

# Burak Şen, Ph.D.

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## Contact Information

Phone (Personal): +90 541 806 4551

Phone (Office): +90 (212) 533 65 32

E-mail: [burak.sen@khas.edu.tr](mailto:burak.sen@khas.edu.tr)

ORCID: 0000-0003-2454-9287

Google Scholar: [Burak Sen](#)

LinkedIn: [Burak Sen](#)

## Education

- **Ph.D (2020)** – Civil Engineering / Sustainable Systems – University of Central Florida, FL, USA

**Dissertation Title:** An Investigation of Life Cycle Sustainability Implications of Emerging Heavy-Duty Truck Technologies in the Age of Autonomy

**Advisor:** Dr. Ömer Tatari, Assoc. Prof.

- **M.Sc. (2018)** – Industrial Engineering – University of Central Florida, FL, USA

**Dissertation Title:** Life Cycle Sustainability Assessment-Based Multi-Objective Optimization: A case for sustainable transit bus fleet mix

**Advisor:** Dr. Qipeng Phil Zheng, Assoc. Prof.

- **M.Sc. (2014)** – Erasmus Mundus Industrial Ecology (Joint Degree) – Chalmers University of Technology, Sweden, Karl-Franzens University of Graz, Austria, and Leiden University, Netherlands

**Dissertation:** Backcasting Approach to Sustainable Mobility in Gothenburg – Stakeholders' Perspectives on Challenges, Barriers, and Opportunities for Sustainability Transition

**Advisor:** Dr. John Holmberg, Prof.

- **B.Sc. (2011)** – Environmental Engineering – Sakarya University

## Academic Experience

### Research Experience

- **Marie Skłodowska Curie Actions/TÜBİTAK 2236 Brain Co-Circulation Program Post-Doctoral Research Fellow (2021 – 2023)** – Sakarya University – Dean of Research

**Project Title:** Exploration of Sustainability Implications of Lithium Sulfur Battery Technology in Turkey

- **Post-Doctoral Research Associate (2020 – 2021)** – University of Southern Denmark – Institute of Green Technology– Department of Life Cycle Engineering

**Project Title:** Critical Resource Bottlenecks and Constraint Aware Pathways towards 100% Renewable Energy in Denmark

- **Research Assistant (2016 – 2020)** – University of Central Florida – Department of Civil, Environmental, and Construction Engineering

**Project Title:** Socio-economic Implications of Large-scale Electric Vehicle Systems

- **Research Assistant (2013 – 2014)** – Chalmers University of Technology – Department of Space, Earth and the Environment

**Project Title:** Application of the Challenge Lab Process for Sustainability Transition of Socio-Technical Systems

### Funded Research & Development Projects

- **Project Title:** SIMPLIST – Exploring the Sustainability Implications of Lithium-Sulfur Battery Technology for Stationary Applications in Turkey  
**Researcher's Role:** Principal Investigator (PI)  
**Funding Organization:** Marie Skłodowska Curie Action (MSCA) Program/TUBITAK BİDEB 2236  
**Project Budget:** EUR 150,000  
**Project Duration:** 24 months
- **Project title:** Combat food deserts: Smart access to healthy food  
**Researcher's Role:** Co-PI  
**Funding Organization:** U.S. Department of Transportation Volpe National Transportation Systems Center

**Project Budget:** USD 550,000

**Project Duration:** 36 months

- **Project title:** Smart On-Board Device for Detection of Static Sign Codes and Other Roadway Entities

**Researcher's Role:** Key Staff

**Funding Organization:** U.S. Department of Transportation Volpe National Transportation Systems Center

**Project Budget:** USD 750,000

**Project Duration:** 36 months

## Publications

### Articles published in Science Citation Index (SCI) Journals

1. **Sen, B.**, Kutty, A. A., Kucukvar, M., Onat, N. C. (2025). Potential climate and resource impacts of next generation solid-state lithium-sulfur battery technology for electrified public transit. *Journal of Industrial Ecology (under final revision – 25-JIE-8912)*.
2. Mandouri, J., Onat, N. C., Mohammad, A., Kucukvar, M., **Sen, B.**, Nawasieh, H. M., Khan, O. (2025). Hybrid Life Cycle Sustainability Assessment of Shared E-Scooters: Utilization Rate as a Key Driver of Sustainability Performance. *Int. J. of Life Cycle Assessment (under final revision – JLCA-D-25-00038)*
3. Kucukvar, M., Haouari, F., Onat, N. C., **Sen, B.**, Aqeel, S., Abunada, A., Naimi, S., Quradaghi, S., Wakjira, T., Thani, S. K. (2025). Sustainability Assessment of Food Value Chains: A Comprehensive Review of Life Cycle Applications and Interdisciplinary Research Directions. *Int. J. of Life Cycle Assessment (under final revision – JLCA-S-25-00086)*
4. Mandouri, J., Onat, N. C., Kucukvar, M., **Sen, B.** (2024). Trilemma of life cycle carbon, employment, and costs of trucking industry's shift toward automation and electrification. *Journal of Industrial Ecology*, 28 (4), 981 – 995.
5. Bella, D. S., **Sen, B.**, Cipman, C., Rocco, V. M., Liu, G. (2023). Exploring the Impact of Recycling on Demand-Supply Balance of Critical Materials in Green Transition: A Dynamic Multi-Regional Waste Input-Output Analysis. *Environmental Science & Technology*, 57 (28), 10221 – 10230.
6. Jafar, H., Kutty, A. A., Onat, N. C., Kucukvar, M., **Sen, B.**, Kagawa, S., Nansai, K. (2023). Rebound Effects Undermine Carbon Footprint Reduction Potential of Autonomous Electric Vehicles. *Nature Communications*, 14, 6258

7. Karaaslan E., Zakaria, M., Ercan, T., **Sen, B.**, Laman, H., Banihashemi, M., and Pol, J. (2023). Encrypted Transfer of Traffic Sign Information for Advanced Driving Assistance Systems Using Invisible Security Patches. *Transportation Research Record: Journal of the Transportation Research Board*, 3.
8. Gislason, S., Bruhn, S., Breseghello, L., **Sen, B.**, Liu, G., Naboni, R. (2022). Porous 3D printed concrete beams show an environmental promise: a cradle-to-grave comparative life cycle assessment. *Clean Technologies and Environmental Policy*, 24 (2639-2654).
9. Elagouz, N., Kim, D., Kutty, A., **Sen, B.**, Onat N. C., and Kucukvar, M. (2022) Rethinking Mobility Strategies for Mega-Sporting Events: A Global Multiregional Input-Output-based Hybrid Life Cycle Sustainability Assessment of Alternative Fuel Bus Technologies. *Sustainable Consumption and Production*, 33 (767-787).
10. Song, H., **Sen, B.**, Wang, C., and Liu, G. (2022). China Factor: Exploring the Byproduct and Host Metal Dynamics for Gallium-Aluminum in a Global Green Transition. *Environmental Science and Technology*, 4 (2699-2708)
11. Karaaslan, E., **Sen, B.**, Ercan, T., Laman, H., and Pol, J. (2021). Reading vehicular messages from smart road signs: a novel method to support vehicle-to-infrastructure in rural settings. *Transportation Research Record: Journal of the Transportation Research Board*, 11
12. Abdella, G. M., Kucukvar, M., Kutty, A. A., Abdelsalam, A. G., **Sen, B.**, Bulak, M. E., and Onat, N. C. (2021). A novel approach for developing composite eco-efficiency indicators: The case for U.S. food consumption. *Journal of Cleaner Production*, 299.
13. Kelly, C., **Sen, B.**, Tatari, O. (2020). A system dynamics analysis of the alternative roofing market and its potential impacts on urban environmental problems: A case study in Orlando, Florida. *Resources, Conservation, and Recycling*, 153.
14. **Sen, B.**, Kucukvar, M., Onat, N. C., Tatari, O. (2020). Life cycle sustainability assessment of autonomous heavy-duty trucks. *Journal of Industrial Ecology*, 24 (1), 149 – 164.
15. **Sen, B.**, Ercan, T., Tatari, O., Zheng, Q. P. (2019). Robust Pareto optimal approach to sustainable heavy-duty truck fleet composition. *Resources, Conservation, and Recycling*, 146, 502 – 513.
16. **Sen, B.**, Onat, N. C., Kucukvar, M., and Tatari, O. (2019). Material footprint of electric vehicles: A multiregional life-cycle analysis. *Journal of Cleaner Production*, 209, 1033-1043.

17. **Sen, B.**, Noori, M., and Tatari, O. (2017). Will Corporate Average Fuel Economy (CAFE) Standard help? Modeling CAFE's impact on market share of electric vehicles. *Energy Policy*, 109, 279 – 287.
18. **Sen, B.**, Ercan, T., and Tatari, O. (2017). Does a battery-electric truck make a difference? – Life cycle emissions, costs, and externality analysis of alternative fuel-powered Class 8 heavy-duty trucks in the United States. *Journal of Cleaner Production*, 141, 110 – 121.

**Teaching Experience** (Role (Year) - Lecture Given (Name of the Course) - Department - Institution)

- **Instructor (Spring 2025 – INE214 Programming Tools for Industrial Engineering –** Department of Industrial Engineering – Kadir Has University
- **Guest Lecturer (Fall 2021) – Resources and Resource Scarcity** (Sustainable Engineering) – Department of Life Cycle Engineering – University of Southern Denmark
- **Guest Lecturer (Fall 2021) – Material-Energy-Transportation Nexus** (Material Flow Analysis) – Department of Life Cycle Engineering – University of Southern Denmark
- **Guest Lecturer (Fall 2021) – Prospective Modeling and Scenario Development** (Material Flow Analysis) – Department of Life Cycle Engineering – University of Southern Denmark
- **Guest Lecturer (Summer 2021) – Societal & Urban Metabolism** (Engineering for Sustainability) – Department of Life Cycle Engineering – University of Southern Denmark
- **Guest Lecturer (Summer 2021) – Resource Criticality** (Engineering for Sustainability) – Department of Life Cycle Engineering – University of Southern Denmark
- **Teaching Assistant (Fall 2018 – Fall 2020) – CGN3700 Measurements and Analysis for Civil Engineers –** University of Central Florida – Department of Civil, Environmental, and Construction Engineering
- **Guest Lecturer (Summer 2019) – The Built Environment and Green Buildings** (CCE4002 Introduction to Construction Industry) – University of Central Florida – Department of Civil, Environmental, and Construction Engineering
- **Guest Lecturer (Fall 2017) – Sustainable Buildings and Green Building Schemes** (CCE5006 Infrastructure Systems Management) – University of Central Florida – Department of Civil, Environmental, and Construction Engineering

## **Advisory Experience** (Role (Year) – Thesis Title (Level) – Department – Institution)

- **Co-Advisor (Spring 2021 – Fall 2023)** – *The Material Constraints of Energy and Climate Transition* (Doctor of Philosophy) – Sakarya University – Dean of Research
- **Co-Advisor (Fall 2020 – Spring 2021)** – *Exploring the Resource Constraints of Renewable Energy Transition* (Doctor of Philosophy) – University of Southern Denmark – Institute of Green Technology – Department of Life Cycle Engineering
- **Co-Advisor (Spring 2021)** – *Life Cycle Assessment of 3D Printed Concrete Load Bearing Architectural Systems* (Master of Science) – Department of Life Cycle Engineering – University of Southern Denmark
- **Co-Advisor (Fall 2020 – Spring 2021)** – *Exploring the Role of Design in the Wind Energy Systems' Value Chain for End-of-Life Management* (Master of Science) – Department of Life Cycle Engineering – University of Southern Denmark
- **Co-Advisor (Fall 2020 – Spring 2021)** – *Circular economy on the product level: Case of Grundfos* (Bachelor of Science) – Department of Life Cycle Engineering – University of Southern Denmark

## **Academia-Related Social Engagement**

- Founding Member of Editorial Team on Social Media Outreach (2021 – 2023) – [the Journal of Industrial Ecology](#)
- Co-Founder (2013 – 2014) – [European Network of Industrial Ecologists](#) (currently joined into International Society of Industrial Ecology – ISIE)
- Board Member of Student Chapter at ISIE (2013 – 2014) – [International Society of Industrial Ecology](#)
- Moderator (2019) – E&C Miscellany Session. *1<sup>st</sup> International Conference on Smart Tourism, Smart Cities, and Enabling Technology (The Smart Conference)*, Orlando, FL, U.S.

## **Presentations and Conferences**

### **Conferences**

1. Della Bella, S., **Sen, B.**, Liu, G. (2023). Assessing supply risks and unveiling holistic insights: A comprehensive analysis of the global nickel supply chain. *11<sup>th</sup> International Conference on Industrial Ecology, Leiden, NL*
2. **Sen, B.**, (2022). An Industrial Ecology perspective of battery technologies for electro-mobility: LCA of solid-state lithium sulfur battery. *International Material and Metallurgy Congress, Istanbul, Turkey*

3. **Sen, B.**, Akbulut, A., Kizilaslan, A., Tokur, M., Eren, B., Kucukvar, M., Onat, N., Akbulut, H. (2022). *Life Cycle Innovation Conference 2022*, Berlin, Germany
4. Ercan, T. and **Sen, B.** (2020). Life cycle assessment of intelligent transportation systems: A case study from Southwest Florida. *27<sup>th</sup> World Congress on Intelligent Transport Systems*, Los Angeles, California
5. Karaaslan, E., **Sen, B.**, Laman, H., Ercan, T., Pol, J. (2020). Artificial Intelligence-embedded on-board machine vision system to support vehicle-to-infrastructure. *Transportation Research Board 99<sup>th</sup> Annual Meeting*, Washington, D.C.
6. **Sen, B.**, Karaaslan, E., Laman, H., Ercan, T., Pol, J. (2019). Reading vehicular messages from smart signs: A novel method to support vehicle-to-infrastructure communication in rural settings. *Transportation Research Board 98<sup>th</sup> Annual Meeting*, Washington, D.C.
7. **Sen, B.**, Ercan, T., Tatari, O., and Zheng, Q. P. (2019). Robust Pareto Optimal Approach for Sustainable Heavy-Duty Truck Fleet Composition. *Transportation Research Board 98<sup>th</sup> Annual Meeting*, Washington, D.C.
8. Mahdavian, A. and **Sen, B.** (2018). The Impact of Autonomous Vehicles and Urbanization Pattern on Florida's Traffic Projections. *Florida Autonomous Vehicle Summit*, Tampa, Florida
9. **Sen, B.**, Noori, M., and Tatari, O. (2018). For Better or For Worse: The impact of Corporate Average Fuel Economy (CAFE) Standards on electric vehicle market. *Transportation Research Board 97<sup>th</sup> Annual Meeting*, Washington, D.C.
10. **Sen, B.**, Ercan, T., and Tatari, O. (2017). Does the electrification of US heavy-duty trucks make a difference? *Transportation Research Board 96<sup>th</sup> Annual Meeting*, Washington, D.C.
11. **Sen, B.**, Garcia, D. V. (2015). A challenge-driven perspective to sustainability transition of transport in Gothenburg – an application of the Challenge Lab Process as a methodology. *International Society for Industrial Ecology (ISIE) Biennale Conference*, Guildford, England

## Presentations

1. **Sen, B.** (2024). "Industrial Ecology as a transdisciplinary approach to modern societal problems". Department of Environmental Engineering, Eskisehir Technical University, November 12<sup>th</sup>
2. **Sen, B.**, (2023). "Environmental sustainability in a sustainable and green transition in industry". Graduate School of Natural and Applied Science, Gazi University, Ankara, Turkey, October 4<sup>th</sup>

3. **Sen, B.**, (2022). "EU's Carbon Border Adjustment Mechanism and Its Impact on Turkish Exporting Industries". Aydin Trade Association (AYSO), Aydin, Turkey
4. **Sen, B.**, (2022). "Application of life cycle engineering in transportation, energy, and manufacturing industries". Faculty of Engineering, Istanbul Technical University, Istanbul, Turkey
5. **Sen, B.**, (2022). "Sustainable transportation under the circumstances of the EU Green Deal and international atrocities". Department of Industrial and System Engineering, Faculty of Engineering, University of Qatar, Doha

## Academic and Professional Memberships

- Member (2013 – cont.) – International Society of Industrial Ecology (ISIE)
- Member (2017 – cont.) – System Dynamics Society
- Founding Member (2014 – cont.) – International Industrial Ecology Professionals (IIEP)

## Professional Experience

- **Co-Founder & Managing Partner (2021 – cont.)** – [SPLUSM LLC](#), Orlando, FL, U.S.

**Role:** Coordinating the development of the sustainability analytics module of the Brane Mobility developed and patented by SPLUSM

- **Academic Advisor (2022 – 2023)** – **Daikin Türkiye, Sakarya**

**Scope:** University – Industry Collaboration Project

**Role:** Supervising the life cycle assessment study on 24 kW NDJ Condensing Boiler commissioned by Daikin Türkiye

- **Academic Advisor (2021 – 2022)** – [Boundless Impact Research and Analytics Inc.](#), NY, U.S.

**Scope:** R&D Project on Autonomous Heavy-Duty Truck Technology

**Role:** Assisting the company with carrying out a life cycle assessment of an autonomous heavy-duty truck designed and manufactured by Locomotion Inc.

- **Co-Founder (2018 – 2020)** – [Connected Wise LLC](#), Orlando, U.S.

**Role:** Data collection for the hardware developed and patented by Connected Wise LLC. And assisting with the operations of the company

- **Sustainability Consultant (2014 – 2016)** – [Sphera Solutions GmbH](#), Germany

**Role:** Providing consultancy on the life cycle assessment projects listed below;

- (1) Organic waste pyrolysis at Ereğli Demir Çelik Fabrikaları A.Ş.,
- (2) Environmental Product Declaration (EPD) for Vitreous China Sanitaryware at Metal Hammadde San. Tic. A.Ş.,
- (3) Environmental Product Declaration (EPD) for Brass Bathroom and Kitchen Mixers at E.C.A. Valfsel Armatür San. A.Ş.,
- (4) Environmental Product Declaration (EPD) for Room Partitioning Systems at ASPEN Yapı ve Zemin A.Ş.

- **Environmental Engineer (2011 – 2012) – Directorate of Environmental Protection and Control, Kartal Municipality, Kartal, Istanbul**

## Useful Skills

Technical Skills: Python, GAMS, Vensim, AnyLogic, SPSS, Minitab

Languages: English (Advanced), Spanish (Advanced), German (Intermediate), Italian (Intermediate)

## Grants and Awards

- Marie Skłodowska Curie Actions (MSCA) / TUBITAK 2236 Brain Co-Circulation – Sakarya University – 2021
- Award for Excellence in Graduate Teaching Assistance – College of Engineering and Computer Science – University of Central Florida – 2018
- Graduate Travel or Presentation Fellowship – 2018
- Graduate Travel or Presentation Fellowship – 2017
- Graduate Travel or Presentation Fellowship – 2016
- Erasmus Mundus Category B Scholarship – European Commission – 2012

## References

References are available upon request.