

Health Impacts of Gas-fired Electricity



Disclosures: None

PREPARED FOR:
NAPANEE TOWN COUNCIL
NOVEMBER 14, 2023

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- ▶ Fossil fuels are the single greatest driver of the climate crisis
- ▶ This includes “natural” gas which is primarily methane, a highly potent fossil fuel 85x worse than CO₂ as a greenhouse gas (GHG)
- ▶ The impact of gas is comparable to coal when massive methane leaks through its entire life cycle are factored in
- ▶ **Human health harms and deaths worldwide in 2020 due to gas were comparable to coal** [Ref: C40 Cities]

- ▶ Ontario's coal phase-out completed in 2014 was the single largest GHG reduction ever achieved in North America
- ▶ Smog days went from 53 days in 2005 to ONE single day over 5 years after phaseout (2014-2019)
- ▶ The most important pollutants from gas-fired electricity generation are particulate matter (PM's) and nitrogen oxides (Nox), both of which are components of smog
- ▶ **Gas expansion risks reversing much of the huge and hard won gains of getting off coal**



Gas-fired electricity harms human health by
2 pathways:



Carbon Pollution

Planetary heating

Climate Change



Air Pollution

Particulate matter (PMs)

Toxic gases – NO_x especially
impacts health



▶ ***“Climate change is the biggest threat to health in the 21st century and our very survival is at stake”***

▶ - Dr Vanessa Kerry, 2023

▶ WHO Director-General Special Envoy for Climate Change & Health

CLIMATE CHANGE ITS IMPACT ON HEALTH IN CANADA

Climate change is the biggest global health threat of the 21st century.

— Lancet¹

IMPACTS ON AVAILABILITY OF TRADITIONAL FOODS² AND MENTAL HEALTH³ IN THE NORTH

Due to arctic warming (3x Global Rate)⁴.



DISPLACEMENT

Climate change-exacerbated drought and famine was one factor in Syrian refugee crisis.²⁴

WILDFIRE-RELATED ASTHMA⁵ & EVACUATION

Healthcare facilities evacuated:

- Fort McMurray: 105 patients^{6,7}
 - Interior BC 2017: 880 patients^{8,9}
- Anxiety & PTSD following evacuation.¹⁰

FLOOD-RELATED DEATHS AND DAMAGE

- 2013 Alberta flood¹¹:
- 5 deaths¹²
- Healthcare facilities closed due to flooding.¹³

DROUGHTS^{14,15}

Uneven impact on crops.¹⁶
Socioeconomic stress.¹⁷

ALLERGIES

Increased severity & duration of pollen seasons.¹⁸

TICK-BORNE DISEASE

2017: 3x higher rate Lyme Disease in Ontario than 2012-2016 average.¹⁹

HEAT-RELATED ILLNESS²⁰

66 people died in Montreal during 2018 heat wave.^{21,22}

RELOCATION & STRESS FROM COASTAL EROSION

P.E.I. homes at risk.²³

ASSOCIATION
MÉDICALE
CANADIENNE



CANADIAN
MEDICAL
ASSOCIATION

1-Costello, The Lancet, 2009; 2-Rosol R, IJCH, 2016; 3-Cunsolo A, Ellis N, Nature CC 2018; 4-Canada's Changing Climate 2019; 5-Yao J et al, 2016; 6-Hampshire, G, CBC 2016; 7-Kirchmeier-Young M 2017; 8-BC Int Health 2017; 9-Kirchmeier-Young M et al, Am Geo Un, 2018; 10-Alberta Health, 2016; 11-Teufel B et al 2017; 12-CBC Alberta Flood 2013; 13-United Nurses of Alberta 2013; 14-Yusa A, et al, Int J Env Res P H, 2015; 15- Smoyer-Tomic KE, et al. Ecohealth 2004; 16- Agriculture and Agri-Food Canada, 2015; 17-Cryderman K, 2018; 18- Ziska LH, The Lancet PH 2019; 19- Neider MP, 2018; 20-Howard, C et al. The Lancet Countdown Policy Brief for Canada 2018; 21-Montreal PH, 2019; 22- Vogel MM et al, Am Geo Union, 2019; 23-Fenech, A, 2014; 24-Kelley, C, et al, 2015



The 2021 BC heat dome was the single deadliest weather event in Canadian history with over 600 deaths



Housing & food are social determinants of health. The climate crisis is deepening housing and food insecurity.

Climate change is escalating infectious diseases & increasing antibiotic resistance

- Climate change may **aggravate nearly 60% of all human pathogenic diseases**
- Risks of **Lyme, West Nile, pandemics** such as COVID, & more, have already increased [Source: Health Canada]
- Ontario may be at risk for **malaria, yellow fever, Zika** & more in near future [Source: Cdn Public Health Assn]

Climate change impacts mental health – disproportionately among youth

Canadian study post Fort McMurray fires:

- Depression, addictions, suicide

Global Study of 10,000 Youth:

- Climate anxiety affects daily life & functioning ~45%
- Hesitant to have children ~40%
- **Governments betray current & future generations ~60%**

Air pollution Related Deaths & Health Costs

Total premature deaths globally due to air pollution:

6.7 million / year (impact > US\$5 trillion in 2013)

Ref: WHO 2022

15 300 premature Canadian deaths annually

(impact \$114 billion nationally)

6600 premature Ontarian deaths annually

(impact \$49 billion provincially)

Ref: Govt of Canada 2022 (2016 stats)

The health harms of air pollution



Skin ageing



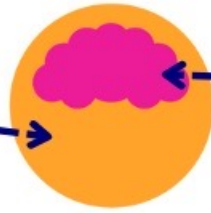
Lung diseases
Asthma
Lung cancer
Lung development
Pneumonia



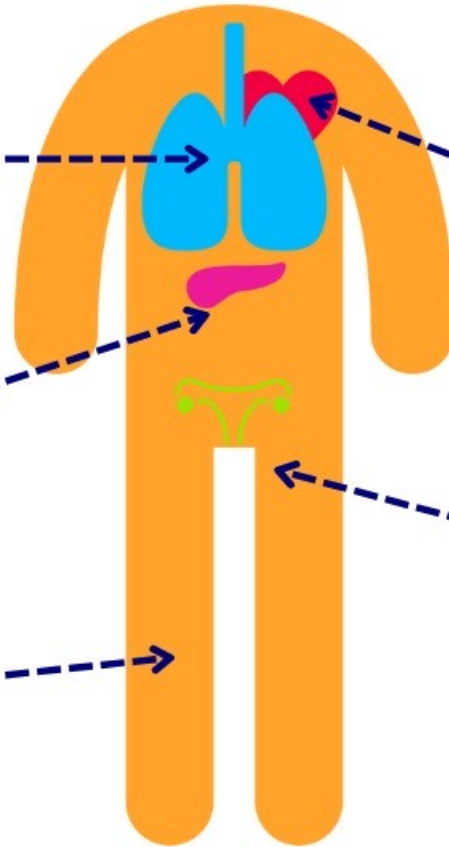
Insulin resistance
and diabetes



Blood clots



Stroke
Brain development
Mental health
Dementia



Heart disease
High blood pressure



Premature birth
Low birthweight
Decreased sperm quality
Illness during pregnancy



Air Pollution Causes Multiple Types of Cancer

- ▶ Lung
- ▶ Leukemia
- ▶ Breast
- ▶ Other



Air Pollution Risks to Pregnant Women & Infants

- ▶ Low birth weight
- ▶ Premature births
- ▶ Still births
- ▶ Birth defects



Air Pollution impacts Mental Health Independently of Climate Change

- ▶ Anxiety
- ▶ Depression
- ▶ Stress
- ▶ Suicide

Review > [Environ Sci Pollut Res Int.](#) 2021 Feb;28(8):9029-9049.

doi: 10.1007/s11356-021-12357-3. Epub 2021 Jan 22.

Association between particulate matter air pollution and risk of depression and suicide: a systematic review and meta-analysis

Qisijing Liu #¹, Wanzhou Wang #¹, Xuelin Gu #¹, Furong Deng¹, Xueqin Wang²,

Huiling Li³, Yixian Gu¹, Guojun Wang⁴

▶ Recent research shows air pollution is increasing antibiotic resistance

- ▶ every 10% rise in PM 2.5 increases antibiotic resistance by 1.1% → By 2050 could lead to 840,000 premature deaths annually unless air pollution is curbed





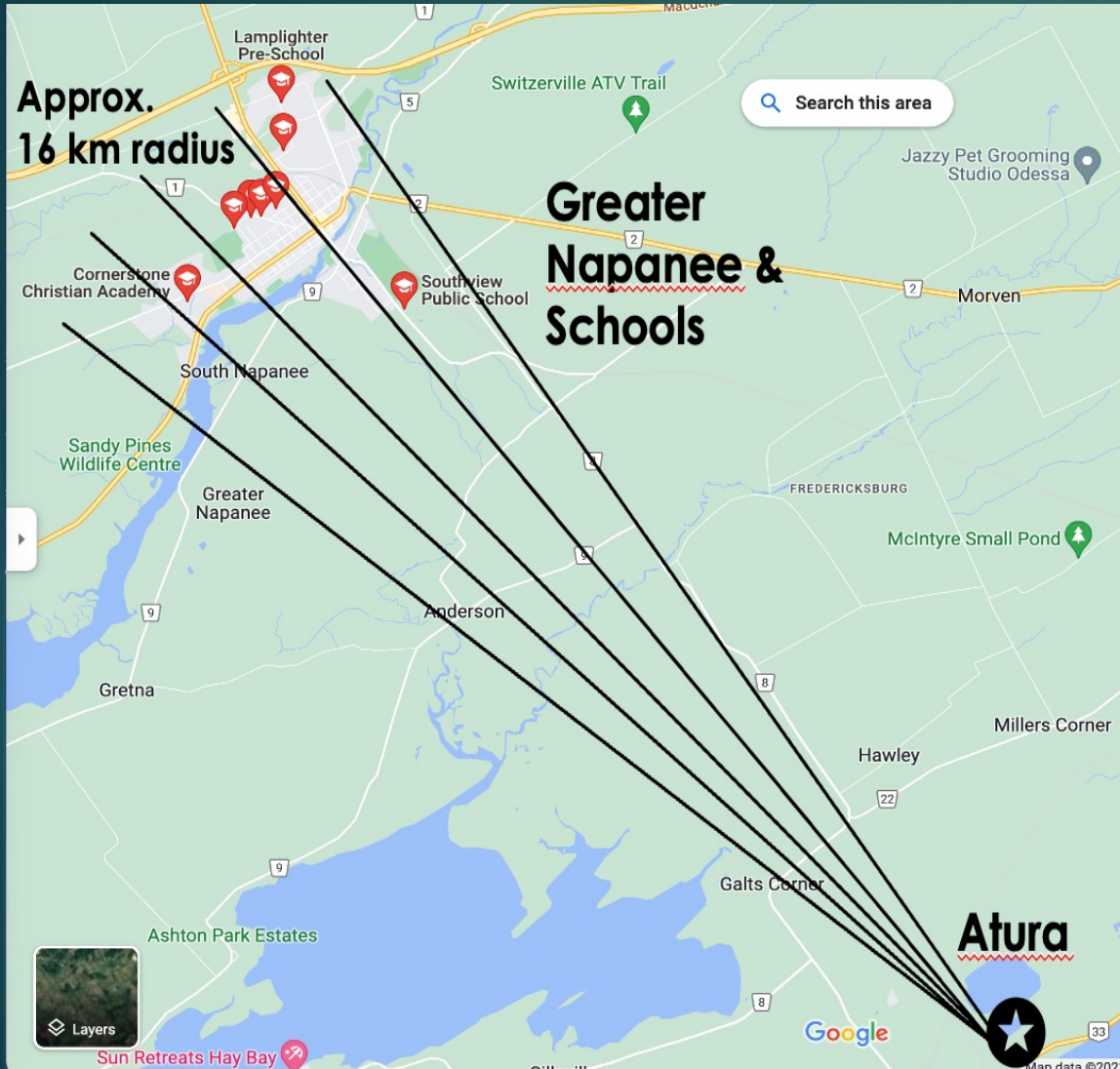
People living near gas plants have increased health risks such as:

- emergency room visits by the elderly
- preterm deliveries for pregnant women
- restricted activity days
- chronic bronchitis

Data is limited & still being validated, but modelling of 2019 health impacts for gas-fired electricity for Toronto estimates:

- 286 new asthma cases in children & 1319 children (total) suffering asthma due to gas pollution exposure
- 9696 sick leave days amongst workers
- 215 premature deaths causing 3419 years of life lost

What is a safe distance to live from a gas plant?



- More research is needed: very few studies & many unknowns
- Some studies showed health impacts within a 20 km radius but there is no strict definition → Greater Napanee approx. 12-16 km
- US EPA: “Because pollution can travel over long distances from a power plant, the impacts ... can be felt many miles away ... the air quality in a community can be due to far-distant sources as well as those sited within a community.”
- Renewable energy (wind, solar, hydro) do not carry the health risks posed by gas-fired electricity

There are better solutions...renewables will protect human health, save lives & money

- While the volatile cost of gas has hit record highs & is projected to keep rising, renewables recently became the cheapest energy sources globally and will become even cheaper with larger scale uptake
- Investment in the green energy sector may generate several times more jobs than equal investment in gas, and will attract more future investment from businesses increasingly seeking a clean energy base
- Many jurisdictions worldwide have transitioned to large scale renewables without significant brownouts using an energy mix, conservation, storage, & smart grid management eg Germany~47% national energy grid renewable & Denmark ~61%
- **Renewables will save the massive costs of fossils induced human health & public infrastructure damage (eg \$50 billion annually due to air pollution related deaths)**





“We are running out of time...We are the last generation that has the opportunity to make the changes needed to avoid catastrophic climate change. Climate change must be treated like the public health emergency that it is.”

Our response to climate change can also be “the greatest health opportunity of this century”

- Cdn Public Health Assn.

Thank you