

# Thomas A. Deetjen

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The University of Texas at Austin, Department of Mechanical Engineering  
204 East Dean Keeton, Stop C2200, Austin, Texas 78712

## Education

- 2014- Ph.D. Candidate in Mechanical Engineering, The University of Texas, Austin, TX.  
Focus Areas: *Energy systems modeling, optimization and analysis; Renewable energy integration; Urban energy districts; Electricity markets*  
Advisor: Dr. Michael E. Webber  
Expected Graduation: May, 2018
- 2006-2010 B.S. Mechanical Engineering, Texas AM University, College Station, TX.  
Minor: German Language

## Academic experience

- 2014- Graduate Research Assistant, The University of Texas at Austin  
Conduct research in the Department of Mechanical Engineering under the direction of Dr. Michael E. Webber.  
Publish research in peer-reviewed academic journals and conference proceedings.  
Research topics:  
Energy systems modeling, optimization, and analysis  
Renewable energy integration into the electric grid  
Grid services from urban energy cooperatives and demand side management  
Electricity markets

## Professional experience

- 2012-2014 Mechanical Engineer, Project Manager  
James F. Turner Engineers  
Analyzed energy loads and equipment specifications to design commercial mechanical and plumbing systems.  
Coordinated designs and schedules with architects, contractors, and other engineers.
- 2011-2012 Mechanical Engineer  
Burns and McDonnell  
Utilized energy models and campus growth projects to design utility infrastructure expansion strategies.

Analyzed economic payback and feasibility of energy saving solutions including combined heat and power plant, thermal energy storage system, and utility plant equipment upgrades.

Designed central utility plant process and instrumentation control diagrams and equipment piping layouts.

Produced client reports and utility master plans detailing recommendations unique to each project.

## Fellowships, honors and awards

- 2014-2018 Virginia and Ernest Cockrell, Jr. Endowed Graduate Fellowship in Engineering, The University of Texas at Austin
- 2014-2016 National Science Foundation Integrative Graduate Education and Research Traineeship, The University of Texas at Austin
- 2014-2015 University of Texas Graduate School Fellowship, The University of Texas at Austin
- 2008-2010 Mollie and Jim Schulze '50 Mechanical Engineering Scholarship, Texas AM University
- 2007-2010 Alice and Erle Nye '59 ESP Engineering Scholarship, Texas AM University
- 2006-2010 C. J. Red Davidson Scholarship, Texas AM University
- 2008-2009 FMC Technologies Engineering Scholarship, Texas AM University
- 2008-2009 Academy for Future International Leaders Study Abroad Scholarship, Texas AM University
- 2007-2008 Engineering Dean's Honor Award for Outstanding Academic Achievement, Texas AM University

## Language skills

English native speaker

German limited working proficiency (ILR Scale)

## Publications

### PEER-REVIEWED JOURNAL ARTICLES

**Thomas A. Deetjen**, J. Scott Vitter, Andrew S. Reimers, Michael E. Webber. Residential central utility plant optimization for reducing neighborhood system costs and grid flexibility requirements. *Energy*, in production.

**Thomas A. Deetjen**, Henry Martin, Joshua D. Rhodes, Michael E. Webber. Modeling the optimal mix and location of wind and solar with transmission and carbon pricing considerations. *Renewable Energy*, in production.

**Thomas A. Deetjen**, Joshua D. Rhodes, Michael E. Webber. The impacts of wind and solar on grid flexibility requirements in the Electric Reliability Council of Texas. *Energy*, in review.

Tong Zhang, Ross Baldick, **Thomas Deetjen**. Generation Planning Using a Modified Screening Curve Method to Account for Planned Outage. *IEEE Transactions on Power*

*Systems*, in review.

**Thomas A. Deetjen**, Jared B. Garrison, Joshua D. Rhodes, Michael E. Webber. Solar PV integration cost variation due to array orientation and geographic location in the Electric Reliability Council of Texas. *Applied Energy*, 180 (2016): 607-616.

Tong Zhang, Ross Baldick, **Thomas Deetjen**. Optimized generation capacity expansion using a further improved screening curve method. *Electric Power Systems Research*, 124 (2015): 47-54. .

#### CONFERENCE PROCEEDINGS

**Thomas A. Deetjen**, Michael E. Webber. Costs Associated with Grid-Level Solar Integration. *World Energy Engineering Congress Proceedings*, Chapter 129 (2016).

#### OTHER PUBLICATIONS

N. Mann, C. Tsai, G. Gulen, E. Schneider, P. Cuevas, J. Dyer, J. Butler, T. Zhang, R. Baldick, **Thomas A. Deetjen**, R. Morneau. Capacity Expansion and Dispatch Modeling: Model Documentation and Results for ERCOT Scenarios. *A Report for the Energy Institute at The University of Texas at Austin*, 2016.

## Presentations

#### INVITED TALKS

The effects of increasing solar capacity on grid flexibility requirements. Presentation for The Electric Reliability Council of Texas (ERCOT), Austin, Texas, August 2016.

Challenges for grid-level solar integration: generator dispatch concerns and possible solutions. Presentation for UT Energy Symposium: Student Research Showcase, The University of Texas, Austin, Texas, April 2016.

Considerations for integrating large amounts of photovoltaic generation in the grid. Presentation for The Electric Reliability Council of Texas (ERCOT), Austin, Texas, March 2016.

What causes blackouts and how a highschool in a developing country can avoid them . Presentation for Ann Richards School for Young Women Leaders, Austin, Texas, March 2016.

Solar PV integration cost variation due to array orientation and geographic location. Poster presentation. Graduate Student Recruitment Week, The University of Texas at Austin, March 2016.

Considerations for integrating large amounts of photovoltaic generation in the grid. Presentation for Webber Energy Group annual research symposium, The University of Texas, Austin, Texas, January 2016.

Entropy relations and isentropic processes. Substitute lecturer for undergraduate thermodynamics course, The University of Texas, Austin, Texas, October 2015.

Solar PV integration in ERCOT and a comparison between German and Texan electricity markets. Presentation for ‘Lehrstuhl für Energiewirtschaft’ Research Group, Universität Duisburg-Essen, Essen, Germany, June 2015.

Solar PV integration in ERCOT and a comparison between German and Texan electricity markets. Presentation for ‘Lehrstuhl für Erneuerbare und Nachhaltige Energiesysteme’ Research Group, Technische Universität München, Munich, Germany, June 2015.

#### CONFERENCE PRESENTATIONS

Optimizing regional wind, solar, and transmission development to balance system cost, carbon emissions, and flexibility requirements: a German market case study with Texas market comparisons. Conference presentation. International Conference on the European Energy Market, June 2017.

Costs associated with grid-level solar integration. Poster presentation. World Energy Engineering Congress, September 2016.

Solar PV integration cost variation due to array orientation and geographic location. Poster presentation. American Association for the Advancement of Science Annual Meeting, February 2016.

## Grants and Funding Proposals

- 2016 Exxon Mobil, 1-year, \$140k contract  
Helped to develop Scope of Work document for contract.
- 2015 Electric Reliability Council of Texas, 5-year, \$500k contract  
Helped to develop Scope of Work document for contract.  
Participated in networking with potential donors.

## Service to the profession

#### RESEARCH COLLABORATION

- Jan - Mar 2017 Participated in joint research project for conference presentation and paper with the Technical University of Munich  
Collaborated with researcher at the Technical University of Munich.  
Converted Texas electricity model to German electricity model for analysis and comparison (see European Energy Markets conference presentation in “Conference presentations” section)
- Jan - Apr 2016 Oversaw Masters Thesis project, The Technical University of Munich  
Hosted masters student from the Technical University of Munich for 4 months.  
Directed research project and publication of study.

- 2015–2016 “Full Cost of Electricity Project”, The Energy Institute, The University of Texas at Austin  
Utilize model simulations to quantify renewable energy integration costs.  
Assist in writing reports and presentation material.
- 2015–2016 Integrative Graduate Education Research Traineeship, National Science Foundation, The University of Texas at Austin  
Attend weekly meetings to discuss smart grid technology and policy issues.  
Participate in outreach opportunities to promote public science engagement.
- 2015–2016 Micro-grid Research Team, The University of Texas at Austin  
Attend monthly meetings to discuss micro-grid technology and policy issues.

VOLUNTEERING AND OUTREACH

- 2016 Poster Competition Judge, Student Engineering Council: Poster Exhibition on Engineering Research, The University of Texas at Austin  
Observed research poster presentations by undergraduate engineering students. Graded the students based on their technical achievement, presentation, and communication.
- 2016 Research Abstract Reviewer, Energy Week Conference, The University of Texas at Austin  
Volunteered to review and grade abstract submissions for annual energy conference.
- 2015–2016 Science Outreach Volunteer, Integrative Graduate Education Research Traineeship, The University of Texas at Austin  
Volunteered at community events to illustrate energy fundamentals.
- 2007–2010 Director and organizer, Spencer Leadership Conference, Texas AM University  
Organized four-day conference for college sophomores focused on leadership growth.  
As Conference Chair (‘09-‘10), managed eight-person director staff by setting deadlines, delegating responsibilities, facilitating communication and running meetings; promoted conference to donors, speakers and contributors.

CONFERENCES ATTENDED

- 2016 World Energy Engineering Congress
- 2015–2016 American Association for the Advancement of Science Annual Meeting
- 2015–2016 American Society of Mechanical Engineers International Mechanical Engineering Congress and Exposition
- 2015 International Conference on the European Energy Market