Trip Report: Summer 2014 in Munich, Germany

1 Goals

Germany hosts the world’s largest installed based of solar photovoltaic (PV) generating capacity and recently closed all of its nuclear power facilities. As someone who researches sustainable grids, the foremost aim of my summer in Munich was to engage in discussions about the dynamics of Germany’s power sector with everyone from academics to ordinary German citizens lounging in a park. Further, I intended to exchange ideas with industry workers and researchers at conferences, as well as at TUM. I also desired to enable self discovery and growth by forcing myself out of the comfort zone I have established in Austin.

2 Conferences

2.1 Cleantech Forum Europe 2014

This conference was hosted by the CleanTech Group (CTG) in Stockholm, Sweden. CTG is a matchmaking organization that aims to connect cleantech startups with large corporations (looking to buy technology) or venture capitalists (looking for strategic investments). Most of the presentations were actually “pitches”; in other words, technological details were typically overlooked in favor of marketing. Even so, I enjoyed learning about innovations in the cleantech space in Europe.

Since I volunteered at the event, I was able to interface with other energy enthusiasts (mostly students) who volunteered for the event from all over the world. This group of volunteers provided a platform to engage in conversations about how to address future energy needs. My favorite panel was the one about the future of utilities, which was coincidentally hosted by Opower (my future employer). I was able to meet two senior managers based out of Opower’s London office at the event; not only was this a good networking opportunity, but also provided me with insight on energy efficiency and utility customer engagement in Europe. Finally, the conference banquet was especially enjoyable; it was held in the Blue Hall, which is the location of the annual Nobel Prize banquet.

2.2 European Energy Markets 2014

This conference took place in Krakow, Poland and covered a broad range of topics – from policy and economics to controls and optimization – related to energy markets. I especially enjoyed the presentations about market coupling;
although power is exchanged among various EU countries, most of them have country-specific, rather than regional, markets. In addition, due to the EU20/20 directive (20% renewables by 2020), the integration of renewables was an extensively covered topic.

I found that most of my questions fell on deaf ears, however, because ERCOT is actually quite progressive in its market operation. For example, most EU countries still utilize zonal, rather than nodal (i.e. considering transmission constraints), pricing. In fact, in one of the sessions, ERCOT was highlighted as a model market. Further, folks approached me and another student from America to ask questions about the roll-out of smart meters in some parts of the US.

Outside of the conference, I was able to interact with a fantastic group of students with varying backgrounds in economics, finance, policy and engineering. We further discussed the topics covered at the conference, and exchanged ideas related to differences between our countries’ energy strategies.

2.3 IGSSE

This conference took place in Burghausen and was the first time that all of the IGERT students came together. It was very nice to see everyone and hear about their respective experiences at conferences all over Europe!
The conference itself wasn’t autonomously valuable; that is, the presentations and group activities provided little insight. Unfortunately, IGERT posters were not included in the competition, either, which means few people asked questions about our research topics. I did enjoy talking with the folks who stopped by my poster and expressed interest in learning more about the content.

Rather, the relationships forged with IGSSE students from TUM, as well
as architecture students interested in sustainable building from UT, were the valuable takeaways from the experience. In particular, I became better friends with one of the people who lives in my four-plex in Austin. We first recognized one another when boarding the bus to Burghausen, and later figured out that we are neighbors! Further, the IGERT group became friends with an IGSSE student named Gaetano who later led us on a hike in the Garmisch region of Germany.

Finally, it was helpful to interact with Petra Liedl, who is a new architecture professor at UT. She is very passionate about sustainability, and I would recommend that IGERT develop its relationship with her. Specifically, she is involved with the Solar Decathlon, which is an activity that IGERT students might find rewarding.

2.4 PEDG2014

This conference took place in Galway, Ireland which is directly west of Dublin; in other words, it is on the Atlantic Ocean rather than on the Irish Sea. The presentations at the conference were extremely technical and controls-oriented. Most of the students and professionals in attendance were power electronics experts, and thus electrical engineers. I felt a bit out of place, but luckily my presentation was well-received. In fact, three folks from the United Technologies Research Center approached me after my talk and disclosed that it was the best they had seen for the entire conference. It took the rest of the day for me to stop glowing from that comment!
The keynote presentations were more relevant than the down-in-the-details presentations. Specifically, one of the keynotes covered the topic of “electric springs,” which are devices that enable non-essential loads to undergo demand response and act as grid balancers (both from a voltage and frequency perspective). The electric spring is based on a similar idea as my research: utilizing existing assets to help stabilize the grid.

I addressed a question to the keynote speaker pertaining to the financial model around the electric spring and was later approached by a man who told me about a company called Enbala. Enbala is a demand-side energy management establishment headquartered in Canada with a US office in Pennsylvania. I was e-introduced to the CTO of Enbala, and am planning to discuss the company’s technology and business model in more detail with him later in July, 2014.

I was also fortunate to meet the inventor of the electric spring, who explained that he is teaming with China Power & Light on the recommendation of Google, who suggested that US markets would be ill-suited for his innovation. Supposedly, China Power & Light only recently made plans to roll out the electric spring technology after Exxon divested its considerable stake in the electric utility. The influence of oil and gas giants never ceases to amaze me.

Finally, I was thoroughly amused by the following slide in one of the presentations, which describes the issues were are addressing as IGERT students.
3 TUM & GE

I interacted with a TUM professor named Dr. Ralph Kennel during my time in Munich. Dr. Kennel is a member of TUM’s Institute for Electrical Drive Systems and Power Electronics, so his research interests and expertise jived with my mine. During our initial meeting, he invited me to attend his monthly student seminar, which was happening later that day. I attended this seminar at which all of Dr. Kennel’s students provided updates on their research. It was at this event that I learned the German way of applauding, which entails knocking your knuckles on the table rather than clapping.

Further, Dr. Kennel provided contact information for one of his collaborators, a GE research scientist named Dr. Pierluigi Tenca. GE has a global research center in Munich (the other one is in Niskayuna, NY); in fact, the office is blocks away from TUM’s north campus. I met with Dr. Tenca and we had a fantastic discussion about the future of electric drive systems and the role that power electronics will play. We also spoke about the culture around energy efficiency in Europe versus in America. Finally, we discussed the role of shales gas and its impact on the deployment of renewables.

Following the meeting with Dr. Tenca, I took the opportunity to test out the infamous TUM slide.
4 Hiking in the Alps

Hiking in the Alps was my personal favorite part of the trip. I went on three different excursions, and each time I was humbled by the expansiveness of the mountains. There is so much natural beauty around the German-Austrian border, and I’m fortunate to have had the chance to experience it.

In particular, Kate and I visited a mountain “hutte” (cabin) in Berchtesgaden National Park. No tent camping is allowed in the park, so hikers utilize these cabins instead; sometimes, hikers exist in the mountains for days or even weeks as they hop from cabin to cabin. The one that Kate and I visited took us 3.5 hours and one kilometer of vertical climbing (including 36 switch backs) to reach. Due to its remoteness, the cabin’s food supply arrives by helicopter, and power must be generated onsite. Specifically, solar panels cover the roof of the cabin, and a battery in the basement stores solar generation for use at nighttime.
On a separate trip, Gaetano (the IGSSE student) took the entire IGERT group on a hike in the Garmisch region. I enjoyed this opportunity to bond with the other IGERT students. Further, the trail included a portion with
waterfalls and otherwise rushing water where we saw decommissioned hydro-
power generating equipment.

5 Other sightseeing

I visited numerous museums with various IGERT students throughout my time in Germany. In particular, the Duetsches Museum had an incredible collection of equipment related to energy and transportation. With so many vintages of equipment on display, it was easy to see rapid technological progressions. In particular, the juxtaposition of some of the oldest power generating devices with the exhibit on clean energy (including nuclear and renewables) was striking.

Further, Kate and I visited the modern art museum and were amused by a cartoon about global warming.
Watching the Germany v. Ghana World Cup match at Olympiapark (the stadium where the Olympics were held) was also a blast! A big screen was placed in the center of the stadium, and fans with patriotic gear screamed at the top of their lungs. The energy in the stadium was electrifying.
Finally, I happened to be visiting Munich with the two girls (Kate and Kristen) with whom I typically boulder, which is a free-form version of rock climbing. Unfortunately, none of us were able to climb outdoors, but Kristen and I visited one of the largest climbing gyms (by square footage) in the world!

6 Conclusion

My summer experience in Munich met and exceeded my expectations. I was thrilled by the friendliness of the German people, and their willingness to engage in political (including energy policy) discussions. The conferences I attended provided a good mix of industry and academic perspectives, and I was fortunate to meet influential people. Finally, I was so happy to have the company of such an open-minded, intellectual, and nature-loving group of students as those in IGERT; I would go so far as to say I’m sad I wasn’t able to bond with them more closely before this trip.

Thanks to IGERT for sponsoring the summer program. The opportunity to take a fully-funded trip to Europe is rare; in that sense, I treat it as an incredibly generous gift.