Appendix I

Student Learning Outcomes (2012-2017)

	Direct Measurements	Indirect Measurements			
Renewable Energy Learning Outcomes The graduate will be able to:	*Performance Criteria Evaluation	Employer Survey 2013, 2014, 2015 (employers n=7, alumni n=8)	Senior Survey (n=18, Fall 2016/Spring 2017) (1.0 - 5.0 scale)	Alum Survey (n=4, 2010/2014) (1.0 - 5.0 scale)	**Planned Curricular Actions for Improvement (2017-2018)**
1. Describe the physical laws and resources that constrain our energy systems.	(a) 88.1% (b) 87.1%	6 meets expectations 2 N/A	4.5		
2. Define the operation of RE systems in terms of basic electrical and physical principles.	(a) 85.3% (b) N/A (c) N/A	6 meet expectations 1 below expectations 1 N/A	4.4		Newly developed TEC258 is offered in 2017-2018.
3. Apply basic business, economic, and technical management principles in a variety of technical and non-technical contexts.	(a) 91.5%	8 meet expectations	4.5		
4. Explain and defend their positions on energy/political/social issues.	(a) 99.0%	5 meet expectations 3 N/A	4.6		
5. Design residential and commercial solar photovoltaic (PV) systems using renewable energy software	(a) 84.5%	3 meets expectations 5 N/A	3.3		
6. Analyze wind data using professional software.	(a) 84.4% (b) N/A	2 meets expectations 6 N/A	4.3		Newly developed TEC258 is offered in 2017-2018.
7. Optimize renewable energy business decision-making.	(a) 97.6% (b) 97.1%	6 meets expectations 2 N/A	4.4		
8. Develop a business case for a commercial RE project.	(a) 92.5%	5 meets expectations 2 below expectations 1 N/A	4.3		

*Performance Benchmarks	Action benchmark for Survey Data < 3.5/5.0 scale	Action benchmark for Employer Data < 75% "meets expectations" or above
Performance criteria: at least 80% average in each category #1(a) Final Grade (TEC259); (b) TEST#1 (TEC160) #2(a) TEST#2 (TEC111); (b) PV workstation Labs (TEC258); (c) Wind Tunnel Lab (TEC258) #3(a) RE Capstone Project (TEC 360) #4(a) Class Discussion (TEC160) #5(a) TEST#2 (TEC260) #6(a) Wind Data Assessment (TEC260); Model Wind Turbine Project (TEC258) #7 (a) SAM Module 6 Solar PV Optimization (TEC260) (b) In-Class Assignment Wind Turbine Selection (TEC260) #8 (a) RE Case Study (TEC360)	5 – well above average 4 – above average 4 – average 3 – below average 1 – well below average	

Appendix J

RE Program Goals and Plan of Work

*RE Specific Goals***	*Plan of Work for 2015-2016 (September 2015)*
1. Provide students with high quality educational experiences by featuring a modern, up-to-date curriculum that will develop the technical and managerial knowledge, skills, and attitudes that are foundational to success as RE professionals.	a. Conduct at least one advisory board meeting (April 2016). b. Revise the RE curriculum to add two new courses and to revise two existing courses. Revise the list of electives for the major. c. Develop wind turbine workstations in the RE lab. d. Jin Jo and Matt Aldeman will attend at least one renewable energy convention. Jin Jo will attend an energy modeling training workshop in Denmark in 2016.
2. Recruit and graduate a diverse group of individuals to support companies and organizations that will employ RE professionals in Illinois and throughout the United States.	a. We will participate in Preview and host prospective students and their families for tours. b. RE faculty will work with RES to promote the program at energy nventions. c. Do at least one outreach program focused on a minority community. d. RE faculty will host potential students from minority communities for program review
3. Provide opportunities for students to interface with RE professionals.	a. Actively promote involvement and advise the Renewable Energy Society (RES), an RSO. b. Promote student attendance at conferences and trade shows and events. c. Invite RE professionals to visit the RE classes, or RES. d. Update the database of potential employers and initiate contact for graduate employment and student internships. e. Visit industry partners to promote student recruitment.

4. Provide service to companies and organizations that employ RE graduates through applied research, consulting/workshops, and participation in professional organizations	a. Center for Renewable Energy (CRE) will collaborate with the RE faculty in research. b. CRE will make an undergraduate internship position at the center to support the faculty research. c. CRE will update RE related job and internship openings. d. RE faculty will work with the RES on a service project. e. RE faculty will work with industry partners on research projects.
5. Develop industry and RE alumni relationships in support of the program	a. Contribute RE information to the annual alumni newsletter for 2015-2016. b. We will build and maintain relationships with industry partners through industry energy conventions. c. We will maintain relationships with RE alumni via SNS.
6. Provide students with high quality educational experiences by featuring a modern, up-to-date curriculum that will develop the technical and managerial knowledge, skills, and attitudes that are foundational to success as RE professionals.	a. Conduct at least one advisory board meeting (April 2016). b. Revise the RE curriculum to add two new courses and to revise two existing courses. Revise the list of electives for the major. c. Develop wind turbine workstations in the RE lab. d. Jin Jo and Matt Aldeman will attend at least one renewable energy convention. Jin Jo will attend an energy modeling training workshop in Denmark in 2016.

7. Recruit and graduate a diverse group of individuals to support companies and organizations that will employ RE professionals in Illinois and throughout the United States.	a. We will participate in Preview and host prospective students and their families for tours. b. RE faculty will work with RES to promote the program at energy conventions. c. Do at least one outreach program focused on a minority community. d. RE faculty will host potential students from minority communities for RE program review
8. Provide opportunities for students to interface with RE professionals.	a. Actively promote involvement and advise the Renewable Energy Society (RES), an RSO. b. Promote student attendance at conferences and trade shows and events. c. Invite RE professionals to visit the RE classes, or RES. d. Update the database of potential employers and initiate contact for graduate employment and student internships. e. Visit industry partners to promote student recruitment.
9. Provide service to companies and organizations that employ RE graduates through applied research, consulting/workshops, and participation in professional organizations	a. Center for Renewable Energy (CRE) will collaborate with the RE faculty in research. b. CRE will make an undergraduate internship position at the center to support the faculty research. c. CRE will update RE related job and internship openings. d. RE faculty will work with the RES on a service project. e. RE faculty will work with industry partners on research projects.

10. Develop industry and RE alumni relationships in support of the program	a. Contribute RE information to the annual alumni newsletter for 2015-2016. b. We will build and maintain relationships with industry partners through industry energy conventions. c. We will maintain relationships with RE alumni via SNS.

Appendix G

RE Employer Survey Example

Employer Survey
B.S. in Renewable Energy

Illinois State University
Department of Technology

Date:

Employer:
Employer Representative & Title:
Number of program graduates hired within the past three years:

Confidentiality statement: *All information from interviews will be reported in aggregate and not linked to any individual or company. This information is intended to help with our continuous improvement efforts.*

Explanation of interview questions: *Our program curriculum and facilities are informed by several desired learning outcomes. Our interest is in understanding your perceptions as to how well prepared program graduates are positioned for success in the workplace with regard to these learning outcomes. For each outcome, please rate the overall performance of graduates as "meets expectations" or "below expectations," and provide any insight into of the performance of our graduates within the context of your work environment. Please remember that you are not rating a specific employee, but rather graduates collectively from the* **Renewable Energy *program*** *during the past 3-years.*

Renewable Energy Learning Outcomes	Employer Rating	**Employer Comments**
1. Describe the physical laws and resources that constrain our energy systems.	☐meets expectations ☐below expectations ☐N/A	
2. Define the operation of RE systems in terms of basic electrical and physical principles.	☐meets expectations ☐below expectations ☐N/A	
3. Apply basic business, economic, and technical management principles in a variety of technical and non-technical contexts.	☐meets expectations ☐below expectations ☐N/A	

4. Explain and defend their positions on energy/political/social issues.	☐meets expectations ☐below expectations ☐N/A	
5. Design residential and commercial solar photovoltaic (PV) systems using renewable energy software	☐meets expectations ☐below expectations ☐N/A	
6. Analyze wind data using professional software.	☐meets expectations ☐below expectations ☐N/A	
7. Optimize business decision-making using maximization techniques.	☐meets expectations ☐below expectations ☐N/A	
8. Develop a business case for a commercial RE project.	☐meets expectations ☐below expectations ☐N/A	

Additional comments:

Appendix H

RE Senior Survey Example

Department of Technology Senior Survey (RE)

Department of Technology Senior Exit Survey

As part of our continuous quality improvement process, we would like to know your perception of how well we have performed as a department and as an academic degree program.

This brief survey has two parts: (a) ratings of general perceptions about the department and its quality, and (b) ratings on how well you achieved the intended learning outcomes for your major. Anticipated time to complete the survey is about 15 minutes.

Thank you very much for your feedback on the quality of the Department of Technology and its programs of study!

Instructions for questions 1 to 17:

This section includes ratings of your perception about the Department of Technology and its quality.

1. Faculty were helpful when I needed assistance.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Faculty	○	○	○	○	○

2. Overall, the quality of instruction was excellent in TEC courses.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Quality	○	○	○	○	○

3. I was treated fairly in my dealings with faculty.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Fairness	○	○	○	○	○

4. Faculty were experts in their subject matter areas.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Expertise	○	○	○	○	○

5. The department's computer resources met my needs.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Computers	○	○	○	○	○

6. Overall, I was satisfied with the quality of laboratory equipment.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lab Equipment	○	○	○	○	○

7. Lab hours provided access to equipment to complete assignments.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lab Access	○	○	○	○	○

8. I was able to get my into TEC courses in a timely manner.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Course Schedule	○	○	○	○	○

9. TEC Advisement Office responded to my inquiries in a timely manner.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Timely Advisement	○	○	○	○	○

10. My TEC advisor was knowledgeable of my academic plan.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Advisement Expertise	○	○	○	○	○

11. My internship was a valuable part of my education.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Did not participate in an internship
Internship	○	○	○	○	○	○

12. TEC department student organizations were a valuable part of my education.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Did not participate in student organization
TEC Student Organizations	○	○	○	○	○	○

13. My TEC major greatly expanded my career options.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Career Options	○	○	○	○	○

14. The content of my TEC courses was state-of-the-art.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Course Content	○	○	○	○	○

15. Overall, I greatly increased my knowledge and skills as a result of my TEC major.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Personal Skills	○	○	○	○	○

16. I would recommend TEC to a good friend or family member.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Recommendation	○	○	○	○	○

17. Would you care to share any additional comments about your experiences with the Dept of Technology?

Instructions for questions 18 to 25:

Please indicate how well the Renewable Energy program prepared you to perform each of the following.

18. I am able to describe the physical laws and resources that constrain our energy systems.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Constraints	○	○	○	○	○

19. I am able to define the operation of RE systems in terms of basic electrical and physical principles.*
RE Systems

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
RE Systems	○	○	○	○	○

20. I am able to apply basic business, economic, and technical management principles in a variety of technical and non-technical contexts. *
Management Principles

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Management Principles	○	○	○	○	○

21. I am able to explain and defend my position on energy/political/social issues. *

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Defend Positions	○	○	○	○	○

22. I am able to write and debug programs for control networks (technical track only, skip if in another track)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Technical: Debug networks	○	○	○	○	○

23. I am able to analyze wind data using professional software (technical track only, skip if in another track)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Analyze Wind Data	○	○	○	○	○

24. I am able to optimize business decision-making using maximization techniques (economics/public policy track only, skip if in technical track)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
business decision-making	○	○	○	○	○

25. Please provide any feedback about the instruction and your learning related to Renewable Energy.

26. I am able to develop a business case for a commercial RE project (economics/public policy track only, skip if in technical track)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
business case	○	○	○	○	○

The remaining questions focus on various issues including your employment search and

status.

27. Who or what influenced you in deciding to pursue the TEC program at ISU?*

28. At what stage are you in finding a position in your major field?

	Accepted an offer	Have tentative offer	Interviewing	Have not started searching
Job Search	○	○	○	○

29. If you are actively searching for a job or have landed a position, what has been most helpful so far: (you may answer more than one)

	ISU Career Services	ISU Career Fairs	eRecruiting	TEC Faculty Employer Contacts	My Own Searches (Websites, personal contacts, etc.)
Help in job search	☐	☐	☐	☐	☐

30. If you have secured a permanent position, please provide the name of the employer:

Name of employer