

A depressed town fights back

For nearly half a century, coal powered the blast furnaces of the 1,410-megawatt Comanche Power Generating station in Pueblo, a city of 110,000 in southern Colorado.

You can't miss Comanche, the state's largest coal-fired power plant; it dominates the flat landscape for 40 miles in each direction, just as its plume of smoke dominates the sky.

That's why residents shuddered in August 2017, when Xcel Energy announced Comanche would shut down Comanche boilers 1 and 2 by 2025. Pueblo already suffered through steel-mill layoffs and closures in the late 1970s and early 1980s, losing 8,000 of 9,000 jobs. This is a place that knows the pain of an industry cutting back. Yet what's happening in Pueblo today offers some hope to other towns experiencing the death of a fossil-fueled economy.

That's because a new industry has come on the scene in Pueblo. Vestas, a Danish windmill factory that employs some 900 people, makes tower bases for giant windmills. And business is booming: Wait time for a new Vestas windmill is five years, says Colorado Public Utilities Commissioner John Gavan.

For Pueblo Mayor Nick Gradisar, who is focused on employment, Vestas' existence helps to ease the pain of losing Comanche's jobs. "We're gonna lose good jobs when Xcel shuts down those boilers," he says of Comanche's coming closure, "but our air will be cleaner."

What does it mean when two of three boilers sit idle? Each boiler devours trainloads of coal along with millions of gallons of water bought from the town, which makes good money on the deal. Comanche used to run flat out, with coal-powered steam spinning the turbines that make electricity, but the



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rise of renewables means coal plants power up intermittently. "Coal-fired plants are running at 54% these days...and plants are built to run at capacity," reports Bloomberg.

Frank Hilliard, who helped build the plant's third boiler, is a roll-your own cigarette-type guy who lives in Walsenburg, a busted coal mine town 50 miles south of Pueblo. Hilliard says the remaining boiler at Comanche is young and powerful, shipping out 857 megawatts. But he fears it's on the chopping block, too.

"We just built Comanche 3 and they want to shut the damn thing down," he complains. He wishes that Xcel and the other big utilities didn't hate coal. "Coal created damned good work," he says, "and most jobs require college now."

But hate isn't the problem; it's the market. Three hundred coal plants have closed in the past 10 years, representing half of U.S. coal generating capacity, reports the research firm S&P Global. 2019 was the second-biggest year ever for coal plant closures, and utilities are pushing early shutdowns for remaining coal plants.

To comply with Colorado's 2040 goals of 100% carbon-free electricity, the smart money predicts that Comanche 3's closure will happen sooner, perhaps much sooner.

When Hilliard worked on Comanche 3, it was one of the last coal turbines built in the country. He's still proud of what he accomplished. "We built Comanche 3 with the plan that it would power Colorado until well after my kid died. These plants are really something. How can we just destroy them?"

It happened fast, this eco-

nomie turn away from fossil fuels and toward renewables. Along with Vestas Windmills symbolizing a new economy, Xcel is building the state's largest solar installation, a 240-megawatt solar farm, which will surround the 139 year-old Pueblo steel mill, now Russian owned. Mayor Gradisar says his Slovenian immigrant grandfather worked there for 50 years making steel using coal, yet he embraces the town's new future.

"Pueblo will be one of the first steel mills run on renewables," he says, "and the Pueblo Mill is already the biggest recycler in Colorado, using nothing but scrap metal."

Gradisar is counting on Pueblo's grit: "This is a city built by immigrants," he says. "The mill had 40 languages going — hard work is in Pueblo's DNA."

These days, Pueblo needs all the economic help it can get as it leads the state in all the wrong categories: mortality, crime and high school drop-out rates. The rapid layoffs in the 1970s and 1980s slammed Pueblo on its back, and the town has never really recovered.

Meanwhile, Mayor Gradisar is banking on the new economy. "If the citizens approve, we'll municipalize the electricity grid and home-grown wind power will cut our electrical bills in half," he says.

As for Hilliard, he continues to miss the good old days, "I don't like change, but I'm not gonna fight it." He says, "I'm too old and too broken-down to look for a new job. It's time to move on."

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Mushroom extract might rescue bees from virus

By Sierra Dawn McClain
Capital Press

Life is tough for the honeybee, but new research may save colonies by using mushroom extracts as feed additives to combat a devastating virus.

Researchers from Washington State University are working on a field experiment with 72 hives this month in California's San Joaquin Valley, where beekeepers have hauled their hives for the annual almond orchard pollination.

Honeybees, worth almost \$20 billion to American agriculture, are dying at alarming rates, threatening honey production and crop pollination. According to the Bee Informed Partnership, from 2018 to 2019, U.S. beekeepers lost 40% of their colonies.

Researchers call this "colony collapse disorder" and attribute much of it to the deformed wing virus, so-named because of how it disfigures bees' wings. The virus, according to entomologist Laura Lavine of Washington State University, undermines a bee's immune system, robs it of flight and halves its lifespan.

"It's a tragedy for our bees," said John Jacob, a beekeeper at Old Sol Apiaries in Rogue River, Ore.

The deformed wing virus is transmitted by a parasitic mite called the varroa destructor, a tiny, button-shaped, eight-legged creature that latches onto bees and feeds on their tissues.

Scientists say their California experiment may offer a solution to the virus: mushrooms.

Walter Steven Sheppard, lead researcher on the project and an entomologist at WSU, said the fungi he's using are classified as *Ganoderma lucidum*, also called lingzhi or reishi. These are rust-colored, kidney-shaped "shelf" mushrooms that grow like fans on trees. Sheppard said he has also experimented with the genera *Fomes*. Both belong to the fungi order polypores, and their extracts have long been prized in Asian medicine for supposed antiviral properties.

The researchers say the idea of using mushrooms to cure bees was the brainchild of Paul Stamets, a prominent mycologist and founder of Fungi Per-



Photo by Walter Steven Sheppard/WSU

Washington State University honeybees at the field experiment site.

fecti, a medicinal mushroom business in Olympia, Wash.

In 1984, Stamets noticed bees from his personal hive landing on mushrooms and sipping droplets of liquid from each mushroom's mycelium, the delicate web of filaments. Decades later, around 2016, he had an epiphany: perhaps the bees had not just been seeking sugar, but were self-medicating.

Sheppard, one of the world's leading bee experts, said Stamets approached him with his theory a few years ago and a partnership was born. They soon collaborated with scientists from the U.S. Department of Agriculture and WSU.

The researchers dosed sugar-water feeders with mycelium extracts from several mushroom species, analyzing the effect on bees.

In field and lab studies, treated bees fared better when infected by the virus. In cages, treated bees had an 800-fold decrease in virus level; in the field, the decrease was 44- to 79-fold, still significant.

Sheppard said it's not yet clear how the extracts reduce virus levels. He said the mushrooms are either bolstering the bees' immune systems or restraining the virus directly, and it will take more lab work to find out.

The field work, Sheppard said, will last until mid-March.

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