

## Rebecca Ciez

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Mechanical Engineering, Environmental and Ecological 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, Environmental and Ecological Engineering**,  
West Lafayette, IN

*Assistant Professor* (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)

**Carnegie Mellon University, Engineering and Public Policy**, Pittsburgh, PA

*Graduate Research Assistant* (2013 – 2018)

**ASME**, Washington DC

*Public Policy Research Intern* (2014)

**Columbia University Water Center**, New York, NY

*Undergraduate Researcher* (Fall 2012)

## SELECTED HONORS AND AWARDS

Andlinger Distinguished Postdoctoral Fellowship (2018-2020)

Carnegie Mellon GSA/Provost Office Graduate Project Research Grant (2017)

NSF Graduate Research Fellowship (2015-2018)

Neil and Jo Bushnell Fellowship (2014)

Friedman Fellowship (2014)

Columbia University King's Crown Civic Responsibility Award (2013)

Columbia University King's Crown Gold Crown Leadership Award (2012)

## PUBLICATIONS

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)

## CONFERENCE PRESENTATIONS

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11. A Power Framework for Making Decarbonization Technology Decisions and a case study of transportation, AGU Fall Meeting, December 2020
10. *Power-to-X: Evaluating Commodities as Long-Duration Energy Storage*. ECS PRiME,, October 2020 (Invited)
9. *Effectiveness of expert judgement in technology innovation*. USAEE/IAEE North American Conference, Denver, CO, November 6, 2019.
8. *Batteries for environmental goals*. Center for Energy Initiatives Battery and Energy Storage Workshop, New York, NY, October 22, 2019. (Invited)

7. *Recycled Battery Materials for Electric Vehicles: Cost and Consumer Perceptions.* USAEE/IAEE North American Conference, Washington, DC, September 25, 2018.
6. *The Costs and Environmental Impacts of Lithium-Ion Battery Production and Recycling.* International Battery Seminar & Exhibit. Fort Lauderdale, FL, March 26-29, 2018. (Invited)
5. *Evaluating food-energy-water systems with a concurrent assessment method.* Energy Policy Research Conference. Santa Fe, NM, September 8-9, 2016.
4. *Prospects for lithium ion battery recycling in a changing market.* Energy Policy Research Conference. Santa Fe, NM, September 8-9, 2016.
3. *Process-based cost modeling of cylindrical lithium-ion batteries.* ASME Power & Energy Conference & Exhibition: Energy Storage Forum. Charlotte, NC, June 26-30, 2016.
2. *How do different battery chemistries perform in a hybrid microgrid?* ASME Power & Energy Conference & Exhibition: Energy Storage Forum. Charlotte, NC, June 26-30, 2016.
1. *Energy Storage Optimization: A Techno-economic Analysis of Battery Chemistries in Hybrid Microgrids.* USAEE/IAEE North American Conference, Pittsburgh, PA, October 27, 2015.

## POSTER PRESENTATIONS

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12. *How cheap can long-duration lithium-ion batteries be?* Andlinger Center Annual Meeting, Princeton, NJ, November 8, 2019.
11. *How cheap can long-duration lithium-ion batteries be?* Princeton E-affiliates Partnership Retreat, Princeton, NJ, June 11, 2019.
10. *How Effective is Expert Judgement for Technology Innovation?* Andlinger Center Advisory Board Meeting, Princeton, NJ, May 2, 2019.
9. *How cheap can long-duration lithium-ion batteries be?* Andlinger Center Annual Meeting, Princeton, NJ, November 9, 2018.
8. *Recycled batteries for electric vehicles: A first look at EV owner preferences,* Princeton E-affiliates Partnership Retreat, New York, NY, June 13, 2018.
7. *Recycled batteries for electric vehicles: A first look at EV owner preferences,* Carnegie Mellon Innovation with Impact Exhibition, Pittsburgh, PA, April 12, 2018.
6. *Analyzing Food-Energy-Water systems with a concurrent assessment method,* International Conference on Energy Research and Social Science, Sitges, Spain, April 2-5, 2017.
5. *Lithium-ion battery costs: Can manufacturing economies of scale deliver cost goals?* Carnegie Mellon Electrochemical Energy Symposium, Pittsburgh, PA, October 21, 2016.
4. *Lithium-ion battery costs: Using process-based cost modeling to capture the manufacturing costs of recent battery trends.* Carnegie Mellon Energy Week, Pittsburgh, PA, March 14-18, 2016.

3. *Optimizing Energy Storage: A Techno-Economic Analysis for Hybrid Microgrid Systems*. Center for Climate and Energy Decision Making Annual Meeting, Pittsburgh, PA, May 20-21, 2015.
2. *Optimizing Energy Storage: A Techno-Economic Analysis for Hybrid Microgrid Systems*. Engineering Sustainability: Innovation and the Triple Bottom Line, Pittsburgh, PA, April 20, 2015.
1. *The (Not So) Little Engine That Could: Implementing Multifunction Energy Platforms in Uganda*. National Sustainable Design Expo, Washington, DC, April 18-19, 2013.

## OTHER PRESENTATIONS

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12. *Assessing the cost limits of lithium-ion batteries*, Carnegie Mellon Battery Modeling Webinar Series, January 12, 2021 (Invited)
11. Purdue Engineering Distinguished Lecture Series Panel: [\*Thermal and Energy Management Challenges in Large-Scale, Sustainable Computing Systems\*](#), December 3, 2020
10. *Energy storage for decarbonization goals*, Purdue ECS Student Seminar, October 19, 2020
9. [\*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 (Invited)
8. *Energy storage for decarbonization goals*, MIT Alumni for Climate Action Webinar, June 24, 2020 (Invited)
7. *Low-cost grid energy storage: cost limits of lithium-ion batteries*. Columbia Electrochemical Energy Center, New York, NY, September 27, 2019.
6. *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. (Invited) <https://doi.org/10.11575/sppp.v12i0.68824>
5. *Low-cost grid energy storage: cost limits of lithium-ion batteries*. NREL, Golden, CO, March 15, 2019. (Invited)
4. *Lithium-Ion Battery Recycling Processes: Environmental Impacts and Economics*, Decommissioning, End of Life, and Recycling Energy Storage Association Webinar, March 13, 2019. (Invited)
3. *Reducing BEV battery costs: contributions from manufacturing and recycling*. UC Davis Sustainable Transportation Energy Pathways Seminar. June 20, 2017. (Invited)
2. *Policies Shaping Power Africa: Perspectives on Energy Policy for the Developed and Developing World*. ASME Board on Government Relations. November 16, 2014.
1. Panel Moderator, *Early Career Engineer Mini-Talks*. ASME Board on Career Development, November 16, 2014.

## TEACHING AND MENTORING EXPERIENCE

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### **Purdue University**

#### ***PhD Advisees***

- Pratik Walimbe, Mechanical Engineering, August 2020-Present
- Cansu Doganay, Mechanical Engineering, August 2021-Present

#### ***PhD Committees***

- Timothy Simon, Environmental & Ecological Engineering, July 2021
- Debanjali Chatterjee, Mechanical Engineering, April 2021-Present
- Soumya Bandyopadhyay, Mechanical Engineering, August 2021-Present

#### ***Thesis MS Advisees***

- Kelsey Biscocho, Mechanical Engineering, August 2021-present

#### ***MS Thesis Committees***

- Trent Murray, Mechanical Engineering, July 2021-Present
- Fahim Vora, Mechanical Engineering, April 2021-Present

#### ***Non-thesis students (MS, Undergraduate)***

- John Lydon, Aeronautical & Astronautical Engineering, September 2020-December 2021
- Ryan Soltis, Mechanical Engineering, June 2021-August 2021
- Soumalya Chakrobarty, Mechanical Engineering, June 2021-August 2021
- Shelby Sturgeon, MS Mechanical Engineering, January 2021-Present

#### ***Courses Taught***

- EEE 560 - Scaling New Energy Technologies, Fall 2020
- ME 463 - Engineering Design, Spring 2021
- ME 200 - Thermodynamics I, Fall 2021

### **Columbia University**

MS (Earth & Environmental Engineering) Thesis Supervisor, David Ng (Fall 2019)

*Project: Modeling the Use of Zinc as an Energy Storage Medium for Seasonal Arbitrage of Electrical Power*

### **Carnegie Mellon University**

External Project Mentor, Electrochemical Energy Storage Systems (Fall 2018)

*Project: Lithium-Ion Battery Recycling and Reuse Decision Tree*

### **Engineering for Change**

Expert Fellow advising Water, Energy, and Transport Research Fellows (Summer 2017)

### **Carnegie Mellon University – Teaching Assistant**

Energy Policy and Economics (Spring 2016, Spring 2017)

Materials for Energy Storage (Spring 2016)

## LEADERSHIP AND SERVICE

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**Clean Air Task Force:** [Transportation Deep Decarbonization Initiative](#) (2020)

**USAEE,** Case Competition Writer (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 Vehicle Technologies Office (2019-2021) *Annual Merit Review, Vehicle Technologies Analysis*
- US Department of Energy Advanced Manufacturing Office (2019) *American-Made Lithium-Ion Battery Recycling Prize*
- US Department of Defense Strategic Environmental Research and Development Program (2020) - *Optimization of Advanced Battery Processing and Recycling Technologies*
- Caltrans/US DOT proposals through ITS-UC Davis (2021)

**Journal Reviewer** Applied Energy, Energies, Energy, Energy Conversion and Management, Energy Policy, Environmental Science & Technology, Joule, Nature Communications, Sustainable Production and Consumption

### ASME

*Nominating Committee Voting Member* (2018-2020)

*Nominating Committee Alternate Member* (2017-2018)

### Society of Women Engineers

*WE Local Pittsburgh Conference Host Committee Chair* (2016-2017)

*Pittsburgh Section Representative* (2016-2017)

## MEDIA, COMMENTARIES, AND BLOG POSTS

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S&P Global: [EV Impact: Battery Disruptors are Joining Metal Supply Chains](#), September 21, 2021

ABC WPTA: [Digging Deeper: Climate Matters](#), August 2021

Eurobiz Japan: [Powering the road to zero](#), July 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

Spektrum (German): [The Legacy of Electromobility](#), June 9, 2020

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

Andlinger Center Speaks: [Electric vehicles, their batteries, and the road to electric transportation](#), June 17, 2019.

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.

Nature Research Sustainability Community: [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.

Green Car Congress: [CMU study suggests difficulties in reaching target low price points for Li-ion batteries](#), December 11, 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.

Green Car Congress: [CMU study concludes lithium market fluctuations unlikely to impact Li-ion battery prices significantly](#), May 5, 2016.