

December 8, 2025

Executive Committee  
City of Toronto  
100 Queen Street West  
Toronto, Ontario M5H 2N2

**Re. EX28.5 Progress and Priorities for Enhancing Toronto's Climate Resilience**

Dear Members of the Executive Committee,

**About the Boltzmann institute**

This submission is on behalf of the Boltzmann Institute, a federally incorporated Toronto- and Ottawa-based think tank concerned to help reduce harmful emissions from human energy use through research and education ([bi-ib.ca](http://bi-ib.ca)). Our present primary focus is reducing emissions from building operations, chiefly space heating. This is the main source of greenhouse gas (GHG) and other emissions in many parts of Canada, including Toronto and the rest of the GTHA, now and perhaps for several decades to come.

**We support the recommendations in Item EX28.5, and offer one amendment**

There is much that is commendable in the proposed Climate Change Resilience Workplan. We support adoption of the recommendations within the report before you and offer an amendment – set out below – that we hope you will also adopt.

**We nevertheless have a basic concern about the Workplan**

Our fundamental concern is that the Workplan's author, Sustainability Solutions Group (SSG), has minimized the future risks from cold weather, particularly the risk of failure of the electrical grid through widespread use of air source heat pumps (ASHPs) for space heating.

**How and why the Workplan may have minimized resilience issues during cold weather**

This minimization appears to have happened for two reasons:

- Through use of an extreme global GHG emissions scenario – the IPCC's SSP5-8.5 – now widely regarded as implausible, SSG may well have underestimated the future likelihood of cold weather events. We agree with the Workplan's stronger emphasis on preparing for higher temperatures, but risks from cold weather, such as is happening here this week, should not be minimized, especially when use of ASHPs is being promoted by the City, as we shall explain.
- The Workplan's author, SSG, perhaps out of respect for its client, the City of Toronto, has accepted the flawed premises of TransformTO. **We believe that TransformTO, through its advocacy of deployment of ASHPs and its emphasis on extreme building retrofits, could cause some of Toronto's major climate-related risks and resilience deficiencies.**

### **How TransformTO is deeply flawed as it concerns space heating**

We believe this part of TransformTO is so flawed that, if implemented, it will cause *increases* in fossil fuel use and consequent worsening of Toronto's contribution to climate change. It could also worsen Toronto's housing predicament and cause *decreases* in Toronto's resilience. Here's how these things could happen:

- TransformTO promotes widespread electrification of space heating mostly using ASHPs. As used, and as are likely to be used, ASHPs are about as inefficient as resistive heating using baseboard heaters when the outside temperature falls much below -8°C (as it happens to be in Toronto at the time of writing). If the approximately 70% of Ontario's building space now heated by natural gas were to be heated by ASHPs, demand on the province's electricity grid would rise threefold – and even more with simultaneous consumption by electric vehicles and data centres. Reinforcing the grid to accommodate such increases, beyond what is planned, would cost hundreds of billions of dollars that would likely be recouped through much higher electricity rates.
- An often-proposed way of compensating for ASHPs' poor performance in cold weather is use of auxiliary natural gas for heating, which may not help progress towards net-zero.
- Without (unaffordable) investment to massively reinforce the grid, widespread deployment of electrified heating could well precipitate grid failure during very cold weather. Essential uses of electricity would be curtailed, in some cases dangerously. Toronto would become a much less resilient city.
- TransformTO, perhaps in recognition of potential massive increases in electricity prices, has set a target of reducing space heating demand by 75%. But the City's own estimates suggest this would cost an average of over \$200,000 per house and over \$100,000 per apartment. Experience elsewhere suggests that reductions in heat demand of anywhere near 75% can rarely be achieved. Reductions from deep retrofitting are usually in the order of 10-20%, with community-wide reductions of no more than 1% annually even when subsidies of 110% are available (i.e., property-owners are paid to retrofit, as has been the case in Italy). High retrofit and/or high electricity costs would do little to make housing more affordable.
- At least until 2040 in Ontario, replacing natural-gas heating with electrified heating will cause an *increase* in GHG and other emissions. This is because (a) almost all electricity generation at the margin in cold winter weather will be from natural gas; and (b) generation of electricity from natural gas and use of that electricity for heating is usually less efficient than using natural gas directly for heating.

### **Where to go for elaboration of the above**

The Boltzmann Institute completed its *Two Pathways* project in mid-2025, mostly funded by the federal government, with results that elaborate all the above. A video on the project and numerous written reports, totalling more than 1,500 pages, are available at [link](#).

**How net zero for space heating can be assured – and funded**

The results of the *Two Pathways* project show how net-zero for space heating can be assured in a way that enhances Toronto's resilience. It would be to deploy thermal networks that provide hot water from non-carbon sources to almost every building in Toronto. Establishing a new utility of this kind could be extremely attractive to patient public- and private-sector investors. Chapter 9 of the project's main report shows how, within current Ontario legislation, Toronto could go about raising the billions of dollars that could be needed to establish the required thermal network(s) that would be jointly owned by the City and one or more funders.

**Two contrary items and a resolution**

All these matters were presented to the Infrastructure and Environment Committee on December 5 as a submission in respect of IE26.3 (TransformTO Net Zero Strategy: Action Plan 2026-2030). They did not seem to have been given due attention, which may be understandable in view of the sheer volume and lateness of the material before the Committee. As a consequence, City Council will have before it later this month two contrary items: EX28.5, which seeks to make Toronto more resilient, and IE26.5, which could well have the opposite effect, at least in respect of space heating, Toronto's main source of emissions. This somewhat embarrassing matter could be resolved by – at the Council meeting later this month – having the whole of Item IE26.3 referred back to the I&E Committee for a further report and for further consideration.

**Suggested wording for an amendment to EX28.5's recommendations**

That, in order to ensure compatibility with the proposed Climate Change Resilience Workplan, the Executive Committee recommends that City Council at its December 2025 meeting refer Item IE26.3 (TransformTO Net Zero Strategy: Action Plan 2026-2030) back to the Infrastructure and Environment Committee, and that the Executive Director, Environment, Climate and Forestry, report to the I&E Committee for its April 2026 meeting on the possibility that the effect of implementation of the space heating part of TransformTO could be such as to worsen climate change and reduce Toronto's resilience, and on how this might be remedied.

Richard Gilbert  
Chair, Board of Directors  
[rgilbert@bi-ib.ca](mailto:rgilbert@bi-ib.ca)

Martin Green  
Director and Treasurer  
[mgreen@bi-ib.ca](mailto:mgreen@bi-ib.ca)

The Boltzmann Institute  
1106-297 College Street  
Toronto, Ontario M5T 0C2  
416 923 8839 [www.bi-ib.ca](http://www.bi-ib.ca)