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September 12, 2025

Regarding the Network for Greening the Financial System's (NGFS) Issues with New Climate Damage Function - An Open Letter to the Office of the Superintendent of Financial Services

Cc:

Bank for International Settlements

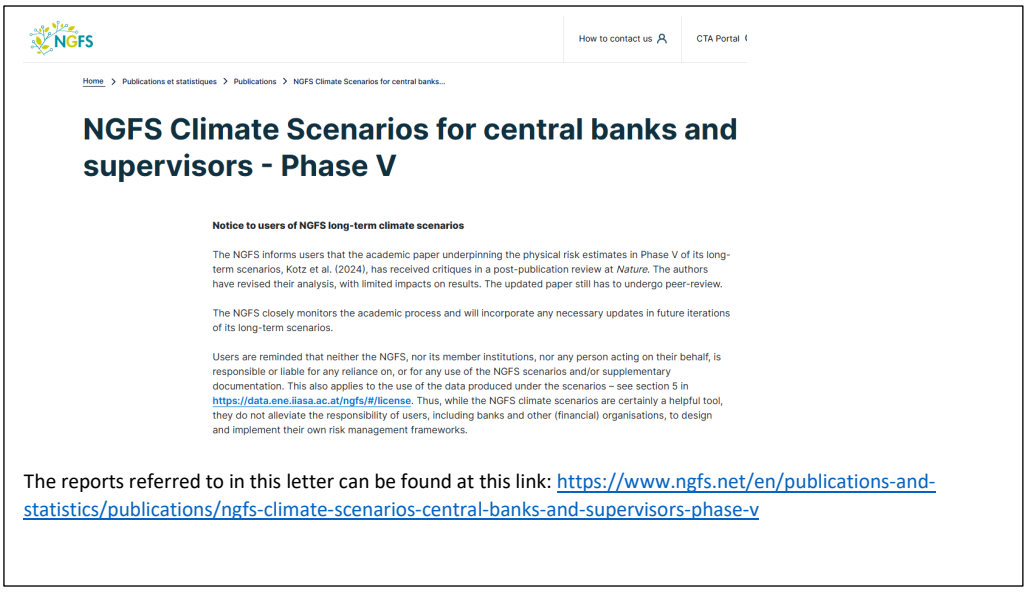
BIS email address: email@bis.org

Bank of Canada
Canadian Securities Administrators - CSA
Alberta Securities Commission
AIMCo
The Honorable Daniel Smith, Premier of Alberta
The Honorable Scott Moe, Premier of Saskatchewan
Toronto Stock Exchange
CSSB
Business Council of Canada

ATTN: Peter Routledge, Superintendent

Dear Superintendent Routledge,

A recent report by climate policy analyst Roger Pielke, Jr., reveals that the 2024 selection of the "climate damage" function by the Network for Greening the Financial System, drawn from the paper by Kotz et al (2024), is deeply flawed and not fit for purpose. A subsequent report by Jessica Weinkle finds that the Kotz et al paper appears to have significant conflicts of interest as well. On Aug. 22, 2025, NGFS posted a note that the users of NGFS scenarios bear the responsibility for use of the NGFS scenarios.


NGFS

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NGFS Climate Scenarios for central banks and supervisors - Phase V

Notice to users of NGFS long-term climate scenarios

The NGFS informs users that the academic paper underpinning the physical risk estimates in Phase V of its long-term scenarios, Kotz et al. (2024), has received critiques in a post-publication review at *Nature*. The authors have revised their analysis, with limited impacts on results. The updated paper still has to undergo peer-review.

The NGFS closely monitors the academic process and will incorporate any necessary updates in future iterations of its long-term scenarios.

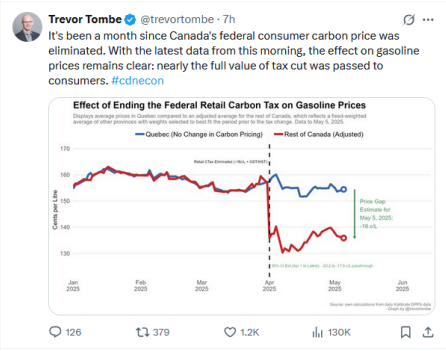
Users are reminded that neither the NGFS, nor its member institutions, nor any person acting on their behalf, is responsible or liable for any reliance on, or for any use of the NGFS scenarios and/or supplementary documentation. This also applies to the use of the data produced under the scenarios – see section 5 in https://data.ene.iiasa.ac.at/ngfs/#/license. Thus, while the NGFS climate scenarios are certainly a helpful tool, they do not alleviate the responsibility of users, including banks and other (financial) organisations, to design and implement their own risk management frameworks.

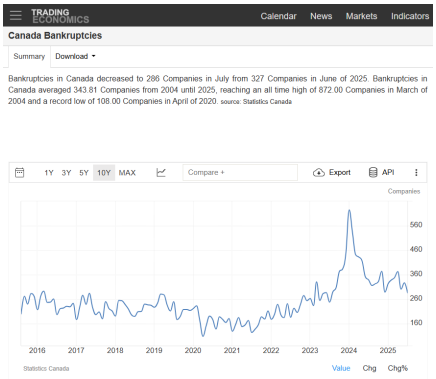
The reports referred to in this letter can be found at this link: https://www.ngfs.net/en/publications-and-statistics/publications/ngfs-climate-scenarios-central-banks-and-supervisors-phase-v

The use or misuse of climate damage functions will have significant socio-economic impacts on society, especially if stemming from the banking/finance sector which, in turn, affects all aspects of modern life. As per Neumann et al (2020) "Climate damage functions are also the basis of the modeling (e.g., Nordhaus 2010; Anthoff and Tol 2013; Hope 2013) that supports estimates of the social cost of carbon (National Academies of Sciences, Engineering, and Medicine 2017)."[1]

Thus, the carbon tax price is founded in climate damage functions. A wildly exaggerated climate damage function will result in a wildly exaggerated price on carbon – or carbon tax – that is not warranted.

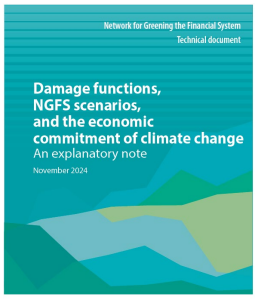
As you are aware, in Canada, the reduction of the consumer-facing carbon tax from its high point of \$80/ tonne CO_2e to zero, as enacted by incoming Prime Minister Mark Carney,[2] had an almost immediate benefit of reduction in costs across the Canadian economy.[3] Inflation dropped 1.7% and, *"As the divisive carbon tax ended, gasoline prices took a nosedive, dropping 18.1 per cent in April compared to a year earlier. Natural gas prices fell 14.1 per cent during the same period, StatsCan noted."* These are significant reductions in costs for Canadians, who live in the second largest country in the world, challenged by vast distances to travel for work, the necessity of access to reliable, affordable energy to heat homes and businesses in times of extreme cold, and the unfortunate fact that most of our food is imported and transported to and fro by train and truck. As Prof. Sylvain Charlebois (The Food Professor) and colleagues ascertained, food prices are directly and indirectly affected by the carbon tax, largely related to transportation costs.[4] In Charlebois' work, he indicates that carbon pricing did reduce greenhouse gas emissions. However, we note that coincident to that time of rising carbon prices, there was a rapid rise in bankruptcies in Canada, in part, due to COVID lockdowns, in part due to inflation; no one has parsed out to what extent the "emissions reduction" was due to bankruptcy and which were due to the carbon tax burden.





[1] https://www.journals.uchicago.edu/doi/10.1093/reep/rez021
[2] https://nationalpost.com/news/canada/mark-carney-rid-of-carbon-tax
[3] https://www.cbc.ca/news/business/inflation-consumer-price-index-april-1.7538823
[4] https://www.sciencedirect.com/science/article/pii/S2590198224002574

Thus, we return to the issue of the NGFS choice of Kotz et al (2024) as the 'climate damage function' for modelling climate risk.



The new damage function proposed by Kotz *et al.* (2024) projects much higher global losses than those foreseen under the old damage function (Kalkuhl & Wenz, 2020). When evaluating the projected global losses using the updated damage function versus the old one within the NGFS scenarios for the year 2050, we can find an increase of 5 to 9 percentage points. More precisely, under the Current Policies scenario, the loss is 5% using the old function, but climbs to 15% with the new one. Meanwhile, for a Net Zero 2050 scenario, the projected losses would rise from 2% to 7% upon switching damage functions. These revisions stem from two elements: (i) the novel features of the new damage function (see Annex 4) and (ii) a change in modelling assumptions (see Annex 1). In previous vintages, NGFS scenarios employed a "high damage" calibration of the damage function instead of median projections (alongside high temperature percentiles for the most disorderly scenarios). This assumption was justified, as the Kalkuhl & Wenz (2020) damage function produced rather modest loss estimates compared to other estimates available in the literature. Since the Kotz *et al.* (2024) paper produces loss projections whose magnitude is in the upper end of the range according to the literature, there is a strong case for adjusting previous modelling assumptions and using median estimates instead, for both damage and temperatures.

Table 3 **Damage estimates across damage functions**

Study	Impact at 2 °C global warming (Current Policies in 2050[1])	Impact at 3 °C global warming (Current Policies in 2100[2])
Nordhaus & Boyer (2000)	1%	2%
Tol (2009)	1%	3%
Weitzman (2012)	1%	3%
Dell *et al.* (2012)	4%	22%
Tol (2014)	1%	2%
Nordhaus (2014)	1%	2%
Dietz & Stern (2015)	2%	13%
Burke *et al.* (2015)	8%	14%
Howard & Sterner (2017)	3%	8%
Kompas (2018)	1%	2%
Kalkuhl & Wenz (2020)	2%	5%
Kahn *et al.* (2021)	3%	8%
Waidelich *et al.* (2024)	4%	8%
Bilal & Känzig (2024)	19%	44%
Kotz *et al.* (2024)	14%	33%

1 Using RCP8.5, the most severe of the seven Representative Concentration Pathways (RCPs) presented in the IPCC's Fifth Assessment Report, global warming will reach 2.3 °C in its median estimate by mid-century. Even when using the 95th percentile of the temperature distribution of RCP8.5, global warming reaches 2.9 °C by 2050.

2 Global warming projections according to Global Change Assessment Model (GCAM) 6.0 in Phase V of the NGFS Scenarios.

Note: Damage estimates relative to a baseline without further climate change. The percentages shown in Table 3 are based on our own calculations and may deviate from the loss projections shared in the original studies. These calculations have been made to allow for a high-level comparison of severity levels across damage functions in which assumptions are aligned across projections. Further information on these calculations can be found in Annex 2.

The table above of damage estimates across damage function, shows the astounding leap in impact, that should have been a clue that the Kotz et al formula was flawed. Indeed, Pielke, Jr. reports that within weeks of publication of Kotz et al (2024) there were statements of concern made known to the publisher, *Nature*. Also note in the footnotes of the table above, that the implausible scenario Representative Concentration Pathway RCP 8.5 is referenced, when this has been known to be an outlier for several years now. We have written you letters about the misuse of this scenario in the past.

By contrast, the recent climate science report issued by the US Department of Energy, "A Critical Review of Impacts of Greenhouse Gas Emissions on the U.S. Climate" holds a far more nuanced view of the impact of carbon dioxide on the economy.

11 CLIMATE CHANGE, THE ECONOMY, AND THE SOCIAL COST OF CARBON

Chapter summary

Economists have long considered climate a relatively unimportant factor in economic growth, a view echoed by the IPCC itself in AR5. Mainstream climate economics has recognized that CO_2-induced warming might have some negative economic effects, but they are too small to justify aggressive abatement policy and that trying to "stop" or cap global warming even at levels well above the Paris target would be worse than doing nothing. An influential study in 2012 suggested that global warming would harm growth in poor countries, but the finding has subsequently been found not to be robust. Studies that take full account of modeling uncertainties either find no evidence of a negative effect on global growth from CO_2 emissions or find poor countries as likely to benefit as rich countries.

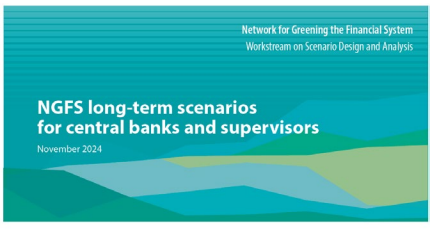
Another excerpt reads:

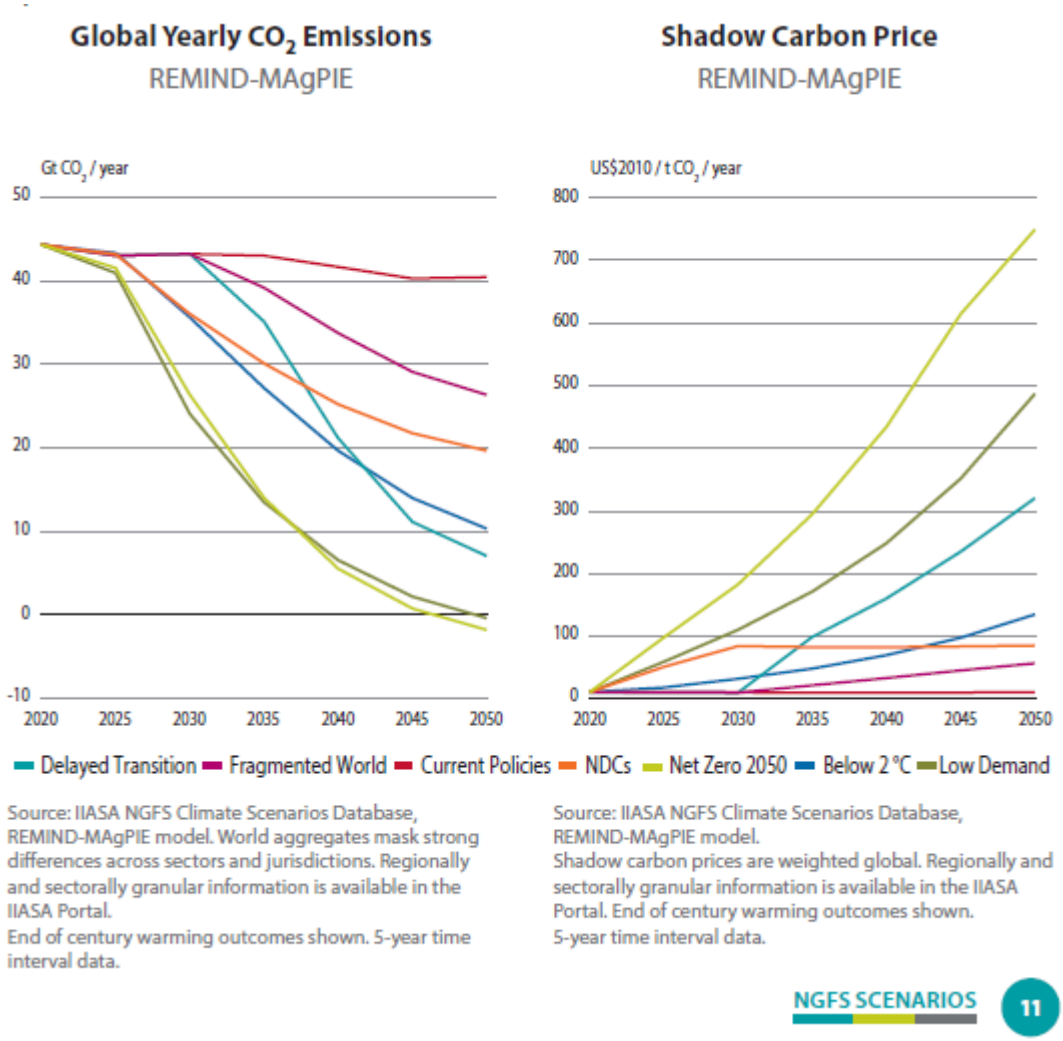
Thirty years later virtually the identical point was made by the IPCC itself in the Fifth Assessment Report (Arent *et al.* 2014, emphasis added)

> **For most economic sectors, the impact of climate change will be small relative to the impacts of other drivers.** Changes in population, age, income, technology, relative prices, lifestyle, regulation, governance, and many other aspects of socioeconomic development will have an impact on the supply and demand of economic goods and services that is large relative to the impact of climate change.

As the USA is our largest trading partner, surely all of our financial institutions should be seeking to find alignment with policies that reflect those of our neighbour and that will benefit trade between our nations, not impair trade or competitiveness.

Unfortunately, the NGFS interprets the worst-case scenario impact of climate damage as being significant, with a potential shadow carbon price of upwards of USD $800/t CO_2eq.





Based on the above scenarios, it appears that to reach Net Zero 2050, the NGFS group suggests that the price on carbon must rise to something like $800 dollars, or TEN TIMES what the carbon price was in Canada, at the time that Prime Minister Carney dropped the price back to zero. Imagine the destructive impact on the economy!

Further, Neumann et al (2020) state: “A climate damage function is a simplified expression of economic damages (which theoretically can encompass both positive and negative effects) as a function of climate inputs, such as changes in temperature.” We do not see any potentially positive effect reflected in the NGFS scenarios.

Our research director, Ken Gregory, has written a number of papers on the benefits of warming to Canada’s economy, using the FUND model. The economic and social benefits are many – meaning that the Social Cost of Carbon, for Canada is ‘negative’ – i.e. should be described as the “Social Benefit of Carbon.” The impact is positive for the cost of heating, for instance, if winter temperatures are one or

two degrees warmer; the CO_2 fertilization effect on agriculture is positive and bountiful. Please review Ken Gregory's analyses here, here, and here are his comments on the US DOE climate report.

The Canadian government has published this estimate[5] which indicates a cost of $394/t (CDN) in 2050. This is substantially less than the estimated damage of $750/t (USD) in the NGFS Shadow Carbon Price Graph for Net Zero 2050. This report by Rennert et al (2022)[6] suggests an SCC of $185/t (USD). Johan Rockstrom of PIKS proposed in 2017 that "In the 2020s, carbon pricing across the world must expand to cover all GHG emissions, starting at $50 per metric ton at least and exceeding $400 per ton by mid-century."[7]

By contrast, the work of Ken Gregory (referenced above) shows that CO_2 emissions are a net benefit – especially to the Canadian economy. According to Gregory's response to the US DOE climate report, FUND estimates the SCC of Carbon in **2025 to be $7.25/t (USD) at 3% discount rate, and once revised for Urban Heat Island Effect (UHIE) and CO_2 fertilization the cost is $-13.07/t**.

Surely NGFS should also model the potential benefits of carbon dioxide and warming, especially for northern, agricultural-based societies. In this case, there would be no need for a price on carbon.

Aside from the obvious issues of economic devastation from applying an exaggerated price on carbon, the reality is that Net Zero is unattainable with current technologies; based on the US DOE report, Net Zero targets are not necessary. There is no climate crisis. Economist Dr. Gerry Brady's recent article which incorporates the Net Zero assessment by UK professor Michael J. Kelly, scientist and life-long engineer, shows that no country has the financial or human resources, nor the does the material supply chain exist, to attain Net Zero targets.[8]

Net Zero must be abandoned. It seems that Lloyd's of London has changed its mind on climate-related restrictions on insuring fossil fuel companies[9]; ironically, 10 years to the month from Mark Carney's famous speech "Breaking the Tragedy of the Horizon – Climate Change and Financial Stability."[10]

[5] https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html
[6] https://www.rff.org/publications/journal-articles/comprehensive-evidence-implies-a-higher-social-cost-of-co2/?_gl=1*152c5cw*_ga*NzgxMTA3MzgwLjE2NjA4NTMwNTQ.*_ga_HNHQWYFDLZ*MTY2NDM3MTM2OC42LjEuMTY2NDM3MjMzMi4wLjAuMA
[7] https://www.rescuethatfrog.com/wp-content/uploads/2017/03/Rockstrom-et-al-2017.pdf
[8] https://open.substack.com/pub/boomfinanceandeconomics/p/net-zero-impossible-no-nation-has?r=f96qu&utm_campaign=post&utm_medium=web&showWelcomeOnShare=false
[9] https://www.ft.com/content/7b1be8d4-f275-43e4-af6e-abff00aabe3c
[10] https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability

Concerns about Conflicts of Interest Related to Kotz et al (2024)

As Jessica Weinkle observed in her commentary, "**A Climate-Related Financial Risk Boondoggle** - Bad Methods and Conflicts of Interest in the Attempt to "Green" Finance"

> *The primary funders of a progressive faction that has failed for 30 years to gain traction on energy policy through democratic process—because their demands are alienating and impractical, if not impossible—have forced their agenda onto the financial system.*
>
> *This is more than politics as usual; this is a system of special interests that creates a rigid structure so strong as to capture the global financial regulatory system and weaken the scientific integrity of climate research all over the world. Consider that banking capital requirements and the potential for penalties for inadequate climate risk management across Europe now hinge on a single editorial decision at Nature.*
>
> *Kotz et al. list their funding from PIK, but it is the pass through philanthropy, ClimateWorks, that gave PIK money for the NGFS scenario update.*
>
> *The relationship between NGFS, ClimateWorks, and PIK researchers is not minor.*
>
> *The NGFS is a direct offshoot of the Task Force on Climate-related Financial Disclosures (TCFD) created by Mark Carney, who is now Prime Minister of Canada. Carney put Michael Bloomberg as head of TCFD. Then, Carney co-founded NGFS which set itself up to carry out TCFD recommendations. Bloomberg Philanthropies and ClimateWorks funded development of the NGFS scenarios since the beginning.*
>
> *Eventually, TCFD recommendations became enshrined into financial disclosure regulations in Europe and are being considered as a regulatory tool in the UK. California will require climate risk disclosures under TCFD recommendations beginning next year. For a hot minute, TCFD and NGFS started to work their way into the US Federal Reserve and corporate disclosure regulations. Formal adoption of TCFD recommendations into international accounting practices was a process that Bloomberg helped usher along.*
>
> *Elsewhere, the Gordon and Betty Moore Foundation funds the INSPIRE program hosted by ClimateWorks and Grantham Research Institute. INSPIRE, is a "designated stakeholder" of NGFS and promotes green finance through research grantmaking; one-third of their commissioned projects have "buy-in from central bankers."*
>
> *All the while, Bloomberg Philanthropies has an advisory seat at ClimateWorks. And ClimateWorks has a seat on the advisory council of the IAM Consortium, a little known research community that organizes scenario development for the Intergovernmental Panel on Climate Change (IPCC). Researchers with important roles producing scenarios for use in IPCC reports are also creating scenarios for NGFS and other financial interests.*

The Financial Times is reporting that there is a push to establish a global carbon price at COP-30 in Belem, Brazil, in November of this year. Clearly, the central banks which are part of the NGFS will have

significant sway over the conference, and carbon pricing, based on their documents, which rely on the flawed and conflicted Kotz et al (2024).

Likewise, other actors in the Canadian climate community, such as Senator Rosa Galvez and her proposed Bill S-243, Climate Aligned Finance Act (CAFA), along with her myriad supporters, may rely on the flawed and conflicted NGFS scenarios to support their case, once parliament is back in session. The OSFI and Bank of Canada, if relying on the NGFS scenarios, may be in support of the proposed Galvez CAFA legislation, which is clearly unnecessary if we take into account the majority of the estimates of damage functions in Table 3 from the **NGFS long-term scenarios for central banks and supervisors.**

However, according to Bloomberg, the IEA has dismissed the notion of peak oil and foresees an expansion in oil, gas and coal for decades to come.[11] Adopting CAFA would simply put Canadian energy industries at a disadvantage in global markets and would impose a burden on consumers, as energy prices would rise to reflect the regulatory burdens and obvious decline in production that would result.

Though the Bloomberg story on peak oil indicates that increased use of fossil fuels will "exacerbate the climate crisis," the US DOE report shows there is no climate crisis. Respected scientists Prof. William Happer, Prof. Richard Lindzen[12] and Prof. William van Wijngaarden[13] **have shown that each additional increase of CO2 in the atmosphere causes a smaller and smaller change in "radiative forcing," or in temperature.** Additional carbon dioxide does not drive extreme weather events or wildfires. The warming bump experienced recently was due to the massive ejection of water vapour into the stratosphere from the undersea eruption of Hunga Tonga.[14] Water vapour is the most influential greenhouse gas.

We call upon you to put a stop to this NGFS misuse of climate research by Canadian financial institutions that you supervise, and to **put a moratorium on climate risk reporting requirement for all financial institutions and advise the federal government to do the same for all corporations.**

As we have recently requested of the Alberta Securities Commission (ASC), we believe there is a need to investigate as to whether or not there is a so-called 'climate cartel' operating in Canada, in a manner similar to that uncovered by the US Republican House Judiciary Committee, as outlined in their report "Climate Control: Exposing The Decarbonization Collusion In Environmental, Social, And Governance (ESG) Investing."

[11] https://www.bloomberg.com/opinion/articles/2025-09-11/peak-fossil-fuel-demand-is-a-crumbling-myth
[12] https://friendsofscience.org/library/library-climate-science/greenhouse-gases-and-fossil-fuels-climate-science.pdf
[13] https://friendsofscience.org/library/library-climate-science/impact-of-changing-greenhouse-gas-concentrations-on-ontarios-climate.pdf
[14] https://blog.friendsofscience.org/2025/02/21/hunga-tonga-temperature-impact-waning/

From this article about the Investors for Paris Compliance complaint to the ASC:

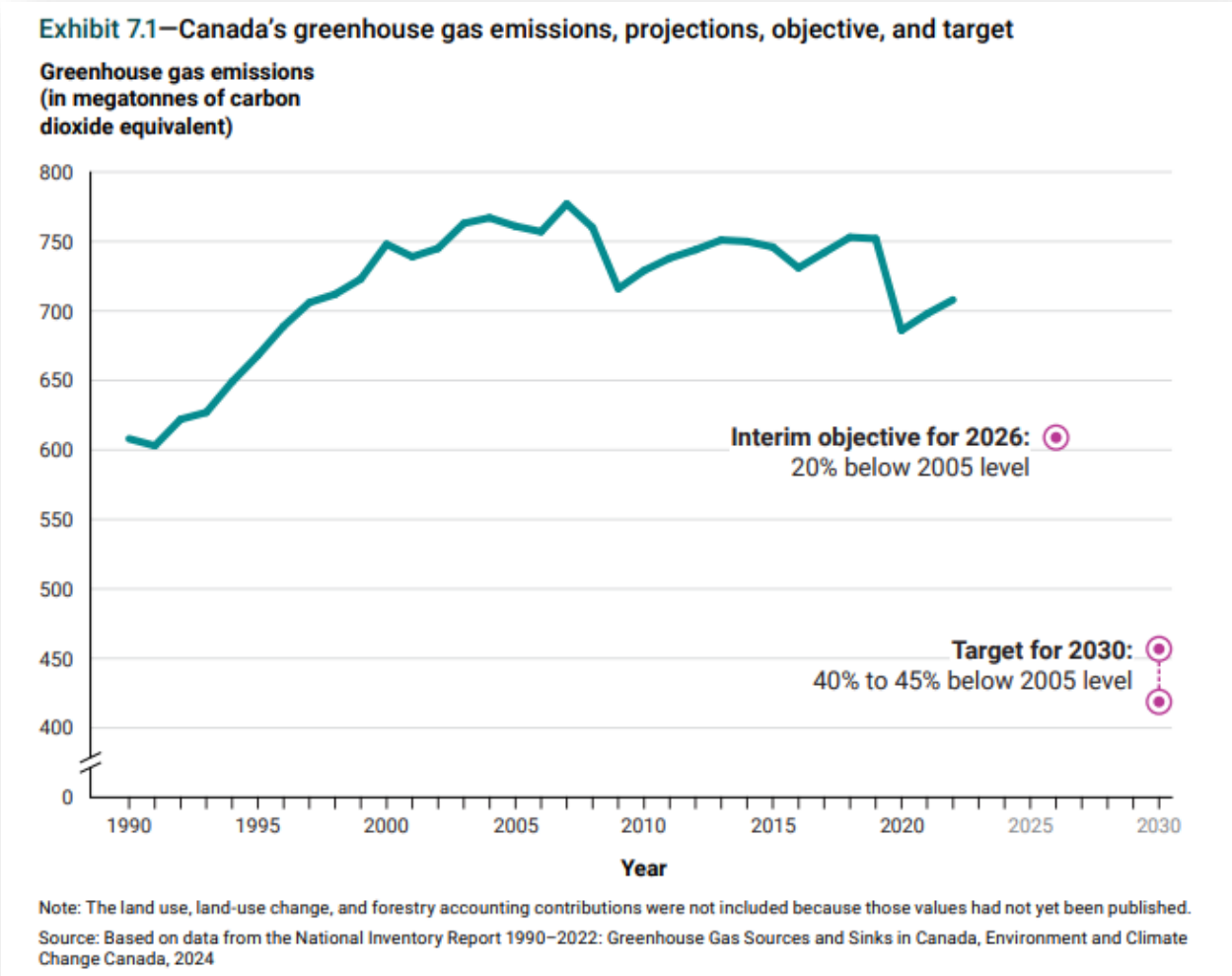
> *However, in this I4PC case, the question arises — is Paris Compliance or Net Zero "material" to corporate operations or shareholder insights?*
>
> *As retired lawyer Andrew Roman put it, in email correspondence to me, "The very name Investors for Paris Compliance is misleading. The concept of compliance suggests that there is a law or other requirement with which one can comply. That is not the Paris Agreement, which is entirely voluntary and non-binding and unenforceable. Alternatively, if anyone needs to comply with the Paris Agreement, it is nation states, not investors. Arguably, the name 'Investors for Paris Compliance' is misinformation."*

Thus, is it not also misinformation for NGFS to propagate future scenarios based on flawed and conflicted research; and is this not in your purview, as OSFI (and related bodies/persons cc-ed on this correspondence) to ensure that markets are not skewed by such faulty misrepresentations of climate damage functions?

Canada is facing pressing matters of economic and energy security issues at this time. Climate commitments simply complicate our ability to be competitive in the marketplace, and as shown by economist Ross McKitrick,[15] the likely reduction in warming, should Canada meet all of its Paris Agreement targets would be an immeasurable 0.007 °Celsius (seven thousandths of a degree Celsius) by 2100. McKitrick's most recent report paints a dark economic future if Canada continues on its Net Zero mission.

Robert Lyman, retired energy economist and former federal public servant of 27 years, former department manager, and diplomat for 10 years prior, has written a new report: "Canada's Climate Policy – What Comes Next?" which offers comments on *Canada's First Biennial Transparency Report under the Paris Agreement* and *Canada's 2035 Nationally Determined Contribution* (NDC). Both reports repeat the claim that Canada's "climate policy is working" to reduce emissions. Neither demonstrate that to any degree, and neither show how Canada can possibly make the leap down to achieve the targets as laid out.

[15] According to Lomborg (2016) the US target under the Paris Treaty implies a reduction of about 1,260 MTCO2e relative to 2015 emissions. If the US achieved this by 2025 and capped its emissions thereafter, in a scenario with 4° C baseline global warming by 2100, global average temperatures as of 2100 would be reduced by 0.031° C compared to if the US did nothing. Prorating this by the size of Canada's proposed emission reduction we find the global average temperature would be reduced by 0.007° C (seven thousandths of a degree Celsius) as of 2100 compared to the case if Canada does nothing. And this assumes that Canada's emission cuts are not offset by increases elsewhere. This is about 0.2% of the projected warming



https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202411_07_e.pdf

Robert Lyman summarized that Canada has committed politically to the United Nations that it will take measures to reduce greenhouse gas (GHG) emissions by 40% to 45% below 2005 levels by 2030. In 2024, it extended this period of commitment to 2035, aiming for a reduction of 45% to 50% below 2005 levels by 2035. Meeting these targets would mean reducing emissions from 708 million tonnes of carbon dioxide equivalent (Mt CO2eq, or Mt for short) to between 419 Mt and 457 Mt by 2030 and to between 419 Mt and 370 Mt by 2035. Attaining the 2030 target would require that emissions decline at the annual average rate of 31.4 Mt from 2022 to 2030. That is, **emissions would have to decline at an annual average rate over 100 times faster than they did from 2005 to 2022**.

Clearly the public, industry, investors, and global partners are being misled by the NGFS and the Canadian government.

The ‘telephone game’ propagation of this misuse of the RCP 8.5 scenarios along with the flawed and conflicted Kotz et al (2024) climate damage function must be stopped, and common sense must return to climate change policy, particularly in banking in relation to its influence on the private sector.

As of today, the Canadian dollar is hovering at about 0.72 cents in value vs the USD.

CAD	USD
1 CAD	0.72 USD

Robert Lyman predicted in 2022, that climate and energy policies in place then, would likely send it down to the 0.60 cent range, accompanied by millions of job losses.

Meanwhile, Canada is the envy of the world, sitting on trillions of dollars in oil, gas, coal, plus critical minerals, forestry and agricultural resources, all stalled by Net Zero climate policies based on unrealistic climate and climate damage models, and a thicket of 321,000 regulations, according to the Business Council of Canada.[16]

It is our understanding from your website that this is your mandate:

> *Our purpose is to contribute to public confidence in the Canadian financial system by regulating and supervising approximately 400 federally regulated financial institutions (FRFIs) and 1200 federally regulated pension plans (FRPPs).*
>
> *Our mandate is to:*
>
> - *ensure FRFIs and FRPPs remain in sound financial condition*
> - *ensure FRFIs protect themselves against threats to their integrity and security, including foreign interference*
> - *act early when issues arise and require FRFIs and FRPPs to take necessary corrective measures without delay*
> - *monitor and evaluate risks and promote sound risk management by FRFIs and FRPPs*

We hope we have provided you with sufficient information to take the necessary action to save Canada from economic ruin.

Sincerely,
Ron Davison, P.Eng.
President
Friends of Science Society

[16] https://www.thebusinesscouncil.ca/report/stifled-by-red-tape/