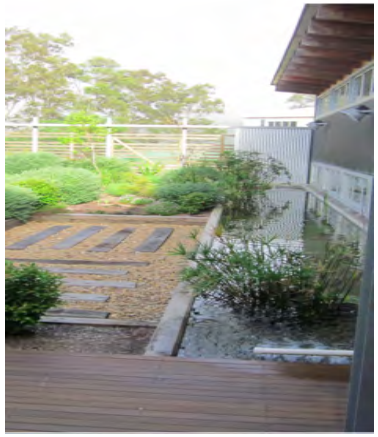
CREATE International
Renewable Energy Education Project



ASEE 2016
New Orleans, LA

Panelists

Kenneth Walz
Andrew McMahan
Roger Ebbage

Mary Slowinski - Moderator

DUE #1345306

Session Agenda

- Provide overview of project
- Present study and results
- Hear from panelists on study findings, their experiences of impact of participating in CREATE's international education experience

Problem Statement

Preparing students for jobs in the renewable energy and efficiency sector involves:

- Rapid technological changes
- Energy policy influences
- Increasingly global workforce
- Need for international literacy in teachers to increase global literacy in students
- Need for industry involvement





Project Overview

- Community college renewable energy educators from across the U.S. applied to participate.
- Participants selected were nationally recognized for their work in energy technician education and specific discipline expertise
- Rigorous study tour to meet technical educators, visit teaching labs, review industry partnerships, meet policy makers and government representatives and report on all the above.

Project Objectives

- To obtain first-hand knowledge of renewable energy international policies and educational practices
- To expand awareness of approaches to educating technicians for the renewable energy sector
- To increase international perspectives in existing programs of study

Site Visit Goals

Academic Sites: Meet educators and visit schools to learn about post-secondary training programs in RE

Policy Sites: Gain an understanding of national renewable energy policies and their impacts

Industry Sites: Tour facilities, meet employers and learn about desired skills and technologies being used.

Australia/New Zealand

March 12 – 26, 2013

Australia/New Zealand

Participants

Australia/New Zealand

Participants

Eleven educators selected to provide expertise in Wind, Solar, Bio-fuel, Building Efficiency, Geothermal & RE Policy

Australia/New Zealand

Sites Visited

8 academic, 2 government/policy, 4 industry





Australia/New Zealand
Education System

- TAFEs (Technical and Further Education) are run by the states and are the equivalent of public community and technical colleges

- Students pay 20% of costs; government reimburses TAFEs for 80% of the remaining 80%





Australia/New Zealand

Education System

- Eleven industry councils comprised of labor and industry determine national quotas for programs to meet workforce needs

- TAFE directors in the individual states vie for programs





Australia/New Zealand

Education System

Shortly before our visit, a shift away from the traditional centralized program planning and allocation was made in favor of allowing student choice to determine programming.

These changes were resulting in drastic funding cuts, dramatic increases in tuition, and generally an unstable environment for educational institutions.

Australia/New Zealand

National Energy Policy

- The national Green Skills Agreement (2009) ushered in renewable energy incentives and stimulus spending, a dramatic increase in RE use, and the installation of solar in particular.

- Technical education needs increased further with the advent of solar installer qualifications and advances in water conservation, re-use, and capture/storage technologies.





Australia/New Zealand

National Energy Policy

- Political change has now reversed much of the Green Skills Agreement.

- As a result, renewable energy jobs are in decline and many TAFE programs are in jeopardy.

Germany/Denmark

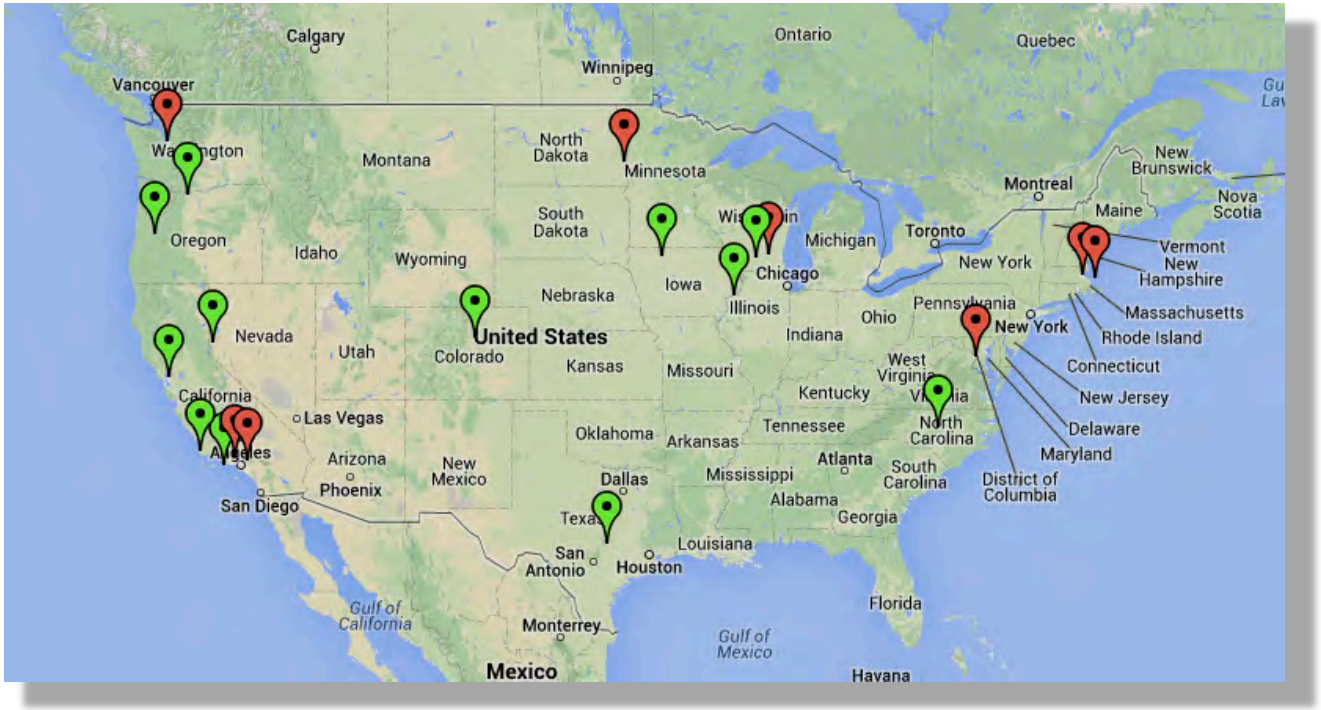
May 29 – June 12, 2014

Germany/Denmark

Participants

Germany/Denmark

Participants



Ten returnees, 3 new educator/experts in Wind, Solar, Bio-fuel, Building Efficiency, Geothermal & Policy

Germany/Denmark

Sites Visited

June 1 – Berufsschule Gross-Gerau
June 2 - Darmstadt Univ.
June 2- Hessian State Office for Technology Training
June 3 - Berufsschule Butzbach
June 3 - Wallerstädten Biogas Plant
June 4 - Insheim ORC Geothermal Plant
June 5 - RENAC
June 5 - Life e.V.
June 6 - BMWi (Federal Ministry of Economic Affairs and Energy)
June 6 - German Association of Solar Energy (DGS)
June 6 - Agora Energiewende
June 7 – Feldheim Renewable Village
June 8 – Bundestag (The Reichstag building)
June 10 – BZEE Wind Training Facility
June 10 - Senvion (formerly REpower)
June 11 – Folkecenter Renewable Energy Education Center

7 education, 6 government/policy, 4 industry





German

Education System

- Education is free for students (all the way through PhD); government and industry share costs.

- "Tracking" begins at age 10





German

Education System

- Renewable energy topics are woven into standard coursework

- General education topics are contextualized and incorporated into technological coursework.





German

Education System

- Post-secondary pathways & supports are varied and numerous and include traditional university degrees, multiple vocational and technical education programs (including “dual system” apprenticeships), and courses of study for workers seeking advancement

German Energiewende

National Energy Policy

- Germany has a comprehensive set of national policies – the Energiewende or "energy transition" – intended to eliminate the nuclear power base and increase energy independence





German Energiewende

National Energy Policy

- Three primary goals:
  - expand & improve renewable energy generation
  - improve energy efficiency
  - enhance the transmission infrastructure.



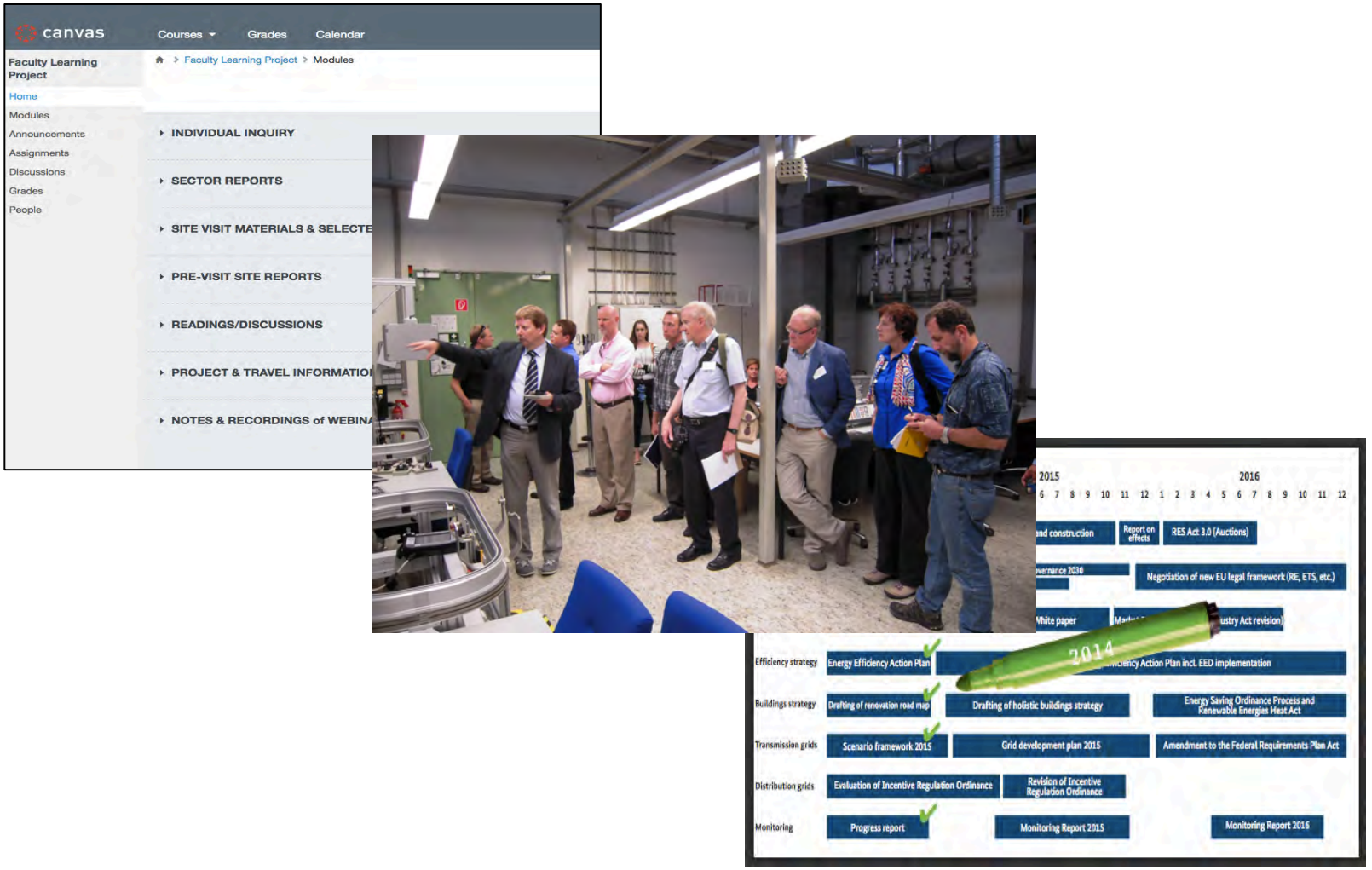


German Energiewende

National Energy Policy

- Establishes aggressive national targets into 2020 and beyond
- Has created a culture-wide shift
- Supports the development of educational pathways and programs in renewable energy and energy efficiency

Learning Activities







Learning Activities

Prior to Travel

- Pre-Travel Survey
- Participation in online shared environment
- Readings & online discussion of key topics
- Monthly webinars
- Pre-visit Site Reports

Learning Activities

During Travel

- Pre-Visit Site Report presentations
- Site Visit Reports
- "Top Two Take-Away" presentations *(AU only)*





Learning Activities

Post-Travel

- Sector Reports
- Individual Inquiry Reports *(Germany only)*
- Post-Survey
- Follow-up Impact Survey *(6 months post-Australia)*
- Long-term Impact Survey *(January 2016)*

Lasting Impacts Study & Results

Study Intent

- Three years since project inception
- Measured lasting impact of involvement on:
    - Teaching practice
    - Curriculum, program, institution
    - Professional development
- Also captured information on dissemination activities





Study Design

- Web-based survey administered using Survey Monkey
- Mix of Likert-formatted and open-ended response items measuring
- Invitations sent to all participants across the two phases of the project
- Twelve completions, response rate of 86%





Results Analysis

- Likert items were interpreted using descriptive statistics and frequency table
- Open-ended items coded independently by study authors, conclusions compared to discern patterns and emergent themes





Key Findings

- Impact on Teaching Practice
- Impact on Curriculum, Program, Institution
- Impact on Professional Development

Lasting Impacts on Teaching Practice

- Developed new presentations, lectures & written materials for my existing courses
- Incorporated or increased the international perspective in my existing courses
- Adopted new instructional techniques.

Lasting Impacts on Curriculum, Program, Institution

- nearly all reported that the international experience shaped the curriculum of their renewable energy programs
- adapted or expanded existing courses
- adapted or expanded existing degrees/certificates
- shifted how students are recruited
- integrated renewable energy into other courses





Lasting Impacts – Professional Development

- developed an understanding of energy policy outside the U.S.
- acquired new ideas about how education & industry can interact
- learned about unique or new technologies
- developed collaborative professional relationships with peers





Lasting Impact – Professional Development

Do any of the following statements reflect changes you've experienced because of the international experience?				
Answer Options	**Very much (2)**	**Some what (1)**	**No change (0)**	**Wtd. Ave.**
I am more likely to engage in discussions related to international advances in renewable energy	11	1	0	**1.92**
I am more attentive to international events and development in renewable energy	10	2	0	**1.83**
I am more likely to engage in conversations about international energy policy	10	1	1	**1.75**
I am more likely to be active as an energy policy advocate in political arenas.	6	4	2	**1.33**

Dissemination of Knowledge Gained

- shared with peers and institutional admin
- delivered lectures or presentations as part of conference or symposium, to other energy professionals or other faculty





Dissemination of Knowledge Gained

Please estimate the number of people from the following groups with whom you have shared information, insights, or details about your international experience		
Answer Options	**Total**	**Average Number**
Students	925	84
Educators	330	30
Energy Professionals	167	15
General Community members	157	14
Business and Indsutry Contacts	150	14
School Administrators	67	6
Govt Agency or Regulatory Officials	50	5
Elected Officials	21	2

Conclusions

Participant Key Take-Away

Provide educators with opportunities to develop global literacy and acquire knowledge of international policy and trends so that they can adequately prepare graduates for the multinational renewable energy industry.





Participant Key Take Away

Working, learning & traveling with professional peers results in the deep sharing of knowledge, strategies and resources and has significant lasting impact on participant teaching and professional practices.

Participant Key Take-Away

Develop core programs of study that apply across sectors rather than "specialty" degrees or certificates.

Participant Key Take-Away

Strengthen interdependent relationships between education, industry and trade associations to allow for the co-development of technological education solutions.

Participant Key Take-Away

Encourage cultural shift and personal responsibility in regards to energy conservation and the use of renewable energy sources.

Participant Key Take-Away

Establish and implement a long-term national agenda for renewable energy development, use, incentives, and deployment.





Other Projects, Next Steps

- Additional Faculty Professional Development

  The Geysers Geothermal Site, Bonneville Lock and Dam

  Lane CC, Columbia Gorge CC

- CREATE support center funded through 2020.

  Newsletter, webinars, and new faculty programs planned for 2017

Questions?

Thank you!

For more info:

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