Renewable Energy Workforce Industry Conversation

RENEW Energy Summit, Jan 2021

MADISON AREA TECHNICAL COLLEGE

mrea
midwest renewable energy association

CREATE
Center For Renewable Energy
Advanced Technological Education

Two Areas that CREATE has identified for future growth are energy storage and SCADA systems.

- Draft Job Task Analyses have been produced
- Have been reviewed by academic instructors
- Need further review and validation by industry experts
- JTAs will be used to guide development of programs and curriculum
- Please send feedback to kwalz@madisoncollege.edu

Energy Storage Project

Overview
The Center for Renewable Energy Advanced Technological Education (CREATE) is working with the Midwest Renewable Energy Association to bring together industry and academic partners to advance Energy Storage technology for the renewable energy sector. The goal of the CREATE Energy Storage Project is to advance the field of renewable energy by supporting the integration of energy storage technology into existing technician education and training programs.

Background
There has been a tremendous growth in renewable energy over the past decade, evidenced by the proliferation of thousands of megawatts of renewable installations across the country. At the same time, the cost of energy storage technology has decreased to a point where pairing of energy storage with renewable generation is now feasible for firming of intermittent renewable energy supplies, while also providing benefits for energy resilience and emergency preparedness.

Although a fair number of energy technician education and training programs were started in the years immediately following the great recession, the vast majority of these do not currently address Energy Storage technology. Furthermore, these programs generally lack the capital equipment and electrical infrastructure necessary to teach Energy Storage topics. This project is intended to address this need.

This CREATE Energy Storage Project has four key objectives:
1) Examining existing model energy storage education efforts to identify best practices.
2) Conducting a Job Task Analysis and Curriculum Gap Analysis to identify critical knowledge and skills for technicians working with energy storage systems
3) Implementing pilot energy storage courses in a model teaching laboratory.
4) Providing Professional development in energy storage for two-year college instructors through digital webinars, presentations, and workshops.

"This material is based upon work supported by The National Science Foundation under Grant # 1800893. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

Energy Storage Job Task Analysis

As described by the Interstate Renewable Energy Council, "Conducting a Job Task Analysis is a formal process for determining what people do, under what working conditions, and with what knowledge and skills." The data provided by a Job Task Analysis (JTA) is useful to support development of educational curriculum, instructional materials, performance standards, and assessment tools to judge knowledge, experience, work, and mastery of key skills.

This draft JTA for the Energy Storage sector was developed by the Midwest Renewable Energy Association, Madison College and CREATE in the fall of 2020. A workgroup of subject matter experts from these organizations was convened to assemble and review the draft. This document is now being shared with others in industry for further commentary and refinement.

Many individuals in the renewable energy field are familiar with the Job Task Analyses produced by the North American Board of Certified Energy Practitioners (NABCEP) for the wind and solar sectors. This Energy Storage JTA was designed to mirror the format of the NABCEP products.

The scope of this JTA encompasses the knowledge and fundamental principles across six content domains covering the Application, Sales and Economics, Design Installation, Commissioning, and Operation & Maintenance, of Energy Storage systems for renewable energy applications.

Renewable Energy Technologies are diverse, and different sectors such as wind, solar, hydroelectric, geothermal, and bioenergy, all integrate energy storage systems to different degrees and having different capabilities. To somewhat constrain the challenge of addressing this wide field, the scope of this JTA was limited to applications for the residential and small commercial and industrial sectors. Technicians employed in the renewable energy industry may not perform all of the tasks described in the JTA, but it is likely that at least some aspect of their job will involve Energy Storage technology.

Energy Storage Job Task Analysis Content Domains

1. **Application**
2. **Sales and Economics**
3. **Design**
4. **Installation**
5. **Commissioning**
6. **Operation and Maintenance**

Supervisory Controls and Data Acquisition (SCADA) Project

Overview
The Center for Renewable Energy Advanced Technological Education (CREATE) is bringing together industry and academic partners to advance the integration of Supervisory Controls and Data Acquisition (SCADA) technology for the renewable energy sector. SCADA technology will be advanced through a series of professional development workshops for college and university faculty, and SCADA instructional activities will be integrated into existing courses and curricula for undergraduate energy technician education programs. The project will also result in the creation of an open source SCADA system that will be deployed and shared amongst participating colleges and universities nationwide.

Background
SCADA systems are core technology for the operation of many key industrial processes, including oil and gas refining, food and beverage production, water treatment, and electric power production. SCADA systems allow engineering technicians to control systems in real time, and log data for monitoring of system performance. SCADA data analytics allow for system optimization, preventive maintenance scheduling, and for rapid detection and correction of faults/alarms to prevent or minimize system downtime. There has been a tremendous growth in renewable energy over the past decade, evidenced by the proliferation of thousands of biofuel, wind turbine, and solar panel installations across the country. Since each of these devices has its own individual SCADA communications output, this has also resulted in an explosion of data for renewable energy system operators. Although a fair number of energy technician programs were started at two year colleges in the years immediately following the great recession, the vast majority of these do not currently address SCADA technology. Furthermore, these two year college programs generally lack both the hardware and software infrastructure necessary to teach SCADA topics. This project is intended to address this need.

Objectives
1) Update the SCADA curriculum previously completed by CREATE to reflect changes in technology and solicit industry input from Next Era and others to re-validate the curriculum
2) Develop curriculum modules to allow faculty to integrate SCADA concepts into existing renewable energy courses and programs
3) Provide faculty professional development in SCADA systems using the existing CREATE webinar platform and summer workshop model.
4) Deploy SCADA equipment at two-year college campuses to facilitate integration of this technology into existing two-year college renewable energy programs.

SCADA Job Task Analysis

As described by the Interstate Renewable Energy Council, "Conducting a Job Task Analysis is a formal process for determining what people do, under what working conditions, and with what knowledge and skills." The data provided by a Job Task Analysis (JTA) is useful to support development of educational curriculum, instructional materials, performance standards, and assessment tools to judge knowledge, experience, work, and mastery of key skills.

This draft JTA for the SCADA sector was developed by CREATE in the winter of 2019 and 2020. A committee of subject matter experts from two-year colleges with renewable energy programs was convened to assemble and review the draft. This document is now being shared with others in industry for further commentary and refinement.

Many individuals in the renewable energy field are familiar with the Job Task Analyses produced by the North American Board of Certified Energy Practitioners (NABCEP) for the wind and solar sectors. This SCADA JTA was designed to mirror the format of the NABCEP products.

The scope of this JTA encompasses the knowledge and fundamental principles across five content domains covering the Application, Installation, Operation & Maintenance, Data Analytics, and Cybersecurity of SCADA systems for renewable energy applications.

Renewable Energy Technologies are diverse, and different sectors such as wind, solar, hydroelectric, geothermal, bioenergy, and energy storage all integrate SCADA systems to different degrees and having different capabilities. As a result, the JTA is broad in scope. Technicians employed in the renewable energy industry will not perform all of the tasks described in the JTA, but it is likely that at least some aspect of their job will involve SCADA technology.

SCADA Job Task Analysis Content Domains

1. **Application**
2. **Installation**
3. **Operation and Maintenance**
4. **Data Analytics**
5. **Cybersecurity***

** The latter domain is tangential to the scope of the current CREATE SCADA grant project, but is included here to demonstrate the overlap between renewable energy and other related technical fields such as information technology and network and computer systems administration.*

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State of Climate Action: Assessing Progress toward 2030 and 2050

by Katie Lebling, Mengpin Ge, Kelly Levin, Richard Waite, Johannes Friedrich, Cynthia Elliott, Christina Chan, Katherine Ross, Fred Stolle and Nancy Harris - November 2020

LAUNCH THE INTERACTIVE REPORT →

To keep the window open to limit global warming to 1.5 C, countries need to accelerate transformation towards a net-zero emissions future across all sectors at a far faster pace than recent trends, according to this report from World Resources Institute and ClimateWorks Foundation, with input from Climate Action Tracker.

Download the Publication

First Name

Last Name *

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Job Title

Some other climate neutral pathway studies:

https://cmi.princeton.edu/annual-meetings/annual-reports/year-2019/the-net-zero-america-project-finding-pathways-to-a-carbon-neutral-future/

https://www.c2es.org/getting-to-zero-a-u-s-climate-agenda-report/

https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/sustainability/cost%20curve%20pdfs/pathways_lowcarbon_economy_version2.ashx

RE Technical Workforce Conversation

The effects of climate change are becoming impossible to deny (wildfires, hurricanes, floods). Recent studies have estimated that to limit global warming to 1.5 ^{o}C, we will need to increase the growth rate of renewable energy by a factor of 3.5 to 5X, to reach a target of 90% renewable electricity by 2030.

This raises some questions:

1. Does this growth rate seem feasible for the Midwest region?
2. What are the biggest workforce needs to support that growth? Where are the largest #s of jobs?
3. What types of employee skills/qualifications are the most valued?
4. What types of employee skills/qualifications are the hardest to find?
5. What RE trends should be watching for in the next 5-10 years?

Please Provide Us With Your Feedback:

To access a copy of these slides, a recording of this session, and the draft Job Task Analyses, please use the link below

https://drive.google.com/drive/folders/1iK4k2rOKI_VVudZJUk1uQoUgDlkoAAvc?usp=sharing

We invite your feedback! Please submit your comments to:

Ken Walz, CREATE Energy Center Director and Principal Investigator

kwalz@MadisonCollege.edu

Madison Area Technical College, Madison, WI

Midwest Renewable Energy Association, Custer, WI

This work was partially supported by the National Science Foundation Advanced Technological Education Program (awards 1600934, 1800893, 1901852, 2000714) and the Department of Energy Solar Energy Technologies Office (awards DE-EE0006910 and DE-EE0008573). The views, opinions and recommendations expressed are those of Madison College and the CREATE Energy Center and do not necessarily reflect those of the National Science Foundation or the Department of Energy.