



# SOCIETY NOTES

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## Ontario Wasted More Than \$1 Billion Worth of Clean Energy in 2016

[STAFF](#) [June 29, 2017](#) [Advocacy, Featured](#) [119 Comments](#)

Following a detailed analysis of year-end data issued by the [Independent Electricity System Operator \(IESO\)](#) and [Ontario Power Generation \(OPG\)](#), the [Ontario Society of Professional Engineers \(OSPE\)](#) is reporting that in 2016, the province wasted a total of 7.6 terawatt-hours (TWh) of clean electricity – an amount equal to powering more than 760,000 homes for one year, or a value in excess of \$1 billion.

“This represents a 58 per cent increase in the amount of clean electricity that Ontario wasted in 2015 – 4.8 TWh – all while the province continues to export more than 2 million homes-worth of electricity to neighbouring jurisdictions for a price less than what it cost to produce,” said Paul Acchione, P.Eng., energy expert and former President and Chair of OSPE.

OSPE shared these findings with all three major political parties, and will be at Queen's Park this morning to speak to media regarding the importance of granting professional engineers more independence in the planning and designing of Ontario's power system.

### So why is Ontario wasting all this energy?

“Curtailment is an industry term that means the power was not needed in Ontario, and could not be exported, so it was dumped. It's when we tell our dams to let the water spill over top, our nuclear generators to release their steam, and our wind turbines not to turn, even when it's windy,” said Acchione.

“These numbers show that Ontario's cleanest source of power is literally going down the drain because we're producing too much. Speaking as an engineer, an environmentalist, and a rate payer, it's an unnecessary waste of beautiful, clean energy, and it's driving up the cost of electricity.”

In addition to curtailment, surplus hydroelectric, wind, and nuclear generation was exported to adjoining power grids in 2014, 2015, and 2016 at prices much lower than the total cost of production. This occurs because Ontario produces more clean electricity than it can use, so it is forced to sell off surplus energy at a discounted rate. Total exports in 2016 were 21.9 TWh compared to 22.6 TWh in 2015, and a significant portion was clean, zero-emission electricity.

“Taken together, those total exports represent nearly enough electricity to power every home in Ontario for an entire year,” said Acchione. “OSPE continues to assert that the government must restore the oversight of professional engineers in the detailed planning and design of Ontario's power grid to prevent missteps like this from happening.”

### Engineers have solutions

<https://blog.ospe.on.ca/featured/ontario-wasted-more-than-1-billion-worth-of-clean-energy-in-2016-enough-to-power-760000-homes/> 1/38

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It seems that #engineering is the UK

Because Ontario is contractually obligated to pay for most of the production costs of curtailed and exported energy, OSPE believes it would be better to find productive uses for the surplus clean electricity to displace fossil fuel consumption in other economic sectors. In the summer of 2016, OSPE submitted [an advisory document to the Minister of Energy](#) and all three major political parties detailing 21 actionable recommendations that would deliver efficiencies and savings, including reducing residential and commercial rates by approximately 25 per cent, without the creation of the subsidy and deferral account under the Ontario Fair Hydro Act.

OSPE also recommended the establishment of a voluntary interruptible retail electricity market in order to make productive use of Ontario's excess clean electricity. This market would allow Ontario businesses and residents to access surplus clean power at the wholesale market price of less than two cents per kilowatt-hour (KWh), which could displace the use of fossil fuels by using things like dual fuel (gas and electric) water heaters, and by producing emission-free hydrogen fuel.

Ontario is currently in the process of finalizing its [2017 Long Term Energy Plan \(LTEP\)](#), a multi-year guiding document that will direct the province's investments and operations related to energy. This presents a key opportunity for the government to reduce Ontarians' hydro bills by making surplus clean electricity available to consumers.

"It is imperative that we depoliticize what should be technical judgments regarding energy mix, generation, distribution, pricing and future investments in Ontario," said Jonathan Hack, P.Eng., President & Chair of OSPE. "We are very concerned that the government does not currently have enough engineers in Ministry staff positions to be able to properly assess the balance between environmental commitments and economic welfare when it comes to energy.

Professional Engineers must be given independence in planning and designing integrated power and energy system plans, which will in turn benefit all Ontarians."

### About the Ontario Society of Professional Engineers (OSPE)

OSPE is the voice of the engineering profession in Ontario, representing more than 80,000 professional engineers and 250,000 engineering graduates, interns, and students.

OSPE's 2012 report [Wind and the Electrical Grid: Mitigating the Rise in Electricity Rates and Greenhouse Gas Emissions](#) detailed the mounting risk of hydraulic spill, nuclear shutdowns, and periods of negative wholesale electricity prices during severe surplus base load generation.

While curtailment will decrease during the nuclear refurbishment program that began in October 2016 and the retirement of the Pickering reactors scheduled to occur from 2022 to 2024, it will rise again when the refurbished reactors return to service, unless the government takes action.

OSPE's Energy Task Force has provided strategic engineering input to Ontario's Ministry of Energy for more than ten years. The majority of OSPE's recommendations have been fully or partially implemented over the past five years, saving consumers hundreds of millions of dollars per year. But more can be done if government engages Ontario's engineers to optimize the use of the province's clean electrical power system.

***What do you think Ontario should do with its surplus clean electricity? Share your ideas and comments below.***

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It seems that **engineering** in the UK faces similar issues as Canada when it comes to **#WomenInSTEM** - representation is low, but growing, and those that are in the industry are flourishing. Read more [▶](#)  
[on.ft.com/2McTtBB](http://on.ft.com/2McTtBB)



22h

**OSPE** @O\_S\_P\_E  
 Another month means another chance to save! This time, OSPE members can get 15% off at St. Louis Bar & Grill! Go to [▶ bit.ly/2YAO36D](#)



Oct 12, 2019

**OSPE** @O\_S\_P\_E  
 Today on the Blog, we take a look at the [@peoplespca](#) platform for the upcoming election. Get up to speed and make your vote count on October 21 [▶ bit.ly/2OLcbl8](#)



Oct 11, 2019

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ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS



Statement re: former engineer Robert Wood and the Algo Centre Mall case

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Six Canadian Senate seats filled for Ontario – not one by an engineer

### 119 Comments



June 29, 2017

**ROB**

Surplus energy should be sold at cost to Ontario residences and businesses, and indeed overall price rates should be lowered in order to decrease the amount of surplus power curtailed or sold at a loss

Reply



July 27, 2017

**JAREMKO NOGOTTA**

Agreed.

Reply



October 20, 2017

**ROB**

I didn't forget it all. I also remember that China is building coal plants as we speak, and Angela Merkel has been hamstrung in the last election, no doubt at least in part by her fixation on expensive green energy. I will also point out Germany is also building and using coal plants

Reply



February 14, 2018

**MRS. ASHE**

Agreed. Furthermore, rather than "curtail" or "dump" surplus energy, this electricity ought to be provided FREE OF CHARGE and sans taxation to hospitals and long-term care facilities and retirement homes for seniors.

Reply



April 10, 2019

**ERIC JELINSKI**

Agree. liberal government energy, including carbon policy is fleecing the people of Ontario, Canada.

Reply



September 15,

**BOB**

No because it causes pollution, poor air quality and climate change.

2019

Reply



June 29, 2017

**BRUCE MILLER**

Time to introduce this power to the general grid system, after all we all paid for it? Remember when heating your home electrically was pushed hard? What the Hell happened? Wynne milked that cow to thin milk, then to death. Ontario needs a fully empowered Energy Board, a system that reaches beyond politics and is run by competent qualified professional Electrical engineers: As it is, Kathleen Wynne's prize catch, and the man that costs us a fortune and possibly more in ineptitude,:

Doug Alexander and Scott Deveau, Bloomberg News Monday, Sept. 28, 2015 Hydro One Ltd. will pay its top executive as much as \$4 million in annual compensation, according to regulatory filings, slightly more than other large Canadian power companies.

His C.V. shows no expertise in things electrical at all? No recent education in this New Age? He is an American that thinks that Northern Ontario is "Alabama North"?

<http://www.financialpost.com/m/wp/blog.html?b=business.financialpost.com%2Fexecutive%2F-suite%2Fhydro-one-ceos-pay-of-4-million-with-bonus-approaches-top-end>  
<https://www.thestar.com/.../opgs-executive-salaries-to...>

is a graduate MECHANICAL ENGINEER from the 1950's in the US!!! FFS!!!

Hydro Quebec makes a profit, Hydro Quebec charges Quebecois 1/3 what Ontarians pay, and is headed by REAL Electrical Engineering Phd's not pseudo smart American jerk offs? Why Can Wynne find this quality of help for Ontario? Did a certain kind of snotty prejudice play a role here? He is an American that thinks that Northern Ontario is "Alabama North"?

Reply

August 18,  
2017**SUSANA**

The above links seem to have been broken.

You could Google: Hydro One CEO's pay of \$4 million with bonus approaches top end, or

#HydroOneCEO'spayof\$4millionwithbonusapproachestopend

For the second link Google: OPG's executive salaries to rise by as much as \$8M while Metrolinx proposes \$100K boost for CEO, or

#OPG'sexecutivesalariestorisebyasmuchas\$8MwhileMetrolinxproposes

Reply



June 30, 2017

**ALIDE FORSTMANIS**

Stop building wind and solar farms! They are too expensive and unreliable, plus pollute countryside.

Reply



July 27, 2017

**BOB**

Then stop using power forcing millions of kids to breath crap out of gas plants. In Mississauga and Toronto. My family along with literally a million people live less then a km from the gas plant at Cheery Beach that you and your family use power from . And

forcing millions of families to live beside the Pickering nuclear plant, what about their property values. Wind turbines are gorgeous and cheaper at 7 cents per kWh. we pay 15 cents for gas generation.

Reply



July 27, 2017

**ROB**

Your statement claims that 'literally a million people' live within a km of that gas plant. That is bullshit. Even if it was 40 000, that is a long way from a million.

Reply



October 20, 2017

**BOB**

Well It appears that 6 million people live east of the Gas plant in Milton don't they. 90% of the winds blow from west to the east.

Reply



October 20, 2017

**ROB**

Again, your statement was 'within one kilometre'... which clearly is wrong



February 14, 2018

**MRS. ASHE**

Agreed, I reside where hideous industrial wind farms were built, and which now BLIGHT the pristine landscape. NIMBY also works for US who live in the country because we don't care to live in industrial messes. Put the damned windmills in the CITY where the most energy is used.

Reply



October 14, 2019

**MIKE JANKOWSKI**

You seem to not realize it is Natural Gas Plants which backs up wind power. As the OSPE said themselves and was posted above – CO2 output increases as we add Wind Power to our grid.

Reply



April 10, 2019

**ERIC JELINSKI**

Agree

Reply



June 30, 2017

**GENE BALFOUR**

Redirect all excess electricity to private and public sector enterprises at the wholesale price in order to reduce operating expenses and re-invest in new ideas that will generate private sector jobs ( we already have too many public servants).

[Reply](#)


July 2, 2017

**RICHARD MANN**

When will government listen? They were warned about this in previous reports (as early as 2012).

Reference: "Ontario's Electricity Dilemma – Achieving Low Emissions at Reasonable Electricity Rates". Ontario Society of Professional Engineers (OSPE). April 2015.

(Archived at:

[http://c.ymcdn.com/sites/www.ospe.on.ca/resource/resmgr/DOC\\_advocacy/20150427\\_WhyWillEmissionsDoubleasWeAddWindandSolarPlants.pdf](http://c.ymcdn.com/sites/www.ospe.on.ca/resource/resmgr/DOC_advocacy/20150427_WhyWillEmissionsDoubleasWeAddWindandSolarPlants.pdf)

Page 15 of 23. "Why Will Emissions Double as We Add Wind and Solar Plants?"

- Wind and Solar require flexible backup generation.
- Nuclear is too inflexible to backup renewables without expensive engineering changes to the reactors.
- Flexible electric storage is too expensive at the moment.
- Consequently natural gas provides the backup for wind and solar in North America.
- When you add wind and solar you are actually forced to reduce nuclear generation to make room for more natural gas generation to provide flexible backup.
- Ontario currently produces electricity at less than 40 grams of CO2 emissions/kWh.
- Wind and solar with natural gas backup produces electricity at about 200 grams of CO2 emissions/kWh. Therefore adding wind and solar to Ontario's grid drives CO2 emissions higher. From 2016 to 2032 as Ontario phases out nuclear capacity to make room for wind and solar, CO2 emissions will double (2013 LTEP data).
- In Ontario, with limited economic hydro and expensive storage, it is mathematically impossible to achieve low CO2 emissions at reasonable electricity prices without nuclear generation.

[Reply](#)


July 27, 2017

**BOB**

Storage is now available in the form of li-ion batteries at very low cost. Audi said their battery costs are half what industry analyst believed at \$112/kW.

The gas plants in Ontario over 30 were built to back up the nuclear plants not wind and solar.

Battery tech in front of gas generators like in California allows gas plants to be idled completely and with a minimum amount of storage and cost.

[Reply](#)



August 18,  
2017

#### SUSANA

Some people expressed concerns about those batteries:  
[http://batteryuniversity.com/learn/article/safety\\_concerns\\_wi](http://batteryuniversity.com/learn/article/safety_concerns_wi)  
 Maybe we should make sure first that solutions were found, so those would be really safe.

Reply



April 10, 2019

#### ERIC JELINSKI

The only energy storage that makes sense is the binding energy of atoms, and that energy is released in a controlled manner using fission as has been done by some 450 nuclear reactors over the past 70 years. Gas plants and batteries are not required, wind turbines not required, and solar is best used for growing food.

Reply



October 14,  
2019

#### MIKE JANKOWSKI

Bob – how many Wind Power arrays in Ontario have full functioning storage capability?

None!

We waste over \$2 Billion a year selling power we can't use from wind generation at a loss because it is generated out of phase with demand.

I agree that if true storage capability were developed and commercially and environmentally viable, it would be a game changer from this perspective, but it is not. In the business world – you would lose credibility with such an unpractical reply.

Reply



April 10, 2019

#### ERIC JELINSKI

solar and wind power need 100% running back-up, and that is why solar and wind are not viable power sources. People talk, oh, but what about batteries nonsense to store the energy from wind. The only energy storage we need to use is the binding energy of the atom that is released during the fission process as has been done using some 450 nuclear reactors around the world for the past 70 years.

Reply



April 10, 2019

#### ERIC JELINSKI

The only reason we got into this fiasco was because of certain politicians acting like snake oil salesmen, telling us that wind power is free and the sunshine is free. Of course these are free. It is the 'machines' to turn wind and solar into electricity that is horrendously expensive, but this was ignored during the salespitch and during the election campaigns. Furthermore the public was

and during the election campaigns. Furthermore the public was threatened by the doomsday sayers telling us that the north pole will all be melted by 2008. The global warming message turned into the climate change message when it was noticed that the temperature had stopped rising. I think we are a lot smarter no having been bitten by the agendas of certain parties to make money by fear mongering. The carbon tax is the latest scam., The doomsday sayers are only looking at the last 100 years and using this to project for the next 100 years. Come on, where do they get their education? If you are going to do trending would you need to look at the longest trend and available data. It turns out that carbon dioxide really has no correlation with temperature during previous millennia eg. the period of the dinosaurs.

Some things to think about are; the sun's output varies and is what drives climate.

The largest amount of global warming gas is water vapour  
And CO2 is plant food, and plants feed people eg. the high levels of CO2 enabled vegetation to flourish that allowed massive dinosaurs to grow a the time that could only grow to that size because of their feed on the vegetation.

For more, please read about the great delusion,

<http://allaboutenergy.net/environment/item/2074-co2-hysteria-bonne-posma-leon-louw-usofa-south-africa>

[Reply](#)

July 2, 2017

**MOHAMMAD N**

Surplus energy should be exported outside Ontario and bring more cash inflow into the province, and eventually province will become more strong and stable

[Reply](#)

July 11, 2017

**BRAD**

Mohammad: Ontario already exports the surplus power. The issue here is curtailment, the surplus power that remains after domestic consumption and exports have been accounted for.

[Reply](#)

July 27, 2017

**JAREMKO NOGOTTA**

This would be great if it were possible. Problem is they don't need it/won't pay the fuel cost (let along the cost of production). I think that's what makes OSPEs solution so perfect: Ontario consumers who are otherwise burning gas or oil can use this clean electricity instead at its fuel cost... they have already paid for the capital costs. Really smart stuff.

[Reply](#)**BOB**

Jaremenko it would not be good idea since we would be running highly polluting gas plants.

September 15,  
2019

Reply



October 14,  
2019

#### MIKE JANKOWSKI

Understand that we are already doing this and losing \$2 Billion/year doing so as the cost of sale is lower than what We pay to generate it. Wind produces usually about only 30% of its nameplate capacity and over 80% of that 30 is produced at time Ontario cannot use it.

Reply



July 12, 2017

#### RICHARD MANN

Has anyone heard back from the Huron County Health Unit?

An investigation into health impacts of wind turbines was initiated in March 2016. (Ontario's HPPA, Health Protection and Promotion Act). Since then we have had one delay after another, and still no remedy for those living under turbines.

As of July 4th, 2017, Erica Clark informed me they have heard back University of Waterloo ethics and are now planning another ethics applications to address concerns raised.

Meanwhile I have been told that all communication of the ethics board, including the names and positions of the applicants, is confidential.

Reply



July 27, 2017

#### BOB

Germany now has over 23,000 wind turbines. Yes INDUSTRIAL wind turbines built to 80M high. And a population of 80 million people in a country smaller than Ontario. Their heads must be exploding! Everyday kids breathe the crap out of the 30 gas plants in the province that you personally use power from, but you have no concern. My family lives less than 1km from the Cherry Beach Gas plant that you use power from. Wind turbines are the safest cleanest cheapest source of power.

Reply



July 29, 2017

#### BARB ASHBEE

<http://instituteforenergyresearch.org/analysis/france-germany-turn-coal/>

Germany is replacing its nuclear units with renewable energy (wind and solar) as part of its energy transition, the so-called Energiewende. It is using mainly coal to back-up its intermittent renewable energy and as a result, it has increased its coal-fired generation. Due to the higher cost of wind and solar units, residential electricity prices have escalated and are 3 times that of the United States.

<http://www.epaw.org/> – just as many problems in Europe

Reply



August 18, 2017

**SUSANA**

Good idea, however someone should make sure those are safe as well, and maintained properly. There were a couple of incidences:

- <https://www.youtube.com/watch?v=CqEccgR0q-o>
- <http://www.cbc.ca/news/canada/nova-scotia/wind-turbine-collapse-point-tupper-cape-breton-enercon-renewable-1.3734562>
- <http://www.reporternews.com/story/news/local/texas/2017/08/17/wind-turbine-collapse-under-investigation/425362001/>

Reply



August 18, 2017

**SUSANA**

More information:

- [https://en.wikipedia.org/wiki/Hornslet\\_wind-turbine\\_collapse](https://en.wikipedia.org/wiki/Hornslet_wind-turbine_collapse)
- Here is an analysis of the wind turbine collapsed in Cape Breton:
  - <http://www.cbc.ca/news/canada/nova-scotia/forgotten-washer-heard-in-hub-before-wind-turbine-collapsed-in-cape-breton-1.4112090>
- Here is an other one:
  - <https://mothersagainstturbines.com/2016/11/22/ocowind-turbine-126-collapse/>
  - [http://journalstar.com/news/state-and-regional/nebraska/wind-turbine-collapses-near-diller-cause-unknown/article\\_6e77706f-065f-5f47-b36b-1ae4fe73cd6a.html](http://journalstar.com/news/state-and-regional/nebraska/wind-turbine-collapses-near-diller-cause-unknown/article_6e77706f-065f-5f47-b36b-1ae4fe73cd6a.html)
- Finally many more videos:
  - <https://www.google.ca/search?q=wind+turbine+collapse+videos&source=lnms&tbm=vid&hl=en&sa=X&btnG=&biw=1455&bih=728>

Reply



September 22, 2017

**HAMMER95**

Wind turbines are not the cheapest source of power. They are extremely unreliable. They should only represent a small part of the generation mix. The gas plant near your home is in a perfect location as it is close to the load center. This eliminates the need for hundreds of kilometers of transmission that would be required to bring unreliable power to your family's home.

Reply



**BOB**

It's not because it spews pollution we all are breathing. Causes climate change since they are

September 15,  
2019

breathing. Causes climate change since they are generating at 500 g of CO2 per kWh. As well as methane leakage is huge climate change issue. And the less gas we use for power generating the more we have to use to heat our homes. Saving huge money. Gas went from \$3 per BTU to \$12 in one year in 2008.

Reply



January 29,  
2018

**KEITH HEHN**

Then move to the north if your so damn concerned. Leave us normal folks alone

Reply



January 30,  
2018

**SUSANA**

Keith Hehn, I would advise you observe the Code of Conduct of OSPE, specifically section 2.0. I received an e-mail from OSPE with your comment and I find it harassing.

Reply



October 14,  
2019

**MIKE JANKOWSKI**

All is not well in Germany as you say. They have only recently published a study which found wind turbine infrasound can travel over 40 km and impact homes. Meanwhile, in Ontario, we have an expert who has measured wind turbine infrasound at much greater distances – over 100 km. In Germany, the climate is similar to here – some doctors do strongly suspect that infrasound is making people ill – and not over decades, but in weeks.

Yes – go for clean energy.

No, do not ignore the risks to human health – bring engineering change to bear on them.

Reply



August 15,  
2017

**BOB**

Germany has over 23,000 INDUSTRIAL WIND TURBINES OF THE BIGGEST VARIETIES ALONG WITH 80 MILLION PEOPLE. And nobody is getting headaches. 80 million people in a space smaller than Ontario. What was the cost of the fires in Fort Mac when the 8 month long fire started, \$11 billion out of everybody's pockets. It was 92 degrees the day the fire started. That was May 5th and it should have been 48 degrees! That is climate change.

Reply



July 16, 2017

**IKE BOTTEMA**

I see people suggesting that surplus power, i.e. the power curtailed or spilled, be provided to the grid. Little do they realize that not curtailing power output would de-stabilize the grid, specifically raise the voltage above acceptable levels. The key aspect they don't understand is that the grid is NOT a battery. Perhaps the OSPEng could help by providing some basic educational material that would serve to clarify issues such as this.

Certainly it might have helped the Liberal government to write contracts that does not oblige payment to wind farm owners in the event high levels of wind aren't needed. In fact, wind (and solar) suppliers should be obliged to store any surplus until it's needed if they expect payment. As it stands, wind and solar contracts are already incomprehensibly high and driving up the Global Adjustment to unprecedented delivered electricity prices!

[Reply](#)


July 27, 2017

**ROB**

People are not just suggesting the excess power be added to the grid... they are suggesting that the price per kWh be lowered to increase demand and decrease the amount of power that is excess... this price decrease could cause people to use cheaper cleaner energy instead of a gas waterheater for instance have a gas/electric water heater... for businesses the cheaper power could be used to expand and create jobs instead of relocating... so not just adding excesspower to the grid but actually increasing demand to reduce the amount of excess power that we have to pay New York and Michigan to take...

[Reply](#)
August 18,  
2017**SUSANA**

Excellent idea, however I'm a little skeptical about the effectiveness of the power consumption increase efforts. (as long as many people are in deep debt already). I think, we should be working on createing more jobs, manufacturing should be coming back to Ontario (to increase power consumption).

[Reply](#)


July 16, 2017

**IKE BOTTEMA**

**“** *Following a detailed analysis of year-end data issued by the Independent Electricity System Operator (IESO) and Ontario Power Generation (OPG), the Ontario Society of Professional Engineers (OSPE) is reporting that in 2016, the province wasted a total of 7.6 terawatt-hours (TWh) of clean electricity – an amount equal to powering more than 760,000 homes for one year, or a value in excess of \$1 billion.*

Where might one find that report? Also if the calculations on which that reported 7.6 TWh are not included in the report, where might I find those calculations?

[Reply](#)

July 26, 2017

**STAFF**

Author

Hello Ike – thank you for taking the time to share your comments. You've raised some great points and have inspired the creation of a follow up blog post that will address some common energy misconceptions, not unlike the ones that you've highlighted in your comment. In the meantime, please feel free to take a look at the following curtailment data for a more comprehensive look at these calculations:

[https://www.ospe.on.ca/public/documents/OSPE\\_Curtailment\\_Analysis](https://www.ospe.on.ca/public/documents/OSPE_Curtailment_Analysis)

If you have any further questions or suggestions, feel free to reach out to our advocacy team directly by emailing [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca) and our team would be happy to connect you with the appropriate resources or contacts.

[Reply](#)

July 27, 2017

**BOB**

Another BS OPSE report. Written by retired nuclear engineers. OPSE has very few if any Wind, Solar and Storage engineers. Please ignore the report and advice.

[Reply](#)

July 27, 2017

**BOB**

EV's will suck up the extra power. At a high value. Audi exec just said Audi's battery costs are half what industry analysts believe. It is cheaper now to own and drive an EV WITHOUT any incentives. It is cheaper to lease a \$43k Chevy Bolt and charge it at \$500/year then to lease a crappy \$20k Chevy Cruze and fill it with gas. NO INCENTIVES INCLUDED IN THAT!

[Reply](#)

July 27, 2017

**ROB**

Germany also has a lot of disgruntled citizens and an extremely high rate of energy poverty. And are still coal plants...

[Reply](#)

July 27, 2017

**BOB**

How are you able to use a computer.... Run a circle out from the Cherry Beach power plant and you will hundreds of condos, hotels, schools. And so yes 6.4 million people are breathing crap from Cherry Beach when we have an easterly wind. Or from the Milton plant when we have a westerly wind. I do live 1km from it my daughter plays lacrosse 500meters from it. You are costing the people of Ontario now since wind is now sub \$70/MWkhr and that is locked for 20 years. Remember how hard the people of Oakville fought the gas plant being located there.

Reply



July 27, 2017

**ROB**

Ok, let's look at your statement. You claim 1 million people live within 1 km of the gas plant where you live. The GTA has a population of 6.4 million or so, in an area of about 7100 square km. The 1 km radius around your gas plant you're speaking of has an area of about 3.5 sq km. So according to my calculations that's less than 1000 people per sq km? So in the 4 sq km around your plant there would be about 4000 people? And you want us to listen to a word you say?

Reply



July 27, 2017

**BOB**

Germany has coal plants because they shut the nuke plants after Fukushima with the support of the coal industry. Remember any accident around the world at a nuke plant will have Ontario looking to close ours. That's why we have gas back-up not because of wind and solar.

Reply



April 10, 2019

**ERIC JELINSKI**

nuclear plants in Ontario do not need 100% gas plant back up

Reply



July 27, 2017

**ROB**

Remember how hard the people in rural Ontario fought the wind farms there? Yeah, that's right. Remember how much those two gas plants they didn't build cost us? Yeah, that's right? Remember how much they actually had to cost us if the liberals didn't mind using the out clause in the contract? Yeah that's right...

Reply



July 27, 2017

**BOB**

And you can't just cancel contracts. That's the whole point of a contract. This is not a banana republic. And if the contract was cancelled compensation would have to have been paid. So stop using power from the gas plants and effecting millions, and we will stop asking you to locate a wind turbine in your area...

Reply



August 15, 2017

**ROB**

You can indeed get out of contracts. That's why there are out-clauses in them. There were out-clauses in each of the contracts for the cancelled gas plants. The builders were in breach of contract because they hadn't gotten

local approvals in the timelines listed, and the gov't could have gotten out of the contracts with no penalties. They chose not to... the same with the Samsung deal. Samsung hadn't met the timelines in the contract and the gov't could have walked away from half of the cost with no penalty. Again they chose not to...

This has all been verified by the Ontario auditor general.

Reply



August 19,  
2017

#### SUSANA

It seems the government tries not to scare investments and opportunities away, however should be making sure not to put the province in more debt unnecessarily. Because if one gets out of a contract in such way, what will keep others from non-compliance and lack of financial responsibilities?

Reply



August 18,  
2017

#### SUSANA

I think, very well thought-out and relevant clauses should be stipulated in contracts from now on. If discoveries would be made while a contract(s) in effect (for example safety related: natural gas seepage or any other safety concerns, the contract should be allowed to be cancelled, maybe with some reasonable payment for cancellation).

Reply



July 27, 2017

#### ROB

Except for the fact that we already produce 50% more power than we need your statement might actually make some sense... as you stated the liberals have contracted us with a surplus for decades to come and are still contracting more. So your statement to stop using power from gas plants is ridiculous and part of the problem as excess power costs more to get rid of than no power at all... and as the auditor general pointed out there was indeed an out clause on both those gas plants that would have allowed the gov't to back out at minimal cost, (I believe the contract stated they had to have local approval). Dolton decided not to use it because he hoped to minimize the screw up. And there was an out clause in the samsung deal which would have save well over a billion the gov't decided not to take advantage of, again because they didn't want to show they'd made a mistake ...!gea has more than doubled the cost of power and increased co2 emissions thanks to liberal ineptitude

Reply



July 27, 2017

#### RICHARD MANN

For information on health impacts of wind turbines, please see the following article, and the comments submitted.

<http://cmajblogs.com/health-canada-and-wind-turbines-too-little-too-late>

"Health Canada and Wind Turbines: Too little too late?". CMAJ (Canadian Medical Association Blogs), November 28, 2014.

Carmen Krogh, BScPharm (retired), is a peer reviewed IWT health researcher and former Director of Publications and Editor-in-Chief of the CPS.

R Y McMurtry is Professor Emeritus (Surgery) of Western University (formerly University of Western Ontario). Dr. McMurtry was also an ADM at Health Canada 2000-02

See also,

Invited Talk. Carmen Krogh, Industrial wind turbines can harm human, Wednesday, March 29, 2017. 10:00am. DC 1302 (Davis Center), University of Waterloo.

Link (livestream) <https://livestream.com/itmsstudio/events/7194480>

Richard Mann

Associate Professor, Computer Science

Faculty of Mathematics

University of Waterloo

<http://www.cs.uwaterloo.ca/~mannr>

Reply



July 31, 2017

**BOB**

I can't believe Waterloo is pushing this crap. So few people live within 550m of a turbine. Not even a km. I live less then a 1km from a gas plant along with a million others. As engineers why don't you do a simulation of when a home, and a turbine more then 500 meters away is in line with the sun. Maybe 30 minutes a year. And then half of that time the turbine is not even spinning. This women is a crack pot. As the folks around Fort Mac about the effects of climate change, when it was over 92 degrees on May 5th last year when an 8 month long fire started. 92 degrees when it should have been 45 deg.

Reply



October 14,  
2019

**MIKE JANKOWSKI**

Bob, you are missing a lot. I am no fan of gas plants, but I stand up to your opinion discrediting claims of harm from wind turbine operation. We experienced negative health consequences at 4.7 km away from the nearest wind turbine and captured data which led me to strongly suspect them as the cause from multiple perspectives. This must be studied employing a diagnostic design. Existing studies have not accomplished this and a wide gap in protections remains. That woman, whom I have met and unfortunately suffered similarly to - is no crackpot. She is yet another person who is proof that our government has failed on its mandate to protect communities. Name calling from you does not refute a single thing she has experienced and such tact actually tempts us to care less about your claims.

Reply



**JEFF**

Electrolysis of water, store the hydrogen that is produced and pump through



August 2, 2017

fuel cell to produce power when demand is up. The oxygen that is produced could also be stored and sold off. Come up with a standard plant design and could do micro plants across the province to generate power where required and in turn have a more reliable grid.

Or battery storage using molten salt batteries, believe these aren't quite as good as li-ion but cheaper to produce and because of cost likely better for a large scale battery storage solution.

[Reply](#)


August 14, 2017

### RICHARD MANN

Further correspondence from Erica Clark, Huron County Health Unit. Published with permission.

From: Erica Clark

Date: August 14, 2017 at 3:52:44 PM EDT

You can publish/circulate the following summary:

Status of the Huron County Health Unit wind turbine study

The wind turbine study is currently undergoing ethics review. Due to the sensitive nature of the information we intend to collect, ethics clearance is important to ensure the recruitment and data collection methods are ethical. We partnered with researchers from the University of Waterloo to do the study and submitted an application to the University of Waterloo Human Research and Ethics Committee. The application was submitted on March 2, 2017 and reviewed at the March 23, 2017 meeting. On April 5, 2017 we received a letter from the University of Waterloo Human Research Ethics Committee listing revisions and additional information required to receive ethics clearance. We sent a response back to the University of Waterloo Human Research Ethics Committee on May 18, 2017 detailing the changes we had made. The University of Waterloo Human Research Ethics Committee met in June and sent us a second letter on June 27, 2017 outlining additional revisions and requests for clarification. We sent a second response back to the University of Waterloo Human Research Ethics Committee on August 9, 2017. We are now waiting for a response.

We understand that it is a long process to get ethics clearance but it is a critical step to ensure that the recruitment and data collection methods are ethical.

Thanks

Erica

---

Erica Clark, PhD  
 Epidemiologist, APHEO Secretary  
 Huron County Health Unit  
 77722B London Rd., RR #5  
 Clinton, ON N0M 1L0  
 519.482.3416 ext. 2022  
 Toll-free 1.877.837.6143  
<http://www.huronhealthunit.ca>  
[eclark@huroncounty.ca](mailto:eclark@huroncounty.ca)

[Reply](#)


### RICHARD MANN

Update:

September 26, 2017

As of Sept 19, 2017, Erica Clark informed me they have heard back from University of Waterloo ethics requesting "some final wording changes in the study materials".

For further details, including correspondence and my own research on Infra sound and wind turbines, please see my web page below.

Richard Mann  
Associate Professor, Computer Science  
University of Waterloo  
<http://www.cs.uwaterloo.ca/~mannr>

Reply



October 18, 2017

**SOMMER**

On the topic of Huron County, where the 'criteria for assessment' to initiate an investigation by the Health Unit was publicly declared already back in March of 2016 ( a year after turbines were turned on and residents started reporting harm to the Health Unit), it is well known now that the Director of Health was abruptly 'released' by the Huron County Health Board and that there was a sudden change of plans by the Health Unit, to do another 'study' rather than 'investigation'. All of this information is in the public domain and available to verify.

As of today, the 'study' proposal process has taken 18 months to plan. Approval from the University of Waterloo (Research and Ethics) was part of the delay. In the meantime, nothing has been put in place to protect residents reporting harm from noise, low frequency noise modulations and infrasound radiation. The harm has continued this whole time, whenever the turbines are running above a certain level and especially during specific barometric pressure weather events.

Wouldn't it have made sense, when curtailing turbines, to make sure that the turbines known to be causing harm in Huron County were curtailed the most? When the 'study' eventually begins, is it ethical to have the turbines running full tilt and causing further harm? This harm is known to be cumulative. There is evidence from around the world of this harm. Take a look at the Waubra Foundation website where a complete list is compiled of the symptoms of harm from wind turbines.

Engineers of Ontario need to be involved in this ethical crisis.

Government must provide safe and affordable energy. Experts from all relevant fields need to be working together to solve safety issues. Incompetency on this crucial portfolio in Ontario is unacceptable.

Reply



October 20,

**STAFF**

Hi Richard,

Thank you for your comment. You raise some important questions about Ontario's renewable

Author

2017

important questions about Ontario's renewable energy investments from an interesting perspective that go beyond the kWh and financial balance sheet.

To your question, "Wouldn't it have made sense, when curtailing turbines, to make sure that the turbines known to be causing harm in Huron County were curtailed the most?" part of the technical answer has to do with the nature of Ontario's grid regarding generation, transmission and capacity. One of the many interesting things about Ontario's power system (and other systems around the world) is that where the power is generated and where it is used (i.e. residential and industrial uses) plays a large role in determining the areas where the turbines are turning and where they are not, even when Ontario's total generation on that same day may be well in excess of what's needed (and is subsequently dumped). In addition, wind turbines require a baseline level of motion to maintain the heat that is required to keep the turbine serviceable and in good operating quality.

At OSPE, we are at the forefront of this issue—because as you mention, it has real costs. We are strong advocates for better system planning and design, including the development of Distributed Energy Resources (DER) that make sense.

I highly recommend that you check out our Wind and the Electrical Grid presentation for more details:

<https://www.ospe.on.ca/public/documents/presentation-and-electrical-grid.pdf>. In the meantime, we will forward your comment to our Energy Task Force.

[Reply](#)


October 20,  
2017

#### SOMMER

Thank you for this response. I will take a look at that presentation.

We can do better in Ontario. Every Ministry within this government has failed to protect people being harmed. No one should be 'collateral damage' to any energy source. This government desperately needs help in finding ways to protect everyone. The number of children being exposed to noise, low frequency noise modulations and infrasound radiation is shameful.

My concerns are for protection from all energy sources. We must do better. The need for experts in relevant fields working together on the energy portfolio is blatantly obvious in Ontario. The OSPE deserves to be heard.

This needs to be an election issue.



August 15,  
2017

**ROB**

You know that nobody in Germany is getting headaches? What is your source for for that statement? What about Denmark? I hear Denmark de-commissioned more wind turbines last year then they put up. And I also heard Germany is still building coal plants... maybe you should actually research your statements before making them

[Reply](#)

August 15,  
2017

**BOB**

Just think of the statement, 80 million people over twice as many as Ontario. 23,000 wind turbines. If there was any real issues with wind turbines their would be a huge push back from those 80 million that are living amongst these beautiful machines. Maybe Denmark didn't need any additional power. DENMARK PRODUCES 42% OF THEIR POWER FOM WIND! Wind is less then 6 cents in Ontario and can be cheaper. Germany is still burning coal because after Fukushima they shut down their nuke plants fearing they are easy targets for terrorists. That was pushed by the coal lobby. You sir are directly responsible for my kid not having cleaner air to breath at recess, along with a million others.

[Reply](#)

October 20,  
2017

**ROB**

Perhaps the latest election results from Germany are 'a huge pushback'...

[Reply](#)

October 14,  
2019

**MIKE JANKOWSKI**

Wow Bob – you employ willful blindness. If you were being exposed to an emission which you can't hear see or smell, which emanated from several km away – how would you know what to do when encountering issues? As one who has lived through it, truly I tell you – if not for my vocation and experience in Electronics Engineering – I would not have had a fog-bound clue what caused our issues. Just like you.

A group of doctors in Germany have requested a moratorium on wind power due to health concerns. Brown Country, WI declared wind turbines a "Danger to human health". The High Court in Cork, Ireland found wind power manufacturer and operator Enercon liable for the suffering of 7 families in the environ of their wind array. Enercon admitted to it as well. Yet you, functioning as an anonymous person here, think you know better than this and people who lived through it. Based on this – I suggest that if you have concern for your fellow person, you will reflect upon what it is you could be missing. I have no kind words for those who attempt to trivialize the suffering my family endured.

[Reply](#)



August 15,  
2017

**ROB**

Actually denmark's wind power decreased last year, just as I said. It went down from 42 to 38% as they are decommissioning turbines. And much of that isn't used by them, it's exported – but the Danes are getting fed up with increasing power costs and fighting new applications. And there are a lot of people in Germany not happy with the wind turbines or with the cost of power- I have relatives in Germany.

Reply



August 18,  
2017

**ROB**

Manufacturing won't come back if you don't decrease cost of power. And usage will go up if prices drop. I had stopped showering every day simply due to cost of electrically heated waters. I'm sure many seniors are the same. Same with air conditioning

Reply



August 18,  
2017

**BOB**

weird cause I have a li-ion battery sitting on my junk while I type this. about 10 others in my house including my daughters bed.

Reply



August 18,  
2017

**BOB**

we should be manufacturing grid storage. EV buses, trains, trucks, can cars.

Reply



October 14,  
2019

**MIKE JANKOWSKI**

Bob – I'd be fine with that if viable – but I insist the infrasonic pulse generated when the blade passes the tower be nearly eliminated first – to protect people.

Reply



August 23,  
2017

**JOE**

Green Energy or fossil fuel- nuclear? A few years ago attended a town hall meeting at my local Chapter on how Green was disruptive to our grid ,being unpredictable,etc,etc. Causing unplanned shutdowns at Nuclear plants,etc,etc.  
Has that view changed now that there would have been mitigating measures in place?

Reply



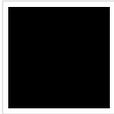
**PAUL ACCHIONE**



September 26,  
2017

Hi Joe. Yes things have changed – nuclear is no longer curtailed ahead of wind and solar. For a number of reasons the IESO grid operator changed the order of curtailment in early 2016. Now the curtailment order is hydroelectric first (based on marginal cost of production), then wind and solar based on energy market floor prices, then flexible nuclear (currently only the Bruce units have flexible capacity). If additional curtailment is necessary then the remaining inflexible nuclear capacity is shut down. Since curtailing hydroelectric and wind usually solves the surplus power problem we rarely see curtailment of nuclear production or a forced shutdown of a nuclear unit. The new curtailment order is much better with respect to the cost and emission performance of the power system. The IESO should be complimented for making that change to the curtailment order. Sorry for the delay in answering your question. Regards.

Reply



September 6,  
2017

#### MARA

What in the world makes you think that Germany and the German people affected by wind turbines are happy with their wind turbine situation? There are plenty of complaints and health issues, believe me. Just because you haven't heard it on CBC doesn't mean it doesn't exist. "an unmitigated disaster"

<http://www.epaw.org/echoes.php?lang=en&article=n609>

Reply



October 14,  
2019

#### MIKE JANKOWSKI

Thank you for the share.

Reply



October 8,  
2017

#### RUTH COOPER

Awesome findings & input from all. I just thought to present that it is unfortunate that perhaps the right people were not involved early on. Knowing that consumption vs. generation profiles are hard to align, especially if the generator can't be controlled (e.g., generators based on wind and solar resources), energy storage should have been the first priority as opposed to an after the fact desperate plea to stop the waste & associated costs.

Reply



October 20,  
2017

#### ROB

There is no cost-effective large scale storage, it hasn't been discovered. Which is why Australia has stopped promoting renewables, and Germany is pulling back, and Austria and Denmark are pulling back... and why for every coal plant shut down globally in the last year or two at least 3 or 4 are being built...

Reply



October 20,  
2017

#### BOB

You forgot China that just added 35 GW's of Solar in six months enough to power Ontario. or the USA adding another 16GW's of solar, Or Germany having 23,000 wind turbines. Or California reducing their carbon emissions by 26% by adding tonnes o solar.

Reply



January 30,  
2018

#### RICHARD MANN

Please see the following link from Engineers Journal (Ireland). This is the latest research on infra sound and industrial wind turbines.

<http://www.engineersjournal.ie/2018/01/23/ilfn-infrasound-low-frequency-noise-turbine-health/>

Reply



February 11,  
2018

#### RICHARD MANN

Please note the following published at the end of the above Engineers Ireland article. Why are Engineers Ireland pointing to a decision made by a government agency in Australia?

“The opinions expressed in this article are the authors’ own and do not represent the views of Engineers Ireland. For details of the Australian Administrative Appeals Tribunal Decision into the effects, if any, of ILFN on human health, please read the following document (PDF): [waubra-and-acnc-decision](#). The section of the Australian decision that deals with Prof Alves-Pereira’s testimony is on pages 123-124.”

Reply



October 14,  
2019

#### MIKE JANKOWSKI

Thanks for the share.

Reply



March 10,  
2018

#### RICHARD MANN

I have just published my results on generation on infra sound. The results are available below or from my web page.

<https://cs.uwaterloo.ca/research/technical-reports/2018-technical-reports-CS-2018-01>

Title Research Report on Infra Sound

Author Richard Mann

Abstract

We have successfully produced infrasound, as a mirror of that produced by Industrial Wind Turbines, in a chamber capable of accommodating a human test subject. This will permit others, with appropriate medical training and ethical oversight, to research the effects of infrasound on humans.

Date February 25, 2018; public release: March 2, 2018

Report CS-2018-01 (PDF)

Reply



October 19,  
2018

### RICHARD MANN

Update, October 19, 2018.

On October 7, 2018 I received an alarming letter from a citizen in rural Ontario.

The title was: "Cardiac instability caused by infrasound radiation from industrial wind turbines"

I am including text from the letter below, with permission.

The authour wishes to remain anonymous going forward.

They have informed the Ontario government at the addresses listed below.

Richard Mann

University of Waterloo

Encl: Excerpt from letter of October 7, 2018

From:

Subject: cardiac instability caused by infrasound radiation from industrial wind turbines...

Date: October 7, 2018 at 1:38:43 PM EDT

To: [doug.ford@pc.ola.org](mailto:doug.ford@pc.ola.org), [rickford.Greg@pc.ola.org](mailto:rickford.Greg@pc.ola.org),  
[colt.manson@ontario.ca](mailto:colt.manson@ontario.ca), [Nina.Chiarelli@ontario.ca](mailto:Nina.Chiarelli@ontario.ca), [rod.phillips@pc.ola.org](mailto:rod.phillips@pc.ola.org),  
[christine.elliott@pc.ola.org](mailto:christine.elliott@pc.ola.org)

Cc: [monte.mcnaughtonco@pc.ola.org](mailto:monte.mcnaughtonco@pc.ola.org), [lisa.thompsonco@pc.ola.org](mailto:lisa.thompsonco@pc.ola.org),  
[bill.walker@pc.ola.org](mailto:bill.walker@pc.ola.org)

BEGIN QUOTE:

In the past two weeks, four people in Ontario have offered to provide their medical investigation records which rule out typical causative factors for traumatic cardiac instability episodes which they have been experiencing in their homes.

All four of these peoples' homes have been surrounded by industrial wind turbines and in two of these cases, substations have been sited too close to their homes.

This situation is an emergency as well as a provable human rights violation.

It confirms the cumulative harm that Dr. Mariana Alves -Pereira has been studying for decades. She has recently presented her work in Slovenia to a group of professionals.

<http://en.friends-against-wind.org/health/infrasound-and-lfn>

In this presentation and also in her most recent interview in Finland, she speaks about LFN and infrasound radiation and the damage to the nervous system as well as the heart. In the interview in Finland she states that, knowing what she knows, she would not live within 20 km of a wind turbine.

Can you imagine how rural residents in Ontario who did not consent to having their homes surrounded by wind turbines feel as their pleas for protection have not resulted in effective measures being taken by their government?

The four people who are willing to have their relevant health investigations used, to show that they are now experiencing the cumulative harm from infrasound radiation, are all people who experienced harm and tried to report it to the Liberal government agents within the MOECC and the MOH. No timely or effective protection was achieved under their leadership and now these peoples' lives are in peril because the turbines that are too close to their homes are still running as I type this letter.

These are four people who have confided in me and are now willing to let you see their medical evidence. How many others are there in rural Ontario who are experiencing harm at various stages of the neurological and cardiac damage that Dr. Mariana Alves-Pereira says is irreversible. How many people, because of the lack of properly delivered information, still have not connected the dots between their symptoms and the turbines near their homes?

With lives of innocent people being threatened in this way and cumulative harm occurring for all who live within 20 km of turbines- harm which cannot be reversed- your government must make this horrible reality a very high priority.

The turbines that are close to or surrounding peoples' homes need to be turned off now.

With respect and gratitude for your willingness to make tough ethical decisions on behalf of the people of Ontario....

END QUOTE

Reply



April 10, 2019

#### BOB

I am guessing the folks in Pickering were not asked if they wanted to live down the road from a nuke plant, that you are currently using power from. Or the people in Milton living beside a gas plant they and their kids have to breath crap from. My daughter has soccer practice 3 times a week 500m from the Cherry Beach gas plant. The air is caustic when it is running. Hardly breathable. I guess those are different though because they affect millions of people and kids. Not just a few important farmers.

Reply



October 14,  
2019

#### MIKE JANKOWSKI

Hi Bob – Can you please stay on topic? I don't see how ignoring risks to human health from operation of wind turbine arrays just because there are other issues will further our advancement as a society. We must bring engineering change to bear upon these issues and progress forward from there.

Comments like yours are dangerous in that they seek to obscure recognition of the issues which will be instrumental in bring forth the mandate to change.

Reply



December 29,  
2018

#### ERIC JELINSKI

Copy of email sent to MP's on November 29th. No reply as of yet.

The author grants permission to post this email for public viewing and sharing.

Dear Honourable members of the 42nd Parliament of Ontario;

I am writing to urge you to cancel all wind turbine contracts in Ontario immediately and I hereby provide you with reasons for doing so.

First, introducing myself, I am a Professional Engineer having been schooled

First, introducing myself. I am a Professional Engineer having been educated in Ontario and worked and payed taxes in Ontario all of my life. I have a B.A.Sc. in Mechanical Engineering from the University of Waterloo in 1976, and a Master of Engineering degree in Chemical and Nuclear Engineering from the University of Toronto in 1992. I have worked for Ontario Hydro, now OPG, for 31 years in positions of engineering and management, and have spent the past ten years teaching nuclear and other engineering courses at Georgian College, UOIT, including eight years of teaching engineering at the University of Toronto. For example my teaching duties at the U of T include teaching in classroom as well as oversight of senior year student capstone engineering design projects. From my perspective of over 40 years of work in industry and academia, I find that the most important aspect for success of students, corporations, and members of government, and collectively the government is making science based decisions, creating trust, and being ethical. Engineers need to write an exam on ethics. What other groups of people are required to write an exam on ethics? It is from this point of view that I feel well justified to write this email to be submitted to you the Honourable Members and to the public for consideration.

The Green Energy and Economy Act of 2009 was at that time touted to be the panacea and growth opportunity for Ontario in terms of jobs and quality of life and a future for the children of all citizens. In fact, and as you all, and we all know, after ten years of 'implementation' the GEA has been a dismal failure and created the opposite of what was intended; eg. high hydro rates, loss of jobs, businesses closing and businesses moving south, astronomical provincial debt, bleak future for students graduating year after year, life has become much harsher for the average person, and for some in rural areas where turbines are being built and operating, life is impossible due to high energy low frequency noise/acceleration of structures including skeletal and inner ear structures, not just adults, but infants, dogs, cats, cattle, and the other issue is the adverse impact on water quality caused by recent turbine construction involving pile driving and disturbing the ground from which residents need to draw water for themselves and for farming, the water in some of the wells have become brackish and undrinkable and requires expensive filtration systems to be installed, paid for the affected residents. Please see jpeg file of a sample of water. The residents have brought this to the attention of their MOH, and the MOH's involved are discounting this as a non-issue. Another issue: This link describes cardiac instability, [https://cs.uwaterloo.ca/~mannr/Letter-ChristineElliot\\_28Oct2018.pdf](https://cs.uwaterloo.ca/~mannr/Letter-ChristineElliot_28Oct2018.pdf) Of course cardiac instability is high concern for cardia arrest, ie. death. This should come as no surprise that infrasound is dangerous as the military has done experiments on how infrasound may be use as a weapon. The attached JPG file lists some of the links that provide evidence of harm from infrasound.

How did we get into this mess? I have been following the implementation of the GEA since its becoming law in 2009 and have written many submission to ERT's. Some of you MPP's also know about this since the beginning. Some of you are just now coming up to speed as the 42nd government. As to how this mess got created, Hansard is the official record of Parliament, and key snippets are presented here in this link, <https://yourwardnews.wordpress.com/2014/02/27/liberal-hack-mike-crawley-exposed/>

From the Hansard recording, we observe this was un-parliamentary and involved an incestuous and salacious relationship between the proponent and the government, so much so, that the government actually became one with the proponent by eg. waiving the "Precautionary Principle" that is generically in all legislation where there is introduction of new processes into the public domain. The precautionary principal requires the proponent to bear the burden of proof of 'no damage'. Waiving of the precautionary

to bear the burden of proof or the damage. The principle de-facto requires anyone who is damaged to bear the burden of proof of the damage. This has caused each and every Environmental Review Tribunal to be a failure, a farce, and a 'kangaroo court' in favour of the wind turbine developers to be allowed to supersede the rights of citizens, so much so, that Municipal Planning was legislated to not be allowed to be involved in turbine location planning. Another example of adverse impact is turbines placed at the ends of airport runways and pilots being told to fly around as they take off and land.

From the Hansard, we observe the self-dealing by liberal party members accessing the blank cheques of the liberal government, while the government turns more than just a blind eye but actively intervenes to disallow the voice of concerned citizens.

Two additional points; in the attached pdf files, one documents what we knew about adverse health effects of wind turbines in 2009. Please read that and compare to the pdf file HGC report copied from the MOEE website originally published in December 2010 by the principal engineering firm HGC commissioned by the government. HGC is a member of CanWea. For your convenience I have commented on just the Executive Summary showing that this report is not a very good work of engineering, but a report slanted to the needs of the client and the industry represent by the author. Such a report, if produced by a student, would be given a Fail if that occurred in my classroom.

And speaking of classrooms. A student design team did a health study in 2014 that was ignored by the government and the wind industry...actually this piece of student work was well received by Faculty, and then it was squashed and never made it past the walls of the university. Please see attached pdf discussing the results of that study. The message given to students by government and industry is disrespectful and inappropriate. The message that was sent by government and industry was that this project result was not politically correct and therefore invalid and not to be used. As a professional engineer I am outraged. As an educator, I am outraged that government is squashing the freedom of thought, idea exchange and speech because it does not fit the government agenda. Ah yes, examples of this has also been in the news at other universities across Canada.

Wind turbines are insignificant to the overall power needs of Ontario only exist because of a subsidy. I do not subscribe to the theory of global warming requiring reduction of carbon dioxide requiring taxes to supposedly control the thermostat of the earth. That is another topic I am prepared to speak to again in the future. The people who believe wind turbines are a necessary solution to reduce CO2 are wrong based on real data, eg. gas turbines back up wind turbines in Ontario, and coal plants back up the wind turbines in Germany, and not including the CO2 produced by manufacturing the steel and concrete for the wind turbines, wind turbines will never be zero carbon nor environmentally friendly due to the very hazardous chemical processes for mining, refining and manufacturing the rare earth for electronics and magnets for the generators. The wind industry has not created any sustaining jobs, in fact the opposite, closing at least one wind turbine manufacturing facility; but in the bigger picture, the high cost of hydro due to subsidy to wind developers is certainly a factor in closing the General Motors plant in Oshawa as announced this week.

In summary, the wind turbines and their contracts are a house of cards propped up by non-science, miss-information, political correctness, malfeasance and a subsidy via the FIT program to achieve a certain ideological and bigoted feel good feeling about the environment. After almost ten years now we observe failure and a certain breach of contract to deliver electrical power economically competitively by wind

turbines, especially breach of social contract by the previous government in collusion with the wind industry.

In light of the recent announcement by General Motors, high costs has certainly been a factor in the irreversible decision to leave Ontario, Ontario needs to swiftly curtail any further losses.

Of course cancellation will stir up emotions and ire of many. The response to all in this light, this is my recommended response. that they need to:

- review Hansard ie. history
- review the interaction between government and industry
- review the gap between actual vs expected performance of the GEA
- review the health impacts, ie. actually listen to citizens

Actions that I recommend for the Minister of the Solicitor General is to communicate with the Professional Engineers of Ontario organization to initiate an engineering investigation into, for example the errors and omissions of the HGC report that I observe is the underlying instrument for the forced installation of wind turbines and the systematic program to ignore citizen complaints.

Another action I recommend is on the Cabinet Ministers for Health and also MOEE, and perhaps in conjunction with the Ontario Medical Association to review culpability of some of the Medical Officers of Health particularly those MOH's who received complaints for not responding appropriately, ie. what was their response, and was their response appropriate.

And finally, to answer some of the media reporters 'whinning'; they may be sent away by simply asking them how much money have they accessed from the trudeau announced \$600 million subsidy for 'trusted journalists' that would pay them to ask their questions and then write their articles. One of the worst things that the federal liberal government has done is to undermine the independence and credibility of those media who participate in the subsidy and I think we have a good idea of who those are or might be. If those media drown, it is because it is self inflicted. To bad, it becomes so necessary to deal with corruption, and this email about the GEA points to corruption that must be undone, and be undone quickly.

I provide my views for th public good and for the public record. Be advised that for privacy reasons I have also sent blind copies to various folks whom I know are like minded and would support this government in cancelling the contracts for the wind turbines.

Fair notice to all who stand in the way of shutting down the turbines, you are aiding and abetting the continuation of harm.

Eric Jelinski M. Eng. P. Eng.  
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L0M1S0  
416-697-9965 cell

[eric\\_jelinski@sympatico.ca](mailto:eric_jelinski@sympatico.ca)

<http://www.linkedin.com/pub/dir/eric/jelinski>

<https://canteach.candu.org/Pages/Welcome.aspx>

"The Future is Nuclear"

"Knowing is easy; it is the doing that is difficult. The critical issue is not what we know but what we do with what we know. The great end of life is not knowledge, but action." Admiral Hyman Rickover

Reply



ALLAN MACRAE

<https://blog.ospe.on.ca/featured/ontario-wasted-more-than-1-billion-worth-of-clean-energy-in-2016-enough-to-power-760000-homes>



January 21,  
2019

<https://blog.ospe.on.ca/featured/ontario-wasted-more-than-1-billion-worth-of-clean-energy-in-2016-enough-to-power-760000-homes/>

With a few exceptions (e.g.: the competent OSPE Note and the comment from Mr. Jelinski, P. Eng.), the comments on this thread reflect a lack of understanding of the electric grid and the way wind power is paid by our imbecilic politicians. Typically, wind power is given first-in access to the grid and other electricity generators are forced to accommodate the wild variations in wind power, proportional the cube of wind speed – this is the first part of the wind power scam. Wind power generators is typically paid full price 24/7, even if the wind power is not needed, and then that excess power has to be dumped from the grid, by disposing it to neighbouring provinces/states, ~always at a loss.

Next, there is no practical economic means of storing grid-scale electricity – there is no “super-battery”, despite claims to the contrary. The only exception is pumped storage, and there are almost no suitable sites in Canada and only a few in the world. To be of value, electricity has to be “dispatchable”, meaning it has to be capable of being increased and decreased to meet the needs of the grid – and wind power is simply not dispatchable. That means that excess grid wind power has to be dumped at a loss.

Because wind power is highly variable, and the grid requires a steady input, wind usually requires almost 100% spinning reserve, usually from gas-turbine generators. It would be much cheaper and the grid would be much more reliable if the wind power was shut down, and the gas turbine generators run 24/7. It would be even less expensive if the wind power was never built. Incidentally, natural gas turbine generators produce ~no real pollution – only CO2 and water vapour.

In a debate in 2002 with the leftist Pembina Institute, my co-authors and I wrote (1):

“Climate science does not support the theory of catastrophic human-made global warming – the alleged warming crisis does not exist.”

“The ultimate agenda of pro-Kyoto advocates is to eliminate fossil fuels, but this would result in a catastrophic shortfall in global energy supply – the wasteful, inefficient energy solutions proposed by Kyoto advocates simply cannot replace fossil fuels.”

Past decades of actual global observations adequately prove that these two statements are correct to date.

Regarding the future, I also wrote in an article published 1Sept2002 in the Calgary Herald (2):

“If [as we believe] solar activity is the main driver of surface temperature rather than CO2, we should begin the next cooling period by 2020 to 2030.”

Solar activity has crashed, and this moderate global cooling prediction is looking increasingly probable. I hope to be wrong, because humanity and the environment suffer greatly in cooling periods. This is even more worrisome because our vital electricity systems have been destabilized by green energy nonsense.

Competent engineers and other scientists have known these truths forever. There are possibly minor exceptions and nitpicks in my above note, but the general facts are correct. For those who wish to challenge my statements, I will gladly compare with anyone my professional career accomplishments on six continents.

McGuinty and Wynn have destroyed Ontario's economic competitiveness through incompetence and corruption. Told you so, 17 years ago.

Allan MacRae, P.Eng.  
Calgary

## References:

(1) CONCLUSIONS from our REBUTTAL, APEGA DEBATE of 2002 on the KYOTO PROTOCOL

Sponsored the Association of Professional Engineers and Geoscientists of Alberta

By Dr. Sallie Baliunas, Dr. Tim Patterson and Allan MacRae, P.Eng.

The PEGG, November 2002

Originally published at:

[http://www.apega.ca/members/publications/peggs/WEB11\\_02/kyoto\\_pt.htm](http://www.apega.ca/members/publications/peggs/WEB11_02/kyoto_pt.htm)

Now at:

<http://www.friendsofscience.org/assets/documents/KyotoAPEGA2002REV1.pdf>

(2) KYOTO HOT AIR CAN'T REPLACE FOSSIL FUELS

By Allan M.R. MacRae

Calgary Herald, September 1, 2002

Excerpted at:

<https://wattsupwiththat.com/2009/01/10/polar-sea-ice-changes-are-having-a-net-cooling-effect-on-the-climate/#comment-74283>

Reply



September 23,  
2019

**BRIAN WARK**

Allan your just completely wrong. Wind generation does not require spinning back-up. Not at all. At this minute in Ontario we are getting 14% or 2600 MW's from wind and only 1600 MW's from Gas plants. 14 of the 52 plants we have are operating. Your other big mistake is the Gas guys are paid for to be sitting there as capacity. Every grid by NERC regulations to have a back-up usually about 70%. Gas needs gas back-up, nukes need back-up, hydro needs back-up. The gas plants were built to back up our nuclear fleet way before the wind and solar was installed. The Gas generators are are paid for all their power in the form of capacity contracts. Which is over 20 cents per kWh (\$200MWh), and those contracts are actually private due to NDA and the IESO does not even publish the Gas generation costs broken out. Why? Wind and solar contracts are public. The spinning back is complete BS. Look at GridWatch.ca and see the Gas plants and wind plants.

Reply



January 21,  
2019

**ALLAN MACRAE**

The level of technical incompetence in governments is enormous – most politicians are so incompetent that they should not even opine on energy matters, let alone set energy policy. Here is one example of why this is true:

In Calgary, our city council allowed the development of residential subdivisions up to within 1 mile of 40% H<sub>2</sub>S sour gas wells. Hydrogen Sulphide (H<sub>2</sub>S) is a powerful neurotoxin that is heavier-than-air and instantly fatal if inhaled at 0.1% concentration. In SE Calgary, these sour gas wells were produced and processed by the Mazeppa project.

While those wells were responsibly operated for decades, Mazeppa was later acquired by Chinese thugs who ceased injecting anti-corrosion chemicals into the sour gas gathering pipelines to save money, resulting in severe corrosion and even minor H<sub>2</sub>S leaks from these pipelines. Earlier studies stated that a major release of H<sub>2</sub>S from these wells would have a "kill radius" of 15 km, encompassing the entire SE quadrant of Calgary, now home to

about 300,000 people. As a private citizen, I intervened and had the project shut down in 2016.

There were early signs that the Mazeppa project was at risk – the new owners stopped paying their bills and were transferring funds offshore as soon as received. They also transferred their economic wells into two sister companies, with the intention of dumping all the uneconomic wells and facilities of the parent company onto the industry/public. The project went bankrupt, dumping ~\$200 million in abandonment/reclamation costs.

The punishment against this company was the most severe in Alberta history, but the question remains – how did it get this bad? There was a major failure by governments and regulators to see the big picture and to take suitable proactive steps. These are the same government people who believe they can set energy policy, “fight global warming”, “stop climate change” and promote intermittent green energy schemes that are not green and produce little useful (dispatchable) energy. Add to this the influence of large amounts of foreign money spent to support phony-green leftist political groups and to influence politicians on energy policy, and we have the energy debacle that is Canada today.

What could possibly go wrong?

Canada has lost over \$120 billion just in oil revenues due to anti-pipeline thuggery, our economy is failing, and our vital energy systems have been damaged by costly and ineffective wind power schemes that fail due to intermittency, a fatal flaw of “green” energy that we have fully understood for many decades.

We are governed by scoundrels and imbeciles.

Regards, Allan

Details of the Mazeppa Sour Gas story:

<https://wattsupwiththat.com/2018/12/25/climate-hero-chinas-ecuadorian-earthquake-zone-dam-paid-for-by-amazonian-oil/#comment-2567216>

Reply



January 21,  
2019

#### ALLAN MACRAE

DARK GREEN MONEY REVEALS VAST SELF-DEALING NETWORK IN CANADA'S CLIMATE CHANGE “LEADERSHIP” LIKE GREEN NEW DEAL PROPOSAL SAYS FRIENDS OF SCIENCE

<https://wattsupwiththat.com/2019/01/18/dark-green-money-reveals-vast-self-dealing-network-in-canadas-climate-change-leadership-like-green-new-deal-proposal-says-friends-of-science/>

This report by Robert Lyman is highly credible, as is the organization Friends of Science. While I am not a member of Friends of Science, I know many of its members and they are highly credible professions, typically with university degrees in science and technology, often focused on the Earth Sciences. In general, they are far better-educated and more accomplished than most-if-not-all politicians and global-warming alarmists.

Reply



February 12,  
2019

#### RICHARD MANN

Here is an Important 28-minute documentary by the science program “planet e.” of the second German television ZDF — November 4, 2018.

Discusses infra sound from Industrial wind turbines. Many experts are interviewed, including Alec Salt (Washington University Medical School) and

the German researchers who did human fMRI studies.

<https://youtu.be/ywWNx3OJyuo>

Richard Mann

University of Waterloo

PS: I find it disturbing that many posters here do not use their real names.  
Can we have an open and honest discussion with the decision makers on this issue?

Reply



March 23,  
2019

**SUSANA**

Too bad, it seems, experiments are going on which are damaging human health.

Reply



March 19,  
2019

**RICHARD MANN**

Update: Tue Mar 19, 2019.

I still have not heard anything back from our government, anyone from my University, or anything from Huron County Health Unit. Nobody seems to be taking responsibility.

At this point I would like to ask that the names of the P.Eng. responsible for wind turbines projects be made public. Who are the P.Eng. who signed off on Ontario's projects under the Green Energy Act? Does anyone have this information?

Thanks,

Richard Mann

University of Waterloo

Reply



April 14, 2019

**RICHARD MANN**

Update. April 14, 2019.

On April 9, 2019 I received a legal document (PDF link below)  
I don't understand the legal implications, if/when there will be a response, or if so, if there will be any remedy. At this point all I know is the document was filed on Feb 15, 2019.

Please follow up here if anyone has further information.

<https://ccsage.files.wordpress.com/2019/04/notice-of-application.pdf>

Sincerely,

Richard Mann

University of Waterloo

Reply



July 22, 2019

**RICHARD MANN**

Update. July 22, 2019.

On May 27, 2019 K2 wind facility has been ordered to curtail 89 of their wind 140 turbines in Huron County.

<http://www.wind-watch.org/news/2019/05/28/wind-farm-ordered>

<https://www.wind-watch.org/news/2019/05/28/wind-farm-ordered-to-reduce-noise/>

I fear that the operating adjustments made to reduce the turbine audible sound levels (dBA) may come at the expense of increased infra sound and low frequency noise.

Further, some people are particularly sensitive to changes in turbine operation (Stephen Cooper, Cape Bridgewater Study, Australia) even though they cannot hear them, <https://www.masterresource.org/windpower-health-effects/sensing-not-hearing-problem-wind-turbine-noise-interview-acoustician-stein-cooper-au/>

Subjecting people to unpredictable turbine operation seems likely to increase health harm.

It is frightening to me that no one is even monitoring infra sound.

How can we continue to experiment on unwilling human subjects for the sake of meeting some arbitrary noise standard?

The only sensible response is to turn off the turbines. They are obviously out of compliance by any measure. But no one seems willing to face that possibility.

Richard Mann  
University of Waterloo

Reply



September 24,  
2019

**ROB**  
Wind - 7.6%  
Gas 15.7%

Reply



April 10, 2019

**ROB**  
You can guess what you want. That's what it will be - a guess...

Reply



April 14, 2019

**UNION ALARM**  
This is only because people are not aware of how beneficial it can get for us. We need to set up a proper way in which we can harvest all of this renewable energy to be used.

Reply



April 15, 2019

**SUSANA**  
I think, it would be a good idea to follow the US Department of Energy too, in their efforts (of course with their permission).  
The following refers more to places with lots of sunshine:  
<https://cleantechnica.com/2019/04/11/how-coal-killing-solar-panels-can-help-us-farmers/> , however the following may be of more interest:  
<https://www.terrestrialenergy.com/technology/leading-the-way/>

Reply



September 15,  
2019

**SUSANA**

Dear Associate Professor at University of Waterloo, Richard Mann.

Thank you for sharing the recording. I'm well into informing myself about infrasound experiments etc. and have 1/2 hour left of the recording to view. I was just wondering, if possibility of resonance was taken in consideration when operating windturbines and other equipment. The type of resonance which prompts marching personnel to walk with random steps over bridges following a command. Resonance, which could potentially amplify frequencies and make matters much worse. Could currently operating windturbines be operated in an alternative fashion?

[Reply](#)

September 15,  
2019

**SUSANA**

Sorry, I meant potential resonance with increased amplitude, not frequency. Next time I'm to choose a better time to comment, than sleepy time.

[Reply](#)

September 23,  
2019

**BRIAN**

Maarten Bokhout is an idiot. Has not completed any studies. A person seeing flicker from a wind turbine even 500m away would exist less than 15 minutes a year in total. The turbine is only in line with the sun either early in the morning before you rise or in the evening. And then it would only be only a couple weeks off the year. Since the suns position is constantly moving. And it would have to be a sunny morning or evening. More BS. 30,000 turbines amongst 80 million Germans is the best study ever. Much bigger turbines as well 4MW beasts!

[Reply](#)

September 24,  
2019

**RICHARD MANN**

Dear OSPE.

It appears someone has removed my posts,

Post Sept 9, 2019

Follow up Sept 9, 14, and 23

Can someone please explain why?

Thanks,

Richard Mann

University of Waterloo

[Reply](#)

September 25,  
2019

**STAFF**

Hi Richard,

We removed your comments on this post because they were promoting an event that was irrelevant to the topic of the post.

Instead, [we created a post solely to highlight the event you were promoting](#). I hope that answers your question.

[Reply](#)October 4,  
2019**RICHARD MANN**

Update Oct 4, 2019

Dear OSPE:

On July 12, 2017, I began commenting on the negative health effects of Industrial Wind Turbines in this article. Certainly engineers involved in design and production of these devices would want to be up-dated with a growing body of evidence of health harm from infra sound and low frequency noise.

For this reason I respectfully ask that we continue this vitally important discussion under the comments.

For the record, the following comments should be restored:

1. the talk and associated Livestream by Mariana Alves-Pereira, Sept 12, 2019 at University of Waterloo. (Original comment Sept 9, 2019)
2. The letter of Dr Bokhout, Acting medical officer of Health, Huron County Ontario, sent to a citizen in Huron County on Sept 16, 2019. (Original comment of Sept 23, 2019)

With respect

Richard Mann

University of Waterloo

[Reply](#)September 24,  
2019**PATTI KELLAR**

Dear Sir/Madam:

My comments have also been removed as well. Could you please provide me with an explanation as to why? If possible please do so prior to Friday as I am going to be speaking with my MPP and would like to provide her with the reasons why?

Thank you.

[Reply](#)September 25,  
2019**STAFF**

Hi Patti,

I would love to review your previous comments and provide you with feedback, but our archive of comments shows no previous comments made by you. They may have failed to post. I'm not sure why I can't find any others, sorry.

[Reply](#)September 25,  
2019**ROB**

Simply not true. 1400 me from wind is 7.6 %

3000 me from gas is 15%

[Reply](#)



September 25,  
2019

**BRIAN WARK**

that's 2016 we are in 2019 now.

<http://www.ieso.ca/en/Corporate-IESO/Media/Year-End-Data>

wind 10.9%

gas 9% ( was as low as 6% in 2017)

solar only shows up as 0.5% because is not live monitored by the IESO. It will be close to 10% as well.

2019 will be even better for wind and solar. Solar also lowers capacity dramatically.

Reply



September 25,  
2019

**BRIAN**

You know what also emits "infrasound"? Walking, driving your pick up truck, running, planes, coal plants, gas plants, hydro plants...

Reply



September 25,  
2019

**ROB**

That is the figures from the link you provided of what the output was right now. Not 2016.

Reply



September 25,  
2019

**ROB**

Ok I see what you're saying

Reply



October 11,  
2019

**RICHARD MANN**

Update, Oct 11, 2019

Dear OSPE: I am restoring my post from Sept 23, 2019 below.

This is the letter from Dr Bokhout, acting medical officer of health, Huron County Health Unit on Sept 16, 2019. The letter is to a citizen in Huron County. I am publishing with the permission of the recipient.

Sincerely,

Richard Mann

University of Waterloo

Encl: below:

From: Maarten Bokhout

To: Carla Stachura ; Erica Clark

Sent: Monday, September 16, 2019, 11:14:02 PM EDT

Subject: possible adverse health effects from wind turbines

Dear Ms. Stachura,

I am responding to your email addressed to Dr. Erica Clark, dated August 29, 2019. I have reviewed your correspondence of August 14 and Rick Chappell's May 15, 2018 response to the article "Altered Cortical and Subcortical...(etc)".

I offer the following:

I offer the following:

Your concern is that the wind turbines in your vicinity are noncompliant with MOE noise regulations. The noise is tonal. This is significant, as the foregoing article suggests that "infrasound near the hearing threshold may induce changes of neural activity across several brain regions, some of which...are regarded as key players in emotional and autonomic control".

I am sympathetic to your ongoing concerns suggesting that there is a link between wind turbine noise and your (and your partner's) health and wellbeing. In part, it was your persistence in notifying us at the health unit of your concerns that led me to seek approval for a study to try to determine whether or not there were particular health issues which could be linked to wind turbine activity. The study was approved but we were unable to attract enough participants to do a quantitative analysis of the data gathered. We will complete a descriptive analysis in the next month or so, but this will, unfortunately, not give us enough information to be able to state whether or not the presence of wind turbines have an adverse effect on the PUBLIC health.

There is enough anecdotal evidence to suggest that some INDIVIDUALS have trouble coping with the effects of active wind turbines (flicker, infrasound, possible stray electric currents). I note that the Madison county Board of Public Health recommends changes to the setbacks of FUTURE wind turbine projects.

Your best bet may be to seek redress in the courts. It is unfortunate that our study was not supported by enough residents of Huron County, some of which allegedly encouraged non participation in the study...

Maarten Bokhout, MD, etc. a/MOH

Reply

### Leave a Reply

Your email address will not be published. Required fields are marked \*

Name (required)

Email (required)

Website

Post Comment

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