

Mrs. Kelly Twomey Sanders

Graduate Research Assistant

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EDUCATION

- Ph.D., Civil, Architectural, & Environmental Engineering, expected December 2013, The University of Texas at Austin (Advisor: Professor Michael E. Webber)
Topic: *Strategies on using the energy-water nexus to achieve cross-cutting efficiency gains*
- M.S., Mechanical Engineering, 2010, The University of Texas at Austin (Advisor: Professor Michael E. Webber)
Thesis: *The Energy Water Nexus: An Examination of the Water Quality Impacts of Biofuels*
- B.S., Bioengineering Engineering (B.S. Minors: Engineering Mechanics and Kinesiology), 2007, The Pennsylvania State University, University Park, PA

ACADEMIC AND PROFESSIONAL EXPERIENCE

- Graduate Research Assistant, Cockrell School of Engineering, University of Texas at Austin, 2008 - present
- Summer Research Fellow, Congressional Research Service, Washington, D.C., 2009
- Software Engineer and Engineering Intern, REMCOM Inc., State College, PA, 2005 - 2008
- Undergraduate Research Assistant, Neil A. Sharkey, Ph.D, University Park, PA, 2007
- Undergraduate Research Assistant, James A. Pawelczyk, Ph.D, University Park, PA, 2007

HONORS, AWARDS, AND FELLOWSHIPS

- Nationally recognized in Forbes' Magazine's "30 under 30: Today's disrupters and tomorrow's brightest stars" feature (Published December 2012)
- National Science Foundation Graduate Research Fellowship (2009-2012)
- Article selected to appear in Environmental Research Letters' *monthly highlights* collection; downloaded over 2300 times in the first month of publication. (Sanders & Webber, "Evaluating the energy consumed for water use in the United States.")
- Best Student Paper Award at the 2010 ASME 4th International Conference on Energy Sustainability (Twomey & Webber, "The Cost of Food in a Carbon Constrained Economy")

PEER-REVIEWED JOURNAL ARTICLES

1. **K.T. Sanders** and M.E. Webber. (2013). "Evaluating the "true" cost of food in a carbon constrained economy." *Environmental Science & Technology*, in review.
2. **K.T. Sanders**, C.W. King, A.S. Stillwell, and M.E. Webber. (2013). "Clean Energy and Water: Assessment of Mexico for Improved Water Services and Renewable Energy." *Journal of Environment, Development, and Sustainability*, in press.
3. C.W. King, A.S. Stillwell, **K.T. Sanders**, and Michael E. Webber. (2013). "Coherence Between Water and Energy Policies." *Natural Resources Journal*, in press.
4. **K.T. Sanders** and M.E. Webber. (2012). "Evaluating the energy consumed for water use in the United States." *Environmental Research Letters*, 7(3), 1-11.
5. A.S. Stillwell, **K.M. Twomey**, R. Osborne, D.M. Greene, D.W. Pedersen, and M.E. Webber. (2012). "An Integrated Energy, Carbon, Water, and Economic Analysis of Reclaimed Water Use in Urban Settings: A Case Study of Austin, Texas." *Journal of Water Reuse and Desalination*, 1(4), 208-223.
6. **K.M. Twomey**, A.S. Stillwell, and M.E. Webber. (2010). "The unintended energy impacts of increased nitrate contamination from biofuels production." *Journal of Environmental Monitoring*, 12(1), 218-224.

PEER-REVIEWED CONFERENCE PROCEEDINGS

1. **K.T. Sanders**, A.K. Townsend, M. Blackhurst, and M.E. Webber. (2013). "Evaluating the role of water prices in reducing water use in the power sector: A case study of ERCOT." *Proceedings of the World Environmental & Water Resources Congress 2013*, May 19-23, 2013, Cincinnati, OH, USA. (accepted for publication; **Presenting Author**)
2. **K.M. Twomey**, S. Conover, and M.E. Webber. (2012). "Reducing Residential and Commercial Energy Consumption in the US: The Role of Water Heaters." *Proceedings of the ASME 6th International Conference on Energy Sustainability*, July 23-26, 2012, San Diego, CA, USA. (**Presenting Author**)
3. **K.M. Twomey** and M.E. Webber. (2011). "Evaluating The Carbon Embedded In The US Public Water Supply," *Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition*, November 11-17, 2011, Denver, CO, USA. (**Presenting Author**)
4. **K.M. Twomey** and M.E. Webber. (2011). "Evaluating the Energy Intensity of the US Public Water System." *Proceedings of the ASME 5th International Conference on Energy Sustainability*, August 7-10, 2011, Washington, DC, USA. (**Presenting Author**)
5. A. S. Stillwell, **K.M. Twomey**, M.E. Webber, R. Osborne, D.M. Greene, D.W. Pedersen. (2011). "An Integrated Energy, Carbon, and Economic Analysis of Reclaimed Water Use in Austin, Texas." *Proceedings of the 2011 World Environmental and Water Resources Congress*, May 22-26, 2011, Palm Springs, CA, USA. (**Presenting Author**)
6. **K.M. Twomey** and M.E. Webber. (2010). "Evaluating the Cost of Food in a Carbon Constrained Economy." *Proceedings of the ASME 4th International Conference on Energy Sustainability*, May 17-22, 2010, Phoenix, AZ, USA. (**Presenting Author**) [**Best Student Paper Award**]

7. **K.M. Twomey**, A.S. Stillwell, and M.E. Webber. (2009). "The Water Quality and Energy Impacts of Biofuels." *Proceedings of the ASME 3rd International Conference on Energy Sustainability*, July 19-23, 2009, San Francisco, CA, USA. **(Presenting Author)**
8. R. Belmonte, S.A. Fast, K. Keefe, and **K.M. Twomey**. (2007). "Clustering Analysis of Refractive Index Profiles: Toward a Ducting Climatology." *Proceedings of the 2007 IEEE Radar Conference*, April 17-20, 2007, Waltham, MA, USA.

TECHNICAL REPORTS AND WHITE PAPERS

1. C.W. King, **K.M. Twomey**, A.S. Stillwell, and M.E. Webber. (2011). "Clean Energy and Water: Assessment of Mexico for improved water services with renewable energy." International Development Research Centre, Ottawa, Ontario, Canada.
2. C.W. King, A.S. Stillwell, **K.M. Twomey**, and M.E. Webber. (2010). "Coherence Between Water and Energy Policies." Organisation for Economic Co-operation and Development. ENV/EPOC/GSP(2010)21, Paris, France.
3. N.T. Carter, **K.M. Twomey**, and A.S. Stillwell. (2010). "Energy's Water Demand: Trends Vulnerabilities, and Management," The Congressional Research Service, Washington, D.C., USA.
4. C.W. King, A.S. Stillwell, **K.M. Twomey**, and M.E. Webber. (2010). "A Survey of the Relationship of Water and Biofuels." prepared for ExxonMobil's Division of Corporate Strategic Research, Clinton, NJ, USA.

TECHNICAL COMMENTARY AND COLUMNS

1. **K.T. Sanders** and M.E. Webber. (2013). "Quantifying the Energy Embedded in the US Water System," Global Water Forum, published by the United Nations Educational, Scientific and Cultural Organization, January 7, 2013.
2. **K.M. Twomey**, C.M. Beal, C.W. King, and M.E. Webber. (2012). "Biofuels: An Energy and Water Conundrum," World Energy Monitor, 3(3), March 2012.
3. M.A. Sounny-Slitine, J.A. Alexander, **K.M. Twomey**, J. O'Rourke, P. Ward, E. Hershaw, S. Moorhead. (2012). "Adaptation to Climate Change: A prospective collaboration between the UT at Austin and Latin American institutions in Flood Control." Portal: LLILAS Annual Review, Teresa Lozano Long Institute of Latin American Studies, 6 , 26-29.

INVITED TECHNICAL PANEL PARTICIPANT

1. "Energy-Water Nexus." Clean Energy and Water International Workshop sponsored by the IDRC, September 23, 2011, Porto de Galinhas, Recife, Brazil **(Panel Moderator and Organizer)**
2. "Energy-Water Nexus." The Texas-Israel Cleanovation Conference, September 14, 2011, Houston, TX, USA. **(Panel Participant)**
3. "The Electricity-Water Nexus in Texas." US Department of Energy Gulf Coast Clean Energy Regional Applications Center's Roadmap Workshop, November 19, 2009, Austin, TX, USA. **(Panel Participant)**

INVITED TECHNICAL TALKS

1. "The role of solid waste management in energy and water conservation." Invited lecturer for GEO 4350: Solid Waste Planning and Management, Texas State University, January 29, 2013, San Marcos, TX, USA.
2. "The water-energy nexus and its relevance to drought." Drought Technology Steering Committee Meeting, December 10, 2012, via webcast.
3. "Quantifying the energy embedded in the US water system." Water-Energy Research Work Group Meeting, November 30, 2012, via webcast.
4. "The Nexus of Water and Energy." Total Energy USA Conference, November 28, 2012, Houston, TX, USA.
5. "The Energy-Water Nexus." Clean Energy-Factor: Women in Clean Energy, Hosted by the Austin Community College's Renewable Energy Student Association, April 11, 2012, Austin, TX, USA.
6. "The Energy-Water Nexus." Clean Energy Education for Veterans, Hosted by the Austin Community College's Renewable Energy Student Association, March 23, 2012, Austin, TX, USA.
7. "Water Quality Considerations in the Water for Energy Evaluation Framework." 6th World Water Forum: Key Priority 2.3 Harmonize Energy and Water, Target 4: Evaluation Framework for Energy and Water, September 30, 2011, Marseille, France.
8. "The Energy-Water Nexus in Mexico." Clean Energy and Water International Workshop sponsored by the IDRC, September 24, 2011, Porto de Galinhas, Recife, Brazil.
9. "The Energy-Water Nexus." Clean Energy and Water International Workshop sponsored by the IDRC, September 23, 2011, Porto de Galinhas, Recife, Brazil.
10. "Young Scientist's Event for Energy-Water Researchers." Union of Concerned Scientist's Webinar, June 9, 2011, via webcast.
11. "The Environmental Impacts of Renewable Fuel Production." Osher Lifelong Learning Institute's UT NOVA program, November 17, 2010, Austin, TX, USA.
12. "The Water-Energy Nexus in Texas." 2010 American Planning Association Meeting, October 7, 2010, San Antonio, TX, USA.
13. "The Energy-Water Nexus and its Impact on America's Future." 2010 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Winter Conference, January 23-27, 2010, Orlando, FL, USA.

INVITED OUTREACH PRESENTATIONS

1. "Introduction to Renewable Energy." Lecture to Garza High School, January 25, 2010, Austin, TX, USA.
2. "The Trade-offs Associated with Renewable Fuel Production." Mad Science Engineering Day hosted by North East Independent School District, November 13, 2009, San Antonio, TX, USA.
3. "Introduction to Energy." Texas Assessment of Knowledge and Skills Science Camp hosted by Round Rock High School, April 27, 2009, Round Rock, TX, USA.

CONTRIBUTED PAPERS, POSTERS AND PRESENTATIONS

1. **K.M. Twomey** and M.E. Webber. (2012). "Evaluating Regional Variations in the Energy Intensity of US Water Systems." *ASME International Mechanical Engineering Congress and Exposition*, November 9-15, 2012, Houston, TX, USA. **(Presenting Author)**
2. **K.M. Twomey**, A.S. Stillwell, C.W. King, and M.E. Webber. (2012). "Clean Energy and Water: Assessment of Mexico for Improved Water Services with Renewable Energy." *ASME International Mechanical Engineering Congress and Exposition*, November 9-15, 2012, Houston, TX, USA. **(Presenting Author)**
3. **K.M. Twomey** and M.E. Webber. (2012). "Evaluating the Energy Intensity of the US Water System." *International Water Association's World Congress on Water, Climate, and Energy 2012*, May 13-18, 2012, Dublin, Ireland. **(Presenting Author)**
4. **K.M. Twomey**, M. Clayton, C.W. King, A.S. Stillwell, and M.E. Webber. (2012). "The energy-water nexus: future opportunities and challenges." *Proceedings of Planet Under Pressure*, March 26-29, 2012, London, England.
5. **K.M. Twomey**. (2012). "The energy embedded in water." *Webber Energy Group Research Symposium*, January 12, 2012, Austin, TX, USA. **(Presenter)**
6. A.S. Stillwell, **K.M. Twomey**, M.E. Webber. R. Osborne, D.M. Greene and D.W. Pedersen. (2011). "An Integrated Energy, Carbon, and Economic Analysis of Reclaimed Water Use in Austin, Texas." *ASME International Mechanical Engineering Congress & Exposition*, November 11-17, 2011, Denver, CO, USA.
7. **K.M. Twomey**. (2012). "Reducing energy and carbon through water efficiency." *Webber Energy Group Research Symposium*, January 22, 2012, Austin, TX, USA. **(Presenter)**
8. **K.M. Twomey** and M.E. Webber. (2010). "The Unintended Energy Impacts of Increased Nitrate Contamination from Biofuels Production." *Ground Water Protection Council's Water Energy in Changing Climates*, September 26-29, 2010, Pittsburgh, PA, USA. **(Presenting Author)**

TEACHING AND MENTORING EXPERIENCE

- Teaching:
 - Teaching assistant to Professor Michael E. Webber for graduate level course, *ME397: Energy, Technology and Policy* in Spring 2013.
 - Teaching assistant to Professors Michael E. Webber, David T. Allen, and Thomas Edgar in *UGS 303: Energy, Environment and Society* in Spring 2009.
 - Teaching assistant to Professors Michael Webber and Philip Schmidt in *UGS 302: The Engineered World – Energy* in Fall 2008.
- Mentoring:
 - Mentor to Mechanical Engineering undergraduate research assistant, Susan Conover from January to August 2012.
 - Mentored elementary school, middle school and high-school aged students through frequent outreach events hosted by Webber Energy Group Outreach and Central Texas Discover Engineering. Participated annually in *FIRST LEGO League* mentoring and coaching, University of Texas at Austin's *Explore UT* event, and Women in Engineering Program (WEP) at UT Austin *Introduce a Girl to Engineering Day*.

MEDIA APPEARANCES FEATURING SANDERS' RESEARCH AND INTERVIEWS

- *Forbes*, Selected to appear in *Forbes' Magazine's "30 under 30: Today's disrupters and tomorrow's brightest stars"* feature. Published December 2012.
- *TechNewsDaily*, "How Droughts Can Cause Power Outages." F. Diep, November 16, 2012. (Sanders interviewed for story.)
- *US Water Alliance*, "Energy/Water Nexus." November 13, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Wichita Falls' Times Record News*, "Report links energy consumption, water use." October 31, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Energy Guardian*, "Study finds water uses more energy than lighting." October 31, 2012. (regarding publication "Evaluating the energy intensity of water in the United States")
- *Consumer Energy Report*, "Water Delivery Accounts for 12.6 Percent of U.S. Energy Consumption: Report." October 31, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Western Sustainability and Pollution Prevention Project*, "Water takes more energy than lighting." October 31, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Washington Post*, "13% of U.S.'s Energy Goes to Collect, Prepare Water, Study Shows." R. Hackley, October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Bloomberg and Bloomberg Businessweek*, "13% of U.S.'s Energy Goes to Collect, Prepare Water, Study Shows." R. Hackley, October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Houston Chronicle and San Antonio Express*, "Study: Water takes more electricity than lighting." M. Tresaugue, October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Water World*, "New UT report sheds light on nation's water-energy security goals." October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Texas Energy Report*, "Energy Burned for Water Uses Higher Than Some Realize." P. Hughs, October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *The Chairman's Block*, "Energy use for water nearly 13%." October 30, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Forbes*, "Study: The Best Way To Conserve Energy Is To Conserve Water." C. Helman, October 17, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Environmental Leader: Environmental & Energy Management News*, "Water 'Directly Responsible' for 12.6% of US Energy Use." October 4, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")

- *Scientific American: Plugged In*, "UT Austin: Over 12 percent of all U.S. energy consumption is directly related to water." D.M. Wogan, October 2, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Environmental Research Web*, "Can using water wisely trump better lighting?" L. Kalaugher, IOP Publishing, September 25, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Danish Broadcasting Corporation*, Interview with Lasse Engelbrecht Jensen, 2012. (regarding publication "Evaluating the energy consumed for water use in the United States.")
- *Huffingtonpost Green Blog*, "Who Says Oil and Water Don't Mix?" J. Lauria, September 8, 2011. (regarding Sanders' panel talk at the 2010 American Planning Association Meeting)
- *EU's Science for Environmental Policy*, "Unintended energy impact from bioethanol production." European Union's Directorate-General of the Environment, March 4, 2012. (regarding publication "The unintended energy impacts of increased nitrate contamination from biofuels production.")

LEGISLATIVE AND GOVERNMENTAL TESTIMONY *(given by Webber based on Sanders' research)*

- "Trends and Policy Issues For The Nexus of Energy and Water," M.E. Webber, Senate Energy & Natural Resources Committee Hearing, U.S. Congress, March 31, 2011.
- "The Nexus of Energy & Water," M.E. Webber, LCRA Board of Directors, Austin, TX, February 16, 2010.
- "The Nexus of Energy & Water," M.E. Webber, Hearing of the Great Lakes Commission, Erie, PA, September 30, 2009.
- "Trends and Policy Issues For The Nexus of Energy and Water," M.E. Webber, Senate Energy & Natural Resources Committee Hearing, U.S. Congress, March 10, 2009.

LEGISLATIVE AND GOVERNMENTAL BRIEFINGS *(given by Webber based on Sanders' research)*

- "The Nexus of Energy & Water," M.E. Webber, ACS Briefings for Congress (House Science and Technology Committee), Washington, DC, December 8, 2009.
- "Trends and Policy Issues for The Nexus of Energy and Water," M.E. Webber, Senate Energy & Natural Resources Committee staffer briefing, U.S. Congress, March 6, 2009.

CONSULTING

- International Research and Development Centre, Ottawa, Canada, February-December 2011
- Organization for Economic Cooperation and Development (OECD), Paris, France, May-December 2010
- ExxonMobil Corporate Strategic Research, Clinton, NJ, March-June 2010

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES

- American Society of Mechanical Engineers (ASME)
- American Society of Civil Engineers (ASCE)
- Association of Women in Energy (AWE)
- CleanTX Foundation