

**What we heard on *Our  
Clean Future***  
**Appendix A: Response  
Letters from  
Stakeholders**

September 2020



# Introduction

This appendix includes the written responses to the draft version of *Our Clean Future* submitted by stakeholders that have asked for their input to be shared publicly. The response letters are organized in alphabetical order as follows:

- Canadian Fuels Association
- Northern Climate ExChange
- Wildlife Conservation Society Canada
- Wildlife Management Advisory Council (North Slope)
- Yukon Conservation Society
- Yukon NDP Caucus
- Yukon Renewable Electricity Panel
- Yukon Wood Products Association





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Aletta Leitch  
Climate Change Secretariat  
Whitehorse, Yukon

Via email: [Aletta.Leitch@gov.yk.ca](mailto:Aletta.Leitch@gov.yk.ca)

Dear Ms. Leitch,

On behalf of the [Canadian Fuels Association](http://Canadian Fuels Association) (Canadian Fuels) and our members<sup>1</sup>, we thank you for the opportunity to provide feedback on Yukon's "Our Clean Future" draft strategy. We appreciate the thoughtful and comprehensive approach the Yukon government has taken in developing this plan including the thorough public engagement.

Canadian Fuels represents the refiners, distributors and marketers of petroleum products including gasoline, diesel, home heating oil, jet fuel and other specialty fuels, and we are among Canada's largest ethanol producers. Refineries also produce asphalt and feedstock for manufacturing facilities and supply 95 percent of Canada's transportation fuels and products for export. Our members operate 14 refineries across Canada

We have a long history of working collaboratively with Governments across the country on the design and implementation of policies that achieve good environmental outcomes while protecting the competitiveness of our sector and ensuring a reliable fuel supply.

We are strongly committed to reducing greenhouse gas emissions and support your government's commitment to develop a variety of measures to make meaningful improvements. We recognize the transportation fuel mix is changing, reducing emissions to help the meet climate change targets.

It is also important that changes to fuels ensure that consumers maintain reliable access to the fuels they require to meet their transportation needs, rural or urban, throughout the year.

Canadian Fuels comments relate to the practicality of R20/E10 mandate noted on pages 26 and 27 of your draft of "Our Clean Future" strategies. Both of these renewable fuel blending targets are technically feasible and reduce the carbon intensity of gasoline and diesel. However, implementation of both targets should consider important logistics, operational and cost implications before being established as regulation. At these blend levels there are potentially significant implications for consumers.

<sup>1</sup> Canadian Fuels members: Federated Co-operatives Limited, Imperial Oil Limited, Irving Oil, North West Redwater Partnership, Parkland Fuel Corporation, Petro-Canada Lubricants Inc., Shell Canada Products, Suncor Energy Products Partnership, and Valero Energy Inc.

For diesel fuel, both biodiesel and renewable diesel are effective products that improve GHG performance over their lifecycle (from production to combustion). However, both products have limitations for use in Canada during colder months.

During winter, low temperature operability of diesel fuel must be satisfactory to avoid pumpability issues in diesel-powered engines. Therefore, diesel fuel cloud points are adjusted by fuel suppliers based on geography and the seasons (cloud point is the temperature of the diesel fuel at which wax crystals will start to form in the fuel, leading to filter plugging and gelling issues). Biodiesel's cloud point does not typically get below -3 or -4 Celsius limiting its application to warmer months and precluding use for storage across seasons (ref: *CGSB 3.522 Diesel fuel containing low levels biodiesel (B6-B20)*<sup>1</sup> section C15). As well, there are technical concerns with biodiesel blends as several diesel engines still in operation are designed for max 5% biodiesel level (ref: *US National Biodiesel Board*<sup>2</sup>).

Renewable diesel cloud points are typically about 5 to 10 degrees Celsius lower than biodiesel, with the exception of a few renewable diesel suppliers that can make renewable diesel with low cloud points suitable for northern applications. However, renewable diesel is not currently produced in Canada and is in short supply globally as more jurisdictions adopt low carbon policies. Renewable diesel used in Western Canada is sourced from Singapore or the US Gulf Coast. Long supply chains, limited access to low cloud point renewable diesel, and strong demand will have significant cost implications for your local markets at the R20 level. The feasibility of sourcing renewable diesel for the Yukon, regardless of cost, is not certain.

Ethanol blending is well established in regular grade gasoline at the proposed E10 level and is readily available in the Canadian market. In the presence of water, ethanol will separate from the petroleum fuel due to phase separation. As such, high humidity that can result from long haul transportation, water in storage tanks or marine transportation needs to be avoided. For these reasons, ethanol is typically blended at terminals near retail stations. Once phase separation occurs the resulting product can not be used for vehicle operation and has limited disposal options. It is important that both local ethanol blending infrastructure and a process to manage fuel that has phase separated or doesn't meet specifications are carefully considered in advance of implementing renewable fuel mandates. The current limited fuel distribution infrastructure in the Yukon, and significant distances to your supply sources increases the importance of managing these concerns to avoid the risk of supply disruptions.

Furthermore, certain types of small off-road engines (marine, gardening, ski-doo, etc.) and classic vehicles are not designed for use of ethanol-blended gasoline. Maintaining an offer of ethanol free gasoline for these consumers is a consideration.

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<sup>1</sup> [http://publications.gc.ca/collections/collection\\_2017/ongc-cgsb/P29-003-522-2017-eng.pdf](http://publications.gc.ca/collections/collection_2017/ongc-cgsb/P29-003-522-2017-eng.pdf)

<sup>2</sup> [https://www.biodiesel.org/docs/default-source/fact-sheets/oem-support-summary.pdf?sfvrsn=4e0b4862\\_10](https://www.biodiesel.org/docs/default-source/fact-sheets/oem-support-summary.pdf?sfvrsn=4e0b4862_10)

We encourage you to fully consider operational, safety, logistics, compatibility and cost impacts to ensure your plans to introduce a renewable fuel mandate into the Yukon are successful. It would also be worthwhile to facilitate consultations with the organizations that currently supply transportation fuel to the Yukon. They may not be fully aware of the potential challenges described above.

Thank you again for the opportunity to comment on your draft policy. Should you have any questions related to our submission or our industry, please do not hesitate to reach out. We would welcome the conversation.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Schick". The signature is written in a cursive, slightly stylized font.

Dave Schick

Vice President- Western Division



January 17, 2020

Hello Aletta and the Climate Change Secretariat Team,

It has been my pleasure to review the Draft Yukon strategy of climate change, energy, and a green economy. “Our Clean Future” is both comprehensive and ambitious. I commend you and the entire Climate Change Secretariat team for your progress on it to date.

Together with members of the Northern Climate ExChange team, I have reviewed the plan. In keeping with our primary area of expertise, the majority of our comments relate to the adaptation measures that are proposed in this draft. However, where applicable, there are some comments on low-carbon resilience actions that benefit both adaptation and mitigation outcomes.

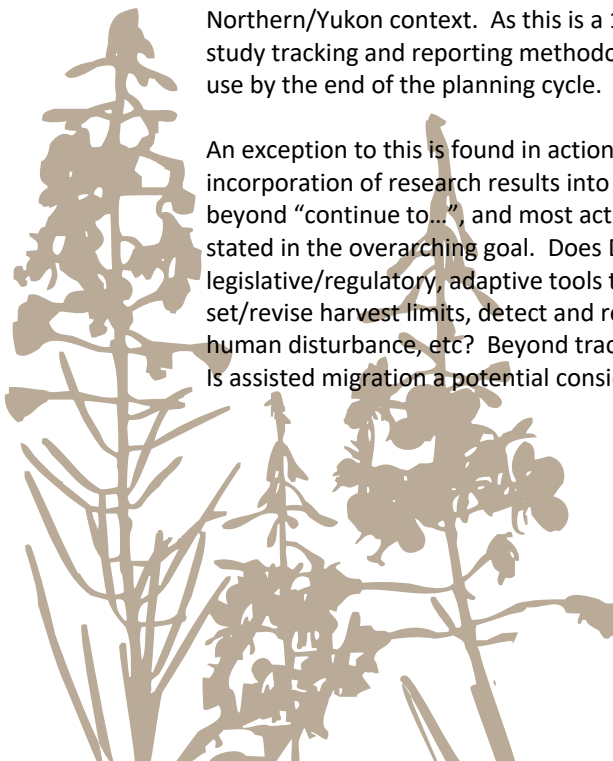
To aid in wading through all these suggestions, I have provided a summary our most substantive comments to begin. This is followed by specific comments that reference a given action. At the high level, our evaluation is that several elements are under-represented in the actions as they are presented. It is entirely possible that you have already considered the issues we raise and that details are not yet public. However, implementation of many of the actions described will benefit from the following:

- There is a lot to take in with this strategy and I commend you for keeping it in generally accessible language. However, there are certainly areas where further communication and detail will assist with efforts to get public buy-in for this strategy. Beyond action 133, what plans are in place to address elements of public criticism and meanwhile harness other public enthusiasm for action?
- There is limited mention of how research and development of monitoring, assessment, and tracking initiatives is incorporated into implementation plans for many actions. For example, actions relating to tracking economic impacts, hazard mapping, risk assessment, etc., are all areas where consideration should be given to specifically how to approach monitoring and reporting that is both robust and appropriate for a Northern/Yukon context. As this is a 10 year plan, I would encourage you to consider a phased approach to study tracking and reporting methodologies for 2-3 years, pilot them, and ultimately move them into active use by the end of the planning cycle.

An exception to this is found in actions 91-95. While they relate to monitoring, data collection and incorporation of research results into decision making, these actions are not ambitious. There is very little beyond “continue to...”, and most actions are not really indicative of “responding to the impacts” that is stated in the overarching goal. Does Department of Environment believe that they have the administrative, legislative/regulatory, adaptive tools that they require in order to be prepared to manage impacts on habitat, set/revise harvest limits, detect and respond to change and separate climate impacts from impacts of other human disturbance, etc? Beyond tracking, what role does environment play in combatting invasive species? Is assisted migration a potential consideration and/or should it be for some species?

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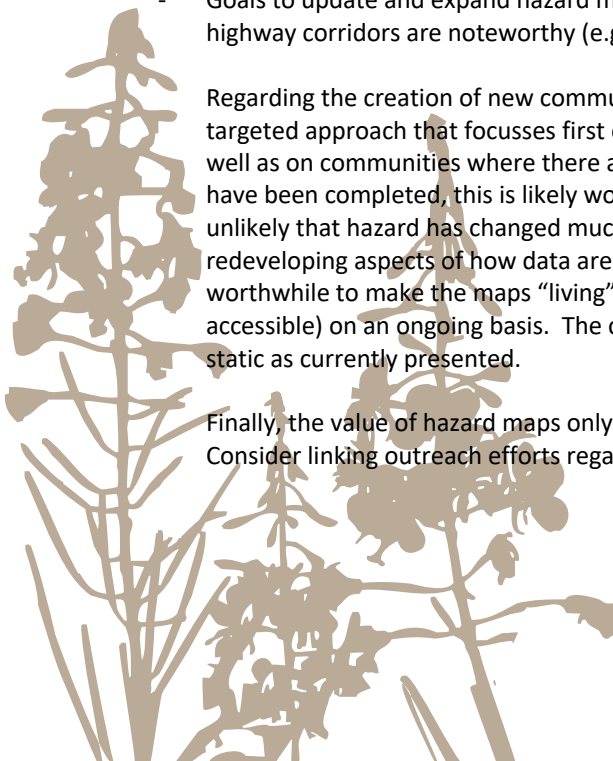
- While implementing many of the actions, careful consideration will have to be given to the workforce training and capacity building that will need to accompany implementation. I understand that Action 126 will aid with this, but it is unclear the extent to which training has been considered as integral to success of many actions. Success in action 126 must move beyond generic training and awareness raising. For example, using “a climate lens”, and the Infrastructure Canada Climate Lens tool is mentioned in many actions. Workforce training and internal specialization in risk assessment will be required to consistently apply these tools, and there are likely data needs that will need to be met prior to meaningful completion of many of these tools. Other examples are for retrofit activities, and risk assessment (not related to infrastructure). I would suggest that greater consideration be given regarding how to collaboratively develop or access a range of training options in partnership with local education institutions, trade and professional organizations.
- Climate impacts risk assessment is mentioned in multiple actions (e.g., 28, 29, 43, 77), and risk-based approaches are emphasized in many other locations. While this is in-keeping with the dominant thinking among adaptation experts, as well as the recommendations of the Auditor General of Canada, an observation is that too often, the practice of risk assessment is too isolated and provides only a snapshot in time. I encourage you to consider ways to more comprehensively implement risk management approaches that systematically consider and document risks and the relevant mitigation measures. Documenting measures taken to avoid risk (and quantifying their effectiveness) is central to monitoring progress on adaptation. This action is alluded to in action 124, but I would recommend that it be made more prominent.
- There is little information and few actions that will fill data gaps and address the needs that arise from many of the planned assessment actions. While many risk assessment approaches are designed to be useable in the absence of complete datasets, they are still improved by using the best available data. I would encourage you to include more detail – perhaps in association with recommendation 140 – regarding collecting and sharing of relevant data. This will include both climate data initiatives, such as the Climate Data Services concept that has been under discussion with pan-territorial partners, as well as other forms of government and economic data.

In order to have an explicit policy statement to refer back to, I would suggest that a specific action be crafted to support development of climate data services and that this action be tied to broader efforts to mobilize knowledge and ensure public access to the best available information and understanding of climate change data and information.

- Goals to update and expand hazard mapping to more Yukon Communities, and to create similar maps for highway corridors are noteworthy (e.g., actions 27 and 74).

Regarding the creation of new community hazard maps and updates to existing maps, consider taking a targeted approach that focusses first on communities where there is a reasonable expectation of hazard, as well as on communities where there are imminent plans for new development. For updates to maps that have been completed, this is likely worthwhile in time. However, the maps are still quite recent and it is unlikely that hazard has changed much since their initial completion. A suggestion would be to focus on redeveloping aspects of how data are presented within the existing maps. For example, it would be worthwhile to make the maps “living” documents where new geotechnical data can be quickly uploaded (and accessible) on an ongoing basis. The current maps have anecdotally been a useful tool, but they are relatively static as currently presented.

Finally, the value of hazard maps only increases when they are presented in training and engagement efforts. Consider linking outreach efforts regarding the maps to actions such as 78, 79, 124, and 138.





- In many of the adaptation goals, the associated actions are to “continue to...”. These actions will be relatively easy to achieve, but may not actually contribute to the overarching goal. I would give greater consideration to whether these actions are already achieving the stated goal, determine whether they need to be expanded or adjusted, and state this as a more ambitious and proactive set of actions.
- The actions identify a lead department, which will give a level of accountability. Effective implementation will require extensive collaborative effort between departments. Are mechanisms already sufficiently established to ensure that the correct level of interdepartmental coordination takes place? If not, this is a critical barrier to success and should be considered within implementation planning. Further, in light of the “Climate Emergency” that was declared prior to the release of this draft, I wonder whether some actions should include a greater degree of involvement and/or leadership by Executive Council Office.

Moving to some of the specific actions, the following are some more targeted questions and comments. For simplicity, the overarching goal is quoted, as well as the action numbers associated with each action. Comments on individual actions list the action number.

- Ensure roads, runways and other transportation infrastructure are resilient to the impacts of climate change. - Actions 26-29
  - o There is a risk that these actions will reidentify the problems, without moving forward with implementable solutions. Within the timeframe, the measures identified do not appear to suggest actions that will result in infrastructure that is resilient, only in a workforce that is slightly more informed about why the infrastructure they manage isn’t resilient. What plans are in place to provide the ability to manage the risks that are already identified? By addressing existing risk, there will be meaningful progress towards increased resilience.
  - o There is no standardized approach to creating geohazard maps, and few examples of this being done for highways. The Northern Climate Exchange, in collaboration with Yukon Geological Survey evaluated Permafrost-related thaw vulnerability for the north Alaska Highway, and landslides have been mapped for Dempster Highway by a contractor. The latter work could form the basis of a predictive study of landslide hazard, but this has not been done to date.

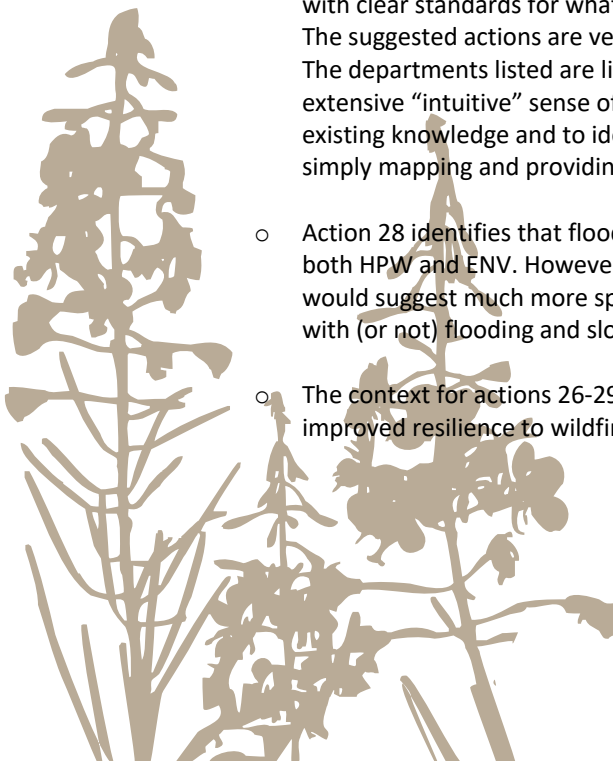
As an alternative to a full-scale mapping of geohazards, I would suggest an initial compilation of known risks (could likely be gleaned from documents such as functional plans, and existing risk management plans. From there a targeted approach to conducting new mapping is likely advisable, with clear standards for what needs to be mapped and how information will be used.

The suggested actions are very broad and unlikely to fully achieve the overarching goal, as stated. The departments listed are likely already quite aware of their current vulnerabilities and have an extensive “intuitive” sense of how things will change in response to climate. Effort to document this existing knowledge and to identify knowledge gaps or uncertainties would be more productive than simply mapping and providing high-level guidance documents.

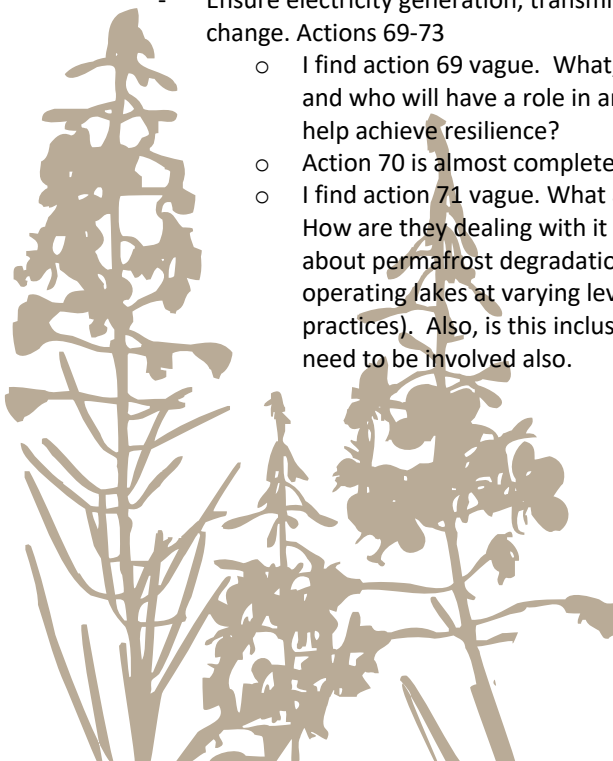
- o Action 28 identifies that flooding as a relevant hazard that will require coordinated planning from both HPW and ENV. However, permafrost hazard is the “big one” for key sections of highway. I would suggest much more specific language around permafrost hazards, and the way that they link with (or not) flooding and slope stability hazards.
- o The context for actions 26-29 mentions forest fire hazards, but there is no specific mention of improved resilience to wildfire in the actions.

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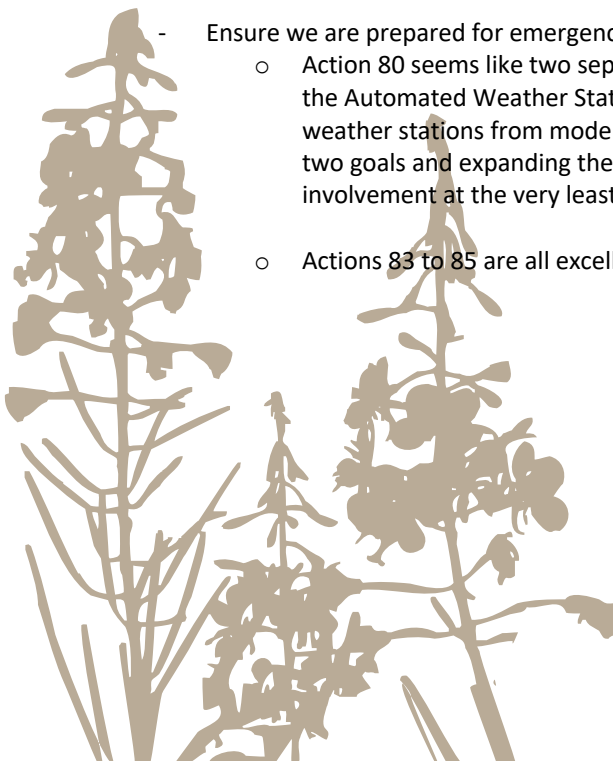
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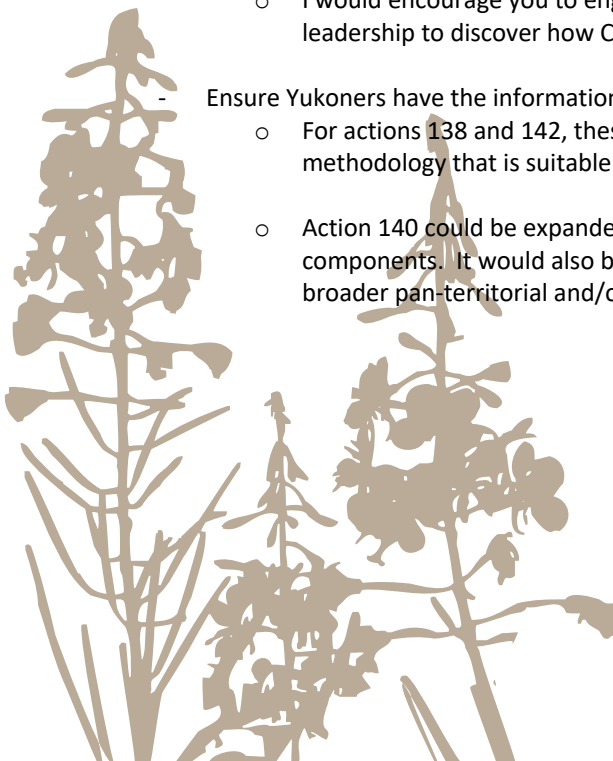
- Improve the energy efficiency and climate resilience of existing homes and buildings. Actions 30-39 –
  - o Action 32 is vague. What specifically will be monitored and how will “climate impacts” be separated from general maintenance issues? Also, will monitoring results be disclosed to the public? Will this action include engagement of and/or input from local knowledge holders?
  - o What are examples of fundable “actions to improve resiliency” referenced in Action 33? This will need to be defined and closely watched. Many maintenance practices are crucial to the resilience and optimal performance of buildings, but I suspect that this action is not thinking of general maintenance? Suggestions would be to ensure that specific high-priority issues are addressed – e.g., grading and site drainage, fire-smarting properties, roof and window sealing, back-up power (specific cases), snow clearing, as key measures that impact building/site resilience.
  - o 39 – GREAT Action!
- Ensure new homes and buildings are built to be low-carbon and climate-resilient. Actions 40-44.
  - o What levers are there to achieve Action 42? The guidelines prepared by Standards Council of Canada’s Northern Infrastructure Standards Initiative are currently not enforceable as Standards. Is there a regulatory, policy, or legislative tools that could make these enforceable as standards?
- Increase the use of biomass and other renewable energy sources for heating. Actions 45-52
  - o Overall, there is a lot of detail for biomass, but not much for other “renewables”. I like these actions because they are good examples of low-carbon resilience actions (accounting for both mitigation and adaptation objectives).
  - o Regarding action 46, this seems like an astonishingly high number of heat pump retrofits for a program that doesn’t even exist yet. Are we talking residential? Commercial? YG or privately owned? Since the 2013 study by Energy Solutions Centre, what are the more recent findings relating to heat pump reliability and performance? What training is required for companies to do these retrofits and/or for operators to use and maintain them? Ground source or air source?? Impacts on electricity consumption (will you just end up burning diesel/LNG to produce the electricity to run these)? I imagine that these details are available, but just weren’t included. Still, I think that there are practical limitations to full implementation of this goal.
- Ensure electricity generation, transmission and distribution infrastructure is resilient to the impacts of climate change. Actions 69-73
  - o I find action 69 vague. What, specifically, will the research questions be? How will they be identified and who will have a role in answering them? Who will be paying? How will work under this goal help achieve resilience?
  - o Action 70 is almost complete already, making this an easy win.
  - o I find action 71 vague. What are the permafrost-related issues with YEC’s current infrastructure? How are they dealing with it now, and what would they like to do differently? Are they concerned about permafrost degradation as it affects the infrastructure directly, or more broadly, who operating lakes at varying levels impacts permafrost (and therefore habitat and FN subsistence practices). Also, is this inclusive of production and transmission? If the latter, then other players need to be involved also.



- Regarding action 73 – Yes please!! Also, I think a useful precursor to this would be a study of remote sensing methods that could compliment a ground validation campaign. Technology and sensors available for this have been rapidly improving, meaning that a small ground-based monitoring program could validate remotely-sensed data and enable a much broader view of changing glacier mass.
- Design our communities to be low-carbon and resilient to the impacts of climate change. Actions 74-79
  - I particularly like the latter half of action 74; determining the values at risk in “high geohazard” locations. This moves the conversation on from simply hazard towards a meaningful understanding of vulnerability. However, this will raise some difficult questions about how to protect properties in these locations and/or whether there are insurance implications. Another step to include in this would be a level of assessment over the resilience of the infrastructure located in high geohazard or flood risk areas. For example, a home on a wood pier foundation in permafrost is likely more resilient to permafrost thaw than a concrete foundation at or below grade.
  - Completing action 76 will be extremely beneficial, particularly when combined with action 42. This is an example of an action that should be accompanied with training and will also likely require a level of data interpretation that is not consistently available in communities. How many communities are likely to be designed in the next 10 years? Would it be productive to work individually with these in order to inform the eventual (likely iterative) development of guidelines?
  - I would suggest an addition for action 77. For “key infrastructure” such as a nursing station, power/water infrastructure valued under \$10M, I would also strongly recommend a similar risk assessment and risk management plan. This same comment could be applied to actions 29, and 43. In addition to simply the monetary value, consider the social value at stake when determining whether a climate risk assessment should be performed.
  - I really like action 78! How can we help? Aside from that, I would suggest splitting these into two, possibly three separate goals. Regional land use planning is quite different from local area planning. Further, the development permit and zoning process is again distinct (and enabled through regulation and legislation); therefore, it is likely another separate activity. Also, per the earlier comment, I would suggest that implementation of this action be explicitly tied to actions such as 27, 74, and 76.
- Ensure we are prepared for emergencies that are becoming more likely due to climate change. Actions 80-85
  - Action 80 seems like two separate, but related goals. While there will be overlap in some tools (e.g., the Automated Weather Stations), there is a lot to separate observation platforms and automated weather stations from modelling tools and warning systems. I would suggest separating these into two goals and expanding the consideration of who should be involved (I see potential for HPW involvement at the very least).
  - Actions 83 to 85 are all excellent! Consider tying 85 to the analysis in 74.



- Supply more of what we eat through sustainable local harvesting and food production. Actions 86-90
  - o For actions 86-87, will non-profits and independent producers also have access to funding and/or technical advice? Also, I feel that some level of evaluation and/or research could be helpful here to evaluate ingredients for longer-term success and/or failure of previous community garden and greenhouse efforts. Anecdotally, there are a lot of community gardens and greenhouses that are no longer in intensive use all over the Territory. Meanwhile, others have remained successful and viable for many years. Why is that? What elements help ensure longer-term viability and success?
- Maintain our ability to safely engage in traditional and cultural activities. Actions 96-100
  - o This is largely “Continuation of” activities. As written, action 100 appears to be largely just a subset of action 99. Also, these are really just actions that are core to the mandate of TC. In the absence of something more ambitious, it will be very easy to mark these actions “complete”, but miss the overarching goal. I would consider reevaluating these actions to move to something more ambitious.
- Protect and enhance human health and wellbeing in a changing climate. Actions 101-104
  - o Regarding action 101, does this training exist already, or will it need to be developed?
  - o I would encourage you to coordinate action 104 with the emergency management plans in actions 83-84.
- Ensure the goals of this strategy are incorporated into government planning and operations. Actions 122-128
  - o An excellent list of leadership actions. The legislation for a Clean Energy Act will be vital.
  - o For action 123, I would like to see additional detail regarding the “climate lens” that could be applied. What, specifically, will this look like? Is it a general mindset, or a specific tool? How will it be documented?
  - o Action 126 will be fundamental to success of many of the other actions. If not done already, consider mapping all actions where training will be required to this one in order to develop meaningful and targeted training.
- Educate and empower youth as the next generation of leaders. Actions 129-132
  - o I would encourage you to engage with academic parts of Yukon College, as well as the YC Kids Camp leadership to discover how College programming could be integrated into these education actions.
- Ensure Yukoners have the information needed to make informed decisions. Actions 138 - 142
  - o For actions 138 and 142, these will both require research in order to develop a defensible, consistent methodology that is suitable for the North.
  - o Action 140 could be expanded significantly to achieve a knowledge sharing, training and data sharing components. It would also be interesting to see whether and how this could be interoperable with broader pan-territorial and/or national knowledge sharing portals.





This comprehensive strategy addresses many needs and sectors of Yukon society. It demonstrates tremendous leadership. Achieving it will carry Yukon a long ways towards realizing climate resilience for many years. While I have refrained from commenting on the elements that relate more to energy, green economy, and mitigation outcomes, I will observe that many of them seem highly ambitious also.

I'll close by reiterating my gratitude for the opportunity to provide comment and would be happy to meet to discuss any of these suggestions in person. Please feel free to email [bhorton@yukoncollege.yk.ca](mailto:bhorton@yukoncollege.yk.ca), or to call 456-8636 at your convenience.

Best regards,

Brian Horton

Cc: Bronwyn Hancock, Associate Vice President, Research Development  
Janet Welch, Vice President Academic  
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COMMENTS BY  
WILDLIFE CONSERVATION SOCIETY CANADA  
ON  
YUKON TERRITORIAL GOVERNMENT'S DOCUMENT  
*"OUR CLEAN FUTURE: A YUKON STRATEGY FOR CLIMATE CHANGE, ENERGY AND A GREEN ECONOMY"*

January 16, 2020

This set of Comments has been put together for the public review  
of the draft *Our Clean Future* document (November 2019)  
by Whitehorse-based scientists:

Donald Reid PhD

Hilary Cooke PhD

## **Introduction**

We provide the following set of comments based on the invitation for public input on the Yukon Territorial Government's draft strategy (*Our Clean Future*, November 2019) for dealing with the climate crisis and associated issues around energy and a green economy. We thank the Government for this opportunity to provide input on what is likely to be a pivotal document and process in Yukon's future.

WCS Wildlife Conservation Society Canada is a non-profit, charitable organization working at a national scale in Canada. Our mission is to save wildlife and wild places through science, conservation action, and inspiring people to value nature. WCS Canada scientists have been working in Yukon since 2004 on land use and protected areas planning, land and water management, and wildlife conservation research and policy applications. Our role is to provide long-term site-based research and syntheses of science that inform policy and practice and support the implementation of effective conservation measures by providing technical advice and by engaging relevant decision-makers at all levels, from local to federal. We are interested in renewable energy because the capture of energy from any source will result in some environmental effects including impacts on fish and wildlife and their habitats, and because dealing with the climate crisis is particularly required to stem loss of biodiversity. An understanding of these effects and impacts has to be brought into decision-making.

We have organized our comments following the structure of the *Our Clean Future* (November 2019) document, so the headings used here correspond to those in the document being reviewed. Our specific recommendations are underlined.

### ***About the Draft Strategy***

Review period: We are encouraged to read that the strategy will be reviewed every three to four years. This is certainly necessary for a set of Actions aimed at addressing the "climate crisis" and that must achieve results to help meet Canada's global commitments to reduction of carbon emissions.

We are concerned that there is no specific mention of how the Government will report Yukon's carbon emissions to the public in Yukon. These have to be reported to the federal government on an annual basis so that the country can report its emissions to the international community as per the Paris Agreement. Yukoners need to be able to learn about and assess our annual emissions and progress towards the stated goal in this strategy: 30% reduction below 2010 levels by 2030. We recommend that this strategy include specific mention of the need for annual reporting to Yukoners on carbon emissions, and lay out the details of which government agency(ies) has the responsibility for the accounting, and the full set of categories of emissions sources for which independent quantitative data are and will be gathered.

### ***Our Future***

The aspirational and optimistic text in this section is good and needed to inspire action on what is indeed a crisis situation. Rightly so, it includes various words that can have positive connotations in the context of climate solutions— renewable, green, and clean. However, these terms are not defined.

Consequently they leave open considerable room for misinterpretation. One very real misinterpretation is that they are synonymous; that what is “renewable” is necessarily “clean”, for example. That is not the case, and so some misinterpretations turn up later in the document (as we will illustrate). We recommend that this section define these terms (clean, green, and renewable) at least in a footnote.

### **Values**

The set of Values laid out here is certainly positive and uplifting, and they can contribute to a sense of purpose and hope, which is good.

We note that in some circumstances particular Values could become contradictory. For example, the Value “Make Informed Decisions” is fluid and changeable in that we currently lack all the information to make the best decisions about whether and how to implement certain Actions. So, as new information becomes available, it might challenge our ability to satisfy other Values such as Respect Our Natural Environment or No “one size fits all” Approach.

Decision makers will need to assert specific Values in precedence or preference to other Values in certain circumstances. This will be challenging, as there is no indication in this strategy as to where the priorities in Values lie. In the context of an overheating climate we propose two policy priorities that should drive a prioritization of Values. These are: (i) evidenced-based analysis of how best to reduce carbon emissions and/or capture carbon from the atmosphere, since these are the dominant biophysical actions that have to occur in dealing with the climate crisis, coupled with (ii) evidenced-based analysis of how to minimize the environmental costs of implementing programs and actions to reduce carbon emissions and capture carbon. These policy priorities fit best under the Value – Respect Our Natural Environment. Consequently we recommend that Respect Our Natural Environment be recognized in this section as the paramount Value, and that fact should be evident in the Goals of this strategy (next section).

Respect for our environment is at the heart of the climate crisis. An historical lack of respect has led us into the crisis, and threatens our future. At the same time, most Actions we propose to deal with the crisis will have some environmental impact. There is no such thing as a free ride for any organism in nature over the long term, humans included, especially given our massive global population. Consequently we have a major set of trade-offs to contemplate as we move to shift our sources of energy to reduce carbon emissions, thereby building new economic activities. How best can we reduce emissions and capture carbon without at the same time incurring large new environmental costs?

Indigenous elders and others repeatedly assert that “respect for nature and animals” is a central practice and philosophical cornerstone of their worldview. This gives added impetus to make Respect for Our Natural Environment the core Value of this strategy.

The Value “Be Accountable” is important, and states that “the final strategy will include information about timelines, evaluation and costs”. This is crucial, because a weakness of this draft is a lack of evidence that government is going to take the lead in making the Actions measurable and readily evaluated, with timelines, targets, and costing. We recommend that a substantial stand-alone section of



the final strategy should include a set of timelines, milestones or targets for evaluation, and cost estimates.

Costing is crucial for this Value. We are dealing with a crisis situation, wherein government needs to start re-allocating costs from other purposes, such as highway upgrades, to dealing with the climate crisis which has to be among the highest priorities in our spending. We recommend that territorial government spending on this strategy be itemized in its own section of the annual Territorial Budget, not buried in separate Departmental budgets where the actual investments and efforts are difficult to assess.

### **Goals**

The draft strategy lays out 4 Goals. Each one has merit, but not equal merit. As presented there is no explicit recognition of priority among Goals, other than the order in which they are presented. That order reflects what we think the prioritization should be. However, the Goals, as with the Values above, might be contradictory in some circumstances or in some interpretations of the language. For example, the second Goal (“Ensure Yukoners have access to affordable, reliable and renewable energy”) could be in conflict with the first Goal (“Reduce Yukon’s greenhouse gas emissions”) depending on how the terms “affordable” and “renewable” are defined and interpreted. For example, biomass energy may be affordable and renewable, satisfying Goal 2, but will add to Yukon’s greenhouse gas emissions, so be in direct contradiction to Goal 1 (detailed analysis in sections below). So, decision makers will be faced with potentially contradictory directives. We recommend that the strategy explicitly lay out the prioritization among Goals. We also repeat our recommendation about the need to define some of words whose meanings are plastic (see *Our Future* above).

### **Reducing greenhouse gas emissions (Goal 1)**

This section lays out the problems quite clearly (but see our Recommendation under ***Building a Green Economy*** below) and sets a useful context.

The pivotal target in this section and the entire strategy is the reduction of emissions to 30% below 2010 values by 2030. However, no justification is provided for target amount, target date, and baseline date. The public needs to understand where these figures came from, and why the strategy is using them. We recommend that the strategy provide explicit justification that the target of reducing emissions to 30% below 2010 values by 2030 is the most suitable and justifiable for Yukon in the current crisis.

We see the need for some additional information to be presented in this section. First, the text lacks the full context of the emissions reduction scenario under the Paris Agreement, which is the need to reach no net carbon emissions by 2050. This draft strategy only lays out a target for 2030. A relatively short-term target (e.g., by 2030) is necessary for a massive undertaking such as this strategy, and needs to be in the Strategy to provide solid direction for the immediate implementation of Actions. However, it is only the first step in a series of steps we have to go through. Those other steps (notably the 2050 target), and the magnitude of the problem in achieving them, are crucial to a public understanding of what needs to be done and to an evaluation of alternative Actions even within the next decade to 2030.

We must not rein in our ambition to just the 2030 target if opportunities to exceed that target by 2030 are in front of us; in fact the 2050 target shows that we should embrace a more ambitious schedule. Figure 4, which is located much later in the document, pertains directly to this point, and should be brought forward in the document. We recommend that the text include the longer term context of targets under the Paris Agreement, and a visual graphic of the total extent of carbon emission reductions that we need to achieve to reach the Paris Agreement target (e.g., a modification to current Figure 4).

Second, there is no mention in this draft strategy of the way in which Government will report carbon emissions to Yukoners during the implementation of the Actions. Yukoners deserve to know all the categories and subcategories of emissions, as reported by the Territory to the federal government, and their quantities, on an annual basis. The general graphics and text presented here (e.g., Figure 2) are useful for this strategy, but are inadequate for a citizen or organization to have a substantive understanding of where alternative Actions might have an effect. For example, it is not possible to understand what sets of emissions from diverse sources are included in the Heating or Road Transportation roll-ups in the data presented. We recommend that this strategy include specific mention of the need for annual reporting to Yukoners on carbon emissions, and lay out the details of which government agency(ies) has the responsibility for the accounting, and the full set of categories of emissions sources for which independent quantitative data are gathered.

### ***Additional action on mining***

This section of the strategy states that the mining sector will get special treatment, and that their emissions will not even be quantitatively included in the annual reporting of emissions. Instead the Government will work to agree on intensity-based targets for the mining sector.

This approach is disingenuous because it will hide emissions from this sector in our territorial and national reporting, provide a false picture of what we are actually achieving, and could well cause us to fail in reaching even the 2030 target. All sectors of society have to play their part in this crisis. The mining sector is no different.

The text argues in favour of the intensity-based approach in two ways. First, it states that the mining sector should get easy treatment because it produces metals of high value for the emerging “global green economy”. As a statement of fact, this is only true to a certain extent. A substantial portion of the mineral output from Yukon is gold which has only marginal value to emerging technologies. It does not follow that the entire mining sector should get special treatment.

As a statement of policy, this is yet another subsidy for the mining industry at a time when all sectors of the economy and society have to be contributing, and when commodity prices already gauge the need for a mining industry in Yukon to contribute to the green economy. Many economic enterprises and individual citizens outside the mining sector are contributing materially to solutions for the climate crisis through their own investments and foregone opportunities. The market place through commodity price returns on demand will provide the incentives for development of mineral deposits that are required in the emerging economy. Another subsidy to the mining industry is neither fair nor needed.

Second, it states that: “If mining were incorporated into Yukon’s overall greenhouse gas reduction target, there is a risk that a decrease in mining activity could cause us to reach our target, resulting in less motivation to reduce greenhouse gas emissions from transportation, heating and other key areas.” This is an embarrassing rationalization rather than a solid reason for treating the mineral industry any differently. It points out why this document has to put the bigger climate change picture to 2050 in the text (as recommended above). Reaching our 2030 target before 2030 has no risk associated with it. In fact that would be a major positive accomplishment, because the journey to reach the 2050 target is going to be a huge challenge. The Government should be searching for ways in which to exceed the 2030 target by 2030. Also there should be no risk to the 2030 target not being met in other sectors because the planning and prioritization around the Actions and their associated policy initiatives should aim to meet the 2030 target in each and every one of the sectors independently.

We recommend that the mining sector be treated as every other sector with a goal of reducing total emissions by 30% below 2010 levels by 2030.

We also recommend that this document provide quantitative data on the mining sector’s carbon emissions since at least 2010 so that Yukoners can judge the relative contribution of that sector to the problem and understand the scale of the problem when mining is not included in the projected picture of emissions.

### ***Ensuring reliable, affordable and renewable energy (Goal 2)***

This section lays out the need for increased availability of electricity as an energy source. It correctly states the need for new sources of electricity to be developed in the territory, but fails to adequately stress just how important this is. A lack of serious investment in this direction over the past decade has put us way behind where we should already be given how long this problem has been on the table. The tentative nature of Government’s approach to this problem is reflected in this text: “We **may** also need to upgrade electricity transmission and distribution infrastructure to support increased use of electricity for things like electric vehicle charging.” There should be no doubt about this need; it is imperative. We recommend that the strategy put much more emphasis on this section, asserting its central importance in emissions reductions, and specifying that the massive need for infrastructure investments and incentives should be one of the top priorities in Government spending, far above what Governments frequently put as high priority such as highway upgrading and new buildings.

Under Transportation and Heating, the stated target is to reach 40% of heating needs from renewable sources by 2030. It also explicitly states that biomass energy will be pursued as one of those renewable energy sources. The latter statement is a huge mistake. Biomass may be renewable, but it is not clean or green because it produces high levels of carbon emissions. More reliance on biomass energy will produce a net annual increase in our carbon emissions from the heating sector, which will then work completely counter to Goal 1 which is to reduce emissions from each sector.

We recommend that biomass energy be removed from this document as a suitable replacement source of energy for space heating. Our more detailed reasoning follows.

*The carbon budget of burning biomass for energy:* Biomass energy is created by burning organic materials that have quite recently been alive. In Yukon, these are mainly wood products from trees. When burned, the carbon that makes up much of the wood goes directly into the atmosphere. Also, there are additional carbon emissions from the harvest, transportation, and processing of the wood.

The effect of this burning on the carbon budget depends on the time and spatial scales of accounting. When all of the carbon dioxide released from burning can be absorbed by new growth of plants *at the same sites in the same annual cycle*<sup>1</sup>, there is no net contribution to the atmospheric carbon pool from the burning (i.e., the energy source is carbon neutral). Carbon neutrality can only be achieved when just one year's worth of growth is burnt in the annual cycle (i.e., carbon payback time of one year).

Carbon neutrality is not achieved, however, when the biomass fuel stock has many years and often decades of carbon accumulation through growth. Such is the case with burning whole trees (whether green or already dead), or wood residue and slash, as we do in Yukon. New plant growth, on sites where the fuel trees previously grew, cannot absorb all of the many years and often decades of tree growth in one annual cycle. The net effect is a large contribution of carbon dioxide to the atmosphere annually, creating a "carbon debt" that has to be recovered in the future<sup>2</sup>, with carbon payback time of many years and even many decades<sup>3</sup>. This is in direct contradiction to the major policy imperative to reduce such carbon emissions year by year.

The fate of carbon dioxide from burnt wood should be compared to the fate of that same carbon if the wood were not burnt. If left on the land, dead wood slowly decomposes releasing carbon dioxide. Burning that dead wood to produce power or heat accelerates the release of carbon dioxide compared to decomposition<sup>4</sup>.

The amount of carbon dioxide emitted by burning wood also needs to be compared to that from other fuel sources. Burning wood produces greater carbon emissions than coal or natural gas for the same amount of energy produced<sup>5</sup>. Depending on the wood type and combustion process, burning wood can produce higher carbon emissions per unit energy obtained than some fossil fuels<sup>6</sup>.

*Policy direction towards biomass globally and in Yukon:* Jurisdictions as large as the European Union and the USA have historically promoted biomass energy as carbon neutral<sup>7</sup>. Policy initiatives here in Yukon such as the Biomass Energy Strategy (2016) and the draft Whitehorse and Southern Lakes Forest Resources Management Plan (2019) have also made this assertion. In the *Our Clean Future* document, biomass is now labelled as "low-carbon".

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<sup>1</sup> An annual accounting period should be applied to biomass as this is the accounting period applied to all other forms of human activity that create carbon emissions, such as burning of fossil fuels and raising livestock. New growth of plants "at the same sites" is required because carbon absorption at all other sites is already maximized given that the atmospheric carbon pool keeps increasing.

<sup>2</sup> Fargione et al. 2008. *Science* 319:1235-1238.

<sup>3</sup> Birdsey et al. 2018 *Environmental Research Letters* 13:050201. <https://doi.org/10.1088/1748-9326/aab9d5>

<sup>4</sup> Dymond et al. 2010. *Forest Ecology and Management* 260: 181-192.

<sup>5</sup> Birdsey et al. 2018. *Op. cit.*

<sup>6</sup> Mäkipää, R. et al. 2015. *Canadian Journal of Forest Research* 45: 217–225 [dx.doi.org/10.1139/cjfr-2014-0120](https://doi.org/10.1139/cjfr-2014-0120)

<sup>7</sup> For example: <https://www.scientificamerican.com/article/congress-says-biomass-is-carbon-neutral-but-scientists-disagree/>

The notion that burning biomass for energy is carbon neutral or low-carbon is increasingly challenged by scientists and policy makers<sup>8</sup>. The Scientific Advisory Board to the U.S. Environmental Protection Agency stated in March 2019 that emissions created by burning recently living wood stocks cannot be assumed to be carbon neutral and have substantial net carbon emissions<sup>9</sup>. The Science Advisory Council of the European Academies warned the European Commission in 2017 and 2018<sup>10</sup> that burning wood harvested from forests cannot be considered carbon neutral for the purposes of meeting carbon emissions targets because of substantive net carbon emissions, and therefore the emissions from biomass must be built into the accounting of carbon footprints. Those warnings also stated that classifying biomass energy as carbon neutral (i.e. discounted in carbon accounting) was actually inducing major increases in conversion of the carbon in mature forests to carbon dioxide in the atmosphere at a time when exactly the reverse is required (see also<sup>11</sup>).

Although not promoted as carbon neutral in *Our Clean Future*, the label of “low-carbon” implies that the carbon footprint of burning wood is inconsequential. However, the waste wood, and live and dead trees that we burn in biomass installations and individual homes require years if not decades to grow back. The carbon debt happens in the current year; the carbon payback is many years and often decades into the future, varying with factors such as decay rates of dead wood left on site<sup>12</sup>. Year by year our wood burning continues to produce more carbon to the atmosphere than can be absorbed. Burning biomass goes directly against our need to balance our carbon accounting as quickly as possible by getting rid of major sources of emissions.

Consequently, we recommend that the policy direction put forward by Yukon Government of investing in new biomass energy infrastructure<sup>13</sup> be dropped from the government’s priorities, and that the equivalent financial and other resources be directed towards development of energy from renewables that are more aptly described as “low-carbon”.

WCS Canada also notes that burning biomass for energy creates considerable additional environmental impacts. We point out negative health impacts under the Actions for Homes and Buildings, below. Also, salvaging of fire- or beetle-killed wood can have negative impacts on biodiversity<sup>14</sup>, a subject WCS

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<sup>8</sup> Booth. 2018. Environmental Research Letters 13. <https://doi.org/10.1088/1748-9326/aaac88> and

<https://www.euractiv.com/section/energy/opinion/need-for-a-scientific-basis-of-eu-climate-policy-on-forests/>

<sup>9</sup> [https://yosemite.epa.gov/sab/sabproduct.nsf/0/B86C81BACFAF9735852583B4005B3318/\\$File/EPA-SAB-19-002+.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/0/B86C81BACFAF9735852583B4005B3318/$File/EPA-SAB-19-002+.pdf)

<sup>10</sup> EASAC 2017. Multi-functionality and sustainability in the European Union’s forests.

[https://easac.eu/fileadmin/PDF\\_s/reports\\_statements/Forests/EASAC\\_Forests\\_web\\_complete.pdf](https://easac.eu/fileadmin/PDF_s/reports_statements/Forests/EASAC_Forests_web_complete.pdf) and in 2018

[https://easac.eu/fileadmin/user\\_upload/180108\\_Letter\\_to\\_President\\_Juncker.pdf](https://easac.eu/fileadmin/user_upload/180108_Letter_to_President_Juncker.pdf)

<sup>11</sup> Kirschbaum 2003. Biomass and Bioenergy 24: 297-310.

<sup>12</sup> Mansuy, N. et al. 2018. Salvage harvesting for bioenergy in Canada: From sustainable and integrated supply chain to climate change mitigation. WIREs Energy Environ. 2018;7:e298.

<https://doi.org/10.1002/wene.298>

<sup>13</sup> Yukon Government 2019. “Our Clean Future”, and Renewable Energy and Energy Efficiency Update (2016-2018) <http://www.energy.gov.yk.ca/pdf/emr-energy-strategy-update-2016-2018.pdf>

<sup>14</sup> Cooke, H. et al. 2019. Fire and Insects: Managing naturally disturbed forests to conserve ecological values. Conservation Series Report No. 12, Wildlife Conservation Society Canada, Toronto, ON.

<https://www.wcsCanada.org/Portals/96/Documents/Reports%20and%20publications/SalvageLogging-highres.pdf>

Canada scientists have investigated in depth. Industrial-scale salvage logging for dead wood in Yukon to fuel a growing biomass industry would make these risks higher.

Burning wood for space heating is well established in Yukon, and will continue to contribute to our energy supply and annual carbon emissions for some years. We argue that these emissions from biomass should be included in the Yukon Government's reporting of annual emissions; they cannot be ignored or left out of the emissions accounts as being "low-carbon" or "carbon neutral".

However, biomass is best viewed as a "bridging" form of energy supply, to be phased out as we progress to truly cleaner sources of energy<sup>15</sup>. New investments in capacity and infrastructure to burn biomass are short-sighted at this time of climate crisis because they lock our economy into a mode of energy supply that is not "clean" and will have to be replaced to reach 2050 targets. To hasten a phasing out of wood burning, incentives are needed to make electric or geothermal energy economically more favourable sources of heat than burning wood: that needs to be at the heart of the Government strategy towards a Clean Future.

### ***Adapting to climate change (Goal 3)***

The text in this section is quite detailed and well represents the issues at hand.

### ***Building a green economy (Goal 4)***

The climate crisis is providing new economic opportunities, and new economic ventures are successfully emerging. This is a good thing especially when these ventures contribute to the achievement of Goal 1 in particular.

There is a danger that any potential business venture that can somehow achieve the labels renewable, clean, or green will automatically be fast-tracked for support under this Goal. That should not be the case. Biomass energy is a case in point. It uses a renewable resource, but it is not clean or green in the sense of satisfying Goal 1 – the reduction of emissions.

All new economic activity will have some environmental impact. This means that impacts have to be adequately assessed before the economic activity takes hold (Is it truly "clean"?). It also means that this Goal has to be approached with great care to avoid the commonly repeated fault that a new economic activity or technology is successful in the market place but creates detrimental environmental and social side-effects and economic externalities. When Government itself is the proponent of the new economic sector or technology, then the onus is on Government to adequately assess the economic, environmental and social impacts of what it is proposing.

The market place is inadequate as an arbiter of social good, especially environmental good. The climate crisis is itself a prime example: carbon pollution is a side effect of burning carbon-rich fuels without an up-front recognition of the ultimate environmental cost which is overheating of the atmosphere. Historically, those costs have been externalized from economic analysis and now the global future is at

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<sup>15</sup> Project Drawdown. <https://www.drawdown.org/solutions/electricity-generation/biomass>

risk. Society is belatedly beginning to internalize those costs in the price of carbon-rich fuels, in particular through a carbon tax. That policy is not even mentioned in this entire strategy. Yet it is a pivotal part of getting all sectors of society to shift away from carbon-rich fuels. Disincentives to burning hydrocarbons, such as the federal government's tax on carbon in fuels, are essential and need to be stronger than at present. We recommend that the strategy include a section (probably under *Reducing greenhouse gas emissions* above) in which the climate crisis is explained in terms of the failure of the market place to internalize the full costs of burning carbon, the need for disincentives to burning carbon-rich fuels is explained, and a carbon tax (truer cost accounting for carbon pollution) is promoted as a necessary policy which needs increasing emphasis.

### ***Taking Action***

Generally speaking, the text and information presented in this section is good and sufficient.

### ***Measuring our Progress***

The development of plans and measures of progress will be essential and is welcomed here.

### ***Reaching our Targets***

Figure 4 illustrates the shortcomings of not including the long term projections to 2050 for reaching the Paris Agreement targets (see our Recommendation above under *Reducing Greenhouse Gas Emissions (Goal 1)*). The substantial GHG emission reductions by 2030 are actually small compared to what has to be achieved by 2050 (zero net emissions). We recommend that Figure 4 be placed earlier in the document (under *Reducing our Greenhouse Gas Emissions*) and modified to include the carbon emissions trajectory to 2050.

The caption to Figure 4 is confusing. It does not explain the large fluctuations in Historical emissions, which we suspect are because of variations in mining activity. However, it describes the emissions as being "non-mining". Does that description refer to the entire emissions trajectory in the graph? We recommend that the information presented in this graph be better explained in the caption.

The exclusion of mining emissions from Figure 4 (at least in future projections) illustrates that the emissions reduction targets in this strategy are not ambitious enough, and the removal of mining emissions is obscuring our view of the scale of the problem and what needs to be done. We recommend that some of the Anticipated Greenhouse Gas Reductions listed here be more ambitious (e.g., more electric vehicles; higher proportion of community energy from electricity), and that this strategy be much more transparent with data on what the mining sector emissions have been historically.

This section includes an emissions reduction target labelled: Conducting energy efficiency retrofits and installing renewable heating systems in Government of Yukon buildings. In general this is a valuable target, but will not help in emissions reductions if biomass is included as "renewable", as we argue above. We recommend that the retrofitting of Yukon Government buildings with "renewable" heating systems should not include biomass systems. These may be renewable, but will not substantively

decrease carbon emissions and will lock the Territory into a long-term pattern of high carbon emissions from those sources.

### ***Actions sector by sector***

Generally speaking the lists of Actions proposed are good and well conceived, and illustrate serious attention to the question of “solutions” to the climate crisis. The major exceptions are the area of Biomass Energy which we have addressed above and do so again here to some extent, and the inadequate attention to the value of intact landscapes in carbon accounting (below under *Communities*).

### ***Transportation***

Actions #16 and #20 (and also #58 in a subsequent section) reference “clean” fuel sources, such as ethanol and biodiesel. These are hydrocarbons with high carbon emissions, so what is meant by “clean”? We understand that these biofuels may produce less emissions per volume burned than conventional fossil fuels (so might assist the achievement of some targets in the short term), but what is the basis for labelling them as “clean” in a full life-cycle analysis. For example, this strategy also refers to energy sources such as geothermal, solar, and wind as “clean”. Do biofuels really fit in the same “clean” category as geothermal, wind, and solar in terms of carbon emission per unit energy produced in a full life-cycle analysis (including land clearing, harvesting, processing and transportation)? We recommend that the document provide a definition of “clean” (in this specific context, which might be different than how the word is used elsewhere in the strategy for other fuel sources), a justification for putting biofuels in the same category as geothermal, solar and wind, and references to the science that supports the claim of lowered emissions from these fuels in a full life-cycle analysis.

### ***Homes and Buildings***

This section repeatedly asserts (e.g., Actions 47 through 52) that biomass energy should be used as a new system for heating buildings because it is low-carbon and renewable. In our reading of the science and the logic of the carbon cycle, biomass is not a low-carbon source of energy, and should not be viewed as a clean source of energy in this context. We detail the reasoning under *Ensuring reliable, affordable and renewable energy* above.

In addition, the list of Actions in this section includes #51 (Conduct a lifecycle analysis of biomass energy use in Yukon to identify recommended forest management practices to guide sustainable and low-carbon biomass harvesting). The inclusion of this Action suggests that the promotion of biomass energy is premature because this lifecycle analysis has not been done. It should have been done in a strategic environmental assessment of this technology in the climate change context before Governments latched onto this technology with the main purpose of creating economic activity. We have reviewed the science of this problem in some detail<sup>16</sup> and concluded that burning wood is not a low-carbon

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<sup>16</sup> Cooke, H. et al. 2019. Fire and Insects: Managing naturally disturbed forests to conserve ecological values. Conservation Series Report No. 12, Wildlife Conservation Society Canada, Toronto, ON.  
<https://www.wcscanada.org/Portals/96/Documents/Reports%20and%20publications/SalvageLogging-highres.pdf>



source of energy (see under *Ensuring reliable, affordable and renewable energy* above). We recommend that all initiatives to promote biomass energy be put on hold until this Action is completed.

Action # 50 (Regulate air emissions from biomass burning systems to minimize the release of harmful air pollutants) illustrates the problem of externalities or side-effects of the promotion of certain technologies in the so-called green or clean economy. Biomass energy produces significant emissions of volatile organic compounds and particulates which are already a health hazard in Whitehorse<sup>17</sup>. This problem is recognized again in Actions #102 and #103. These recognitions of a health problem lend additional evidence to the argument that biomass energy is not clean or green.

Action # 52 (Continue to use residual biomass fibre harvested during forest fuel management projects to provide a source of renewable biomass energy and increase the resilience of communities to wildland fire risk) seems to provide an argument in favour of biomass energy installations because there have been and will be certain volumes of “waste” wood (branches, slash, small trees and shrubs) left behind from activities aimed at reducing fire risk such as fire-smarting and cutting fire breaks. First, the volumes of wood fibre here are relatively small, after whole logs are removed, compared to overall space heating needs, and will not constitute a reliable source of fibre on an annual basis over the long term. Also, the carbon emissions from gathering and transporting this material to a central site have not been accounted for and will make the value of the exercise questionable. Perhaps most important, removing this wood fibre from where it grew results in removal of a substantial set of nutrients from the local plant communities compromising future plant growth, especially in Yukon with its nutrient-poor soils. This is on top of the same effect resulting from removing whole logs. A much more ecologically sustainable approach is to chip the “waste” wood material on site (as is often done along Yukon’s highway rights-of-way). Breaking it into small pieces will reduce its availability as fuel in a wild fire, and will encourage decomposition (slower ultimate emissions of its carbon to the air than burning it) and local recovery of soil nutrients. We recommend that this Action be removed from the strategy.

Overall, we recommend that biomass energy be removed from this document as a suitable replacement source of energy for space heating.

### ***Energy Production***

This section deals largely with the exploration and promotion of “renewable” energy sources to replace fossil fuels. This is good if those renewables do actually reduce emissions. Although biomass energy can be considered “renewable”, it is an energy source with high carbon emissions and should not be lumped with solar, wind and geothermal (as we discuss under *Reducing greenhouse gas emissions (Goal 1)* above). We recommend that biomass energy be removed from this document as a suitable replacement source of energy for space heating.

This section leaves out hydro-electricity generation in the discussion of renewables. This is a serious oversight. Although large-scale hydro-electricity generation with dams on major rivers should not be

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<sup>17</sup> Yukon Initiative for Healthy Air. [http://www.yukoncmoh.ca/files/YIHA-CMOH-Recommendations\\_2019.pdf](http://www.yukoncmoh.ca/files/YIHA-CMOH-Recommendations_2019.pdf)

pursued in the territory<sup>18</sup>, the strategy should give small-scale hydro generation associated with headwater lakes and associated small drainages serious attention, because these can be developed with relatively small ecological effects and footprints. Good examples from this region include the generating facilities associated with Surprise Lake and Pine Creek near Atlin, British Columbia, and with Dewey Lakes near Skagway, Alaska. We recommend that small-scale hydro-electricity generation be included in the list of renewable energy sources addressed by this section of the strategy, with Actions included to build on the serious work that has already been done to explore potential sites.

Action #68 (Research the potential to use nuclear energy in Yukon, including small modular reactors) is important and worth pursuing. We need to know more about this potential source of energy, especially as it might be employed at communities and mines..

### **Communities**

We are particularly interested in the section: *Respond to the impacts of climate change on wild species and their habitats.*

We are disappointed that this topic is placed within the Human Communities section of the strategy. The whole topic of natural environments, and their full suite of habitats from water bodies to wetlands and forests, deserves a section of its own in the strategy. And it deserves expansion beyond the small set of Actions now in the draft strategy. This is mainly because intact landscapes (i.e. those without human modification) are themselves part of the solution to the climate change problem. We recommend that the strategy include a section, at the same organizational level as Transportation or Energy Production, dealing with Natural Ecosystems.

Why is this so important? First, on an annual basis intact landscapes absorb massive amounts of carbon. Annual carbon absorption or removal from the atmosphere is one the two cornerstone policy imperatives for solving the climate crisis, the other being reducing emissions (which is a primary focus of much of this strategy). When left intact, wild landscapes will continue to absorb carbon. When they are disturbed (such as by new road developments, timber harvesting, infrastructure development), the rate at which they absorb carbon decreases. Yukon's intact landscapes are providing an immense ecosystem service to not just Yukoners but globally. This needs to be explicitly recognized with associated Actions in the strategy.

Second, intact landscapes are currently storing huge amounts of carbon in plants, soils, and water. Disturbance of landscapes by people and fires causes much of the stored carbon to be emitted to the atmosphere, in the short-term by burning, and in the longer term through faster decomposition from dead plants, soils and permafrost which will melt faster. Carbon storage is another massive ecosystem service provided by Yukon's intact landscapes.

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<sup>18</sup> von Finster, Al and Donald Reid, 2015. Potential Impacts and Risks of Proposed Next Generation Hydroelectric Dams on Fish and Fish Habitat in Yukon Waters. Wildlife Conservation Society Canada Conservation Report No. 8. Toronto, Ontario, Canada. Available at: <https://www.wcscanada.org/Publications/Conservation-Reports.aspx>

We recommend that the strategy explicitly recognize the ecosystem service provided by intact landscapes in Yukon and that these services have value and benefit at least nationally if not globally.

We also recommend that the strategy include an Action to better quantify the scale of these ecosystem services (carbon absorption and carbon storage) and how they vary geographically around the Territory, and how they are affected by human and wildfire disturbances.

Wild fires turn carbon stores into atmospheric carbon, and therefore are a huge problem in the climate change crisis. In the context of risk of increasing fire frequency and severity (which the strategy needs to acknowledge), we need to better target our fire-fighting to reduce the risk of losing mature and old growth forests. These forests are likely to be reduced in extent by fire, below their historical extent regionally, and have particularly high habitat value for focal wildlife (e.g., caribou winter ranges, riparian bird communities). They are often the landscapes with highest carbon storage. We also need to better understand what factors are driving so many human-caused fires in the territory, how those relate to specific human activities, and how they can be reduced.

We recommend that the strategy include an Action to direct the prioritization of fire-fighting efforts based on the mapping of existing carbon storage and absorption capacity (noted above), plus mapping of old growth forests with particularly high wildlife habitat values.

We recommend that the strategy include an Action to develop policy recommendations on how to reduce fire risk, based on improving our understanding of how land use practices (e.g., mineral exploration and extraction, agriculture, and new road access) affect fire risk, the incidence and patterns of human-caused fires, and fire regimes.

In the draft strategy, the whole topic of wild species and habitats (better described as Natural Environments) is only noted as having importance under the Goal – Adapting to climate change. This is a large misrepresentation of the importance of Natural Environments in the full suite of goals in this strategy. There are carbon and economic benefits to be derived from protecting intact landscapes and associated ecosystems and biodiversity. Keeping landscapes intact is a strategy that directly supports Goal 1 – Reduce greenhouse gas emissions – because these landscapes generally emit less than human influenced landscapes, and emissions need to be viewed in a carbon budgeting or net sense with absorption from the atmosphere built into the equation. Keeping landscapes intact is a strategy that directly supports Goal 4 – Build a green economy – because intact landscapes provide the habitat for fish and wildlife that support the traditional economy and local foods, they provide natural resilience to extreme weather events such as heavy precipitation and flooding, and they are the foundation of the ecotourism and outfitting industries. We recommend that the strategy more realistically depict the role of Natural Environments in fulfilling the Goals of the strategy.

Under the objective *Respond to the impacts of climate change on wild species and their habitat* we generally support the various proposed Actions (91 through 95). However, this Objective only talks about “responding” to change. We can do much better than that. We must be pro-active if we are going to adequately deal with climate change impacts on ecological systems. We need to plan, set goals, identify indicators, monitor, conduct research, and then adapt management (i.e. respond) as necessary.

There is a large body of scientific research, modelling and thinking that Yukon Government needs to be part of, and which WCS Canada is pursuing to some extent, that can help with a pro-active planning approach to mitigating the risks ahead. We recommend that the wording of this Objective be changed to reflect greater urgency and opportunity for pro-active effort in this regard, rather than passive waiting to see what will happen.

Four of five Actions in this section use the verb “continue”. However, it is not clear to us that Yukon Environment is actually involved in or has accomplished much in regard to “establishing a network of protected areas in response to climate change”, or in “developing solid research programs to assess the impacts of climate change on ecosystems”. So, continuation needs more evidence to assess. Also, these endeavours will require significant new investments to the budgets of Yukon Environment to achieve results, and such investments need to be earmarked in the final strategy. We recommend that the strategy include some text to show the current state of achievement in these “continuing” Actions.

### ***Innovation***

No specific comments

### ***Leadership***

#### ***Ensure the goals of this strategy are incorporated into government planning and operations***

Action 122 (Create a Clean Energy Act that legislates our greenhouse gas reduction targets, renewable energy generation targets and our commitment to energy efficiency and demand-side management to hold the Government of Yukon accountable to the commitments in this strategy). This is an important Action that we support. We need clear legal definitions of “clean” in an energy production context, and legislated carbon emissions targets are important to avoid potential future political indifference to the issue. We recommend that this Action be kept and supported.

Action 123 (Consider greenhouse gas emissions and climate change adaptation in major Government of Yukon policies, programs and projects by applying a climate change lens to decision-making). The verb “consider” is too weak in this context. Building a climate change lens into decision making is essential given the current crisis. We recommend that the wording in this Action be changed: “Apply a climate change lens regarding greenhouse gas emissions and climate change adaptation in all major Government of Yukon policies, programs and projects”.

#### ***Increase public awareness of this strategy and how businesses and individuals can make a difference***

Action 133 (Implement a Yukon-wide information campaign about climate change, energy and green economy). We agree that this is an important Action if it is complete and factually accurate in its messaging. We have raised two serious concerns throughout our review, - one about the inaccuracies of promoting biomass energy, the other about the serious omission of the role of intact landscapes in climate change mitigation and adaptation. We recommend that any “information campaign” needs to inform Yukoners that i) biomass is roughly equivalent to fossil fuels in contributing to our short-term

carbon emissions and ii) Yukon has a unique opportunity to manage its carbon budgets by protecting its intact landscapes rather than developing them.



January 17, 2020

Aletta Leitch  
Climate Change Secretariat V-205  
Box 2703 Whitehorse, Yukon Y1A 2C6

Re: Our Clean Future, the draft climate change, energy and green economy strategy for Yukon

Dear Ms. Leitch,

Thank you for providing the Wildlife Management Advisory Council (North Slope) (the Council) with the opportunity to review this draft Strategy. The Council applauds Government of Yukon's efforts to address the climate emergency. The environment influences every aspect of Inuvialuit life, and although there are no permanent settlements on the Yukon North Slope, it remains the 'breadbasket' for many Inuvialuit and provides opportunities for Yukoners and others to experience a truly spectacular intact landscape as visitors. All actions that Yukon and other jurisdictions take to reduce greenhouse gas emissions will be beneficial for the ecosystems of the Yukon North Slope and the ability for Inuvialuit to access those ecosystems for traditional use purposes.

The Council is currently developing a *Wildlife Conservation and Management Plan for the Yukon North Slope*, a draft of which has been reviewed by Yukon. The Council is pleased to see that this Climate Change strategy aligns with the vision in the draft *Wildlife Conservation and Management Plan for the Yukon North Slope* when it comes to planning for climate change related impacts to species and their habitats as well as planning for sustainable harvest of wild populations given future climate-related uncertainty. The Council looks forward to working with Yukon and other partners on implementing the actions in this Strategy that apply to the North Slope. That said, the Council has a number of suggestions for strengthening the Strategy, especially where it pertains to wildlife populations and habitat.

Firstly, the Council is in strong support of Action 123 "Consider greenhouse gas emissions and climate change adaptation in major Government of Yukon policies, programs and projects by applying a climate change lens to decision-making". This is the type of action that shows leadership in the face of a climate emergency and can encourage innovative policies and decisions. In a final strategy, the Council suggests adding more detail as to how this commitment will be implemented. This would include explicit criteria for how policies and decisions will be informed by the assessment of associated climate impacts.



A central focus of the strategy is on mitigation and adaptation strategies. Guidance is needed in how policies, programs, other undertakings and developments will be assessed in Yukon government decision-making – for instance in Decision Documents issued by Yukon with regard to assessments conducted by the Yukon Environmental and Socio-Economic Assessment Board. These types of decisions require information that identifies policies, programs, developments and related activities that both contribute to and *hinder* the achievement of GHG emission targets. It would be helpful to provide discussion of what actual analysis will be done to determine the extent to which an initiative or project would hinder or contribute to meeting Yukon’s and Canada’s climate change commitments. This is a key requirement for consideration by decision makers. Without clarity on how the key analysis will be done, there is no transparency and reduced confidence in predictability and consistency in decision making.

We encourage Yukon to continue following in the footsteps of New Zealand to develop a tool to estimate emissions impacts from various policies or decisions and that this tool and other accounting methodologies should be transparent and publicly available. It is not clear whether Yukon will undertake estimates of downstream emissions to reduce emissions. Downstream emissions will affect atmospheric loadings of GHG in the same way as project and upstream emissions. Determination of net positive and adverse downstream emissions is complex, but not impossible to do in pragmatic and even-handed way.

The Council understands the effort that has been made to keep this strategy high level and accessible. For an all-encompassing, complex issue like climate change, it can be difficult to categorize mitigation and adaptation actions into discrete categories. We noted that the actions related to wildlife and wildlife habitats (actions 91-95) fall into the Communities section. These actions (with the exception of 94) are focused on basic knowledge and monitoring. While these activities are essential, turning knowledge into action is equally important.

The Council recommends expanding this set of actions and, if appropriate, building out an ‘ecosystems and traditional use’ category or section of the Strategy (which would also include actions 96-100). The connection of traditional use to landscapes and ecosystems underlies the very sustainability of traditional use and its importance to Yukon communities. For example, it is made explicit as a defining purpose of the Yukon Environmental and Socio-Economic Assessment Act ((S. 5(2)(e)) in project assessments.

Some suggestions include:



- Action 95 “Continue to track new and invasive species to Yukon that could impact ecosystems and biodiversity” can be expanded to include measures to limit the spread of invasive species
- Tracking wildlife disease is important in light of climate change (warmer temperatures can change disease dynamics) and can be a secondary impact of invasive and new species. Monitoring disease and taking measures to limit the spread of disease is an action that the Council suggests adding to the Strategy. This action could appear in ‘wild species and habitats’ (91-95) as well as ‘sustainable local harvesting and food production’ (86-90)
- Actions 91-93 are very important. The Council recommends adding to these actions specific language relating to understanding which watersheds, wild populations and wildlife habitats will be more resilient to climate change and which will be more vulnerable, and applying management actions based on this understanding of vulnerability/resilience
- Action 94 speaks to “building a network of protected areas and other lands that allow native species to move, adapt and survive in the face of climate change.” The Council is in full agreement with this action. We suggest adding language that speaks to the fact that network conservation/protected areas should be managed adaptively, given the uncertainty of climate change effects. This includes consideration of flexible boundaries, as species ranges shift.
- For Action 93 “identify and monitor key species...” we recommend adding language related to taking measures, where appropriate, to conserve populations of key species (umbrella species, keystone species and important cultural/traditional use species). Conserving these types of species is anticipated to have indirect positive effects for other wild species sharing the ecosystem.
- Recent academic studies have demonstrated that biodiversity is highest on Indigenous-managed lands (<https://news.ubc.ca/2019/07/31/biodiversity-highest-on-indigenous-managed-lands/>). Maintaining biodiversity is critical as part of adapting to climate change. For this reason, the Council suggests an action relating to supporting and enhancing Indigenous management of biodiversity in Yukon. The Council also suggests adding an action relating to supporting Indigenous guardian and monitoring programs, as these programs provide support for active Indigenous and federal and territorial government ecosystem management.
- Indigenous people are not only a critical part of ecosystem management, but are often on the front lines of climate change, experiencing change in real time. Monitoring programs are increasingly becoming the norm and on the land observations are increasingly collected in a systematic fashion. This information will be critical for understanding climate change impacts and information adaptation strategies. The





Council suggests adding an action speaking explicitly to valuing and considering both scientific knowledge and Indigenous knowledge in managing ecosystems and developing measures to adapt to climate change.

- The Council is in support of action 98 and recommends that a complementary action be added to raise awareness of other important changes in species habits and what this means for land users (e.g. changes in critical nesting sites for birds, migration pattern changes for species and how people can ensure that their activities out on the land do not disrupt these critical activities) at a time of heightened vulnerability to environmental and human stressors.
- The Council is very supportive of actions 99-100 and looks forward to seeing their implementation.
- The Council would like to see actions speaking to the increased likelihood of marine access to Yukon's north coast, due to climate change impacts reducing the presence of sea ice, and the implications this has for vulnerable coastal ecosystems and species already undergoing climate-related stress. An increased presence on the northern coast (via Indigenous guardians or other programming) could be an avenue for monitoring impacts to vulnerable ecosystems and species and informing adaptation strategies.

For the Yukon North Slope, the Council is recommending in its draft *Wildlife Conservation and Management Plan* that greenhouse gas emissions related to activities on the Yukon North Slope be reduced. A large component of North Slope activities is related to the operation of Herschel Island Qikiqtaruk Territorial Park. The Council is supportive of the draft Strategy's actions pertaining to reducing emissions related to Government of Yukon procurement and operations, as these actions will help reduce the climate footprint of operations on Qikiqtaruk.

Thank you for considering the Council's comments on the draft Strategy. The Council looks forward to working with Yukon and other relevant parties to implement actions pertaining to the Yukon North Slope. If there are any questions, please contact the WMAC NS office at [wmacns@wmacns.ca](mailto:wmacns@wmacns.ca) or 867-633-5476.

Sincerely

A handwritten signature in black ink that reads "Lindsay Staples". The signature is written in a cursive, flowing style.

Lindsay Staples



January 17, 2020

Aletta Leitch  
Senior Project Manager  
Climate Change Secretariat V-205  
Box 2703 Whitehorse, Yukon Y1A 2C6

Via email: Aletta.Leitch@gov.yk.ca

CC: Shane Andre, Director, Energy Branch, Department of Energy, Mines, and Resources

The Yukon Conservation Society (YCS) is a grassroots environmental non-profit organization, established in 1968. We pursue ecosystem well-being throughout the Yukon and beyond, recognizing that human well-being is ultimately dependent upon fully functioning healthy ecosystems. Through a broad program of conservation education, input into public policy, and participating in project review processes, we strive to ensure that the Yukon's natural resources are managed wisely, and that development is informed by environmental considerations.

We are pleased to provide our comments on “Our Clean Future”. It is an important document for Yukoners. It sets a tone of both necessity and opportunity and communicates urgency and practicality. It is a significant positive step toward addressing the reality of climate change and biodiversity loss in Yukon.

Our submission follows the organization of “Our Clean Future” and begins with overarching comments followed by more specific comments with examples. An addendum provides our comments per section.

YCS appreciates that the document alerts readers to the dire consequences for our society—our heritage, our culture, our way of knowing—if we fail to take immediate action to address the dual challenges of Climate Change and Biodiversity Loss.

We are pleased that the document acknowledges that in many circumstances we are data deficient or put another way, don't have the baseline data from which we can measure change—for good or bad (e.g. actions #91–#93). This recognition is particularly important because without baseline data from which to detect and measure change, we are missing information necessary to achieve social and ecological resilience.

At YCS we observed that some sections have clear targets to report against. Other sections in the document report actions that do not have clear targets associated with them. It appears that the actions with the least number of clear targets fall outside of transportation, homes and buildings, and energy production, leaving communities, innovation and leadership with less precision. We caution that introducing actions with “continue to”, “explore”, “investigate” or other words of intent that are not followed up with a numerical target, frequency or intensity, make actions difficult or impossible to measure and report against. Therefore, **YCS recommends a hard review of each of the actions with the intent to identify an associated target for each action.** We ask this because without clear and measurable targets from which adjustments can be made (adaptive management), a positive prognosis



for Yukon's future is difficult to envision. For example, a Yukoner born on January 1, 2020 and who lives 80 years without the benefit of clear targets risks welcoming a new century that is naturally impoverished and unhealthy. Therefore, **we call on the Yukon government to be decisive and bold in setting targets throughout the document where there are presently none.**

## Vision

YCS is impressed that at the outset it speaks about ecosystems and our place in them as we address climate change. This is a very important positional statement that drives home humanity's place in the world at a time of urgent need to address biodiversity loss and climate change. **YCS supports the vision for "Our Clean Future" and encourages including the following words at the end of the vision:**

"Our vision is to come together as leaders to address climate change by building thriving, resilient communities powered by clean energy and supported by a sustainable green economy **that maintains net zero GHG emissions**".

We suggest the additional words to acknowledge the future state that is necessary for the survival of social and ecological systems that support Yukon and Yukoners. We were also struck by the importance of what a circular economy achieves. Circular economies rely on renewable energy, cradle-to-cradle design, reuse, and recycling. YCS observes that bringing forward in the document the importance of what a circular economy is and does, may contribute to the transformative change that is necessary for Yukon.

## Values

The values as presented are important because they apply to decision-making associated with both social and ecological systems necessary to sustain Yukon into the future. The values are cross-cutting and hold decision-makers accountable for their application in each of the actions identified. YCS offers one modification to an existing value and introduces a new value that reflects the importance of Yukoners' full participation in the actions described.

Presently, the wording for the value "Respect our Natural Environment" is: "We will recognize the inherent value and importance of our natural environment and prioritize solutions that harness natural capital and ecosystem services". **YCS recommends the following wording: We will recognize the inherent value and importance of our natural environment and prioritize solutions that protect, conserve and harness natural capital and ecosystem services.** The terms "protect" and "conserve" are critical concepts because they drive actions that must achieve reductions in the rate of biodiversity loss, increase the likelihood species will continue to persist in Yukon and acknowledge adjustments are needed to our way of life in order for it to be sustainable. Particularly through achieving reductions in GHG emissions.

**The new value we recommend considering is equity.** Traces of what makes something equitable are found in the values "empower everyone", "raise awareness" and "support reconciliation". We believe that given the magnitude of the effects of climate change and biodiversity loss, that all Yukoners over time, must have equitable access to information, knowledge, learning, decision-making and problem solving. Efforts associated with achieving equity also strengthen the systems necessary to achieve community resiliency.



## Goals

YCS is pleased that the goals are time bound (10 years) and reflect important topics. We offer the following comments about each.

### **Goal: Reducing Yukon's greenhouse gas emissions.**

The Intergovernmental Panel on Climate Change has stated (IPCC 2018) that to stay within 1.5°C global warming, anthropogenic CO<sub>2</sub> emissions would need to decline by about 45% from 2010 levels by 2030 and reach net zero around 2050. YCS believes that in Yukon more should and can be done to achieve the IPCC levels of GHG emissions reductions by 2030. We also believe it is important to set a goal for net zero GHG emissions.

**We recommend the Yukon government set a target of 45% reduction by 2030 and of net zero GHG emissions by 2050.** We make this recommendation because research into climate change effects in Northern regions indicate increased warming at rates faster than what has been previously projected for elsewhere in the world. "Our Clean Future" calls for preparing for future conditions that assume "that global greenhouse gas emissions will continue along the current path when predicting the risks that we will face" (p 13). We agree and suggest the likelihood that temperatures in Yukon will be greater than what has been predicted and therefore Yukon's steps to reduce GHGs and prepare for a warming climate is that much more urgent with less time to affect necessary changes.

**YCS believes that "Our Clean Future" should include a section looking forward to a net zero 2050 world.** We must all recognize that the necessary societal changes in GHG emission do not stop at the year 2030. While there might not currently be a plan with actions to reach net zero in Yukon, it is important to demonstrate that the "Our Clean Future" strategy is a partial strategy that will guide us a good part of the way towards where we, as a society, ultimately need to end up with net zero GHG emissions.

We would like to draw your attention to two recommendations related to mining that we submitted in our December 17<sup>th</sup>, 2018 submission, for the initial consultation phase. Both these recommendations are muted or absent as a result of the wording presented under "Additional action on mining", found within the "Goals" section. They are:

Require all new mines to contribute new clean energy infrastructure to Yukon or finance energy efficiency and conservation initiatives that have lifetime GHG emissions reductions equal to the mine's lifetime emissions.

And

YCS recommends that Yukon government modernize mining royalties, being sure to fairly include affected First Nations in the agreement and use the raised funds to support our transition to a green economy.



These two points are germane to this submission in that “Our Clean Future” states in part:

In the past, Yukon’s greenhouse gas emissions have gone up and down, driven in large part by the level of mining activity in the territory. While our greenhouse gas reduction target will ensure we see a decrease in emissions from transportation, heating and other areas, we also need a plan to address greenhouse gas emissions from mining and other industrial activities. Over the next several months, we will work with industry to set an intensity-based target for mining that will see our mines produce fewer emissions of greenhouse gases across their lifecycle for every kilogram or kilotonne of material produced. This intensity-based target will encourage industry to look for innovative ways to reduce energy use and greenhouse gas emissions from mining, regardless of how many or few mines are in operation at any time. If mining were incorporated into Yukon’s overall greenhouse gas reduction target, there is a risk that a decrease in mining activity could cause us to reach our target, resulting in less motivation to reduce greenhouse gas emissions from transportation, heating and other key areas. (p. 9)

YCS is deeply concerned that Intensity-based targets just for Yukon’s mines disrupts what otherwise is a strong message by the Yukon government about the importance of all Yukoners doing their part to help reduce GHGs. “Our Common Future” is meant to reduce Yukon’s entire GHG emissions. Instead, the strategy is communicating to Yukoners it is permissible to increase GHG emissions as long as it can be done efficiently in the mining sector. To address this worrisome direction, options need to be explored that result in mines using energy sources other than ones that pump carbon into the atmosphere.

If Yukon is to have both mining and reduction in GHGs then the balance sheet for net GHG reduction must take into account increases created by intensity-based production. This diffusion of responsibility to others means that increases from mining must be offset by others. Only then will Yukon realize an actual decrease in greenhouse gas emissions. This scenario returns us to our two early recommendations.

The first recommendation is responsive to intensity-based targets in that those responsible for increasing GHG emissions are also contributing to new clean energy infrastructure in Yukon and/or financing energy efficiency and conservation initiatives throughout Yukon that prove GHG emissions reductions – equal to the mine’s lifetime emissions. This may mean that biofuel boilers in Yukon communities are partially funded by mining operations, or electrification of the Alaska Highway is achieved. Perhaps more importantly, invention and innovation is promoted as a result of money available to support creativity and problem solving. The idea of green development investment is also reflected in our second point about mining royalties.

Our second recommendation strikes at investing in Yukoners’ ability to innovate and contributes to what is partially necessary to achieve resiliency in Yukon communities. YCS believes that mining royalties must be modernized to raise funds to support Yukon’s transition to a green economy. Therefore, given the indication that the Yukon government is considering the application of intensity-based targets, **YCS again recommends:**



**Require all new mines to contribute new clean energy infrastructure to Yukon or finance energy efficiency and conservation initiatives that have lifetime GHG emissions reductions equal to the mine's lifetime emissions.**

**And**

**YCS recommends that Yukon government modernize mining royalties, being sure to fairly include affected First Nations in the agreement, and use the raised funds to support our transition to a green economy.**

A sincere worry by YCS is that a “business as usual” approach is unintentionally being promoted as a result of choosing intensity-based targets for mining. What is preferred by YCS is an intensity and urgency-based shift in our focus and behaviours to immediately address our changing climate and move toward a circular economy. **Intensity-based targets could contribute to increased GHG emissions, and this is simply not an option, thus YCS is strongly opposed to intensity-based targets.**

**Goal: Ensuring reliable, affordable and renewable energy**

*Electricity:*

YCS is pleased that the strategy commits to ensuring “that at least 93 per cent of the electricity we use comes from renewable sources, even as demand grows” (p. 10). However, **YCS believes that 98% of the electricity we use should come from renewable sources** and that this is achievable by 2030 through intentional, focused and planned investment in new electricity generation from renewables that are more abundant in the winter. YCS believes that the renewable electricity research and development should focus on first wind, hydro, and potentially wood biomass combined heat and power and other options as they appear more viable.

We also note that an extra action item that focuses on identifying and pursuing pumped hydro energy storage should be included in “Our Clean Future”. **YCS encourages the Yukon government, and the Yukon Energy Corporation to collaborate with interested stakeholders to pursue a comprehensive analysis of pumped storage potential in the territory.** The analysis should build on past studies and incorporate new information as well as the perspectives of the First Nations whose territories contain the potential sites.

YCS recognizes that wood biomass heating is a popular choice in the Yukon. We are also aware that biofuels are an attractive option given Yukon's fire history and elevated concern about fire risk to communities (for example Actions #81 and #82). YCS supports the idea of biofuels as an alternative to fossil fuel energy sources but cautions describing it as a low carbon emitter. **YCS recommends the Yukon government collaborate with interested stakeholders to pursue a comprehensive analysis of the effective use of wood biomass as part of providing for Yukon's energy needs and achieving net zero GHG emissions by 2050.**



YCS would like to point to the statement in the first paragraph on page 10: “as Yukoners increasingly invest in electric vehicles and electric heating technologies... demand for electricity will grow.” We address this in the following two sub-sections as electricity for transportation and heating will likely play a significant role in the Yukon energy context.

## *Transportation and Heating*

YCS notes that the strategy commits to 40% of our heating needs to be met by renewable energy sources by 2030, however the strategy makes no target commitments to transportation.

In the first part of the above statement, about 26% of the Yukon’s heating needs are presently being met by wood heat and renewable electricity. YCS points out that the strategy as framed is committing to only a 14% reduction in fossil fuel used for space heating by 2030. YCS will address in the following sub-section how this can be improved.

Addressing the second part of the above statement YCS is encouraged that the Yukon government has been contacting local vehicle dealerships in Whitehorse about increasing the availability of electric vehicles (EVs) in the Yukon marketplace as stated in Action #1 (page 24). YCS is also very pleased that Yukon government has already begun installing EV charging stations and committing to Action #4 to bring EV accessibility to all Yukon road-accessible communities by 2027. There is growing evidence that EVs will overtake fossil fueled vehicles over the coming decades and this will require more renewable electricity generation on the Yukon grid (CBC, 2019).

## *Electricity for Transportation and Space Heating*

Approximately 700 GWh of new electricity will be needed annually to replace the fossil fuels presently being used to power the (ground) transportation (300 GWh/yr) and space heating (400 GWh/yr) needs in the Yukon (Pinard, 2019). This is compared to 450 GWh of electricity that is presently used on the Yukon grid today.

YCS suggests that the Yukon government use the IPCC report recommendations of replacing 45% of our fossil fuel consumption by 2030, and here in Yukon focus on transportation and space heating. The 700 GWh of energy needs met by fossil fuels will require 330 GWh of new renewable electricity generation by 2030.

There are six small hydro projects identified in Yukon Energy’s 2016 Resource Plan that could provide a total of 370 GWh annually of firm hydro energy generation potential along the Yukon Grid. These projects range in average cost of \$0.12 to \$0.19 / kWh. Combined, these hydro projects would add up to about 44 MW of dependable power capacity. To make up for some of the annual energy shortfall, about 150 MW of new wind farms (assuming 23% capacity factor) totalling about 300 GWh of annual generation could be built (The other 30 GWh could be met in the space heating sector with heat from wood biomass). The Eva Creek 25 MW Wind Farm 100 km southwest of Fairbanks sells its electricity for 12.5 ¢ (9.5 US¢) per kWh. YCS believes that a larger 50 MW wind farm, possibly situated on Mt Sumanik,



should be closer to 10 ¢ per kWh. A 50 MW wind farm could heat 5000 homes with 68 GWh of electricity (Wong and Pinard, 2017) and reduce the use of diesel-generated electricity.

YCS has identified the following projects that should be considered and could be built in the next 2 to 5 years:

1. 4 MW on Haeckel Hill near Whitehorse	8	GWh
2. 50 MW wind on Sumanik near Whitehorse	100	GWh
3. 20 MW wind on Montana Mt near Carcross	40	GWh
4. 8 MW hydro near Atlin	46	GWh
	<u>194</u>	<u>GWh</u>

This 194 GWh of possible new renewable electricity generation would represent 28% of the current 700 GWh of energy needed for transportation and space heating. These four new projects could be built by 2025.

**Therefore, YCS recommends that:**

- **The Yukon government set an aggressive target that even as demand grows, 98% of the required electricity originate from renewable sources.**
- **The Yukon government set a target that by 2030, there is a 45% reduction in fossil fuel usage from transportation and space heating.**
- **In consultation with others, the Yukon government prioritize new renewable energy developments by type. For example, wind first, then hydro, solar photovoltaic (PV), and wood biomass.**

## **Goal: Adapting to Climate Change**

Biodiversity loss and Climate Change are two sides of the same coin. We must achieve GHG reductions in order to improve the conditions for nature and our place in it. Increases in temperatures to northern environs are at least 2.5 times faster than in southern Canada, and recent literature reporting mean annual winter warming in the arctic could reach 7 ° C by the end of the 21<sup>st</sup> century (Post et al., 2019) demands we know what is happening to the ecosystems that support all life in the north. We must do our best to understand the changing circumstances and decide what to do about it. Fundamental to understanding and taking action are monitoring and measuring rates of change from baselines to targets. Because of Yukon’s absence of key ecosystem data, significant investment by the Yukon government in both hard and soft sciences is required.

YCS firmly believes that slowing the rate of biodiversity loss in Yukon is a critical issue for the continued health and well-being of Yukon society and for the wild species that are experiencing loss. “Our Clean Future” includes many actions that will improve living conditions for nature and people. YCS is pleased to see a number of actions identified in the draft that we made recommendations about in our December 2018 submission. We are particularly pleased with Actions #91 – #95 as they are critical steps to ensuring a future that includes wild animals, wild nature and Yukon wilderness. **We suggest that emphasizing biodiversity loss and the need to address it in the next iteration of the strategy is necessary.** Later in this document we provide specific comment on the actions related to wild species and their habitats.





Here though, we wish to recognize the importance of actions like, “continue to incorporate active transportation in the design of highways and other Government of Yukon transportation infrastructure near communities” (Action #13), not only as a way to address individual Yukoner contributions to GHGs but also as a strategy to connect people with nature. YCS believes that connecting people with nature is an essential strategy to help Yukoners understand our place in the ecosystem and as a direct result, improve the physical and mental health of Yukoners (Hayes et al., 2018; Tillmann et al., 2018). It is a link that if made here and repeated in other actions will result in connecting “hard” sciences with “soft” sciences. This connection between hard and soft sciences ultimately improves community resilience and demonstrates the need for systems thinking to form how decision-making can take place that is bold and outside a “business as usual” approach to establishing priorities.

Following from the above discussion, YCS offers two recommendations: Firstly, **YCS recommends that a series of actions be written that specifically address the need to connect people with nature.** We believe “Our Clean Future” will be improved by strengthening the message that humans are part of nature and that by increasing active connections with nature we are improving our physical and mental health while also increasing our appreciation for our place in the natural world (Buckley et al., 2019; Sandifer et al., 2015). We note that illustrative representation of improving mental and physical health and connecting people with nature are absent from the figures associated with “Yukon in 2030” (p. 17) and “Reaching our Targets” (p. 19). Perhaps adding a symbol in the Yukon 2030 graphic that represents physical activity, such as a hiker in profile, will help communicate the importance of personal choice in reducing GHGs and building community resiliency. Similarly, adding another hexagon with the wording “visit parks to learn about biodiversity” and one that reads “visit nature and improve your well being” may assist in communicating how individual choices will power achieving “Our Clean Future”.

Secondly, to help achieve the necessary shift to transformative action, **YCS recommends that the Government of Yukon determine whether there are enough social scientists within the public service to inform and advise government on steps to achieve community resiliency and address community vulnerability in the face of a changing climate. We further recommend that these findings form appropriate actions in the next draft of “Our Clean Future”.**

YCS also believes that in order for Yukon to absorb the shocks that will come from climate change i.e. increased wildfire numbers and intensities, changing precipitation patterns, northern migration of southern species, arrival of southern species, increased invasive species, and melting permafrost, Yukon would be wise to take steps to set aside at least half of Yukon lands and waters for conservation purposes by 2030 (Coristine et al., 2018; Dinerstein et al., 2019; Kopnina, 2016). Such a target will mobilize cross-sections of society to come together to achieve certainty for responsible development while taking urgently needed steps to ensure the health and well being of all species that rely on the natural environment for their existence. **Therefore, YCS recommends that at least half of Yukon lands and waters be set aside for conservation purposes by 2030.** This target would fit well under “Respond to the impacts of climate change on wild species and their habitats” (p. 46).

Given the commitments in “Our Clean Future” to position Yukon as a leader in addressing Climate Change, then as part of resiliency planning, serious consideration must be given by decision-makers to the public good this target represents. Setting aside half a landscape not only ensures development will continue because ecological and social systems necessary to support development are functioning, it



represents prudent leadership in the face of uncertainty. It is also a foundational step toward moving away from “business as usual” thinking and catalyzing transformative change.

## **Goal: Building a Green Economy**

YCS supports the description provided in “Our Clean Future”. We also wish to acknowledge that much of what we recommended in our December 2018 submission about achieving a sustainable green economy has been accounted for in this draft of “Our Clean Future”. Here, we wish to reiterate the importance of addressing equity as it relates to communications, learning, knowledge generation, workforce development, and innovation.

Part of building a green economy entails fostering a community of innovation and invention. The necessary societal changes to reach net zero GHG emissions by 2050 will require that all aspects of society participate in the change and move to a sustainable green economy. Mining is a large part of Yukon society and based on the scientific literature, no continents, countries or industries are exempt from the planetary effects of CO<sub>2</sub> concentrations. Therefore, the Yukon mining industry will also need to undergo substantial change. Bringing that industry on board as part of the solution to climate change can be achieved by providing opportunities and pathways within the new green economy. Perhaps there are doors being shut in some ways, but with innovation and invention there are new doors opening to new opportunities. YCS recognizes that where countries in northern latitudes have realized behavioural shifts to a net zero future, these examples can inform and inspire change here at home.

## **Conclusion**

YCS is impressed with the draft of “Our Clean Future”. The majority of its content represents necessary change for Yukon to adapt to climate change and address biodiversity loss. Having said this, we are not confident that Yukon has the benefit of time. We feel a great sense of urgency associated with the need for change, meaning a decisive step away from a business as usual approach to growth and development in Yukon. With this in mind and acknowledging that “Our Clean Future” is a strong document, we believe it can be improved. Following is a synopsis of our recommendations and suggestions.

We look forward to reading more targets associated with stated actions.

We believe “Our Clean Future” must set a more aggressive 45% GHG reduction target and that a net zero target for GHG emission be set for 2050.

We suggest adding the words “protect” and “conserve” to the value “Respect our Natural Environment”.

We recognize equity as a value that is missing from the document.

YCS believes that “Our Clean Future” should include a section looking forward to a net zero 2050 world.

Intensity-based targets could contribute to increased GHG emissions, and is simply not an option, thus YCS is strongly opposed to intensity-based targets.



We recommend all new mines contribute new clean energy infrastructure to Yukon or finance energy efficiency and conservation initiatives that have lifetime GHG emissions reductions equal to the mine's lifetime emissions.

We see our current mining royalty regime as a systemic barrier to necessary financial resources to implement "Our Clean Future".

We believe that a more aggressive target of 98% of the electricity we use should come from renewable sources.

YCS recommends the Yukon government, and the Yukon Energy Corporation collaborate with interested stakeholders to pursue a comprehensive analysis of pumped storage potential in the territory. The analysis should build on past studies and incorporate new information as well as the perspectives of the First Nations whose territories contain the potential sites.

YCS recommends the Yukon government collaborate with interested stakeholders to pursue a comprehensive analysis of the effective use of wood biomass as part of providing for Yukon's energy needs and achieving net zero GHG emissions by 2050.

We encourage the Yukon government in consultation with others to prioritize new renewable energy developments by type. For example, wind first, then hydro, solar photovoltaic (PV), and wood biomass.

We think that connecting people with nature is a key strategy that is absent from "Our Clean Future".

We encourage the Yukon government to examine local capacities related to natural and social sciences, and engineering to ensure the expertise is available to assist in decision-making associated with "Our Clean Future".

We believe in order to position Yukon to be able to respond to the uncertain future that comes with climate change, that at least half of the Yukon be set aside for conservation purposes by 2030.

We suggest that emphasizing biodiversity loss and the need to address it in the next iteration of the strategy is necessary.

We are hopeful that given the urgency to enact the changes necessary for Yukon to thrive during the decades ahead, the need for transformational change, not more of the same or a "business as usual approach" to decision-making and investment in Yukon is understood.

YCS encourages the next draft of "Our Clean Future" to address aspects of a circular economy in relation to mining.

We recognize that where countries in northern latitudes have realized behavioural shifts to a net zero future, examples from them can inform and inspire change here at home.



YCS appreciates that much of what needs to be done to achieve “Our Clean Future” is dependent on individual Yukoners making decisions about nearly every aspect of their life. This is a big ask but one that is necessary. Over the last 51 years, YCS has been instrumental in rallying Yukoners to realize change through our efforts and relationships. Assuming YCS is resourced appropriately, YCS is ready to assist the Yukon government and others where we can.

The following addendum provides specific comments associated with each action reported with the caveat, as reported earlier, that each action be carefully reviewed for clear targets.

Mike Walton, PhD

A handwritten signature in black ink that reads "M. Walton" with a stylized flourish at the end.

Executive Director



## Addendum – Specific Comments.

### Area #1: Transportation

#### Increase the number of zero emission vehicles on our roads.

1. Work with local dealerships to ensure enough zero emission vehicles are available for purchase in Yukon to reach targets that zero emission vehicles will be 10% of light duty vehicle sales in 2025 and 30% in 2030. **YCS supports this action.**
2. Ensure half of all new cars purchased by the Government of Yukon are zero emission vehicles. **YCS supports this action.**
3. Provide a rebate to Yukon businesses and individuals who purchase eligible zero emission vehicles. **YCS supports this action and recommends that Yukon government consider matching the federal government's offer of \$5k for purchase of EV, therefore making the rebate for the purchase of new zero emission vehicles \$10k in Yukon.**
4. Continue to install fast-charging stations across Yukon to make it possible to travel between all road-accessible Yukon communities by 2027. **YCS supports this action and recommends including Old Crow.**
5. Work with the governments of British Columbia, Northwest Territories, and Alaska to explore options for installing electric vehicle charging stations to connect Yukon with BC, NWT, and Alaska. **YCS supports this action.**
6. Provide financial incentives to support the installation of electric vehicle charging stations at multi-residential and commercial buildings. **YCS supports this action.**
7. Require new residential buildings in the greater Whitehorse area to be built with the electrical infrastructure to support Level 2 electric vehicle charging. **YCS supports this action.**
8. Enable private businesses and Yukon's public utilities to sell electricity for the purpose of electric vehicle charging. **YCS supports this action.**
9. Conduct a public education campaign to raise awareness of the benefits of electric vehicles and how they function in cold climates. **YCS supports this action.**

#### Increase the use of public and active transportation.

10. Provide financial incentives to encourage the purchase of electric bicycles for personal and business use. **YCS supports this action.**
11. Investigate the feasibility of using electric buses for public transportation. **YCS support this action.**
12. Explore opportunities to support municipal and First Nations partners with public transportation projects. **YCS supports this action and recommends researching long range electric buses for inter community travel.**



13. Continue to incorporate active transportation in the design of highways and other Government of Yukon transportation infrastructure near communities. **YCS supports this action.**

**Reduce the carbon footprint from medium and heavy-duty vehicles.**

14. Continue to offer flexible start times to make it easier for Government of Yukon staff to use public transit, active transportation and carpooling when operationally feasible. **YCS supports this action.**

15. Replace older Government of Yukon heavy-duty fleet vehicles and incorporate fuel efficiency into purchasing decisions to reduce greenhouse emissions and fuel costs. **YCS supports this action. However, Yukon government should begin including EVs in new heavy-duty fleet for future purchases.**

16. Increase the use of clean diesel alternatives like biodiesel and renewable diesel, such as through a 20% renewable content standard. **YCS supports this action. YCS suggests a description of what renewable diesel is.**

17. Establish a financial incentive to support the purchase of short-haul medium and heavy-duty electric vehicles for commercial applications within Yukon. **YCS supports this action.**

18. Pilot the use of idle-reduction and fuel efficiency technologies to reduce the fuel consumption of heavy-duty vehicles. **YCS supports this action.**

19. Work with the Government of Canada to offer courses on efficient driving for medium and heavy-duty vehicle operators. **YCS supports this action.**

**Be more efficient in how and when we travel to avoid unnecessary travel and to use fuel more efficiently.**

20. Increase the use of ethanol as a clean gasoline alternative, such as through a 10 per cent renewable content standard. **YCS could support this action once cellulosic fuel additives become available.**

21. Expand the Government of Yukon's video and teleconferencing systems, raise awareness of the options available, and require employees to consider these options when requesting permission for work travel. **YCS supports this action.**

22. Develop systems to coordinate Government of Yukon staff travelling by vehicle within Yukon. **YCS supports this action.**

23. Develop guidelines for the Government of Yukon vehicle fleet to ensure appropriate vehicles are used and incorporate fuel efficiency into purchasing decisions to reduce greenhouse gas emissions and fuel costs. **YCS supports this action.**

24. Expand the Government of Yukon's telehealth services to improve access to healthcare in Yukon communities while reducing greenhouse gas emissions from travel to and from Whitehorse. **YCS supports this action.**



25. Conduct a public education campaign to raise awareness of the benefits of public and active transportation and efficient driving practices. **YCS supports this action and would like to assist.**

**Ensure roads, runways and other transportation infrastructure are resilient to the impacts of climate change.**

26. Develop and implement climate-resilience guidelines for road construction and transportation infrastructure projects built by or receiving capital funding from the Government of Yukon. **YCS supports this action.**

27. Update and expand geohazard maps to cover all major transportation corridors. **YCS supports this action.**

28. Analyze flood risk along all major transportation corridors at risk of flooding and continue to incorporate flood risk information into the design of transportation infrastructure. **YCS supports this action.**

29. Conduct climate risk assessments of all major transportation infrastructure projects above \$10 million, such as through the federal Climate Lens assessment. **YCS supports this action.**

## **Area #2: Homes and Buildings**

**Improve the energy efficiency and climate resilience of existing homes and buildings.**

30. Conduct retrofits in Government of Yukon buildings to reduce energy use and greenhouse gas emissions. **YCS supports this action and recommends setting a target.**

31. Continue to retrofit Government of Yukon social housing and staff housing to reduce energy use in these buildings by 30 per cent. **YCS supports this action.**

32. Continue to gather information about climate change impacts on Government of Yukon buildings to maintain safe conditions for occupants and to inform decisions<sup>[17]</sup> for major construction projects. **YCS supports this action.**

33. Provide upfront financing to support energy efficiency retrofits and actions to improve building resiliency. **YCS supports this action.**

34. Continue to provide comprehensive incentive programs for home energy retrofits, commercial building retrofits, and energy efficient appliances and other products to reduce energy use. **YCS supports this action and recommends incentives for energy storage appliances such as ETS, home batteries and EV charging stations; and, no more incentives for high efficiency fossil fuel furnaces.**

35. Continue to work with Yukon First Nations to retrofit First Nations housing to be more energy efficient. **YCS supports this action.**



36. Continue to provide financial support to Yukon First Nations and municipal governments to pursue major energy retrofits to their government buildings across Yukon. **YCS supports this action.**

37. Evaluate options to encourage landlords and/or tenants to pursue energy efficiency improvements to rental units. **YCS supports this action.**

38. Work with the Government of Canada to develop and implement a low-carbon model building code suitable to northern Canada that will reduce energy use and greenhouse gas emissions from existing buildings. **YCS supports this action and recommends that the building code should include energy storage to maximize the efficient use of renewable electricity from the grid.**

39. Review the *Insurance Act* to ensure Yukoners can access adequate insurance for fires, floods and permafrost thaw. **YCS supports this action.**

### **Ensure new homes and buildings are built to be low-carbon and climate-resilient.**

40. Work with the Government of Canada to develop and implement building codes suitable to northern Canada that will aspire to see all new residential and commercial buildings be net zero energy ready by 2032. **YCS supports this action.**

41. Publish a building standards manual for the design and construction of new Government of Yukon buildings that will improve energy efficiency and reduce greenhouse gas emissions. **YCS supports this action.**

42. Require buildings to be constructed to be more climate resilient by adopting and enforcing standards related to permafrost thaw, flooding, fires and other climate change impacts. **YCS supports this action.**

43. Conduct climate risk assessments of all major building projects over \$10 million that are built or funded by the Government of Yukon. **YCS supports this action.**

44. Continue to provide rebates for new homes that are built to energy efficient standards. **YCS supports this action.**

### **Increase the use of biomass and other renewable energy sources for heating.**

45. Install renewable heat sources such as biomass energy in Government of Yukon buildings to reduce greenhouse gas emissions and create long-term demand for renewable heating. **YCS supports this action however Yukon government should set a clear target for fossil fuel replacement by 2030.**

46. Establish a program to support the replacement of fossil fuel heating systems with electric heat pumps in buildings that have been retrofitted to be more energy efficient, with a target of 1,500 buildings over 10 years. **YCS supports this action.**





47. Continue to provide technical and administrative support to First Nations governments and development corporations to switch to biomass and other renewable heating systems. **YCS supports this.**

48. Continue to provide rebates to install biomass and other renewable heating systems. **YCS supports this action.**

49. Identify regulatory improvements that could support the growth of Yukon's biomass energy industry during the review of the *Forest Resources Act*. **YCS supports this action.**

50. Regulate air emissions from biomass burning systems to minimize the release of harmful air pollutants. **YCS supports this action.**

51. Conduct a lifecycle analysis of biomass energy use in Yukon to identify recommended forest management practices to guide sustainable and low carbon biomass harvesting. **YCS supports this action.**

52. Continue to use residual biomass fibre harvested during forest fuel management projects to provide a source of renewable biomass energy and increase the resilience of communities to wildland fire risk. **YCS supports this action and recommends that Yukon government ban slash burning from new all new land developments including highway right of way improvements.**

## **Use energy more efficiently and better align energy supply and demand.**

53. Direct the Yukon Utilities Board to allow Yukon's public utilities to pursue cost effective capacity demand-side management measures. **YCS supports this action. The definition of DSM though is not clear: is it DSM to reduce overall electricity consumption (reduced annual sales of kWh) or to shift demand away from peaking periods (maintaining and increasing sales of renewable electricity).**

54. Install individual electrical meters at Government of Yukon social and staff housing to encourage tenants to use energy more efficiently. **YCS supports this action.**

55. Conduct a pilot project to evaluate the use of smart devices to shift customers' energy demand to off-peak hours. **YCS supports this action. This should include a pilot project to evaluate the use of energy storage appliances (ETS units, hot water tank, home battery), with smart grid technologies to increase the use of renewable electricity.**

56. Continue to conduct outreach and education to encourage Yukoners to use energy more efficiently. **YCS supports this action.**



## Area #3 Energy Production:

### Increase the supply of electricity generated from renewable sources

As reported earlier, YCS suggests there should be an extra action that focuses on identifying and pursuing pumped hydro energy storage. This may be an appropriate section for that action to be included.

57. Require at least 93 per cent of the electricity generated on the Yukon Integrated System to come from renewable sources, calculated as a long-term rolling average. **This implies that up to 7% of the critical generation on the grid will remain GHG-producing. Using existing technology could reduce this to near zero. YCS recommends that the Yukon government set an aggressive target that even as demand grows 98% of the electricity used comes from renewable sources.**

58. Substitute some of the diesel used to generate electricity with clean diesel alternatives like biodiesel and renewable diesel. **The use of biodiesel to reduce GHG is contested due to the high GHG involved in growing oilseed crops. YCS suggests a description of what renewable diesel is.**

59. Update the *Public Utilities Act* to ensure an effective and efficient process for regulating electricity in Yukon. **YCS supports this action and suggests describing what is meant by effective and efficient legislation. The legislation should encourage locally produced renewable electricity to reduce GHG emissions from fossil fuels used in electricity generation, space heating and transportation.**

60. Pursue opportunities to install renewable electricity systems on Government of Yukon buildings and at remote historic sites co-managed by the Government of Yukon and Yukon First Nations. **YCS supports this action.**

### Support local and community-based renewable energy projects.

61. Continue to provide financial and technical support for First Nations and municipal governments and community organizations to undertake community-led renewable energy projects. **YCS supports this action and would like to assist. This should include providing support for building an energy workforce for First Nations and municipal governments/organizations to undertake their initiatives.**

62. Continue to implement the Independent Power Production Policy that enables Yukon's public utilities to purchase electricity from independent power producers, including Yukon First Nations and communities, and increase the Standing Offer Program limit from 20 GWh to 40GWh to support additional projects. **Currently, the power purchase price in the Standing Offer of the IPP Policy is set by the operating cost of LNG (subsidized), which is not sufficient to cover the capital and operating cost of non-thermal power generation. However, a higher price may be available through 'unsolicited proposals', as part of the IPP process. YCS supports this action and recommends the Standing Offer price in Whitehorse should be increased to provide some certainty for potential projects.**



**YCS understands that the IPP policy allows for larger renewable energy projects at lower purchase prices to be considered if they meet the requirements of affordable, reliable, and renewable. A 50 MW wind farm could generate about 100-110 GWh annually of electricity at about 10 cents per kWh.**

63. Develop models for First Nations to economically participate in renewable electricity projects developed by Yukon's public utilities. **YCS supports this action recognizing that federal programs may assist with First Nation participation in renewable electricity projects. YCS could develop a partnership model to facilitate this, such as a wind Working Group. YCS believes that this action is also an opportunity to involve all people of the Yukon as well as power producers other than the public utilities. We suggest the following wording is used for this action item: "Develop models for First Nations and Yukoners to economically participate in renewable electricity projects developed by Yukon's public utilities or independent power producers."**

64. Continue to enable Yukoners to connect renewable energy technologies to their homes and businesses and export surplus energy to the electrical grid through the Micro-generation program. **YCS supports this action.**

65. Continue to provide rebates to support the installation of renewable energy systems for heating and electricity in residential, commercial and institutional buildings. **YCS supports this action and recommends that this should include rebates for electric thermal storage (ETS) to allow increased use of renewable electricity from winter wind and hydro.**

66. Develop legislation to regulate geothermal energy development in Yukon. **YCS supports this action.**

67. Continue to conduct research into the potential to use geothermal energy in Yukon for heating and/or electricity. **YCS supports this action and suggests a description of what is being continued would improve clarity of the action.**

68. Research the potential to use nuclear energy in Yukon, including small modular reactors. **YCS has tempered support for this action. Modular nuclear reactors (MNRs) are at least ten years away from being viable for use in the Yukon according to members of the Expert Energy Panel that the Yukon government recently commissioned to consult with Yukoners. Tracking progress on the development of MNRs and communicating results is all that is necessary.**

- **YCS recommends that there should be an extra action item in this section that focuses on measuring the wind energy potential at several sites concurrently across the Yukon grid. This multi-site measurement campaign will allow a better understanding of how much firm wind capacity exists on the Yukon Grid. YCS would like to participate in this initiative.**



**Ensure electricity generation, transmission and distribution infrastructure is resilient to the impacts of climate change.**

**YCS notes that the actions in this section are mainly targeted at understanding how climate is impacting the hydro electricity production into the future. As noted in the previous recommended action there should be a Yukon-wide effort to measure and model the wind electricity production potential in terms of alleviating water level impacts for the hydro system. For example, wind speeds have increased by 15% (1 m/s) over 50 years according to Pinard (2007). Efforts should be made to understand how wind varies from year to year compared to hydro potential.**

69. Continue existing partnerships with academia, government, First Nations, and NGOs to research and understand key impacts of climate change on the electricity sector. **YCS supports this action and would like to assist.**

70. Use in-flow forecasting models to incorporate climate change data into short, medium and long-term water forecasts for renewable hydroelectricity generation. **YCS supports this action.**

71. Design, construct and maintain all electricity infrastructure using best available methods to avoid permafrost degradation. **YCS supports this action.**

72. Continue to incorporate updated flood probability and intensity considerations into dam safety programs and reviews. **YCS supports this action.**

73. Implement a glacier monitoring program to improve our ability to predict the impacts of glacier melt on hydrological systems and hydroelectricity generation. **YCS supports this action.**

#### **Area #4: Communities**

**Design our communities to be low-carbon and resilient to the impacts of climate change.**

74. Update and expand geohazard and floodplain maps to cover all Yukon communities, where appropriate, and assess how many buildings and other structures are currently located in areas with high geohazard or flood risk. **YCS supports this action and suggests the inclusion of a date by when the mapping will be complete.**

75. Conduct a review of best practices for developing walkable, bike-friendly, transit-oriented communities and develop guidelines that can be used by the Government of Yukon and partners. Develop active and public transport guidelines. **YCS supports this action.**

76. Develop and implement climate-resilience guidelines for community design and infrastructure development projects built by or receiving capital funding from the Government of Yukon. **YCS recommends modifying the action to read YG funded infrastructure is contingent on climate resilient design.**



77. Continue to conduct detailed climate change risk assessments of all major community infrastructure projects over \$10 million that are built or funded by the Government of Yukon. **YCS is pleased that climate resilience, as well as climate risk is built into many of the actions in this document. YCS suggests that a discussion of how to build in resilience be part of the detailed risk assessment articulated by this action. YCS supports this action.**

78. Make recommendations to consider the impacts of climate change in regional land use and local area planning processes and, consistent with those plans, ensure communities are designed to be climate-resilient through the Government of Yukon's development permitting and zoning processes. **YCS recommends the Yukon government require climate resilience to be included in Official Community Plans.**

79. Provide technical and administrative assistance to First Nations and municipal governments to prepare integrated asset management plans that will reduce costs, attract businesses and investment to communities and increase climate resilience. **YCS supports this action.**

### **Ensure we are prepared for emergencies that are becoming more likely due to climate change.**

80. Improve our ability to predict floods and forest fires by using updated earth observation platforms, expanding our network of automated weather stations and using modelling tools, and improve early warning systems for flooding. **YCS is particularly pleased to see a commitment to expanding the network of weather stations, as the lack of climate data has been a major impediment to developing climate plans of any type. YCS does suggest that local and Indigenous knowledge is very valuable and should be used and leveraged in making predictions. YCS supports this action.**

81. Develop and implement Wildfire Protection Plans for Yukon communities that outline recommended forest fuel management activities like FireSmarting to reduce forest fire risk. **YCS supports this action noting the importance of community engagement to achieve greater understanding of the intent and mechanisms used to achieve FireSmarting.**

82. Increase the capacity in Yukon Wildland Fire to prevent wildfires through forest fuel reduction activities and to respond to extended fire seasons. **Increased capacity of the branch should include enhanced community engagement to better bring along all Yukon communities to embracing forest fuel reduction plans as part of community FireSmart programs. YCS supports this action.**

83. Work with First Nations and municipal governments to develop emergency management plans for all Yukon communities informed by all-hazard community and critical infrastructure assessments, including plans to provide animal shelters during emergency evacuations. **Regardless of climate change drivers, well understood and rehearsed community emergency plans are a core part of resilient communities. YCS supports this action.**

84. Work with First Nations and municipal governments to deliver emergency management programming for all Yukon communities, including initiatives to raise awareness of wildfire and flood risk and what Yukoners can do to be more resilient. **YCS supports this action.**



85. Develop a territorial disaster financial assistance policy to support recovery from natural disasters that result in extensive property damage or disruption to the delivery of essential goods and services. **YCS supports this action.**

**Supply more of what we eat through sustainable local harvesting and food production.**

86. Continue to provide access to funding for community gardens, greenhouses and animal husbandry projects, especially in rural communities. **YCS encourages the Yukon government to consider making funds available for new farmers, or groups of farmers to acquire land from legacy landowners. We believe this would support sustainable local food production. YCS supports this action.**

87. Continue to provide technical advice to assist First Nations and municipal governments with their agricultural and animal husbandry projects. **YCS supports this action and recommends that it be expanded to cover all local producers.**

88. Continue to research how climate change could affect local agriculture in the future. **YCS supports this action.**

89. Continue to assist agricultural producers to respond to the impacts of climate change, adopt low-carbon practices, and use surface water and groundwater efficiently through technical advice, access to funding, and supportive infrastructure. **Providing the best information on which foods are likely to grow best in the novel climates of the future will be essential. While current projections indicate increased rainfall, this does not always translate to more water being available for agriculture. As strictures against using fossil fuels mount, finding low or zero carbon methods of working farms will be essential, as will sharing and developing best practices to make the best use of what water is available. YCS supports this action.**

90. Regularly gather data on food insecurity to understand how many Yukoners are food insecure and why. **YCS supports this action and suggests that it includes research on how to address food insecurity.**

**Respond to the impacts of climate change on wild species and their habitats.**

91. Continue to improve our understanding of how climate change will impact watersheds, including water quality, quantity and habitat for fish and other wild species. **YCS supports this action.**

92. Continue to build our knowledge of how climate change is affecting ecosystems, wild species and their habitats. **YCS is pleased to see this action. The most effective carbon storing and sequestering ecosystems on earth, notably peat bogs and fens, are under threat. It is very important that these ecosystems are protected and nurtured. YCS supports this action.**

93. Identify and monitor key species that will provide an indication of the impacts of climate change on Yukon ecosystems. **Few Yukon species are currently monitored specifically in order to understand climate impacts. Addressing this knowledge gap should be a priority so we can assess if the network of protected areas identified as a need in action #94 below is fit for the purpose. YCS supports this action.**



94. Continue to apply landscape conservation science to build a network of protected areas and other lands that allow native species to move, adapt and survive in the face of climate change. **YCS is very pleased to see this action. Resilience to the effects of the warming climate will require considerable redundancy; when one area becomes inhospitable, it must be feasible to move to another suitable area. However, this action does not indicate any particular size for this network. Considerable research has found that a minimum of 50% of the planet must be given over to natural processes. YCS recommends that at least half of Yukon lands and waters be set aside for conservation purposes by 2030.**

95. Continue to track new and invasive species to Yukon that could impact ecosystems and biodiversity. **It is very hard for new species to become established in intact ecosystems, however in the event of a disturbance, an invasive species may be able to rapidly colonize new ground. Climate change can be viewed as the ultimate disturbance, so it is likely that the threat of ecosystem disruption, at the expense of valued species, will increase. Knowing more about new and invasive species is something we will continue to benefit from. YCS supports this action.**

#### **Maintain our ability to safely engage in traditional and cultural activities.**

96. Increase search and rescue capacity through training, retention and volunteer recruitment. **Search and Rescue organizations not only help to mitigate increased risk to people on the land related to a changing environment, but help to build a sense of community, a key element of resilient communities. YCS supports this action.**

97. Continue to offer hunter education courses to promote environmental stewardship and safety on the land. **YCS supports this action.**

98. Continue to raise awareness of changing bear hibernation habits and how to stay safe in bear country. **YCS supports this action.**

99. Continue to address the impacts of climate change on historic and cultural sites across Yukon. **Many historic and cultural sites are in riparian zones likely to be affected by changes to water flow. Others become vulnerable as the cryosphere retreats. YCS supports this action.**

100. Work collaboratively with First Nations and the Inuvialuit to develop a strategy to address the impacts of climate change on heritage sites on the North Slope. **YCS assumes that the driver for this being an additional action to #99 above is related to different jurisdictional environments as well as the extra large climate change impacts expected in the northern Yukon. YCS supports this action.**

#### **Protect and enhance human health and wellbeing in a changing climate.**

101. Train health and social service care providers to identify and respond to the physical and mental health impacts of climate change. **YCS suggests that our institutions need to be prepared to respond to climate change impacts as well as individual providers. YCS supports this action.**

102. Develop and implement a system to track cases of climate-related illnesses like heat stroke,



respiratory illness, and vector-borne diseases. **YCS agrees that ensuring our health systems can respond effectively to novel issues will involve being aware of how climate change affects health. YCS supports this action.**

103. Continue to monitor concentrations of particulate matter in the air from biomass burning and forest fires. **This strategy promotes the use of biomass energy. Biomass often involves burning wood. Benefits of burning wood can be countered if we become unhealthier. Similarly, our forests are likely to become more vulnerable to wildfire. Responding to elevated levels of air pollution requires regular air quality monitoring. YCS supports this action.**

104. Make clean air shelters available to Yukoners to provide a place to breathe clean air during periods of intense wildfire smoke. **The summer of 2019 was only the most recent summer when smoke pollution became problematic. An unexpected feature was a smoke season that extended well into fall. Longer duration as well as higher intensity periods of dangerous levels of smoke pollution will require clean air respite, particularly for more vulnerable sectors of the population. YCS suggests that clean air shelters should also be designed to function as emergency shelters. YCS supports this action.**

## **Area #5: Innovation**

**Support innovation and green business practices.**

105. Consider greenhouse gas emissions as part of the decision-making process for Department of Economic Development funding programs. **YCS supports this action.**

106. Support sustainable and local procurement through updates to the Government of Yukon's procurement policies and standards. **YCS supports this action.**

107. Identify and develop options to address potential regulatory and policy barriers to the growth of green businesses in Yukon. **YCS supports this action.**

**Ensure Yukoners have the skills to participate in the green economy.**

108. Continue to provide training for Certified Energy Advisors who are able to evaluate the energy efficiency of homes and buildings. **YCS supports this action and would like to assist. With a focus on First Nation youth becoming "Energy Advisors" in their communities.**

109. Continue to provide training for tradespeople, builders, and other interested individuals to develop the skills needed to retrofit and maintain buildings to energy efficient standards. **YCS supports this action and would like to assist. With focus on FN youth receiving such training in their communities.**

110. Continue to improve science, technology, engineering, arts and math (STEAM) education in Yukon schools. **YCS supports this action, would like to assist, and recommends including energy education in relation to energy needs in the communities.**





**Reduce the carbon intensity of mining and ensure mining projects are prepared for the impacts of climate change.**

**YCS recognizes opportunity in this section to link mining and the positive outcomes for society that result from moving toward a more circular economy. YCS encourages the next draft of “Our Clean Future” to address aspects of a circular economy in relation to mining.**

111. Ensure critical mine infrastructure is planned, designed and built to withstand current and projected impacts of climate change throughout all phases of mining through the quartz mine licensing process. **Given the lack of transparency in the Quartz Mining Licence process, this statement should also reference the YESAB and Yukon Water Board processes.**

112. Require quartz mines to project their anticipated greenhouse gas emissions, identify measures to reduce emissions, and annually report greenhouse gas emissions through the quartz mine licensing process. **Given the lack of public access and participation to almost all aspects of the Quartz Mining Licence processes (for example, none of the mining inspectors reports are made public), this statement should be amended to ensure that a public registry of the mining GHG reports is established (similar to what the Yukon Water Board does with its reports).**

113. Provide financial support for energy audits of mines to identify opportunities to reduce energy use and save money. **YCS believes no financial support for energy audits should be provided to mines. We find it difficult for example to think a large mining company interested in producing in Yukon, would not have sufficient resources to perform this task on its own.**

114. Continue to support targeted research on ways to reduce the carbon footprint from mineral exploration, development and closure activities, including options to use alternative energy sources at mine sites. **Using alternative (by which it is assumed it is meant renewable energy as opposed to carbon fuels) should not be an option, it should be mandatory. YCS supports this action, however it believes that the mining sector should aim to have similar renewable energy targets as in other sectors like transportation and space heating.**

115. Continue to work with the mining industry to encourage and support the use of low-carbon and green practices and technologies in exploration, development and closure. **The use of low-carbon and green practices and technologies in exploration, development and closure shouldn't be encouraged and supported, they should be mandatory.**

116. Increase the Government of Yukon's participation in intergovernmental initiatives related to mine resiliency, low-carbon mining and innovation. **Although the Yukon Government's past record on intergovernmental initiatives is not good. For example, Yukon is still not a participant in the National Orphaned/Abandoned Mines Initiative (<https://www.abandoned-mines.org/en/>), YCS supports this action.**



## **Improve how we manage our waste to move toward a more circular economy.**

117. Assess options for establishing a comprehensive waste diversion system in Government of Yukon buildings, including recycling, compost and e-waste collection. **YCS supports this action.**

118. Continue to increase the types of materials with recycling surcharges under the *Designated Materials Regulation* to increase waste diversion and generate more funding for recycling operations. **YCS supports this action.**

119. Work towards a system for Extended Producer Responsibility that would make producers responsible for managing materials across the lifecycle of a product. **YCS supports this action.**

120. Continue outreach and education activities aimed at reducing solid waste and increasing waste diversion. **YCS supports this action.**

121. Conduct a lifecycle assessment of the best ways to deal with the waste generated in Yukon from an economic and environmental perspective to inform future actions. **YCS supports this action.**

## **Area #6: Leadership**

### **Ensure the goals of this strategy are incorporated into government planning and operations.**

122. Create a Clean Energy Act that legislates our greenhouse gas reduction targets, renewable energy generation targets and our commitment to energy efficiency and demand-side management to hold the Government of Yukon accountable to the commitments in this strategy. **YCS agrees with this action. The action would be improved by stating when a draft of the Act would be initiated and by when it would be passed. The Act should have clear targets and timelines for 2025, 2030, etc.**

123. Consider greenhouse gas emissions and climate change adaptation in major Government of Yukon policies, programs and projects by applying a climate change lens to decision-making. **YCS supports this action.**

124. Continue to evaluate the risks that climate change poses to the Government of Yukon's operations and implement strategies to address those risks. **YCS supports this action.**

125. Incorporate greenhouse gas emissions and energy efficiency into the process for identifying and prioritizing Government of Yukon building retrofits and new construction projects. **YCS supports these actions and proposes they should be requirements for approval of retrofits and construction projects.**

126. Develop and promote climate change training for Government of Yukon employees. **YCS supports this action and suggests the training should be opened to others in non-government organizations.**



127. Continue to assist First Nations and municipalities to identify, implement and access federal and Government of Yukon funding for climate change and energy projects. **YCS supports this action and looks forward to assisting. This should include building people capacity to implement energy efficiency up grades and energy projects in the communities.**

128. Continue to monitor progress and report on the effectiveness of our actions in meeting targets, reducing greenhouse gas emissions and adapting to the impacts of climate change through the Government of Yukon's Climate Change Secretariat. **YCS is uncertain if the Climate Change Secretariat is the best place to house the monitoring and reporting function for the Yukon government. Given the magnitude of the issue and the challenges, Yukon government may wish to consider establishing an arm's length body that has the authority to investigate performance and make recommendations for improvements to the Deputy Minister of the Executive Council Office. Our major concern is that a body in or of the Yukon government must be able to compel action when departments are not performing. We simply remain uncertain that the Climate Change Secretariat is able to perform this responsibility. YCS may be able to play a role in the establishment and operationalization of such an arm's length body.**

**Educate and empower youth as the next generation of leaders.**

**YCS recommends that there be an action item on developing a workforce of skilled energy workers in the communities.**

129. Create a Youth Panel on Climate Change that will provide advice and perspectives to the Government of Yukon on climate change, energy and green economy matters.

**YCS looks forward to assisting with this initiative.**

130. Provide mentorship opportunities for Yukon youth to participate in major climate change conferences or events with Government of Yukon staff. **YCS supports this action. The conferences should include those on renewable energy.**

131. Continue to integrate information about climate change impacts and adaptation into the Yukon school curriculum. **YCS supports this action and recommends including community-focused renewable energy and energy efficiency.**

132. Continue to support land-based programs in the Yukon school curriculum that teach First Nations ways of knowing and doing to youth. **YCS supports this action.**

**Increase public awareness of this strategy and how businesses and individuals can make a difference.**

133. Implement a Yukon-wide information campaign about climate change, energy and green economy. **YCS looks forward to assisting with this initiative.**

134. Raise awareness of funding programs that can support green businesses and encourage applications to these funds. **YCS supports this action.**



135. Create a recognition program to recognize the achievements of local green businesses and organizations. **YCS looks forward to assisting with this initiative.**

136. Implement an education campaign for Government of Yukon building occupants and visitors to encourage more energy efficient behaviours. **YCS looks forward to assisting with this initiative.**

137. Provide accessible information on how to improve energy efficiency, use renewable energy, reduce wildfire and flood risk, reduce water consumption, and build safely on permafrost. **YCS looks forward to assisting with this initiative.**

## **Ensure Yukoners have the information needed to make informed decisions.**

138. Conduct regular assessments of the impacts of climate change on Yukon communities and evaluate the costs and benefits of responding to these impacts to inform future efforts. **YCS supports this action.**

139. Conduct annual energy assessments of Government of Yukon buildings to identify further opportunities for energy efficiency and greenhouse gas reductions. **YCS supports this action. YCS could play an oversight role.**

140. Share technical information and lessons learned about climate change, energy and green economy with governments and stakeholders across Yukon using Yukon.ca and the Open Data Portal. **YCS supports this action.**

141. Regularly meet with stakeholders to share information and receive feedback on energy-related policies, programs and projects. **YCS looks forward to participating in such meetings. The Yukon Energy Partners administered by the Energy Branch is one such group that meets quarterly that can play a role in this action item.**

142. Regularly report on the impacts climate change could have on Yukon's economy. **YCS supports this action.**



Comments on **“Our Clean Future”** from John Maissan, a YCS Energy Committee member

1. A CBC radio news coverage of premier saying that the connection to BC grid would be good for **“Our Clean Future”** strategy without context or explanation was not helpful, it undermines a number of the strategy goals and would be very costly compared to local alternatives.
2. ZEVs:
  - a. 10% of light vehicle sales by 2025 and 30% by 2030 is a good target (BC is 100% by 2040).
  - b. Use YG purchasing to ensure that dealers have demonstrator vehicles on hand at all times.
  - c. EV range is a concern in Yukon – consider PHEVs for rebates where the electric range is >50 km.
  - d. Provide additional subsidy for larger battery EVs. Federal example of the smaller battery Tesla 3 being subsidized but larger battery version not being subsidized could be counter productive in Yukon. Perhaps lobby the feds to ameliorate this for the north.
  - e. Norway is achieving high EV penetration in part because of high annual registration fees on gasoline / diesel vehicles. Yukon’s registration fees are very low and should be raised in conjunction with EV/PHEV subsidies.
3. Video conferencing:
  - a. A very good thing to be encouraged, bravo. This should be first and default option rather than a fallback.
  - b. Radiative forcing of the high altitude jet emissions means that CO2 is 2.7 times more harmful than at the ground level.
4. 40% RE building space heat by 2030 from 26% now:
  - a. This is a very weak target, should be higher.
  - b. Building heat fuel switching really is low hanging fruit.
  - c. Target of 1,500 buildings on air source heat pumps will require a significant reduction from the present very high cost local supplier.
  - d. Consider 30% of present 74 % fossil fuel heat, thus about 50% overall by 2030.
5. First Nation capacity building in new and retrofit housing (and in all other ways) is very necessary, cannot be too strong a program in my opinion.
6. Biomass & FireSmart:
  - a. Very good area to target.
  - b. Would like to see an aggressive conversion target for all major YG buildings, say 30% by 2030.
7. Electricity conservation / peak management:
  - a. Deserves immediate and strong attention.
  - b. Needs strong targets, e.g. 30% of non-industrial load growth between now and 2030; and non-industrial peak load flat to 2030
8. 93% RE electricity:
  - a. This is a disappointing target, it is pretty much the present status quo with Fish Lake, the microgeneration supply plus a few solar and one wind IPP.
  - b. Essentially target is load growth to 2030 met by 93% RE.



- c. The target should be much more aggressive e.g. 98% which would require 40 GWh per year of RE now (e.g. IPP SOP allotment) plus 98% of load growth between now and 2030.
9. There is no mention of the YEC battery, the battery is a good thing as it could be used to integrate intermittent PV and wind.
10. No mention of need for pumped hydro storage, in my view there should be a commitment to have a shovel ready pumped hydro storage project ready by 2025.
11. IPP SOP increase good for solar that can profitable at the SOP price, however, small wind cannot work at that price without significant capital subsidies.
12. For winter energy YEC/YDC should look for the IPP Unsolicited Proposals and offer realistic costs for small projects if the winter energy is desired OR do RFP for a 20 MW or larger wind project. If YEC can beat price with a RE project, go for it!
13. IPP SOP energy price is not realistic or fair.
  - a. It excludes variable generating costs and the carbon price, but the utility gets the environmental attributes, how is this fair? Appears inconsistent with Action 123.
  - b. If YG / YEC wants energy at the lowest possible cost issue an RFP for lowest cost energy meeting the RFP requirements.
14. Should be more push to diversify energy supply, right now we are very vulnerable to fluctuations in hydro supply. Hydro supply will get more variable in future according to the climate studies (more erratic weather patterns).
15. Biomass heat combined with fire risk reduction is a good target area. Hard targets are needed, see comment #6 above.
  - a. All new YG buildings completed in 2022 or later should be biomass heated or biomass ready as part of their design.
  - b. Higher building code standards (or YG policy standards) for energy efficiency are needed to prevent things like the dual-pane windows in the new FH Collins school.
  - c. This target area would also strongly support the local green economy with local job creation.
  - d. Increasing the volume of biomass market will lower the cost of the supply in the longer term.
16. There is no mention of a possible summer agricultural electricity rate which would be good for local food production. The grid may well have surplus summer energy again soon with lots of IPP SOP PV in the pipe.
17. Renewable energy supply in mining activities will be a big challenge. I have no answers to suggest. Dialogue with the mining industry is needed.

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January 17, 2020

Climate Change Secretariat  
Government of Yukon  
Box 2703 Whitehorse  
Yukon Y1A 2C6

**Re: Submission by the Yukon NDP Caucus in response to the draft climate change, energy and green economy strategy for Yukon entitled Our Clean Future**

**About the Report**

This report concerns Our Clean Future in its draft form, as released by the Government of Yukon on November 14th, 2019. The Yukon NDP Caucus understands that Our Clean Future is in its draft stage, and that the proposals outlined in the draft are not the final solutions to be implemented by the Government of Yukon. This report should be considered an open recommendation to the Our Clean Future draft.

## **Executive Summary**

While Our Clean Future is a positive step in acknowledging the climate emergency we are facing, the draft does not do enough to reduce Yukon's impact on the environment and climate. Modest goals and continuing actions that are already in place are not conducive to addressing a climate emergency that requires a swift move away from the status quo. The plan is often unambitious, and sets the bar too low for what we can achieve, both as communities, and as a territory. The Yukon NDP would like to see more aggressive targets being set before the final draft of the plan is put into action. Many current action points are unquantified and lack timelines required for their implementation.

One key problem with the draft is its failure to consider the mining sector's greenhouse gas emissions as part of Yukon's overall goals. Mining sector emissions could double Yukon's overall greenhouse gas emissions by 2030, should projects like Casino, Kudz Ze Kayah, and Coffee move forward. If that's the case, then the proposed plan would fall short of its goal to reduce greenhouse gas emissions, and Yukon would continue to be a proportionately major polluter in Canada.

If the goal is to reduce our per capita greenhouse gas emissions, then the whole of our emissions must be considered. At 18 tonnes per person, we have the sixth highest emissions per capita in the country, and higher emissions per capita than other northern countries, including Norway, Iceland, Denmark, Sweden, Finland, and Switzerland. We see no reason why Yukon couldn't be a leader in lowering greenhouse gas emissions.

Concerning the greenhouse gas emissions reduction goal, of the 264 kilotonnes reduction, 62 kilotonnes are unaccounted for. This 25 percent of the reduction goal is currently unplanned. While technological innovation could help us with this reduction down the line, the timeline is unrealistic. The process from innovation to review of applicability in our northern climate, to installation and application would leave us behind on our goal. There is no guarantee we will see this technological innovation in the next 10 years.

In light of what the draft says about the average temperature increase in Yukon as compared to the rest of Canada, in light of what it says about rainfall average increase in Yukon, about natural disaster frequency in Yukon, and the changing environment as a whole, it is disappointing that the draft doesn't set out more ambitious goals.

Overall, the draft comes short of the fundamental changes that a climate emergency commends. It proposes surface-level and incremental solutions to the climate crisis that is very real, and that is already impacting us directly. It is no longer the time for half measures. Yukon has declared a climate emergency, and we must abide by this declaration and do everything in our power to preserve the world around us. We must ensure that future generations will be able to appreciate Yukon in the same way we have.

## **On “Continuing” Duties to Yukoners**

One problem that affects the potential for change in the Our Clean Future draft is the large portion of commitments that consist of maintaining current practices or policies. Is the role of government not to continue to offer services that are in place? This self-congratulatory approach to climate change is not taking the important steps needed to make a serious impact and does not reflect the necessary break from status quo that a climate emergency commends.

This highlights the idea that with the release of Our Clean Future, the Government of Yukon attempts to inflate their strategy by adding points that should fall under their due diligence. If enough was being done, we would not be in the situation we find ourselves in. Moving forward, we hope to see these “continuing” points of action being turned into new, more ambitious initiatives.

## **On the format of this report**

The draft sets out four goals for the future:

- Reduce Yukon’s greenhouse gas emissions.
- Ensure Yukoners have access to reliable, affordable and renewable energy.
- Adapt to the impacts of climate change.
- Build a green economy.

It does so through six sections:

- Transportation.
- Homes and buildings.
- Energy production.
- Communities.
- Innovation.
- Leadership.

As such, we will cover each section through its ability to respond to the four goals. In an effort to be brief, specific points of action will generally not be covered.

For the purpose of the report, goals will refer to the four goals above, sections will refer to the six major divisions in the plan, objectives will refer to sub-goals within sections, and action points will refer to the 142 actions that make up the Our Clean Future draft.

## **Section 1: Transportation**

### **Overview**

The objectives set out by the transportation section lack in ambition. They fail to see the larger purpose behind the implementation of a climate strategy.

Increasing the number of vehicles on the road, even if these are electric, will not result in an increase in public and active transportation. In fact, the barriers to public and active transportation are often linked to the number of vehicles on the road. The same applies to the proposal to reduce the carbon footprint of medium and heavy-use vehicles. Carpooling, public transportation, and active transportation are great solutions to reducing transportation costs and emissions, and these are the solutions we would hope to see put in place. Striving for a reduction in the number of vehicles on the road would alleviate traffic on Yukon roads, reduce maintenance costs of Yukon roadways, and make biking and walking safer in our communities. Making improvements to our telecommunication infrastructure could drastically improve our chances to attract technology-based innovators to Yukon, while reducing transportation costs.

We find that the four goals are not sufficiently met by the objectives of the transportation sector. Despite the transportation sector being a major component of reducing greenhouse gas emissions, the objectives and points are not defined well enough to ensure the necessary changes happen.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the transportation section of Our Clean Future.

- Switch the focus to reducing the overall number of vehicles on Yukon roads while increasing the proportion of electric vehicles.
- Promote active and public transportation through the implementation of infrastructure and incentives for Yukoners.
- Consider expanding the public transportation pass system as it currently applies to full-time Yukon College students to Government of Yukon workers.
- Conduct a review on the feasibility of free public transportation for all in Yukon, especially where it concerns reducing the total number of vehicles on roads.
- Make changes to Government of Yukon fleet policy such that less vehicles need to be replaced every year, and ensure that all new light-duty vehicles are zero emission vehicles by 2027 or by the implementation of point no. 4.
- Implement and promote carpooling for Government of Yukon staff through apps and incentives informed by the work already being done by Yukon Rideshare.
- Expand Yukon telecommunication infrastructure as to decrease costs to Yukoners while increasing feasibility of teleconferencing for Government of Yukon.

## **Section 2: Homes and Buildings**

### **Overview**

Most of the objectives in the homes and buildings section are well defined, but the section currently presents many continuing objectives. Due diligence concerning best practices and climate change is expected from the Government of Yukon. We would like to see new policies proposed to supplement what is currently being done in terms of improvements to existing homes and buildings.

We are happy to hear about initiatives being undertaken by the Government of Yukon and other governments across Canada to develop zero-emission buildings and a related National Building Code. However, the posited timeline of 2032 goes beyond the scope of the Our Clean Future draft, and might prove to be too little too late. If the Government of Yukon is aware that the implementation of these new codes may be difficult in Canada's north, then it should be working harder to prepare Yukoners ahead of time.

Once more, this section doesn't sufficiently meet the four outlined goals. If the Government of Yukon committed to pushing for retrofits and changes to building policies, the impact of the section could be both timely and tangible. The impact of the section seems too removed from the current state of the draft.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the homes and buildings section of the Our Clean Future draft.

- Aim to successfully implement a new minimal-energy building code in Yukon within the scope of Our Clean Future by 2030.
- Create a timeline for the implementation of biomass heating in Government of Yukon buildings including how the related biomass demand will be met.
- Implement necessary changes to the *Forest Resources Act* before the next election.
- Create a plan for the recuperation of forest management fuels in relation to the construction of fire breaks in communities.
- Increase incentives for FireSmarting to increase the demand for FireSmart opportunities.
- Create a timeline of retrofitting opportunities in Government of Yukon buildings where it concerns energy use and waste management.

## **Section 3: Energy Production**

### **Overview**

The energy production section of Our Clean Future does a good job at highlighting the potential for clean energy in the Yukon. However, it fails to recognize how objectives will be accomplished, especially as they relate to making alternative energy sources available for Yukoners.

Potential off-grid mining projects are not currently included in the energy production calculations. These projects need to be accounted for by our energy production plan to ensure a sustainable future in light of mining development. The implementation of community-based clean energy projects in off-grid communities would certainly help in managing this demand, and we look forward to reading the timeline to 2025. In terms of biodiesel, we hope to see the implementation of its use before future diesel generators are put into operation. We further hope that these generators will maximize the use biodiesel, and will only be used to combat peak energy demand.

In terms of the goals of greenhouse gas emissions reduction and energy production, the section does well. However, it's difficult to see when actions will be taken to ensure that our energy grid is resilient to climate change, especially where it concerns the implementation of alternative energy solutions.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the energy production section of the Our Clean Future draft.

- Require industries, including mining, to offset their energy demand with renewable energy projects proportionate to the long-term impact they will have on energy supply.
- Commit to having 93 percent of total energy production, including mining projects, be renewable energy based.
- Commit to meeting the full baseload residential demand with renewable energy.
- Consider the full life cycle emissions of biodiesel, regardless of whether or not these emissions take place in Yukon.
- Set a precise goal for the percentage of renewable diesel to be used for energy production and commit to making Yukon Energy maximize renewable diesel for their future diesel generators planned in 2021 and 2026 provided that their full lifecycle emissions prove to be advantageous.
- Systematically conduct outreach through radio and other means when peak demand requires the burning of fossil fuels.
- Ensure the completion of the geohazard map update before beginning the process of developing legislation to regulate geothermal energy development in Yukon.
- Specify the scope and timeline of the glacier monitoring program, including its impact on the production of renewable energy.

## **Section 4: Communities**

### **Overview**

The community section is well fleshed out. While it thoroughly assesses the needs of communities, it is unclear how the changes proposed will be implemented.

While the section aims at creating sustainable communities through increased active and public transport integration, the review on these topics may cause undue delay. A concrete plan of action, including financial commitments and a list of partners such as the City of Whitehorse, would be better suited for rapid implementation. Partners such as Yukon Wildland Fire Management should also be contacted, especially where it concerns concrete emergency preparedness plans. While climate change will certainly affect the long-term health of Yukoners, there are further systemic issues that should be addressed first.

Overall, the community section covers important aspects in maintaining our way of life in light of climate change. There are difficulties in relating the section back to the four goals, especially where it concerns greenhouse gas emissions reduction.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the communities' section of the Our Clean Future draft.

- Begin a review for the implementation of extended active transportation infrastructure in Whitehorse.
- Work with the City of Whitehorse to review the feasibility of a pedestrianised center in the Whitehorse core.
- Review the feasibility of protected bike lanes, local street bikeways, and painted bike lanes in communities.
- Create an incentive plan for FireSmarting communities.
- Include Yukon Wildland Fire Management Staff under the "listed disease" presumption as covered in section 17.1 of the *Workers' Compensation Act*.
- Include Search and Rescue staff, including volunteers, under the PTSD presumption as covered in section 17.3 of the *Workers' Compensation Act*.
- Increase funding to Yukon animal shelters, such that programs can be prepared for the operation of emergency animal shelters in case of natural disasters.
- Create a community flood and fire preparedness plan including workshops to be conducted in communities alongside awareness initiatives.
- Partner with communities to develop mixed-use zoning around community gardens to create healthy, pedestrian communities.
- Create a plan to include farming and agriculture into education curricula. Opportunities include student managed community gardens, as well as student managed freight (vertical) farms.

## **Section 5: Innovation**

### **Overview**

The innovation section focuses on building a green economy. It is well defined, but lacks in specifics and suffers from vague points of action.

An increase in educational outcomes is beneficial, but it is not made clear how climate change could be further integrated into education curricula. The stance taken towards mining emissions is insufficient, especially in considering that greenhouse gas emissions from the mining sector are not included in the overall targets of the Our Clean Future draft. While the section begins to look at the role that the Government of Yukon could have in waste management, it does not do enough to turn this into ambitious initiatives. The principle of extended producer responsibility needs to be implemented across the board rather than in an ad hoc basis limited to specific items. A strict timeline for progress towards these policies should be included.

Overall, the innovation section speaks widely to the potential for new industries in Yukon. Not considering mining emissions in the plan is a major shortcoming. Other shortcomings include not speaking to how innovation will be done in light of changes to our environment, and how innovation and energy will work bilaterally to create a better future for Yukoners.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the innovation section of the Our Clean Future draft.

- Create a plan for reducing the gaps in student outcomes between Yukon students and expand the lessons on climate change taught in education curricula.
- Make changes to physical education requirements for Yukon students such that physical education classes must include a module on traditional sport and leisure activities in Yukon, as to preserve this knowledge and create learning opportunities on the impacts of climate change.
- Include future mining emissions in the Our Clean Future draft, especially in relation to per capita greenhouse gas reduction predictions.
- Include the Faro Mine remediation project in the Our Clean Future draft, especially in relation to per capita greenhouse gas reduction predictions.
- Require all mines to project their anticipated greenhouse gas emissions, identify measures to reduce emissions, and annually report greenhouse gas emissions.
- Commit to conduct retrofits in Government of Yukon buildings where these concern wastewater management.



## **Section 6: Leadership**

### **Overview**

The leadership section of Our Clean Future seems to be a catch-all for goals that didn't fit in other places. It speaks in general terms about who will be involved in the implementation of the strategy, but fails to properly define stakeholders.

The section speaks to the implementation of Our Clean Future in Government of Yukon policy. It is expected that the Government of Yukon will implement its own climate change plan. The section also mentions the role of youth in speaking to climate change. While a motion concerning this was put forward during the Fall 2019 sitting, we have yet to hear back on the purpose and implementation of the Youth Panel on Climate Change. Part of the necessary information Yukoners need in making environmentally conscious change is knowing exactly what the plan entails, and communicating the potential shortcomings of the plan in clear, straightforward language. We hope to help increase awareness for Our Clean Future through this report.

Overall the objectives set by the section are reasonable. However, the lack of specificity might affect their implementation. Marketing climate change as an opportunity for market growth is missing the point of why we need to act. The four goals need to be kept in mind despite the need for financial growth.

### **Recommendations**

The Yukon NDP proposes the following recommendations to the leadership section of Our Clean Future.

- Commit to finalizing Our Clean Future before the end of the Spring 2020 sitting.
- Commit to creating a Clean Energy Act before the next election.
- Commit to finalizing the Youth Panel on Climate Change before the end of the Spring 2020 sitting.
- Define stakeholders for the purpose of implementing Our Clean Future.

## **Prioritization Criteria**

Before closing, we want to take a look at the prioritization criteria as is set out at the end of the Our Clean Future draft. We find four points of contention in the prioritization criteria.

### **Effectiveness: How much could this contribute to reaching our four objectives?**

The four goals as set fall short of their targets. We've discussed how and why above. To recap, greenhouse gas emissions reduction currently fall short by 25 percent all of which is unaccounted for. Access to reliable and renewable energy excludes the mining sector, heightening the shortcomings of greenhouse gas emissions reduction. Adapting to the effects of climate change is done in response to insufficiencies in combating climate change. If the four objectives outlined by the draft are bound to fall short, we suspect that prioritizing effectiveness wasn't done in earnest.

### **Societal effects: Could taking action in this area positively or negatively affect social equity and community wellbeing?**

Climate change is already taking from us things we will never get back. It is affecting us in more negative ways than we can predict. To that end, we hope that the societal effects of the proposed draft are far reaching. We cannot continue to live as we have in the past. Social equity is bound to change as we come together to combat climate change through inexpensive access to green products and goods and modernization of public and active transportation.

### **Cost effectiveness: How cost effective would it be to take action in this area? For greenhouse gas reduction initiatives, we considered the cost per tonne of greenhouse gases reduced.**

It seems that cost effectiveness was the main priority behind the plan. Perhaps this explains the reluctance on behalf of the Government of Yukon to put forward bold initiatives in reducing the environmental impact Yukon has in the world. A Climate emergency requires a significant shift in all aspects of our society and will imply disturbing the status quo. This is not reflected to the extent required in the plan.

### **Environmental effects: Could taking action in this area positively or negatively affect the environment?**

The purpose of an environmental policy is to affect the environment. We need to change the way things are in order to benefit the environment. If objectives and action points that would negatively affect the environment are brought to the table, the strategy as a whole needs to be reconsidered.

## **General Recommendations**

While recommendations were made throughout the Yukon NDP report on the draft of Our Clean Future, we want to take a moment to commit to recommendations at large concerning the proposed plan.

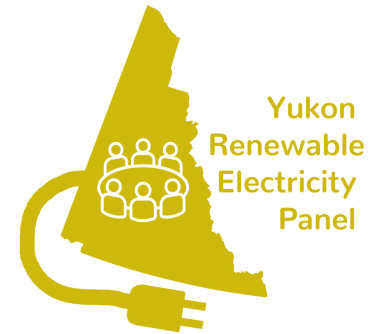
1. Ground both objectives and points in actionable items. Continuing to provide a service does not constitute an actionable item, unless this results in the implementation of a new program or initiative. Concerning other continuing efforts, we would hope to see them struck from the draft as a commitment to following through on these ongoing projects regardless of the state of affairs of Our Clean Future. Alternatively, these “continuing commitments” should be identified in a separate category from the actions that stem out of Our Clean Future. Now is not the time for self-congratulations, now is the time for action.
2. Set more aggressive targets concerning both objectives and action points. As it stands, Our Clean Future does little to curb the environmental impact that Yukon has as a whole. Energy production, greenhouse gas emissions reduction, and waste management all need to be further addressed. The Government of Yukon needs to make commitments to lead the way to a greener future through implementing audacious internal policies to reduce, reuse, and recycle wherever it can.
3. The mining sector needs to be held accountable for its effects on climate. The Faro Mine remediation process must be included in the draft. Future mining projects must be predicted in the draft. This is about more than greenhouse gas emissions. This is about developing a sustainable future for Yukoners. It’s time to take a good look at ourselves and realize that the problems we face won’t be resolved by paying lip service to climate change.

## MEMORANDUM ON 'OUR CLEAN FUTURE' STRATEGY

**TO:** Yukon Department of Energy, Mines and Resources

**FROM:** Yukon Renewable Electricity Panel

**Date:** December 23, 2019



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We, the independent Yukon Renewable Electricity Panel engaged by the Government of Yukon (YG) offer the following feedback on proposed actions contained in the recently released *Our Clean Future* document. Many areas of attention in the strategy affect, or are affected by, electrical energy; as such, our scope of review and commentary is broad. Our comments are organized according to the main sections of the strategy.

### TRANSPORTATION

- **Actions 1-9**

These are good actions and further consideration could be given to the following:

- Leveraging YG's purchasing of zero emission vehicles to ensure that local vehicle dealers keep some demonstrators in stock to enable the public to see and test drive them.
- We believe that there may be some hesitation by the public to adopt electric vehicles (EVs) due to uncertainties and concerns about their range and the large distances between Yukon communities. There may be a bigger (at least transitional) role for plug-in hybrid electric vehicles (PHEVs) in Yukon than elsewhere. These may be worthy of greater rebates than the federal government has given them, particularly those with a larger battery range.
- Similarly, some EVs with larger battery options lose their federal rebate (e.g. Tesla Model 3 extended range). Given Yukon's distances larger batteries and longer ranges are to be encouraged and are more likely to be purchased and used.
- Norway is achieving a high penetration of EVs in part because of higher registration fees for gasoline and diesel powered vehicles. Yukon's vehicle registration fees are very low, and these could be structured to create a price advantage for EVs.

- **Actions 15-25**

- Fuel efficiency consideration in the purchase of YG vehicles is "low hanging fruit" – that is, easy to implement - as is leading with the purchase of heavy vehicles used mostly in localized activities such as delivery trucks.
- Video conferencing has the potential to displace the significant amounts of GHGs generated from air travel as emissions from jets at altitude has a radiative forcing multiplier of about 2.7.

## HOMES AND BUILDINGS

In regards to the stated target of 40% of heating energy from renewable energy (RE) sources (pg. 18):

- Although this target is not repeated in this section of the report it merits discussion. At present 26% of Yukon's heat energy is obtained from RE (page 37) so a 14% increase seems to be a weak goal over a 10-year period. The application of the overall GHG reduction goal of 30% to the 74% non-RE heat contribution ( $30\% \times 74\% = 22\%$ ) results in a theoretical target of 48% ( $26\% + 22\% = 48\%$ ). Considering building heat is "low hanging fruit" compared to transportation, the target should be at least 48% and should be easily achievable given the number of large YG-operated buildings.
- **Actions 30-39:**
  - A 30% reduction in energy use from a retrofit seems to be a similarly unambitious goal. When retrofitting housing it is important to attempt to exceed the 2030 target. Since retrofits are expensive it makes more sense to do a "deep" retrofit once than two separate retrofits to achieve the same ultimate goal.
  - Lack of access to capital for retrofits is a significant barrier for many home and building owners. Providing access to capital and incentives for substantial (rather than shallow) retrofits would be very helpful.
  - In general First Nations (FN) housing is in very poor shape (e.g. mould) and in short supply. Building retrofit capacity in FN communities and providing the required financial support would benefit FN people and communities in reduced energy costs, provide employment and create much healthier living environments.
  - Will a specific retrofit building code be required or is this linked to new construction building codes referred to in the next section?
- **Actions 40-44:**
  - An updated building code that aims to achieve the ultimate goal of net zero emissions by 2032 is good. The present YG incentive program has been very effective in motivating builders and homeowners to construct to higher standards than the present codes.
- **Actions 45-52:**
  - Installing biomass renewable energy heating systems in government buildings can achieve multiple government objectives including reduced GHG emissions, employment creation, and reduced wildfire risk to communities. Biomass-related employment in the smaller and more remote communities is of particular importance. YG's adoption of biomass heating in its larger buildings could help to provide the "critical mass" for these local economic benefits.
  - The purchase and installation cost of air source heat pumps in Yukon is presently very high. High volume YG-led or supported purchasing will be needed to drive

these costs down to the point where they can be realistically considered by homeowners.

- Biomass harvesting for fire risk abatement and of fire-killed or beetle-killed wood would benefit from some regulatory changes that make it easier for commercial operators to obtain higher volume and multi-year permits on which they can base their businesses.
- **Actions 53-56:**
  - Conservation and peak electrical demand management can and should be a cornerstone of YG's electrical/energy policy as it is the most cost-effective, least environmentally detrimental, and the most socially acceptable option available.
  - The ability of the utilities to shift or control peak power demand loads of water heaters and electric heating could be made a requirement for all customers<sup>1</sup>. If implemented in an appropriate way this ability could also comprise part of the utilities' load shedding program to minimize outages from the loss of a generation source.

## ENERGY PRODUCTION

- **Actions 57-60:**
  - Action 57 (at least 93% electrical generation from renewable sources) seems to be a modest goal. Yukon Energy Corporation's (YEC) estimate of its long-term average thermal generation at a load of 490 GWh/yr (approximate 2018 load plus Victoria Gold) is 51.1 GWh/yr<sup>2</sup>. When we add in Fish Lake generation at about 8 GWh/yr and the present micro-generation supply the actual load is about 500 GWh/yr. The maximum thermal generation requirement is then 35 GWh/yr, so YEC is only 16.1 GWh/year short right now. If an additional 20 GWh/yr was added from the Independent Power Producer (IPP) Standing Offer Program (SOP), the target will already have been met. The result appears to suggest that YEC only needs to meet the 93% renewable target for new load growth occurring between 2020 and 2030. Is this the intention?
  - Installing renewable electricity systems on government buildings is an excellent action to pursue.
  - There is no mention of YEC's planned 8 MW/40 MWh battery. It would be appropriate to see a commitment to fully leverage this planned resource by having it meet multiple goals such as meeting peak system loads, spinning reserve, displacing more expensive fossil fuels where possible, and facilitating the grid

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<sup>1</sup> As is being piloted currently by YEC and ATCO in its Peak Smart program.

<sup>2</sup> YEC Memo (re 2017-2018 General Rate Application Response John Maissan dated November 30, 2017. Refer [http://yukonutilitiesboard.yk.ca/pdf/YEC\\_2017-18\\_GRA/YEC\\_Revised\\_IRs\\_-\\_Nov\\_30\\_2017.pdf](http://yukonutilitiesboard.yk.ca/pdf/YEC_2017-18_GRA/YEC_Revised_IRs_-_Nov_30_2017.pdf)

integration of intermittent renewable energy (RE) supplies like solar photovoltaic (PV) and wind power.

- There is also no action with respect to developing or soliciting significant wind power resources to augment the winter supply of RE.
- There is no mention of the need to develop pumped hydro storage that enables more abundant summer hydro energy and intermittent energy sources to be stored for periods of days or seasonally to provide firm winter capacity and winter energy.
- It would be appropriate for the Yukon grid, which is heavily reliant on hydro, to have a long-term average reserve of hydro or other another renewable resource to reduce the significant impact of thermal generation to cover periods of drought. There were secondary sales customers who bought 12 GWh/yr of interruptible power in the past. As well there is potential to increase sales in summer for agricultural uses with an appropriate rate (or rates) that prioritizes food supply independence and resilience. It may be that the Yukon Government is leaving such details for Yukon Energy to manage. The main point here is that having some “surplus” renewable electricity supply can reduce thermal generation in dry years and still derive revenues when used to serve interruptible and or seasonal uses in wetter years.
- **Actions 61-68:**
  - The doubling of the IPP SOP program limit from 20 GWh/yr to 40 GWh/yr is good. However, the SOP price - while reportedly attractive now for solar PV development - is below the threshold required for wind power projects to be economic (in the order of 20 MW). A common commercial wind turbine is now in the order of 3 MW. If use of the SOP portion of the IPP policy is not the appropriate approach for wind energy, then YEC should use the Unsolicited Proposal or RFP portions of the IPP policy to solicit wind energy supply, which is a critical part of meeting peak winter demand with renewable sources.
  - The diesel and liquid natural gas (LNG) used for power generation is presently exempt from the carbon tax. In setting the SOP (or other IPP portion) rates the cost of the carbon tax, or even the realistic cost of carbon reported to be about \$200 per tonne, should be included.
  - The goal of 30% less diesel for power generation in off-grid communities (page 18) should be achievable. Since a bit portion of the off-grid diesel is in the community of Watson Lake, one substantial project there alone could achieve the goal. There are two potentially economic hydro projects there but no obvious proponent. ATCO does not appear to be interested and the Liard First Nation does not have the capacity to lead such a project. Solar PV on its own may be hard pressed to achieve that goal.

- **Actions 69-73:**
  - An electricity supply portfolio of diverse energy sources is much more likely to be climate change resilient than one composed of a single main source, such as hydro. In drought years, such as those experienced recently, thermal generation requirements become very significant.

## COMMUNITIES

- **Actions 80-85:**
  - The goal of fire risk reduction is completely aligned with the goals of increased development of and use of biomass for building heat, (possibly) power generation and employment creation.
- **Actions 85 -90:**
  - The implementation of an agricultural power rate would assist in food import substitution, developing a climate resilient food supply, and a green economy.

## INNOVATION

- **Actions 105-107:**
  - YG and YEC will continue to monitor energy-related technological developments around Canada and the world to ensure that Yukon avails itself of best reliable and appropriate energy technologies available.
- **Actions 108-110:**
  - Yukon in general and FNs in particular require human resource capacity development in housing / buildings and in energy related fields.
- **Actions 111-116:**
  - Energy supply to and energy efficiency in mining will be a challenge to Yukon into the future whether on or off the grid. This is especially true for larger mining projects which are not so easily serviced with RE by the grid.

## LEADERSHIP

- **Actions 122-128:**
  - The IPP Policy as it presently exists does not appear to be consistent with Action 123 in that the SOP portion of the policy sets the price for purchased power at the marginal cost of fuel. This price excludes the carbon tax as well as the *true* cost of carbon. Furthermore, the environmental attributes of the RE purchased pursuant to the SOP power purchase agreement must be assigned to the utility purchasing the power. This appears to be a double standard that creates a disadvantage to new RE projects.
  - All new government buildings should be designed and constructed to take biomass or other RE heat source.



- It is to be hoped that the reduction of GHG actions would continue even if the stated targets are achieved ahead of 2030. In fact it would be wise to be more aggressive as all indications are that the global climate crisis is worsening.



# Yukon Wood Products Association

WORKING TOGETHER FOR YUKON'S FORESTRY FUTURE

PO Box 31130 Whitehorse, Yukon Y1A 5P7

yukonwoodproducts.org

January 14, 2020

Shane Andre  
Director Energy Branch  
Box 2703  
Whitehorse YT  
Y1A 2C6

Dear Shane,

I am writing you today to thank you for your efforts with regard to the development of the Our Clean Future strategy. We were especially pleased to find that the use of Yukon's ample forest resources as a renewable and carbon neutral source of fuel is strongly supported throughout the strategy.

We would like to offer the following as a way to address the weakness in the strategy regarding emissions attributable to the mining industry. Yukon could adopt a mitigation strategy that allows mining and other industries to offset their carbon foot print through forest renewal projects. This could include reclamation activities on old industrial sites through reforestation and site productivity treatments.

Yukon forests are subject to large stand replacing forest fires and insect infestations. Offset strategies on large stand replacing fires could include actions to improve soil productivity and shorten regeneration delay periods. Natural regeneration on disturbed areas can take 30 plus years in some situations. Yukon could undertake to reduce the regeneration delay period to less than five years by allowing industrial and government agencies to invest in replanting and site enhancement activities. This would add significantly to the recapture and sequestration of the carbon emitted by the disturbance agents natural and human caused.

Forest management branch has the modeling capability to calculate the amount of carbon capture possible if site productivity is improved and shortening regeneration time line.

There is also an opportunity to calculate the offset value of sequestered carbon in the construction of buildings. This could involve adopting building codes that incentivize using wood in construction. Other provinces are allowing construction of tall building (18+ stories tall) using wood as the primary construction material. The amount of carbon

stored in the walls and floors of building could contribute to a reduction in overall carbon through long term sequestration.

Thanks again for your efforts on this important subject and we look forward to working together to build the green economy in Yukon.

Yours truly,

Myles H Thorp RPF  
Executive Director