

PROBLEM-BASED LEARNING IN THE SCIENCES

It's Electrifying!

An Exploration in Water-Based Alternative Energy

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Problem Log

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Learning Issues Board

Hunches:

What We Know	Learning Issues	Plan of Action

Problem Log

Reflective Moment: Engineers and Energy

You have been asked to step into the shoes of an engineer who works in alternative energy. Watch one of the videos, or read the description provided on the following pages, and describe the *attitudes* and the *skills* required to be in this field of work. What did you find interesting about what you saw and/or read?

A quality response: (1) addresses the question, (2) stays on topic, (3) is plausible or reasonable, and (4) gives enough detail to make your ideas clear.

Video Options:

www.iseek.org/industry/green/careers/energy-engineer-video.html

www.iseek.org/industry/green/careers/wind-developer-video.html

Written Option:

Attached transcript

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Who Are YOU?

*Meet Tanuj Gulati, a senior energy engineer for
Energy Management Solutions (EMS), Inc.*



Please share your name, title, and a description of your job responsibilities.

My name is Tanuj Gulati. I'm a senior energy engineer for Energy Management Solutions, Inc. Our company does energy audits and energy conservation analysis for commercial and industrial customers. For energy conservation projects, we have to first find out what the customer is looking for. That is, what can we do to help them make the best energy conservation decisions related to their projects? We usually start by visiting people on the floor, talking to them, and asking questions about what they need in order to make this building more energy-efficient. Then we come back to the office, do the calculations, put spreadsheets together, and determine which products in the market are the best fit for that particular project.

...Once that is done, we present our findings and recommendations to the people who will be making the decision. If they choose to move forward with the project, that's great. If they don't, they may tell us that they're not comfortable with some aspect of the project in particular. In that case, we'll revisit the topic to ensure they have all of the information they need and want. Most of the time, after two or three back-and-forth meetings, the project will move forward.

The best part about this job is when the project gets done and the customer is happy. And we are happy to see that they listened to our recommendations, that they completed their project, and that they were able to get the energy savings they were expecting.

How did you get started working in this field?

In 1999, I finished my bachelor's degree in mechanical engineering. After that, I was hired by Chemical Industry in India. While I was working there, I noticed I was interested in how I could make their process flow better—that is, how I could make the movement of material and labor more efficient. That's when I realized that I wanted to be in the field of making businesses more energy-efficient.

In 2002, I came to the United States to get my master's degree in mechanical engineering. While I was finishing up my master's, I was working on a fuel cell, which is a renewable energy source. That work brought me closer to what I wanted to be doing....

Problem Log

In 2005, the Industrial Assessment Center at the University of Louisiana put together a conference for commercial customers in New Orleans. The owner of Energy Management Solutions was one of the presenters. I was facilitating and heard his presentation. I knew this is the field I would like to be in, so I gave him my resume.... About one month after I took my technical test, I was flown to Minnesota for a face-to-face interview. A week later, I was offered an internship. A few months later, I was a full-time employee. I am still working for Energy Management Solutions and love every bit of it.

What sort of training or education do you have?

I have a bachelor's and master's degree in mechanical engineering. I worked for the Industrial Assessment Center for a year and a half, and I have since become a certified energy manager, certified energy auditor, and certified lighting efficiency professional. All three are certified by the Association of Energy Engineers.

That's my formal experience and educational background, but we have to keep doing things to remain knowledgeable in a changing market. For instance, I have attended a lot of trainings regarding compressed air, HVAC, refrigeration, steam, and motors. I also read related magazines and go on websites like the one for the Association of Energy Engineers and for the U.S. Department of Energy to keep myself on top of new technologies. Additionally, I sometimes go to energy design conferences.

What sort of tools, machines, or equipment do you use regularly?

I use a laptop and cell phone, as well as GPS devices, thermometers, thermo-sensors, data loggers, light meters, and infra-red cameras.

I always have a light meter with me to determine lighting levels. This helps determine how we can maintain the same lighting level but with more efficient lighting or lets us know if those lighting levels are efficient as they are. I also always carry a thermo-gun with me. It's a sensor to see whether parts of a building may have energy leaks....

Cell phones and laptops are always handy for us. Sometimes we sit down with a customer to process the data right away. We can do some spreadsheets so we have an idea of what our recommendations will look like and what the energy savings calculations will look like to give the customer an estimate of what's going on.

What skills or personal qualities are good for this job?

...you have to be a good communicator. You should be persuasive for people to realize what you have to offer. Do remember this: customers will be investing a lot of money in their project....

You should also have good mathematical skills. You should be good in Excel so you can easily pull up reports and clearly communicate. You need to communicate, "This is what I'm saying, and this is *why* I'm saying it. These are your pay-backs, and here are your projected energy savings in the next year."

So you have to be a good presenter, persuader, and communicator. You have to help them make decisions. You can't just give them a spreadsheet and move on. You have to follow up. If there is a question, you need to give them an answer. If you give them a report and it sits on their desk, the project might not happen. If you give them a report and follow up to see what's going on, they might tell you, "I'm not comfortable because I'm not sure if this will work." Then we come back with more information that the customer can look at to help him better understand what we're suggesting. He can look at it, read it, and feel comfortable that what we're suggesting has been done before and has a proven track record.

What do you enjoy most about your job?

I enjoy that I get to wear different hats every day. I get to visit different people, different facilities. Sometimes I'm in a food processing facility, sometimes I'm in a city building, and sometimes I'm in schools or shipyards. We get to travel a lot. We get to see different places. Every place that we visit has an entirely different scenario.

The other thing that I like is talking to the customers and helping them make good decisions about energy conservation....

How does your job benefit the environment?

It is a direct impact on the environment: lower energy usage results in lower greenhouse gases, which positively impacts the environment. The benefit is very direct.

Are there any common misconceptions about this type of work?

Until recently, energy conservation used to be a topic that was almost an after-thought. But since the economy has changed, people have started to worry more about the profitability of their company. They're looking into forecasting their future profit and how their industry would be doing in the future. Electric and gas rates are going up, and energy is getting expensive. So this type of work is no longer an after-thought. It's seen as more relevant and important.

Also, people used to think that anyone can do energy audits, and that's not true. You have to know what you're recommending. You have to know what's going on. You have to be familiar with the business....

What is your advice to someone interested in this field?

...Internships are always helpful. We have people approach our organization for internships, and for the past five years we've had interns every year. Some of the people I have personally given recommendations for are now in this field. In fact, this morning we interviewed a woman who might intern with us. If it works out, she will start working for us soon.

Any final thoughts you'd like to add?

I'm passionate about my job because I like wearing different hats every day. I'm not just sitting at my desk doing the same thing every day. I'm visiting different customers, looking at different projects, looking at different problems. And different people try to save energy in different ways. Some try to use less water; some try to use less gas; some try to use less electricity. And that makes it interesting....

But what I like best about my job is when customers complete projects using my recommendations. It's a great feeling when you walk into the building after the project is done and the customer says, "Hey, Tanuj, thanks for telling us about this. It worked, and we love it!"