitrogen emissions for marine eutrophication modelling in life cycle impact assessment at the damage level and global scale. Int J Life Cycle Assess 22:1558–1570 . doi: 10.1007/s11367-017-1271-5

Scherer L, Pfister S (2015) Modelling spatially explicit impacts from phosphorus emissions in agriculture. Int J Life Cycle Assess 20:785–795 . doi: 10.1007/s11367-015-0880-0
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1.4.1g Fuzzy logic

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2. Journal of Cleaner Production

2.1 Attributional life cycle assessment studies

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2.2 Consequential life cycle assessment studies
2.2.1 Uncertainty analysis performed
2.2.1a Monte Carlo-like approaches

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2.2.1b Probabilistic (other than Monte Carlo)

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2.2.1c Taylor series
None.

2.2.1d Scenario analysis
None.

2.2.1e Qualitative/pedigree
None.

2.2.1f Sensitivity analysis

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2.2.1g Fuzzy logic
None.

2.2.1h Bayesian
None.

2.2.1i Regression
None.

2.2.1j Not indicated/other
None.

2.2.2 Uncertainty analysis reported as not performed
None.

2.2.3 Uncertainty mentioned but no analysis performed
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2.2.4 No mention of uncertainty

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2.3.1 Uncertainty analysis performed

2.3.1a Monte Carlo-like approaches

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2.3.1b Probabilistic (other than Monte Carlo)

None.

2.3.1c Taylor series

None.

2.3.1d Scenario analysis

None.

2.3.1e Qualitative/pedigree

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2.3.1f Sensitivity analysis

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2.3.1g Fuzzy logic

None.

2.3.1h Bayesian

None.

2.3.1i Regression

None.

2.3.1j Not indicated/other

None.

2.3.2 Uncertainty analysis reported as not performed

None.

2.3.3 Uncertainty mentioned but no analysis performed

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2.3.4 No mention of uncertainty

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3. Sustainability

3.1 Attributional life cycle assessment studies

3.1.1 Uncertainty analysis performed

3.1.1a Monte Carlo-like approaches

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3.1.1b Probabilistic (other than Monte Carlo)

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3.1.1c Taylor series

None.

3.1.1d Scenario analysis

None.

3.1.1e Qualitative/pedigree

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3.1.1f Sensitivity analysis

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3.1.1g Fuzzy logic

None.

3.1.1h Bayesian

None.

3.1.1i Regression

None.

3.1.1j Not indicated/other

None.

3.1.2 Uncertainty analysis reported as not performed

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3.2.1 Uncertainty analysis performed

3.2.1a Monte Carlo-like approaches

None.

3.2.1b Probabilistic (other than Monte Carlo)

None.

3.2.1c Taylor series

None.

3.2.1d Scenario analysis

None.

3.2.1e Qualitative/pedigree

None.

3.2.1f Sensitivity analysis

None.

3.2.1g Fuzzy logic

None.

3.2.1h Bayesian

None.

3.2.1i Regression

None.

3.2.1j Not indicated/other

None.

3.2.2 Uncertainty analysis reported as not performed

None.

3.2.3 Uncertainty mentioned but no analysis performed

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3.2.4 No mention of uncertainty

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3.3 Combination attributional and consequential life cycle assessment studies
3.3.1 Uncertainty analysis performed
3.3.1a Monte Carlo-like approaches

None.

3.3.1b Probabilistic (other than Monte Carlo)

None.

3.3.1c Taylor series

None.

3.3.1d Scenario analysis

None.

3.3.1e Qualitative/pedigree

None.

3.3.1f Sensitivity analysis

None.

3.3.1g Fuzzy logic

None.

3.3.1h Bayesian

None.

3.3.1i Regression

None.

3.3.1j Not indicated/other

None.

3.3.2 Uncertainty analysis reported as not performed

None.

3.3.3 Uncertainty mentioned but no analysis performed

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3.3.4 No mention of uncertainty

None.

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4.1 Attributional life cycle assessment studies
4.1.1 Uncertainty analysis performed
4.1.1a Monte Carlo-like approaches

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4.1.1c Taylor series

None.

4.1.1d Scenario analysis

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4.1.1e Qualitative/pedigree

None.

4.1.1f Sensitivity analysis

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4.1.1g Fuzzy logic
None.

4.1.1h Bayesian
None.

4.1.1i Regression
None.

4.1.1j Not indicated/other
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4.2.1 Uncertainty analysis performed

4.2.1a Monte Carlo-like approaches

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4.2.1b Probabilistic (other than Monte Carlo)
None.

4.2.1c Taylor series
None.

4.2.1d Scenario analysis
None.

4.2.1e Qualitative/pedigree
None.

4.2.1f Sensitivity analysis
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4.2.1g Fuzzy logic
None.

4.2.1h Bayesian
None.

4.2.1i Regression
None.

4.2.1j Not indicated/other
None.

4.2.2 Uncertainty analysis reported as not performed
None.

4.2.3 Uncertainty mentioned but no analysis performed
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4.3 Combination attributional and consequential life cycle assessment studies
4.3.1 Uncertainty analysis performed
4.3.1a Monte Carlo-like approaches
None.

4.3.1b Probabilistic (other than Monte Carlo)
None.

4.3.1c Taylor series
None.

4.3.1d Scenario analysis
None.

4.3.1e Qualitative/pedigree
None.

4.3.1f Sensitivity analysis
None.

4.3.1g Fuzzy logic
None.

4.3.1h Bayesian
None.

4.3.1i Regression
None.

4.3.1j Not indicated/other
None.

4.3.2 Uncertainty analysis reported as not performed

None.

4.3.3 Uncertainty mentioned but no analysis performed
None.

4.3.4 No mention of uncertainty
None.

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5.1 Attributional life cycle assessment studies
5.1.1 Uncertainty analysis performed
5.1.1a Monte Carlo-like approaches

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5.1.1b Probabilistic (other than Monte Carlo)
None.

5.1.1c Taylor series
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5.1.1d Scenario analysis
None.

5.1.1e Qualitative/pedigree
None.

5.1.1f Sensitivity analysis
None.

5.1.1g Fuzzy logic
None.

5.1.1h Bayesian
None.

5.1.1i Regression
None.

5.1.1j Not indicated/other
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5.1.2 Uncertainty analysis reported as not performed
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5.1.3 Uncertainty mentioned but no analysis performed
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5.2.1 Uncertainty analysis performed

5.2.1a Monte Carlo-like approaches

None.

5.2.1b Probabilistic (other than Monte Carlo)

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5.2.1c Taylor series

None.

5.2.1d Scenario analysis

None.

5.2.1e Qualitative/pedigree

None.

5.2.1f Sensitivity analysis

None.

5.2.1g Fuzzy logic

None.

5.2.1h Bayesian

None.

5.2.1i Regression
None.

5.2.1j Not indicated/other
None.

5.2.2 Uncertainty analysis reported as not performed
None.

5.2.3 Uncertainty mentioned but no analysis performed

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5.2.4 No mention of uncertainty

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5.3 Combination attributional and consequential life cycle assessment studies
5.3.1 Uncertainty analysis performed
5.3.1a Monte Carlo-like approaches
None.

5.3.1b Probabilistic (other than Monte Carlo)
None.

5.3.1c Taylor series
None.

5.3.1d Scenario analysis

None.

5.3.1e Qualitative/pedigree
None.

5.3.1f Sensitivity analysis
None.

5.3.1g Fuzzy logic
None.

5.3.1h Bayesian
None.

5.3.1i Regression
None.

5.3.1j Not indicated/other
None.

5.3.2 Uncertainty analysis reported as not performed
None.

5.3.3 Uncertainty mentioned but no analysis performed
Parajuli R, Knudsen MT, Birkved M, et al (2017) Environmental impacts of producing bioethanol and biobased lactic acid from standalone and integrated biorefineries using a consequential and an attributional life cycle assessment approach. Sci Total Environ 598:497–512 . doi: 10.1016/j.scitotenv.2017.04.087
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5.3.4 No mention of uncertainty
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6.1.1 Uncertainty analysis performed
6.1.1a Monte Carlo-like approaches
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6.1.1c Taylor series

None.

6.1.1d Scenario analysis

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6.1.1e Qualitative/pedigree
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6.1.1f Sensitivity analysis
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6.1.1g Fuzzy logic
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6.1.1h Bayesian
None.

6.1.1i Regression
None.

6.1.1j Not indicated/other
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6.1.2 Uncertainty analysis reported as not performed

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Song X, Zhang C, Yuan W, Yang D (2018) Life-cycle energy use and GHG emissions of waste television treatment system in China. Resour Conserv Recycl 128:470–478 . doi: 10.1016/j.resconrec.2016.09.004
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6.1.4 No mention of uncertainty

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6.2 Consequential life cycle assessment studies

6.2.1 Uncertainty analysis performed

6.2.1a Monte Carlo-like approaches

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6.2.1b Probabilistic (other than Monte Carlo)

None.

6.2.1c Taylor series

None.

6.2.1d Scenario analysis

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6.2.1e Qualitative/pedigree
None.

6.2.1f Sensitivity analysis
Mehr J, Vadenbo C, Steubing B, Hellweg S (2018) Environmentally optimal wood use in Switzerland—Investigating the relevance of material cascades. Resour Conserv Recycl 131:181–191 . doi: 10.1016/j.resconrec.2017.12.026

6.2.1g Fuzzy logic
None.

6.2.1h Bayesian
None.

6.2.1i Regression
None.

6.2.1j Not indicated/other
None.

6.2.2 Uncertainty analysis reported as not performed
None.

6.2.3 Uncertainty mentioned but no analysis performed
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6.3 Combination attributional and consequential life cycle assessment studies
6.3.1 Uncertainty analysis performed
6.3.1a Monte Carlo-like approaches

None.

6.3.1b Probabilistic (other than Monte Carlo)
None.

6.3.1c Taylor series
None.

6.3.1d Scenario analysis
None.

6.3.1e Qualitative/pedigree
None.

6.3.1f Sensitivity analysis
None.

6.3.1g Fuzzy logic
None.

6.3.1h Bayesian
None.

6.3.1i Regression
None.

6.3.1j Not indicated/other
None.

6.3.2 Uncertainty analysis reported as not performed
None.

6.3.3 Uncertainty mentioned but no analysis performed
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6.3.4 No mention of uncertainty
None.

7. Journal of Industrial Ecology
7.1 Attributional life cycle assessment studies
7.1.1 Uncertainty analysis performed
7.1.1a Monte Carlo-like approaches
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Muller S, Mutel C, Lesage P, Samson R (2018) Effects of Distribution Choice on the Modeling of Life Cycle Inventory Uncertainty: An Assessment on the Ecoinvent v2.2 Database. J Ind Ecol 22:300–313 . doi: 10.1111/jiec.12574
Patrício J, Kalmykova Y, Rosado L, Lisovskaja V (2015) Uncertainty in material flow analysis indicators at different spatial levels. J Ind Ecol 19:837–852 . doi: 10.1111/jiec.12336
Ross SA, Cheah L (2017) Uncertainty Quantification in Life Cycle Assessments: Interindividual Variability and Sensitivity Analysis in LCA of Air-Conditioning Systems. J Ind Ecol 21:1103–1114 . doi: 10.1111/jiec.12505
Ross SA, Cheah L (2018) Uncertainty Quantification in Life Cycle Assessments: Exploring Distribution Choice and Greater Data Granularity to Characterize Product Use. J Ind Ecol 00:1–12 . doi: 10.1111/jiec.12742
Song R, Clemon L, Telenko C (2018) Uncertainty and Variability of Energy and Material Use by Fused Deposition Modeling Printers in Makerspaces. J Ind Ecol 00:1–10 . doi: 10.1111/jiec.12772
Tecchio P, Gregory J, Olivetti E, et al (2018) Streamlining the Life Cycle Assessment of Buildings by Structured Under-Specification and Probabilistic Triage. J Ind Ecol 00:1–12 . doi: 10.1111/jiec.12731

7.1.1b Probabilistic (other than Monte Carlo)

Faludi J, Baumers M, Maskery I, Hague R (2017) Environmental Impacts of Selective Laser Melting: Do Printer, Powder, Or Power Dominate? J Ind Ecol 21:S144–S156 . doi: 10.1111/jiec.12528

7.1.1c Taylor series

None.

7.1.1d Scenario analysis

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7.1.1e Qualitative/pedigree

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7.1.1f Sensitivity analysis

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Van der Voet E, Van Oers L, Verboon M, Kuipers K (2018) Environmental Implications of Future Demand Scenarios for Metals: Methodology and Application to the Case of Seven Major Metals. J Ind Ecol 00:1–15 . doi: 10.1111/jiec.12722

7.1.1g Fuzzy logic
None.

7.1.1h Bayesian
None.

7.1.1i Regression
None.

7.1.1j Not indicated/other
El-Houjeiri H, Monfort JC, Bouchard J, Przesmitzki S (2018) Life Cycle Assessment of Greenhouse Gas Emissions from Marine Fuels: A Case Study of Saudi Crude Oil versus Natural Gas in Different Global Regions. J Ind Ecol 0:1–15 . doi: 10.1111/jiec.12751
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7.1.2 Uncertainty analysis reported as not performed
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7.1.3 Uncertainty mentioned but no analysis performed
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Achachlouei MA, Moberg Å, Hochschorner E (2015) Life Cycle Assessment of a Magazine, Part I: Tablet Edition in Emerging and Mature States. J Ind Ecol 19:575–589 . doi: 10.1111/jiec.12227
Almeida C, Vaz S, Ziegler F (2015) Environmental Life Cycle Assessment of a Canned Sardine Product from Portugal. J Ind Ecol 19:607–617 . doi: 10.1111/jiec.12219
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Ding N, Gao F, Wang Z, Yang J (2016) Life Cycle Energy and Greenhouse Gas Emissions of Automobiles Using Aluminum in China. J Ind Ecol 20:818–827 . doi: 10.1111/jiec.12298
Faludi J, Baumers M, Maskery I, Hague R (2017) Environmental Impacts of Selective Laser Melting: Do Printer, Powder, Or Power Dominate? J Ind Ecol 21:S144–S156 . doi: 10.1111/jiec.12528
Froemelt A, Mauchle M, Steubing B, Hellweg S (2018) Greenhouse Gas Emissions Quantification and Reduction Efforts in a Rural Municipality. J Ind Ecol 22:92–105 . doi: 10.1111/jiec.12534
Fry J, Lenzen M, Giurco D, Pauliuk S (2016) An Australian Multi-Regional Waste Supply-Use Framework. J Ind Ecol 20:1295–1305 . doi: 10.1111/jiec.12376
Gallagher J, Basu B, Browne M, et al (2017) Adapting Stand-Alone Renewable Energy Technologies for the Circular Economy through Eco-Design and Recycling. J Ind Ecol 00:1–8 . doi: 10.1111/jiec.12703
Garcia R, Freire F, Clift R (2018) Effects on Greenhouse Gas Emissions of Introducing Electric Vehicles into an Electricity System with Large Storage Capacity. J Ind Ecol 22:288–299 . doi: 10.1111/jiec.12593
Gaudreault C, Miner R (2015) Temporal Aspects in Evaluating the Greenhouse Gas Mitigation Benefits of Using Residues from Forest Products Manufacturing Facilities for Energy Production. J Ind Ecol 19:994–1007 . doi: 10.1111/jiec.12225
Grant A, Ries R, Kibert C (2014) Life cycle assessment and service life prediction: A case study of building envelope materials. J Ind Ecol 18:187–200 . doi: 10.1111/jiec.12089
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7.2 Consequential life cycle assessment studies

7.2.1 Uncertainty analysis performed

7.2.1a Monte Carlo-like approaches

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7.2.1b Probabilistic (other than Monte Carlo)

None.

7.2.1c Taylor series

None.

7.2.1d Scenario analysis

None.

7.2.1e Qualitative/pedigree

None.

7.2.1f Sensitivity analysis

None.

7.2.1g Fuzzy logic

None.

7.2.1h Bayesian

None.

7.2.1i Regression

None.

7.2.1j Not indicated/other

None.

7.2.2 Uncertainty analysis reported as not performed

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7.2.4 No mention of uncertainty

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7.3 Combination attributional and consequential life cycle assessment studies

7.3.1 Uncertainty analysis performed

7.3.1a Monte Carlo-like approaches

None.

7.3.1b Probabilistic (other than Monte Carlo)
None.

7.3.1c Taylor series
None.

7.3.1d Scenario analysis
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7.3.1e Qualitative/pedigree
None.

7.3.1f Sensitivity analysis
None.

7.3.1g Fuzzy logic
None.

7.3.1h Bayesian
None.

7.3.1i Regression
None.

7.3.1j Not indicated/other
None.

7.3.2 Uncertainty analysis reported as not performed
None.

7.3.3 Uncertainty mentioned but no analysis performed
None.

7.3.4 No mention of uncertainty
None.