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SUSTAINABILITY COMMITTEE REPORT

INTRODUCTION by Ian Duncan of CIQS

The following is an editorial was prepared by Arif Ghaffur Bsc.(Hons) PQS(f) FRICS MCIarb.

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When I read this article, in the recent publication, it really defined what I believe will be the effects of global warning on Canada and it cried out to be shared.

When I asked Arif if he would allow me to share his thoughts with PAQS members he whole heartedly, gave me his consent without reservation.

Global Warning, Climate Change & Construction

Study Findings

A scientific study, "*Canada's Changing Climate Report 2019*" (https://changingclimate.ca/CCCR2019) indicates that Canada, on average, is warming at a rate that is two times faster than that compared to the rest of the world. In addition, many of the present effects as a result of climate change are seen as probably irreversible. Some interesting and perhaps alarming aspects include:

- Changes are already evident in many parts of the country and are projected to intensify.
- Canada's Arctic has seen the deepest impact and will continue to warm at more than double the global rate.
- Canada's annual average temperature has warmed by an estimated 1.7C since being first recorded in 1948.
- The largest temperature increases have been seen in the North, the Prairies, and in northern British Columbia.
- Annual average temperature in northern Canada have increased by approximately 2.3C.

In terms of the debate on how much humans are to blame, the report states that *"While both human activities and natural variations in the climate have contributed to the observed warming in Canada, the human factor is dominant"* and also that *"It is likely that more than half of the observed warming in Canada is due to the influence of human activities."*

Impacts & Consequences

The effects of global warming on Canada's environment include more extreme weather. Hotter temperatures could mean more heat waves, which can possibly result in higher risks of wildfires and droughts in some parts of the country. Oceans are expected to become more acidic and less oxygenated, which could harm marine life.

Parts of Canada's Arctic Ocean are projected to have extensive ice-free periods during summer within a few decades. A rise in sea levels could also increase the risk of coastal flooding and more intense rainfall could cause problems with flooding in urban centres.

Causes & Concerns

Canada's rapid warming is due to a number of factors, some of which include the decline of snow and sea ice. According to the study, this decline has caused greater surface warming as there is an increased absorption of solar radiation.

Despite the bleak projections, the study notes that the amount of warming could be limited if global action is taken by drastically reducing "carbon emissions to near zero early in the second half of the century and [reducing] emissions of other greenhouse gases substantially".

Canada is one of nearly 200 countries that have signed on to the Paris Agreement - a single global agreement on tackling climate change that seeks to keep temperatures "well below" 2 °C above pre-industrial times and "endeavour to limit" them even more, to 1.5 °C.

The Canadian government says it will meet the Paris target of cutting emissions to 30% below 2005 levels by 2030 despite the fact that a number of official reports indicate the country being unlikely to meet its reduction targets without significant effort.

Public Opinion

Matthew J. Hoffmann, a Professor of Political Science at the University of Toronto and Co-Director of the Environmental Governance Lab told us that, like the recent Intergovernmental Panel on Climate Change report, this one underscores the warnings about the impact of climate change.

"...Civil society appears to be at a "tipping point" on the issue with public opinion moving in support of governments taking action..."

"This is yet another reaffirmation of the urgency of this problem," and that *"People are starting to feel climate change - it's starting to be part of their lived experience,"*

Civil society appears to be at a "tipping point" on the issue with public opinion moving in support of governments taking action. Mr. Hoffmann points to recent student protests in the UK, Canada and elsewhere pushing for governments to take active steps to tackle the problem.

Incentives & Carbon Tax

Whilst householders are happy to be compensated by the federal government in the form of "climate action incentive" rebates, the carbon tax has been met with the opposition Conservatives vowing to scrap it should they win federal elections in October. It is intended that the carbon tax will be added to the cost of fuel i.e. 4.4 Canadian cents per litre initially - equivalent to 20 Canadian dollars per tonne of carbon produced, more than doubling by 2022.

Government & Industry

I recall that the current government, some two years ago warned the provinces that they needed to come up with plans by April 1, 2019 setting out how they would contribute to Canada's reduction targets. The four that the government accuses of failing to introduce their own plans for tackling climate change are Ontario, Manitoba, Saskatchewan and New Brunswick.

Impact on buildings

Whilst the debate on climate change continues, what is clear is that literally everything that is built impacts structures including: embankments, buildings (residential, commercial & industrial), roads, tunnels, bridges, rail tracks, drainage systems, overhead, damns and transmission lines need to be designed for expected climate conditions which are projected to increase in frequency and intensity.

Existing Structures

Whilst there is a huge focus on the development and construction of new infrastructure, there is a genuine concern about the viability of older and existing structures that have been exposed directly and indirectly to changes in weather and may be at risk of further damage and potential catastrophic collapse causing risk to human life.

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Changing Winters

The sheer volume of water resulting from winters that are wetter and heavier downpours make it critical that rainwater and water from melting snow and ice are directed away from structures, be it residential houses, areas that are paved and/or structures of any sort.

Regardless of the controlled direction of groundwater, we will see higher water tables and an increase in the water levels in streams and watercourses. This combined with storm surges along coastlines will result in seepage and flooding, something increasingly being experienced in Canada. There will need to be a higher vigilance to the control of water ingress and flooding.

Changing Summers

Warmer summers will directly impact the durability of construction materials and affect the indoor climate of buildings with a heavier emphasis on the movement of suitable air and increase the reliance on air conditioning and ventilation. These warmer summer conditions will also increase the dry conditions required for forest fires and the inherent risk to buildings and people's lives.

Vulnerable Structures

The severe weather events and change in climate will make structures vulnerable to the ongoing changes in climate with risks of catastrophic collapse and impacts on physical and mental health. This all points to significant loss of value resulting from severe weather conditions, the reduced life of building materials and direct impacts on those living/working in buildings and or using infrastructure such as roads and bridges.

"…The debate around rebates and taxes will continue as political parties' position themselves to maximise election votes.. "

What is clear is that there will need to be regular and ongoing inspections and risk analysis of all structures with mapping of future risks of flooding and excessive heat based on experience over the last few years that are evidenced by scientific data, including weather records.

Conclusion

In summary, Canada is warming quicker than average. The effect of climate change on Canada is likely to be more severe than the majority of the rest of the world. This will have a devastating repercussions for wildlife. Although, if strenuous efforts are made to control emissions then impacts can be reduced. It is likely that there will be an increase in the movement to take active steps, particularly by those who are concerned about implications for future generations.

The debate around rebates and taxes will continue as political parties' position themselves to maximise election votes including those at the federal level. The various jurisdictions across Canada will no doubt continue to differ on what needs to be done, when, and who will pay the costs. What is clear is that almost every single structure will be impacted by climate change to some extent. Older and existing structures that may have been built based on an outdated build codes maybe at particular risk.

"…It is also evident that there will be a greater amount of ground water that will need to be managed…"

It is also evident that there will be a greater amount of ground water that will need to be managed. In conjunction, warmer weather conditions will impact buildings both internally and externally. A high level of vigilance will be required to monitor any failure of existing structures and losses resulting from damage caused by climate change. This has been witnessed by significant weather events across Canada, including forest fires in British Columbia, Alberta and extensive flooding in parts of Ontario, and Quebec. These events will no doubt lead to insurers having to respond to claims and as a result premiums coming under upward pressure.

"…taxes levied on the cost of production…will translate into additional construction costs…"

For construction economists such as Quantity Surveyors, this means that they will be involved in the process of estimating and administrating the increased expenditure on enhancement work to existing structures and new build required to ensure buildings are able to withstand climatic change. Further, any taxes levied on the cost of production (carbon tax) will translate into additional construction costs that will impact budgets and final costs. During construction climatic "events" such as, adverse/inclement weather will result in delays and disruption with potential additional costs adding pressure to project budgets.

I thank you for your support and contribution to the Construction Economist, and sincerely wish you and your families are having a wonderful Summer. If you have feedback, suggestions, and of course any articles that you would like to be considered for publication, please email: editor@ciqs.org.

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