# Climate Change and Safety Concerns regarding Natural Gas

Docket # UE-170033 and UG-170034
Testimony from Kevin Jones, Carbon Free PSE – Vashon campaign lead
kevinjonvash@gmail.com
206-463-1766

Good evening. My name is Kevin Jones and I am a PSE customer. Thank you for this opportunity to provide testimony regarding the replacement of Colstrip 1 & 2 coal fired power plants as part of the PSE rate structure.

I would like to discuss the related climate change impacts from a regulations point of view, which I prefer to think of as a "protections" point of view. Your charter includes "ensuring private… energy… companies are providing services that are fairly priced, reliable and safe". I will focus on safety, and your role to protect us from dangers and damages that could be inflicted on us by energy providers.

My testimony will address my direct experience with PSE regarding their approach to coal use, my indirect experience of PSE regarding their documented disregard of safety emphasis with respect to Natural Gas, new observations that Methane leaks have been significantly underestimated and a recent, local example of ignoring the impacts of Methane leaks during the Natural Gas extraction and transportation process that I hope you will not overlook while considering PSE plans to replace Colstrip 1 & 2.

My first point is in response to statements captured in the Bellevue Reporter Article Environmental advocates call for Bellevue-based Puget Sound Energy's closure of Montana coal plant written by Raechel Dawson on August 2 following your July 31 rate case hearing. In that article Sameer Ranade of the Washington Environmental Council said "President Donald Trump is not going to implement the Clean Power Plan, which would have reduced emissions from coal-fired power plants". Subsequently the article states that "Grant Ringel, a spokesman with Puget Sound Energy, said environmental issues are also "of great concern" to the company".

My letter to the editor, citing my direct experience with PSE, indicates little incentive to address environmental and climate change issues, in part:

> Since December of 2016 I started calling PSE to ask a simple question "How can PSE ratepayers help you move away from coal based electricity?" I expected a simple and straightforward answer. I called almost every week, for four months – first the media department, then a community outreach department. I can assure you that PSE did not offer any concrete thoughts about how their million-person rate payer base can accelerate this transition away from coal. When a new PSE community outreach person did call me, he mainly repeated "the (Colstrip closure) settlement is the settlement", meaning the lawsuit that enforced the current schedule for PSE to shut down half the Colstrip plant was not something they planned to alter. Throughout the 20-minute conversation, despite repeated requests on my part, there was not one suggestion offered to accelerate this process.

PSE has not evidenced, to me, an interest in moving away from carbon based fuel. I do not expect them to be inclined to evaluate this approach in their future energy planning. As Commissioners, you should not expect PSE to have an interest or a strategy to abandon carbon based fuel.

We should also expect PSE to propose a gas plant to replace Colstrip. This leads me to comment on PSE statements about Natural Gas safety, in this case their planned Tacoma LNG facility, in an article from KNKX:

> Puget Sound Energy says … the project … is safe.
>
> "It virtually eliminates the spill risk from bunker fuel because liquefied natural gas simply evaporates. It's non-toxic. It simply evaporates if in fact the unlikely spill happens," according to PSE spokesman Grant Ringel.

A more realistic assessment of Natural Gas leaks is included in a Crosscut article, which states:

> Liquified natural gas is not explosive, but if it warms up and reverts back to its gaseous form (*ie: evaporates*) and mixes with the air in the right proportions — and these vapors find a spark or flame — it can catch fire (*ie: explode*).

While Mr Ringel makes light of this risk, the world of Natural Gas extraction and transportation is not so innocent as Natural Gas developers claim, as stated in The Economist:

> Methane emissions come from several sources—not least the digestive systems of livestock such as cows. But the latest figures show that the biggest chunk of annual methane emissions in America, around a third, can be traced to the natural-gas industry. An estimated 2.5% of the natural gas flowing through America's ageing energy infrastructure leaks out of wells, pipelines and storage tanks. Often it seeps discreetly into the air. Sometimes it leaves a more noticeable footprint—a 2015 blowout at the Aliso Canyon storage facility in Los Angeles produced the worst leak in American history.

The related article in The Economist further states:

> Recently, the Environmental Protection Agency (EPA), an American regulator, has introduced its first regulations specifically aimed at capping methane emissions, acknowledging it has underestimated the problem. It has lifted its estimate of the amount of methane that leaked out of the natural-gas and oil supply chain in America in 2013 by about 30%—a massive revision. Steve Hamburg, EDF's chief scientist, says that still leaves out the "fat-tail" super-emissions. He reckons about 2-2.5% of the gas flowing through the American supply chain leaks out, in total.
>
> Get much higher, and that would endanger the argument that natural gas is over all time periods cleaner than coal. And if natural gas emerges as a rival to petrol as a

> transport fuel, as European companies such as Royal Dutch Shell strongly hope, such levels would erode the net climate benefit altogether, Mr Hamburg says.

Methane leaks, the primary component of Natural Gas, are much more frequent and of larger scale than has been previously assumed. The results of Methane leaks on climate change are not insignificant, according to this summary from the Tox Town website:

> Methane is a major greenhouse gas because it absorbs heat in the atmosphere, sending some of the absorbed heat back to the surface of the earth and contributing to climate change. Methane emissions represent approximately 10 percent of all greenhouse gas emission in the United States. Methane is about 21 times more powerful than carbon dioxide in absorbing and keeping heat in the atmosphere. It stays in the atmosphere for approximately 9 to 15 years.
>
> Source: https://toxtown.nlm.nih.gov/text_version/chemicals.php?id=92

The results can also be deadly, and the resulting explosion and fire can be difficult to fight due to the risk to first responders, according to this Sightline Institute article:

> Nearly two years ago, an explosion and massive gas leak at a liquid natural gas (LNG) facility in Plymouth, Washington, thirty miles south of the Tri-Cities, injured five workers and forced hundreds of people to evacuate their homes. To this day, state and federal oversight agencies have not published the findings of their investigations into the accident, and the facts about what happened are almost completely unknown to the public.
>
> Sightline's research into the Plymouth LNG explosion reveals that the LNG industry is creating a false safety record, and current regulations allow the industry to do so. Though the accident released a dangerous LNG vapor cloud into residential areas, it didn't meet the definition of "a threat to public safety," and federal rules did not classify it as an LNG spill. Furthermore, facility owner Williams Pipeline Company (Williams) is still withholding key details about the accident.
>
> Shortly after 8:00 a.m. on March 31, 2014, gas processing equipment at Plymouth LNG exploded into a towering, mushroom-shaped cloud. Nearby residents saw flames shoot into the air, and people living three to six miles from the plant could feel the explosion. The blast sent 250 pounds of debris and shrapnel flying as far as 300 yards, damaging buildings and equipment and puncturing one of the large LNG storage tanks.

> In the hours that followed, 14.3 million cubic feet of gas spewed from a large gash in the storage tank and other damaged equipment on site.
>
> Fumes from the facility sickened residents and emergency responders and endangered the public. The leak formed a dangerous cloud of gas vapors, which an east wind pushed toward the town of Plymouth. Vapor clouds become more dangerous as they drift away from the site of the leak and mix with oxygen: at a 5 to 15 percent concentration, a vapor cloud that meets a spark or flame can catch fire and burn all the way back to the source. To protect public safety, state officials evacuated Plymouth LNG employees as well as residents within two miles of the facility. They shut down traffic on the nearby Columbia River, parts of Highway 14, and the rail lines near the plant, which helped reduce ignition sources for the escaping gas.
>
> Emergency responders—there were more than 100 on the scene—had to wait for the wind to dissipate the natural gas before they could safely enter the facility and address the leak. The wait was drawn out by LNG's extremely low temperature: the leak kept forming ice blockages over the hole in the tank. External temperatures would then melt the ice, and the leak would continue. Hazardous materials experts were finally able to enter the facility eight hours after the explosion.

Why is this relevant? From the Port of Tacoma PSE LNG facility website (https://www.portoftacoma.com/puget-sound-energy-lng-facility):

> Puget Sound Energy's LNG facility will be used to fuel ships and provide natural gas to residential and commercial customers during peak cold weather demands.

PSE is making a large investment in Natural Gas, offering financial incentives to its customers to switch to Natural Gas and expects its commercial Natural Gas segment to grow. Building a Natural Gas plant to replace Colstrip is a likely extension of their Natural Gas expansion objectives.

Unfortunately, despite the climate change damage due to significant Methane leaks from Natural Gas extraction and transportation and the safety problem of Natural Gas explosions, those chartered to protect the public don't always consider these issues.

From the Tacoma LNG Facility Frequently Asked Questions website:

> Question: Why does the (LNG Tacoma export terminal) EIS not account for greenhouse gas emissions during extraction, transmission, and processing of LNG?
>
> Answer: … Any impacts associated with natural gas extraction, processing and transportation to the PSE natural gas system were considered too remote to the actual impacts of the project in and around the project site, and in the City of Tacoma generally, to legitimately be part of the scope of the EIS. …the City of Tacoma determined that the greenhouse gas emissions evaluation would be limited to the Tacoma LNG facility and TOTE Marine Vessel LNG Fueling system.

Of course, the "remoteness" of the gas leak does not reduce its contribution to climate change, but does leave the problem of explosions in someone else's back yard.

In summary:

- Do not expect PSE to be self-motivated to move away from carbon based fuel
- Do not rely on PSE to accurately convey the true dangers of Natural Gas extraction and transportation, both Climate Change dangers and the risk of explosion due to gas leaks
- Do lend significant weight to the social costs of carbon pollution and the related safety issues in your assessment of PSE Colstrip 1 & 2 replacement options and
- Protect us, your constituents, from harm.

**Source articles and referenced material**:

Yellow shaded text included in the testimony above.

- Bellevue Reporter article:

# Environmental advocates call for Bellevue-based Puget Sound Energy's closure of Montana coal plant

- Raechel Dawson
- Wed Aug 2nd, 2017 3:30pm
- News

Bellevue was flushed with green on Monday.

Several state environmental groups and residents across the county packed Bellevue City Hall's council chambers during a public hearing with the Washington State Utilities and Transportation Commissioners.

Their mission? To tell the commission to put Puget Sound Energy on a debt schedule that would close a coal plant in Montana by 2025.

Back in January, Bellevue-based Puget Sound Energy filed a rate case that proposed increasing consumers' rates — 4 percent for electric rates and a 3.2 percent decrease for natural gas rates. Puget Sound Energy officials said the money would be used to to help with aging businesses, the increased costs to produce electricity and the future expenses of retiring the coal plant. Monday's public hearing was the first of two hearings on the rate case before the commission is expected to make a decision this December.

But the most contentious issue wasn't on the rate increase request, which would reduce natural gas rates by $22 million a year yet raise electricity rates by $87 million.

It was regarding the timeline in which Puget Sound Energy would close the coal plant in Colstrip, Montana. While the energy company is in the process of shutting down half of the coal plant by 2022, environmental stewards argue the rest of the plant should be on its way out by 2025 instead of the proposed 2035 time frame.

"I think folks are looking out at the national political scene and are seeing that if we're going to make any progress on climate, it's going to have to come from the state level and the single most important thing we can do in this state to act on climate is to shutdown Colstrip," Jessica Koski, the Puget Sound organizer of Beyond Coal's Sierra Club, said. "It's the lowest hanging fruit, it's a big deal."

In 2015, the coal plant in Colstrip was the third largest climate polluter in the United States, Koski added. It's one of many Beyond Coal is working to retire. The Sierra Club, based in Seattle, is part of Beyond Coal and leads the effort to shutdown the Colstrip coal plant.

"Coal is the expensive, dirty, dangerous fuel," Koski said. "So, when you actually take into account the true cost to folks' health … it's obvious we have better options that are available, especially in the Northwest. We have abundant wind, abundant solar, huge energy efficiency potential, so there's really no excuse in terms of the economics to still be burning coal."

Ryan Snell, a Kirkland resident whose granddaughter attends Sacred Heart School in Clyde Hill, said he worries about her future if climate change isn't brought under control.

"We need to shutdown all the coal plants in Colstrip," he said. "I'm also quite aware the longer Colstrip is open, it's going to continue to dump toxic waste into the ash ponds and, as rate payers, we're going to have to pay for that cleanup."

Sameer Ranade of the Washington Environmental Council of Seattle agrees the plant should shutter by 2025.

"Local jurisdictions, state governments have to act now that we know the federal government is not," Ranade said, adding that President Donald Trump is not going to implement the Clean Power Plan, which would have reduced emissions from coal-fired power plants.

The first target date for greenhouse gas reductions in the Paris Climate Accords, which Gov. Jay Inslee has vowed to uphold, is 2025, and King County's Strategic Climate Action Plan, which was signed by 14 King County mayors, calls on the county to phase out coal-fired electricity by 2025.

Grant Ringel, a spokesman with Puget Sound Energy, said environmental issues are also "of great concern" to the company, which has been the Pacific Northwest's largest utility owner of renewable energy since 2006.

Ringel said Puget Sound Energy is one of six owners of the Colstrip plant, which was built in the 1970-80s, and its plans to move away from coal are "aggressive," citing the request to close half of the plant by 2022.

Puget Sound Energy also has several "green" programs, such as the Green Power Program, Solar Choice and Green Direct. Puget Sound Energy officials claim to be one of the largest energy efficiency programs in the nation, which helps customers save money on their bills while conserving energy.

"This year, we requested the Utilities and Transportation Commission accelerate recovery of outstanding costs for units 3 and 4 (the second half of the coal plant) to allow

for timely retirement of those units in the future," Ringel said. "Part of the current rate case deals with the future costs of decommissioning and environmental remediation related to the retirement plan for Colstrip units 1 and 2 (the first half of the coal plant) by July 2022."

Although the rate increase proposal called for a 2035 depreciation schedule for units 3 and 4, Ken Johnson with Puget Sound Energy said "further accelerating" the schedule to 2025 – per advocates' requests – could potentially increase customer rates but said it would be minimal – less than 1 percent.

"It will be determined by the commission as this rate case proceeds throughout the litigation process," Johnson said, noting that a number of rate payers at the public hearing Monday said they would pay more to accomplish a faster shutdown.

Ringel said Puget Sound Energy found a way to pay for the eventual closure of Colstrip while minimizing the impact to customers' bills through the rate increase.

However, the Sierra Club doesn't see it that way. Even though half of the plant will be closed by 2022, the club said the next generation will be paying off the debt and cleanup costs for that closure through 2036. They say part of the money that Puget Sound Energy is asking for in the rate increase includes a "reasonable amount of return," or profit, to shareholders for those depreciation costs, which, they claim, should have been wrapped up much earlier.

And they don't want the same thing to happen with the closure of the rest of the coal plant.

In June, the Utilities and Transportation Commission staff recommended Puget Sound Energy take a different approach to paying for the decommission of units 1 and 2 in the coal plant.

Staff recommended the commission rule Puget Sound Energy should lower its rates for natural gas by 6.6 percent ($46 million) and decrease, not increase, electricity rates by 2.2 percent ($54 million).

To fund costs associated with decommissioning and remediation of the first half of the Colstrip site by 2022, commission staff recommended revaluing Puget Sound Energy's share of the coal plant in Colstrip, which "would allow the company to repurpose a portion of federal treasury grants to an interest-earning account" for that purpose, according to a news release.

That recommendation, however, was made by staff and not the three commissioners who make up the Washington State Utilities and Transportation Commission.

The next public hearing for Puget Sound Energy's rate case will be at 6 p.m. Thursday, Aug. 31 at the Washington State Utilities and Transportation Commission, 1300 S. Evergreen Park Drive SW in Olympia.

Customers who would like to comment on the case can submit comment online at www.utc.wa.gov/comment, email comment@utc.wa.gov, call toll free 1-888-333-9882, or write the Washington State Utilities and Transportation Commission at: P.O. Box 47250 Olympia, Washington 98504.

- Bellevue Reporter Letter to The Editor – August 2017

  Submit to: http://www.bellevuereporter.com/submit-letter/

  I feel compelled to respond to your article Environmental advocates call for Bellevue-based Puget Sound Energy's closure of Montana coal plant on August 2, particularly in response to PSE spokesman Grant Ringel's statement that environmental issues "are of great concern" to PSE. This does not ring true for me.

  Since December of 2016 I started calling PSE to ask a simple question "How can PSE ratepayers help you move away from coal based electricity?" I expected a simple and straightforward answer. I called almost every week, for four months – first the media department, then a community outreach department. I can assure you that PSE did not offer any concrete thoughts about how their million-person rate payer base can accelerate this transition away from coal. When a new PSE community outreach person did call me, he mainly repeated "the (Colstrip closure) settlement is the settlement", meaning the lawsuit that enforced the current schedule for PSE to shut down half the Colstrip plant was not something they planned to alter. Throughout the 20-minute conversation, despite repeated requests on my part, there was not one suggestion offered to accelerate this process.

  It would be great if PSE backed up their concern for the environment with concrete plans to reduce their environmental impact. There are many reasons, cited in your fine article, that Colstrip 3 & 4 should shut down by 2025. Personally, I have seen no evidence PSE is serious about doing this. Help us tell PSE to do the right thing – go to sc.org/CarbonFreePSE.

  Kevin Jones

- Puyallup Tribe Opposes LNG Facility article:

  Source: http://knkx.org/post/puyallup-tribe-says-it-opposes-lng-facility-port-tacoma

# Puyallup Tribe Says It Opposes LNG Facility At Port Of Tacoma

By BELLAMY PAILTHORP • APR 18, 2017

The Puyallup Tribe says it will not go along with plans to put a liquified natural gas facility on a site at the Port of Tacoma. The site is located on land that lies sandwiched between parcels on its reservation.

The tribe says its biggest concern is that its reservation lies in an urban area. And the heart of that is the Port of Tacoma.

John Weymer is a spokesman for the Puyallup. He says there have been several minor spills of fossil fuel oils coming in on trains over the past few years.
"So we're very concerned, about the environment, oil spills. And then, on top of that, adding LNG and methanol? We just don't want to be the fuel depot to the world," Weymer said.

He says that's why they have filed suit under the Clean Water Act. Weymer says pipelines for liquified natural gas -- or any fracked fuel -- are too risky, especially those referenced in the suit, because they are located on the shores of Puget Sound or in the heart of their reservation.

"We don't want to take any chances. They are slim, but there are chances of spills, explosions and so on — so, it's just, no," Weymer said.

Puget Sound Energy says it has done extensive environmental review and that the project is permitted correctly and is safe. The utility says natural gas is cleaner than the bunker fuel it will be replacing and the Tote shipping company wants the fuel for its natural gas powered ships.

Utility spokesman Grant Ringel says Tote is replacing dirty bunker fuel with LNG on many of its ships. Bunker fuel is worse than diesel in terms of the particulate and carbon pollution it puts in the air.

"It virtually eliminates the spill risk from bunker fuel because liquefied natural gas simply evaporates. It's non-toxic. It simply evaporates if in fact the unlikely spill happens," he said.

Ringel says the risk of environmental catastrophe is much lower with pipelines. He says the permitting process for the facility has been transparent. Anyone who wants to see the process online can go to the utility's project website.

A spokeswoman from office of Tacoma's City Attorney said the suit filed most recently has to do with an appeal of the shoreline permit and at this time, the city does not have a court date for the next level of the legal action. The city also wants to the public to see its frequently asked questions site about the project.

- Crosscut article regarding Tacoma LNG Facility risks

  Source: http://crosscut.com/2016/06/company-fights-to-suppress-safety-risks-of-proposed-tacoma-natural-gas-terminal/

Monday 13, June 2016

# Explosive claims drive fight over proposed LNG terminal

by Chetanya Robinson

*The Port of Tacoma. Credit: **Andrew Albertson***

In April, environmental activists helped cancel construction of the world's largest methanol refinery, which was proposed for the Port of Tacoma. Now they've set their sights on another fossil fuel facility proposed for this location: a refueling and storage station for liquified natural gas (LNG). Their claim is the facility could one day explode and expose the surrounding area to fires or suffocating gas, potentially for miles.

These risks are the subject of a legal appeal filed last week, focused on suppressing documents that detail the project's potentially incendiary safety issues.

The documents were requested by John Carlton, a member of the opposition group calling itself RedLine Tacoma, and pertain to worst-case scenarios for the facility. This request was denied by project backers Puget Sound Energy (PSE) — a private energy holding company owned by Australian investors — which claimed these documents fell under Critical Energy Infrastructure

Information (CEII). This meant they could not be released to the public, due to risks they could fall into the hands of terrorists who wish to attack the facility. On May 13, a Pierce County judge rejected these arguments, ruling the documents would have to be released. This has not yet transpired, pending the resolution of an appeal from PSE, which was filed on June 8.

Tarika Powell, a senior researcher at Seattle-based think tank Sightline Institute, calls this "a groundbreaking case in terms of helping to define what is and isn't critical energy infrastructure."

Puget Sound Energy spokesperson Grant Ringel downplays their legal action, saying simply that "We believe federal law requires that we comply with the action that we took." Ringel also asserts that opponents are attempting to use inaccurate but shocking claims about risks to scare up more opposition.

In one case, Carlton admits this is true. In making his case for the release of documents, Carlton presented in court a map suggesting the fire and asphyxiation hazard zone from an explosion at the facility could encompass a three mile radius. The map, he admits, was only meant to be conjecture. "It's more of a challenge than a statement of fact," he says.

Ringel puts it another way: "That information was flat wrong." The company released a map of their own, asserting that even in a worst case scenario, the facility would only affect a 550-foot area, strictly on the site of the facility, and not the surrounding three miles.

Liquified natural gas is not explosive, but if it warms up and reverts back to its gaseous form and mixes with the air in the right proportions — and these vapors find a spark or flame — it can catch fire. In opposing the new Tacoma facility, RedLine Tacoma cites a 2014 explosion at an LNG facility in Plymouth, Washington, in which hundreds were evacuated from their homes, and five workers were injured.

People were told to evacuate to at least two miles away from the site of the explosion — an area closer to the three mile hazard zone proposed by Carlton than the 550 feet cited by PSE, Powell notes.

“We don’t have clear information on what the hazard zone is,” says Powell. But if an accident occurred, it’s not clear how leaking gas could be contained within a fence, she says.

“In my opinion we need to be more concerned about the company running the facility than a terrorist threat,” she says, citing other incidents at LNG facilities, and the fact that no LNG facility has yet been targeted in a terrorist attack.

Some past LNG-related accidents have been even more destructive than Plymouth. In 1944 in Cleveland, 130 people were killed when two liquid natural gas tanks exploded. Thirty people were killed and 70 injured when an LNG facility in Algeria exploded in 2004. PSE notes that in these cases, safety risks were not as well understood, the facilities were dealing with millions more gallons of LNG, and the accidents weren’t a result of the facilities themselves.

Tacoma is just one of several West Coast cities that have seen liquified natural gas facilities proposed and fiercely contested by activists. This spring, two different LNG facilities planned for northern and southern Oregon were defeated. Unlike in Tacoma, it was fishing, fish habitat and landowner concerns that most concerned activists in these cases. Activists have also raised concerns about LNG plants in Rhode Island, British Columbia, New York State and Maryland.

The Northwest has become an attractive target for companies eager to reach fossil fuel markets in Asia. But efforts to build export facilities for coal and other fuels have met with effective environmentalist resistance. LNG can have an environmental impacts separate from its use as fuel, which is relatively low-emissions. According to Powell, these include unregulated leaks in the pipeline that can spew methane — a potent greenhouse gas — directly into the atmosphere, and the large amount of water needed to cool natural gas down into liquid form.

The proposed Tacoma facility would supply ships plying the West Coast with fuel, and store LNG to be sold later. It is currently undergoing a design and engineering review, having passed environmental review and a slew of other permits. If all goes to plan, it will be operational by early 2019. PSE has operated a smaller LNG facility in Gig Harbor for over a decade.

Carlton says he isn't opposed to the facility per se — he just thinks it's too dangerous in an area close to where people live.

"It is kind of NIMBY-ish," he admits. "But who wants eight million gallons of LNG in their backyard?"

- The Economist magazine – July 23, 2016 issue

Source: https://www.economist.com/news/leaders/21702470-even-natural-gas-needs-clean-up-its-act-tunnel-vision

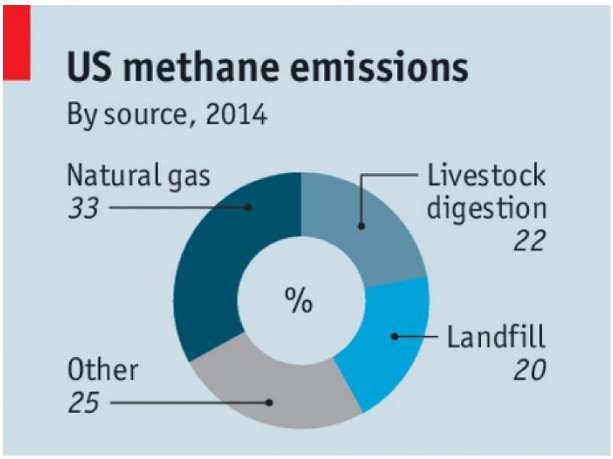
Methane leaks

# Tunnel vision

*Even natural gas needs to clean up its act*

**Print edition | Leaders**

Jul 21st 2016




CARBON DIOXIDE is the main greenhouse gas emitted by human activities. But it is not the only gas capable of causing great harm to people and the planet. That point was driven home by the emissions scandal that engulfed Volkswagen last year. Since the 1990s policymakers in Europe had backed diesel as a way to reduce carbon emissions, turning a blind eye to other ways in which the fuel might damage human health. The VW affair drew back the

veil on this trade-off. The company's diesel engines did indeed deliver lower carbon emissions and better fuel economy, but at the cost of belching out noxious pollutants capable of shortening many lives.

A similar case of tunnel vision also exists in the energy industry. To its evangelists, natural gas helps satisfy demand for fossil fuels but causes less harm to the planet than coal and oil. Like diesel carmakers, natural-gas producers make reduction of carbon-dioxide emissions a big selling-point, but downplay the effects of other gases they emit. For the car industry, the problem is nitrogen oxides. For natural gas, it is methane, the fuel's main component.

Burning natural gas converts methane into carbon dioxide, but in lower quantities than in alternative fuels. It emits almost half as much carbon dioxide as coal, and almost a third less than petrol. The problem is that lots of methane escapes into the atmosphere without being burnt. And methane has its own effect on the climate. Although it stays in the atmosphere for far less time than carbon dioxide, which hangs around for centuries, it is about 25 times more potent as a cause of global warming (see article).

Methane emissions come from several sources—not least the digestive systems of livestock such as cows. But the latest figures show that the biggest chunk of annual methane emissions in America, around a third, can be traced to the natural-gas industry. An estimated 2.5% of the natural gas flowing through America's ageing energy infrastructure leaks out of wells, pipelines and storage tanks. Often it seeps discreetly into the air. Sometimes it leaves a more noticeable footprint—a 2015 blowout at the Aliso Canyon storage facility in Los Angeles produced the worst leak in American history.

Recognition of the problem is growing. This year America's Environmental Protection Agency (EPA) admitted that it had underestimated the extent of oil- and gas-related leakages, revising them up by almost a third and ramping up regulation. Recent use of infra-red cameras and airborne monitoring devices has shown where the worst problems lie in the natural-gas supply chain. Last month Mexico joined America and Canada in their commitment to cut methane emissions from oil and gas operations by 40-45% by 2025, compared with 2012.

The industry has been slower to acknowledge the problem. American oil companies are reluctant to provide the public with emission-reduction targets. They chafe against new EPA regulations, such as those requiring them to monitor leaks at compressor stations twice as often as in the past. Controlling methane leaks should not be that expensive; the less gas that escapes, the more the industry has to sell, after all. But the head of the Railroad Commission of Texas, which regulates oil in the state, calls them part of Barack Obama's "war against fossil fuels" and too costly for small producers to comply with.

If even American oilmen are so dismissive of the problem, it is hard to be hopeful for other places, like Russia, which have even creakier natural-gas networks. Few countries monitor methane emissions with the precision that they do carbon dioxide. Many developing countries have not reported energy-related methane emissions for at least a decade, so it is impossible to know whether conditions are getting better or worse. Without good data, it is hard to set targets for reduction.

**Methane bane**

Natural-gas advocates have decent reason to hope the fuel will be a bridge to a post-carbon future. Thanks to the shale-gas revolution, natural gas last year rivalled coal as the main source of electricity in America. That brings immediate climate benefits. But the problem of methane leaks should not be downplayed. They do not just sully the climate. They sully the good name of natural gas.

- The Economist magazine – July 23, 2016 issue

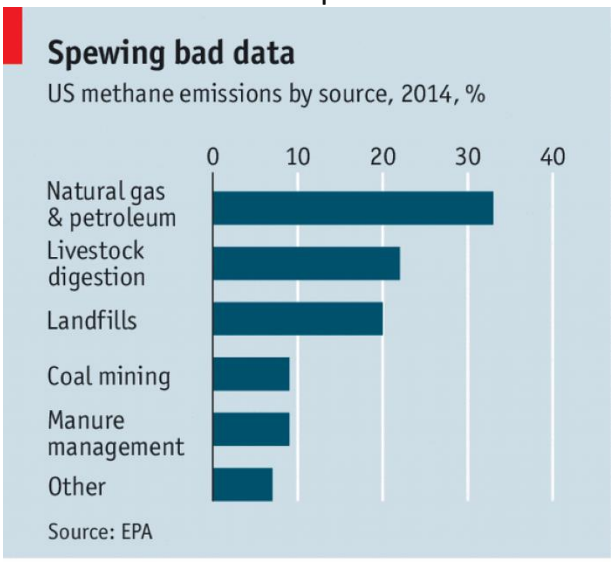
Source: https://www.economist.com/news/business/21702493-natural-gass-reputation-cleaner-fuel-coal-and-oil-risks-being-sullied-methane

**Methane leaks**

# A dirty little secret

METHANE is invisible to the naked eye and does not make for good television. So when about 100,000 tonnes billowed out of a natural-gas system in Aliso Canyon, Los Angeles, over 112 days last winter (pictured in infra-red above), it drew relatively little media attention—even though it forced the evacuation of thousands of homes and the plume was big enough to be detectable from

space. Compare that with coverage of the Deepwater Horizon oil spill in 2010, which was the top item of news for weeks in America, much of it focused on the environmental impact on the Gulf coast.




Unsurprisingly, many oil and gas companies would prefer methane leaks to remain out of the public eye, even though their industry now surpasses cow burps as a source of emissions (see chart). Methane is the predominant constituent of natural gas, a fuel that energy companies are embracing over oil and coal as a "bridge" to a post-carbon future and which has been given a new lease on life by America's shale revolution. When burned, it emits about half as much carbon dioxide as coal and far less sulphur, soot and other pollutants. But greenhouse gases insulate the Earth in different ways. Carbon dioxide stays in the atmosphere for more than 500 years; methane just for 12. But the latter is about 25 times more potent.

The American Petroleum Institute (API), a lobby group, says America is in "good shape" thanks to natural gas. As it has over time rivalled coal as the main source of power generation, it has helped lower emissions of the main source of global warming. The institute cites data showing that the amount of methane that leaks out of natural-gas wells and pipelines criss-crossing America has fallen over the past quarter of a century. "Let's not get unreasonably concerned about [methane], because the industry has been addressing it," says the API's Erik Milito.

Yet even environmentalists who acknowledge a preference for natural gas over coal believe methane leaks could be its fatal flaw. The Environmental

Defence Fund (EDF), an American NGO that works with industry to reduce methane emissions, has in recent years deployed infra-red cameras along energy firms' pipelines and beside thousands of oil and gas wells, as well as airborne monitoring kit to gather data. The results suggest methane leaks are significantly higher than had been previously understood

EDF has found that a disproportionate amount of fugitive emissions from the oil and gas infrastructure comes from a few "super-emitting" sites. In rare cases, like Aliso Canyon, they can take months to plug. More often the culprits may be well-side storage tanks with faulty valves, which may be fixable just with a wrench, but while left unattended billow methane into the air.

Recently, the Environmental Protection Agency (EPA), an American regulator, has introduced its first regulations specifically aimed at capping methane emissions, acknowledging it has underestimated the problem. It has lifted its estimate of the amount of methane that leaked out of the natural-gas and oil supply chain in America in 2013 by about 30%—a massive revision. Steve Hamburg, EDF's chief scientist, says that still leaves out the "fat-tail" super-emissions. He reckons about 2-2.5% of the gas flowing through the American supply chain leaks out, in total.

Get much higher, and that would endanger the argument that natural gas is over all time periods cleaner than coal. And if natural gas emerges as a rival to petrol as a transport fuel, as European companies such as Royal Dutch Shell strongly hope, such levels would erode the net climate benefit altogether, Mr Hamburg says. "Switching from coal to gas is always advantageous to the climate over the long term, but the short-term benefits depend on minimising methane emissions," he says. He has experience of methane's effect at his cabin in the White Mountains of New Hampshire, where global warming means that trees now grow in places he would never have thought possible.

Oil and gas producers acknowledge it is in their interest to curb leaks; it gives them more natural gas to sell. They say they are stepping up monitoring efforts, and have increased the use of "green completions" at shale wells to capture methane emitted at the end of the fracking process, rather than flaring it at the well head. Big European companies appear to take the reputational risk seriously. "The industry realises it needs to get its act together," says one executive. BP, for instance, has designed a gas project in

Oman that should be leak-free. Italy's ENI has set publicly available targets for cutting methane emissions.

Some state-owned oil giants, such as Saudi Aramco and Mexico's Pemex, have joined global efforts to reduce methane emissions. But many reckon firms in Russia, Angola and Nigeria would show up as big emitters if reliable data were collected. A report last year by the Rhodium Group, a research firm, said large producers such as Iraq, Angola and Libya had never reported methane-emissions numbers to the UN. Without good global data, it will be impossible to get the problem in hand.

- Plymouth Wa LNG explosion – the reality of a LNG spill is extremely dangerous:

  Source: http://www.sightline.org/2016/02/08/how-industry-and-regulators-kept-public-in-the-dark-after-2014-lng-explosion-in-washington/

# How Industry and Regulators Kept Public in the Dark After 2014 LNG Explosion in Washington

*Lax industry oversight and incomplete reporting leave us with questions still today.*

Duane VanBeek tells Plymouth residents that the evacuation zone had been reduced to one mile. by Courtney Flatt, Oregon Public Broadcasting (Used with permission.)

Author: Tarika Powell

On February 8, 2016 at 6:30 am

This article is part of the series Fracked Fuel & Petrochemical Projects in the Pacific Northwest

Nearly two years ago, an explosion and massive gas leak at a liquid natural gas (LNG) facility in Plymouth, Washington, thirty miles south of the Tri-Cities, injured five workers and forced hundreds of people to evacuate their homes. To this day, state and federal oversight

agencies have not published the findings of their investigations into the accident, and the facts about what happened are almost completely unknown to the public.

Sightline's research into the Plymouth LNG explosion reveals that the LNG industry is creating a false safety record, and current regulations allow the industry to do so. Though the accident released a dangerous LNG vapor cloud into residential areas, it didn't meet the definition of "a threat to public safety," and federal rules did not classify it as an LNG spill. Furthermore, facility owner Williams Pipeline Company (Williams) is still withholding key details about the accident.

Incomplete accounting of accidents slows safety improvements in the LNG industry and conceals critical information that could help keep first responders safe. It also makes it very difficult for local governments and the public to make informed decisions about where to permit proposed LNG facilities. Oregon and Washington are considering three LNG terminal proposals, and the events at Plymouth should inform both states' analyses of those proposals.

## What happened at Plymouth LNG?

LNG is simply natural gas that has been refrigerated to -260 degrees Fahrenheit. At this temperature, natural gas becomes liquid and condenses to 1/600th of the space it occupied as a gas. Cryogenic refrigeration allows plant operators to store large quantities of natural gas in tanks that could not otherwise hold such a large volume. If liquid natural gas is not kept extremely cold, it turns back to a gas. When a utility needs to use the LNG it has stored, workers simply pipe LNG out of the refrigerated storage tank and return its temperature to normal.

Plymouth is the largest LNG storage facility in the Pacific Northwest, boasting two 14.6 million gallon storage tanks. Shortly after 8:00 a.m. on March 31, 2014, gas processing equipment at Plymouth LNG exploded into a towering, mushroom-shaped cloud. Nearby residents saw flames shoot into the air, and people living three to six miles from the plant could feel the explosion. The blast sent 250 pounds of debris and shrapnel flying as far as 300 yards, damaging buildings and equipment and puncturing one of the large LNG storage tanks.

Shrapnel injured four of the fourteen employees on duty, and a fifth worker was hospitalized for burns. Debris from the blast also damaged the main rail line on the north side of the Columbia River, which delayed more than 40 trains before BNSF Railway completed repairs

on Tuesday afternoon. (Sightline has previously calculated that on a typical day, several notoriously combustible oil trains traverse the route that passes by the Plymouth LNG facility.)

In the hours that followed, 14.3 million cubic feet of gas spewed from a large gash in the storage tank and other damaged equipment on site. Video and photos show vaporized LNG escaping from a puncture low on the tank. Williams says the damaged tank was only one-third full.

Fumes from the facility sickened residents and emergency responders and endangered the public. The leak formed a dangerous cloud of gas vapors, which an east wind pushed toward the town of Plymouth. Vapor clouds become more dangerous as they drift away from the site of the leak and mix with oxygen: at a 5 to 15 percent concentration, a vapor cloud that meets a spark or flame can catch fire and burn all the way back to the source. To protect public safety, state officials evacuated Plymouth LNG employees as well as residents within two miles of the facility. They shut down traffic on the nearby Columbia River, parts of Highway 14, and the rail lines near the plant, which helped reduce ignition sources for the escaping gas.

Emergency responders—there were more than 100 on the scene—had to wait for the wind to dissipate the natural gas before they could safely enter the facility and address the leak. The wait was drawn out by LNG's extremely low temperature: the leak kept forming ice blockages over the hole in the tank. External temperatures would then melt the ice, and the leak would continue. Hazardous materials experts were finally able to enter the facility eight hours after the explosion.

LNG terminal by NorthEndWaterfront.com used under CC BY-NC 2.0

## A failure to report

Federal law requires operators of LNG plants or gas pipelines to report to the Pipeline and Hazardous Materials Safety Administration (PHMSA) any incident that causes an emergency shutdown, death, an overnight hospital stay, or property damage greater than $50,000. Companies must report to PHMSA within 30 days, and sometimes the safety agency asks for a supplemental report. Williams provided its initial report in May 2014 and prepared the supplemental report in December 2015—twenty-one months after the incident.

Despite this generous time frame, Williams Pipeline Company summed up the complex accident in just one paragraph, revealing that it was caused by "incorrect operation" of equipment. LNG facilities shut down for maintenance a couple of days per year, and

operators purge gases from the equipment that helps cool natural gas into a liquid state. Yet on the day preceding the accident, the operators did not properly purge the equipment, so when employees started up the system on March 31, a mixture of gas and air auto-ignited inside the system, causing a rapid increase in pressure. Overpressurization exploded a unit of processing equipment along with some piping inside the plant, and flying shrapnel damaged adjacent buildings and equipment.

Here's what the extraordinarily brief narrative does not say: According to a Benton County Fire Department captain, the shrapnel actually created two separate leaks in the LNG tank: one in the tank's outer wall and one in a small pipe that connects to the bottom of the storage tank. LNG leaked from the pipe for over 24 hours until crews stopped the leak by shutting off a valve the next afternoon. Yet Williams' report to federal officials only mentions the leak in the tank's wall. Sightline pointed out this omission to a PHMSA official, who was not aware of the second leak.

The Williams narrative also leaves out other key information, including the size and location of the hole in the tank, whether the interior of the double-walled tank was punctured, and which equipment was damaged. As it turns out, these omitted pieces of information are critical to whether or not the accident can be officially classified as an LNG leak.

## Most injuries are never recorded

According to federal rules, a person has to either die or stay overnight in a hospital for an injury sustained in an LNG accident to be considered significant. Since the four employees who were struck by flying debris were treated and released the same day, PHMSA doesn't count their injuries. The only person whose injury counts as "significant" is the employee who was hospitalized for burns, so only one injury is listed in PHMSA's official records.

No harms to the public will go on record either. Even though a resident who lived a quarter-mile from the plant reported smelling gas and said it was "making people sick," and responding officers became nauseous at the scene, these harms will never become part of the official record because no members of the public were killed or hospitalized overnight. The permissive accounting standards for LNG accidents give the industry license to distort its safety record by downplaying serious accidents like the one at Plymouth LNG. For example, a full 18 months after the Plymouth explosion, the Environmental Impact Statement (EIS) for the proposed Tacoma LNG facility claimed that only two LNG accidents in US history have resulted in adverse effects on the public: a 1944 disaster in Cleveland that killed 128 people and an industry-changing explosion at Cove Point, Maryland, in 1979.

It's hard to imagine that the Plymouth accident was unknown to project backer Puget Sound Energy, which stored natural gas at Plymouth LNG at the time of the accident, or to the City of Tacoma, which prepared the Tacoma LNG EIS. Yet even Tacoma's accounting is more thorough than what's found in the safety analysis of Oregon LNG and Jordan Cove, two large LNG export proposals in Oregon for which the Federal Energy Regulatory Commission and the project backers claim that aside from the Cleveland accident, "the LNG industry has been free of safety-related incidents resulting in adverse effects on the public or the environment."

## Spill of LNG won't count as LNG spill

In addition to not being considered a threat to public safety, the Plymouth LNG spill is not even considered an LNG spill. The data retrieved from PHMSA's website states that even though 14,270 barrels (599,340 gallons) of LNG spilled, no LNG was lost. When Sightline contacted PHMSA about the apparent error in the report, an agency official responded that in fact no LNG was spilled at all. The official clarified that *evaporated* natural gas was spilled, not *liquid* natural gas.

Semantically, this is akin to saying that if you leave a glass of water outside and the water evaporates, then you have not lost any water, you've only lost water vapor. LNG becomes vaporized natural gas when it warms to a temperature above -260 degrees, so if the LNG has time to vaporize before it hits the ground, a company can say it didn't spill any LNG.
But what about the second leak, the one Williams didn't mention in its report to PHMSA? It's possible that this leak was LNG that did not evaporate—that it was still liquid as it leaked out of the pipe. A spokesperson for Williams stated in April 2014 that leaking LNG froze the ground before warming up and evaporating into the atmosphere. We still don't know whether investigative agencies will count the second leak as an LNG spill, or whether their reports will mention the second leak at all.

Neither PHMSA nor the Washington Utilities and Transportation Commission (UTC) has completed a report on the accident. PHMSA's report will be published by the end of the second quarter of 2016, more than two years after the incident. Meanwhile, the UTC does not have any anticipated date for publishing its investigation. Both reports will likely be published only after Williams completes repairs to Plymouth LNG in April 2016.

## Plymouth may still pose danger

As Williams Pipeline Company prepares to resume full service operations at Plymouth LNG, we still don't know what happened in March 2014, and we don't know something that's equally important: how Williams repaired the damage. According to public documents available from the Washington UTC, the tanks at Plymouth are double-walled steel tanks built in the late 1970s, around the time the industry began to enhance the safety of LNG tanks by surrounding them with an exterior container made of concrete. Plymouth LNG does not have these "full-containment" tanks, leaving the exterior wall of both LNG storage tanks exposed.

The damaged tank at Plymouth could be set to spill more LNG in the future. The interior wall of an LNG tank is made of 9 percent nickel steel, which can withstand extremely cold temperatures without becoming brittle. The exterior wall, however, is not made of a steel grade that stands up to the cold temperatures of LNG over time; its purpose is to help contain spilled LNG, but exposure to the thermal stress of LNG temperatures can crack and warp the outer wall. Now that the exterior wall has been damaged by a large gash and exposed to cryogenic temperatures, it's important to know whether Williams simply patched the puncture or whether it completed more thorough fortifications on the damaged tank. It's also important to know how much, if any, damage was sustained by the interior tank wall. While the exterior wall is visible, the interior wall is hidden, so any faults that might develop after the repair will also be hidden. As metallurgical and mechanical engineering firm Hoffmann Engineering noted in a 2007 report to the American Gas Association on aging LNG facilities, a tank failure "could be an isolated occurrence or the beginning of a series of failures."

When companies don't have to provide these details, the information that the LNG industry reports about safety at its facilities becomes completely unreliable. As more companies propose LNG terminals in the Pacific Northwest, who will parse the industry's semantics to determine whether or not the industry is as safe as it claims to be? Under the current regulatory framework, towns and ports that lease land to LNG projects can't possibly learn from prior mistakes when deciding which safety features they should require to protect nearby citizens. And as long as safety reports take two years to publish or lack key details, the public will lack the facts needed to make informed decisions about where—and indeed whether—to build these terminals.

***Update 2/12/16:*** *Sightline accessed PHMSA's data on the Plymouth LNG accident on Jan 21, 2016. The database indicated that 14,270 barrels were spilled. We revisited the database on Feb. 11, 2016. The information had been changed to 0 barrels spilled. See comparison of the first and second data exports. We contacted PHMSA for clarification. The agency stated that their previous data was incorrectly listed as barrels, because barrels count only the "volume of*

*liquid spilled to the ground." PHMSA confirmed that they consider the spill to have released 14,270 MCF of gas (14,270,000 cubic feet, or 181,964 gallons in liquid form). This quantity includes evaporated LNG that will not be counted as LNG. At this time PHMSA has no plans to add volume of gas released to the data on their public display, so the publicly available data will continue to read as 0 releases from the Plymouth accident, as though nothing came out of the tank at all.*

- Local administrative groups tend to not account for the overall impact of Natural Gas extraction and transportation:

  Source: http://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=113653

  Question: Why does the (LNG Tacoma export terminal) EIS not account for greenhouse gas emissions during extraction, transmission, and processing of LNG?

  Answer: Scoping is the first step in an EIS process and is intended to narrow the focus of the EIS to significant issues, eliminate insignificant impacts, and identify alternatives to the proposal. Any impacts associated with natural gas extraction, processing and transportation to the PSE natural gas system were considered too remote to the actual impacts of the project in and around the project site, and in the City of Tacoma generally, to legitimately be part of the scope of the EIS. Through the scoping process, and following consultation and comment from other agencies with expertise, the City of Tacoma determined that the greenhouse gas emissions evaluation would be limited to the Tacoma LNG facility and TOTE Marine Vessel LNG Fueling system.

- Social Cost of Carbon Approach

  The social cost of carbon approach is:

  - A dollar estimate of the future damages from climate impacts (eg: droughts) wrought by each ton of carbon dioxide released to the atmosphere
  - Motivation: until there is a price on carbon, most of these climate impacts will be borne by the environment and the public, not paid by power generators

  An important feature of this approach:

  - States can put cleaner energy sources on a more level playing field with fossil fuels
  - Experts say the social cost of carbon approach may have even greater impact on carbon emissions than a carbon tax alone, because social cost of carbon estimates are typically higher than carbon market prices.

  Source: https://insideclimatenews.org/news/11082017/states-climate-change-policy-calculate-social-cost-carbon