ENERGY

Power Traders

From offices at FPL's corporate campus, a group of 35 traders, analysts and managers wheels and deals, buying and selling power and procuring fuel. By Mike Boslet

"Fuel is where all of our dollars are spent," says Gerry Yupp, senior director of wholesale operations at FPL's Energy Marketing & Trading division. The utility expects to spend \$3.2 billion on fuels this year.

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The atmosphere at Florida Power & Light's energy trading group is more accounting department than *Wolf of Wall Street*. But while the office may not buzz with the frenzy of a stock exchange floor, the men and women who work here share their Wall Street brethren's desire for power. Loads of it.

Power precisely, megawatt hours of it — is a commodity that util such as FPL buy and sell to each other ery day he wholesale market . If FPL generat or bore than it needs and can sell a megawatt hour for more than it costs to generate it, off the power goes to a utility that's willing to pay the price ["Transactions," page 73].

Conversely, FPL's "power traders" often buy power from utilities such as Tampa Electric and Duke Energy when market prices are below FPL's cost of generation. "Those gains on sales and all of those savings on purchases get passed back … to our customers," says Sam Forrest, vice



FPL senior fuel trader Bill Miller monitors three screens. On one, he communicates with buyers and sellers of fuel. president of FPL's Energy Marketing & Trading division.

The group of 35 traders, analysts and managers occupies space in the corporate campus of FPL's parent, NextEra Energy, just off State Road A1A in Juno Beach.

Each day begins with analysts using software to run projections for fuel consumption. The GenTrader software computes the marginal price of power. Above that price, FPL's traders sell. If they can buy power below that price, they buy, says. Gerry Yupp, the trading unit's senior director of wholesale operations. Utilities "all valuate our costs the same way," he adds. "It's a very transparent process."

Over the course of a typical morning, traders connect with their counterparts at other utilities, usually by instant messaging but sometimes by phone, to discuss purchases. Traders have the flexibility to negotiate final transaction prices, but there's not really much wheeling and dealing. The Federal Energy Regulatory Commission controls the "adders" utilities can apply to their marginal cost of power when selling energy, eliminating the opportunity to price gouge.

Power trading is usually a low-key affair. But a sudden plant shutdown or the onslaught of severe weather conditions, particularly cold spells, can turn the normally calm bunch of power traders into a direct-to-video version of Hollywood's stock market hustlers.

So it was in early 2010 when a cold front pulled into south Florida. With no power available from other utilities, which were also coping with the weather, the operations group focused on fuel management and maintaining adequate supplies of oil. On Jan. 11 alone, demand hit a record 24,512 megawatts, 1,488 megawatts shy of FPL's capacity. As the system hit peak load, FPL was able to sell power to three other utilities in the state.

That year also stands out as FPL's highwater mark for energy trading. The group racked up \$82.7 million in savings, with savings on purchases accounting for all but \$4.4 million of that amount. The total savings that year amounted to an 80-cent reduction on a typical monthly power bill for a year, Forrest estimates.

From 2001 through 2013, FPL's energy trading unit recorded \$557 million in savings that went to help lower monthly bill

E D resource has its price. While nuclear has the lowest fuel cost, it makes up shan a quarter of FPL's output.

Air Mechanics

Siemens trains 200 technicians a month in operating and servicing wind turbines.



The great irony of the new Siemens Energy's Wind Service Training Center in Orlando is that Florida lacks the basic resource for being a wind-energy producer. The Plains States and West Texas are more favorable U.S. locations for operating the windmills of the 21st century.

Florida's "wind resources are not of great enough magnitude" to make the current wind energy technology truly productive, says Tim Holt, CEO of Service Renewables at Siemens Energy. "However, as new wind turbine technology develops, such as longer blades and taller towers, the wind industry will be able to explore development in states where wind energy is not yet available."

What the Sunshine State does have is Orlando International Airport, which Siemens Energy found convenient for bringing in wind turbine service techs stationed throughout the Americas. Siemens



Siemens' Wind Service Training Center in Orlando uses three 30-foot towers and two 100-ton generators to train techs.

One 2.3-megawatt onshore wind turbine can power nearly 700 average U.S. houses a day, says Kevin McCarty, Siemens' technical training manager.

opened the \$7-million, 40,000-sq.ft. wind service training facility near the airport in September 2013 on the heels of a boom in wind turbine installations in the United States. The facility trains about 200 Siemens wind turbine service techs a month.

The center combines classroom training with realistic technical, mechanical and safety exercises performed on three 30-foot towers and in two actual, 100-ton-plus nacelles, the generator components of the turbine. The nacelle sits atop an 80- to 100-meter tall steel cylinder, harnersing three blades — each measuring feet to 180 feet — that generate power when turned by the wind. One 2.3-megawatt onshore wind turbine can power nearly 700 average U.S. houses for a day, says Kevin McCarty, Siemens' technical training manager.

The ideal candidates for the job include airplane mechanics and other techs with experience in hydraulics and electrical systems, Mc-Carty says. The work takes techs to remote locations, even to offshore wind farms, where they work in pairs for a week at a time. The acrophobic and/or claustrophobic need not apply.

Only three months after opening the wind service training facility, Siemens announced it had received the largest onshore wind turbine order in the world. The \$1.9-billion deal with MidAmerican Energy will create five wind farms in Iowa, with 448 turbines generating a total output of a gigawatt of power by late 2015. That's enough clean energy for nearly 320,000 average American households a day, Siemens says.

Stronger Winds

The American Wind Energy Association says wind power grew to more than 61,000 megawatts in 2013, a 140% increase over five years. Nationwide, wind power made up 4.13% of all electricity generation in the United States last year, the AWEA reported.

Florida Falls Short

A U.S. Department of Energy wind map shows Florida wind speeds at 80 meters above ground moving generally at less than five meters per second. Meanwhile, winds in the country's midsection move at sevenplus meters per second at the height of a typical wind turbine.

Sunny: Still on the Cusp





OUC's Community Solar Farm provides power to 39 customers. The municipal utility is looking into expanding its solar service.

In 2009, Bob Reedy was quoted in a magazine article as saying that by 2012 "every home (in Florida) will be built covered with" solar panels. Reedy, director of solar systems research at UCF's Florida Solar Energy Center, based his prediction on what he saw as a surge in manufacturing of photovoltaic cells, the shiny panels that convert sunshine into energy.

Well, here we are in 2014, and Reedy might as well have predicted everyone would be driving electric cars by now. Reedy says he doesn't recall making that prediction, but he is even more certain now than he was five years ago that solar power in Florida is on the cusp of a boom.

It's a matter of simple economics, he says. The cost of photovoltaic cells has fallen by about two-thirds since 2009 while electric utility Even though the cost of photovoltaic cells has fallen drastically in the past five years, solar power's time still may be years away. rates have gone up every year and will continue to rise. At some point soon, Reedy predicts, the upfront cost of solar no longer will deter investment in it, as has been the case.

"It'll be driven by money, not by wanting to help the environment," he says. "It's a pocketbook issue."

Indeed it is, says Michael Kerr, a partner in Blue Energy Electric, an energy consulting company with locations in Oviedo and Stuart. Kerr says he has seen the cost of photovoltaic plummet 50% in two years, to about \$2.50 a watt, but the decrease in cost hasn't boosted demand for solar installations so far. A typical five-kilowatt residential system costs about \$12,500, he says, a price that remains prohibitive for many homeowners, despite a 30% federal tax credit for converting to solar power.

While Kerr says solar invest-

ment is nearing a quick payback period, the Florida Solar Energy Center estimates that it could take as long as nine years to recoup the upfront cost. By 2025, the center says, the payback time period may be only a few years.

Orlando Utilities Commission may have found a way for homeowners and businesses to use solar without spending five or more figures to buy photovoltaic systems: Rent solar power from a utility company, as has been the practice with electric power.

OUC's new Community Solar Farm provides solar power to 39 customers, charging them 13 cents per kilowatt hour, or about 3 cents more per kilowatt hour than OUC's base rate. But the solar rate is fixed for 25 years. An OUC spokesman says the municipal utility is looking into expanding its solar service.

Duke's Billion-Dollar Plans

Duke Energy, the second-largest utility in the state, plans to spend nearly \$1.7 billion on building a combined-cycle, natural-gas plant and two simple-cycle combustion turbine generators at two Florida facilities. The new generators and a \$160-million upgrade to a third facility will produce a combined 2,200 megawatts of power by 2018.

The improvement plans come as Duke continues with the decommissioning of the structurally damaged Crystal River nuclear plant, which has been offline since 2009. The company also recently announced it had canceled plans to build a nuke plant in Levy County.

If it gets regulatory approvals, the Charlotte, N.C.-based utility expects to begin construction in 2016 on a natural-gas addition to its Crystal River Energy Complex. The \$1.5-billion project is slated to replace two 1960s-era coal-fired plants at the same facility and bring up to 700 jobs to the Citrus County area. Duke says it decided to retire the old units rather than equip them with scrubbers to meet federal regulations. A scrubber removes sulfur dioxide emissions, a major air pollutant, from the exhaust of a coal-fired power plant.

Duke also plans to begin operating in 2016 two simple-cycle combustion turbine generators at its Suwannee Plant near Live Oak. The generators will produce 320 megawatts of power and will be used to meet peak periods of demand. The new units cost \$197 million and will replace three steam plants built in the 1950s.

Finally, Duke will install inlet airchilling units at its Hines Energy Complex in Polk County to increase efficiency and power output during summer months. The upgrades will be in place by 2017, boosting the 1,912-megawatt Polk plant's power generation by 220 megawatts.

Duke's Florida customers — now at 6 million — will pick up the tab for the upgrades, paying a "recovery" fee of \$9.19 per 1,000 kilowatt-hours.

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Waste to Energy

Sustainable energy producer Harvest Power is nearing its first full year of converting organic waste into renewable biogas and fertilizers.

Harvest's Energy Garden gets its organic waste from area hotels, restaurants and theme parks. The producer uses anaerobic digestion, "naturally occurring microorganisms to break down organic materials and produce biogas - a mixture of methane and carbon dioxide" - that is then combusted to produce renewable energy, according to the company's website. The company says the plant is the fir kind in the country. It produces 3.2 megawatts of power and 1.6 megawatts of recoverable heat, with the latter being used to dry natural fertilizers. Harvest says the facility can process 130,000 tons of organic waste a year.



Harvest's Power's Energy Garden in Orlando converts waste into energy using 'naturally occurring microorganisms to break down organic materials.'

Testing Carbon Capture

Tampa Electric's Polk (County) Power Station is the site of a carbon-capture research project that could lead to the clean and efficient use of fossil fuel sources. The U.S. Department of Energy is funding the \$169-million demonstration of RTI International's warm synthesis gas (syngas) desulfurization system.

According to RTI, the technology "removes contaminants at warm process temperatures, eliminating the need for substantial syngas cooling and expensive heat recovery systems."

The project, running through next June, could yield commercially viable applications for the clean and efficient use of coal for the generation of electrical power, says Wayne Holden, president and CEO of RTI.

RTI says its system also is expected to demonstrate a process for capturing more than 90% of the carbon dioxide from the syngas stream. "Following cleanup, the hydrogen-enriched syngas will be reintroduced to the Polk 1 plant and combusted in the existing syngas turbine," the company says.

► Investor-Owned Utilities

Utility	Headquarters	Top Executive	Florida Service Area	Power Sources	Florida Customers	1,500 KWH Residential Charge
Florida Power & Light	Juno Beach	Eric Silagy	Eastern/south Florida	natural gas: 67.4% nuclear: 22.6% coal: 5.4% other: 4.6%	4,572,776	\$145.67
Duke Energy Florida ¹	Charlotte, N.C.	Lynn J. Good	Big Bend/central Florida/Tampa Bay	natural gas/oil: 57.2% coal: 26.2% other: 16.6%	1,619,716	\$176.54
Tampa Electric	Tampa	Gordon L. Gillette	Hillsborough County	coal: 50.3% natural gas: 39.2% other: 10.5%	687,000	\$150.83
Gulf Power	Pensacola	Stan Connally	Northwest Florida	natural gas: 76.5% coal: 48.5% other: -27.5% ²	439,783	\$166.38

¹ Formerly Progress Energy; merger completed July 2012

² Gulf Power generated more energy than its Florida customers consumed and sold the excess to Southern Co.

Note: Ranked by customers. "Other" includes non-utility generated power, out-of-state generators and alternative energy sources.

Source: Florida Public Service Commission; respective utilities. Research by Laurie Graulich

Non-Investor-Owned Utilities

Utility	Headquarters	Top Executive	Service Area	Florida Customers	1,500 KWH Residential Charge
JEA	Jacksonville	Paul McElroy	Northeast Florida	426,771	\$171.19
Orlando Utilities Commission	Orlando	Kenneth P. Ksionek	Orlando	214,424	\$165.15
Lakeland Electric	Lakeland	Joel Ivy	Lakeland	122,057	\$112.92
City of Tallahassee Electric Utility	Tallahassee	Rob McGarrah	Big Bend	115,343	\$170.30
Gainesville Regional Utilities	Gainesville	Kathy E. Viehe	Gainesville	92,556	\$223.65
Kissimmee Utility Authority	Kissimmee	James C. Welsh	Osceola County	64,297	\$165.22
Ocala Utility Services	Ocala	David Anderson	Ocala	48,456	\$173.30
City of Vero Beach Electric Utility*	Vero Beach	Ted Fletcher	Vero Beach	34,401	\$192.23
Florida Keys Electric Cooperative	Tavernier	Scott Newberry	Monroe County	31,535	\$173.99
Keys Energy Services	Key West	Lynne E. Tejeda	Lower Keys	30,637	\$191.68
Fort Pierce Utilities Authority	Fort Pierce	William G. Thiess	Fort Pierce	27,717	\$182.16
Lake Worth Utilities	Lake Worth	Clayton Lindstrom	Lake Worth	26,325	\$151.18
New Smyrna Beach Utilities Commission	New Smyrna Beach	William R. Mitchum	New Smyrna Beach	25,938	\$157.77
Homestead Energy Services	Homestead	Barbara Quinones	Homestead	22,317	\$175.73
Reedy Creek Improvement District	Lake Buena Vista	Bill Warren	Walt Disney World	1,352	\$182.11

* Pending sale to FPL

Note: Ranked by customers. Local taxes, franchise fees, and gross receipts taxes not embedded in rates are excluded.

Source: Florida Public Service Commission; respective utilities. Research by Laurie Graulich