



**Canadian Nuclear Workers' Council**  
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## **COP26: Exploring Climate Actions. Decarbonizing Ontario's summertime hot water heating would require a new nuclear plant larger than Darlington.**

As Global leaders gather in Glasgow for COP26, we should all turn our minds to how human activity is harming our planet and how we can implement actions to counter that. Most scenarios for deep decarbonization involve a significant amount of electrification across sectors of our economy. The scale of the task is daunting and requires international collaboration with the involvement of governments, industry and social society.

We urgently need updated demand forecasting with proactive consideration for impending electrification. At the same time we will need reliable, emissions-free sources of electricity. Planning for that new electricity supply needs to start immediately.

Canada's Nuclear Workforce has decades of experience with nuclear energy and know that nuclear energy offers significant benefits for all of us and will be required to achieve a net-zero future. The Canadian Nuclear Workers' Council (CNWC), our Member Unions and our International Network would like to share our experience and participate in the discussion.

To help put the scale of what's required for electrification into perspective we've looked at one specific opportunity for electrification---the use of natural gas in the province of Ontario. Data analysis finds that decarbonizing gas-fired hot water heating in the summertime in Ontario would require a new generating station larger than the 3,500 MW Darlington Nuclear Generating Station (four 875 MW CANDU Reactors). Even in the sweltering heat of summer Ontario uses enough natural gas for domestic use and commercial hot water heating that replacing it would require more than 4,500 MW of electric power generation. You could think of that energy demand as the 'baseload' of natural gas usage in Ontario through the year.

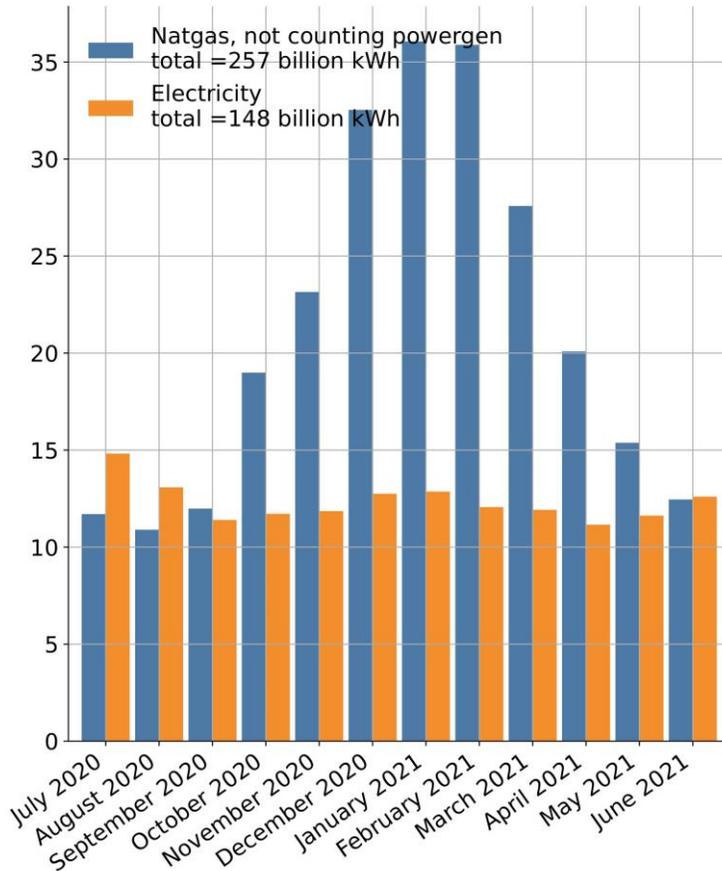
That 4,500 MW does not include industrial gas usage. In the heat of summer, Ontario industry uses more than twice as much gas as all homes and commercial enterprises do combined. This means Ontario would need more than 14,000 MW of generation capacity to electrify the minimum heating demand that is currently met with gas.

"Think about what this means," says Bob Walker, National Director of the Canadian Nuclear Workers' Council. "By going after the lowest hanging fruit---by transitioning from natural gas to electricity for hot water heating---Ontario could cut more than 8.5 million tonnes of greenhouse gas emissions every year. That's just by electrifying the minimum amount of residential and commercial gas we use throughout the year. If we went after industrial heating on top of that, we're looking at reductions of tens of millions of tonnes of greenhouse gas emissions annually."

“It makes the argument more powerful,” according to Dr. Michael Ivanco, past President of the Society of Professional Engineers and Associates. “Such an act alone, replacing gas powered hot water heating in Ontario with nuclear generated electricity hot water heating, would reduce Canada's greenhouse gas emissions by almost 3%.”

### Ontario monthly energy, billion kWh Natural gas v Electricity

sources: 1. Independent Electricity System Operator  
2. Statistics Canada. Table 25-10-0055-01 Supply and disposition of natural gas



But Walker cautions that the source of the electricity makes all the difference. "If the electricity comes from burning fossil fuels, then we don't reduce GHG emissions. In fact they go up." The only generation that makes sense in a decarbonization-by-electrification scenario is zero-emitting generation. "Our only reliable alternative is nuclear. It's the only source that is available 24 hours a day regardless of weather."

The analysis was conducted in the course of producing the [CNWC's Electrification Policy Paper Series](#), which seeks to map the fastest and most economy friendly route to electrifying, and decarbonizing, personal and commercial transport, heavy applications like construction and steelmaking, and other lighter urban applications. Heating---by residences, commercial entities, and industry---represents the single largest energy use category in Ontario, by far. Natural gas usage alone accounted for over 257 billion kilowatt hours last year. Next biggest is transportation, which utilizes upward of 200 billion kWh per year. Electricity generation, at over

140 billion kWh, is a distant third.

"When we reviewed the data, which is publicly available from Statistics Canada, it supported our thinking but I was still surprised." says Walker. "For years we've been making the case for the construction of new nuclear generation. We've always known we would need more generation capacity but I thought in terms of a new Darlington NGS. The data clearly tells us we will need many thousands of megawatts just to meet minimum demand."

Meanwhile the Pickering NGS is expected to cease commercial operations in 2025 which will remove 3,100 MW of clean energy from the Ontario grid.

The truly exciting thing is, we already know where this extra nuclear capacity could go. "Darlington has an Environmental Assessment and Site Preparation Licence from the CNSC (Canadian Nuclear Safety Commission) for another 4,800 MW. Pickering is currently licensed for over 3,000 MW. Both those sites are connected to the grid. This connection to the grid is also true for Nanticoke which until 2014 was the site of a 4,000 MW coal-fired plant. And at one point, Bruce Power was advocating for a Bruce C nuclear plant. We have more than enough physical space at existing facilities to accommodate at least twice our existing nuclear capacity," says Walker.

Of course, it's more than just a matter of snapping fingers and making it all happen. It will take long-term planning and approval from the Government of Ontario. Two CNWC major employers, Bruce Power and Ontario Power Generation, would have to be on board and, most importantly, the citizens of Ontario would have to support it.

To get that support, the expert organizations in our sector need to work the numbers. Those organizations include the Ministry of Energy, IESO, OEB, Hydro One, the Local Distribution Companies (LDCs), and of course the gas distributors. Howard Phorson of the Power Workers' Union (PWU) points to the [Electrification Pathways Report](#) the PWU recently commissioned which looked at the overall implications of electrification and demand. "Ontario faces an electricity supply shortage and reliability risks in the next four to eight years," says Phorson. "The report is clear: we will not meet our net-zero objectives without building new nuclear generation starting as soon as possible."

"No projection of electricity demand has really zeroed in on details such as baseload hot water heating demand," says Walker. "Nobody has talked about gas baseload as a portion of energy demand that electricity is perfectly capable of meeting. All parties would really need to have a serious look at this data. The utilities and reactor vendors would have to seriously look at the cost of meeting that minimum demand. It would have to cost close to what it costs homes and businesses today to heat with gas. Otherwise people won't switch to electricity."

The last point is critical. The electric generation capacity that delivers these minimum 4,500 MW has to do that at a price that is comparable to what consumers pay today for gas. That price has to cover the capital and operating costs of the generation. If this minimum heating portion was earmarked to be zero emitting energy then it would be a matter of who can provide that at the most reasonable cost.

Why would the gas distributors be included? "They're the ones who have this business today," says Walker. "We fully expect they'd be part of any consortium that decarbonizes not only the portion under discussion, but eventually all heating. They're the true experts, they've been serving all customer segments in the heating business, for decades. There's no way they can't be involved in electrifying."

Walker points out that there's a huge precedent for a major fossil industry player becoming directly involved in large scale zero emitting power generation. "Bruce Power is the result of an oil and gas transportation company, TransCanada (now TC Energy), joining a partnership with a pension fund and two labour unions to finance and then operate the biggest nuclear plant in North America. It's totally feasible that a fossil fuel company would play a pivotal role in electrification. That's where it's all going anyway. They'd just be ahead of the curve."

The biggest bang for the buck when it comes to reducing GHG emissions would be to replace the coal fired generation in Alberta, Saskatchewan and Nova Scotia with nuclear. "That would save you around 60 to 70 million tonnes of GHG emissions annually," says Dr. Ivanco. "Alberta's ~7,000 MW electrical baseload, all currently met with fossil, could be decarbonized with 10 CANDU EC6 Reactors." But that's for a later story.

The CNWC Electrification Policy series can be found at <https://cnwc-cctn.ca/introducing-the-cnwc-electrification-policy-paper-series/>

The Power Workers' Union commissioned study of electrification implications can be found at <https://www.pwu.ca/submissions/electrification-pathways-report/>.

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### **About the Canadian Nuclear Workers' Council**

The CNWC has been the collective voice of Unionized Workers across Canada's Nuclear Industry since 1993. Our Member Unions represent Workers in uranium mines and mills, nuclear fuel fabrication, nuclear power plant (NPP) operation and maintenance, NPP construction and refurbishment, engineering, medical isotope production, nuclear research and development, nuclear waste management and decommissioning.

*Nuclear power is a proven, safe, reliable and non-GHG emitting source of electricity that will serve a vital role in our net-zero future.*