

## Energy Engineer

Interview by Melissa Hartman

### Jordana Viuker, Senior Energy Engineer Bright Power, Inc.

Before she went to college, Jordana Viuker thought she might follow a pre-medical track. Instead, she earned a bachelor's degree in biological anthropology from Pomona College and then a master's degree in civil and environmental engineering from Stanford University. She has been an energy engineer at Bright Power, an energy management firm, since 2015.



#### What drew you to this career?

My family's frequent trips to national parks instilled in me a love of the wild world. I was drawn to the magic of nature and, specifically, our role within it. I wanted to learn more about our species—the human animal—so in college I majored in biological anthropology. But it was always the interaction between the non-human world and our own that captivated me. This feeling grew steadily throughout my life into a passion for reducing the harmful impact that our civilization has on the rest of the planet and its inhabitants.

A career in engineering never occurred to me. But after I finished the course requirements for my major, I started taking courses on energy and the environment. I saw the potential to make an impact, so I co-founded a biodiesel initiative for the Claremont Colleges.\* Alternative energy sources were the focus of my first job after graduation, at a residential solar photovoltaic company.

#### But then you went back to school. Why?

Producing electricity from solar radiation on buildings is great because it's providing clean energy, but I realized that my interest was really in reducing a building's resource consumption to begin with.

My graduate work in civil and environmental engineering taught me about buildings, and I earned a master's degree in sustainable design and construction. After graduate school, I interned at a sustainability consulting firm and a non-profit training organization to gain more hands-on experience and qualifications—like certifications from the Building Performance Institute (BPI) and the U.S. Green Building Council (USGBC).

#### What exactly does an energy engineer do?

This job involves working closely with architects and mechanical/electrical/plumbing (MEP) engineers throughout design—as well as with contractors during construction to ensure that the intent of the designs is fulfilled.

I work with developers of multifamily mid- and high-rise new construction and rehab projects. My focus is on energy and water use, but I also deal with issues related to indoor environmental quality, materials selection, and land use.

#### What would be a red flag to you that something in a design or project might not be as efficient as it could be?

It could be something as straightforward as the efficiency rating of a certain heating, cooling, or domestic hot water system. I examine the efficiency of these systems' layouts, pumps, and controls; check sizing calculations to ensure equipment is not oversized to meet the necessary loads; and suggest how construction of these systems can be improved.

I also look closely at exhaust and supply ventilation rates. The goal is to exhaust air and provide fresh air as required by building codes, but not over-ventilate, which wastes not only fan energy in moving these air streams, but also energy used to heat or cool the air supplied.

Another red flag is poor window design. I want to make sure that the windows themselves are high-performance, but also that they are installed to prevent air infiltration (leakage) and thermal bridging (i.e., the conduction of heat from the interior to the exterior of the building in the winter, and vice versa in the summer).

#### Are most people in your field trained as civil engineers?

That's the degree I have. But this role can be filled by a wide variety of backgrounds—many of my colleagues are mechanical engineers; some are architects by training; some are just out of college with a degree in environmental science. Regardless of one's formal education, learning on the job is critical in our field.

\*Pomona College, where Viuker earned her degree, is a member of this five-college consortium.



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**Does it require a license?**

Not in the role I'm in. The engineer of record—the person usually contracted by the architect to design a building's systems—needs a license. I am contracted by the developer/owner to consult and review the architect's and the engineer's designs. By having a seat at the design table, I can help ensure the quality of what gets built.

**What is a typical day like for you?**

In the office, I review architectural and mechanical drawings and comment on products proposed for installation by contractors. Some of my job takes place on construction sites, inspecting work, making sure it's high-quality and meeting the expectations of the design, especially the energy efficiency considerations. My time on site can range from an hour to a full day depending on the state of the project and type of inspection I'm doing.

**What are you working on now?**

I have a lot of projects that are targeting Passive House certification, a very ambitious energy standard related to building a very tight and highly insulated "envelope" (which comprises a building's outer walls, roof, foundation, windows, and doors). Passive House for multifamily buildings is fairly new and the standard is very rigorous, so I'm more closely involved in the design and monitoring of construction than I am for more typical buildings.

**What do you find most challenging about this job?**

The building industry can be slow to change. The irony is that most construction decisions are driven by cost, but the prices of energy and materials today do not reflect the true cost of their global warming potential. If one day we have a system like a carbon tax that includes the actual costs to the Earth inside each product's price tag, then my job can

focus more on maximizing energy savings than on convincing owners that this is the right thing to do.

**What do you like most about your job?**

I enjoy learning about new technologies. I also love working with very smart people who care about the planet and its future. It feels good to know I'm doing this job to make the world a healthier place for all species—especially humans.

**How do you think this job might be different in 10 years?**

The content of the job will evolve. There will still be a need for energy ambassadors within the building industry to disseminate information on how to build in the most sustainable ways possible. But what that specifically entails will change as new technologies emerge and the electric grid becomes cleaner. People in this role will certainly also be looking at issues of building resiliency, as climate change continues to affect our environments locally.

In 10 years, developers are likely to care more about the health and wellness impact their buildings have on occupants. Building owners are already seeing that they can charge higher rents for more energy-efficient rental units with lower utility costs. Hopefully the market will continue to be driven toward better indoor environments as well.

**What advice do you have for readers who are interested in this field?**

In any profession, it's a huge asset to be familiar with as many different aspects of a given field as possible. For my career, that's meant having as much hands-on experience in construction and buildings operations as I can get. Don't minimize any opportunity; learning experiences that are self-driven, such as small construction projects or investigations in one's own home, can be the most rewarding. ■

**What energy engineers do**

Energy engineers, sometimes also called energy efficiency engineers, make sure that buildings are as energy-efficient as possible. They work with architects to make sure construction and rehabilitation projects create continuous thermal and air boundaries; with mechanical, electrical, and plumbing (MEP) engineers to incorporate efficient space heating, cooling, lighting, and hot water systems; and with builders to ensure that projects are completed as intended to prevent energy waste. Energy engineers are usually consultants whose role is to review, comment on, and inspect projects at various points of completion. Some conduct energy audits and create models of energy flows to determine where existing buildings can be retrofitted to improve efficiency.

**Where they work**

Energy engineers work everywhere from construction and development firms to energy companies and consulting agencies. Many industrial manufacturers also employ energy engineers.

**Education required**

Most energy engineering positions require at least a bachelor's degree in engineering or a related science discipline.

**Salary range**

According to the Bureau of Labor Statistics, the 2016 median salary for energy engineers was \$97,300.

**Learn more**

**Science Buddies Career Profile**  
[sciencebuddies.org/science-engineering-careers/engineering/energy-engineer](http://sciencebuddies.org/science-engineering-careers/engineering/energy-engineer)

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