**Undergraduate and Graduate Syllabus**

**CFAN 3520/ CFAN 5520 “Germany: Leading the Renewables Revolution”—an embedded fall course and winter-term study abroad experience in Germany**

**What:** intensive study abroad seminar to experience Germany’s globally inspiring energy transition

**Target group:** There will be 15-22 undergraduate students from across the University of Minnesota system campuses (Twin Cities, Duluth, Morris, Crookston, Rochester); sophomores to seniors; at least 18 years old at time of departure. Course also open for up to 5 students from other colleges in MN. The graduate offering of this course will include 1-5 graduate students. Total student target number: 15-25 students

**Instructors:** Sabine Engel, PhD, director for international partnerships, Institute on the Environment, U of M; PI on energy policy grants with German government (2011-2013; 2014-2015; 2016; 2017; 2018); PI on Climate-Smart Municipalities project with German government and 12 cities in MN and Germany (2016-2020). Native German speaker. Former director of the U’s DAAD Center for German & European Studies (Dec. 2006-May 2014); program organizer and U of M leader for 18 delegations to Germany of MN legislators, government officers, and representatives from the private and nonprofit sectors. Access to a very strong and deep network of partners in Germany.

Beth Mercer-Taylor, J.D., sustainability education coordinator, Institute on the Environment, U of M

Assisting Instructor: Troy Goodnough, sustainability director, University of Minnesota Morris

**When:** J-Term 2020. January 7 -19, 2020 [depart US on Jan. 7 for arrival in Europe on Jan. 8; leave Germany on Sunday, Jan. 19, for same day arrival in USA]. 10 full class days: Jan. 8-Jan. 18. In addition 3 one-day workshops prior to departure.

**Credits:** 3 credits, embedded course

**Where:** North Rhine-Westphalia (NRW), Germany. Visits to Duesseldorf, Saerbeck, Muenster.

**German partners:** Program partners-- award-winning climate-smart City of Saerbeck; University of Applied Sciences Muenster (senior faculty member and international office); NRW State Ministry for Environment, Agriculture, Nature Protection and Consumer Protection (MKULNV); NRW State Ministry for Economic Affairs, Innovation, Digitalization, and Energy [all confirmed]

**Background:**

A special relationship between Minnesota and NRW allows multi-stakeholder collaboration on renewable energy.
For the past eight years, the University of Minnesota has organized a high-level policy exchange with Germany’s federal government on renewable energy policy and Germany’s ambitious energy transition (80% renewables by 2050). To date, more than three dozen bipartisan members of the MN state legislature and MN commissioners as well as representatives for MN utilities, NGOs and U of M leaders have traveled to Germany as part of the program. Beginning right after the 2011 nuclear accident in Fukushima, Japan, the policy exchange has allowed MN leaders a firsthand view of the massive restructuring effort of a major world economy. Minnesota’s solar energy legislation of 2013 is among the lasting and most visible direct outcomes. In December 2013, Minnesota signed an agreement with the NRW Ministry for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection (MKULNV) to cooperate on renewable energy and energy efficiency. In October 2015 and at the suggestion of MKULNV, Minnesota Governor Dayton signed the Under 2 MOU, recommitting the state to limiting the impact of climate change and collaborating on actions to promote adaptation and resilience. In 2018, Minnesota’s Department of Commerce renewed its agreement with NRW.

Minnesota’s most recent state election results are adding additional momentum to the state’s special relationship with Germany. Governor Walz’s new cabinet includes Steve Kelley and Larry Herke. Both have been close partners in the exchange with Germany and are committed to continuing their involvement also in their new roles. [for an assessment of the renewable energy exchange, see the attached Star Tribune editorial commentary “Leaders Can Gain Much From Looking Beyond Their Horizon—What We Gained From ‘How Germany Does it,’” Nov. 22, 2015.]

MN and NRW states have built organizational structures and instruments to support and accelerate the adoption of economically beneficial energy strategies. Both states embrace a culture of collaboration that allows multiple stakeholders to work together for maximum individual benefit. Both states have large geographic footprints and extensive rural areas.

Expanding the dialogue to our students as the generation of future leaders

With the proposed study abroad experience, we would like to expose students to this bi-national dialogue, to highlight the systems approach underlying Germany’s energy transition, and to allow students to experience and understand the energy transition as a project that ties together social, technical, and political issues and requires collaborative leadership across those divisions.

We will involve students from across the U of M system

Institute on the Environment (IonE) is a system-wide research entity that brings multiple disciplinary perspectives to bear on environmental topics. We would like to use this student experience to generate stronger collaborative relationships between the system campuses and to tap and highlight especially the sustainability focus of the Morris campus.

Since 2014, IonE has involved UMM in the energy policy exchange project with Germany. In October 2015, the City of Morris signed a cooperation agreement with the award-winning climate-smart City of Saerbeck in NRW. The close connections between the City of Morris leadership and UMM Vice Chancellor on energy efficiency and renewable energy and the proximity to advanced research facilities and personnel prompted the German city to enter into the agreement. Morris and Saerbeck are core twinned cities in the IonE “Climate-Smart Municipalities” research project. In 2017 and 2018, students from the UMM campus participated in the student delegation. In 2017, five students from the Duluth campus participated. We are committed to involving strong cohorts from the core campuses involved in the Climate-Smart Municipalities project: Twin Cities, Duluth, Morris. We are also committed to leveraging this study abroad experience into opportunities for international internships for student
delegation members. The January 2018 study abroad course segment opened the door for two UMTC undergraduates to do internships with our partners at University of Applied Sciences Muenster in summer 2018.

Energy Transition in Germany:

Germany and the Scandinavian countries have a long track record as sustainability leaders—from creating comprehensive recycling programs to embracing energy efficiency to replacing fossil with renewable fuels to building large public transportation systems. There is majority support in the public for “green” technologies and for finding effective ways to reducing the climate impact of a large industrial society. In summer 2011 and reacting to massive political pressure from the citizenry to immediately exit nuclear power, Germany’s conservative government under Chancellor Angela Merkel announced the energy transition. The country would exit nuclear power by 2022. It would dramatically increase the percentage of renewables in the electricity mix (80% renewables by 2050). It would establish milestones to successively reduce greenhouse gas emissions by 80% compared to 1990 levels. Germany, in effect, is a live laboratory for a broad technological and social transformation that requires new kinds of collaboration between established actors.

This study abroad course introduces students to the political, social, and technological settings within which the transformation to a market-based green economy takes place. Students will meet with the full range of stakeholders and agents—in politics, government, the private sector, research and education, and civil society. They will also visit sites that model Germany’s integrated approach to the energy transition. The primary site is the award-winning small city of Saerbeck in rural North Rhine-Westphalia (NRW). Saerbeck’s city leadership embraces broad-scale collaboration, partners with regional and national applied research institutions on new advances in renewable energy storage, combined heat and power, solar and wind power, and the electrification of transportation. In October 2015, Saerbeck began a technical partnership with the City of Morris, Minnesota, and UMM to cooperate on measures that reduce the communities’ carbon footprints and generate economic benefits. This study abroad course takes advantage of an international agreement between the state of Minnesota and the state of North Rhine-Westphalia to work together on best practices in renewable energy and energy efficiency. Students will have a unique opportunity to experience Germany’s accelerating energy transition. To foster bi-national learning, they will also generate reports to the German partners on the status of Minnesota’s energy transition.

Strong institutional partners in Germany

We will be able to draw on strong institutional partners in Germany representing government (state and local), politics, education and research, the private sector, and civil society. We have secured commitments from these partners to share their perspectives with our students:

- NRW state ministry for Environment, Agriculture, Nature Protection and Consumer Protection (MULNV)
- NRW state ministry for Economic Affairs, Innovation, Digitalization, and Energy
- NRW EnergieAgentur
- City of Saerbeck (mayor and technical director for city’s integrated climate protection and energy agenda)
- University of Applied Sciences Muenster (International Office; Prof. Christoph Wetter, Department of Energy, Building Services, and Environmental Engineering)
- NRW state legislators USA group (group of about 40 current state legislators who are active supporters of continued strong relations to the USA)
STUDENT CONTACT TIME

Workload expectations: 3 semester credits. For undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade in the course. For example, a student taking a three credit course that meets for three hours a week should expect to spend an additional six hours a week on coursework outside of the classroom.

CFAN 3520/ CFAN 5520 is considered a Fall Semester Embedded Course. There will be 22.5 hours of classroom instructional time in Minnesota, in the form of three, full-day Saturday 7.5 hour in-person (or by participation via web-ex for those outside Twin Cities campus location) classroom-based meetings, on Nov 9, Nov 23 and Dec 7, from 9am-4:30 pm, at Institute on the Environment (IonE) “Board Room,” R370, Learning and Environmental Sciences (LES) Building, 1954 Buford Ave. St Paul MN 55108. These campus-based preparatory sessions will be followed by the 12-day study abroad portion of the program, in Germany from Jan 7-19, 2020. The Germany in-country contact time will include 10 days of substantive content of more than 5 hours per day, divided into 1) 37 hours of “classroom instructional time” in the form of briefings, lectures and student presentations and 2) 21 hours of “field instructional time” in the form of energy facility excursions, cultural visits, museum and architecture tours and debriefings.

Total academic course time: **126.5 hours**, including
- **80.5 hours of on-campus and in-country direct instructional time** (22.5 + 58 = 80.5)
  - On-campus fall semester direct instructional time - **22.5 hours**
  - In-country direct instructional time (January 2018) - **58 hours** (37 + 21 = 58)
    - 37 hours of classroom instruction (generally 3-4 hours per day)
    - 21 hours of outdoor field instruction, substantive field excursions and guided museum tours
- **46 hours for student work** including reading, research and completion of assignments
  - On-campus workshop readings and mini research paper - 12 hours
  - In-country - 18 hours
    - Daily journals, required for 10 of 12 days in country - 10 hours
    - Day-to-day questions for next day development & preparation - 5 hours
    - Research, interviews, discussion with instructors for final research paper topic approval - 3 hours
  - Post-travel - 16 hours
    - Research paper research, writing, bibliography, map/chart - 12 hours
    - Preparation for, presentation of, documentation of a short talk - 4 hours

Note that required dinners, travel time to and within Germany with the instructors as well as culturally important time in Germany that is not directly part of the substantive energy component of the course is not included in the hours above.

Graduate Offering

The graduate students enrolled in this course will be held to graduate-level expectations, in the context of a course enrolling predominantly undergraduates. For graduate students, the level of academic effort, learning outcomes, analytical capability and professional development expected are described here.
Graduate students will participate in and an enhanced role in all workshops and in-country activities, which means preparing for and asking questions each day. They may be asked to prepare short special topic briefings for the German ministry partners. They will also need to complete all academic work with the focus, thoroughness and accuracy appropriate to the graduate level, meaning their work indicates what is labelled a “capstone,” or 4 on a 1-4 scale, level of achievement, as described in the Association of American Colleges and Universities (AACU) Critical Thinking VALUE rubric: https://www.aacu.org/sites/default/files/files(VALUE/CriticalThinking.pdf

Graduate students will be expected to complete a well-researched and professionally presented final paper and to write a final reflection essay on the course experience and on their own professional development. This essay will afford graduate students a chance to offer their insights and suggestions with regard to the course substantive content and pedagogy and to outline steps for their own professional development in the area of energy transition work and research.

Graduate students will be expected to **take initiative in their own learning**, specifically by integrating their own discipline or area of study into the course content, by:
- Writing a **two page introductory briefing paper** for our German partners to learn about the focus of their graduate study, whether in terms of research, method or practical application, as it relates to the German-Minnesota energy policy exchange;
- Creating and presenting, for one or more of our professional meetings, a **5-slide powerpoint** on the connection between their research and the German-Minnesota energy policy exchange;
- **Preparing well-researched and engaging questions** connected to their own interests and to the content of our professional meetings, for 10 of the 12 days in Germany, noting the responses to the questions in their daily journal;

Graduate students will be invited, but not expected to and not graded on, providing leadership to the undergraduate students by:
- at each group dinner, offering reflections on the responses to their own question(s) posed at each day’s professional meetings (i.e. restating what they had asked and what they heard in response, along with their own critique or context that might be helpful); and
- holding an optional discussion circle with students interested in pursuing graduate study or research.

**Graduate Grades:** Students may earn a possible total of 100 points. Graduate level work is noted, but the structure and weighting of assignments follows the same pattern, but at a higher level of work and expectation, as for undergraduates.

**Class Participation (Minnesota workshops; Germany seminar and site visits) - 20 points:** As with undergraduates, graduate students earn points for constructive participation. Graduate students will also be expected to ask daily prepared questions, as indicated. They will not be graded on, but will be invited and encouraged to, offer reflections at group dinners, and to host a discussion circle on graduate study and research.

**Daily reflection journal while abroad – 10 points:** All students will receive points for a daily page of journal reflection. Graduate students will be expected to reflect on answers to their prepared questions and, along with the undergraduates, to undertake writing, sketching and/or photography about substantive topics read or discussed, cultural experiences and intercultural observations.

**2 page introductory briefing paper, accompanying 5 slide presentation [graduate level] and 2 page mini-research paper – 20 points:** Graduate students will integrate their own work with the energy
exchange in their 2 page briefing paper, and write an additional 2 page mini-research paper on the same topic as the undergraduates are assigned, related to Minnesota’s energy system, political dynamics and the German context. These papers will be included as background material on the course website and provided to German guest speakers and hosts. Assignment announced at first workshop in Nov., due prior to travel.

Final paper (8 pages) and Reflection Essay (4 pages) – 40 points: The final paper will be shaped by group work done in Germany, which will inform Minnesota’s energy transition in Morris and other “climate smart” municipalities. The final paper will be on an individual research topic that must apply to the energy transition in both Minnesota and Germany and be approved by the instructor. Graduate students must also write a reflection essay reflecting on course content and pedagogy, offering suggestions with regard to the undergraduate final paper topic ideas and outlining steps for their own professional development. Completed after Germany experience; tentative due date: Feb. 19, 2019

On-campus public research presentation on final project – 10 points: Students will present their research to faculty, staff, and other students at a special event that involves the U’s Energy Transition Lab, IonE, CERTS, and the campus sustainability coordinators

Learning Outcomes:
By the end of the course students should substantively understand:

- The basic concept of Germany’s energy transition as a comprehensive societal transformation that is only partly about technology
- the various technologies that need to be combined across sectors to achieve a sustainable, secure, and affordable energy system
- the need to invest in multiple and parallel new technologies
- the differences between the energy system in the USA and Germany
- the levers for action in a democratic system and the crucial role of citizens
- the history and status of Minnesota’s efforts to advance renewable energy

Additionally, students will learn habits of mind that are crucial to grappling with complex societal challenges. They will:

- develop an understanding of competing social demands and interests and ask questions that emphasize social justice issues
- see and evaluate projects that connect policy and practice
- develop a better understanding of why and how cultural differences enrich solutions to complex problems
- practice effective communication skills in writing and speaking assignments
- locate and critically evaluate sources of information
- reflect on their own role in solving the 21st-century climate challenge

Environmental Theme

As the 21st century begins, there is probably no set of issues on which academic research, educational instruction, the demands of public policy, and the requirements of informed citizenship are more powerfully joined than those relating to the environment. Over the last half century, even with a doubling of the human population, human health and per capita income have improved dramatically in many parts of the world as supplies of food and energy increased in combination with advances in technology. This success has required a vast increase in the intensity of human use of the environment with the inadvertent, environmental impacts such as global climate change, air and water quality degradation, loss of biological diversity, and invasions by exotic species. During the coming 50 years, the
human population is projected to increase by 40%, leading to further stresses on the environment. Societal policies and practices must change to minimize environmental impacts. Now more than ever all citizens need to be engaged with the science and policy surrounding the environment to minimize unintended environmental impacts from the local to global scale.

Environmental issues are complex. Finding solutions to these environmental issues will have students vigorously debating the myriad of solutions; weighing the costs with the benefits and tradeoffs among alternative policies and practices; exploring the roles of science and technology; learning to become involved, informed, and constructive citizens after graduation. Issues such as sustainability and the ethics of intergenerational equity must be weighed against meeting current needs and wants. The pursuit of solutions to environmental issues is a highly synthetic and interdisciplinary endeavor. Therefore, courses that fulfill this Theme need to connect students, in explicit ways, to solving problems. A broad array of disciplines, from physical and biological sciences, to the social sciences and humanities need to be integrated into the proposed solutions, which must be based on science, but which will be implemented and sustained only if they are consistent with the ethics and values of society.

The environment theme asks that courses must meet these criteria by:

Raising environmental issues of major significance:
CFAN 3520 and CFAN 5520 addresses the environmental benefits of societal-level shifts away from fossil fuels in energy production, distribution and usage, both in Minnesota and in Germany. The course presents the opportunities and challenges of a clean energy transition, and compares the context of Minnesota and Germany, including scientific, technological, economic, public policy and cultural perspectives. Carbon and pollution reduction are key benefits of clean energy, but shifts away from conventional energy causes economic dislocation for some workers and industries.

Giving explicit attention to interrelationships between the natural environment and human society:
CFAN 3520 and CFAN 5520 presents to students the enormous impact of human energy systems on the natural environment, and on human society as well, in both Minnesota and in Germany. Students will be expected to understand and present the policy and cultural frameworks through which Minnesotans care for and use the natural environment. Students will be considered to be members of a Minnesota energy delegation, by the German professionals that they interact with. German and European understanding of land use, community and natural resources will be compared to that of Minnesota and the U.S.

Underlying scientific principles behind environmental issues will be examined:
CFAN 3520 and CFAN 5520 students will gain an understanding of the scientific and engineering concepts of carbon reduction and energy transition at scale, including the necessity of deploying multiple renewable energy technologies (wind, solar, small hydro, geothermal and others) to achieve a stable clean energy system, the different needs for baseload and for peaking power, the costs and opportunities of energy storage, the benefits of smart grids, the particular challenges of biofuels, the water and energy nexus and much more. Minnesota and German technical experts in addressing climate change, crafting environmental policy and operating complex energy systems will present to students and address their questions.

Students explore the limitations of technologies and the constraints of science on the public policy issues being considered.
One of the purposes of visiting Germany is to explore transition to a clean energy economy in a highly developed country with a strong environmental ethic and commitment to clean energy across multiple party lines, that nevertheless faces a variety of challenges in scaling up solar, wind, biofuel and other
clean energy technologies. CFAN 3520 and CFAN 5520 students will be asked in their daily writing to reflect on the interaction of technological, economic, and cultural aspects of the energy and environmental issues they encounter.

Students learn how to identify and evaluate credible information concerning the environment. CFAN 3520 and CFAN 5520 students will collect information about the Minnesota and German energy transition from assigned readings, from Minnesota and German experts and from their own research. They will be asked to document, assess, discuss, receive feedback on and make presentations about selected energy topics, both individually and in a group format.

Students demonstrate an understanding that solutions to environmental problems will only be sustained if they are consistent with the ethics and values of society. In preparing to serve as members of a Minnesota energy delegation to Germany, CFAN 5020 students will be exposed to and contemplate German care for natural resources, relationships to land, political systems, culture, ethics and social values, and how these influence energy and environmental policy. Students will in turn come to understand more about their own culture, ethics, and belief system, and how these influence their view of energy systems and the environment.

Global Perspectives Liberal Education Theme:

Undergraduates must develop the competence to function effectively and ethically in a complex, rapidly changing world that is increasingly interdependent yet fraught with conflicts and disparities. The Global Perspectives Theme assures that graduates from the University have at least one significant exposure to the world beyond U.S. borders, and the opportunity to consider the implications of this knowledge for the international community and their own lives.

In the case of this course, students will experience concentrated study of a particular country, culture and region - Germany- through in-depth focus on the matter of the German energy transition, as it is situated in a European and a comparative international context, and as it compares to the energy transition in Minnesota and in the United States. Through the lens of the energy system in Germany, students will cultivate a broader and more thoughtful perspective on the technological, policy and cultural aspects of providing power for human needs. Given that energy systems in a highly developed European country like Germany differ from the U.S., in that they involve multilateral financial, business and trading relationships, as well as complex international policy frameworks, students will learn first-hand how geography, politics, history, economics intersect in shaping as fundamental an aspect of modern society as energy. In addition to a deep exposure to energy systems in an interdisciplinary context, students will be exposed to German culture through class excursions and discussions on current issues affecting the cities we will visit, including immigration, economic development, housing, transportation, city planning, architecture, contemporary art, food traditions and fashion.

The Global Perspectives Themes entails that the following criteria are met:

The course, and most or all of the material covered in the course, focuses on the world beyond the United States: CFAN 3520 and CFAN 5520 focuses on energy transition from a distinctly German perspective and experience - in which clean energy technologies are already applied at scale and are well understood by the populace - and also considers how Germany’s learning about clean energy is already being applied in other countries, regions and even globally.
The course either (1) focuses in depth upon a particular country, culture, or region or some aspect thereof; (2) addresses a particular issue, problem, or phenomenon with respect to two or more countries, cultures, or regions; or (3) examines global affairs through a comparative framework.

CFAN 3520 and CFAN 5520 emphasizes the historical, cultural and economic reasons why Germany, in particular, became a global leader in clean energy adoption and innovation. The course also addresses, at a global scale, the issue of the renewable energy transition now underway throughout the world, particularly in wealthier developed countries in which decoupling energy/ carbon usage and economic growth offers a solution to climate change and a path towards technology and policy innovation. Students discuss and reflect on the implications of issues raised by the course material for the international community, the United States, and/or for their own lives. The intent of CFAN 3520 and CFAN 5520 is for students to become members of an on-going international exchange between Minnesota and Germany, in which Minnesota professionals and students who have traveled to Germany are all encouraged to reflect on what they learned, how the experience changed their views, to build community with one another around their experiences, and most importantly, to find ways to work together to bring to Minnesota the best new energy-related ideas, projects and opportunities.

Texts: The reading material for this class includes a number of articles and documents available on the course website. In addition, students must purchase a packet containing excerpts from books.

The course will begin with three one-day Saturday workshops that use video-conferencing in order to minimize course travel for participants from the various campuses. Instructors or partner faculty/staff members associated with the course (e.g. campus sustainability coordinators) will be present at each campus location and participate as expert speakers.

Grades and Incompletes
In accordance with the University of Minnesota Uniform Grading Policy, we will grade your performance in this course based on the following scale:

A: Achievement that is outstanding relative to the level necessary to meet course requirements.
B: Achievement that is significantly above the level necessary to meet course requirements.
C: Achievement that meets the course requirements in every respect.
D: Achievement that is worthy of credit, even though it fails to meet fully the course requirements.
F: Represents failure and signifies that the work was either: 1) completed, but at a level not worthy of credit, or 2) not completed and there was no agreement between the student and instructors that the student would be awarded an “incomplete”.

Incompletes will only be given under extraordinary circumstances late in the semester that prevent normal completion of the course requirements. If such extraordinary circumstances arise, contact the instructors as soon as possible to review the situation.

Scholastic Dishonesty
Scholastic dishonesty is any act by a student that misrepresents the student’s own academic work or that compromises the academic work of another. Examples include plagiarizing, cheating on assignments or examinations, and engaging in unauthorized collaboration on academic work. Students who engage in dishonest conduct will be referred to academic affairs.

Students With Disabilities
Any student with a documented disability (physical, learning, systemic, vision, hearing etc.) who need to arrange special accommodations should contact the instructors and the Office of Disability Services (160 McNamara Alumni Center, 612-626-1333 TTY) as soon as possible.

**Sexual Harassment**
Sexual harassment by or toward a member of the University community is prohibited by Board of Regents policy. Complaints about sexual harassment should be reported to the University’s Office of Equal Opportunity and Affirmative Action, 419 Morrill Hall.

**Classroom Conduct**
All students at the University have the right to a civil, productive, and stimulating learning environment. In turn, instructors have a responsibility to nurture and maintain such an environment. Lively, even heated, discussion is not disruptive behavior. Both instructors and students have a fundamental obligation to respect the rights of each other and an equally fundamental obligation to respect the instructional setting as a place for civil, courteous behavior. Students who disrupt the educational process because of discourteous, threatening, harassing, or other aggressive behavior will be removed from class.

**Course schedule**

**Workshop #1, Saturday, Nov. 9, 9:00-4:30**
**Minnesota’s Energy Transition—politics, economics, regulatory framework, best practice examples**
A day with seminar sessions.

- 9-10:15 am - Introductions of students, instructors, overview of program, substantive and intercultural development
- 10:15-10:25 break
- 10:25-12:00 am – Minnesota’s Energy Transition
  [Minnesota’s track record as a national leader for renewable energy legislation; Minnesota’s Renewable Energy Standard; MN Next Generation Energy Act; MN Solar Energy legislation]
  *Guest speaker (tbc):* Ellen Anderson, director, Energy Transition Lab, UMTC
- 12-12:30 group activity
- 12:30 -1 pm - lunch at each campus location
- 1 -2:15 pm - Regulatory perspective
  *Guest speaker (tbc):* Public Utilities Commissioner Matt Schuerger
- 2:30- 3:30 pm - the economics of energy with a focus on Minnesota
  *Guest speaker (tbc):* Dr. Arne Kildegaard, UMM
- 3:30 - 4:30 pm – course logistics, debrief, reflect, discuss readings and assignments, questions

**Workshop #2, Saturday, Nov. 23, 9:00-4:30**
**Germany’s Energy Transition—History, Context, Players—and Intercultural Learning**
A day with interactive seminar sessions, group activities and cultural awareness workshop

Required reading:
“Germany’s Energiewende in 416 words”: https://www.cleanenergywire.org/dossiers/germanys-energiewende-easy-guide#Description

and

https://www.cleanenergywire.org/factsheets/main-stories-germanys-energiewende

- 9am-11:00 am Germany’s political system, in comparison to the US and in terms of recent changes at federal and provincial levels, status of various parties with regard to energy transition, matter of forming governing coalition with 3-4 parties (speed of adoption of renewable), interactive exercise on forming a government (caucus meetings to organize parties, then establishment of guideline document), Q & A
- 11:00-11:15 Break
- 11:15-12:30 pm - Germany’s energy transition, 1974 to the present
  *Guest speaker (tbc): Dr. Gabe Chan, Humphrey School of Public Affairs*

- 12:30 - 1pm - lunch
- 1:00-2:15 Intercultural Development Inventory (IDI) and presentation by CFAN/ Learning Abroad staff, safety talk, orientation
  *Guest speaker (tbc): Maggie Wallenta, Study Abroad Program*

- break
- 2:30-3:30 - Shane Stennes, director of sustainability, U of M Facilities Management (tbc)—applied solutions, UMN as a city, what are we doing - overall climate action planning, recent community solar and solar on campus commitments
- 3:30-4:15 - “Business Perspective on the 21st Century Energy Transition: From Silos to Systems”
  *Guest speaker (tbc): Ken Smith, President and CEO, Ever-Green Energy*
- 4:15-4:30 – Reflection and sign up for assignments for next workshop (will include 3-min. powerpoint presentation by each student)

**Workshop #3, Saturday, Dec. 7, 9:00-4:30**

**The Politics and Business of Changing Energy Systems—Two Conversations and Travel/Logistics for January delegation experience**

A day with interactive sessions that practice learning format to be encountered with political, administration, and business leaders in Germany plus travel logistics info

- Welcome and introductions of all delegation members (all students encouraged to attend workshop #3 on TC campus)
- 9:15 - 10:45 am Student presentations about their political representation and a renewable energy/energy efficiency project they are connected to, either from experience or near where they are from or living now.
- 10:45-11:00 break
- 11:00-12 noon “Geronimo Energy: Developing Wind and Solar Energy in the Midwest and Beyond” Tena Monson, director of solar development, Geronimo Energy (tbc)
- 12:00-12:30 break and lunch
- 12:30-1:45 bipartisan energy perspectives
  *Guest speakers: MN State Senator David Senjem (tbc) and MN State Representative Melissa Hortman (tbc)*
1:45-2:30 “Serving as Citizen Ambassadors for Minnesota and the USA in Germany”
Guest speaker (tbc): MN State Senator David Senjem
2:30-2:45 break
2:45-4:15 pm - Logistics and preparing to go to Germany! Packing, transportation in country, lodging arrangements, food, cell phone and internet, communication back home, technology needs. Social media.
4:15-4:30 pm - final questions

Study Abroad segment, Jan. 7-19, 2020

Tuesday, January 7
departure of flight to Amsterdam; train to Duesseldorf

Wednesday, 1/8
arrival in Duesseldorf, Germany; transfer to hostel in Duesseldorf
Guided walking tour of the city; group dinner and group activity

Thursday, 1/9
Germany’s Energy Transition—the state level: Structures, Players, Status
Morning through lunch:
Group hosted by NRW Ministry for Environment, Agriculture, Nature Protection, and Consumer Protection
- Presentation on NRW MULNV structure, sustainability and climate adaptation issues in NRW
- Discussion with NRW MKULNV Minister or deputy secretary
- Window on Minnesota presentation to German ministry partners: 2 student teams report of aspects of MN’s energy transition

Afternoon:
Pushing state renewable energy agendas
- NRW Ministry for Economic Affairs, Innovation, Digitalization and Energy MWIDE
- EnergieAgentur.NRW
- Focus topic: Renewable Energy and Storage Systems

Evening: group dinner and debrief discussion

Friday, 1/10
Policy Guides Innovation: Practical Energy Efficiency and Policy Making
Morning:
Site visit to Stadtwerke Duesseldorf and high efficiency gas CHP plant
- Company presentation on high efficiency CHP plant
- Company presentation on energy transition and engagement with renewable energy [Stadtwerke Duesseldorf is majority owned by investor-owned utility EnBW]
Lunch at NRW state parliament
Afternoon:
Visit to NRW State Parliament and conversation with representatives of major political parties (conservative CDU, liberal SPD, and big-tent environmental Die Gruenen

group dinner and debrief discussion
Evening open for individual activities (doors to hostel close at midnight)

Saturday, 1/11
Cultural Day—Art, History, Urban Life
Group visit to Medienhafen urban redevelopment, Kunstmuseen K21, and traditional coffee shop
Evening open for individual activities (doors to hostel close at midnight)

Sunday, 1/12

morning:
*Departure by train to Muenster; check into Muenster youth hostel*
Afternoon:
Walking tour of Muenster, one of Germany’s largest university towns and Germany’s acknowledged “bicycle capital” (pop. 300,000 including 55,500 students)
Evening:
Group dinner with special guests from University of Applied Sciences Muenster (Dr. Christoph Wetter and students)

Monday, 1/13

Germany’s energy transition and applied research:
Group hosted by University of Applied Sciences Muenster International Office
Program organized in cooperation with Dr. Christof Wetter, University of Applied Sciences Muenster and students
Interactive format. Program includes mini-presentations/ briefs by teams of U of M student delegation members and FH Muenster student peers on aspects of Minnesota’s and NRW’s energy and sustainability efforts

Tuesday, 1/14

Saerbeck site visit day 1: Integrated Approaches to the energy transition
Focus on Saerbeck’s bioenergy park (biomass, wind power, PV arrays, energy storage concepts, combined heat and power, micro grids)
Speakers/hosts: Wilfried Roos, Mayor of Saerbeck; Guido Wallraven, city planner and technical director for Saerbeck’s climate-smart community projects; Dr. Christoph Wetter, University of Applied Sciences Muenster
Evening: community outreach event “A Westphalian Evening” with invited guests from business and nonprofit sectors (cross-generational panel discussion with Saerbeck leaders, MN student delegation members, and UofM instructors)

Wednesday, 1/15

Saerbeck site visit day 2: Interactive Workshop
site visit to Saertex, local manufacturer of multiaxial fabrics and core materials
Workshop: How to envision and organize change—students develop a comprehensive integrated climate and renewable energy communication strategy for the City of Morris (or another CSM project city)
Workshop leaders: Troy Goodnough, sustainability director, UMM, and Guido Wallraven, city planner and technical director for Saerbeck’s climate-smart community projects

Thursday, 1/16

Integrated Approaches in a large city: City of Muenster.
Host: City of Muenster
bike tour and site visits
● Climate change and city action
● Multi-modal transportation systems
● Resource Efficiency and the Circular Economy: Waste Management and Recycling
• Muenster as a city of peace and solidarity: from the 1648 Peace of Westphalia to today’s solidarity with arriving refugees

Friday, 1/17  Germany’s energy transition and applied research—water/energy nexus
Host: Dr. Christoph Wetter, University of Applied Sciences Muenster
Seminar and hands-on day at various labs

Saturday, 1/18  half day open for individual activities in Muenster; train to Duesseldorf;
concluding group dinner

Sunday, 1/19  departure from Duesseldorf; same day arrival at MSP