

January 15, 2026, EFSC Meeting

Item F, Attachment 2

Public Comments on Biglow Canyon Windfarm RFA4 and Proposed Order

Index of comments received **as of December 31, 2025**

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12/23/25	K. McCullough	1-63
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From: [Kathryn McCullough](#)
Sent: Tuesday, December 23, 2025 7:57 AM
To: [CLARK Christopher](#) * [ODOE](#)
Subject: Biglow Canyon Wind Farm Facility
Attachments: Wind Towers Down-compressed.pdf

Christopher,

Here is Exhibit One. Why in the world would we trust PGE to run a solar project in a high-risk wildfire area when the wind towers look like this? Yes, they still look like this. Supposedly, 17 of the 40+ broken Vestas towers will be fixed in 2026, **over four years after the "blade throw"**.

We are over 100 miles from Portland. It is hard to find good help, especially when PGE pays less than the surrounding wind facilities like Avangrid. On weekends, the plant is not staffed, although there are some technicians working. On nights, no one is working. **Is this a power plant? Or a tax write-off?**

Yes, they have a new pitch system coming from Germany, and it looks great. But this project was built from the ground up in 9 months. That tells me this is a **financial** issue.

Will the solar facility be 24/7, especially during fire season? Will the weeds be kept down? Will the facility be protected by hundreds of feet of gravel on the west side or just 50, like they are proposing?

Will the BESS units be maintained better than the transformers? (pictures included below) I put this PDF together three years ago. The towers still look like this, and most of the Vestas are unsafe to run.

These are questions that need answers. We do not believe PGE is operating Biglow in good faith. They should not be allowed to build solar until the Vestas towers are fixed.

Sincerely,

Keven and Kathy McCullough

When Wind Towers Fall Apart

Portland General Electric's (PGE) Biglow Canyon

Without maintenance or good management, everything fails.

Welcome to Biglow Canyon Wind Farm

Owned and operated by Portland General Electric

Biglow Canyon Phase One



Phase One of the Biglow Canyon Wind Farm


Biglow Canyon Wind Farm, one of the largest wind farms in the Pacific Northwest, will generate 450 MW of electricity providing enough electricity to power over 120,000 homes utilizing 217 operating turbines.

Phase One, completed in Dec. 2007, has 76 turbines capable of providing electricity to 37,500 homes. Each turbine is rated at 1.65 MW. After completion of Phase Two in 2009 and Phase Three in 2010, the total investment will be over \$1 billion.

Phase One wind turbines are 262 ft. high and, with blades extended, reach 396 feet from the base to the top. Each wind turbine weighs 246 tons.

Each blade is 131 feet long and weighs 16,000 pounds. Each turbine generates at 600 volts, which is stepped up to 34,500 volts by an individual pad mount transformer located at each tower.

With a diameter of 269 feet (larger than the wing span of a Boeing 747), the blades turn clockwise at 14.4 revolutions per minute. The tip speed of each blade turns at more than 130 mph.



Sitting 260 ft. in the air, a worker is dwarfed by a Vestas turbine.




Lower Assembly

Each wind turbine is automatically operated by on-board computers that sense wind speed and direction. Rotors start to turn at 7 mph, power production begins at 9 mph, and rated power of 1.65 MW is reached at 27 mph.

If the 10 minute average wind speed reaches 44 mph, safety features automatically shut down the turbine by rotating the blade pitch 180 degrees to allow the air to bypass the turbine as it coasts to a stop in 3-4 rotations.

John DeMoss died in 2008 and his oversight went with him.



John Elvin DeMoss Jr.


February 2, 1947 - November 25, 2008

From an early age, John dreamed of harvesting the wind. He came by it naturally; his grandfather, John Monroe DeMoss, and his father, Curly (John Sr.), sold and erected wind chargers in the 1930s and 40s for a company called WinPower. Wind chargers, installed on fifty-foot towers or on existing windmills, supplied 32 volts, enough electricity to run lights and often a mangle iron in a time when electricity was not provided to rural areas.

Raised in Sherman County, Oregon, John returned home after 8 years in the U.S. Navy to become a fifth generation wheat grower. In 2001, he read an *Oregonian* article about wind power and realized that landowners would benefit if he could market their land as a large tract of acreage.

John developed a plan, created a business called Praise the Wind, Inc., and started a venture that would culminate in bringing a new, high value crop to Sherman County: Wind.

John was instrumental in the development of wind energy for the Portland General Electric Biglow Canyon Project and British Petroleum Alternative Energy Golden Hills Project in Sherman County.



One of John's favorite quotes was by Amway founder, Richard DeVos:

"The only thing that stands between a person and what they want from life is often the will to try it and the faith to believe it is possible."

Development of Wind Power


Sherman County

Sherman County, population 1800, is located on the Columbia River and is a rural northern Oregon county known for its dryland wheat farming. For most of the later 20th century, the county suffered from its dependence on depressed wheat prices and adverse weather conditions. Many residents have roots to the land and were quick to embrace the opportunity to harness the wind.


In early 2000, wind farms were introduced to Sherman County. Prevailing westerly winds funneled through the Columbia River Gorge provide strong spring and summer winds. These predictable winds have attracted a massive amount of development in wind projects. The modern turbines generate both electricity and a good dose of hope for the community.

Because of wind farms, the economics of Sherman County and the entire Mid-Columbia region has dramatically changed in the last decade. Over \$6 billion worth of wind farms are completed or in various stages of development in Sherman County, adjoining Gilliam County, and Klickitat County in Washington.

The economic impact of these wind projects is a tremendous boost to the region in the form of jobs, lease payments to landowners, property taxes for depressed rural communities, and economic benefits for local businesses—all the while producing clean energy that has little impact on the county's core industry, agriculture.



We were so proud of this wind farm. Thrilled. Excited.
We stayed outside at night in the cold watching them erect the towers.




Biglow Canyon Phases Two and Three


Work on Phase Two was completed in 2009 with the installation of 65 turbines followed by Phase Three and the installation of 76 turbines in 2010. The power generated here is delivered to PGE customers through a Bonneville Power Administration (BPA) 230 kV transmission line connecting the Biglow substation to BPA's John Day substation.

Construction of each phase of the project required installation of roads, foundations, substation additions and collector/transmission system. Each unit required the delivery and assembly of over ten truck loads of equipment.


Turbines for Phases Two and Three are larger than the Phase One turbines, each having an output of 2.3 MW. Towers are 262 feet high with a rotor diameter of 305 feet. Total height from base to blade tip is 415 feet, or 140 feet shorter than the Washington Monument.



To prepare about 50% of the sites, the "Thumper" dropped a 63,000 lb steel weight from 100 ft, 950 times as required on several sites to prepare a solid foundation for the concrete turbine foundation.

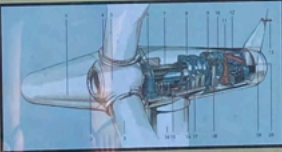


Each foundation consisted of a rebar cage and over 400 yards of concrete.



Each foundation was backfilled and ready for installation of the wind turbine. The final visible footprint being a 30 ft. diameter area with wheat planted around the base.

Siemens Nacelle



Nacelle arrangement:

1. Spinner	11. Generator
2. Spinner bracket	12. Service crane
3. Blade	13. Meteorological sensors
4. Pitch bearing	14. Tower
5. Rotor hub	15. Yaw ring
6. Main bearing	16. Yaw gear
7. Main shaft	17. Nacelle bedplate
8. Gearbox	18. Oil filter
9. Brake disc	19. Canopy
10. Coupling	20. Generator fan

For more information visit the following web sites:

1. PortlandGeneral.com/Biglow
2. RoadtoBiglow.com
3. GreenPowerOregon.com

Then, in 2010 the towers started leaking oil. Kevin and I complained, but nothing changed. The leaks got worse.

PGE says they have vegetable oil in all their transformers, and that it is safe. That's a bait and switch. The transformers are at the bottom of the towers. This is a blade pitch motor leak and it is definitely hydraulic oil.



There are 76
Vestas in this
project, and over
half of them are
leaky, oily
messes.



Disgusting.



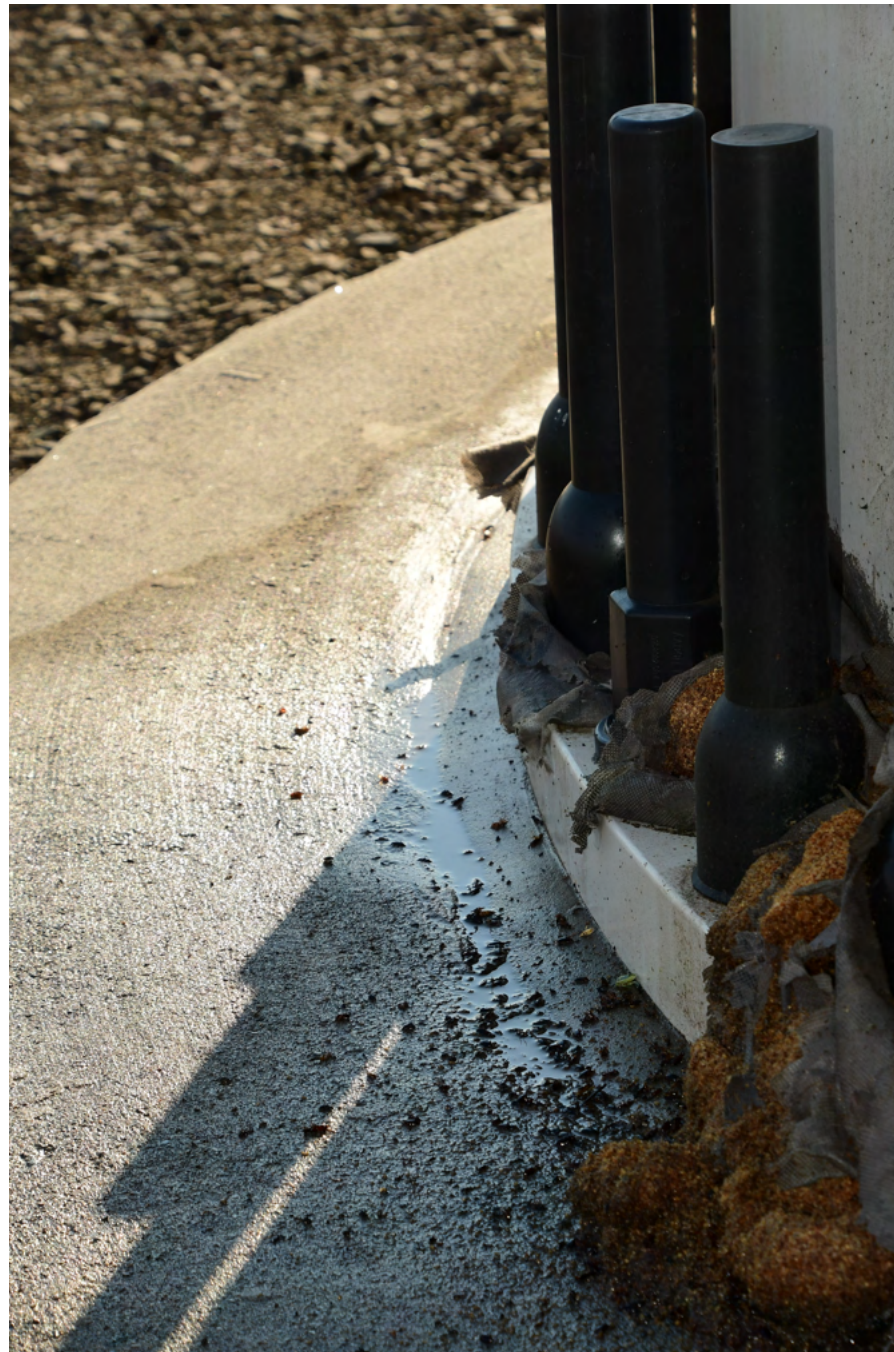
No more great
photos for me.

When things
break, the towers
sit idle for months
before parts arrive
or a crane is
brought in.



Oil at the bases
leaking onto the
ground....

We fix our farm
equipment when
we see leaks.



Oily rags show just how dirty it is up there.



Oil all over the ground.



PGE puts oil pads around some of the bases to soak up the excess oil.



These bases are relatively clean...
it's the transformers that look bad. A little paint?



This is one of the "vegetable oil" transformers.
Vegetable oil still has a flashpoint...!



Then the biosolid spreaders and PGE technicians started finding bolts on the ground.
Sheared off.



Siemens Europe has had two deaths from bolts hitting people on the ground. And one man is permanently brain-injured, according to a safety presentation technicians here in Sherman County received.



Oregon Department
of Energy (ODOE)
says anything that falls
from 265 feet can be
deadly, especially since
it can reach a velocity
up to 130 feet per
second.



Some of the bolts are almost two feet long.



There were bolts on the ground so the biosolid spreaders used them as paperweights!

It's not like taking them over to the PGE building makes a difference... when you have pieces lying on the ground for a year you get the impression that no one cares about this project.



Bolts aren't the
only things that
falls to the
ground.



This one is missing a door. In fact, a lot of these towers are missing hatch doors, and the guys find them in our fields "all the time."

(Zoom in, it's hard to see with all the oil).



When a tower is this greasy, how can you see a problem?



This is a hatch door.
We pick them up out
of the fields and lean
them against the
towers - or take them
over to the PGE
building.



Zoom in.

(Two doors between
each blade, 6 total.)



I leaned the door under
the stairs for them to find
and fix.

(Yes, I'm a dreamer...)



Another missing door.

I found three missing
yesterday where we
were harvesting. 22, 23,
and 25.



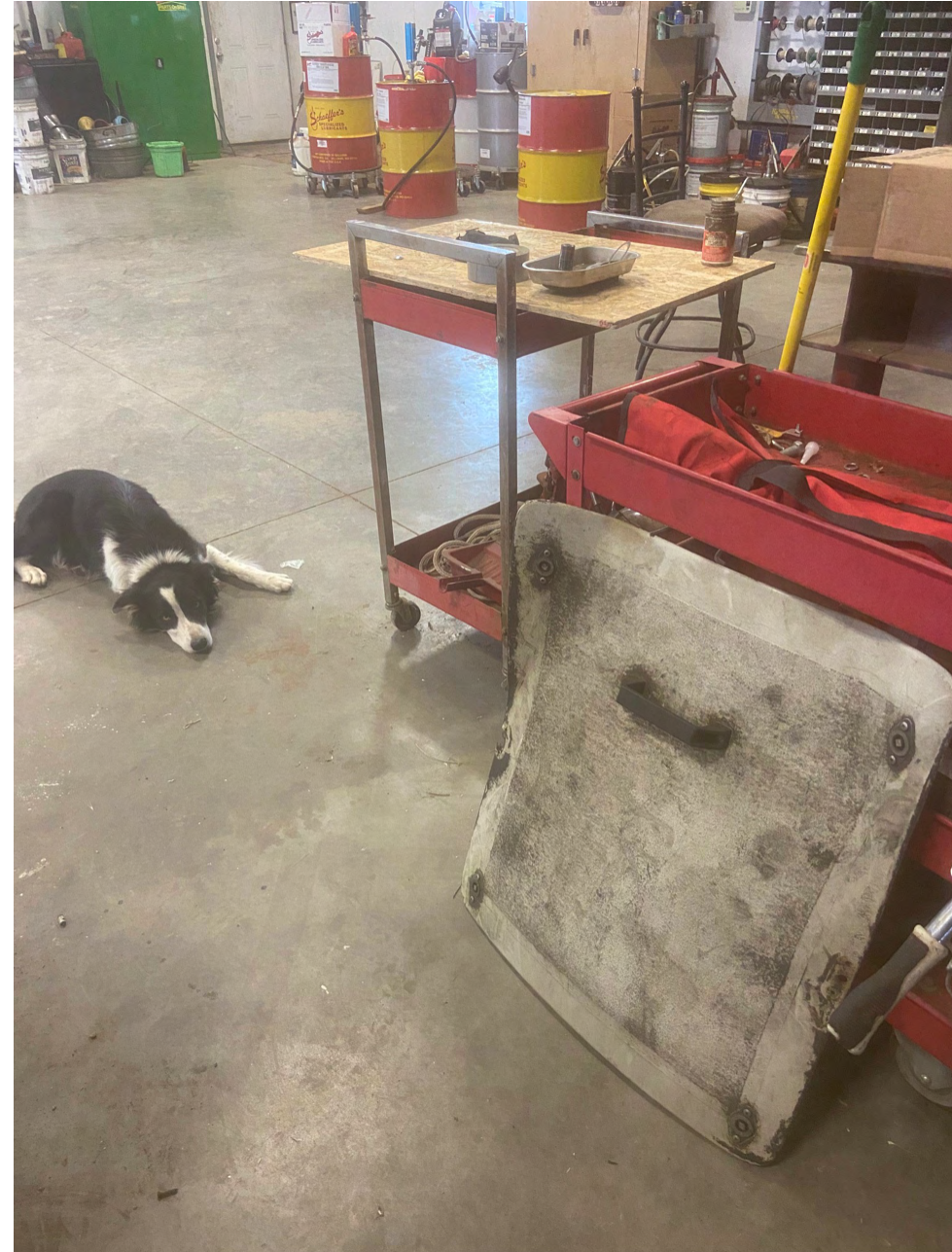
See the hole? You can see where it broke away.



The backside of the door.
Really greasy on the inside,
of course.



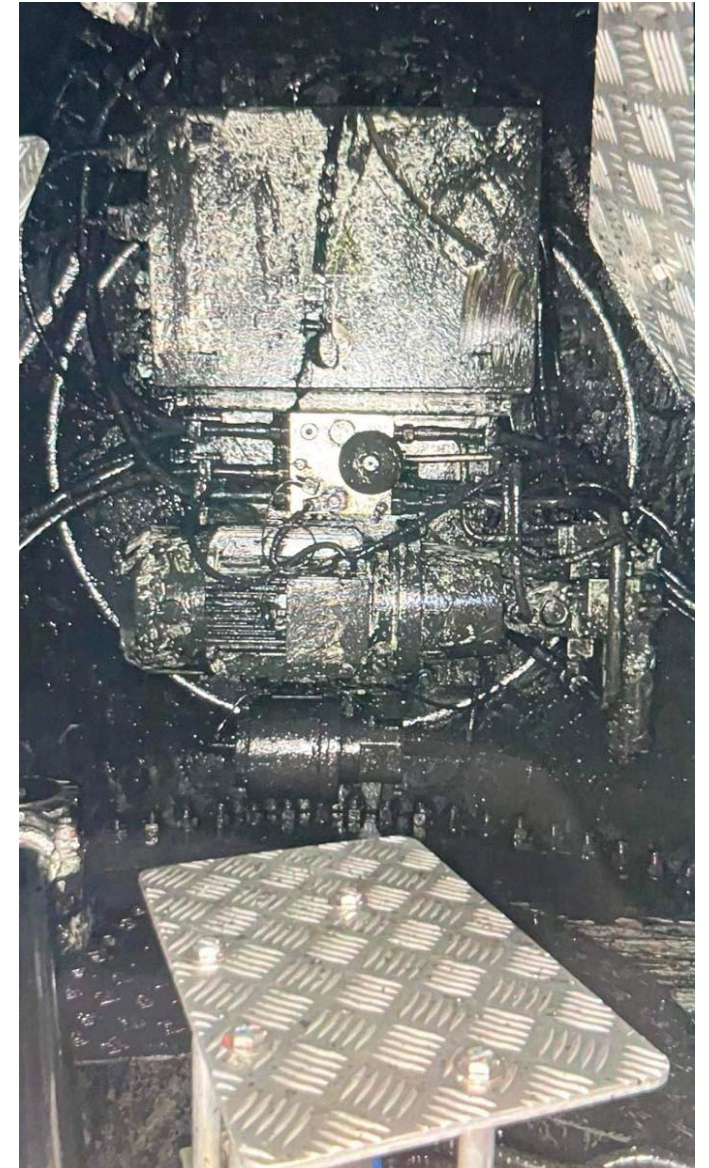
Even Turbo is discouraged.



My other worry is
fire. These things
are oily and greasy
inside.

PGE says they can't
confirm this is a
Biglow tower.

Well, I can.





With our high summer temperatures (111 degrees +), and their over-heating components, it's a fire waiting to happen.

We've told PGE this.
So it is on them.



This is what they actually look like in the ones that haven't been cleaned lately.

The trouble is, without fixing the problem, they keep leaking and within a couple weeks they are disgusting again.



PGE says they are clean, and even sent techs up to take a photo to confirm it. Yes.

This is a cleaned-up one, and what they should all look like inside.



But that's not all that falls off. Oh no. That's not all.

(I feel like I'm living in a Dr. Seuss book.)



This disk is a big flying saucer that weighs ten pounds.



About 100 yards
away in a gully
the guys found
a disk from a
Siemens tower.

So it isn't just the
Vestas that have
maintenance
issues.



Don't believe me?

It even has a part
number on it.

(ZOOM IN)



It is metal, and it is thick.
It belongs up in the hub...
vibrations loosen them
and they fly like a saucer
through the air!

They basically plug a hole,
a wind technician friend
of mine says. But if you
don't get it screwed in
properly...



I can't see
where it should
be from the
ground, but
apparently a
good tech can
see that it is
missing.



It flew a long ways -
about seventy-five
yards... ouch.



A year ago, April 2021, part of a nose cone fell off. PGE took the rest of the nose cone down and left it.
We were seeding October 7 and it was still there.



We picked up the 3+ pieces that had dropped in the field and placed them under the tower.

When the blade fell off February 1, 2022, all the pieces were still there! (You can't see the nose cone in the gully)



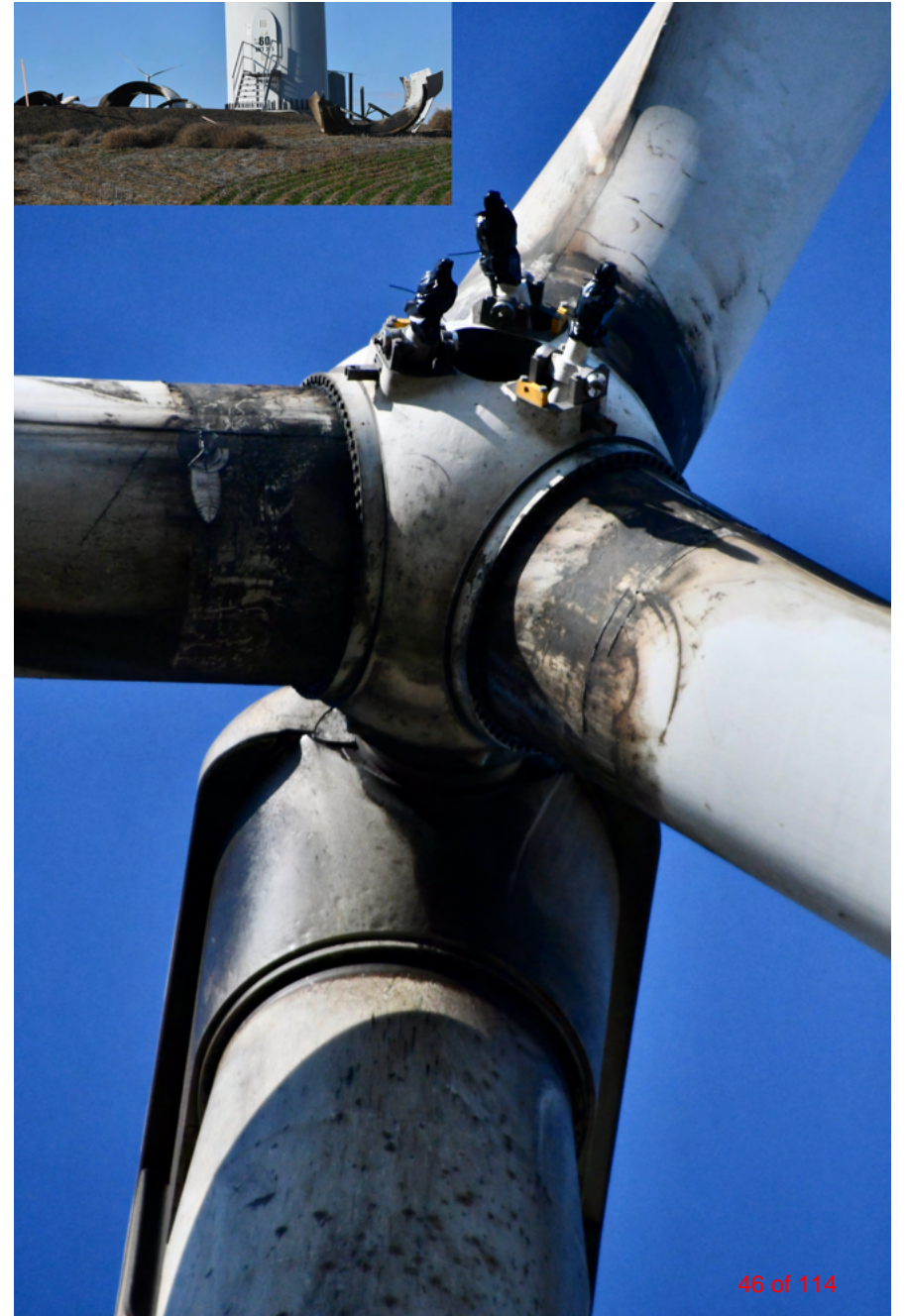
I mentioned the nose cone was still down in the gully on a Zoom call this July. They said that was because the farmer told them not to pick it up! *Well, kind of true.* We didn't want them driving through our growing wheat, but they had 6 months before we seeded!

Besides, it's not like that's the only thing that falls that they don't pick up...



You can't make this stuff up. But you can lie about it. When asked why the nose cone wasn't reported to ODOE (a year later), PGE "self reported" within 72 hours and ODOE basically said, that's okay. You guys are good partners. Just don't let it happen again.

Anything that falls is reportable.



I feel like ODOE, PUC, PGE, and BPA are all in a secret club that doesn't include the ratepayers or the taxpayers or the landowners. Remember, they used federal and state money to build this project.



So what happens when you don't maintain a wind project?



A blade falls off.
That is our house
in the
background.



The blade fell off at 2:13 AM, and the thump woke Kevin and our dog, Turbo. It landed 300 feet away from the tower.

There was a load of biosolids delivered in this field by this tower at 10:30PM. It could have fallen then. And killed someone.



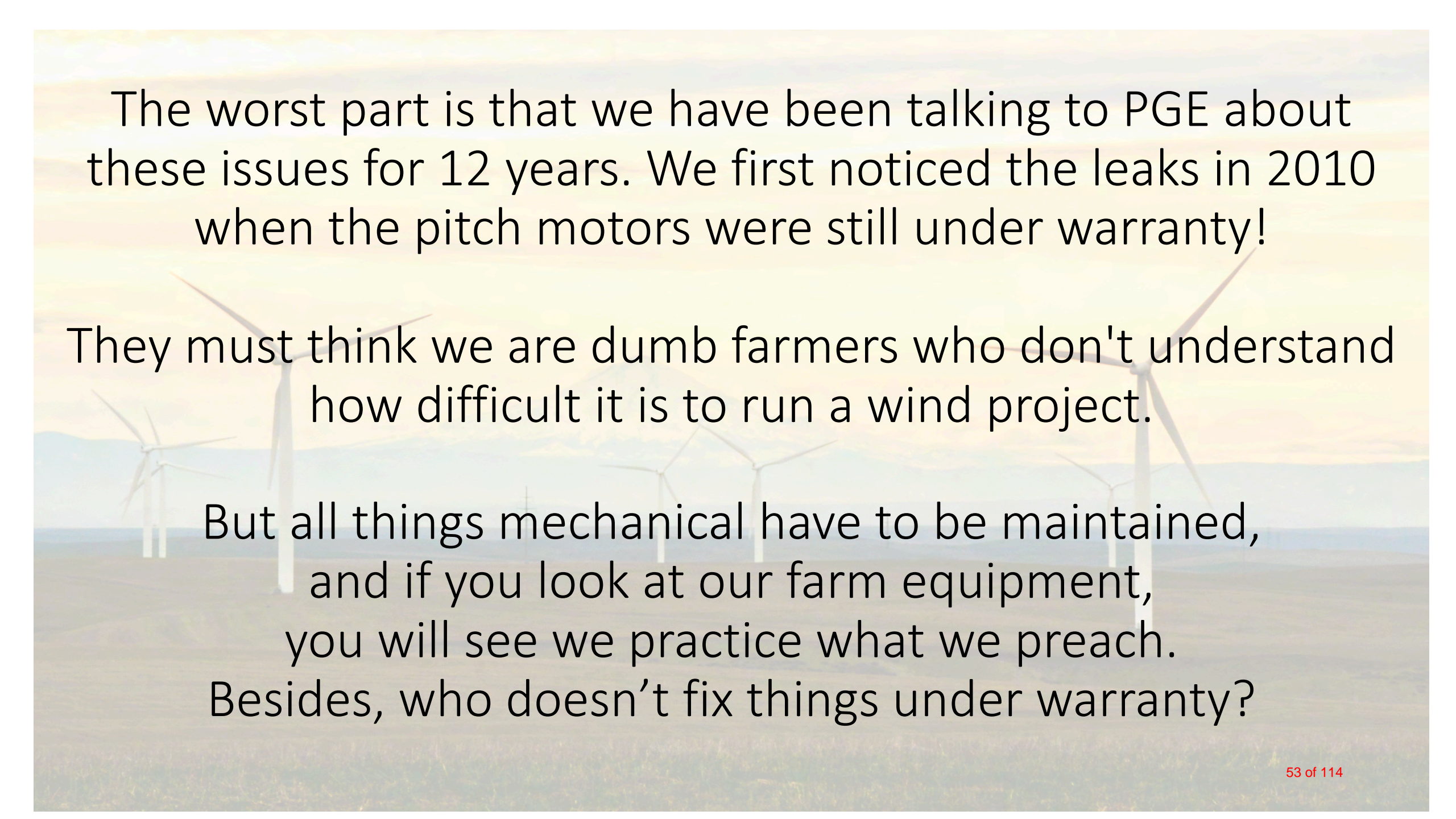
Crews flooded the fields after the blade fell. I have never seen that many workers checking and tightening bolts.

I believe it is only a matter of time until another blade falls.



Lies and broken promises.
(The landowner told us not to pick up the
nose cone. You're our partners. We'll get
a newsletter out to the landowners each
quarter. And on and on.)





The worst part is that we have been talking to PGE about these issues for 12 years. We first noticed the leaks in 2010 when the pitch motors were still under warranty!

They must think we are dumb farmers who don't understand how difficult it is to run a wind project.

But all things mechanical have to be maintained, and if you look at our farm equipment, you will see we practice what we preach. Besides, who doesn't fix things under warranty?



Two weekends ago
there were 40
towers down out
of 217. No one is
here to notice
except us. Don't
we need electricity
24/7?

This isn't a hobby
farm and I'm
pretty sure Biglow
isn't either.



I'm mad, but mostly I'm sad. We noticed that they were shutting down the towers on windy days. Eventually we learned PGE was getting paid to shut them down. BPA paid them “wheeling charges” when there was too much wind and the dams were running water through.



PGE told us we only got paid when the towers generated electricity. It had never occurred to us that PGE would get money for *not* producing electricity from towers on our land.

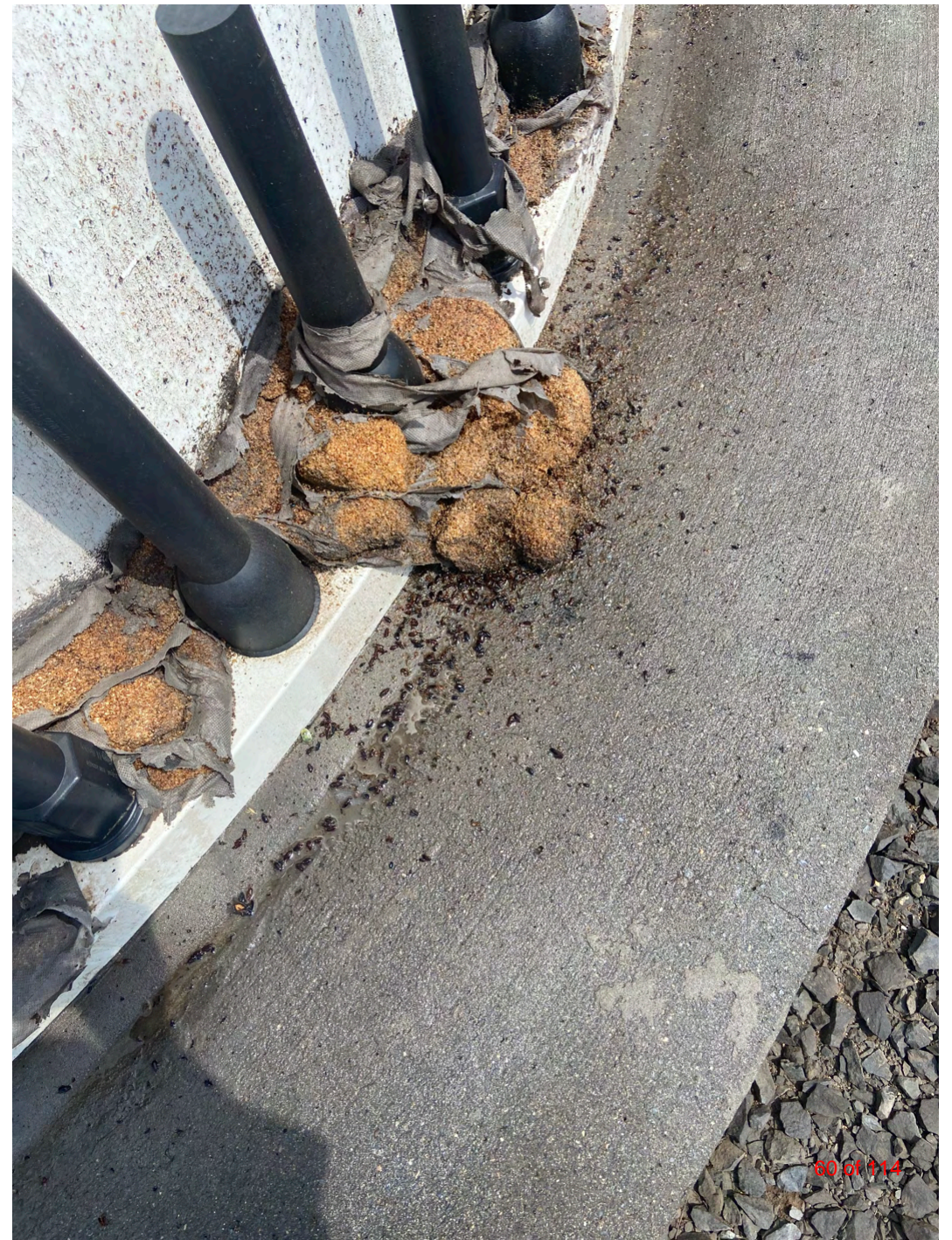




This could have been a great partnership. Like marriages that end in divorce after an affair, the relationship probably isn't salvageable.
We don't trust PGE anymore.



Grease & oil, bolts,
doors, disks, nose cone
pieces, and blades.



Our payments are over 50% down.
But that's the least of our worries.



What's next?
A tower falling over?

I don't want anyone
else hurt or killed.

We already lost one
life in this county
when a wind tower
fell over.

11:54
Messenger

Colorado wind tur...
www.kiro7.com


KIRO 7
LIVE. LOCAL. IN-DEPTH.

WATCH

WEATHER ALERT | Heat Advisory

Colorado wind turbine found snapped in half

Fleming Volunteer Fire Department KDFR



When crews arrived on scene, they found that a turbine had snapped in half, creating an inverted "V" shape.

Colorado wind turbine found snapped in half Crews in Colorado were called to an unusual sight. (NCD)

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By **Lauren Silver, Cox Media Group National Content Desk**

June 23, 2022 at 6:33 pm PDT

LOGAN COUNTY, Colo. — Crews in Colorado were called to an unusual sight: a wind turbine had snapped in half and fallen over.

[>> Read more trending news](#)

The Fleming Volunteer Fire Department [said on](#)

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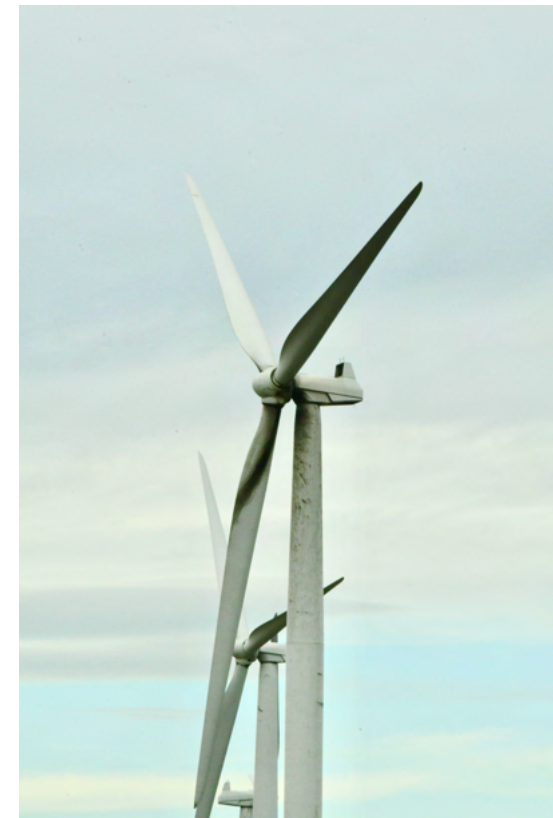
2007

WHERE DO WE GO FROM HERE?

WILL PGE FIX THE TOWERS AND
MAKE US “WHOLE”?

OR WILL THEY CONTINUE TO RUN
THIS PROJECT AS CHEAPLY AS
POSSIBLE WITH NO INTEGRITY?

IT'S UP TO THEM, BECAUSE WE FEEL
DISCOURAGED, USED, AND LIED TO.



2022

PGE has not maintained the Biglow Wind Project. We have observed Biglow's deterioration since 2010. We have no reason to expect that solar will be any different.

PGE has lied to us so many times over the years that I have lost count. It started when we noticed the towers were turned off on windy days or at night. The plant manager told us they were not turning them off at night. Besides, how could we tell if they were when it was dark out? After that ridiculous statement, I informed him of the large, lighted moon, as well as the red lights on the turbines flashing as I see the blades going around.

We found large pieces, including doors, discs, and a nose cone that had fallen off. Of course, we reported them to PGE, often taking them to the operations building. When the blade was "liberated" in February 2022, they could no longer deny our claims. PGE told ODOE they didn't know what size falling pieces had to be reported. ODOE said any size. DUH.

I asked ODOE why they hadn't noticed the oil leaks. The man on the phone said he had never looked up. The bases were in the site certificate, so he measured and inspected the gravel around the tower. Additionally, they had numerous projects to monitor in Oregon — the annual inspections on Biglow were being done by phone, since PGE was a trusted operator.

Now, almost four years later, despite promises to repair the turbines, including a new pitch system, 41 turbines are either too unsafe to operate or broken beyond repair for the foreseeable future. PGE claims they will fix 18 of them in 2026. We're waiting, but not holding our breath.

Now they want to install solar. We have no reason to believe that a solar project will be maintained any better than the wind, especially after the first five years. We are worried because we live and farm around the Biglow project. We have asked PGE for a hold harmless clause if we accidentally start a fire. Their answer is a firm no. No explanation, no discussion—just that their lawyers said NO.

"Matters of civil liability are generally outside of the Council's jurisdiction, and it is my understanding that EFSC cannot require a developer to indemnify surrounding farm operators from liability beyond the requirements of the existing right-to-farm law under ORS 30.930 to 30.947 or other state or local laws and ordinances, and as you have brought up in the past, the existing right to farm law does not cover damages from fire." Christopher Clark, ODOE

As stated above, Oregon's Right to Farm Law does not include fire. This may be outside the Council's jurisdiction, but it should be considered. Either the law needs to be amended, or solar projects should not be located in high-fire-risk areas.

Oregon adopted legislation in 1993 and updated it in 1995 and 2001 to protect farm and forest practices from adjacent conflicting issues. The program is called Oregon's Right to Farm laws. It protects farmers from claims over smell, dust, noise, and other trespass or nuisances associated with farming.

Oregon Department of Agriculture Literature

<https://www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/RightToFarm.pdf>

ORS 30.930 to 30.947, Farming and Forest Practices

[ORS 30.936 and 30.937](#), Immunity from private action based on farming practices

We need a hold harmless agreement from PGE before this project is approved or assurances in writing that they will not sue us or go through our insurance.

Every year, fires start in Sherman County from hot equipment or sparks. We keep our equipment in good condition, just like other operators around us do. Each year we help as volunteer firefighters to extinguish fires near us. It's not a matter of if we will have a fire, but when. PGE has already had two, but I don't believe they have reported all of their fires. Usually, we help extinguish between 6 and 10 fires a year.

Over half of the PGE Vestas towers are dripping oil. The transformer cases were allowed to rust. PGE Biglow transformers have blown and started a fire: at least two. Who knows if they have reported all of them.

The new Tesla battery cases look immaculate in the BESS photo from BrightNight. But the transformer cases around the existing wind turbines looked good when they were new, too. Lithium-ion batteries have a history of catching on fire when not properly maintained. In addition, there were five solar panel fires last year in the Avangrid project in the next county, and two this year in our county.

While we have not started any fires ourselves, that remains a possibility. So far, we have been lucky.

Our farm has \$5 million in liability insurance, but that would be insignificant if we start a fire. Covering the cost of 700 or 800 acres of solar panels and/or BESS (battery storage) could bankrupt us. That's a blow to the right to farm. Placing a solar project in the heart of a county that has the highest percentage of agricultural land in Oregon interferes with our livelihood. With high temperatures and wind in the summer, this could lead to serious issues. We shouldn't be held responsible for normal farming practices.

PGE has verbally stated that they will not target us personally and will "only" use our insurance money if a fire results from typical farming activities. They miss the point. After such a large claim, we will never be insured again. No insurer will want to cover us. Insurance is already very

costly where we live, and our agent said that even a microwave fire in the PGE office building south of us could increase our rates.

Besides, we don't trust PGE or BrightNight. We have been lied to by both of them so many times that we have lost count.

PGE told us they were maintaining the towers, but they weren't. The budget allocated annually decreased instead of increasing. Everyone with equipment knows that costs rise, not fall, with age. PGE explained its approach to wind farm maintenance:

“...state regulators have not issued any violations for failing to report safety incidents; only two of the incidents it did report were actually related to public health and safety; leaking oil posed only a low environmental or fire risk; and lost service time is likely the result of grid constraints beyond its control. The issues at Biglow Canyon, it said, are consistent with those experienced by other utilities with similarly aged equipment.”

BrightNight told us we would have a setback from our property, then sent us photos of them right up to our property line. Fortunately, the property owner raised concerns and got it pushed back ½ mile.

Here are a few of the highlights from the Wind Bust article (Linked below) in the Oregonian:

Although the Vestas machines were just halfway through their 30-year estimated useful lifespan by 2022, *The Oregonian* reported PGE was already thinking about retiring them.

Despite all this, a PGE spokeswoman gave a prickly reply about the tone of *The Oregonian's* questions. <https://capitalresearch.org/article/wind-turbines-produce-drama-cash-and-some-electricity-part-1/>

“PGE entered into a long-term maintenance contract with the maker of the turbines, a wind sector leader, Vestas,” PGE spokesperson Melissa Havel said in response to written questions. “This was a prudent and industry standard action on the part of PGE. **“We challenge your categorization of the volume of troubles,”** she wrote. “Since coming online, Biglow Canyon wind farm has generated more than 13,000,000 MWh of clean electricity, which translates to powering 120,000 homes per year.”

Problems began more than a decade ago. The McCulloughs said they expressed concern to PGE that the Vestas turbines, then only three years old, were leaking oil and lubricants from the nacelles, the box atop the turbine tower that houses its gearbox and other major components.

“PGE is updating our office regularly with the inspection status, as well as committing to provide our office with a longer-term inspection and maintenance plan,” Hank Stern, a spokesperson, said in an email. **“Sen. Wyden will keep watchdogging this issue to ensure PGE follows through on its commitment to him and the community.”**

Financially, PGE appears to have two routes to address issues.

Jenkins, the utility's vice president of operations, insists that PGE is managing the project – and the Vestas turbines – for longevity, focusing on preventive maintenance to keep small problems from turning into big ones. “I don't know that with the age of these assets, the case can be made that they're not performing,” he said.

Biglow Canyon has never experienced a turbine fire. But they do happen in the industry, with a 2,000-acre blaze in Gilliam County four years ago linked to a turbine operated by a different company, according to compliance reports submitted to the state.

“Just because an asset is dirty doesn't mean it's not running well,” Jenkins said. “We're more concerned with what's on the inside.”

But keeping the turbines performing at a high level may require significant investments, and PGE's filings with regulators don't reflect that reality.

In fact, PGE's operations and maintenance expenses at Biglow Canyon have steadily declined, despite the aging equipment and acknowledged need for major repairs. PGE spent \$13 million last year, down 40% from 2013, according to figures filed with the Federal Energy Regulatory Commission. That's the lowest total since 2010.

And in documents submitted to Oregon regulators, the company said it would spend even less this year: \$10 million.

Jenks, the ratepayer advocate, said the review would also include an analysis of whether the current equipment has been properly maintained, and if not, what went wrong.

“If we're going to make a transition to clean energy,” he said, “we need to hold the utilities responsible for managing these projects properly.”

The landowners would like that same level of accountability.

“When we entered into the agreement, the objective of the company and the landowners leasing the land was to have the project work, and make money,” said Cheryl Woods, a Biglow Canyon property owner and the accountant for the wind prospecting company that originally arranged the lease.

“But it doesn't seem to be exactly going that way. It just hasn't been managed well.”

-
- PGE has failed to report public safety incidents at Biglow Canyon, in potential violation of its operating agreement with the state. The utility hasn't disclosed incidents where hatches, metal disks and blade bolts have fallen off turbines from a height of about 265 feet. PGE has questioned whether such incidents meet the reporting threshold, but regulators insist even small objects may be a hazard to anyone near a turbine because they can reach almost 90 mph when falling.
 - PGE knowingly operated at least four turbines at Biglow Canyon with broken blade bolts, in one case for nearly a year, maintenance records show. Those bolts clamp blades to the rotor and bear the stress of wind and motion. Research indicates that broken bolts,

while not uncommon, can become a serious problem leading to catastrophic blade failures like the one in February.

- Oil leaks from Biglow Canyon's wind turbines and transformers are environmental and fire hazards. The turbines have been plagued by leaks of oil and lubricants that coat towers and blades and spit on to their gravel pads and surrounding fields. Transformers have ruptured regularly, causing two fires and spilling about 3,000 gallons of mineral oil into surrounding soil that prompted expensive cleanups.
 - The number of problems PGE has disclosed to regulators is out of line with other wind farms. Since 2010, PGE has reported more than a dozen oil spills and other incidents at Biglow Canyon with the potential to affect public safety – about three times more than any other wind farm regulated by the state. But state officials only recently began pressing PGE to explain those troubles.
 - Biglow Canyon has generated far less power than PGE originally projected. The availability of its Vestas wind turbines to produce energy has abruptly declined in recent years, and the project's rate of energy production is less than neighboring wind farms of comparable age.
 - Ratepayers may end up footing the bill for assets that are no longer useful. The project's 76 turbines manufactured by Vestas are halfway through their projected life but PGE is already considering replacing them. If that happens by the end of 2023, ratepayers would be stuck covering \$156 million in remaining costs.
-

Kathy McCullough:

I showed the Oregonian a real photo of the inside of a Biglow tower after Jenkins provided a clear photo. They say Biglow has not had a turbine fire, but they have experienced other fires, including transformer fires.

PGE spokesperson Havel did not admit that the maintenance contract was changed and that the pitch seal warranty claim was never finalized. I'm so tired of lying by omission.

All things considered, the energy they generated isn't something Havel should brag about. PGE produced much less energy than expected, with the project just south of us in a less windy area, generating only 37%. So, this isn't a wind issue. It's a maintenance problem. It's also because BPA is paying PGE wheeling charges.

"We will investigate if it's reported to us," said Todd Cornett, assistant director of the Department of Energy siting division.

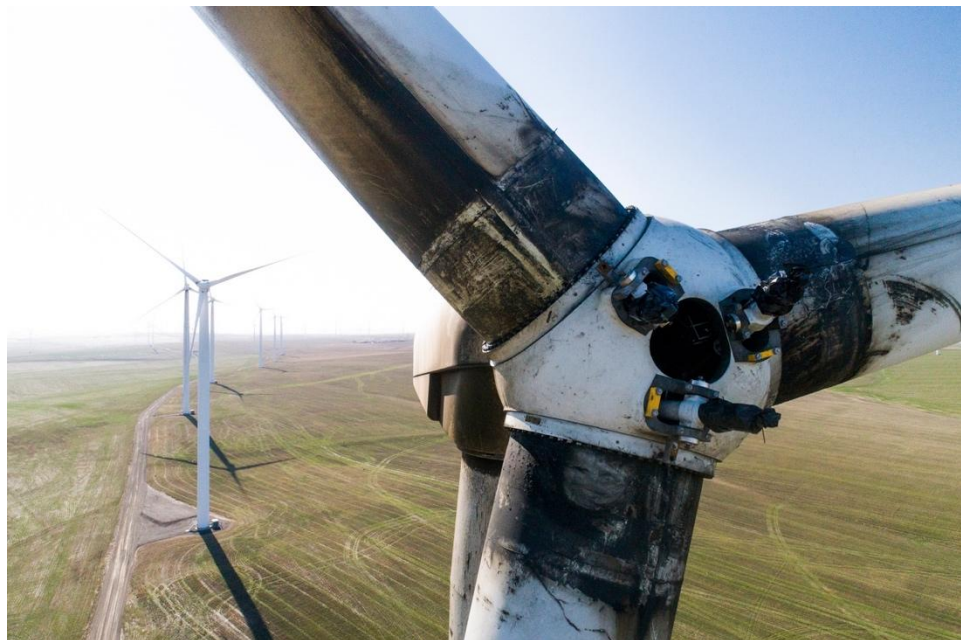
PGE did not report violations to the Oregon Department of Energy, and ODOE did not investigate. Additionally, there aren't any reports from other utilities with similarly aged equipment.

Senator Wyden has not continued to watch over the situation; in my opinion, he has not taken any action.

“...rules require issues in comments to be raised with “sufficient specificity” to afford the Council, the Department, and the certificate holder an opportunity to respond. Under OAR 345-027-0367(7)(a), that means the comments must identify the recommended findings of fact, conclusions of law or conditions of approval identified in the proposed order to which you object; specify the Council standard or other applicable state and local requirements on which the objection is based; and present facts or statements supporting that objection.” ODOE

Sufficient specificity: I object to this project piggybacking on the wind without proper fire mitigation. Oregon has a “Right To Farm” law that should be respected. This project infringes on our Right To Farm. It's a high-risk fire area. There is a lot that PGE has not done in good faith in the past. Given PGE's track record, we need proof that things will be different with solar.

Wind Bust



<https://projects.oregonlive.com/wind-farms/?e=f4aa693a6abe4e79c6b29ce5788dac77>

Story by **Ted Sickinger**
Photography by **Dave Killen**
The Oregonian/OregonLive
Aug. 27, 2022

In the waning days of January, a worker delivering fertilizer to a wheat farm in the rolling hills of Sherman County found some broken, industrial-size bolts on the ground near one of Portland General Electric's towering wind turbines.



A broken blade bolt found under a wind turbine at Biglow Canyon wind farm by a worker delivering fertilizer in late January. A day or two later, the turbine threw an eight-ton blade into a nearby field. (Courtesy Kevin Massie)

He was puzzled because it stood to reason the bolts fell from the machine. But he didn't know if there was a problem or, if so, who to tell. So he picked up one, sent a snapshot to his co-worker, Kevin Massie, and used it as a paperweight while he documented the delivery.

Massie arrived a day or two afterward to tow a delivery driver whose vehicle got stuck in the mud near the same turbine at Biglow Canyon. It was dark and windy. Nothing seemed out of the ordinary.

Hours later, at 2:11 a.m. Feb. 1, one of the turbine's three spinning blades launched into the night.

No one saw it. No one heard it. But it was evidently a violent affair.

The skinny blade, as tall as an 11-story building and weighing more than four Toyota Camrys, soared the full length of a football field. It plowed a furrow 4-feet deep in the wheat stubble where it eventually landed.

Heavy-duty bolts that once kept the blade fastened to the tower scattered around the turbine base like shrapnel, some spiked deep into the soil.



Broken blade bolts were scattered around turbine 71 at Portland General Electric's Biglow Canyon wind farm after the turbine threw a blade in the early hours of Feb. 1. Hours before the blade throw, a driver delivering fertilizer became stuck in close proximity to the turbine and had to be towed out. (Courtesy Kevin Massie)

"Someone could have been killed or badly injured," said Kathryn McCullough, whose husband, Kevin, farms under about half of Biglow Canyon's turbines – including the one that lost its blade.

The broken bolts preceding the incident weren't the only warning signs of problems at PGE's flagship wind facility, which opened 15 years ago amid a push to expand green energy technology in Oregon and nationally. But it took the so-called "blade liberation" for PGE to take urgent action at Biglow Canyon, one of Oregon's largest wind farms, shutting down all 217 turbines for testing and keeping some out of service for at least four months.

The dramatic episode in the rural landscape of the Columbia River Gorge represents a revealing, if concerning, inflection point in Oregon's two-decade history with the ubiquitous turbines that help fuel clean energy.



On Feb 1, turbine 71 at Portland General Electric's Biglow Canyon wind farm threw an eight-ton blade 100 yards into a nearby field, plowing a deep furrow in the ground where it landed. (Left, Dave Killen, right courtesy Kathryn McCullough)

Industry groups insist that wind farms are very safe and major malfunctions, such as blades flying off the turbines, are exceedingly rare. But as wind farms grow older and the underlying components age, regular and proactive maintenance become far more important.

[More: Why accident, safety data is hard to come by for wind industry](#)

Yet landowners have been raising concerns to PGE for the last decade about maintenance issues at Biglow Canyon and their impact on energy production at the facility. And an investigation by The Oregonian/OregonLive has found that the seemingly isolated blade incident is part of a wider set of maintenance problems and equipment failures that are now undercutting electricity generation at Biglow Canyon, shortchanging ratepayers and landowners, and putting those who cultivate crops under the turbines – and potentially their farmland itself – at risk.

Among the findings:

- PGE has failed to report public safety incidents at Biglow Canyon, in potential violation of its operating agreement with the state. The utility hasn't disclosed incidents where hatches, metal disks and blade bolts have fallen off turbines from a height of about 265 feet. PGE has questioned whether such incidents meet the reporting threshold, but regulators insist even small objects may be a hazard to anyone near a turbine because they can reach almost 90 mph when falling.
- PGE knowingly operated at least four turbines at Biglow Canyon with broken blade bolts, in one case for nearly a year, maintenance records show. Those bolts clamp blades to the rotor and bear the stress of wind and motion. Research indicates that broken bolts, while not uncommon, can become a serious problem leading to catastrophic blade failures like the one in February.
- Oil leaks from Biglow Canyon's wind turbines and transformers are environmental and fire hazards. The turbines have been plagued by leaks of oil and lubricants that coat towers and blades and spit on to their gravel pads and surrounding fields. Transformers have ruptured regularly, causing two fires and spilling about 3,000 gallons of mineral oil into surrounding soil that prompted expensive cleanups.

- The number of problems PGE has disclosed to regulators is out of line with other wind farms. Since 2010, PGE has reported more than a dozen oil spills and other incidents at Biglow Canyon with the potential to affect public safety — about three times more than any other wind farm regulated by the state. But state officials only recently began pressing PGE to explain those troubles.
- Biglow Canyon has generated far less power than PGE originally projected. The availability of its Vestas wind turbines to produce energy has abruptly declined in recent years, and the project's rate of energy production is less than neighboring wind farms of comparable age.
- Ratepayers may end up footing the bill for assets that are no longer useful. The project's 76 turbines manufactured by Vestas are halfway through their projected life but PGE is already considering replacing them. If that happens by the end of 2023, ratepayers would be stuck covering \$156 million in remaining costs.



Kathryn McCullough, a Sherman County landowner, examines a bolt off the blade that was thrown from a turbine at PGE's Biglow Canyon wind farm on Feb. 1. "Someone could have been killed or badly injured," she said.

The Biglow Canyon turbine that launched its blade is one of about 72,000 machines nationwide, including some 2,300 turbines in Oregon, which has more production capacity than all but nine other states. Yet there is no effective national, state or county reporting requirement or database tracking safety or operational incidents at wind farms, and only 13 of the largest of Oregon's 48 wind farms are regulated by the state, numbers that include multiple phases of some projects.

PGE launched an investigation into this winter's blade throw and is filing written updates to regulators. But it has asked the Oregon Department of Energy to keep those confidential until the end of the year because of the possibility of litigation.

Seven months into that review, PGE told The Oregonian/OregonLive that preliminary results suggest the connection between the turbine blade and its hub was “not well clamped,” a problem likely caused by “bolts becoming loose and experiencing fatigue damage over time.”

PGE said it took the blade failure “very seriously as a safety incident” and is working to fully understand the cause, rectify it and make any other necessary adjustments to improve operations.

But PGE defended its overarching maintenance efforts. It said that state regulators have not issued any violations for failing to report safety incidents; only two of the incidents it did report were actually related to public health and safety; leaking oil posed only a low environmental or fire risk; and lost service time is likely the result of grid constraints beyond its control. The issues at Biglow Canyon, it said, are consistent with those experienced by other utilities with similarly aged equipment.

“PGE entered into a long-term maintenance contract with the maker of the turbines, a wind sector leader, Vestas,” PGE spokesperson Melissa Havel said in response to written questions. “This was a prudent and industry standard action on the part of PGE. We challenge your categorization of the volume of troubles. Since coming online, Biglow Canyon wind farm has generated more than 13,000,000 MWh of clean electricity, which translates to powering 120,000 homes per year.”

Even so, PGE said it has now taken a more active role monitoring the turbines at Biglow Canyon, analyzing incoming data for anomalies or patterns that may indicate performance or safety issues. PGE officials said the utility could also end up suing Vestas, which maintains all the turbines there and manufactured the one that launched the blade. PGE said it has streamlined Vestas’ scope of work so the company can focus more on preventative maintenance.

Vestas said it completed its own investigation into the blade failure but could not share results because they contain proprietary information. Vestas, which has its North American headquarters in Portland, said there was no evidence to suggest that inadequate maintenance has shortened the lifespan of turbines at Biglow Canyon, and that the project continues to operate at or above industry standards.

Most of the turbines at Biglow Canyon have now returned to service.

“We wouldn’t run it if it wasn’t safe,” said Jesus Carrera, PGE’s manager of wind operations.

Maintenance issues at Biglow Canyon matter broadly because PGE – Oregon’s largest electricity provider, serving some 900,000 homes and businesses in Oregon – plans to transition to 100% carbon-free energy by 2045. And its customers will be paying the bill.

To eliminate all its greenhouse emissions, PGE would need to supersize its fleet of renewable energy resources and manage them for longevity, maximizing production for decades to come. Yet the economics of wind power are heavily dependent on federal subsidies, and some experts suggest those subsidies are structured in a way that incentivizes operators to skimp on maintenance for older equipment that is no longer eligible.

PGE's operations and maintenance expenses at Biglow Canyon have declined precipitously, federal records show. In 2021, PGE spent 40% less than it did eight years earlier, and it told economic regulators that spending would be even lower this year.

PGE said it has consistently invested in Biglow Canyon's operations while also striving to maintain competitive rates and balancing customer cost implications. "We expect to remain consistent with our investments this year until we determine the best future course of investment," Havel added.



The blade thrown from a turbine at PGE's Biglow Canyon wind farm on Feb 1. An outbuilding next to the McCullough's residence is shown in the background.

Meanwhile, Biglow Canyon landowners who believe in the promise of green energy have been left frustrated, not only by a perceived lack of transparency from PGE, but also because they feel financially shortchanged by excessive turbine downtime, as payments to them are based on energy production.

Don Godier, a retired air force colonel who lives in Florida, said it's always been a team effort to scratch a modest living out of the farm his great grandparents established. The family was fired up by the prospect of "harvesting the wind" by placing turbines on their land. But the resulting payments from PGE, which he said he uses to support his mother's long-term care, haven't met expectations.

"We were a little naïve and trusting," he said, "but those days are over."

Landowners recently hired a Portland lawyer to investigate potential remedies.

The McCulloughs, whose house and farm are surrounded by turbines, have been particularly vocal. They've regularly complained to PGE and recently provided documentation about maintenance concerns to the office of U.S. Sen. Ron Wyden, Oregon's senior senator and a member of the Senate Energy and Natural Resources Committee.

"If you think about it, any of those things could come down at any time," said Kathryn McCullough, a retired 747 airline captain. "If we maintained our equipment like that, we wouldn't be farming for long."



Kathryn McCullough, a Sherman County landowner, examines the blade that was thrown from a turbine at PGE's Biglow Canyon wind farm on Feb. 1. Her husband, Kevin McCullough, farms wheat under about half the wind farm's 217 turbines, including the one that threw the blade. Thirteen of the wind farm's turbines are on their land.

'What's not to like?'

When a wind prospecting outfit first approached Sherman County residents in 2001 about leasing out portions of their cropland to a wind farm operator, the McCulloughs were immediately intrigued.

The nation's wind energy boom was just getting off the ground. California was adopting rules requiring utilities to invest in green power, soon to be followed by Oregon and Washington. And

the Columbia River Gorge, with solid winds and existing transmission lines established to carry hydropower around the west, would soon become a hotbed of wind farm development and eventually become one of the top ten wind energy producers in the nation.

The big-talking wind prospector was spinning tales of the Learjets landowners would soon own, the McCulloughs remember.

It seemed like a no-brainer.

And while state and county regulations limit public access to the land under wind farms, there are virtually no off-limit areas for farming. That meant farmers could continue to cultivate nearly right up to the base of the turbines, harvesting crops from the ground and a regular stream of lease payments from overhead machines.

The McCulloughs and their neighbors soon became big backers, expressing support for the Biglow Canyon project at various forums as other groups raised concerns about its visual and noise impacts, bird mortality and operations of a nearby airport. Kevin McCullough even appeared in a [promotional video for the project](#).

It took several years, but the project gained momentum, first steered by Orion Energy, then PGE.



The first 76 Vestas turbines under construction at Biglow Canyon wind farm in 2007. Kevin McCullough, right, looked on enthusiastically at the time. He farms under about half of the wind farm's 217 turbines today and earns lease payments based on electricity production from the 13 turbines on land he and his wife own there. (File photos by Ross William Hamilton)

By 2007, the first 76 turbines manufactured by Vestas were up and spinning on the McCulloughs' and neighboring farms. They were followed by 141 Siemens machines by 2010, in what was then the largest wind farm on the Columbia Plateau. PGE said costs from the \$1 billion project would raise ratepayers' monthly bills by a total of 4.5% while producing the equivalent amount of energy used by 125,000 homes in a year.

PGE's Biglow Canyon wind farm was a reality. The electricity – and the dollars – began to flow.

“We were ecstatic,” Kathryn McCullough said of the 13 turbines on their land. “What’s not to like? When these things are turning, we’re making \$100,000 a year. How do you shake a stick at that?”

‘Just pure carelessness’

Long before the blade flew into the night at Biglow Canyon, landowners say they had concerns about substances spewing from PGE’s turbines.

Problems began more than a decade ago. The McCulloughs said they expressed concern to PGE that the Vestas turbines, then only three years old, were leaking oil and lubricants from the nacelles, the box atop the turbine tower that houses its gearbox and other major components.

It’s a condition that persists today. Many of the once-pristine white Vestas turbines are visibly soiled by oil, blackening the towers, the blades, the gravel pads and spitting into the fields below. The McCulloughs snapped photos of the problem as recently as early August showing their truck spattered in oil after just 30 minutes parked near a turbine, and the ground darkened with oil spots.

The leaks likely fall below the threshold for reporting oil spills to the Department of Environmental Quality, which requires disclosure only for discharges to the ground over 42 gallons in any 24-hour period. And officials at the Department of Energy said the problem had not been brought to their attention by a member of the public, during annual inspections or by PGE, so they haven’t looked into it.



Kevin McCullough parked his truck near one of Biglow Canyon’s Vestas wind turbines for about 30 minutes during wheat harvest in early August. When he returned, he said it was spattered in oil leaking from the top of the turbine. At right, oil spots on the ground nearby the same turbine. Landowners worry that regular leaks of oil and lubricants from Vestas turbines, which PGE says is a fixable problem if it chooses to make the investment, could be contaminating their cropland.

(Courtesy Kathryn McCullough)

Godier, the property owner paying for his mother’s care, said he’s driven cross country twice in the past few years and made it a point to check conditions at other wind farms.

“I didn’t see a single one with the amount of oil and grease we have on ours,” he said, while speculating that it could be seeping into the water table. “It’s on the ground. Someone needs to hold these folks liable for what we’re going to find in 50 years.”



Residents who own land under PGE’s Biglow Canyon wind farm worry that regular leaks of oil and lubricants from turbines pose fire and environmental hazards.

Brett Gray, who farms under PGE’s turbines, said the Vestas turbines seem the worst, but the Siemens machines at Biglow Canyon leak, too. He also farms under turbines at another wind farm to the south, Klondike, and regularly passes by others.

“It’s not the norm for the projects I’ve been around,” he said of the oil, adding that PGE told landowners there’s “no way to fix” the Vestas turbines. “But that’s hard to believe.”

PGE’s spokesperson said Vestas has identified a solution and could install retrofit kits to equipment that is prone to leaking. But PGE hasn’t decided whether to make those fixes, saying it must first choose between enhanced maintenance of existing turbines or replacing them.



A metal frame and pieces of fiberglass fell from the spinner cone of this Vestas turbine into a field below at Biglow Canyon wind farm in April 2021. PGE didn't report the incident to regulators until this summer. Wind technicians later lowered the turbine's nose cone and spinner frame onto the turbine pad, where the pieces remained for a year. The nose cone blew into a nearby gully, and remained there earlier this month.

Mark Haller, a wind industry consultant who spent 40 years managing and developing wind farms across the globe until retiring last year, said that if the turbines continue to leak oil, "it's because someone isn't spending the money to fix them."

"Those machines should not be puking oil all over the place, other than just pure carelessness," he said.

The same model of Vestas turbines used at Biglow Canyon, officially known as the V82 1.65mw, are in operation at the Echo wind farm about 50 miles to the east. They were commissioned in 2009, two years after those at Biglow Canyon, and are partially owned by a group of farmers.

Kent Madison, one of the farmers there, said he's seen an occasional leak from the gears in several turbines, but they've been promptly fixed, cleaned and look nothing like the machines at Biglow.

"Ours have run like a fine watch," he said. "We have not had any issues over the years."

Brad Jenkins, PGE's vice president of utility operations, this summer led a reporter on a guided tour of Biglow Canyon that didn't include any of the soiled turbines. Jenkins downplayed the potential environmental issues, saying the oil leaks were confined to the machines, and said PGE would never run a turbine with a fire risk.

Biglow Canyon has never experienced a turbine fire. But they do happen in the industry, with a 2,000-acre blaze in Gilliam County four years ago linked to a turbine operated by a different company, according to compliance reports submitted to the state.

“Just because an asset is dirty doesn’t mean it’s not running well,” Jenkins said. “We’re more concerned with what’s on the inside.”



Portland General Electric provided a look inside the spotless nacelle of a Vestas turbines (left) at Biglow Canyon wind farm during a tour in late June. Kathryn McCullough sent the pictures at right to U.S. Sen. Ron Wyden, which she said shows the oil-coated nacelle of a Vestas turbine this spring at Biglow Canyon. (Photos courtesy PGE, left, and Courtesy Kathryn McCullough, right)

The guided tour included showing off the inside of a spotless turbine. But Kathryn McCullough recently emailed Oregon’s senior senator photos she said she obtained from a contractor showing the inside of a turbine at Biglow Canyon this spring.

The machinery appeared filthy, heavily coated in oil, the photos show.

PGE declined to comment, saying the photos had no metadata attached so it couldn’t confirm where or when they were taken.

Oil has also leaked from Biglow Canyon’s on-site transformers, which sit at the base of each turbine and are used to regulate electrical current.

Ten transformers have failed at Biglow since 2010, three times more than reported by any other facility regulated by the state, according to Department of Energy records. Nine transformers under both Vestas and Siemens turbines and one in a substation spilled some 3,400 gallons of mineral oil — 90% of it to the ground around the turbines, prompting excavation and soil replacement.

“Ten transformer failures?” said Haller, the industry consultant. “That’s bad.”

PGE’s Jenkins said oil used in transformers is essentially vegetable oil, and poses minimal environmental or fire hazard. But the mineral oil used in transformers is flammable, and transformers have caught fire at Biglow Canyon in 2011 and 2013.

After nine transformer ruptures and related oil spills since 2010, state regulators this year pressed PGE for answers about the problems. But after hearing from a utility official in January, they took no further action.



PGE has experienced 10 transformer failures at Biglow Canyon that have collectively leaked 3,000 gallons of mineral oil to the ground surrounding turbines and caused two fires. Pictured above, pad-mount transformers sit in cabinets below each turbine at Biglow Canyon.



Screen shots of a ruptured transformer and the required cleanup of a transformer oil spill from a presentation that PGE made to state regulators in January about transformer problems at the wind farm.

Lenna Cope, a project specialist at PGE, told regulators during a public meeting transformer failures are an industry-wide problem and PGE was replacing them with transformers with different specifications when they failed. She said the demand on turbine transformers is unique because it rises and falls with rapid changes in the wind, and resulting temperature changes can degrade transformer oil and insulators, leading to the buildup of combustible gasses. The gas accumulation can over pressurize a tank, cause a rupture or, if there's an electrical arc, flash off and cause an explosion.

"PGE has a program to sample each transformer for dissolved gasses, but there are no industry standards to compare the results for decision making and accurately predict pending failures," Cope said. "PGE does our best to make prudent choices."

After watching PGE's presentation online at The Oregonian/OregonLive's request, Tony Sleva, the president of Prescient Transmission Systems, said it appeared to be tailored for an audience with limited knowledge of electrical equipment, and a panel of electrical engineers would have been more skeptical. Sleva, whose expertise includes forensic analysis of aging and failed electrical equipment, told the newsroom that testing gas in oil is an effective method to predict remaining transformer life, the methodology is well understood, and the science simple.

“PGE needs to obtain the service of a forensics lab,” he said in a statement, adding that without intervention the number of failures would likely climb.

Two weeks after Cope’s comments to regulators, another transformer failed at Biglow Canyon, leaking 166 gallons of mineral oil to the surrounding ground.

‘They’d hurt you’

Pieces of turbine equipment are now falling into landowners’ fields with some regularity.

PGE has not reported those incidents to the state promptly, or in some cases at all. That’s a potential violation of state administrative rules governing wind farms, as well as the conditions in Biglow Canyon’s operating permit with the state.

Take the metal frame and pieces of fiberglass that fell off the damaged nose cone of a Vestas turbine in April 2021. PGE didn’t report it until June of this year, and only after a reporter asked why it hadn’t been disclosed to regulators.

State rules require wind farm owners to operate the facility in a way that prevents structural failures of the tower or blades that could endanger public safety, and PGE’s operating permit requires a report within 72 hours of any incident with the potential to impact public safety.



Pieces from a damaged Vestas V82 wind turbine at Biglow Canyon. PGE told regulators a metal frame and pieces of fiberglass fell off the turbine in April 2021. Wind technicians later lowered the turbine’s nose cone and spinner frame to the ground, where they were left for a year.

After PGE questioned whether such an incident was reportable, the Department of Energy made it clear to PGE that it was, noting that even a small item falling from about 265 feet could reach 130 feet per second, the equivalent of almost 90 miles per hour.

At “those speeds, even a small object may present a hazard and raises questions with both the adequacy of and compliance with the requirements of PGE’s Operational Safety-Monitoring Program,” Wally Adams, an analyst at the department, wrote to the utility.

Using that standard, it appears PGE should have been reporting a lot more public safety incidents, based on what landowners say happens.

Kevin McCullough said that over the years, he has found 10 to 12 hatch doors, most of them beaten up and coated in oil, that have broken off the top of the Vestas turbines and fallen into the fields he farms. Each measures 25 inches by 29 inches and weighs about 10 pounds. He picks them up so his combine doesn’t, and either sits them against the base of the turbines or delivers them to PGE’s office.

Gray, one of the neighboring farmers, confirmed the same. “The Vestas turbines, they lose doors all the time and you’ll see them laying in the field. They’d hurt you. My neighbors won’t park by them.”

Likewise, the McCulloughs’ son, Colton, said he’s found several metal disks with a Siemens label attached, of about the same size and weight as the Vestas hatches, that have fallen off the Siemens turbines.



Landowners say they find hatch doors (left) from the Vestas turbines at Biglow Canyon and metal disks (center) from the Siemens turbines that break off and fall into their fields from a height of about 265 feet. State regulators say even small objects falling from that height can reach speeds of nearly 90 mph and could endanger anyone below. (Courtesy Kathryn McCullough)

PGE has also discovered at least one instance of broken blade bolts falling from the turbines. Last year, the company discovered broken bolts on four of its Siemens turbines, maintenance

reports obtained by The Oregonian/OregonLive show. In three cases, those were identified during annual inspections or during repairs, while broken blade bolts were found under one of the turbines in the fourth instance.

It's not clear how many blade bolts were broken or missing on each turbine. But PGE did not report the bolts, or the fallen hatches or disks, to the state.

Havel said PGE has reported "consistent with our understanding" of state rules and "in alignment with other wind operators' reporting patterns" but will "continue to evaluate our practice to ensure we are meeting" the state's expectations. PGE told regulators in July that it would hold meetings with staff and contractors to review the types of events that trigger reporting requirements.

The Department of Energy told the newsroom it would require reporting of a broken blade bolt found below a turbine but wouldn't say if the obligation would apply to other items, without having more details from the wind farm operator or a member of the public.

"We will investigate if it's reported to us," said Todd Cornett, assistant director of the Department of Energy siting division.

What is clear is that PGE kept its four Siemens turbines with broken blade bolts running for months while awaiting spare parts. In one case, according to the maintenance reports, PGE left a turbine in service with broken bolts for nearly a year.

Jenkins, the PGE manager, defended the decision. He said both Siemens and Vestas specify how many bolts attaching a blade to the rotor hub can be loose or broken and have the turbine remain operational. He declined to say what those specifications are, saying PGE is under a non-disclosure agreement.



Flags marking debris in a wheat field after a Vestas V82 wind turbine at Biglow Canyon threw one of its eight-ton blades the length of a football field on Feb. 1.

Andrew Luther, a spokesperson for Siemens Gamesa, said in a statement that it provides focused recommendations for Siemens turbines with broken blade bolts, but that “as every wind farm has a unique combination of location, wind conditions, equipment, age, and maintenance schedules, we do not have the necessary information to comment on this situation.” He also declined to comment on falling equipment or oil leaks because the company is not responsible for maintaining turbines at Biglow Canyon.

Vestas said most oil leaks are contained within the turbine structure, don’t affect performance and have a low risk of migrating to surrounding areas.

In the “rare instance” that objects fall to the ground, it is the responsibility of the wind turbine owner to make any required report to regulators, it said.

“Vestas investigates and repairs issues provided the failure falls within Vestas’s agreed upon scope with the wind turbine owner.”

The company said that when broken blade bolts are found, engineers make the determination on a case-by-case basis.

“Under certain circumstances and with the necessary engineering assessment, Vestas’ guidelines may allow for temporary wind turbine operation with additional guidelines,” it said in response to written questions. Those might include extra inspections and replacing additional bolts around the broken bolt during repair.

PGE said it had not identified broken bolts on Vestas turbine No. 71 or any of the other Vestas machines before this winter's blade throw. But it found broken bolts and other problems on other machines afterward — including a cracked blade bearing, a steel ring that connects the blade to the rotor hub and controls the blade angle to the wind. PGE had to replace both the bearing and the attached blade as a result.

“A cracked blade bearing is a biggee,” said Haller, the retired industry consultant.

PGE told regulators its inspections this year included hiring a contractor to check the torque on “a representative sample” of more than 10,000 blade bolts at Biglow Canyon, and it submitted 50 of the failed blade bolts from the thrown blade for specialized metal testing.

Project maintenance reports obtained by The Oregonian/OregonLive show broken blade bolts were found on four more Siemens turbines and two more Vestas machines. The reports show those machines were taken offline by PGE.

Jenkins told the newsroom that if a certain percentage of blade bolts on a given turbine were not within specifications, it planned to replace all bolts on that blade. Havel later said that it replaced all the bolts on four Vestas turbines but, after testing the metal, concluded full bolt replacement was unnecessary on additional turbines.

The failure of blade bolts due to stress and metal fatigue is cited as a frequent cause of turbine failure, according to a recent study published in the academic journal *Engineering Failure Analysis*, which presented a methodology to predict the remaining life of in-service wind turbine bolts.

Metal blade bolts do have some ability to stretch and deform without breaking. But over time, they begin to lose that elasticity, and corrosion or cracking can cause them to snap under severe loads.



Workers replacing the blades on a Vestas V82 wind turbine at Portland General Electric's Biglow Canyon wind farm in late June. The turbine threw one of its blades into a wheat field on Feb. 1. PGE blamed "a loss of clamping force."

When a fatigue failure occurs, the paper said, it's difficult to pinpoint the origin after the fact, which complicates the decision on whether to replace bolts on every turbine or just the one with failed bolts. "It is of paramount importance to know whether the fatigue-damaged bolts are in general throughout the whole farm/park, only of one turbine or only those of one connection."

One of the paper's authors, Daniel Garcia Vallejo, a professor of mechanical engineering at the University of Seville in Spain, said in an email that catastrophic failures typically result from a cascading set of events.

"Usually, the first bolt will break due to fatigue, and after a number of other bolt breakages the rest will break due to overload," he wrote.

Asked if it was considered safe, under any circumstance, to run a turbine with broken blade bolts, he replied, "I don't think so. When one bolt breakage is detected it should be analyzed and repaired."

['It could produce so much more'](#)

Amid the problems, landowners say Biglow Canyon's turbines often resemble giant lawn ornaments, sometimes sitting idle for months at a time.

And that is what they find most exasperating, and something they contend should also concern utility ratepayers and regulators, who aren't getting the carbon-free energy production they are paying for and expect.

“It’s a good rent, but I’m complaining because it could produce so much more electricity,” said John Scharf, who has 26 of the project’s turbines on his land.

Where the turbines are

The U.S. Geological Survey maintains a database of more than 72,000 onshore and offshore wind turbine locations in the United States. Zoom to Biglow Canyon wind farm

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Oregon wind farms

Oregon has about 2,300 turbines across 48 wind farms, mostly concentrated near the Columbia River Gorge.

Search:

Farm	County	Turbines	Model	Operator	Distributor
Farm	County	Turbines	Model	Operator	Distributor
Benson Creek Wind Farm	Baker	5	GE 2.0	DE Shaw Renewable Investment / Oregon Wind Farms	Idaho Power
Biglow Canyon Phase 1	Sherman	76	Vestas V82 1.65	PGE / Orion Energy	PGE
Biglow Canyon Phase 2	Sherman	65	Siemens SWT 2.3	PGE	PGE
Biglow Canyon Phase 3	Sherman	76	Siemens SWT 2.3	PGE	PGE
Combine Hills	Umatilla	41	Mitsubishi MWT 1000	Eurus	PacifiCorp / Energy Trust of Oregon
Combine Hills II	Umatilla	63	Mitsubishi MWT 1000	Eurus	PacifiCorp
Condon (Phase I)	Gilliam	41	Mitsubishi MWT 600	ALLETE / AES / SeaWest	BPA
Condon (Phase II)	Gilliam	42	Mitsubishi MWT 600	ALLETE / AES / SeaWest	BPA
Durbin Creek Wind Farm	Baker	5	GE 2.0	DE Shaw Renewable Investment / Oregon Wind Farms	Idaho Power
Echo – Big Top	Umatilla	1	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Butter Creek Power	Umatilla	3	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp

Farm Farm	County County	Turbines Turbines	Model Model	Operator Operator	Distributor Distributor
Echo – Four Corners Wind Farm	Umatilla	5	Senvion mm92	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Four Mile Canyon Wind Farm	Morrow	5	Senvion MM92	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Oregon Trail Wind Farm	Umatilla	6	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Pacific Canyon Wind Farm	Morrow	5	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Sand Ranch Wind Farm	Morrow	6	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Wagon Trail	Morrow	2	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Echo – Ward Butte Wind Farm	Umatilla	4	Vestas V82 1.65	Exelon / Oregon Wind Farms	PacifiCorp
Elkhorn Wind Power Project	Union	65	Vestas V82 1.65	EDP Renewables	Idaho Power
Golden Hills	Sherman	51	41 Vestas V150 4.3 10 GE 116.2.5	Avangrid Renewables	PSE
Hay Canyon	Sherman	48	Suzlon S88 2.1	Avangrid Renewables	Snohomish PUD
Jett Creek Wind Farm	Baker	5	GE 2.0	DE Shaw Renewable Investment / Oregon Wind Farms	Idaho Power
Klondike I	Sherman	16	GE 1.5	Northwestern Wind / Avangrid Renewables	BPA
Klondike II	Sherman	50	GE 1.5	Avangrid Renewables	PGE
Klondike III	Sherman	44	Siemens SWT 2.3	Avangrid Renewables	PG&E / PSE / EWEB / BPA
Klondike IIIa	Sherman	51	GE 1.5	Avangrid Renewables	PG&E
Leaning Juniper	Gilliam	67	GE 1.5	Avangrid Renewables	PacifiCorp
Leaning Juniper II	Gilliam	133	GE 1.5	Avangrid Renewables	
Lime Wind	Baker	6	Nordtank 500/41	Joseph Millworks	Idaho Power / BEF
Montague Wind Power Facility	Gilliam	56	Vestas V136/3450	Avangrid Renewables	

Farm Farm	County County	Turbines Turbines	Model Model	Operator Operator	Distributor Distributor
Patu	Sherman	6	GE 1.5	Ormand Hildebrand	PGE
Pebble Springs Wind	Gilliam	48	Suzlon S88 2.1	Avangrid Renewables	Southern California Public Power Authority (SCPPA)
Project Chopin	Umatilla	6	GE 1.7	BayWa r.e. Wind	PacifiCorp
Prospector Wind Farm	Baker	5	GE 2.0	DE Shaw Renewable Investment / Oregon Wind Farms	Idaho Power
Rattlesnake Road Wind Phase I	Gilliam	49	Suzlon S88 2.1	EDP Renewables	PG&E / CEP / Confederate Tribes of the Umatilla
Shepherds Flat Central – South Hurlburt	Gilliam & Morrow	116	GE 2.5	Caithness Energy	Southern California Edison
Shepherds Flat North – N. Hurlburt	Gilliam	106	GE 2.5	Caithness Energy	Southern California Edison
Shepherds Flat South – Horseshoe Bend	Gilliam & Morrow	116	GE 2.5	Caithness Energy	Southern California Edison
Star Point	Sherman	47	Suzlon S88 2.1	Avangrid Renewables	
Stateline (OR side)	Umatilla	186	Vestas V47 .6	NextEra Energy	PacifiCorp
Stateline Expansion (1 of 2)	Umatilla	279	Vestas V47 .6	NextEra Energy	
Threemile Canyon Wind	Morrow	6	Vestas V82 1.65	Exelon / Momentum RE	PacifiCorp
Vansycle II (Stateline III)	Umatilla	43	Siemens SWT 2.3	NextEra Energy	PacifiCorp
Vansycle Windplant	Umatilla	38	Vestas V47 .6	NextEra Energy	PGE
Wheat Field Wind Farm	Gilliam	46	Suzlon S88 2.1	EDP Renewables	Snohomish PUD
Wheat Ridge	Morrow	120	GE 2.3 and 2.5	Next Era	PGE
Willow Creek	Gilliam & Morrow	48	GE 1.5	Invenergy	LADWP
Willow Spring Wind Farm	Baker	5	GE 2.0	DE Shaw Renewable Investment / Oregon Wind Farms	Idaho Power

Sources: U.S. Geological Survey, Renewable Northwest

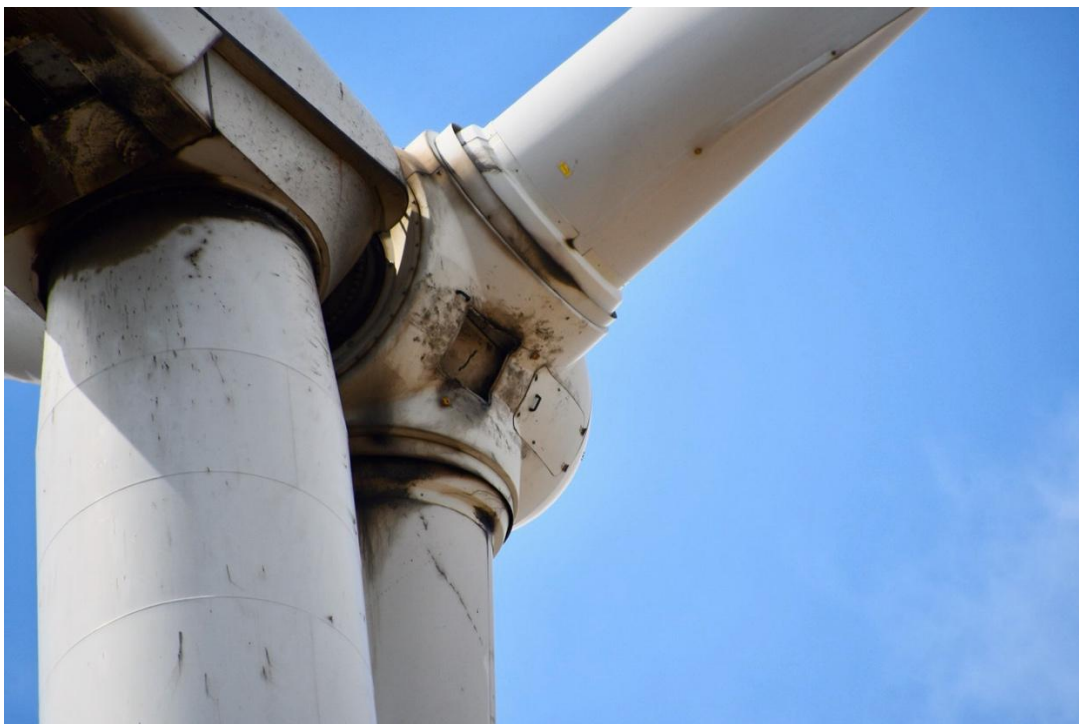
Map: Mark Friesen/staff

Biglow Canyon has been a disappointment from the start.

In 2008, when PGE first asked the Oregon Public Utility Commission to approve a rate increase to cover the cost of the first phase of Biglow Canyon, it told commissioners it expected the Vestas turbines would generate, on average, about 37% of their rated capacity of 125.4 megawatts.

That number is known as a turbine's "capacity factor," which accounts for the fact that wind doesn't blow all the time. It's an important contributor to wind farm economics, as it tells you not only how much power they'll generate but how many federal subsidy dollars are likely to flow to the project.

The project's capacity factor has never hit 37%. In their first five years of operation, compliance reports filed with the state show the Vestas turbines had an average capacity factor of 31%, meaning the project widely missed its initial projections.



A Vestas V82 turbine, missing a hatch door, at PGE's Biglow Canyon wind farm this summer. Farmers say the hatches fall into their fields from a height of 265 feet. (Courtesy Kathryn McCullough)

"Phase one was clearly not very good," said Bob Jenks, a ratepayer advocate for the Citizens' Utility Board of Oregon. "They'd probably argue that it was new technology and they were learning how to operate it. But they asked us to pay for output, not a learning experience."

By the time the last turbines were finished in 2010, PGE said publicly that the entire project's capacity factor was expected to be about 33%. Instead, it's averaged 27.6% – again, well below projections.

PGE said its estimates were based on assumptions and history of wind at the location, and that as the industry matures and it collects more weather pattern data, it can now more accurately assess wind farms capacity factors.

Nearby facilities are performing better.

The Patu wind farm, a six-turbine operation owned by a neighboring landowner that opened in 2010 and sits directly adjacent to some of Biglow's turbines, has had an average capacity factor of 36%. Klondike III, a large, neighboring wind farm of comparable age, has maintained consistently higher capacity factors than Biglow, averaging 29.2%, which over the years adds up to a lot of extra generated electricity.

Gray said he has four Biglow Canyon turbines on his land to the north and west of the Patu wind farm. He said he seldom sees any of the neighboring turbines down.

"He's not on any exceptional ridge," Gray said of the Patu operator. "When they built Biglow, they built on the best wind resource available."

PGE said different environmental factors and plant features affect the capacity factors of each, and that "these wind farms are not directly comparable."

State regulators separately require wind farm operators under their jurisdiction to report how often equipment is available to generate power, regardless of whether the wind is blowing.

On-shore wind turbines tend to be very reliable, typically available more than 95% of the time, according to James Manwell, a professor in the Department of Mechanical and Industrial Engineering at the University of Massachusetts who studies wind energy.



Farmers cultivate wheat right up to the base of wind turbines at Portland General Electric's Biglow Canyon wind farm (left). An aerial shot (right) of a Vestas turbine on Feb. 22, after it threw a blade 100 yards into a field below.

Among wind farms under state jurisdiction that have been operational for at least 10 years, all have hit that mark, on average, including Biglow Canyon. But the Vestas machines at Biglow have failed to achieve that target in half the years they've operated, plummeting to 88.5% in 2020 and 86.5% in 2021.

This year's performance could be worse, as many of the Vestas turbines were down three or four months after the blade separation.

Doug Medler, a Portland resident who sold his land to the McCulloughs three years ago but retained the wind rights, said his payment for the second quarter of this year was about \$5,250, compared to about \$17,850 in the same quarter last year, a 71% reduction.

"It's a significant hit," he said. "It's a big source of income, but not one that affects my ability to put food on the table or pay the utility bill."

During the past five years, PGE has offered landowners various reasons for the turbine downtime: low wind; plant curtailments by the Bonneville Power Administration when the region's hydroelectric dams are producing too much energy; and more recently, aging equipment and a lack of parts due to disruptions in the global supply chain. PGE has also said it's sometimes advantageous to ratepayers to run its other wind plants that are still within the 10-year eligibility window for federal production tax credits, and shut down Biglow Canyon, which is no longer eligible for the subsidies.

PGE told the newsroom substation and transmission outages initiated by the Bonneville Power Administration likely affected Biglow Canyon in 2020 and 2021. "There were no equipment failures or breakdowns that significantly impacted availability or capacity," PGE previously told regulators about those years.

Yet in emails to Kathryn McCullough about frustrations over downtime, a PGE official last year acknowledged the role of failing equipment.

Nick Loos, the director of dam safety and renewable energy, blamed increased downtime on wear and tear, "end of life issues" that were "rearing its ugly head" and the need for PGE to stay ahead of the "failure curve."

"The past maintenance strategy of replace as main components fail has worked in the past," he told her, "but with the increase in failures we need to mature our maintenance strategy. Work we are doing in the background is focused on preventative maintenance."

'Need to hold the utilities responsible'

The path forward for Biglow Canyon is uncertain.

Company officials have pledged to improve safety and performance, and Wyden, the senator, has vowed to keep watch.

“PGE is updating our office regularly with the inspection status, as well as committing to provide our office with a longer-term inspection and maintenance plan,” Hank Stern, a spokesperson, said in an email. “Sen. Wyden will keep watchdogging this issue to ensure PGE follows through on its commitment to him and the community.”

Financially, PGE appears to have two routes to address issues.

Jenkins, the utility’s vice president of operations, insists that PGE is managing the project – and the Vestas turbines – for longevity, focusing on preventive maintenance to keep small problems from turning into big ones. “I don’t know that with the age of these assets, the case can be made that they’re not performing,” he said.



But keeping the turbines performing at a high level may require significant investments, and PGE’s filings with regulators don’t reflect that reality.

In fact, PGE’s operations and maintenance expenses at Biglow Canyon have steadily declined, despite the aging equipment and acknowledged need for major repairs. PGE spent \$13 million last year, down 40% from 2013, according to figures filed with the Federal Energy Regulatory Commission. That’s the lowest total since 2010.

And in documents submitted to Oregon regulators, the company said it would spend even less this year: \$10 million.

If that seems strange, perhaps it shouldn’t.

A 2020 study by researchers at Lawrence Berkeley National Lab found that wind plant performance in the United States declines suddenly after 10 years – far more abruptly than output dropped in Europe or Asia. One theory the authors offered: As plants aged out of the 10-year window for federal production subsidies, they don't warrant more intensive operations and maintenance activities to maximize production.



A wind technician enters a Vestas turbine at PGE's Biglow Canyon wind farm. The project's 76 Vestas turbines are now 15 years old, about halfway through their depreciable life. PGE is already considering replacing them.

A related hypothesis cited by the research: regular maintenance that was deferred to maximize production while the wind farms were still eligible for the tax credits eventually comes home to roost in the form of increased breakdowns.

PGE's alternative to spending more on maintenance would be to repower the Vestas turbines, replacing most of their components, increasing their efficiency and output. It's not uncommon. And PGE is considering it.

If that happens, ratepayers could end up eating the remaining value tied to the existing machines. The Public Utility Commission said that was \$178 million at the end of last year and would decline to about \$156 million by the end of 2023.

The likelihood of repowering may have just gotten higher, as the Inflation Reduction Act passed by Congress this month renewed the federal production tax credit subsidy for another 10 years for wind and solar farms that begin construction prior to Jan. 1, 2025, including those repowering turbines.

Any decision to repower turbines at Biglow Canyon would be subject to a so-called “prudence review” by the Oregon Public Utility Commission to determine whether the investment is in the public interest. That decision would include all the costs involved, including the remaining costs of the turbines being repowered, the cost of the new equipment, and the available tax credits.

Jenks, the ratepayer advocate, said the review would also include an analysis of whether the current equipment has been properly maintained, and if not, what went wrong.

“If we’re going to make a transition to clean energy,” he said, “we need to hold the utilities responsible for managing these projects properly.”

The landowners would like that same level of accountability.

“When we entered into the agreement, the objective of the company and the landowners leasing the land was to have the project work, and make money,” said Cheryl Woods, a Biglow Canyon property owner and the accountant for the wind prospecting company that originally arranged the lease.

“But it doesn’t seem to be exactly going that way. It just hasn’t been managed well.”



A Vestas wind turbine at PGE's Biglow Canyon wind farm.

Wind Turbines Produce Drama, Cash, and Some Electricity: Big Trouble at Biglow Canyon



Diablo Canyon Power Plant, California's last operating nuclear power plant. Credit: Tracey Adams. License: Wikimedia.

by [Ken Braun](#)
February 27, 2024

Danish Wind Turbines Produce Drama, Climate-Left Cash . . . and Some Electricity (full series)

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At 2:11 a.m. on February 1, 2022, according to a [report](#) in *The Oregonian*, a wind turbine at the Biglow Canyon Wind Farm in Oregon hurled one of its giant blades the “full length of a football

field” away from its tower. Described as heavier than “four Toyota Camrys” and “as tall as an 11-story building,” the detached blade sliced a four-foot-deep crater in a nearby farm field. In an eerie newspaper photo, the crash site looked like the wreckage of an alien spacecraft.

A few days earlier a driver delivering fertilizer had recovered and photographed “industrial-size bolts” on the ground near the troubled tower. His coworker returned to the same location during the evening of January 31, just hours before the blade flung loose, to tow out the vehicle of another delivery worker who had gotten stuck in the mud.

“Someone could have been killed or badly injured,” observed Kathryn McCullough, whose husband farmed the same fields.

Owned by Portland General Electric, the turbine was built by Vestas, a Danish firm that has been one of the world’s largest producers of wind-energy machines. *The Oregonian* [investigative feature](#) in August 2022 was headlined “Wind Bust: How an Airborne Blade Exposed Broader Problems at PGE’s Flagship Wind Farm.” The report revealed concerns about both Vestas turbines and PGE’s maintenance of them.

The recently enacted Inflation Reduction Act is expected pay out [\\$400 billion](#) in carbon and climate policy pork, and much of it is crashing down on weather-restricted energy systems such as wind turbines. The wind welfare industry is already off to a flying start. Using 2022 data, energy journalist Robert Bryce [compared the subsidies](#) for all major American forms of energy, “calculated on an energy-produced basis,” and found that wind power received nearly *70 times* more taxpayer loot than carbon-free nuclear power.

As a major wind industry supplier, Vestas stands to indirectly profit from the taxpayer largesse.

[In 2012](#), facing the threat of Congress ending the wind production tax credit (PTC), a Vestas official warned that 75 to 95 percent of the American wind power industry could disappear without the corporate welfare. [In 2014](#), according to the *Washington Free Beacon*, the two U.S. senators from Colorado specifically cited Vestas as the reason they were supporting renewal of the PTC.

Not surprisingly, Vestas has also been a big donor to major left-wing nonprofits that promote its problematic weather-dependent wind power.

Big Trouble at Biglow Canyon

PGE responded to the February 2022 blade detachment by shutting down and inspecting all 217 turbines at Biglow Canyon, 76 of which were made by Vestas and 141 by Siemens Gamesa, a Spanish-German firm. Some of the turbines were still out of action four months later.

The Oregonian investigation found that “hatches, metal disks and blade bolts” had repeatedly fallen off PGE’s 265-foot-tall turbine towers and the utility had “knowingly operated at least four turbines at Biglow Canyon with broken blade bolts, in one case for nearly a year.”

The newspaper cited concerns with all of PGE's turbines, but also revealed that the Oregon power company was considering suing Vestas. Although the McCullough family were initially supporters of the wind project, the newspaper said they began noticing problems just three years after the Vestas turbines were installed in 2007.

The turbines started leaking lubricants:

It's a condition that persists today. Many of the once-pristine white Vestas turbines are visibly soiled by oil, blackening the towers, the blades, the gravel pads and spitting into the fields below. The McCulloughs snapped photos of the problem as recently as early August showing their truck spattered in oil after just 30 minutes parked near a turbine, and the ground darkened with oil spots.

The Oregonian showed photos of the badly soiled turbines and the truck hood, plus large parts that had been falling from the Vestas machines:

Kevin McCullough said that over the years, he has found 10 to 12 hatch doors, most of them beaten up and coated in oil, that have broken off the top of the Vestas turbines and fallen into the fields he farms. Each measures 25 inches by 29 inches and weighs about 10 pounds.

"The Vestas turbines, they lose doors all the time and you'll see them laying in the field," confirmed another farmer quoted in the report. "They'd hurt you. My neighbors won't park by them."

The report also cited an official from the Oregon Department of Energy who estimated that the items falling from 265 feet up could smash into the ground (or anything and anyone else) at nearly 90 miles per hour.

In 2008, according to *The Oregonian*, PGE told state regulators its Vestas turbines would average 37 percent of their rated capacity. But the newspaper found the turbines never even achieved 37 percent of rated capacity, let alone made an average of that production level.

"They'd probably argue that it was new technology and they were learning how to operate it," chirped a ratepayer advocate quoted by *The Oregonian*. "But they asked us to pay for output, not a learning experience."

Because the weather is fickle, the capacity factor of wind turbines is very low. [According to](#) the U.S. Department of Energy, the average capacity factor of all American wind energy is just 34.6 percent. At 92.7 percent, carbon-free nuclear energy has the highest capacity factor of all major American sources of electricity.

Although the Vestas machines were just halfway through their 30-year estimated useful lifespan by 2022, *The Oregonian* reported PGE was already thinking about retiring them.

Despite all this, a PGE spokeswoman gave a prickly reply about the tone of *The Oregonian's* questions.

“We challenge your categorization of the volume of troubles,” she wrote. “Since coming online, Biglow Canyon wind farm has generated more than 13,000,000 MWh of clean electricity, which translates to powering 120,000 homes per year.”

All things considered, that’s nothing to brag about.

Biglow Canyon came online in 2007 and covers [25,000 acres](#) (39 square miles), [almost the size](#) of the city of Eugene, Oregon, home to 177,000 people. By comparison, California’s [Diablo Canyon](#) nuclear plant covers just [1,000 acres](#) (1.5 square miles).

Yet every year Diablo Canyon produces at least 16.5 million MWh of carbon-free electricity (and sometimes more than 18.5 million MWh). That works out to a cumulative total of more than 281 million MWh during the era when Biglow Canyon generated just 13 million MWh.

Leave aside the years of oil leaks and smaller debris falling onto Oregon. If throwing just one 11-story, multi-ton piece of equipment since 2007 can be excused away as the acceptable price to pay for Biglow Canyon’s relatively pitiful zero-carbon energy output since then, then the hyper efficient Diablo Canyon needs to drop 22 giant blades on its local community just to catch up to the same level of incompetence.

Biglow Canyon’s turbine troubles should be considered a serious problem in any context, but even more so relative to the tiny power output and immense chunks of Oregon’s land and skies that it consumes.

<https://capitalresearch.org/article/wind-turbines-produce-drama-cash-and-some-electricity-part-1/>

In the [next installment](#), Vestas wind turbines experience “unexpected and increasing wind turbine failure rates.”

Wind Turbines Produce Drama, Cash, and Some Electricity: “Unexpected”



by [Ken Braun](#)
February 27, 2024

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“Unexpected . . . Failure Rates”

But Biglow Canyon is far from the only place where Vestas turbines have been behaving badly according to the media. There were at least a half dozen additional incidents in the 20 months after the flying blade failure in Oregon.

In [June 2022](#), an entire tower with a Vestas turbine fell over at an Australian facility run by the Iberdrola energy firm. “The failure of turbine 43 at Alinta Wind Farm is a serious event,” said the Iberdrola’s Australia CEO. “We are currently working closely with regulatory bodies and the operations and maintenance contractor, Vestas, to understand the factors that have contributed to the failure of the turbine.”

A fire broke out at a Vestas turbine in Germany in [December 2022](#), according to ReNews.Biz.

And in [October 2022](#), a turbine owned by [Warren Buffett's](#) MidAmerican Energy caught on fire in Iowa. [According to](#) ReNews.Biz, the Vestas turbines at the facility had “began operating in 2020.”

“An incident such as this is an extremely rare occurrence—throughout our fleet we have experienced only one other fire of this magnitude in the nearly 20 years since we began operating our first wind farm,” said a MidAmerican official.

He soon learned the wind turbine gods can be as capricious as the wind itself. Almost precisely a year later, in [October 2023](#), another Vestas turbine at a different MidAmerican facility in Iowa reportedly caught fire.

“Local fire brigades from Adair and surrounding towns responded but could do little as they lacked equipment to reach the nacelle,” reported [ReCharge](#). “The fire eventually consumed the nacelle and one of the blades, with burning debris falling into surrounding cornfields that sent up plumes of smoke that could be seen for miles.”

Local TV news caught a [dramatic video](#) of a flaming blade crashing to the ground. “An incident such as this is an extremely rare occurrence,” the MidAmerican official reportedly said once again.

According to other media accounts, 2023 had already been a thrilling year for Vestas turbines.

In [February 2023](#), ReNews.Biz reported a fire at a Vestas machine in Denmark, its home nation. The report did not quote anyone claiming the fire was a “rare occurrence.”

Good thing, because in [August 2023](#), EnergyVoice reported an offshore Vestas turbine had caught fire just off the coast of Norfolk in the United Kingdom. A [BBC account](#) featured several dramatic photos of the destroyed machine billowing black smoke that could be easily seen from the coastline.

By [July 2023](#) ReNew Economy was reporting maintenance troubles for Vestas:

Vestas has added €210 million in warranty provisions for repairs in the December quarter, as rising call outs and higher upgrade costs bite at the Danish company, too. Vestas also said its lost production factor is rising towards 4 per cent due to the number of “extraordinary” repairs and upgrades.

By then all of the big turbine makers were having troubles, according to ReNew Economy:

Unexpected and increasing wind turbine failure rates, largely in newer and bigger models, are savaging the profits of some of the world’s biggest manufacturers, as Siemens Gamesa, GE and Vestas report heavy repair and maintenance losses.

In its Biglow Canyon [investigation](#), *The Oregonian* correctly observed that “there is no effective national, state or county reporting requirement or database tracking safety or operational

incidents at wind farms.” The newspaper also reported that Portland General Electric had claimed the “issues at Biglow Canyon” were “consistent with those experienced by other utilities with similarly aged equipment.”

It is difficult and perhaps impossible for an outside party to objectively evaluate whether the problems for Vestas have been typically awful for the industry, or extraordinarily awful. In the absence of any substantive recordkeeping or obligation on the part of the turbine makers to publicly report their major malfunctions, we must rely on the accuracy of media accounts.

Even if accurately reported, such accounts often fail to mention critical details such as who manufactured the equipment. And there are likely major malfunctions that have gone unreported, particularly in lower-income nations with comparatively less robust media coverage.

Even with these caveats, Vestas wind turbines have been appearing in unpleasant media accounts for more than a decade.

<https://capitalresearch.org/article/wind-turbines-produce-drama-cash-and-some-electricity-part-2/>

In the [next installment](#), Vestas characterizes the wind turbine failures as “extraordinarily rare.”

Wind Turbines Produce Drama, Cash, and Some Electricity: “Extraordinarily Rare”



Offshore wind farm in Baltic Sea near Copenhagen, Denmark. License: Shutterstock.

by [Ken Braun](#)
February 27, 2024

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An “Extraordinarily Rare Event”

“In [December 2011](#), a wind turbine in the coastal town of Ardrossan in the UK spectacularly exploded during a storm,” reported *New Scientist*. “Pictures of the flaming debris shower flashed across global media, triggering claims that turbines cannot cope in extreme weather.” According to *New Scientist*, a Vestas wind turbine had been the star of that show.

A few months later in [April 2012](#), according to the *Crescent News*, two blades broke off of a Vestas turbine in Ohio. The facility was owned by EDF Renewables. the *Crescent News* quoted an EDF spokesman [who claimed](#) the problem was an “extraordinarily rare event.”

But within weeks of each other in the [early summer of 2012](#), according to *Renewable Energy Magazine*, fires occurred at Vestas machines in Germany and Spain.

“Given the information available, the Casa del Aire incident is an isolated case with no connection to the fire involving the V112 in Germany or any other incident concerning a Vestas wind turbine,” claimed a Vestas official.

And then *Lincoln Star Journal* reported another Vestas wind turbine fire in Nebraska in [October 2012](#).

According to the *Bangor Daily News*, a Vestas wind turbine in Maine, [near](#) the Canadian border, caught fire in [January 2013](#).

“Companies that operate wind farms in Maine are not currently required to report turbine fires to any state agency,” reported the newspaper in late April, explaining why it was just getting around to covering a fire that had occurred on January 16. The newspaper began the report claiming the incident had “generated concern about the safety and reliability of turbines, and the process by which these fires are reported to government officials and the public.”

In [March 2013](#) a Vestas turbine tower collapse in Ireland, leaving wreckage that “had been strewn over a wide area,” [according to](#) one local newspaper, and “just yards from a popular cycling route” [according to](#) the *Irish Independent*.

An [Irish radio station](#) interviewed Vestas officials who “said such incidents are very rare” but “refused to answer questions about how many times such collapses have happened in the past.” In a statement, Vestas declined to speculate on the cause of the collapse, but [ironically noted](#) it had occurred in “very high winds.”

In [April 2013](#), *North American Windpower* reported that a Vestas turbine in Ontario had caught on fire. [According to](#) the *Stratford Beacon-Herald*, the fire “fueled the fierce debate between those who add fire hazard to their list of reasons to hate wind turbines and those who say an isolated incident doesn’t detract from wind energy’s exceptional safety record.”

Two young Dutch workers trapped atop a turbine inferno died in [October 2013](#). Multiple online [images](#) and [videos](#) show a “Vestas” logo on the machine, including those showing the doomed workers sharing a final hug. Two ReNews.Biz stories archived at the Wayback Machine from [October 2013](#) and [November 2013](#) identify the turbine as a “Vestas V66,” with the first report stating “Vestas said it was saddened by the incident and extended its sympathies to the families involved.”^[1]

The German news site Soester Anzeiger posted a [February 2014](#) account of another fire with [photos](#) of a Vestas turbine ablaze in Echtrop, Germany.

In late [December 2015](#), according to ReNews.Biz, a Vestas turbine tower collapsed in Sweden. The report paraphrased a Vestas official who claimed that “incidents involving structural integrity are very rare.”

Eight weeks later in [February 2016](#) the *Huron Daily Tribune* in Michigan reported the collapse of a “400-foot, 485,000-pound” Vestas wind turbine and tower. According to the newspaper, investigators concluded it had “shook itself apart” in a “pretty violent act” during an “overspeed event.” The reporter wrote there was a “dose of irony” involved in high winds wrecking a wind turbine.

“In Operation Less Than One Year”

In [October 2016](#) blades broke off two different Vestas wind turbines at another wind facility in Michigan. According to the *Huron Daily Tribune*, the wind machines had just been turned on during the “startup phase” at the then-new Deerfield Wind Energy project. Also in [October 2016](#), according to North American Windpower, a Vestas wind machine caught fire in Brazil.

In early [January 2017](#), CBC News reported that a Vestas wind turbine tower “snapped in half” during a “severe wind warning” in Nova Scotia. One observer [told CBC](#) he could “see the debris was flying down towards the ocean.”

“If it’s too windy, then maybe it’s not the right place for it,” said another local Nova Scotian. “Because it is close to houses and I imagine the people up the hill . . . they must have been scared because it was right near to their house.”

The Clarendon Enterprise reported in [June 2017](#) that a Vestas turbine had caught fire near Jericho, Texas; Offshore Energy reported in [August 2017](#) that a Vestas turbine had burned up atop a 140-meter tower at a Denmark test facility; and in [October 2017](#), according to Balkan Green Energy News, a Vestas turbine tower collapsed in Croatia.

A Vestas wind turbine in Iowa owned by MidAmerican Energy caught fire in [May 2018](#), according to Perry News. It had “been in operation less than one year,” according to the newspaper.

ReNews.Biz reported that a turbine and blades simply fell off a tower in Thailand in [October 2018](#). “Vestas said a nacelle detached from the tower and fell to the ground together with the blades,” reported ReNews.Biz. “TV pictures have shown a wrecked turbine at the foot of a relatively unscathed tower.” It was another incident involving a wind project that had “only very recently been completed and commissioned.”

A Vestas turbine in Denmark caught fire in [January 2019](#). A TV station reported the fire spread to buildings at a nearby farm where dozens of bull calves were kept, but that none of the livestock were injured. The website featured a photo of the turbine ablaze, with the Vestas logo still visible.

A blade from a Vestas turbine in Ohio snapped off in [September 2020](#), according to the account in Windpower Monthly. The following month in [October 2020](#), according to ReNews.Biz, a blade fell off a “recently-commissioned” Vestas turbine in Australia. And Windpower Monthly reported the [November 2020](#) collapse of a “newly installed” Vestas turbine tower in Sweden.

And in [October 2021](#), Mercury Energy reported a fire had destroyed one of its Vestas turbines at the Tararua Wind Farm New Zealand. [According to](#) the *New Zealand Herald*, Mercury had just purchased Tararua and the Vestas turbine from another energy firm in August 2021.

Notes

[1] Curiously, as of January 2024, the pair of ReNews.Biz page addresses, each referencing the original headlines from the dramatic story, redirected to benign and unrelated ReNews.Biz reports from [May](#) and [June](#) of 2019. A request for clarification sent to ReNews.Biz in early January was acknowledged but not answered before CRC posted this analysis. Beyond the two, now oddly discarded, ReNews.Biz reports, any other original reporting naming Vestas as the maker of the turbine in the Dutch fire is (at a minimum) difficult to locate.

As noted, a Vestas logo is clearly visible in multiple online videos and photos purporting to be from the incident. There are still some secondary media accounts online that mention the original ReNews.Biz reports. National Wind Watch, a watchdog group that is skeptical of wind energy, reproduced the entire text of the November 2013 ReNews.Biz report: “[Dutch Investigate Deadly Turbine Fire](#).”

<https://capitalresearch.org/article/wind-turbines-produce-drama-cash-and-some-electricity-part-3/>

In the [next installment](#), wind turbines compare unfavourability with carbon-free nuclear power.

Wind Turbines Produce Drama, Cash, and Some Electricity: Support for Anti-Nuclear Nonprofits



by [Ken Braun](#)
February 27, 2024

Danish Wind Turbines Produce Drama, Climate-Left Cash . . . and Some Electricity (full series)

[Big Trouble at Biglow Canyon](#) | [“Unexpected”](#)
[“Extraordinarily Rare”](#) | [Support for Anti-Nuclear Nonprofits](#)

Relative Unreliability

As noted earlier, all the major turbine makers have recently reported financial challenges linked to unanticipated reliability issues. The assertion that these dozens of comprehensive and frequently dangerous failures represent “very rare” incidents for Vestas should be weighed against what each those calamitous turbines can produce.

In a comparison of needless drama produced per kilowatt hour, how do wind turbines stack up?

Not well. [According to](#) a January 2024 estimate from the Massachusetts Institute of Technology Climate Portal, nearly 800 average-sized wind turbines are needed to match the electricity output of just one average output (900MW capacity) carbon-free nuclear reactor.

The report also calculates how much environment gets torn up by all those turbines:

When it comes to land use, nuclear plants take up as little as 10 hectares per terawatt-hour of electricity produced per year, while wind uses about 100 hectares, measuring just the area taken up by turbines. (This rises to an astounding 10,000 hectares if you include all the land covered by a wind farm, but most of this space is open land and can be used for ranching or farming.)

For environmentalists who wish to reduce carbon emissions while preserving the environment, the choice between nuclear and wind energy (or solar, also a large land hog) should be a no-brainer.

Support for Anti-Nuclear Nonprofits

But as these supposedly “very rare” disasters have hit Vestas turbines over the past two decades, the wind machine maker has been supporting and partnering with nonprofits that oppose nuclear energy.

In 2011, the [World Wildlife Fund](#) (WWF) announced it was partnering with the Vestas “[WindMade](#)” campaign.

“The new label in the WindMade family will recognize a wide variety of renewable energy sources, including wind, solar, and geothermal, as well as hydro power and biomass from approved certification schemes,” crowed WWF in a [news release](#).

Missing from this formula is nuclear energy. [According to](#) Our World in Data, nuclear reactors provided more of the planet’s carbon-free power in 2022 than any other source except hydroelectric dams. And nuclear was the overwhelming carbon-free power champion [in the United States](#) in 2022, kicking out *three times* more electricity than American hydro dams and more than the *combined total* for wind, solar, geothermal, and biomass.

WWF is anything but a champion of nuclear power. Throughout [2020](#) and [2021](#) the climate alarmist nonprofit repeatedly opposed attempts by the European Parliament to include nuclear power as part of the EU’s sustainable energy taxonomy.

Whether its agreement with Vestas translated into direct support isn’t clear, but WWF isn’t starving either. In its recent [IRS filings](#) the U.S. affiliate of WWF reported revenue of \$381.6 million for 2022 and \$408.3 million for 2021.

Like all 501(c)(3) educational nonprofits, WWF should be entitled to donor privacy and is not legally required to disclose the names of donors. But some occasionally do so voluntarily.

The [2015](#) and [2016](#) annual reports from the [Rocky Mountain Institute](#) (RMI) both thank Vestas for donations in the “\$100,000–499,000” giving range. RMI has quietly become one of America’s largest climate policy nonprofits, with annual [reported revenue](#) since 2021 exceeding \$115 million. RMI founder Amory Lovins has been a [strident opponent](#) of nuclear power for almost half a century.

It is not clear when or if Vestas continued this support for RMI, though RMI's [2022](#) annual report credited 13 "anonymous" donors giving at least \$100,000 each, with four of those giving more than \$1 million each.[\[2\]](#)

A [May 2016](#) Rocky Mountain Institute report on its Renewable Energy Buyer's Alliance noted a collaboration between RMI and Vestas:

Finally, looking beyond the value chain, we engaged manufacturers, including turbine producer Vestas, and transmission-line developers such as Clean Line Energy, that are helping to improve the grid so that more wind and solar can be transmitted easily and reliably from where the wind blows and the sun shines to where customers need it.

A [2017 annual report](#) from the Australian affiliate of [Friends of the Earth](#) credits Vestas Australia in its list of "donors and supporters," but does not disclose a giving level. [IRS filings](#) by the U.S. affiliate showed revenue exceeding \$17.6 million for both 2021 and 2022.

For at [least 40 years](#) Friends of the Earth (FoE) has been one of the Earth's most adamant enemies of nuclear power. In 2023, FoE's American affiliate filed lawsuits in an [effort to close](#) California's Diablo Canyon nuclear plant. This put FoE far to the kooky left of even California's stridently lefty Gov. Gavin Newsom (D), who wisely and successfully intervened to keep the carbon-free energy facility open.

Diablo Canyon has a generating capacity of [2,240 megawatts](#). Using the aforementioned [estimate](#) from the Massachusetts Institute of Technology (nearly 800 wind turbines needed for every 900 MW of nuclear capacity), this would make Diablo Canyon the equal of *more than 1,900 wind turbines*. In 2022, according to the U.S. Department of Energy, Diablo Canyon all by itself produced [17.6 terawatt hours](#) of electricity, [20 percent more](#) than the combined output of every wind turbine in the state of California.

Using the MIT estimate of a 10,000 hectare field needed for each terawatt hour of annual wind energy production, a wind turbine facility producing 17.6 terawatt hours would scatter turbines across a 176,000 hectare field.

That would mean using 679 square miles to accomplish what Diablo Canyon does with [1.5 square miles](#). To put 679 square miles in perspective, imagine covering an area [twice the size](#) of the [very windy](#) Rocky Mountain National Park with wind turbines.

Why is there all this evidence that Vestas reliably and repeatedly works with and supports so many powerful, stridently anti-nuclear, climate nonprofits?

There may be nuanced and complex answers to this question.

But the simple answer is probably the correct one.

<https://capitalresearch.org/article/wind-turbines-produce-drama-cash-and-some-electricity-part-4/>

Notes

[2] This detail regarding anonymous donors was also referenced in “Climate Alarmists Hoover Up Corporate Welfare,” an [October 4, 2023](#), CRC analysis that looked more closely at Rocky Mountain Institute donors: “In the 2022 annual report alone, 13 “anonymous” donors are also credited with giving \$100,000 or more—four gave more than \$1 million. Given what is known of the named donors, it is reasonable to conclude that some of the 13 have also benefited directly from the IRA corporate welfare for weather-dependent power and storage.”

In a development that may be merely correlation, but could also be causation, the Rocky Mountain Institute’s [2023 annual report](#) appeared after the online posting of the passage quoted above. But this latest RMI annual report did not itemize the number of anonymous donors at each giving level. RMI had publicly disclosed this statistic regarding anonymous giving in [every previous annual report](#) since at least 2007.

From: [Kathryn McCullough](#)
Sent: Wednesday, December 24, 2025 4:17 PM
To: [CLARK Christopher](#) * [ODOE](#)
Subject: Exhibit #2 NOI PDF
Attachments: Biglow Canyon Solar Fire Issues NOI Exhibit #2.docx
