Adria E. Brooks

Power Systems & Renewable Energy

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Skilled Analyst with a broad range of experience in leading energy research and over 12 years of experience in the power systems and renewable energy sectors. Knowledgeable in technical project requirements including programming and engineering. Strong team leader and author of several different reports and peer reviewed journals. Dedicated to supporting the evolution of the Nation's power grid. Skilled with effective communication and presentations, data visualization, programming in multiple languages, justice and equity.

Areas of Expertise

- Electric Transmission Planning
- Power System Modeling
- Electricity Markets
- Renewable Energy
- Energy Equity & Justice
- Research & Analysis
- Policy & Regulation
- Stakeholder Relationships
- Presentations & Briefings
- Memo, Report & Journal Writing
- Data Visualization
- Team Leadership

Professional Experience

U.S. Department of Energy, Washington, D.C. **October 2021 – present**
Transmission Planning Engineer

Key member of Grid Deployment team with goal of enhancing the efficiency and reliability of the nation's power grid to meet decarbonization goals. Portfolio includes electric transmission planning, technical stakeholder engagement, analysis of power grid congestion and reliability concerns, oversight of research projects, and briefing leadership on grid needs.

- Co-lead several research projects, including analyst and author of National Transmission Needs Study, which requires extensive stakeholder engagement with States, Indian Tribes, and transmission planning organizations.
- Provided dozens of briefings on technical transmission topics to top leadership in both the Department of Energy and the White House. Briefings are frequently applauded by attendees as clear and informative.
- Department of Energy staff representative on the U.S. Interagency Council for Homelessness, supporting Deputy Secretary David Turk.

U.S. Department of Energy, Washington, D.C. **September 2020 – October 2021**
AAAS Science and Technology Policy Fellow

Provided analysis on top national renewable energy priorities, managed national lab research, and responded to Congressional or DOE leadership information requests. Projects included energy justice, electric transmission planning, electricity markets, and demand-side grid modeling.

- Facilitated more than a dozen workshops with 50+ attendees each, which involved developing workshop materials and coordinating schedules.
- Authored two reports for Congress within a few months.
- Managed a dozen projects simultaneously across different research groups.
- Reviewed several dozen articles for leading power system journals.
- Developed a new energy justice roadmap project, which re-envisions a new suite of energy analysis tools focused on equity and justice.

Public Service Commission of Wisconsin, Madison, Wisconsin **January 2019 – August 2020**
Public Service Engineer

Spearheaded research projects and advised leadership regarding transmission planning and wholesale electricity market policies including issues with transmission planning, distributed energy resources, energy storage, and electric vehicles.

- Led multiple analyst and research projects.
- Advised Commissioners on transmission and renewable energy policy once per week.
- Wrote weekly internal policy memos to communicate transmission system material.

University of Wisconsin, Madison, Wisconsin **September 2015 – August 2020**
Graduate Research Fellow

Researched topics including electric power systems, electricity markets, optimal dispatch with variability, microgrids, renewable energy, and distributed energy resources. Oversaw a student project with the Midcontinent Independent System Operator (MISO) states to quantify the existence of distributed energy resources and to compare grid interconnection policies of other regional transmission organizations.

- Authored and published three peer reviewed papers and four conference papers.
- Led a weekly peer research group to produce a high quality report for a regulatory client.
- Coded for modeling research in four different programming languages.
- Reviewed several dozen articles for leading power system journals.

University of Arizona, Tucson, Arizona **May 2010 – September 2015**
Research Specialist

Led a team of eight students and post-graduate researchers. Installed and evaluated new photovoltaic (PV) systems throughout Southern Arizona, and analyzed system technologies for the benefit to electric utility companies, product developers, and the scientific community.

- Initiated 20+ different research projects to report performance and reliability measures of PV systems across Southern Arizona.
- Liaised with leaders of 12 utilities and solar energy companies to understand research needs.
- Authored four peer reviewed journal articles and 15 conference papers.
- Wrote three grant/contract applications awarding $395K to lab group.

Arizona Research Institute for Solar Energy, Tucson Arizona **January 2011 – May 2011**
Research Fellow

Developed research experiences that met industrial criteria for PV energy consumption in order to advise future commercial energy production for private companies.

- Created one semester of PV installer curriculum for Arizona Western College in Yuma, Arizona.
- Developed solar energy education outreach for secondary school students in Tucson including a six-week PV curriculum that meets Arizona science standards.

National Space Science and Technology Center, Huntsville, Alabama **June 2008 – August 2008**
Research Fellow

Conducted materials and electrical engineering experiments on ferroelectric circuit elements of space-compatible computer memory.

- Completed concept trade study for seismometer package on Lunar Lander.

Additional Experience

Engineering Intern, Semprius, Inc., Durham, North Carolina
Intern, National Renewable Energy Laboratory, Golden, Colorado
Environmental Conservation Intern, Student Conservation Association, AmeriCorps, Hawley, Massachusetts
Student Deputy Principal Investigator, Lunar and Planetary Laboratory, Tucson, Arizona

Education

Master of Science and Ph.D. in Electrical Engineering, August 2020
University of Wisconsin, Madison WI

Energy Analysis and Policy Certificate, December 2018
University of Wisconsin, Madison WI

Bachelor of Science in Engineering Physics, May 2011
University of Arizona, Tucson AZ

Publications

Technical Reports

[R1] **Brooks, A.E.** "Renewable Energy Resource Assessment Information for the United States." U.S. Department of Energy Office of Energy Efficiency and Renewable Energy (Mar 2022).

Textbook Chapters

[T1] **Brooks, A.E.,** "Solar Energy: Photovoltaics." *Future Energy, 2nd Ed*. Ed Trevor Letcher. New York: Elsevier, 2014. 383-404. Print.

Journal Articles

[J1] **Brooks, A.E**., Lesieutre, B.C. "The validity of a locational marginal price on variable power injections in energy and regulation markets." *International Journal of Electrical Power & Energy Systems*. Vol 121 (Oct 2020).

[J2] Zielke, M., **Brooks, A.E**., Nemet, G. "The Impacts of Electrical Vehicle Growth on Wholesale Electricity Prices in Wisconsin." *World Electric Vehicle Journal*. Vol 11, No. 2 (Apr 2020).

[J3] **Brooks, A.E**., Lesieutre, B.C. "A Review of Frequency Regulation Markets in Three U.S. ISO/RTOs." *The Electricity Journal*, Vol. 32, No. 10 (Dec 2019).

[J4] Barron-Gafford, G.A., Minor, R.L., Allen N.A., Cronin, A.D., **Brooks, A.E**., Pavao-Zuckerman M.A. "The Photovoltaic Heat Island Effect: Large solar power plants increase local temperatures." *Scientific Reports,* 6, Article No. 35070 (Oct 2016).

[J5] Lonij, V.P.A **Brooks, A.E**., Cronin, A.D., Leuthold, M., Koch, K. "Intra-hour forecasts of solar power production using measurements from a network of irradiance sensors." *Solar Energy,* Vol. 97 (Nov 2013): 58-66.

[J6] **Brooks, A.E**., Allen, N., Lonij, V.P.A., Cronin, A.D. "Evaluation of Four Geomembrane-Mounted PV Systems for Land Reclamation in Southern Arizona." *Journal of Energy and Power Engineering,* Vol. 7, No. 5 (May 2013): 834-840.

Conference Papers and Preprints

[C1] **Brooks, A.E**., Lesieutre, B.C. "RTO Frequency Regulation Market Clearing Formulations and the Effect of Opportunity Costs on Electricity Prices." arXiv:2001.11134 [esss.SY] (Jan 2020).

[C2] **Brooks, A.E**., Lesieutre, B.C. "A Locational Price for Power Injection Fluctuations of Variable Generation and Load." 10th IREP Bulk Power Systems Dynamics and Control Symposium, Espinho, Portugal, August 27-Sep 1, 2017.

[C3] Sehloff, D., Manur, A., **Brooks, A.E**., Venkataramanan, G., Lesieutre, B. "Solar Forecast Uncertainty Pricing and Optimal Scheduling with the Simple Electric Utility Platform (SUEP)." MCET Renewable Energy and Sustainable Environment Conference, Pollachi, India, July 20-22, 2017.

[C4] **Brooks, A.E**., Manur, A., Venkataramanan, G. "Energy Modeling of Aggregated Community Scale Residential Microgrids." IEEE International Conference on Sustainable Green Buildings and Communities, Chennai, India, December 18-20, 2016.

[C5] Lai, T., **Brooks, A.E**., Potter, B.G., Simmons-Potter, K. "Environmental Aging in Polycrystalline-Si Photovoltaic Modules: Comparison of Chamber-Based Accelerated Degradation Studies with Field-Test Data." SPIE Optics + Photonics for Sustainable Energy, San Diego, CA, August 9-13, 2015.

[C6] **Brooks, A.E**., Cormode, D., Cronin, A.D., Kam-Lum, E., "PV System Power Loss and Module Damage due to Partial Shade and Bypass Diode Removal Depends on Cell Behavior in Reverse Bias." 42nd IEEE Photovoltaic Specialists Conference, New Orleans, LA, June 14-19, 2015.

[C7] Della-Giustina, D., **Brooks, A.E**., St. Germaine, M., Patterson, S., Cronin, A. "Characterization and Use of a Sinton FMT-350 Flash Tester at the Tucson Electric Power Solar Test Yard." OSE Optics for Solar Energy Conference, Tucson, Arizona, Nov 3-7, 2013.

[C8] Cormode, D., Cronin, A.D., Richardson, W., Lorenzo, A.T., **Brooks, A.E**., DellaGiustina, D.N. "Comparing Ramp Rates for Large and Small PV Systems, and Selection of Batteries for Ramp Rate Control." 39th IEEE Photovoltaic Specialists Conference, Tampa Bay, Florida, June 16-21, 2013.

[C9] **Brooks, A.E**., DellaGiustina, D.N., Patterson, S.M., Cronin A.D. "The Consequence of Soiling on PV System Performance in Arizona; Comparing Three Study Methods." 39th IEEE Photovoltaic Specialists Conference, Tampa Bay, Florida, June 16-21, 2013.

[C10] **Brooks, A.E.**, Fijal, J. St. Germaine, M.T., Orsburn, S., Greenberg, J., Lonij, V.P.A., Della-Giustina, D.N., Cronin, A.D. "Conversion Efficiencies of Six Grid-Tied Inverters at the Tucson Electric Power Solar Test Yard." 39th IEEE Photovoltaic Specialists Conference, Tampa Bay, Florida, June 16-21, 2013.

[C11] Russo, J.M., Zhang, D., Vorndran, S., Gordon, M., Castillo, J., **Brooks, A.E.**, Lonij, V., Cronin, A., Kostuk, R. "Method for site characterization of anisotropic diffuse illumination of photovoltaic systems." SPIE Reliability of Photovoltaic Cells, Modules, Components, and Systems V Proceedings, San Diego, California, Aug 12, 2012.

[C12] **Brooks, A.E.**, Allen, N., Lonij, V.P.A., Cronin, A.D. "Evaluation of Four Geomembrane-Mounted PV Systems for Land Reclamation in Southern Arizona." 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, June 3-8, 2012.

[C13] Kopp, E.S., Lonij, V.P.A, **Brooks, A.E.**, Hidalgo-Gonzalez, P.L., Cronin, A.D. "I-V Curves and Visual Inspection of 250 PV Modules Deployed over 2 Years in Tucson." 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, June 3-8, 2012.

[C14] Hidalgo-Gonzalez, P.L., **Brooks, A.E.**, Kopp, E.S., Lonij, V.P.A., Cronin, A.D. "String-Level (kW-Scale) I-V Curves from Different Module Types under Partial Shade." 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, June 3-8, 2012.

[C15] Lonij, V.P.A., **Brooks, A.E.**, Koch, K., Cronin, A.D. "Analysis of 80 Rooftop PV Systems in the Tucson, AZ Area." 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, June 3-8, 2012.

[C16] Russo, J.M., Zhang, D., Gordon, M., Vorndran, S., Castillo, J.E., **Brooks, A.E.**, Lonij, V.P.A., Cronin, A.D., Kostuk, R.K. "Characterization of Diffuse Anistropic Illumination Effects to the Output of Bifacial and Holographic Planar Concentrating Photovoltaic Panel Configurations." 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, June 3-8, 2012.

[C17] **Brooks, A.E.**, Kostuk, R.K., Castillo, J.E., Lonij, V.P.A., Russo, J.M., Zhang, D., Vorndran, S., Cronin, A.D. "One Year of Field Studies of Holographic Planar Concentrators at the Tucson Electric Power Solar Test Yard." ASES World Renewable Energy Forum, Denver, Colorado, May 13-17, 2012.

[C18] Lonij, V.P.A., **Brooks, A.E.**, Greenberg, J., Orsburn, S., Cronin, A.D., Torres, G. "Field Performance Measurements of New and Traditional PV Technologies." ASES World Renewable Energy Forum, Denver, Colorado, May 13-17, 2012.

[C19] Cronin, A.D., Castillo, J.E., Hauser, P., Rosenberg, G.A., Kumar, R., Kostuk, R.K., Zhang, D., Russo, J.M., Vorndran, S., Lonij, V.P.A., **Brooks, A.E.** "Holographic CPV Field Tests at the Tucson Electric Power Solar Test Yard." 37th IEEE Photovoltaic Specialists Conference, Seattle, Washington, June 19-24, 2011.

[C20] Cronin, A.D., **Brooks, A.E.**, Cormode, D., Hardesty, G., Lonij, V.P.A. "Performance Reviews from the Tucson Electric Power Solar Test Yard." 37th IEEE Photovoltaic Specialists Conference, Seattle, Washington, June 19–24, 2011.

[C21] Ghosal, K., Burroughs, S., Lily, D., Gabriel, J., Cronin, A.D., **Brooks, A.E.**, Lonji, V.P.A., Krause, M.F., Lindsey, C., Metzger, S. "On-sun Performance of a Novel Microcell-Based HCPV System Based in Tucson: Comparison with Conventional Systems." 37th IEEE Photovoltaic Specialists Conference, Seattle, Washington, June 19–24, 2011.

Awards & Distinctions

Grainger Power Engineering Award University of Wisconsin-Madison, Madison WI (April 2019)

Graduate Research Fellowship Program National Science Foundation, Washington DC (March 2016)

Wisconsin Distinguished Graduate Fellowship University of Wisconsin-Madison, Madison WI (August 2015)

Bill of Rights Award American Civil Liberties Union of Tennessee, Nashville TN (December 2008)

NASA Motivating Undergraduates in Science & Technology Award University of Arizona, Tucson AZ (May 2008)

First Place in Undergraduate Engineering Research University of Arizona, Tucson AZ (April 2008)

Academic Distinction Award University of Arizona, Tucson AZ (October 2006)

Arizona Excellence Scholarship for Undergraduate Studies University of Arizona, Tucson AZ (August 2005)

Professional Activities

Memberships

- American Association of the Advancement of Science (2019 – present)
- IEEE Power and Energy Society & Women in Engineering (2019-present)
- Evergreen Data Viz Academy (2020-present)
- National Science Policy Network (2019 – 2020)

Activities

- Invited editor, IEEE and Elsevier on papers related to transmission planning and system modeling (2018-present)
- Diversity Equity and Inclusion in the Workplace Certificate, University of South Florida Muma College of Business (2021)
- Data Visualization for Storytellers short course, University of California Berkeley (2021)
- Influencing Virtually short course, Georgetown University McCourt School of Public Policy (2021)
- Mentor with TryEngineering (2019 – 2020)
- Televised interview with Arizona Public Media for "Metro Week: Solar Energy Advances in the Southwest" (June 2015)
- MSHA Part 46 Surface Miner Certification (2011 – 2013)
- Solar Energy International Solar Electric Design and Installation Workshop, Guemes Island WA (2011)

Grants & Contracts

- Photovoltaic Crystalline-Silicon System Field Performance Comparative Study, SunPower Corporation, $150,000 (2013)
- FRV PV Heat-Islanding Monitoring Project of Interest, Fotowatio Renewable Ventures, $100,000 (2012)
- Photovoltaic System Field Performance Comparative Study, Rosemont Copper, $145,000 (2011)

Leadership and Community Service Activities

- Teaching Assistants' Association South Central Federal of Labor Delegate (2018 – 2020), Co-President (2016 – 2018), departmental steward (2015 – 2020)
- *The WEMPECKER* (departmental annual satirical paper), Lead Editor (2016 – 2018)
- Mountain Vista Unitarian Universalist religious education Chairperson (2014) and Youth Director (2012 – 2014)
- EON Youth Lounge volunteer (2005 – 2006 and 2011 – 2014)
- Camp Wildcat Vice-Chairperson (2010 – 2011), Secretary (2007 – 2008), member and youth counselor (2005 – 2011)
- One-In-Teen Youth Services Board Member (2003 – 2005)

References

Ms. Michelle Manary

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Mr. Randel Pilo

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