IEEE Madison Section Newsletter

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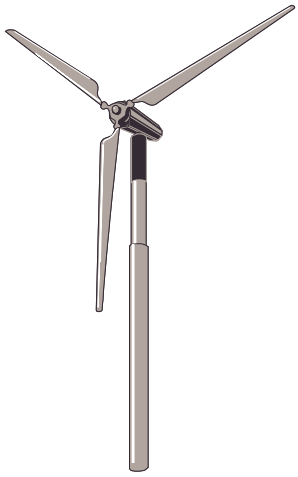
## Wind Turbine Generators: A Comparison of Machine Technologies



**Date/Time:** Thursday, September 20, 2007, 11:45 - 1:00 PM
**Speaker:** Mitch Bradt, PE, University of Wisconsin Dept. of EPD
**Location:** Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444
**Menu:** Pizza buffet, salad and soft drinks (cost $10.00, free for student members)
**RSVP:** by September 17th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.224.0664

*Non-member guests are always welcome!*

The wind generation market is growing at the rapid rate of 27% annually. It is possible that a national renewable energy standard could emerge advocating 20 to 30% of all energy consumed in the US be provided by renewable resources by the year 2030. Wind generation technology has significantly improved in recent years in terms of increasing the harvest of wind energy, exploiting low wind speed sites, and ameliorating the concerns of reactive power flow.

What is meant by an asynchronous generator; or a doubly-fed induction generator? How do the machines of that are utilized in wind turbines differ from conventional generators at a typical thermal power plant? What are the electrical behaviors for different machines? An brief introduction to the mechanical and electro-mechanical conversion process will be presented for several common wind energy conversion systems. It is the intention that this presentation be the first of a three meeting series; the second and third of which will include a tour of an operating wind farm and a wind turbine manufacturing facility.

Mitch Bradt is a certifiable Wind Geek. He is a Program Director at the University of Wisconsin's Department of Engineering Professional Development, where he develops and delivers continuing engineering education for practicing engineers. He has worked in the design of substation protection and control systems and the application of power electronics at a utility scale. He has also worked in product development and R&D for the aerospace industry while serving in the U.S. Air Force. He received the MSEE from UW-Madison and the BSEE from Marquette University.

## Unleash Your Inner Innovator

*By John R. Platt*

I first met Jeff (not his real name) at a bookstore in central New Jersey. Jeff was an IEEE member and an engineer, but he didn't seem to have a very high opinion of himself. "I just do my job," he told me. "I'm not one of those R&D guys."

This surprised me. I asked him, "Don't you think you'll invent something some day?" "Nah," he replied. "I don't think I have it in me to do something really innovative."

I felt bad for Jeff, because of those two words he used: "really innovative." Without even realizing it, Jeff was placing so much pressure on himself and his creativity that he wasn't even willing to try.

The truth is, ideas come in all shapes and sizes, and anyone can come up an innovative idea. But unfortunately, not everyone puts themselves in an intellectual place where they are ready to take advantage of their own creativity to do something innovative.

So... how do you come up with something innovative? Sometimes all it takes is putting yourself in the right frame of mind. Here are some strategies and approaches you can take to help unleash your own inner innovator.

### Step 1: Ignore the Nay-Sayers... Including Yourself

The first step toward coming up with an innovative idea is to give yourself permission to innovate. You can't do anything if you're holding yourself back. If you have ideas, let them live. Write them down. Try them out. Test them. Voice them. Exercise your creativity. The more you let yourself think in new ways, them more often you will do it.

Don't let others shoot your ideas down, either. This can happen far too often on an organizational level. "That won't work here" or "We've

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always done it this way" are no longer excuses. Rigidity leads to stagnation. Don't be afraid of change. Embrace it.

### Step 2: Start Small (Unless You Think Big)

Not every innovation changes the world in one giant step. Sometimes it's just as important to make small, incremental changes.

Think about it: can you make a small improvement to something that already exists? Can you add value to an existing application? If you could improve a device that you use every day, how would you do it? Can you combine two ideas and make them better or easier when the work together?

Along the same line, many processes are ripe for improvement and innovation. Start by taking a look at the processes you use every day. If something takes ten steps, can you do it in nine? If not, can you trim the time for any of the steps and make them more efficient? Is there an entirely different way of doing something which will produce the same or similar result? Can you cut costs? These are all vital questions, and answering them is just as important as coming up with a new product.

You don't have to start small, of course. Your ability to innovate is limited only by your ability to dream. Speaking of which...

### Step 3: Inspire/Challenge Your Creativity

You've probably heard the expression "think outside the box." It's a good phrase, but how do you actually do it?

Here's one example. In 1975, musician Brian Eno and painter Peter Schmidt came up with a technique to break themselves out of creative stalemates. They produced a deck of cards they called "Oblique Strategies." Each card contained a simple, challenging statement, like "change instrument roles," "turn it upside down" and "emphasize the flaws." While some of the cards obviously have more to do with music than anything else, they have been used for years by numerous writers and creative people to help point their work in directions they might not otherwise have expected.

The lessons of "Oblique Strategies" are simple: ask questions, don't make assumptions, don't force yourself down the same path over and over again, look outside yourself, and trust yourself to come up with the answers you need.

### Step 4: Role Play

Let's say you're working a particularly thorny problem, and you just can't come up with an answer. But perhaps you know of someone else in your field — let's call him Fred — who excels at this type of work. Don't go ask Fred for help, but instead, ask yourself: "What would Fred do in this situation?" Get inside Fred's head and put yourself in his shoes. By looking at things from Fred's perspective, you might be able to role-play yourself into an answer.

This technique also works in reverse. Just ask yourself, "What wouldn't Fred do?" Sometimes taking the opposite approach of the experts in your field can yield surprising results.

Another form of role playing can be of great use when working on new products. Try to put yourself in the mindset of your end-user. How will they use a product? What need will it serve? What problems would get in the way of their enjoyment? What would make it more useful? Understanding your customer is more than a marketing technique, it can help you to fill a need that isn't being filled.

### Step 5: Absorb Everything

Your mind is just like your stomach: it needs to be fed in order to fuel your creativity. Read everything you can get your hands on. Try new things. Cram your head with concepts and ideas and realities. Once your head is full, your subconscious mind can start to sort through all of those little bits of information and combine them in unexpected

ways. When something new comes along, it may trigger a memory of something else, and your mind may combine the two to create something entirely new.

One man who understands this practice is science-fiction and comic-book writer Warren Ellis (Planetary, Crooked Little Vein). Ellis is known for the wild ideas which populate his fiction. He also has a very good take on where inspiration, creativity and innovation come from: "You take it from everywhere. It's like making compost: you stack up a big pile of crap until it starts steaming, and hope something useful fuses together at the bottom of the pile. You take in as much information, as much experience, as possible, and let it float around until bits connect together and form something new. That's inspiration. That's writing."

That's also innovation. Give it a try. See if your mind can take one plus one and come up with three.

### Step 6: Try, Try, Try, then Fail Again

Not every idea is going to pan out. Don't worry about it. Learn from your mistakes, and keep trying. Or examine where you went wrong, and ask if it might lead to something different than what you were trying in the first place.

After that, start again. You've got nothing to lose.

*John R. Platt is a freelance writer and marketing consultant. He can be found online at www.john-platt.com. Comments may be submitted to todaysengineer@ieee.org.*

## Unit Conversions

For all you folks who have difficulty converting units:

- Ratio of an igloo's circumference to its diameter = Eskimo Pi
- 2000 pounds of Chinese soup = Won ton
- 1 millionth of a mouthwash = 1 microscope
- Time between slipping on a peel and smacking the pavement = 1 bananosecond
- Weight an evangelist carries with God = 1 billigram
- Time it takes to sail 220 yards at 1 nautical mile per hour = Knot-furlong
- 16.5 feet in the Twilight Zone = 1 Rod Serling
- Half of a large intestine = 1 semicolon
- 1,000,000 aches = 1 megahurtz
- Basic unit of laryngitis = 1 hoarsepower
- Shortest distance between two jokes = A straight line
- 453.6 graham crackers = 1 pound cake
- 1 million microphones = 1 megaphone

**Position: Senior Electrical Engineer**

A growing company in the renewable energy field is seeking a senior level electrical engineer to work in the design and development of renewable energy projects. This is an excellent opportunity for the right candidate. The successful candidate will have a minimum of 10 years experience in the design of medium-voltage distribution and transmission systems, and will be familiar with the design principles that apply to electrical generating facilities. The ability to communicate effectively with others is essential.

**Qualifications:**

Must have experience with and a broad knowledge of topics and methods in electrical power engineering. Degree: Minimum BSEE, but MSEE is desired. Should be licensed by Illinois to practice engineering, and be willing to seek licensure in other states.

Please visit www.iee-inc.com/employment.asp for a full description of this excellent opportunity. Please send all resumes to info@iee-inc.com or mail to:
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