

## Hanna M. Breunig

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Research Scientist, Energy Analysis & Environmental Impacts Division | Climate and Ecosystem Sciences Division,  
Lawrence Berkeley National Laboratory (Sep 2018 – present)

### RESEARCH EXPERTISE

**Techno-Economic Analysis (TEA):** DOE HyMark TEA on bulk hydrogen storage and transportation (key staff); LBNL LDRD Mitigating fossil and microbial methane emissions with new materials for distributed energy systems (PI); EPA STAR and LBNL LDRD TEA of brine and carbon dioxide by-product reuse and disposal from carbon dioxide capture and sequestration (CCS) projects (key staff)

**Geospatial and Scenario Modeling:** CEC EPC 14-030 Paths to sustainable distributed generation through 2050: matching local waste biomass resources with grid, industrial, and community needs (key staff)

**Life Cycle Assessment (LCA):** CEC EPC 14-030 LCA of land applying biochar and digestate from bioenergy facilities; DOE EERE Fuel Cells Technology Office Grant impact analysis of low-temperature PEM fuel cell deployment in commercial buildings (key staff); EPA STAR impact analysis of proposed biofuel pipeline construction from Midwest to East Coast (key staff)

### EDUCATION

**University of California, Berkeley, USA**

*Ph.D.*, Environmental Engineering, May 2015

*Ph.D. Minors:* Geographic Information Science; Energy and Resources

Dissertation: “Parameter variation and scenario analysis in impact assessments of emerging energy technologies”

Co-advisers: Thomas McKone; Ashok Gadgil

*Engineering and Business for Sustainability Certificate*, June 2012

*M.S.*, Environmental Engineering, May 2011

**Cornell University, Ithaca, New York USA**

*B.S.*, Environmental Engineering, May 2010

### PUBLICATIONS

Temporal and geographic drivers of biomass residues in California. **Breung, Hanna;** Huntington, Tyler; Jin, Ling; Robinson, Alastair; Scown, Corinne. *Resources, Conservation and Recycling* 2018, 139, 287-297.

Dynamic geospatial modeling of the building stock to predict future urban energy demand. **Breung, Hanna;** Huntington, Tyler; Jin, Ling; Robinson, Alastair; Scown, Corinne. *Environmental Science & Technology* (2018, Vol 52, pp. 7604-7618).

Food waste for bioenergy in California. **Breung, Hanna;** Jin, Ling; Robinson, Alastair; Scown, Corinne. *Environmental Science & Technology* (2017, Vol 51, pp. 1120- 1128).

Environmental, public health, and safety assessment of fuel pipelines and other freight transportation modes. Strogan, Brett; Bell, Kendon, **Breunig, Hanna,** Zilberman, David. *Applied Energy*. (2016, Vol. 171, pp. 266-276).

Spatially-explicit water balance implications of carbon capture and sequestration. Sathre, Roger; **Breunig, Hanna**; Greenblatt, Jeffery; Larsen, Peter; Masanet, Eric; McKone, Thomas; Quinn, Nigel; Scown, Corinne. *Environmental Modelling and Software*. (2016, Vol 75, 153-162).

A total cost of ownership model for low temperature PEM fuel cells in combined heat and power and backup power applications. Wei, Max; Lipman, Timothy; Mayyas, Ahmad; Chien, Joshua; Chan Shuk Han; **Breunig, Hanna**; Stadler, Michael; McKone, Thomas; Beattie, Paul; Chong, Patricia; Collela, Whitney; James, Brian. *Lawrence Berkeley National Laboratory Report*. LBNL-6772E, October 2014.

Regional evaluation of brine management for geologic carbon sequestration. **Breunig, Hanna**; Birkholzer, Jens; Borgia, Andrea; Oldenburg, Curtis; Price, Phillip; McKone, Thomas. *International Journal of Greenhouse Gas Control*. (2013, Vol 14, pp. 39-48).

## **PUBLICATIONS IN REVIEW**

Developing life-cycle approaches for adsorption-based biogas and associated gas systems. **Breung, Hanna**; Anastasopoulou, Aikaterini; Sundstrom, Eric; Devkota, Jay; Coma, Simon; Hao, Henry; Haranczyk, Maceij. (*under review*).

Devkota, J.P.; Nordahl, S.L.; Amirebrahimi, J.; Smith, S.J.; Preble, C.; Satchwell, A.; Jing, L.; Breunig, H.M.; Brown, N.; Sohn, M.; Scown, C.D.; Kirchstetter, T., Life-Cycle Greenhouse Gas and Air Pollutant Emissions from Anaerobic Digestion and Biogas Upgrading. (*under review*).

Role of Digestate and Biochar in Carbon-Negative Bioenergy. **Breung, Hanna**; Amirebrahimi, Jahon; Smith, Sarah; Scown, Corinne. (*under review*).

## **AWARDS**

Early Career Development Award Berkeley Lab LDRD 2017  
Bay Area Regional NSF I-Corps Start-up Team 2016  
MIT CEE Rising Stars Workshop Fellow, MIT 2015

## **FELLOWSHIPS**

EPA Science to Achieve Results (STAR) Fellowship, UC, Berkeley 2014-2015  
Schmidt-MacArthur Fellowship, UC, Berkeley 2014-2015

## **ACADEMIC**

### **SERVICE**

*Member*, American Geophysical Union  
*Steering Committee*, International Symposium on Sustainable Systems and Technology (ISSST)  
*Steering Committee Chair*, Society of Environmental Toxicology and Chemistry (SETAC) Interest Group in Sustainability (2017-2018)  
*Reviewer*, Journal of Industrial Ecology; International Journal of Greenhouse Gas Control; Waste Management; Developmental Engineering; Information Processing in Agriculture