Thomas Gibon

Engineer, M. Sc. and Ph. D. in Industrial Ecology
Sustainability assessment, life cycle assessment, input-output analysis

Born 21.11.1986 (**38**) in Le Mans (France)
Phone +33685415636
Email t.gibon@gmail.com
Google Scholar https://scholar.google.no/citations?user=l3ATYsQAAAAJ

Work experience

Apr. 2016–now **Research & Technology Associate** at the **Luxembourg Institute of Science and Technology (LIST)**, Esch-sur-Alzette, LU

Life cycle sustainability assessment; prospective, consequential, hybrid analyses; integrating energy/electricity scenarios with life cycle assessment, coupling of hybrid LCA and agent-based modelling for mobility policymaking, temporal differentiation in LCA, coupling of material flow analysis (MFA) and LCA, assessing financial products with LCA methods, promoting sustainability science to the public (projects "Science to be green", "So you think you're green").

Research development, proposal submission (competitive, national and international), successful projects as PI:

- **HERMES** (2018-2019, Luxembourg's Fonds National de la Recherche, FNR, partner ENGIE, 220k€),
- **BEST** (2019-2024, FNR "INTER" with Research Council of Norway, partners NTNU and PIK, 600k€),
- **IMMEC** (2022-2025, FNR & DFG, partner Uni. Kassel, DE, 477k€),
- **FRESCO** (2024-2028, FNR & FORMAS, partner KTH, SE, 537k€),
- **MECALO** (2024-2028, Horizon Europe, coordinator SINTEF, NO, 450k€).

Nov. 2011–Oct. 2017 **Ph. D. candidate** at the **Norwegian University of Science and Technology (NTNU),** Trondheim, NO

Dissertation**:** *Scenario-based life-cycle inventory methods to inform climate change mitigation***,** Supervisor: Prof. Edgar Hertwich

Environmentally-extended input-output (IO), multiregional IO analysis, hybrid LCA, scenario modelling,

Prospective LCA of global electricity systems via the development of a multiregional, prospective hybrid LCA database

Photovoltaics, hydropower, wind, geothermal, nuclear, biomass, coal, and gas power, CO_2 capture and storage,

Jan.–Oct. 2011 **Researcher** at **NTNU**, Trondheim, NO

Assessing the environmental impact of the global deployment of low-carbon energy technologies for the **United Nations Environmental Programme (UNEP) International Resource Panel (IRP)**

Project management, data collection, tool development, electricity systems, energy-efficiency measures, hybrid LCA-IO

Aug. 2009–Dec. 2010 **Consultant** at **Bio Intelligence Service** (now **Deloitte**), Paris, FR

Life cycle assessment for private companies and institutional bodies

Environmental assessment of food waste for the **European Commission DG ENV**

Environmental improvement potential of textiles for the **European Commission's Joint Research Centre (JRC)**

Jul.–Aug. 2008 **Summer intern** at **StatoilHydro** (now **Equinor**), Trondheim, NO

Production of jatropha-based biodiesels at Mongstad plant and linked environmental impacts

Teaching

2024 Lecture series "A sustainable tomorrow", Bachelor of Management, contact: Nicolas Jonard, uni.lu

2024 Lecture "Life cycle assessment", contact: Adeline Agut, ENSAE

2019– Annual lecture on "Climate, Energy and Finance" in the Sustainable Finance Certificate, contact: Peter Mathis, uni.lu

2020–2021 "Life cycle assessment" – Assistant Professor, contact: Anders Hammer Strømman, NTNU

2012–2014 "Energy and Environmental Consequences" – Teaching Assistant, contact: Edgar Hertwich, NTNU

2008 "Life cycle assessment" – Teaching Assistant, contact: Anders Hammer Strømman, NTNU

Education

2011–2017 Ph. D. in Industrial Ecology, **Norwegian University of Science and Technology** (NTNU), Trondheim, Norway.

2007–2009 M. Sc. in Industrial Ecology, **Norwegian University of Science and Technology** (NTNU), Trondheim, Norway. Double-degree programme (*Top Industrial Managers for Europe, TIME*) with École Centrale Paris.

Thesis: *Hybrid input-output analysis/life-cycle assessment of biofuel production in Fenno-Scandinavia,*

Supervisor: Prof. Anders Hammer Strømman

2005–2008 Engineering degree (M. Sc. equivalent), **École Centrale Paris** (now **CentraleSupélec**), Paris, France
Mathematics, physics, mechanics, thermodynamics

PRO BONO

2023– Member of Alphonse Weicker Foundation board, promoting inclusion, digitalization, and sustainability in Luxembourg

2021– Member of Scientific Committee "Team for the Planet", assessment of large-scale decarbonizing solutions

2017–2020 Expert for Bertrand Piccard's "Solar Impulse Foundation", assessment of sustainable technologies

PEER-REVIEWED PUBLICATIONS

2025 Arvesen, A., Humpenöder, F., Gutierrez, T. N., **Gibon, T.**, Baustert, P., Dietrich, J. P., ... & Cherubini, F. (2025). Advancing life cycle assessment of bioenergy crops with global land use models. *Environmental Research Communications*, *6*(12), 125004.

2024 **Gibon, T.** (2024) Learning from the Life Cycle Assessment of Power-to-hydrogen Systems. In *Chemical Technologies in the Energy Transition*. Royal Society of Chemistry. https://doi.org/10.1039/BK9781839165818-00224

2024 Schmidt, S., **Gibon, T.**, Gutiérrez, T. N., Lindemann, K. M., & Laner, D. (2024). The environmental costs of clean cycles: Quantitative analysis for the case of PVC window profile recycling in Germany. *Journal of Industrial Ecology*, *28*(6), 1755-1770. https://doi.org/

2024 Schmidt, S., Verni, X. F., Aguirre Molina, L., Biwer, A., **Gibon, T.**, & Laner, D. (2024). Schadstoffbedingte Herausforderungen für PVC-Kreisläufe im Bausektor in Deutschland. *Österreichische Wasser-und Abfallwirtschaft*, *76*(9), 382-392. https://doi.org/10.1007/s00506-024-01057-0

2024 Popescu, I., Schaubroeck, T., **Gibon, T.**, Petucco, C., & Benetto, E. (2024). Investment funds are responsible for substantial environmental and social impacts with trade-offs. *Communications Earth & Environment.* https://doi.org/10.1038/s43247-024-01479-4

2024 Luu, L. Q., **Gibon, T.**, Cellura, M., Sanseverino, E. R., & Longo, S. (2024). Integrated hybrid multi-regional input-output for assessing life cycle air emissions of the Italian power system. *Energy*, *290*, 130109. https://doi.org/10.1016/j.energy.2023.130109

2024 Hitaj, C., Popescu, I. S., Schaubroeck, T., & **Gibon, T.** (2024). Social dimension of green finance: Covid-19 shines spotlight on companies' vulnerable employment in supply chains. In *Sustainable Finance and the Global Health Crisis*. Taylor & Francis. https://library.oapen.org/handle/20.500.12657/87794

2023 Popescu, I. S., **Gibon, T.**, Hitaj, C., Rubin, M., & Benetto, E. (2023). Are SRI funds financing carbon emissions? An input-output life cycle assessment of investment funds. *Ecological Economics*, *212*, 107918. https://doi.org/10.1016/j.ecolecon.2023.107918

2023 **Gibon, T.**, & Hahn Menacho, A. (2023). Parametric Life Cycle Assessment of Nuclear Power for Simplified Models. *Environmental Science & Technology.* https://doi.org/10.1021/acs.est.3c03190

2023 Porcelli, R., **Gibon, T.**, Marazza, D., Righi, S., Rugani, B. (2023) Prospective environmental impact assessment and simulation applied to an emerging biowaste-based energy technology in Europe. *Renew. Sustainable Energy Rev.* https://doi.org/10.1016/j.rser.2023.113172

2021 Schaubroeck, T., **Gibon, T.**, Igos, E., & Benetto, E. (2021). Sustainability assessment of circular economy over time: Modelling of finite and variable loops & impact distribution among related products. *Resources, Conservation and Recycling*, *168*, 105319.

2020 **Gibon, T.**, Popescu I.-Ş., Hitaj, C., Petucco, C., Benetto, E., Shades of green: life cycle assessment of renewable energy projects financed through green bonds. Environ. Res. Lett. https://doi.org/10.1088/1748-9326/abaa0c ***Best Paper Prize winner at the GRASFI conference 2020***

2020 Mehrtash, M., Capitanescu, F., Heiselberg, P. K., & **Gibon, T.** (2020). A new bi-objective approach for optimal sizing of electrical and thermal devices in zero energy buildings considering environmental impacts. *IEEE Transactions on Sustainable Energy*, *12*(2), 886-896.

2020 Mehrtash, M., Capitanescu, F., Heiselberg, P. K., **Gibon, T.**, & Bertrand, A. (2020). An enhanced optimal PV and battery sizing model for zero energy buildings considering environmental impacts. *IEEE Transactions on Industry Applications*, *56*(6), 6846-6856.

2020 Schaubroeck, S., Schaubroeck, T., Baustert,P., **Gibon, T.**, Benetto, E., *When to replace a product to decrease environmental impact? – A consequential LCA framework and case study on car replacement*. Int. J. Life Cycle Assess. https://doi.org/10.1007/s11367-020-01758-0

2020 Pigné, Y., Tiruta-Barna, L., Navarrete Gutiérrez, T., **Gibon, T.**, Schaubroeck, T., Popovici, E., Shimako, A., Benetto, E. *A tool to compute time differentiated lifecycle environmental impacts of production-consumption systems*. Resources, Conservation and Recycling. https://doi.org/10.1007/s11367-019-01696-6

2019 Luderer, G., Pehl, M., Arvesen, A., **Gibon, T.**, Bodirsky, B., Sytze de Boer, H., Fricko, O., Hejazi, M., Humpenöder. F., Iyer, G., Mima, S., Mouratiadou, I., Pietzcker, R., Popp., A., van der Berg, M., van Vuuren, D., Hertwich, E. G. *Environmental co-benefits and adverse side-effects of alternative power sector decarbonization strategies*. Nature Communications. https://doi.org/10.1038/s41467-019-13067-8

2019 Baustert, P., Navarrete Gutiérrez, T., **Gibon, T.**, Chion, L., Ma, T.-Y., Leite Mariante, G., Klein, S., Gerber, P., Benetto, E., (2019). *Coupling Activity-Based Modeling and Life Cycle Assessment—A Proof-of-Concept Study on Cross-Border Commuting in Luxembourg*. Sustainability 11(15): 4067. https://doi.org/10.3390/su11154067

2019 Tranberg, B., Corradi, O., Lajoie, B., **Gibon, T.**, Staffell, I., & Andresen, G. B. (2019). Real-time carbon accounting method for the European electricity markets. Energy Strategy Reviews, 26, 100367. https://doi.org/10.1016/j.esr.2019.100367

2018 Vandepaer, L., **Gibon, T.**, The integration of energy scenarios into LCA: LCM2017 Conference Workshop, Luxembourg, September 5, 2017. Int. J. Life Cycle Assess., 1-8. https://doi.org/10.1007/s11367-017-1435-3

2017 Schaubroeck T., **Gibon T.**, *Outlining reasons to apply hybrid LCA—a reply to "rethinking system boundary in LCA" by Yi Yang.* Int. J. Life Cycle Assess. https://doi.org/10.1007/s11367-017-1311-1

2017 **Gibon T.**, Schaubroeck T. *Lifting the fog on characteristics and limitations of hybrid LCA—a reply to "Does hybrid LCA with a complete system boundary yield adequate results for product promotion?" by Yi Yang*. Int. J. Life Cycle Assess. https://doi.org/10.1007/s11367-017-1291-1

2017 **Gibon T.**, Arvesen A., Hertwich E. G. *Life cycle assessment demonstrates environmental co-benefits and trade-offs of low-carbon electricity supply options.* Renew. Sustainable Energy Rev. https://doi.org/10.1016/j.rser.2017.03.078

2017 **Gibon T.**, Hertwich E. G., Arvesen A., Singh B., Verones F. *Health benefits, ecological threats of low-carbon electricity*. Environ. Res. Lett. https://doi.org/10.1088/1748-9326/aa6047

2016 Martínez-Corona J. I., **Gibon T.**, Hertwich E. G., Parra-Saldívar R. (2017) *Hybrid life cycle assessment of a geothermal plant: from physical to monetary inventory accounting*. J. Clean. Prod. http://dx.doi.org/10.1016/j.jclepro.2016.11.024

2015 Bergesen J. D., Tähkämö L., **Gibon T.,** Suh S. (2015) *Potential Long-Term Global Environmental Implications of Efficient Light-Source Technologies*. J. Ind. Ecol. http://dx.doi.org/10.1111/jiec.12342

2015 Beucker S.*, Bergesen J. D., **Gibon T.** *Building Energy Management Systems: Global Potentials and Environmental Implications of Deployment*. J. Ind. Ecol. http://dx.doi.org/10.1111/jiec.12378

2015 **Gibon T.**, Wood R., Arvesen A., Bergesen J. D., Suh S., Hertwich E. G. (2015) *A methodology for integrated, multiregional life cycle assessment scenarios under large-scale technological change*. Environ. Sci. Technol. http://dx.doi.org/10.1021/acs.est.5b01558

2015 Hertwich E. G., **Gibon T.**, Bouman E. A., Arvesen A., Suh S., Heath G. A., Bergesen J. D., Ramirez A., Vega M. I., Shi L. (2015) *Integrated life-cycle assessment of electricity-supply scenarios confirms global environmental benefit of low-carbon technologies.* Proc. Natl. Acad. Sci. U. S. A. http://dx.doi.org/10.1073/pnas.1312753111

Research highlight in *Energy: Benefits outweigh clean-energy costs*. Nature (2014), *514*, (7522), 276. http://dx.doi.org/10.1038/514276b

2014 Bergesen J. D.*, Heath G., **Gibon T.**, Suh S. (2014) *US thin-film photovoltaic power generation offers decreasing greenhouse gas emissions and increasing environmental co-benefits in the long term*, Environ. Sci. Technol. http://dx.doi.org/10.1021/es405539z

2013 Ramírez A., Bakshi B. R., **Gibon T.** and Hertwich E. G. (2013) *Assessment of Low Carbon Energy Technologies: Fossil Fuels and CCS.* Energy Procedia, volume 37, 2637–2644. http://dx.doi.org/10.1016/j.egypro.2013.06.148

Reviewer *for Environmental Science & Technology, Journal of Cleaner Production, International Journal of LCA, Journal of Industrial Ecology, Journal of Open Research Software, Nature Sustainability, Environmental Research Letters, Renewable & Sustainable Energy Reviews…*

REPORTS, BOOKS, AND OTHER PUBLICATIONS

2024 Saouter, E., & **Gibon, T.** (2024). *All You Need to Know about the Next Energy Revolution: Solutions for a Truly Sustainable Future*. Springer Nature. https://link.springer.com/book/10.1007/978-3-031-51332-9

2022 UNECE (2022) Life Cycle Assessment of Electricity Generation Options (as lead author).
Available at https://unece.org/sites/default/files/2022-04/LCA_3_FINAL%20March%202022.pdf

2021 "Luxembourg in Transition 2050" consultation (lead Florian Hertweck)
First phase report available at https://luxembourgintransition.lu/wp-content/uploads/2021/02/LiT_report_unilu_20210201.pdf

2017 **Gibon, T.**, *Scenario-based life cycle assessment methods to inform climate change*. Doctoral dissertation. Available at https://brage.bibsys.no/xmlui/bitstream/11250/2469193/1/2017-289%20Gibon%20Thomas.pdf. ISBN 978-82-326-2646-5.

2017 UNEP International Resource Panel (2017) *Green Technology Choices: The Environmental and Resource Implications of Low-Carbon Technologies*. Suh S., Bergesen J., **Gibon T.**, Hertwich E. G., Taptich M. (eds.). United Nations Environment Programme, Nairobi, Kenya. http://www.resourcepanel.org/reports/green-technology-choices

2017 Hertwich E. G., Arvesen A., Suh S., **Gibon T.** *Does 'green energy' have hidden health and environmental costs?* The Conversation https://theconversation.com/does-green-energy-have-hidden-health-and-environmental-costs-52484

2016 UNEP International Resource Panel (2016) *Green Energy Choices: The benefits, risks, and trade-offs of low-carbon technologies for electricity production*. Hertwich, E. G., Aloisi de Larderel, J., Arvesen, A., Bayer, P., Bergesen, J., Bouman, E., **Gibon, T.**, Heath, G., Peña, C., Purohit, P., Ramirez, A., Suh, S. (eds.). http://www.resourcepanel.org/reports/green-energy-choices-benefits-risks-and-trade-offs-low-carbon-technologies-electricity

2014 IPCC (2014) *Climate Change 2014: Mitigation of Climate Change*, in Fifth Assessment Report, Working Group III Report, Chapter 7: Energy Systems. Contributing author. http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf

2014 European Commission's Joint Research Centre (2014) *Environmental Improvement Potential of textiles (IMPRO Textiles)*. ftp://139.191.159.82/pub/EURdoc/JRC85895.pdf

2011 European Commission (2011) *Preparatory study on food waste across EU 27*. Edited by European Commission DG ENV. Accessible at http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf

SELECT CONFERENCES AND PRESENTATIONS

2023 *Environmental impacts of electricity generation: focus on photovoltaics (invited lecture)*
Solar Impulse Foundation Expert Session

2022 *The environmental costs of 1 kWh (invited lecture)*
Electrification Academy, https://www.youtube.com/watch?v=swLxrDyr0wM

2021 *Environmental consequences of future bioenergy deployment pathways (presentation)*
Life-Cycle Management (LCM) 2021, Stuttgart, DE

2019 *Empreinte carbone : notre affaire à tous? (*"Carbon footprint: everyone's deal?*" invited presentation)*
Seminar "Urgence climatique" (*Climate emergency*), Institut Français du Luxembourg, LU

2019 *The hidden impacts of our investments (invited presentation)*
LuxFLAG Sustainable Investment Week, Luxembourg, LU

2019 *Enjeux de la transition énergétique : les impacts d'une électricité décarbonée (invited presentation)*
Colloquium "Energy transitions: environmental and social stakes", Université Grenoble-Alpes, FR

2019 *Integrating scenarios in life cycle assessment (panel discussion)*
American Center for LCA XIX, Tucson, AZ, USA

2019 *Life cycle assessment: introduction and application to energy systems (invited lecture)*
World Nuclear University Summer Institute, Baden, CH

2019 *So you think you're green? The environmental impacts of our lifestyles (public conference)*
Organized together with LIST colleagues at Néimënster Abbey, Luxembourg, LU
Available at https://www.list.lu/en/news/the-environmental-impacts-of-our-lifestyles/

2019 *Life cycle assessment of electricity generation: Focus on nuclear, new renewables and storage (invited presentation)*
World Nuclear Association, London, UK

2018 *Simulating Multimodal Passenger Mobility and its Environmental Consequences at a Territorial Scale (presentation)*
American Center for LCA XVIII, Fort Collins, CO, USA

2017 *Tracking metals in the future automobile fleet and finding the low-carbon solutions (presentation)*
World Efficiency Forum 2017, Paris, FR

2017 *Time-differentiation in life cycle inventories (presentation)*
SETAC 23rd Case Study Symposium, Barcelona, ES

2017 *The role of nuclear energy systems in low-carbon energy scenarios (invited presentation)*
14th INPRO Dialogue Forum, IAEA, Vienna, AT

2016 *Green Energy Choices (invited presentation)*
European Commission Side Event, COP22, Marrakesh, MA

2015 *Green Energy Choices (invited presentation)*
French Ministry of the Environment, Energy and Marine Affairs, La Défense, Paris, FR

2015 *Making data-intensive life cycle frameworks policy-relevant (poster)* ***2nd place Award for Best Poster 2015***
International Society for Industrial Ecology (ISIE) 2015, Guildford, Surrey, UK

2014 *Impact assessment methods of energy scenarios for climate mitigation (poster)* ***1st place Award for Best Poster 2014***
International Society for Ecological Economics (ISEE) 2014, Reykjavík, IS

SKILLS, AFFILIATIONS AND INTERESTS

IT **Software** Microsoft Office suite, SimaPro, Adobe Illustrator/Inkscape, Photoshop/GIMP, Matlab (MFA, LCA, IO)
Programming Python (LCA, plotting, data mining), HTML, CSS

Languages

English	C2 (fluent)	**Norwegian**	B1 (intermediate)	**German**	A2 (beginner)
French	C2 (mother tongue)	**Spanish**	B1 (intermediate)		

Affiliations Member of the International Society for Industrial Ecology
Member of the "Shifters", volunteers with the "Shift Project", carbon transition think tank https://theshiftproject.org/en/team/

Interests Travels, languages, history, puzzles (crosswords and recreational mathematics, e.g. Project Euler)

Sports Distance running, road cycling, sailing, kayaking, alpine and cross-country skiing, swimming