Rebecca Ciez

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Mechanical Engineering,
Sustainability Engineering and Environmental Engineering
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EDUCATION

Carnegie Mellon University, College of Engineering, Pittsburgh, PA
Ph.D. Engineering and Public Policy, 2018

Columbia University, School of Engineering and Applied Science, New York, NY
B.S. Mechanical Engineering, Economics & Sustainable Engineering Minors, 2013

EXPERIENCE

Purdue University, Mechanical Engineering, Sustainability Engineering and Environmental Engineering, West Lafayette, IN
Assistant Professor (August 2020-Present)
Columbia University, Chemical Engineering, New York, NY
Postdoctoral Research Scientist (2020)
Andlinger Center for Energy and the Environment, Princeton University, Princeton, NJ
Distinguished Postdoctoral Fellow (2018 – 2020)

SELECTED HONORS AND AWARDS

ACS Energy Letters: Women Scientists at the Forefront of Energy Research (2026)
National Academy of Engineering, Japan-America Frontiers of Engineering Participant (2025)
40 Under 40 American Academy of Environmental Engineers and Scientists (2025)
Purdue Teaching Academy: Teaching Leadership Award *Promoting Graduate Student Teaching Excellence and Community*
Scialog Fellow, Negative Emissions Science, Research Corporation for Science Advancement (2022, 2023)

REFEREED JOURNAL PAPERS

18. Zhu Zhu, **Rebecca E. Ciez***, *Comparing the Energy and Climate Impacts of Conventional Lithium- ion and All Solid-State Batteries*, EES Batteries (2026)

17. Giovanni Stabile, Meenakshi Narayanaswami, Jeremy Reynolds, **Rebecca E. Ciez*,** *Job and energy preferences of steelworkers and impacts for industrial electrification***,** Environmental Research: Energy, **2**, 4 (2025)

16. Anindya Nath, Abhinand Ayyaswamy, Hanwen Qin, Navneet Goswami, Partha P. Mukherjee, **Rebecca E. Ciez**, *Consequential Analysis of Climate and Grid Energy Impact of Steel Electrification*, ACS Energy Letters, **10**, (2025)

15. Emily Clare Barber, Navdeep Vansal, Ziqi Fang, Yu-Wei Hung, Joseph Peoples, **Rebecca Ciez**,

William Travis Horton, Xiulin Ruan. *Impacts of Radiative Cooling Paints for CO_2 Reduction and Global Warming Mitigation.* Energy and Buildings*,* **332**, (2025)

14. **Rebecca E. Ciez**, *Impacts on manufacturing workers as part of a whole-system energy transition*. Frontiers in Sustainable Energy Policy: Energy and Society, **2**, (2023)

13. Kelsey Biscocho, Mohammad Rezqalla, Aaron Farha, Alexandru Boanta, **Rebecca E. Ciez**, *Development of a High-Resolution Top-Down Model to Estimate Actual Household-Level Heat Pump Electricity Consumption*, Environmental Research: Infrastructure and Sustainability, **3**, (2023)

12. Aashutosh Mistry, Ankit Verma, Shashank Sripad, **Rebecca Ciez**, et al. *A Minimal 'Information' Set to Enable Verifiable Theoretical Battery Research*. ACS Energy Letters, **6**, (2021)

11. John J. Lydon, **Rebecca E. Ciez**, *Existing seasonal flexibility in U.S. manufacturing energy use*. IOP SciNotes, **2**, (2021)

10. David L. Greene, Judith M. Greenwald, **Rebecca E. Ciez***, *U.S. fuel economy and greenhouse gas standards: What have they achieved and what have we learned*?, Energy Policy, **146**, (2020)

9. Guannan He, **Rebecca E. Ciez**, Qixin Chen, Panayiotis Moutis, Soummya Kar, Jay Whitacre*, *The Economic End of Life of Electrochemical Energy Storage*, Applied Energy, **273**, (2020)

8. Eric Hittinger*, **Rebecca E. Ciez**, *Modeling the costs and benefits of energy storage systems,* Annual Review of Environment and Resources, **45**, (2020)

7. **Rebecca E. Ciez**, Daniel Steingart*, *Asymptotic Cost Analysis of Intercalation Lithium Ion Systems for Multi-Hour Duration Energy Storage*, Joule, **4**, 1-18 (2020)

6. **Rebecca E. Ciez**, J.F. Whitacre*, *Examining different recycling processes for lithium-ion batteries*. Nature Sustainability, **2**, 148-156, (2019)

5. Kevin Knehr, Robert Buline, Todd Baldwin, Erick Guzman, Hang Huynh, **Rebecca E. Ciez**, Daniel Steingart*, *Optimization and Design of the Minimal Architecture Zinc-Bromine Battery using Insight from a Levelized Cost of Storage Model*, Journal of the Electrochemical Society **165**, A4041-A4050 (2018)

4. Brian Sergi, Matthew Babcock, Nathaniel J. Williams, Jesse Thornburg, Aviva Loew, **Rebecca E. Ciez***, *Institutional Influence on Power Sector Investments: A Case Study of Distributed and Centralized Energy in Kenya and Tanzania,* Energy Research and Social Science **41**, 59-70 (2018)

3. **Rebecca E. Ciez**, J.F. Whitacre*, *Comparison between cylindrical and prismatic li-ion cell costs using a process based cost model*, Journal of Power Sources **340**, 273-281 (2017)

2. **Rebecca E. Ciez**, J.F. Whitacre*, *The cost of lithium is unlikely to upend the price of Li-ion storage systems*, Journal of Power Sources **320**, 310-313 (2016)

1. **Rebecca E. Ciez**, J.F. Whitacre*, *Comparative techno-economic analysis of hybrid micro-grid systems utilizing different battery types*, Energy Conversion and Management **112**, 435-444 (2016)

REFEREED CONFERENCE PAPERS

2. Joseph Tenpenny, Jan Spale, Davide Ziviani, **Rebecca Ciez**, *Technoeconomic and Greenhouse Gas Impact Analysis of a Twin-Screw Compressor High Temperature Heat Pump for Spray Drying.* ASME International Conference on Energy Sustainability, July 8-10, 2025

1. Aaron H.P. Farha, Panagiotis Papagerogiou, Kevin J. Kircher, Eckhard A. Groll, Rebecca E. Ciez, *A Technoeconomic Framework for Thermal Energy Storage in Net-Zero Energy Systems Across the United States*. ASHRAE Annual Conference, June 21-25, 2025

PRODUCTS UNDER REVIEW

3. Jiayu Geng, Meenakshi Narayanaswami, Jeremy Reynolds, Rebecca E. Ciez**,** *Worker preferences for time-dependent job attributes in an electrifying industry.*

2. Ioannis Keroglou, Rebecca E. Ciez, *Process-based lifecycle climate, energy, water and material constraints of solid adsorbent production for gigaton-scale direct air capture.*

1. Joseph Tenpenny, Jan Spale, Darshak Gadagkar, Davide Ziviani, Rebecca E. Ciez, *Technoeconomic analysis of high-temperature heat pumps for industrial applications.*

INVITED CONFERENCE AND SEMINAR PRESENTATIONS

21. *Industrial Electrification, Technologies and Interactions with the Energy System*. Penn State University, Department of Mechanical Engineering Seminar, November 18, 2025

20. Hanwen Qin, Anindya Nath, Abhinand Ayyaswamy, Partha P. Mukherjee, Rebecca E. Ciez, *Sociotechnical modeling of steel electrification interactions with electricity grids*. INFORMS Annual Meeting, Atlanta, GA, October 28, 2025

19. *Technoeconomics of Energy Storage,* 3rd Annual Electricity Camp in the Rockies, Net Zero Electricity Research Initiative, University of Calgary, May 23, 2024 (Invited)

18. *Environmental Impacts of Battery Recycling*, Georgetown University Environmental Metrology and Policy Program, December 1, **2023** (Virtual)

17. *Lithium-ion battery recycling-Options, Environmental Impacts, and Economics*, 50th MRS Fall Meeting, November 27, **2023** (Invited)

16. *Renewable Energy Impacts on Manufacturing*, Industrial Decarbonization Research Insights Webinar, NYU Institute for Policy Integrity, November 8, **2023** (Invited)

15. *Recycling Lithium-Ion Battery Materials*, Materials, Corrosion, Mitigation, Next Gen Motors, Systems Engineering Executive Track, SAE COMVEC, September 21, **2023** (Invited)

14. *Techno-economic considerations for battery energy storage design*, Oxford Battery Modeling Symposium, Pembroke College, Oxford, UK, March 28, **2023** (Invited)

13. Moderator, *Batteries: What's Next?* Purdue Engineering Distinguished Lecture Series Panel, March 23, **2023**.

12. *Environmental Impacts of Battery Recycling*, Sustainable Recycling of Critical Materials in Lithium-ion Batteries, National Academies Chemical Sciences Roundtable, March 2, **2023**

(Invited)
https://www.nationalacademies.org/event/03-02-2023/sustainable-recycling-of-critical-materials-in-lithium-ion-batteries

11. *Assessing the cost limits of lithium-ion batteries*, Carnegie Mellon Battery Modeling Webinar Series, January 12, 2021
10. *Designing Energy Storage for Climate Goals*. Dartmouth Arthur L. Irving Institute for Energy & Society New Energy: Conversations with Early-Career Energy Researchers, July 15, 2020, Recording: https://www.youtube.com/watch?v=YwqAdCl0pZI&feature=youtu.be
9. *Power-to-X: Evaluating Commodities as Long-Duration Energy Storage*. ECS PRiME, October 2020
8. *Energy storage for decarbonization goals*, MIT Alumni for Climate Action Webinar, June 24, 2020
7. *Batteries for environmental goals.* Center for Energy Initiatives Battery and Energy Storage Workshop, New York, NY, October 22, 2019.
6. *Low-cost grid energy storage: cost limits of lithium-ion batteries.* Columbia Electrochemical Energy Center, New York, NY, September 27, 2019.
5. *Trends in Energy Storage Costs*. Electricity Roundtable: The role of storage in Alberta's electricity market, University of Calgary School of Public Policy, Calgary, AB, March 18, 2019.
4. *Low-cost grid energy storage: cost limits of lithium-ion batteries*. NREL, Golden, CO, March 15, 2019.
3. *Lithium-Ion Battery Recycling Processes: Environmental Impacts and Economics*, Decommissioning, End of Life, and Recycling Energy Storage Association Webinar, March 13, 2019.
2. *The Costs and Environmental Impacts of Lithium-Ion Battery Production and Recycling.* International Battery Seminar & Exhibit. Fort Lauderdale, FL, March 26-29, 2018.
1. *Reducing BEV battery costs: contributions from manufacturing and recycling*. UC Davis Sustainable Transportation Energy Pathways Seminar. June 20, 2017.

TEACHING AND MENTORING EXPERIENCE

Purdue University

PhD Advisees

- Joseph Tenpenny, Mechanical Engineering, *expected 2026*
- Jiayu Geng, Environmental and Ecological Engineering, *expected 2028*
- Hanwen Qin, Environmental and Ecological Engineering, *expected 2028*
- Jennifer Patterson, Environmental and Ecological Engineering, *expected 2028*
- Zhu Zhu, Environmental and Ecological Engineering, *expected 2028*
- Matthew Ellett, Environmental and Ecological Engineering, *expected 2029*

Thesis MS Advisees

- Kelsey Biscocho, Mechanical Engineering, Spring 2023
- Meenakshi Narayanaswami, Mechanical Engineering, Summer 2024
- Mohammad Aquib Zafar, Mechanical Engineering, Spring 2024

LEADERSHIP AND SERVICE

Advisory Committee, *American Society of Mechanical Engineers (ASME) CATALYZE Summit* (2026-2027)

International Symposium on Sustainable Systems and Technology Conference Theme co-Chair: Sustainability & Resilience of Energy Systems (2025, 2026)

Moderator, Industrial Load Flexibility, NREL Workshop on Flexible Demand in 100% Clean Grids, (September 2023)

Review Editor, Frontiers in Sustainable Energy Policy: Energy and Society (Fall 2022-present)

INFORMS Annual Conference Session Chair, Energy, Natural Resources and the Environment, October 2021, October 2022

Clean Air Task Force: Transportation Deep Decarbonization Initiative (2020)

Center for Energy Initiatives Battery and Energy Storage Workshop, Organizing Committee (2019)

Institute for Transformative Technologies, 50 Breakthroughs Scientific Translation Committee (2019)

World Bank Technology Futures Workshop (April 24, 2018)

Reviewer

- US Department of Energy Office of Critical Minerals and Energy Innovation (2026), *Infrastructure Investment and Jobs Act Battery Materials Processing & Battery Manufacturing*
- Stanford Doerr School of Sustainability, Sustainability Accelerator (2025, 2026) *Sustainable Industry*
- US Department of Energy Office of Manufacturing and Energy and Supply Chains (2024), *Bipartisan Infrastructure Law (BIL) Battery Materials Processing and Battery Manufacturing*
- US Department of Energy Office of Clean Energy Demonstrations (2024), *Distributed Energy Systems (DES) Demonstrations*
- US Department of Energy Advanced Materials and Manufacturing Technologies (2024), *Data Analysis and Modeling Lab Call Review*
- US Department of Energy Office of Clean Energy Demonstrations (2023), *Bipartisan Infrastructure Law (BIL) Long-Duration Energy Storage Demonstrations*
- Nebraska Research Initiative (2023)
- University of California Institute of Transportation Studies (2023)
- US Department of Energy Vehicle Technologies Office (2022), *Bipartisan Infrastructure Law (BIL) Battery Materials Processing and Battery Manufacturing*
- KU Leuven Research Council (2022)
- Caltrans/US DOT proposals through ITS-UC Davis (2021)
- US Department of Defense Strategic Environmental Research and Development Program (2020) - *Optimization of Advanced Battery Processing and Recycling Technologies*
- US Department of Energy Vehicle Technologies Office (2019-2023) *Annual Merit Review, Vehicle Technologies Analysis*
- US Department of Energy Advanced Manufacturing Office (2019) *American-Made Lithium-Ion Battery Recycling Prize*

Journal Reviewer Applied Energy, Batteries & Supercaps, Energies, Energy, Energy and Buildings, Energy Conversion and Management, Energy Policy, Environmental Research: Energy, Environmental Research: Infrastructure and Sustainability, Environmental Science & Technology, IEEE Open Access Journal of Power and Energy, Joule, Nature Communications, Nature Energy, Progress in Energy, Resources Conservation & Recycling, RSC Sustainability, Science Advances, Sustainable Production and Consumption

ASME

Nominating Committee Voting Member (2018-2020)
Nominating Committee Alternate Member (2017-2018)

SELECTED MEDIA, COMMENTARIES, AND BLOG POSTS

Marketplace: The oil shock could be worse if it wasn't for U.S. fuel efficiency standards, April 13, 2026

The New York Times: Trump Returns to Gasoline as Fuel of Choice for Cars, Gutting Biden's Climate Policy, December 3, 2025

Marketplace: Trump is likely to target vehicle fuel efficiency standards, January 13, 2025

Democrat & Chronicle: Trashed no more: How a Rochester site will recycle our EV batteries for a US green surge, March 1, 2023

The City:As Battery Fires Mount, Sanitation Department Scrambles to Deal with the Hazardous Aftermath, February 20, 2023

ABC WPTA: Digging deeper into solar farm facts, October 12, 2022

Fox 59 Indianapolis: Tax credits offered for heat pump installation, October 7, 2022

Canary Media: Energy Dome is the rare long-duration storage firm that's moving fast, December 9, 2021

Interchange Recharged Podcast: The Future of Solar Storage, November 26, 2021

S&P Global: Carmakers try to head off supply crunch with battery recycler investments, October 13, 2021

Business Insider: Why It's so Hard to Recycle Electric-Car Batteries, September 30, 2021

S&P Global: EV Impact: Battery Disruptors are Joining Metal Supply Chains, September 21, 2021

ABC WPTA Fort Wayne: Digging Deeper: Climate Matters, August 19, 2021

S&P Global: Battery recycling efforts pick up as cobalt, lithium face potential deficit, June 9, 2021

S&P Global: Shift to solid-state batteries could be 'seamless,' experts say, June 4, 2021

Science Magazine, Millions of electric cars are coming. What happens to all the dead batteries?, May 20, 2021

Volts, Battery week: competitors to lithium-ion batteries in the grid storage market, May 14, 2021

Volts, The ongoing battle among lithium-ion batteries, April 21, 2021

Comprehensive look at U.S. fuel economy standards show big savings on fuel and emissions, August 25, 2020

S&P Global: As battery costs plummet, lithium-ion innovation hits limits, experts say, May 14, 2020

Wired: VW Will Make Its Own Batteries to Power an Electric Future, May 19, 2019

The Wall Street Journal: The Secret to Why a Tesla Costs So Much (Hint: Batteries), February 19, 2019.

Behind the paper: Examining different recycling processes for lithium-ion batteries, February 11, 2019.

ARS Technica: Electric car batteries might be worth recycling, but bus batteries aren't yet, February 12, 2019

IEEE Spectrum: 2017 Is the Make-or-Break Year for Tesla's Gigafactory, December 30, 2016.

Charged: New study: Lithium cost swings unlikely to impact battery prices, May 26, 2016.

Clean Technica: Lithium Price Changes Unlikely to Do Much to EV Battery Prices, May 12, 2016.