AGCO Your Agriculture Company
myFarmLIFE.com

Baling BTU

A switch to switchgrass generates both energy and economic activity in southern Virginia.

BY JASON JENKINS | PHOTOS BY JASON JENKINS

Inside the boiler plant at Piedmont Geriatric Hospital near Burkeville, Virginia, an earthy aroma wafts through the air. It's a warm and inviting smell, a scent that simultaneously hints of both a campfire and baking bread.

"You can definitely tell when we're burning switchgrass and not fuel oil," says LW Wilson, the plant's longtime manager. "It's got a unique smell. I have to admit, I kinda like it."

Since 2013, the smell of switchgrass has filled the air almost daily at the boiler plant. It operates 24 hours a day, 365 days a year, generating steam that supplies heat and hot water to the hospital and other buildings within the state-owned facility. The plant is a unique success story of energy independence, one made possible thanks to a partnership of private and public stakeholders.

Trial Run

FDC Enterprises delivers switchgrass to the boiler at Piedmont Geriatric Hospital near Burkeville. The renewable fuel saves the hospital $1,800 to $2,200 per day versus other fuel sources.

More than a decade ago, representatives from the Conservation Management Instituteat Virginia Tech University embarked on an ambitious endeavor: create a sustainable, renewable, homegrown biofuel using native warm-season grasses, such as switchgrass. Working in conjunction with the hospital, they wanted to evaluate if the grass could substitute for fuels such as coal, sawdust and No. 2 fuel oil, thereby reducing both heating costs and emissions. The team reached out to FDC Enterprises in Springfield, Ohio, a company that specializes in establishing native grasses and forbs, to get the first stands of switchgrass established.

“When you think about oil or coal, it’s not coming from Nottoway County,” recalls Fred Circle, FDC’s president and CEO, referring to where the hospital is located. “Energy independence means something here, and this was a research project to prove they could actually save money and yet still do a better job of husbanding our resources. So, we got involved and planted the first 380 acres of grass.”

Circle says the process was very much trial and error. Getting material into the boiler using the plant’s existing conveyance systems proved problematic.

“We thought that would be really easy with grass, but boy, did we guess wrong,” he says. “The project ran out of money, and they basically had to abandon it. After about 60 days, the hospital administration called us. They asked us to come back and see if we could finish it. We figured it out.”

From 2008 to 2013, FDC supplied switchgrass, predominantly in the wintertime, that met some of the hospital’s fuel needs. In January 2011, the team began a 44-day burn using biomass exclusively, to great success.

“During that run, we saved just shy of $44,000 with the grass, which was cheaper than fuel oil,” Wilson says. “We had no issues with the boiler or the conveyor.”

The next year, a similar 50-day burn netted almost $100,000 in fuel savings. That was enough evidence for the Commonwealth to invest $7 million in a brand-new biomass boiler.

“Since that time, we’ve been burning year-round,” Circle says proudly. “We’re saving them anywhere from $1,800 to $2,200 a day versus other fuel sources.”

Fred Circle

Growing Grass

Supplying enough biomass to constantly feed the hospital's boiler required FDC Enterprises to expand its managed switchgrass acreage. With help from the county, the company identified interested landowners. FDC leased each parcel, establishing the grass, performing annual maintenance and harvesting each fall. In return, landowners now receive either a per-acre rental payment or per-ton payment from the biomass harvested. With a sole-source contract from the Commonwealth, FDC was able to provide landowners with a guaranteed income source.

"Our typical landowner is taking a portion of his farm that he's not making any money on, like an old cattle pasture, tobacco field or fields that aren't fit for traditional row crops," Circle explains. "In this part of the world, you don't get much out of pasture. We have folks making about 10 times more per acre, on average, letting us grow switchgrass on their land."

Circle says that in addition to the income, landowners reap other benefits. The perennial grasses help prevent erosion, sequester carbon and enhance water quality while providing habitat for wildlife. "There's really no downside to any of it," he adds.

Better Btu

Previously, sawdust from local mills was used as fuel in the hospital's older biomass boiler. While the wood byproduct provided energy, as much as half of the sawdust volume could be water, which decreased the boiler's efficiency.

Switchgrass hay, on the other hand, averages less than 15% moisture. The monoculture stands of grass that FDCmanages are baled and then stored under cover.

The company uses a large tub grinder to reduce the grass stems to a consistent length for feeding into the boiler with maximum efficiency. On average, the forage contains 12 million Btu per ton, Wilson says.

"A guy who's raising cattle is trying to hit a nutrient spec with his hay, but we're trying to hit a Btu spec with our switchgrass," Circle explains. "Whereas the cattle guy doesn't want his hay to get rained on and lose nutrient value, that's not a concern for us. I can get rain on grass, and it doesn't change the Btu value."

While interest in alternative energy seems to rise and fall with the price of a barrel of crude oil, Circle says he sees sustained support for switchgrass. In 2017, the Virginia Department of Environmental Quality awarded the team the Governor's Environmental Excellence Gold Medal. FDC Enterprises is actively seeking more acreage in Virginia, while also exploring related projects elsewhere.

"It's been humbling to see the kind of support that we now enjoy as a result of doing something that's right for our world, our society, for the air we breathe and the water we drink," Circle says. "This truly has been a community effort."