

Dr Heiko Keller

heiko.keller@ifeu.de | +49 6221 4767-777
www.ifeu.de | www.linkedin.com/in/heiko-keller

Dr Keller is senior project manager at ifeu – Institute for Energy and Environmental Research Heidelberg with a focus on integrated sustainability analysis. He has been at ifeu for over 10 years and has led numerous sustainability studies in the field of bioeconomy. His spectrum of expertise includes bio-based products, biofuels, bioenergy, biorefineries and food/feed as well as, on the raw material side, cultivated annual and perennial biomass, lignocellulosic residues, algae and fermentation of electricity-based synthetic intermediates.



These studies usually include the assessment of technical, environmental, social and economic, often also regulatory and political sustainability aspects, barriers and risks. In addition to the methodological development and application of Life Cycle Assessment (LCA), Social Life Cycle Assessment (sLCA) is a further focus of his work. One of Dr Keller's core competences is the integration of the individual sustainability dimensions (environmental, social, economic and other aspects) by means of Integrated Life Cycle Sustainability Assessment (ILCSA), as well as the translation of the results on the level of the Sustainable Development Goals of the United Nations (UN-SDG). He played a leading role in the development of the ILCSA methodology.

Dr Keller graduated in biochemistry / biophysical chemistry from the University of Hannover and the Hannover Medical School. He did research and a PhD in biophysics at the TU Dresden, the Max Planck Institute for Molecular Cell Biology and Genetics Dresden and the University of Heidelberg. Since 2011 he has been contributing his deep understanding of biophysical and chemical processes to the sustainability research at ifeu. He is a lecturer and workshop leader at university and non-university events. For several years, he e.g. gave courses on life cycle assessment at the KIT. He is author of numerous studies and peer-reviewed publications, reviewer for scientific journals and speaker at international conferences and congresses.

Selected projects:

[EnXylaScope](#) (2021-2025, EU Horizon 2020) Development of environmentally friendly ingredients for cosmetics, personal care products and dietary supplements based on xylan from lignocellulosic residues.

[UNRAVEL](#) (2018-2022, BBI-JU / EU Horizon 2020) Lignocellulose biorefinery based on the acetone organosolv process to produce sustainable chemicals and building materials.

[BioMates](#) (2016-2022, EU Horizon 2020) Co-processing of pyrolysis oil from biomass residues and perennial grasses to biofuels in crude oil refineries.

[NanoTextSurf](#) (2017-2020, EU Horizon 2020) Development and demonstration of nanocellulose surface coatings to enhance membranes, protective textiles, friction pads and abrasive materials.

[PUFAChain](#) (2013-2017, EU FP7) Algae strain selection, cultivation and isolation of omega-3 fatty acids (poly-unsaturated fatty acids, PUFA) for nutraceuticals.

[D-Factory](#) (2013-2017, EU FP7) Microalgae biorefinery to cultivate Dunaliella algae and convert them into pharmaceuticals, nutraceuticals, food colorants, feed and other products.

[BIOCORE](#) (2010-2014, EU FP7) Lignocellulose biorefinery project screening and developing numerous products including the polymer precursor itaconic acid, lignin-based resins and the sweetener xylitol.

Selected publications:

- Keller, H. (2021): Potential sustainability pitfalls in the success story of lignin use. Conference of the European Cooperation in Science&Technology LignoCOST, 1-2 September 2021, Pisa, Italy and online
- Senn, J., Keller, H., Rettenmaier, N., Reinhardt, G.A. (2021): Environmental assessment of biocommodities from biomass pyrolysis. *Proceedings of 17th RRB – International Conference on Renewable Resources and Biorefineries*, 6-8 September 2021, Aveiro, Portugal
- Keller, H., Rettenmaier, N., Zinke, C. (2021): How can biomass pyrolysis sustainably contribute to climate change mitigation? *Proceedings of 29th European Biomass Conference and Exhibition, ETA-Florence Renewable Energies*, online, 26-29 April 2021.
- Rettenmaier, N., Keller, H., Zinke, C, Reinhardt, G.A. (2021): Life cycle assessment of electromicrobial production of renewable hydrocarbon fuels. *Proceedings of 29th European Biomass Conference and Exhibition, ETA-Florence Renewable Energies*, online, 26-29 April 2021.
- Keller, H., Rettenmaier, N., Reinhardt, G.A. (2021): New method attributional land use and land use change (aLULUC) applied to biofuels. What can it do better than iLUC and dLUC? *Proceedings of 29th European Biomass Conference and Exhibition, ETA-Florence Renewable Energies*, online, 26-29 April 2021.
- Keller, H., Franke, B., Gärtner, S., Reinhardt, G.A. (2020): Techno-economic assessment of nanocellulose-enhanced products. In: *NanoTextSurf project reports*, supported by the EU's Horizon 2020 programme under GA No. 760601, ifeu – Institute for Energy and Environmental Research Heidelberg, Heidelberg, Germany.
- Keller, H., Fehrenbach, H., Rettenmaier N., Hemmen, M. (2019): Extending LCA methodology for assessing liquid biofuels by phosphate resource depletion and attributional land use / land use change. *Proceedings of the 9th International Conference on Life Cycle Management (LCM)*, Poznan, Poland, 1-4 September 2019
- H. Keller (2019): Operationalising UN sustainable development goals on a project level by linking them to integrated life cycle sustainability assessment applied to algae-based products. *Proceedings of the 9th Nordic Seaweed Conference*, Grenaa, Denmark, 9-10 October 2019
- Keller, H., Rettenmaier, N., Reinhardt, G. A. (2018): How to Set Up Sustainable Algae Biorefineries – Learning from Algae-Based Nutraceuticals. In: *Proceedings of 26th European Biomass Conference and Exhibition, ETA-Florence Renewable Energies*, Copenhagen, Denmark.
- Peñaloza, D., Keller, H. (2018): Using the social hotspots database to assess the social risks of prospective value chains: The case of D-Factory. Supported by the EU's FP7 under GA No. 613870. In: *Proceedings of the 6th International Conference on Social Life Cycle Assessment*, Pescara, Italy.
- Keller, H., Rettenmaier, N., Reinhardt, G. A. (2015): Integrated life cycle sustainability assessment – A practical approach applied to biorefineries. *Applied Energy*, Vol. 154, pp. 1072–1081.