

What We Heard: Response to the Yukon Energy Draft 10-Year Renewable Electricity Plan

provide your input 

All comments received will be reflected in the What We Heard Report that will be used by our project team and Board of Directors to make future decisions about our 10-Year Renewable Electricity Plan.

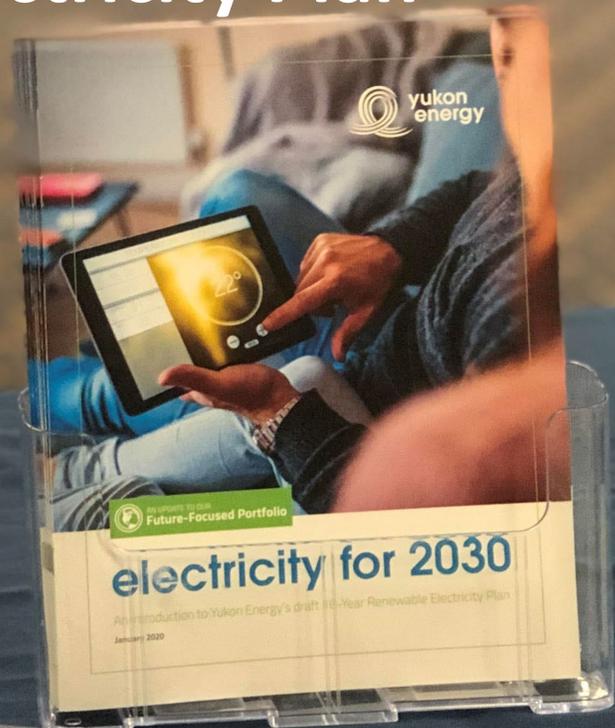
RETURN THIS COMMENT FORM TO A YUKON ENERGY REPRESENTATIVE, OR VIA:

 MAIL  EMAIL

Yukon Energy
ATTN: Community Engagement
42 Miles Canyon Road, PO Box 5920
Whitehorse, Yukon Y1A 6S7
communications@yec.yk.ca

1. What do you like or dislike about our 10-Year Renewable Electricity Plan?

2. Is there anything missing from the plan?



Prepared for:
Yukon Energy Corporation
Miles Canyon Road, Whitehorse YT Y1A 6L4

Prepared by:
Northern Governance Institute
508 Hanson St, Whitehorse YT Y1A 1Z1

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1. Executive Summary

In January 2020 Yukon Energy released the Draft 10-Year Renewable Electricity Plan (draft Plan) which outlines the portfolio of key projects and partnerships needed by 2030 to address the substantial demand anticipated for renewable electricity.

As Yukon's economy and communities grow, and as Yukoners increasingly invest in electric vehicles and electric heating technologies, demand for electricity will also grow. In order to continue providing most of Yukon's electricity from renewable sources, it is vital to invest in new dependable renewable electricity projects. This will allow Yukon Energy to continue meeting Yukoners' growing demands for renewable power while also supporting Yukon government's emission reduction targets outlined in the September 2020 climate change strategy *Our Clean Future*.

Engaging directly with Yukoners about the draft Plan in a transparent and inclusive process is a priority for Yukon Energy in finalizing how to move forward. Yukon Energy enlisted the services of the Northern Governance Institute (nGI), a third-party engagement professional company, to execute a fulsome and professional engagement plan with the goal of creating increased understanding of the benefits and opportunities outlined in the draft Plan and to gather informed input from Yukoners.

This report documents the input that was received during the multi-month engagement process.

In order to accommodate the widest range of voices to be heard, the engagement plan was designed to include a variety of methods for gathering comments including:

- an online comment form on Yukon Energy's website
- a feedback form included in an information booklet mailed to Yukon residents
- posting on Yukon Energy's Facebook page
- general comments received by mail, online, phone and email
- engagement sessions organized with interested groups:
 - First Nations governments and organizations
 - Public government
 - Electricity stakeholders
 - Public meetings in identified communities
 - Youth

Shortly after it had been started, the engagement process which called for a number of public meetings, had to be re-designed to accommodate the public health restrictions put in place due to the COVID-19 pandemic. This involved moving engagement sessions to an online format. The platform allowed Yukon Energy staff to present details of the draft Plan to attendees, allowing meaningful discussion of what was being proposed. Once public health restrictions were eased in August a number of COVID-safe in-person sessions took place in communities alongside continuing online sessions.

What we heard...

Overall, reaction to the draft Plan was positive. There was a strong understanding and appreciation heard of the need for future increases in demand to be met through renewable electricity sources.

Input received can be broadly divided into themes as listed below:

Impact on rates

The impact of the draft Plan on the cost of electricity to citizens is a key consideration heard repeatedly throughout the engagement process. While it was generally accepted there would be some increase in electricity rates, the reaction to that was varied with some participants displaying willingness to pay a small amount more, with others voicing the opinion that existing rates were already too high. A small number indicated a willingness to pay whatever was necessary to ensure a reliable supply of clean electricity.

Alternative plan

Yukoners asked if an alternative plan existed in the event the required federal funding is not forthcoming or if any of the three projects is not realized. There is understanding that the planning function is an ongoing process and that if Yukon Energy is unsuccessful in moving forward with any of these projects it will need to return to Yukoners to discuss other options.

Environmental impacts

Yukoners recognize that projects of this kind are not environmentally neutral and expressed that during all phases of implementation of the projects priority should be given to impacts on wildlife, water ecosystems and landscape, as well as the environmental cost of producing the renewable electricity. There was broad consensus that the net benefit to the planet by achieving Yukon's 97% renewable energy target is of great value and should be the dominant goal.

Reliance on British Columbia

Participants voiced concern that the Plan's two electricity generating projects are in BC. This embraced two general thoughts: firstly, seeking assurance around the level of support from the BC Government and residents living and businesses operating in that area for these to move forward; and secondly, suggesting there would be greater benefits to Yukoners and the Yukon economy if similar projects were pursued in Yukon.

What's missing from the plan

There was much discussion about other sources of renewable electricity that participants felt should be given consideration by Yukon Energy including wind, geothermal such as the Eavor-Loop technology, solar, biomass and small modular reactors with the implementation of demand side management programs being encouraged.

Forecasting models

Questions were asked frequently about the forecasting models used for climate as well as electricity supply and demand. Issues raised centered on the lack of consideration for meeting demands of potential industrial customers, particularly mines, and the perceived questionable reliability of previous forecasting.

Development timeline for projects

Yukoners commented that the timelines for the Plan's three new major projects appeared too optimistic and potentially unachievable. However, it is recognized that the draft Plan's many pieces including projects already underway or planned will help increase renewable electricity supply over the 10 year timeline, even if some targets for the three proposed projects are missed.

Energy literacy

It was widely felt that Yukon Energy should ensure wide and clear education on all aspects of energy in Yukon. Suggestions included explaining the challenges of the Yukon electricity grid, ensuring clear and territory-wide communication about rebate and incentive programs, explaining rate calculations for communities and for demand projections. Appreciation was expressed that Yukon Energy's engagement efforts improve understanding of this vital and often complicated subject.

The overall reaction to the 10-Year Renewable Electricity Draft Plan was positive, and participants and respondents sent a clear message of support for developing a future electricity supply that is both reliable and clean. Concerns and questions were raised about the draft Plan which Yukon Energy can consider when developing the final Plan to ensure that the interests of Yukoners and the environment can be addressed.

The response from participants to the engagement process was very positive with appreciation being voiced that Yukon Energy is involving Yukoners at this early stage to inform and gauge reaction on the projects in the draft Plan. Having the opportunity to question and discuss issues directly with senior Yukon Energy staff was considered productive.

Finally, the time, effort and willingness of Yukoners to engage on the draft Plan during the last few months that were so full of challenge, worry and distraction was greatly appreciated by Yukon Energy and nGI.

2. Introduction

2.1 Yukon Energy Draft 10-Year Renewable Electricity Plan

In late 2019, Yukon Energy developed a draft 10-Year Renewable Electricity Plan to update its plans following the Yukon Energy Board decision not to move forward with development of a new 20 MW thermal facility. This plan is based on the science completed as part of Yukon Energy's 2016 Resource Plan and accounts for updated electricity load forecasts. This plan can be found in Appendix C.

The plan also looks to meet the requirements of increasing demands for electricity that will result from the Government of Yukon's 10-year energy and climate change strategy, *Our Clean Future*, the final version of which was released in September 2020.

Our Clean Future makes clear that climate change is the biggest challenge of our generation, and details four goals to tackle it. These include:

- Reduce Yukon's greenhouse gas emissions so that they by 30% by 2030
- Ensure Yukoners have access to reliable, affordable and renewable energy with 97% of the electricity on the main electricity grid coming from renewable sources.
- Adapt to the impacts of climate change.
- Build a green economy.

Yukon Energy's draft Plan shows how, together, the visions of the Yukon government, Yukon Energy and Yukoners themselves can be aligned in a way that will create a Yukon prepared for the future where reliable renewable electricity continues to power daily life, work and the economy.

Yukon Energy currently meets over 90% of Yukon's electricity needs each year with clean renewable power because of large supply of hydroelectricity. As Yukon's economy and communities grow, and as Yukoners increasingly invest in electric vehicles and electric heating technologies, demand for electricity will also grow. In order to continue providing most of the electricity from renewable sources, investments must be made in new dependable renewable electricity sources that add firm winter capacity to the grid. This will allow Yukon Energy to continue meeting Yukoners' growing demands for power – even on the coldest and darkest of days – predominantly through renewable sources, while also supporting government's emission reduction targets.

These factors have led to this latest review of potential projects and technologies. This Plan will continue to be reviewed regularly by Yukon Energy to decide whether changes are necessary in the light of new data and updated forecasts.

Both *Our Clean Future* and Yukon Energy's draft Plan align with Yukoners' vision for reliable, sustainable electricity and a clean, unspoiled environment.

2.2 Engagement on the Draft Plan

Engaging directly with Yukoners about the draft Plan in a transparent and inclusive process is a priority for Yukon Energy in finalizing how to move forward.

Yukon Energy enlisted the services of Northern Governance Institute (nGI), a third-party engagement company to execute a fulsome and professional engagement plan with the goal of creating an increased level of understanding of the benefits and opportunities outlined in the draft Plan and to gather informed input from Yukoners.

The engagement process included an online feedback form, an information booklet mailed to Yukon households and discussion on social media platforms as well as engagement sessions, both virtual and in some cases in-person, with First Nation governments and organizations, public governments and electricity stakeholders. Public meetings were held in some Yukon communities and general comments were welcomed through email, phone or online.

Specific input was collected on Yukoners' general reaction to the draft Plan, what was felt to be missing from it and on who should bear the cost of achieving Yukon's long-term greenhouse gas reduction targets.

This report is the outcome of that engagement. It details how the engagement was carried out and what was heard from the many groups and individuals who participated. This feedback will be presented to the Board of Yukon Energy, and will assist decision-makers in finalizing the 10-year Renewable Electricity Plan.

2.3 What's in the Draft Plan?

The draft Plan presents a once-in-a-lifetime opportunity for Yukon to invest in the critical renewable electricity projects needed to fuel Yukon with clean energy. It creates opportunities for Yukon Energy, First Nations governments and development corporations, the Yukon and federal governments, and Yukoners to jointly shape the electricity future.

The draft Plan outlines the portfolio of key projects and partnerships needed by 2030 to address the substantial demand for renewable electricity that will result from the policies and actions outlined in the Yukon government's *Our Clean Future* strategy.

The projects proposed in this plan are the best mix of projects because they:

- promote energy conservation;
- maximize the amount of renewable electricity generated at existing hydro facilities;
- connect new sources of First Nation-owned renewables to the grid;
- store and use excess renewable power generated in the summer to decrease dependency on fossil fuels during the winter;
- open new markets for surplus renewable electricity generated during the summer; and
- ensure enough back-up liquefied natural gas and diesel resources are available to provide reliable electricity when renewables are not in sufficient supply to meet demand.

2.3.1 Key Projects

Existing resources

- All current assets except for three diesel engines set to retire before 2030.

Projects under development

- Whitehorse Hydro #2 Uprate
- Battery Storage
- Electricity purchases from Independent Power Producers
- Micro-Generation Program

Planned projects (based on approvals)

- Whitehorse Hydro #4 Uprate
- Southern Lakes and Mayo Enhanced Storage Projects
- Incremental Diesel Replacement
- Demand Side Management Programs

There are three new proposed projects located primarily in the Southern Lakes region of Yukon and just across the border in northern British Columbia, an area rich with potential for hydro power and pumped storage.

2.3.2 Future Potential Projects

What Yukon needs even more than increased energy is increased capacity. The combination of these three potential projects not only stores and uses excess renewable power generated in the summer to decrease dependency on fossil fuels during the winter, but also makes connecting potential sources of First Nation-owned renewables in the Southern Lakes region more viable, and creates opportunities for future sales of surplus renewable electricity to Skagway.

Atlin Hydro Expansion and Connection to Yukon

Project Summary:

- Sourcing renewable energy from the planned expansion of the Atlin hydro facility owned by Tlingit Homeland Energy LP, a company owned by the Taku River Tlingit First Nation.
- Capitalizes on an already existing project.
- Presents a near-term opportunity to make more dependable, renewable electricity available in Yukon.
- Its close proximity to existing transmission infrastructure in Yukon keeps project costs reasonable.

Moon Lake Pumped Storage

Project Summary:

- A reversible hydroelectric facility where water is pumped uphill into a reservoir when there is electricity surplus available in Yukon and from the Atlin hydro.
- Water flowing back down the hill is harnessed to generate electricity in the same way as a conventional hydro plant when needed.
- Adds much needed capacity that is required to meet demand during the winter and in emergencies.
- Provides a way to store excess renewable electricity in the summer to decrease dependency on fossil fuels during the winter.

Southern Lakes Transmission Network

Project Summary:

- An upgraded transmission line between Whitehorse and Carcross combined with a new line from Carcross to Tutshi–Moon to deliver excess renewable power to the pumped storage facility in the summer and make that power available on the Yukon grid during the winter.
- A new transmission line to Jakes Corner allows the Atlin hydro plant to connect to the Yukon grid.
- An upgraded line from Carcross to Tagish and a new line to connect with the Atlin line provides another electricity path if something were to happen to the Carcross-Whitehorse line.
- Enables the connection of future community-based renewable projects in southern Yukon to the grid including significant wind generation potential in the Carcross area.
- Creates the opportunity for future sales of surplus renewable electricity to the Skagway port when the cruise ship industry rebounds.

For the projects in the draft Plan to be accomplished and to keep rates reasonable it is vital that the federal government provides funding.

3. The Engagement Process Approach

The engagement plan was designed to build on the momentum created about the draft Plan following its introduction at the January 2020 Building Partnerships energy conference in Whitehorse. There were some initial conversations with electricity stakeholders and First Nations governments prior to the introduction of COVID-19 public health restrictions, when a re-designed online engagement approach was introduced.

Yukon Energy asked that nGI, throughout the engagement process, give priority to both inclusiveness and transparency. To that end, in addition to the engagement sessions held at COVID-sensitive venues and online, a comment form was included in the information booklet mailed to all residents in Yukon and posted on Yukon Energy's website. Comments were also welcomed by mail, email or through social media platforms.

Feedback from all submissions and engagement events is captured in Section 5 of this report with details of input received in Appendices A and B.

3.1 Written Input

Online/Mailed Comment Form

A short comment form was mailed to all residents in Yukon as part of the information pamphlet about the draft Plan. It was also available on the Yukon Energy website. This included 4 questions and a section for additional comments detailed below:

1. What do you like or dislike about our 10-Year Renewable Electricity Plan?
2. Is there anything missing from the plan?
3. How much more would you be willing to pay each month on your electricity bill to know that the power you are using is 97% renewable?
4. What is the most important thing for Yukon Energy to keep in mind as we work on this plan?

Additional comments

A total of 49 forms were submitted.

Letters and emails

A total of six letters and emails were received by Yukon Energy.

Facebook Input

Details of the draft Plan and scheduled engagement events were posted on Yukon Energy's Facebook page with comments and conversation encouraged.

3.2 Engagement Sessions Pre-COVID

The engagement process was originally planned to include in-person open houses and community meetings throughout Yukon. No open houses or community meetings took place pre-COVID, however, a few targeted meetings took place in advance of health restrictions introduced by government in response to COVID-19.

In March government regulations were introduced in an effort to protect public health as COVID-19 started to spread around Canada. Rules came into effect on social distancing, travel and meeting in groups. Shortly after engagement started, a temporary halt was called as society, and Yukon Energy, adjusted to living and working under the new restrictions and challenges.

3.3 A new COVID World

After a pause in the program to re-assess the engagement strategy given the new restrictions, in April nGI and Yukon Energy realigned the approach to one heavily dependent on a web-based platform, Google Meet. This program allows up to 250 people to join a secure online video session as well as allowing participation by phone for those with no computer or internet access. It also allows document sharing, a crucial element for Yukon Energy to present details of the draft Plan.

By August, as public health restrictions eased, the decision was made to combine online sessions with COVID-19 compliant in-person meetings where possible. This involved social distancing, provision of masks and hand sanitizer and the regular disinfecting of surfaces at the events with limits on the number of attendees at any one time. Meetings were scheduled hourly throughout the day to safely accommodate everyone who wanted to participate.

The new approach involved two phases:

Phase One:

Audience: targeted online engagement with industry and community influencers, First Nations and municipal governments and organizations

Objective: to gauge initial reaction to the draft Plan and to seek input on whether, given the impacts of COVID-19, it was suitable to move into a more substantial round of engagement with a broader base of Yukoners (Phase Two)

Phase Two:

Audience: wider engagement with a broad cross-section of Yukon organizations and individuals.

Objective: To present and explain, and get informed input on, the draft Plan

3.4 Engagement Events

These engagement events were designed to be qualitative in nature, enabling dialogue between Yukon Energy senior staff and Yukoners. This allowed clear explanations of the draft Plan and the opportunity for those attending to speak directly to Yukon Energy to voice concerns, questions, ideas and opinions.

The Yukon Energy representatives who attended sessions and presented information or answered questions varied from meeting to meeting but they included:

Andrew Hall, President & CEO

Stephanie Cunha, Manager, Communications

Mila Milojevic, Vice President, Resource Planning & Regulatory Affairs

Michael Brandt, Vice President, Business & Corporate Development

During several of the sessions the Chair of the Yukon Energy Board or one of the Board directors also attended to hear first-hand the feedback that was being shared.

3.5 Phase One Engagement

This engagement was targeted at interested stakeholders, such as First Nations and municipal governments and organizations as well as those involved in energy-related fields in Yukon communities. The aim was to gauge initial reactions to the draft Plan and to seek advice on how to move forward with a wider engagement given the impacts of COVID-19. The draft Plan was presented at each of these engagement sessions and the subsequent discussion included the following:

- What are your thoughts on the draft Plan?
- COVID-19 has disrupted many initiatives requiring input from individuals. What do you think of our seeking the views of Yukoners through web-based meetings over the next month or two?
- Who else in Yukon do you think would be interested in being approached to take part?

There was a clear message from the engagement carried out in Phase One that, although there were many challenges posed to engagement by the ongoing COVID-19 restrictions and societal impacts, the conversation should be taken more widely at this time.

3.6 Phase Two Engagement

After nGI presented the initial findings and the recommendation to move forward, Yukon Energy agreed and the next round of engagement was set up. This engagement was carried out in large part using a virtual meeting platform, Google Meet.

The sessions were based around a presentation by Yukon Energy senior staff of the draft Plan and the key projects included in it. Questions were welcomed with pauses for questions built into the presentation. A sample of this presentation can be found in Appendix D.

3.7 Who did we meet?

The priority for Yukon Energy throughout this engagement process was to ensure the widest range of voices was heard. This included First Nations governments and organizations, First Nations development corporations, those involved in the energy industry, municipalities, youth specific engagement and members of the general public.

Formats for engagement were varied and included individual conversations with energy stakeholders, COVID-safe in-person town hall meetings and, to accommodate public health restrictions imposed due to COVID-19, online meetings using a virtual multi-person platform.

Meetings were arranged with several key groups detailed as follows:

- First Nations governments, development corporations and organizations – this includes the Yukon First Nation Chamber of Commerce and other First Nation groups such as the Council of Yukon First Nations
- Electricity Stakeholders – those currently involved in or with expertise in the Yukon electricity industry and groups with an interest in the development plans
- Public Governments – this includes town councils, Local Advisory Councils and associated staff
- Public – this includes meetings that were open to members of the general public as well as public organizations who wished to be involved in the process; in addition, most of the written comments fall into this category
- Youth – a session run by and for younger people (15 to 25 age group) who wanted to participate and provide their unique perspective on this issue.

The engagement sessions arranged are detailed below in Section 4.

4. Engagement Sessions Held

This section details all the engagement sessions that took place as part of Phase One and Phase Two. These are presented in tables for each of the key groups identified for consultation.

First Nations governments and organizations

Electricity Stakeholders

Public Governments

Public

Youth

The feedback from all of these sessions can be found in Section 5 What We Heard

4.1 First Nation Governments and Organizations

Involvement of First Nations communities in this decision-making process was important for Yukon Energy and efforts were made to arrange engagement sessions with First Nations around the territory. Originally this engagement was planned to take place in-person in most communities to allow all interested citizens to attend and meet with the Yukon Energy team.

With the arrival of the COVID-19 pandemic and subsequent public health restrictions regarding social distancing and travel, a revised format of these meetings was developed to enable engagement and community input to continue. Every Yukon First Nation was contacted by Yukon Energy and the following engagement sessions were arranged:

| Date | Group | Location | Attendees |
|---------|---|-----------|---------------|
| Jan 24 | Taku River Tlingit First Nation | In-person | Not collected |
| Jan 28 | Carcross Tagish First Nation | In-person | Not collected |
| June 2 | Tr'ondëk Hwëch'in First Nation | Online | 8 |
| Jun 3 | Council of Yukon First Nations | Call | 8 |
| June 18 | Carcross Tagish First Nation | Online | Not collected |
| June 30 | Assembly of First Nations Yukon | Online | 3 |
| June 30 | Yukon First Nations Chamber of Commerce | Online | 12 |
| July 7 | Selkirk First Nation | Online | 6 |
| July 27 | Kwanlin Dün First Nation | Online | Not collected |
| July 28 | Kluane First Nation | Online | 5 |
| July 29 | First Nation of Na-cho Nyak Dun | Online | 6 |
| July 30 | Ta'an Kwach'an Council | Online | 9 |
| Sept 14 | Little Salmon/Carmacks First Nation | Online | 8 |

4.2 Electricity Stakeholders

There were sessions arranged with groups currently involved in, or with a stake in, the Yukon energy industry. The engagement sessions that took place with those electricity stakeholders are as follows:

| Date | Group | Location | Attendees |
|---------|---|----------|---------------|
| Mar 3 | Yukon Government Energy Officials from Department of Energy Mines & Resources and Department of Environment | Online | 2 |
| Mar 12 | Yukon Conservation Society | Online | Not collected |
| May 4 | Yukon Chamber of Commerce (Energy Committee) | Online | 6 |
| May 26 | ATCO Electric Yukon | Online | 7 |
| June 12 | Yukon Rotary Club | Online | Not collected |
| July 8 | Yukon Chamber of Mines | Online | 14 |
| July 15 | Yukoners Concerned | Online | 23 |
| July 28 | Whitehorse Chamber of Commerce | Online | 3 |

4.3 Public Government

The engagement sessions that took place with public government representatives are listed below. There were two meetings with City of Whitehorse as the members of staff attending the first session suggested that there should be a follow up with the Mayor and Council.

| Date | Group | Location | Attendees |
|---------|--------------------------------------|-----------|---------------|
| May 27 | City of Whitehorse Staff | Online | 3 |
| May 28 | Village of Haines Junction Council | Online | 6 |
| Jun 10 | Village of Mayo Council | Online | 2 |
| July 27 | Town of Faro Town Council | Online | 9 |
| Aug 6 | City of Whitehorse Mayor and Council | Online | 14 |
| Sept 3 | City of Dawson Council | In-person | 3 |
| Oct 21 | Marsh Lake Local Advisory Council | Online | Not collected |

4.4 Public

Engagement sessions were arranged for members of the general public to attend and publicized through radio, print and online advertisements and direct outreach from Yukon Energy and nGI. Originally these had been planned as in-person events throughout Yukon. Due to the public health restrictions imposed in the wake of COVID-19, the plan was re-designed to facilitate online participation using Google Meet.

By August, with a change in government guidance, some in-person events were re-introduced. These events were COVID compliant with the following measures put in place:

- Meetings arranged hourly throughout the afternoon to enable participation by all those who wished to attend while maintaining the mandated limit of people in one place
- Room arranged to meet social distancing regulations
- Provision of hand sanitizer and masks
- Sanitizing wipe down of all areas/seats used by public in preceding session
- Signage to remind attendees of the public health advice and regulations

These sessions attracted individuals from a wide cross-section of Yukon society. In addition to interested private citizens, attendees included:

- ex government officials
- energy professionals
- project developers
- educators and researchers
- environmental consultants
- those employed in tourism
- staff from Renewable Resources Councils

The engagement sessions organised for interested members of the general public are listed below:

| Date | Group | Location | Attendees |
|---------|----------------------------------|--------------------------|-----------|
| Aug 24 | Teslin Public Meeting | Teslin Recreation Centre | 0 |
| Aug 25 | Tagish Public Meeting | Tagish Community Centre | 1 |
| Aug 26 | Carcross Public Meeting | Carcross Cultural Centre | 3 |
| Sept 3 | Dawson City Public Meeting | Downtown Hotel | 5 |
| Sept 9 | Whitehorse Public Meeting | Gold Rush Inn | 13 |
| Sept 11 | Virtual Meeting Territorial Wide | Online | 6 |
| Sept 14 | Virtual Meeting Territorial Wide | Online | 12 |
| Sept 15 | Mayo Public Meeting | Bedrock Motel | 3 |
| Sept 23 | Whitehorse Public Meeting | Gold Rush Inn | 6 |

4.5 Youth

Throughout the engagement process one theme that was heard very strongly was the need to involve and hear from Yukon's youth. It was felt that as they will be the group of society most impacted by the success or failure of environmental protection measures and by the long-term financial implications of any plan their opinions were of high importance.

An online session was organized by a young education professional who also moderated the meeting. The tone of this session was different to the others that had taken place as it was structured with a view to engage youth specifically. Those attending were very engaged and vocal about the importance of creating a sustainable and renewable electricity supply to ensure a reliable supply of clean energy to take Yukon into the future.

| Date | Group | Format | Attendees |
|---------|--------------------------|--------|-----------|
| Sept 24 | Youth Engagement Session | Online | 19 |

5. Your Input – What We Heard

This section of the report presents what was heard throughout the engagement process from all sources and engagement methods. Where comments were made more than once we are including once and in some instances have phrased them differently to the actual comments made in order to reflect a common theme or opinion heard.

This is not a scientific quantitative survey of public opinion. It is a qualitative capture of the thoughts of Yukoners on the future electricity supply and the proposed new projects put forward by Yukon Energy.

In addition to a first section on broad overall themes, the feedback is separated into multiple sections to represent the main themes and comments from the five main groups with which we engaged over the past number of months:

- First Nations Governments and Organizations
- Electricity Stakeholders
- Public Government
- Public
- Youth

Comments are organized within each section by a number of themes identified during the engagement process and only reflect the most common opinions and comments received. A more detailed list of comments can be found in Appendix A.

5.1 Overall Themes

General reaction

Overall, the projects outlined in the draft Plan were positively received by Yukoners. There is a strong understanding of the need for future demand increases to be addressed through renewable electricity sources and ultimately the reduction of any reliance on diesel and LNG for electricity generation.

Impact on rates

The cost of electricity to citizens is a key consideration. Yukoners understand that these projects are expensive, some say “incredibly expensive”, at over \$500 million. From the feedback received it is clear Yukoners generally expect that there will be an increase in electricity rates. The reaction to that fact was varied with some participants displaying willingness to pay a small amount more, with others voicing the opinion that existing rates were already too high. A small number of participants said that they would be willing to pay whatever was necessary to ensure a reliable supply of clean electricity.

Alternative plan

Yukoners asked if Yukon Energy has a “plan b” if the financing is not forthcoming from the federal government or if any of the three projects is not realized. Participants understood that the planning

function is an ongoing process and that if Yukon Energy is unsuccessful in moving forward with any of these projects it will need to return to Yukoners to discuss other options.

Environmental impacts

Yukoners recognize that projects of this kind are not environmentally neutral and that care and attention is needed to mitigate possible impacts on habitat, both water and land ecosystems. However, there is clear understanding that the net benefit to the planet by achieving Yukon government's 97% renewable energy target is of great value and should be the dominant goal here.

Reliance on British Columbia

On many occasions the comment was made that two of the key proposed projects that make the Plan work are outside Yukon in northern BC. This theme embraced two general thoughts. First, is there sufficient assurance that there will be official support from the Provincial Government and from residents and businesses in the general area for these to move forward? Second, would there not be greater benefits to Yukoners and Yukon business, including impact on rates ultimately, if projects of a similar kind were to be pursued in Yukon? Although generally positive, there was considerable discussion between participants and Yukon Energy staff on the relative advantages of moving forward on the Atlin and Moon Lake options.

Projects that aren't in the plan

There were many comments and discussion around other sources of renewable electricity that participants felt should be given consideration by Yukon Energy including wind, geothermal such as the Eavor-Loop technology, solar and biomass. Yukoners reflected on how direct investment in these kinds of infrastructure could deliver more renewable electricity to the grid both faster and over the long term. However, it was recognized that without a massive storage option like Moon Lake, any source that generates energy in the summer is wasted given the seasonal variations in demand and supply.

Forecasting models

Much discussion occurred around the forecast that Yukon Energy is relying on to generate the projection of need over the next 10 years. There were two key observations. Firstly, there's always the unexpected that could throw this off considerably with previous forecasting models generally viewed as unreliable, and secondly Yukoners wondered about meeting industrial supply especially if new mines are connected to the grid.

Development timeline for projects

Yukoners reflected on the timelines for the three major potential projects commenting that they appear too optimistic and therefore likely unachievable. Participants did on the whole accept and appreciate that until the larger projects are operational there will be some of the more advanced, smaller scale projects coming online to increase the renewable electricity supply.

Energy literacy

Yukoners expressed interest in getting more information on “all things energy” including among other things clear communication of the programs that are in place to support individual households in improving conservation or building own-source electricity supply; how demand projections are forecast and rates calculated; and on whether Yukon government and Yukon Energy programs apply outside Whitehorse. There was general appreciation expressed that Yukon Energy’s efforts to engage with Yukoners helped improve understanding of this complex area vital to life in Yukon.

5.2 What We Heard: First Nations Governments and Organizations

Concerns were raised about the cross-border focus of the potential projects

- There was concern expressed about the loss of economic opportunity for Yukon First Nations and questions on why similar major project sites in Yukon had not been included
- It was felt that there was vulnerability to the development of projects should there be leadership changes in BC First Nations or provincial governments

Environmental concerns were raised related to the water levels and previous flooding events in project areas and with regard to traditional hunting and fishing activities

The importance of the engagement and involvement of First Nations communities at all levels were highlighted

- First Nations Development Corporations need to be strong, integrated players in the development of projects
- Appreciation was expressed for being involved in this engagement process and having the plan clearly explained
- It is vital to ensure a just economy for all citizens and promote reconciliation through climate action, to recognize the Indigenous worldview and be mindful as to whose needs are being met with these projects

Financial implications of the draft Plan on First Nations communities were noted

- Clarity was requested on whether federal funding for this plan would reduce funding available for separate First Nations projects
- Impact on rates for off-grid First Nation communities should be considered given that there will be no direct benefit to those communities in either reliability or environmental improvements

There were a number of projects that were felt to be missing from the draft Plan

- Finalizing smaller scale renewable First Nations-led projects that are already in development should be a priority
- There were requests that geothermal technology such as the Eavor-Loop technology supported by Little Salmon/Carmacks First Nation and its development corporation and small modular reactors be considered and included in the plan
- Concern was voiced that there was a heavy reliance on hydro and not enough consideration for potential wind sites such as in the Carcross area

Other energy topics important to First Nations were raised

- Improving energy literacy in all communities must be a priority so citizens understand the different generation technologies and challenges Yukon faces and all incentive and support programs available
- Investment should be made in people, capital and infrastructure to support Yukon's First Nation communities

5.3 What We Heard: Electricity Stakeholders

There was a lot of interest in the forecasting models

- Concerns were raised about previous forecasting models for both climate and energy demand being unreliable
- Given the rise in forecast energy demand there were questions about whether there would be enough summer surplus energy to make the proposed Moon Lake storage project useful in storing enough energy for winter use
- There were several issues raised around planning in the event of low water levels throughout the key watersheds in the Southern Lakes, Mayo and Aishihik regions
- There was overall a positive reception to the energy mix being proposed from a forecasting perspective

Cross border and environmental concerns were raised frequently

- There was interest in how the approvals process would work given that Yukon and BC have different environmental assessment and regulatory frameworks
- Participants stated a number of times that careful consideration must be given to the impacts on wildlife and recreational uses of the potential sites

Consideration of, consultation on and confirmation of the potential transmission corridors were all considered to be a high priority

Financial considerations of the draft Plan were highlighted

- Concerns were voiced about relying so heavily on federal funding particularly in light of the potential drain on resources from recent government-funded COVID-19 support programs
- It was suggested that producing billing rate scenarios would help to illustrate and get support for the draft Plan from Yukoners

It was suggested that some technologies (geothermal Eavor-Loop, biomass, extra wind, solar) were missing from the draft Plan.

5.4 What We Heard: Public Government

The issue of electricity rates was a concern raised with a suggestion that an explanation could be prepared on the anticipated range of impact on customer rates to finance the plan under various scenarios involving external funding

There was much discussion around forecasting models used in the draft Plan

- The opinion was voiced that the forecasts should include the increase in demand from the additional electric vehicles anticipated to be in, and passing through, the region
- There were also questions around including population growth and increased electrification of residential, municipal and commercial buildings

The importance of robust community engagement throughout the development of these projects was highlighted as a priority

- The presentation and discussion were considered insightful and helpful
- It was suggested that Yukon Energy reach out to groups or individuals who would not normally participate in such engagement to ensure their voices were heard and that the energy landscape was understood as widely as possible

Cross border issues were raised

- There was interest as to why there was no interconnection being considered into the BC grid as it had been discussed previously

5.5 What We Heard: Public

The potential impact on rates was a top priority for participants

- Any rate rise, although widely accepted as necessary, is generally unpopular as electricity bills are considered to be too high already
- Clarity was requested on how any rise in rates will affect off-grid communities who will receive no supply or health benefit from these projects and the associated environmental improvement

A variety of environmental and socio-economic concerns were voiced

- Environmental assessments and protection must be a priority when planning transmission corridors
- The aesthetic impacts of transmission line corridors must be treated seriously for new lines in pristine wilderness areas such as along the South Klondike Highway in the BC section
- Requests were made for fish, wildlife and landscape protection for both environmental and recreational reasons at all potential sites

On the subject of community engagement there were many comments and suggestions

- The presentation given at engagement sessions was generally considered thorough and the opportunity to be involved in these sessions was widely appreciated

- Comments were made that suggested it was vital to communicate clearly to Yukoners the overall benefits of greening the electricity system, both supply and use, and in promoting electric vehicles
- The importance of aligning the visions of Yukon Energy, Yukon government and Yukon citizens was brought up
- The importance of promoting and improving energy literacy throughout the region was mentioned by a number of participants

On the subject of the development timeline there was much discussion

- It was viewed as good to be looking forward and planning renewable projects to meet future needs
- The very early stage of these projects raised concern about a reliable electricity supply if one or more of them fails
- The timeline was considered to be unrealistic with previous experience showing that projects take a lot longer to develop and build

There was some discussion around projects and technologies that were felt to be missing from the plan

- Participants voiced the opinion that missing from the plan were projects that included biomass, small modular reactors, geothermal such as the Eavor-Loop system, and additional hydropower sites
- It was suggested that the draft Plan should include the environmental costs of producing electric vehicles and hardware for renewable electricity generation projects and factor those into overall targets
- The demand and capacity forecasts as presented all support the current plan, but there was concern that demand projections have been quite different than reality in the past particularly regarding mines
- There was much discussion around the potential to introduce time of use rates and demand side management programs and putting a focus on individual actions

5.6 What We Heard: Youth

Of the values upon which the draft plan is based those that mattered most to this group were that it was reliable and clean.

Participants agreed that future projects should be renewable

The draft Plan was generally considered expensive but worth doing

The participants felt that some important elements were missing from the draft Plan

- Interest was shown in the possibility of using nuclear power and small modular reactors
- Biomass was highlighted as a popular form of energy that is either already being used by participants or would be welcome as part of the plan
- There was a perceived lack of demand side management initiatives
- It was felt that the environmental impacts of disposing of, or recycling renewable energy components (solar panels, batteries) need to be considered in any plan

6. Conclusion and Next Steps

Engaging with Yukoners in a clear and transparent manner is always a priority for Yukon Energy and it was no different with the 10-Year Draft Electricity Plan. This engagement process, however, was conducted during a challenging time for all of those involved. The original design of the engagement plan had to be modified and conducted over a more extended period of time to accommodate the challenges of public health restrictions and the wider societal impacts of COVID-19.

Despite this background, and with appreciation from Yukon Energy, Yukoners approached this engagement with energy, thoughtful comment and insightful questions providing Yukon Energy with the opportunity to explain the draft Plan, hear concerns and participate in meaningful dialogue with participants.

There was a clear message of approval from Yukoners on moving towards increased reliance on clean and reliable electricity generation and storage to meet the demands of the changing and developing territory.

There is recognition that success in the implementation of the draft Plan will involve partnerships with First Nation governments and their development corporations, the communities, Yukoners and their businesses, as well as the federal government which is critical for achieving moderation in cost increases for Yukoners.

This was balanced with concern on the funding and financing of the draft Plan and the potential impacts on the cost of electricity to consumers. There was also a clear message to safeguard the environment when developing projects and to ensure that the most accurate and reliable forecasting is used.

Improving the understanding of all areas of Yukon's energy landscape is also a priority, with Yukoners seeking information on incentive and rebate programs, as well as on available technologies and the challenges of managing the Yukon electricity system.

The comments and feedback contained in this report will be considered by Yukon Energy in the preparation of the final plan ensuring that Yukon moves into the future with a reliable, affordable, clean and modern electricity system that meets the needs of Yukoners.

As plans and projects move forward there will be ongoing engagement activities relating to assessment and regulation of the projects, and Yukon Energy encourages all Yukoners to keep an eye out for these opportunities.

Appendix A – What We Heard

ON THE PROPOSED MAJOR PROJECTS IN THE PLAN

1. Atlin Hydro Expansion & Connection to Yukon

• **COMMENTS REGARDING CROSS BORDER FOCUS:**

- Questions arose about the permitting of cross border projects
- Will there be economic value to Yukon with so much of the infrastructure being built in BC both in construction and sale of electricity?
- Preference voiced for Yukon First Nation owned projects
- Changes in First Nation leadership in BC may affect support for BC projects

• **TRANSMISSION:**

- Clarity requested on who builds and operates the transmission line
- Consult with data storage industry representatives who are looking at using underground cable infrastructure from Atlin to Carcross
- Environmental assessments and protection must be a priority for planning the transmission corridor

• **GENERAL COMMENTS:**

- Short development timeline is definitely a positive for this project
- Costs seem prohibitive
- What is the social licence within Atlin for the development should be considered given that all the additional power generated will be exported?
- Project seems to be heavily dependent on reaching land-related agreements in BC and overlap agreements with Yukon First Nations
- Given other renewable options how was this project selected bypassing any request of alternative proposals?

2. Moon Lake Pumped Storage

• **ENVIRONMENTAL:**

- There will be considerable environmental impacts of the project on fish and wildlife
- Recreational use of the lake will likely be affected as will tourism and the local outfitters who benefit from the pristine wilderness environment
- Water level change from pumped storage in Tutshi and Moon lakes was identified as a value requiring attention in design, assessment and regulatory processes
- The potential for expanded storage must be weighed against the habitat loss it will cause
- Moon Lake is close to the site of protected areas in the Atlin Land Use Plan which could cause delays
- What were the factors in selecting this site and had other possibilities been considered?
- As diesel will still be required until this project is ready does it really make environmental sense?

- **CROSS BORDER CONCERNS:**
 - There is vulnerability on relying so much on power from BC as opposed to Yukon
 - There will be fewer financial opportunities for Yukon business with this major project occurring in BC
 - What would the impacts be, especially timing, from the differences between the BC and Yukon environmental assessment and regulatory frameworks?
 - Is there enough support on the BC side to allow such a big project to move forward?
 - Given the timeline, concern was raised about the impact on this project of a change at any level of the government involved both public and First Nations
 - Clarity was requested on ownership structure and whether there was any potential for Yukon First Nation partnerships or investments
 - Any possibility that this could have been done in Yukon as opposed to BC?
 - Clarity requested on the taxation structure of the project given location in BC
- **TRANSMISSION:**
 - The transmission connection is longer than some of the possible sites in Yukon such as Striker Pass
 - Clarity is requested on whether the transmission line will run along existing corridor
 - The aesthetic impact of the line could negatively impact the tour operators in that unspoilt region of BC, who themselves get no benefit from the project but who rely on the wilderness experience to succeed in business
 - The impact of the line on the landscape in Yukon would impact tourism in that region of the territory
 - Tour operators in the region anticipate opposing the line due to potential impacts especially in the light of the downturn caused by COVID-19
- **ENERGY SUPPLY:**
 - In the Plan there is a lack of focus on wind energy production
 - Project as proposed along with new winter supply from wind will give the maximum effect while minimizing requirements for water storage capacity increases in other lakes
 - Given the rise in forecast energy demand would there be enough summer surplus energy to make this project useful in storing enough energy for winter use?
 - Clarity requested on climate modelling used
 - What measures are planned in the event of a low water year at both Whitehorse and Moon Lake (and possibly other lakes)?
- **UNFAMILIAR TECHNOLOGY IN YUKON:**
 - Information requested on previously developed pumped storage projects of this size
 - What evidence is there that this project would work in that area given cold climate and related severe conditions? Have previous pumped storage projects been built in cold climates and how have they performed?
 - Would the power required to pump the water uphill still make it economic?
 - Questions were raised regarding the technology and how it works
 - Potential to develop more pumped storage projects in Yukon if this site works
 - Lack of a complementary wind or solar project on the site was questioned

3. Southern Lakes Expansion

- **TRANSMISSION:**
 - Clarity and engagement requested on who will build infrastructure
 - Confirmation of the corridor to be used is vital
 - Potential should be considered to run the transmission lines underground and underwater
- **ENVIRONMENT**
 - Wildlife in Southern Lakes region must be considered in any development plans
 - Environmental assessments must be a priority before any widening or changing of powerline corridors
- **AESTHETICS:**
 - Opposing opinions were voiced as to whether it would be preferable to have the lines running along the existing highway corridor (environmental values) or through more remote areas (socio-economic values) to avoid visual impacts
 - There would be an impact on tourism in the area if transmission infrastructure spoils views and wilderness quality of the region
- **ECONOMIC OPPORTUNITIES:**
 - Lack of skills training available at Yukon University to enable Yukoners to benefit from job opportunities being created by this project
 - The addition of the connection at Jakes Corner will help with reliability and reducing power interruptions for business in that area

ON THE FEASIBILITY OF THE PLAN

- **GENERAL COMMENTS:**
 - There have been low water years at both Mayo and Aishihik, and both need to be factored in carefully, significant impact on supply.
 - Any development should tie in the Assembly of First Nations (AFN) declaration
 - Recognize self-determination of First Nation communities
 - There is the potential for issues arising if there is overlap between multiple First Nations on these projects
 - There were questions around the individual cost of each project
 - Plan was viewed as expensive but worth doing in the long term
 - The observation was made that using new technology may result in actual cost savings, not increases, and that, if so, these savings should be passed on to rate payers
 - Explain the Plan B if the funding plan or these projects can't all be successful
 - BC Regional AFN Chief should be involved in discussions on cross border projects
 - First Nation Development Corporations need to be strong, potentially integrated players in the project developments
- **DEVELOPMENT TIMELINE:**
 - Election cycles do not fit with 10-year planning horizons. Those involved in the political system aren't interested in such a long-term picture

- Demand side management and some of the short-term micro-hydro/other renewable projects should be the priority
- Good to be looking forward and planning to do things right from the start of projects
- Good plans long overdue
- The very early stage of these projects raises concern about supply if one or more of them are not built
- Timeline seems unrealistic. Previous experience has shown that projects take a lot longer to develop and build
- Yukon is growing very fast and there is a danger that Yukon Energy should start developing projects ASAP instead of spending too long listening to political and public opinions and pressure
- **FORECASTING:**
 - Forecasting models have been shown to be unreliable
 - Risk that by the time the projects in the plan are operational there might be a deficit placed by increased demand due to electrification within buildings, both residential and commercial, and from electric vehicles
 - Plan should reflect more on the actions to increase efficiencies by individuals and the private/public sector users
 - Some challenge as to whether the peak forecasting is too optimistic if we get another extended -40 period along with a low water year. May wish to revisit these
 - Important to have diversity in the energy production portfolio and what is proposed create this diversity/flexibility
 - Projection forecasting needs to be clear on amount of energy that will be used by the 6,000 electric vehicles anticipated in Government of Yukon plan as well as cars passing through and what that looks like in terms of timing and need for charging stations through the territory
 - Forecasting needs to account for growth in population and subdivision planning in Whitehorse
 - Whitehorse is looking at an increase in electrification of public buildings which needs to be factored in to demand forecasts
 - What are the “deal breakers” that could prevent this plan going forward?
 - Are all anticipated mining activities considered in the projections where there is intention to provide from the grid? Potential for new mining projects, currently not “on the screen” that will have to be taken into consideration
 - Demand and capacity forecasts all support the current plan, but it seems that demand projections have been quite different than reality in the past particularly regarding mines
 - Existing plan does not appear to recognize, nor factor in, future industrial customers which may be operational within a decade. This potential demand supports the rationale to continue with additional generation and transmission opportunities so that future generations of Yukoners and developers may continue to rely on competitive and predictable rates
 - Doubt was raised as to the assumption of continual growth particularly in the light of COVID-19 impacts
- **ENVIRONMENTAL:**
 - Will there be new vulnerabilities to the water supply being created by these projects?

- There are noise concerns in Faro around the number of additional rental diesel units being based there when they are needed to serve other communities
- **COMMUNITY ENGAGEMENT:**
 - The presentation and discussion were very insightful and helpful
 - The presentation is thorough and the opportunity to be involved is appreciated
 - Appreciate the ability to ask questions during the town hall engagement format
 - It is important to reach out for comment to those segments of society that might not normally participate in this form of engagement
 - By far the largest consumer is Whitehorse. It is also where the greatest impact will come for increased demand as the Yukon government implements its strategy with electric cars, more new construction electricity-heated homes, electric bus conversions etc. It is also the area where the greatest amount of conservation can be achieved. Dialogue with the city must continue on all these fronts.
 - Consideration should be given to a more community focussed Phase 3 that concentrates on individual community needs instead of the broad territory-wide discussion
 - The question was raised as to why this is considered engagement on the Plan when these projects have already been selected
 - Vital to communicate clearly to Yukoners the overall benefits of greening the electricity system, both supply and use, and in promoting electric vehicles
 - Align visions of Yukon Energy, Yukon government and Yukon citizens

ON FINANCING THE PLAN

- **FEDERAL FUNDING:**
 - Before going to the federal government, ensure all alternatives are thoroughly investigated
 - Project is heavily reliant on, as yet unsecured federal funds
 - Potential that even without federal funding, the projects should be possible financially, and a detailed financial picture should be carefully developed and provided as part of the education to Yukoners
 - Risk that COVID-19 measures have been a drain on federal government financial resources
 - Expectations on what will be received should be realistic
 - Prepare and distribute to the public a clear alternative plan to address the initiatives without federal financial support
 - Clarity requested on whether federal funding for this plan will reduce funding available for separate First Nation projects
 - What is the anticipated range of impact on customer rates to finance the plan under various scenarios involving external funding (primarily Ottawa)?
 - Implications to consumers noted especially if federal funding is not forthcoming. Notable that even with federal funding a considerable amount of funding will rest with Yukon rate-payers that may not be acceptable
 - Federal government should pay for most of these projects as rates are already high
 - Financial analysis of thermal options should be presented
 - Assurance requested that funding is available to meet any cost over runs

- **RATES:**

- Impact on rates for off-grid First Nation communities should be considered given that there will be no direct benefit to those communities in either reliability or environmental improvements
- Financing for Moon Lake would need to cover ongoing operating and maintenance costs not only capital expenses
- Raising rates, although undesirable, would enable the plan to proceed without federal funding
- Higher rates should be viewed as a cost that has to be paid to mitigate the impacts of climate change over the coming decades
- Produce billing rate examples to help confirm support for the plan
- Any rate rise is generally unpopular as electricity bills are considered to be too high already
- There is general acceptance that a rate rise will be necessary but nothing higher than 10%
- The notion of user-pay was brought up in the mining area; mines contributing to increased GHG impact can pay for green energy offsets in infrastructure
- Carbon tax refund from Yukon government could be linked to any Yukon Energy rate increase to offset the cost increases
- Clarity requested on how any rise in rates will affect off-grid communities who will receive no supply or health benefit from these projects and the associated environmental improvement

ON WHAT IS MISSING FROM THE PLAN

- Plan incomplete without addressing the important role biomass can play in Yukon's future energy mix
- The lack of small modular reactors from the plan was pointed out repeatedly
- Further details requested about heat pumps being added to public buildings
- No major cross border plan to connect the grid which was suggested may be a Federal level opportunity given anticipated booms in mining in both Yukon and northern BC
- A Yukon Energy-owned solar or wind farm would be a valuable complement to the Moon Lake storage project
- Consider including the environmental costs of producing electric vehicles and hardware for renewable energy generation projects and factor into overall target
- Possibility for Yukon Energy, not micro-generators, to use potential of rooftops in Whitehorse for solar energy production
- Consideration of underwater generators (run of river) stretching the length of Yukon River to harness the river's power with no damage to landscape
- Consider pursuing additional hydro-electric sites and geothermal generation capacity
- There is no mention of a plan to mitigate the noise levels of the rental diesel generators
- Yukon's aim should be to reduce territory wide GHG emissions by at least 50% by 2030 through support for electric vehicle infrastructure and replacement of oil and propane furnaces with electric ones.
- As there will be a reliance on diesel generators until these projects are up and running consider replacing them with LNG generators

- Finalizing smaller scale renewable First Nation led projects that are already in development should be a priority
- Geothermal projects, particularly Eavor-Loop system, are not included and should be considered
- Lack of new wind development, particularly for winter supply
- Revisit application to the Utilities Board to fund demand-side pilot studies
- Liard Canyon should be looked at as potential for hydropower
- There was a perceived lack of demand side management initiatives

ON OTHER ENERGY TOPICS

- Energy literacy across Yukon is key. Yukoners should be aware of the structure and challenges of the Yukon electricity system and the available generation technologies. All programs and subsidies offered need to be widely and clearly communicated.
- Yukon Energy and Government of Yukon should be focussing on aligning their supply and demand plans
- The environmental impacts of disposing of or recycling renewable energy components (solar panels, batteries) need to be considered in any plan
- Subsidies for green home initiatives would be welcomed
- Potential to use funds to invest in research and development on renewable energy technologies as opposed to giving subsidies
- Demand side management and time of use rates need to be a focus with programs to reduce peak demands and to conserve energy
- Reliable energy is crucial to protect the current way of life. Any power interruptions can impact freezers, for example, that can cause the season's meat to spoil
- There is too much time spent doing studies and engagement which leads to projects being delayed and the potential for issues with power supply reliability
- There should be some reduction in rates for those communities negatively impacted by water drawdowns to run hydro projects that benefit other communities
- Investment should be made in people, capital and infrastructure to support Yukon's First Nation communities
- Making use of Tuttle airstrip could reduce cost of transporting diesel to Old Crow
- Is there still interest in using gas from Eagle Plains to provide fuel to generators in Yukon?
- In the same way that we didn't know about COVID-19 until it was here, we must be mindful that there are other things we can't see coming that change plans like accelerating climate change and climate migration
- Ensure a just economy for all citizens and promote reconciliation through climate action
- Recognize the Indigenous worldview and be mindful as to whose needs are being met with these projects
- Utilize as many different engagement methods as possible to enable participation from all citizens including those with limited energy literacy and no access to online platforms
- Concerted effort needed to align interests with First Nation communities. This is as much an internal capacity challenge as it is a matter of interest in participating
- A framework for shared management of land and resources is needed
- Involve and focus on youth voices within First Nation communities

- Recreational use of lakes should be considered as part of any plan
- The ethical framework for connecting the life force that is water to energy must be a priority. There is a potential for the abuse of water and the loss of respect for it. Water is critical for personal use, salmon and other food stock. The western engineered approach does not embrace a holistic worldview that balances the multiple values that water offers.
- Ensure contractors are aware of all energy conservation programs
- Consideration should be given to re-commissioning North Fork hydro project to meet demand
- Every household needs to be a producer not a consumer. Programs and initiatives must make this easy
- Focus should be on small scale projects and encouraging individual actions
- There is a perceived disconnect between government plans and actions which leads to not meeting their own targets
- Build power solutions that are right for Yukoners and the natural resources available

Appendix B - Responses received in writing

Responses received on feedback form

Question 1. What do you like or dislike about our 10-Year Renewable Electricity Plan?

| | |
|----|---|
| 1 | I think its good to be planning ahead with clean energy in mind |
| 2 | What plan? Where are the details? I dislike that you are putting more cost on Yukoners. I don't agree with any of the new projects – they all involve BC |
| 3 | The plan does not seem viable and as we have experienced the diesels are being used to compensate the LNG over loads |
| 4 | Sounds OK |
| 5 | All good |
| 6 | Do we need to be dependable on BC (Atlin/Moon Lake?) Can we not be self sufficient in or energy use? |
| 7 | Good plans but long overdue. Good trans-boundary thinking + long term investment. Accessing federal funding to off set costs |
| 8 | |
| 9 | I would have liked to see various scenarios and their relevant costs. I would also like to know what kind of batteries there will be, and where. (I think that Lithium-batteries are too precious to use for stationary applications.) |
| 10 | I don't think this plan goes far enough. Why are we not aiming for 100% renewables? |
| 11 | The bandaid solution of raising the highwater limits for the southern lakes. |
| 12 | You still are telling only the half trues. We denied the 20MW Thermal Generation because it would have been done with LNG." |
| 13 | Your consultation plan seems to be missing, as are the detail about each strategic plan or step. |
| 14 | don't want costs to increase |
| 15 | I like that you are continuing to leverage our hydro as a key source of electricity. |
| 16 | Very sketchy detail as to how this all fits together and doesn't seem tightly coupled to proposed action plan from 2016. How did the YG 2019 strategy change the 2016 plan other canc the 20 MW thermal? 1) Capacity Gap chart shows peak demand without mines. Why the low-industrial scenario? 2). Capacity, well OK. But what about energy? Batteries and pumped storage don't produce energy. Is there enough energy produced overall to charge the batteries and keep Moon Lake full to give the capacity when we need it? Chart? How much would come from Atlin? 3) What assumptions are you making with regard to IPP and microgeneration in these projections? What assumptions for changes in space heating to electric? Electric cars? 4) Where is ATCO hydro in the chart? 5) Doesn't seem like lots of excess capacity. Not sure about energy (see comments above). So selling power to Skagway? Really? Under what circumstances would that be feasible? What new sources of energy? |
| 17 | I like the fact that there is a plan. It should lead to a 20 year plan and 30 year plan. The 10 year plan looks realistic. |
| 18 | The only type of method I agree on is hydro. Batteries, solar, windmills all have a short life in comparison to hydro. Water is held back, spins the turbines and out it goes. As far as impact on the environment, everything adapts and in some cases even get stronger. The only obstacle I see is getting on board with the first nations that would be effected. once that can be accomplished, there would be one more larger dam supplying more power than the green options scattered all over the territory. It's been working for decades. |
| 19 | "I like the Moon lake pump storage plan. |

| | |
|----|---|
| | I dislike that the Moon lake pump storage plan is the only part of the 10 year plan that allows significant renewable energy production. I dislike that the predictions of energy demand/production show that in 2036 Yukon will again not have enough renewable energy production to sustain itself. It doesn't seem like a lot of forethought for long term planning went into the plan. " |
| 20 | "I really like the focus on trying to reduce electricity generation from oil and LNG to solar etc. It would be best to try and stay away from affecting water levels in the Southern Lakes. A longer Plan would be better; ten years will come and go before you know it....20, 30, 40, 100 year plans. Re micro-generation; how about increasing the rate that you buy the extra electricity from solar producers? We have solar panels. Why did you put a cap on how much power people can produce, ie 65%. If people are willing to spend their own money to produce electricity, why are you putting barriers up if they can and want to install more panels?" |
| 21 | I dislike the limited range of options for projects we need. I have concerns about the Moon Lake pumped storage project that are not addressed by the report, including the ability to get BC approval, the potential environmental damage by building and potential failure of the system, the 'mega' project approach instead of multiple small projects. I like the idea of purchasing hydro from Atlin. I like the idea of expanding the transmission network but do not like the idea of selling to Skagway. If we are able to do that, we have built excess capacity in the Yukon for no apparent reason. |
| 22 | It is vague and lacking detail. The ideas are sweet nothings whispered in my ear... |
| 23 | "Like - Plan to move to more renewable resources. Dislike - We are not looking at New Hydro Electric Dams to provide for the future. Battery is good, still expensive and needs time to perfect. In peak times battery, wind and solar will not suffice currently. -30 usually means cold and calm, while still only having 6hrs of light. The Yukon has plenty of sources to provide our own Hydro, why are all the plans to get water storage or power from BC. " |
| 24 | It's not being implemented fast enough |
| 25 | "There is not much I like about it; it pays passing lip service to renewable electricity generation, but is not planning to do anything really serious about it. I thoroughly dislike that there is absolutely zero mention of any real renewable energy, that is, solar and wind generation, and no mention at all of working and investing to improve the storage capacity of modern batteries. Your plan is not a plan; it's an attempt to anesthetise the citizens of Yukon. A smoke and mirror show. " |
| 26 | "I would have liked to see various scenarios and their relevant costs. I would also like to know what kind of batteries there will be, and where. (I think that Lithium-batteries are too precious to use for stationary applications.)" |
| 27 | "- First I like the transparency of the plan and community engagement. - I like the diversity of the solution, from demand side management, micro-generation, and a focus on renewables for new energy supply. - I wonder if more can be done on demand-side management" |
| 28 | "The concerns I have about this plan are: 1. The ""moon lake pump storage"" idea appears to be the only part of the plan that actually adds any significant amount of increased renewable energy production. Even this, according to your Capacity Gap chart, only provides enough renewable energy to sustain Yukon for about three years before it can't keep up anymore. If you implement the ""possible"" moon lake pump storage expansion it would sustain Yukon for about another 5 years. While this is a good new initiative, there doesn't seem to be much long term planning - if everything goes exactly as planned and Yukon Energy is able to implement everything in this 10 year plan on time, it will only provide renewable energy to sustain Yukon's demands for 8 years before it can't keep up again, which means at the end of this plan we'll be back in the same position we're in currently (not having enough renewable energy and having to rent diesel generators). 2. Micro-Generation solar program: If it is really beneficial to Yukon Energy for individual residents to install solar on their houses and sell excess back to Yukon Energy then why does Yukon Energy put |

| | |
|----|---|
| | a limit on how much residents can install/sell back to the grid? And why doesn't Yukon Energy do their own large scale solar generation project?" |
| 29 | This can't go through, without C/TFN having a B/C. land Claims negotiated. Atlin is imposing a false jurisdiction over C/TFN's Traditional Territory. |
| 30 | |
| 31 | I don't see any benefits to the individual C/TFN Citizens. It will go to the Dev Corp and be spent, Citizens will not see any benefits. I believe Moon lake is C/TFN's Governments alone decision and not anyone else's. We already loose a lot of wildlife diversity from the Whitehorse Hydro dam from the ice falling and trapping them and killing them, when lake levels drop. Now where gonna do it twice to them or even more though out the winter? How will this affect wildlife that cross on the ice and fall through...this will increase. The UFA only speaks about water in the Yukon "Yukon Water Board" has no jurisdiction in B.C. How will the Quality, rate and water flow be different through our lands and unseeded B.C. lands? This just smells bad anyway I look at it! I think this should wait until C/TFN has secured a B.C.Settlement negotiations, then look at this, because the way I look at it, its highway robbery. |
| 32 | There are many proven areas that support "hydro". Do this and you solve issues. Get on side with the First Nations or whatever it takes. We should be exporting power with all our resources / water availability! |
| 33 | I like all the points in the plan for the 2030 vision. The only part I don't like is the time line. Its hard to believe a fraction of that work getting done by 2030. I went to a hydro meeting 12years ago, which was discussing which location to build a hydro. Nothing has even started as far as hydro is concerned. |
| 34 | |
| 35 | |
| 36 | |
| 37 | |
| 38 | |
| 39 | Has anyone at YEC considered the SEARL GENERATOR? It is not a new idea but too complicated for me. Perhaps it could be used to charge your Giant Batteries? |
| 40 | I do not see anything about nuclear energy, hydrogen storage ie SMR nuclear |
| 41 | A wide variety of sources. |
| 42 | Any plan that included solar or wind will increase the customers overall cost for power that is only available during non peak hours. |
| 43 | |
| 44 | The plan seems to be reasonable. |
| 45 | No mention of geothermal energy. All new development should be evaluated for geothermal potential <u>prior</u> to any development approval, this includes all commercial, mining and housing development projects |
| 46 | Like – expansion of renewable sources of energy with low carbon emissions (solar,hydro,wind) – pumped hydro storage (Moon Lake) |
| 47 | The 10-year plan is ok if it is administered realistically. |
| 48 | I really like the focus on renewable electrical energy. But why a 10-year plan instead of a 3,5, or 7-year plan? And when are the "new projects we need" going to become projects underway? I'm encouraged by the community focus and I like that aspect of the above plan. |
| 49 | I like everything mentioned especially interested in community based and individual involvement. |

Question 2. Is there anything missing from the plan?

| | |
|---|---|
| 1 | I don't know |
| 2 | Where is the research that shows solar and wind resources will be efficient? Here in the north? How often will the batteries need replacing? Where will the batteries be stored? How much will it cost to heat the storage areas? |
| 3 | Yes a sustainable plan |
| 4 | Specifics: Is another dam required/ diesel still?/ demand side management/timelines for the projects listed |

| | |
|----|--|
| 5 | What about geothermal? |
| 6 | Renewable energy that excludes LNG and diesel altogether. Is that realistic? I think we need to look 'harder' and; more' for solar power and wind energy. |
| 7 | Timeline to phase out the antique diesel generators by Riverdale that have no pollution controls or sound level reduction efforts since the 1960's Plans to mitigate the noise levels of the generators (btw if you have your engineers look at an aerial image of them you will see that the adjacent dam and the building forms "V" that projects and amplified this sound straight at Riverdale – did you ever notice? The design flaw? |
| 9 | How much is it to connect to the BC electricity grid? How much des the micro generation cost at what level of uptake? |
| 10 | |
| 11 | |
| 12 | "Yes, What has been done to install more green renewable energy generation? What was done with the \$1.3M from the Feds, specific labeled for green clean renewable energy generation? To where did the so loudly advertised wood biomass energy projects go?" |
| 13 | "You should not indulge in a public consultation during a pandemic. It is immoral and unethical. Your constituents are focused on other matters." |
| 14 | keeping costs lower than what we already pay |
| 15 | "Incremental Diesel Replacement project - I am not seeing much information on what it is being replaced with, will it still be diesel?" |
| 16 | Detail. Where is the actual plan? Maybe I missed it somewhere. |
| 17 | More emphasis on demand conservation. How can consumers be convinced to use less power? There should be promotion of biomass heating as an alternative to electric heat. Electric heat must be a major factor in Whitehorse with most new houses using it exclusively. Perhaps another project could be added to the plan: Partner with Biomass industry to provide funding for FN and businesses that install biomass boilers as an alternative to electric and fossil fuel heat sources. |
| 18 | |
| 19 | According to the Capacity Gap chart, starting in 2031 the energy demand in Yukon starts to level off, why is this? Some information on how these predictions are calculated would be beneficial. It would also be beneficial to know why Yukon Energy hasn't planned or implemented any new renewable energy production measures in the last 10+ years. What are the hurdles Yukon Energy faces in doing this? |
| 20 | How much networking is happening with residential planners, private builders and contractors? I have driven through Whistle Bend. I was surprised to see houses with garages and few windows facing south. Why aren't the streets all built so that all new construction is orientated south to take advantage of heat from the sun. Our home faces south and we have a sunspace on the south side of our house. Starting in February we can open the doors and let heat from it enter our home! A huge focus should be on reducing the need for more electricity so we don't have to produce more to meet the demand. How about working with the Department of Education and install solar panels in all those fields and incorporate classroom learning? Is there a plan for storage of electricity from solar panels? |
| 21 | It is missing serious examination of expanded household solar generation capacity. Or wind or small hydro, for that matter. In Whitehorse, all of the Whistle Bend housing development could have incorporated solar panel requirements. Still could generate a lot by doing so retroactively. Also, could expand support for installing solar panels on homes and businesses. Suspect it would be cheap compared to cost of a Moon Lake project. It is not clear how the Moon Lake project is considered renewable energy. Construction energy costs do not seem to be considered in that calculation. |
| 22 | details |
| 23 | New Hydro! |
| 24 | |
| 25 | See my answer to previous question. It applies here as well. |

| | |
|----|---|
| 26 | "How much is what? How much are the alternatives? How much is it to connect to the BC electricity grid? How much des the micro generation cost at what uptake?" |
| 27 | Have we evaluated the possibility of storing excess electricity in the form of hydrogen (using hydrolysis at the hydro dam)? That could be in addition to battery storage |
| 28 | "You don't provide any information on how you arrived at the numbers on the Capacity Gap chart - why are you predicting that Yukon's energy demands will plateau starting in 2032/33? This seems suspicious as it makes sense that the demand would increase steadily every year. To add to this, Yukon Government just announced more new incentives for people to switch to electric vehicles - it seems that electric energy demands are only going to go up and up, as that seems to be what Yukon Government's greenhouse gas emission reduction plan is based around. Also, I note that the Capacity Gap chart does not factor in any mining operations, which would potentially add a significant load to the system. " |
| 29 | A C/TFN B.C. negotiated Land Claims agreement, with land Use Planing! This needs to happen before even thinking about water storage issues. At least a 5 to 10 year study on how raising the water and ice through out the winter and how it will affect our wildlife that go under the ice as well as the animals that travel on it in the winter! |
| 30 | "exploring geothermal options reducing diesel" |
| 31 | |
| 32 | Let's be real. They have a long ways to go before "electric" transportation works in the north. More studies, more plans etc? Are you kidding us? You already know the answers. Quit fabricating "BS"! |
| 33 | What happened to the idea of holding high water levels at marsh lake? That seemed like an easy solution with minimal impact. I thought Yukon energy was exploring the idea of buying power from the Skagway hydro? Now it is talking about sending power to Skagway? I thought I understood Skagway has far more power than it needs. |
| 34 | |
| 35 | |
| 36 | |
| 37 | |
| 38 | |
| 39 | For storage batteries, have you considered the land behind Utah Yards? It appears to be zoned for this use and no close neighbours. Only a short distance to connect to your main system at the Dam. It appears that if successful to at least charge the batteries, or keep them charged under load. If successful could supplement Mayo and Aishik facilities. LOOKING FORWARD TO YOUR REPLY |
| 40 | If you are running at 97% know with 40k population how do you ensure the potential increase of population (mostly electric heat/cooling) will be accommodated if the population increase by 50%? |
| 41 | More of a focus on reducing electrical consumption. |
| 42 | Hyde electric dams are the best 'green' solution... |
| 43 | |
| 44 | |
| 45 | See comment #1 I would like to see some PSAs promoting responsible energy use. We don't need huge appliances and electric toothbrushes etc |
| 46 | Discussion of kinds of energy storage during off-peak especially in summer. What about hydrogen cells as energy storage systems? |
| 47 | First of all Yukon Energy should <u>seriously consider</u> investigating the use of hydrogen fuel cell engines for generating power versus diesel and or LNG. Hydrogen fuel cells have zero carbon emissions; the only emission are drinkable water. Hydrogen fuel cells are in use in Tokyo, Japan in their commuter trains and buses. Hydrogen fuel cell engines have also been used in transport trucks. Furthermore "Cummins" Engine Co has already invested in hydrogen fuel cells engines. The hydrogen fuel engines are produced in the USA, with the plant in Spokane, WA and another in New York State. The company is listed on the stock exchanged as "PLUG" (Plug Power Inc) I believe this is worth checking into. |

| | |
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| 48 | What's missing is an implementation schedule for the "New project we need" and the status of "projects currently underway". What's missing is a long-term vision for renewable, sustainable energy, beyond 2030. Are there other sources of renewable energy that are missing that could be taken into consideration? |
| 49 | How about micro-hydro projects? Are there other pumped storage sites in Yukon? What is happening with the plan to hold more water in Southern Lakes? |

3. How much more would you be willing to pay each month on your electricity bill to know that the power you are using is 97% renewable?

| | |
|----|--|
| 1 | Listen, as a result of COVID-19 and lock-downs that followed a lot of Yukoners either lost or had their jobs put on hold We are struggling to meet monthly bills, put food on the table, buy clothes for our children and struggling to keep our homes it seems typical of corporations and big business to reach their hands out for more money. Not to mention the recent unannounced rate hike that took us all by storm. |
| 2 | \$0 or -50% because it is renewable |
| 3 | 0 |
| 4 | Whatever it takes. It's hard to overstate how serious this is |
| 5 | Not much – around 5% more |
| 6 | We've seen a steady increase already in our bills: 2016 to 2017 up 8% 2017 to 2018 up 9% 2018 – 2019 up 19% And 2020 looks to be even higher up to 20% increase. So no, we do not need yet another increase. 2019 comp to 2016 44%! Increase in our bills |
| 7 | I would not want any further increases in my monthly electricity bill as they are already expensive When you swap the noisy and polluting diesel generators I would happily pay \$10/mo more for my peace + quiet |
| 8 | It depends on what range you're suggesting. Rates seem to be going up continually |
| 9 | : 0 - zero! The electricity cost has to come down, not go up |
| 10 | That depends, how much is currently being generated by renewables? Is this a permanent fee increase? Or will it be temporary until the funds for building the projects have been recouped? |
| 11 | zero |
| 12 | "The cost for my electricity should not go up, if you finally would install more solar, wind, wood gasification and ground source heat energy generation, and stop doing more expensive studies." " |
| 13 | It doesn't matter as long as it respects First Nations rights and does not rely on LNG and Fracking. |
| 14 | want less costs |
| 15 | no more. I have a high efficiency home and I pay monthly amounts as high as \$680. I am not willing to pay more on power just because it is labeled renewable. Biomass, solar, and wind are renewable energies that I don't believe are a good idea for power generation. |
| 16 | Renewable is important. But make a specific offer (or several options) based on stated assumptions. Then we can think about it. |
| 17 | "I would pay more but not sure how much. \$20-50? I am not a big consumer, but would prefer a system that rewards conservation and Peak Smart initiatives - ie lower rate at nonpeak times, lower rate for maintaining modest use lifestyle." |
| 18 | As most consumers, the less the better. Construction in the last ten years has really been pushed to get off oil and propane and go electric. Only makes sense that the system was not going to be big enough for the future at that rate. A hydro dam built with the planned capability to be increased in the future with minimal costs makes sense to me. |
| 19 | I would not be willing to pay anything more. Why does Yukon Energy think that renewable energy production needs to be more expensive in the long run than running/building more diesel and liquefied natural gas plants? |
| 20 | Not sure; I have already spent \$20,000 to put in solar panels and you are welcome by the way. How about a bigger sliding scale; bigger incentives for those conserving power? |

| | |
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| 21 | I am willing to pay more, don't really know how much, but am also making personal effort to reduce energy consumption and generate my own electricity through solar panels. |
| 22 | |
| 23 | "ZERO Dollars. Fossil fuels are not causing enough pollution in the Yukon for this to be anything besides political." |
| 24 | Nothing. The latest 20.00/month increase on my power bill meant a 45%... increase on my summer bills. As a pensioner, every increase of \$10. Here and \$20 there means that much less for groceries. I pay more in fees than I do for actual power. Something is very wrong here. |
| 25 | In theory, quite a bit, however, reality is a harsh teacher that constantly reminds me that I am an old man trying to survive on what is now my sole source of revenue, the Canada Pension Plan, which never seems to increase to keep up with the ever increasing cost of living. If it weren't for the guaranteed income supplement, right now, I would be sleeping on the street and as it is, I am right now, very close to that. The simple truth is that as it is now, every month I have to make very tough choices between paying my hydro bill and buying groceries. It's not that I would not be willing to pay more for clean electricity, but that I literally have no more money to add to an already much too high monthly electricity bill that just increases drastically again just a few weeks ago, without any warning. |
| 26 | 0 - zero! The electricity cost has to come down, not go up. |
| 27 | 30% more |
| 28 | This question assumes that renewable energy needs to be more expensive to produce. Why does Yukon Energy make this assumption, especially with all the Federal grants available? Diesel generators we rent are very expensive. In order to answer this question, Yukon Energy needs to show us a cost comparison analysis between the different options. It appears Yukon Energy is far behind the game by not doing any long term planning until now. Is Yukon Energy trying to distract from this lack of foresight by using a false narrative that the reason you're not using renewable energy is that it's too expensive? Let's see the data. |
| 29 | I don't care as long as C/TFN gets a B.C. land Claims Agreement! |
| 30 | the issue is that the more expensive electricity is the more clients may choose less clean options for heating |
| 31 | |
| 32 | 0 – we already pay enough |
| 33 | That is a tough one. But I would say 10% as a starting point. |
| 34 | |
| 35 | |
| 36 | |
| 37 | |
| 38 | |
| 39 | |
| 40 | Nothing: Yukon Energy should be moving in renewable energy regardless |
| 41 | \$0 There are already too many fees, the energy charge is barely over half of the bills. |
| 42 | 0. Hydro should cost less |
| 43 | 150 |
| 44 | The recent increases in electrical prices have been difficult as we are now paying between \$200.00 and \$500.00 per month for electricity even though we heat our home with fuel oil. I cannot afford to pay more for renewable electricity. |
| 45 | Nothing. I am one of the many that have been pushing for renewable energy for 25 years. This is not a new idea nor is it a surprise that the Yukon needs more energy. This should have been done decades ago. It would have cost considerably less if this had started in the 90's or even 15 years ago |
| 46 | About twice what I pay now (which is \$175/mo). Overall Yukon Energy and Yukon government need to be more upfront and direct about the fact that energy will have to cost more in the future. Do not hide this fact at the back of public notices and media as is done in this document. Yukon is heavily subsidized by the rest of Canada already. Yukoners are spoilt and need to start taking on more of the cost and responsibility of living in the north. Higher energy charges to consumers can be accounted for in a means-adjusted mechanism for low-income households (perhaps an income tax rebate). Many Yukoners are very well off and can afford to pay more. |

| | |
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| 47 | I would not like to pay any more than I am already paying for electricity. |
| 48 | To quote "federal funding of these projects will be key to keeping electricity rates affordable". Yukon Energy needs to determine what's affordable, taking into consideration people on fixed incomes and lower incomes and how many people are on lower and fixed incomes. Do an income assessment based on the incomes of municipal territorial or federal employees. |
| 49 | I would be willing to pay more if I am encouraged and able to participate in things like peak shifting and generating my own power. |

4. What is the most important thing for Yukon Energy to keep in mind as we work on this plan?

| | |
|----|---|
| 1 | Keep in mind that the timing for spending unbelievable amounts of money couldn't be worse |
| 2 | To keep electricity affordable or even lower rates for Yukoners |
| 3 | Consider hooking up to BC Hydro |
| 4 | Time |
| 5 | Cost over run – hire locals |
| 6 | Aiming for 100% renewable and be self-sustainable |
| 7 | Federal government should pay for most of such Northern projects as our rates are the highest in Canada Expansion costs to BC + Alaska should be heavily supported by them as they will benefit the most. Yukon customers should not pay more for their savings. I think Americans should also pay for development costs and pay a higher rate than Yukon residents. Trump can afford it. |
| 8 | There are too many power outages. Having no electricity for 9 hours in -40c weather is not acceptable. I've lived here for 45 years and we have had much colder weather in the past so winters haven't seem unusually cold. I think that reliability is very important and needs should be calculated as necessary. |
| 9 | Make it more affordable. |
| 10 | You are already 20 years behind where you should be. Move quickly. |
| 11 | Be creative. Be ambitious. Let's not nickel-dime solutions. |
| 12 | Stop doing more studies over and over again, do some actually installation off green clean energy production. |
| 13 | "Better more modernistic public engagement." |
| 14 | keeping the costs lower that what I am paying now. |
| 15 | Build power solutions that are right for us for the natural resources we have and can leverage. Focus on hydro, in the Yukon, it is the most renewable and environmentally friendly option. |
| 16 | |
| 17 | Provide updates, actually listen to those who have expertise or real experience. Give clear reasons why some suggestions won't work. Admit it when answers are not clear. Avoid jargon. |
| 18 | Supplying enough power at a minimal cost to the consumer, and trying to please all parties, is a real challenge. I saw a proposal a few years back with three different locations as options for hydro. The Pelly River location looked favorable to me. Cost effective to build and maintain. Perhaps the band didn't approve. unfortunate if that is the case. |
| 19 | Yukoners expect Yukon Energy to plan ahead for the long term and be progressive. Yukon Energy seems to consider, or at least portray itself, as a progressive leader in green energy but it's actions do not reflect this. According to your Capacity Gap chart, this current 10 year plan will provide renewable energy to sustain Yukon for about 8 years and then Yukon will be back in the same situation it's in currently, back to having to use more diesel and liquefied natural gas plants to sustain ourselves. |
| 20 | Consult with all Yukoners. Lots of education and not just in writing. |
| 21 | Sustainability, environmental protection. |
| 22 | Continue to communicated to Yukoners about your plan and where is it is working and where it isn't and changes need to be made. Tell us about why you need to change and what the effect will be |
| 23 | Hydro provides the best bang for the buck, no global warming from large panels or fossil fuels |
| 24 | Residential users should not be subsidising commercial and mining users. |
| 25 | Without the only real clean energy of solar and wind, your plan is total nonsense. |

| | |
|----|--|
| 26 | Make it affordable. |
| 27 | I would like to see the same graph from "The Capacity Gap", but with a view of how we plan to eliminate dependency on Diesel. |
| 28 | Yukon Energy needs to do much better long term planning with clear and transparent cost comparison analysis between different energy options. Also, get creative. There are lots of amazing resources available to us, both financial from Federal Funding and technological. |
| 29 | To help put pressure on the B.C. Government to negotiate a C/TFN settlement Land Agreement! |
| 30 | "Consultation Long term planning Increase the reliability of our electricity sources Increase the reliability of network and infrastructure" |
| 31 | |
| 32 | You already know and have studied it to no end; wind source in the Yukon on any scale does not work and the same goes with solar! Our "carbon footprint" is negligible and we all know it!! It's like trying to reduce the number of occupants in an already empty building |
| 33 | I think Yukon energy spends a lot of time listening to political and public opinions and pressure. The Yukon is growing at a huge rate and building electric heated buildings at an alarming pace. I think to prepare for the future, YE needs to start developing projects ASAP. |
| 34 | |
| 35 | |
| 36 | |
| 37 | |
| 38 | |
| 39 | |
| 40 | Affordability, resilience, future expansion, technical resources from local companies and educating locals to be apply for work here |
| 41 | Affordability for the average users and small businesses. |
| 42 | Partnership with Yukon first nations to attain permission to create a new lake in central Yukon... for hydro |
| 43 | Renewable energy is key, hydro energy can be green and good, however we need to really focus on the impacts to fish and wildlife when dams are the best option. |
| 44 | Electricity has to be affordable. Homeowners cannot bear the expense of expensive electricity projects from the rate base. Additional sources of funding such as Government revenues must be used to fund projects. |
| 45 | Outside of Whitehorse, most people do not have gov't pay cheques. Cost/mo needs to be kept at today's cost or lower. My own energy cost was 45/mo in summer and 85-100/mo in winter until your new fees were added. |
| 46 | Demand for electricity is going to increase dramatically and perhaps in unexpected ways. Frequent modelling of projected demand under emerging scenarios will be required. Given long lead times for implementation of projects, 10-year plans will have to overlap by 5 years in a rolling-plan framework. This 10-year plan will require revision in 5 years with a new 10-year horizon. |
| 47 | The most important to keep in mind is to get the legislators to permit Yukon Energy to maximize the hydro electric potential; instead of bending to the whining and complaining minorities "Administer with some backbone" |
| 48 | What's very important to me is that Yukon Energy will provide actual, factual information on the current projects and the progress we make with the new projects and with renewable sustainable electrical energy. I want to know when the new projects are, projects currently underway. I want to be updated on community involvement. What's MOST important to me are the children of today and their children and so on. |
| 49 | Keep up and expand on the public education – what percentage of the power comes from the various sources? How would Yukon involvement in BC Hydro jurisdiction work? How much money/energy is saved by retrofitting? |

Additional Comments

| | |
|----|--|
| 1 | |
| 2 | Please make electricity affordable for Yukoners! |
| 3 | Hire consultants who have the courage to take giant steps – with less foot print. Increase the amounts the mines pay. Reconsider: electric vehicles/ heating homes with electricity. Is there really a shortage of electricity or is the problem the management of the current available resources Please note: we are providing our input at yet another 3+ hour power outage 3:30 – most inconvenient |
| 4 | |
| 5 | |
| 6 | |
| 7 | Yukon First Nation governments should also partner and invest in these improvements. Some already have small solar arms – should be encouraged to build more to tie into our grid. |
| 8 | |
| 9 | Please try again to get regulatory permission to introduce a reduced night rate in order to move some use to off-peak hours, like stored heat, hot water, charging of electric vehicles. Probably it is better to give household who heat electric but use Thermal Storage or other methods to move use away from peak load times a general discount on electricity. Given the small number of households on the Yukon grid, that may be more cost efficient than investing into Peak/Off-Peak charging systems - and definitely more privacy friendly! |
| 10 | |
| 11 | There are a few potential hydro reserves identified and protected through First Nation final agreements. Let's use them. Why avoid a meeting at Marsh Lake? |
| 12 | Do you really want more? |
| 13 | |
| 14 | |
| 15 | |
| 16 | Is this for all of Yukon or just the grid-connected communities? |
| 17 | Thank you! I think you are showing leadership and the plan gives me hope that there is as real desire to use renewable sources for our power needs. |
| 18 | Will wait and see where it all goes, I heat my home with electricity. |
| 19 | Overall it is positive to finally see some initiative from Yukon Energy towards increasing Yukon's renewable energy production capacity but it is disappointing that there doesn't appear to be much long term planning accounted for in the current 10 year plan. |
| 20 | |
| 21 | Expanding battery storage in future to store solar energy generated in the summer (as well as hydro energy) would be good plan, either at household or community level. Support to householders for installing/increasing their own battery storage capacity would help make this appealing. Also probably cheaper capital cost than Moon Lake project. And individual households could manage their own energy use to reduce their reliance on hydro or other generation. |
| 22 | If there is anyway to move the diesel generators out of the valley and still connect them to the grid, I'd be grateful. Their noise and emissions do remind me to turn off the lights, but I'd be happier in the winter and spring without that reminder of the continued reliance on fossil fuels.. |
| 23 | " the mining companies should be charged more so residents pay less, today and tomorrow. Thanks for the opportunity to comment, Bryce" |
| 24 | |
| 25 | Good luck. You would do well to try (if you are capable of it?) to really and truly think creatively for a change. So far, your thinking is thoroughly conventional. Do try to make an effort for god's sake! A lot of us depend on you. |

| | |
|----|---|
| 26 | Please try again to get regulatory permission to introduce a reduced night rate in order to move some use to off-peak hours, like stored heat, hot water, charging of electric vehicles. |
| 27 | |
| 28 | "Keys to Success" tab states " Ultimately, the success of our 10-year renewable electricity plan hinges on everyone working together. With full participation, we can implement our plan and reduce our reliance on fossil fuels. Without the complete plan, we will have little choice but to build more diesel and liquefied natural gas plants to meet the growing demand for electricity. We don't want this, and we know Yukon doesn't either." You actions certainly do not reflect this statement. Considering Yukon Energy hasn't done any long term planning or serious feasibility assessments on renewable energy production options and last year tried to buy a bunch of new liquefied natural gas plants, it would appear that building more diesel and liquefied natural gas plans is exactly what Yukon Energy wants to do. |
| 29 | |
| 30 | |
| 31 | |
| 32 | How stupid can we get. We already have limited power due to our years of over studies with lots of non-action! So what do we do...we let an entire new subdivision (Whistlebend) build homes with electric heat (because capital costs are cheaper)! Get the priorities straight! |
| 33 | |
| 34 | I would like to have the option of putting my carbon tax rebate into a fund for renewable energy projects. Is this something that could happen through Yukon energy? |
| 35 | "What are Whitehorse # 2 uprate, and #4 uprate? Thx. " |
| 36 | There is good potential for geothermal energy sources, particularly in Yellowknife's abandoned mines. The concern of course is safety and potential earthquake scares but modern tech has approached, and in some ways surpassed, these concerns. We ought not hesitate in pushing for renewable energy if cost is the concern, unless it is for the safety of locals and workers who may be harmed and underserved by such endeavours. From Ontario, I salute all the incredible work Yukoners have done in the way of renewable clean energy. |
| 37 | Hi...I am interested in joining Yukon Energy and am doing some research on your current direction and plans. |
| 38 | Is Yukon Energy still considering an interconnection to BC Hydro and Power Authority grid via Teslin-Watson Lake-Iskut-Bob Quinn Lake??? |
| 39 | |
| 40 | |
| 41 | |
| 42 | Do not follow Ontario's lead with attempting to move to solar and wind simply to raise the cost without adding to the overall capacity. |
| 43 | I like hydro renewable energy moving forward, however we must do everything in our power to minimize the impact on fish and wildlife. We need to be cutting edge when it comes to hydro energy!! |
| 44 | |
| 45 | 1 Get rid of the convoluted paperwork required for personal solar or other energy projects that individuals can apply for rebates on. Publicize the fact that there are rebates available. There should be partial grants for low income persons and seniors or disabled on fixed incomes 2 No subsidies to mining companies or oil/gas exploration companies/projects |
| 46 | |
| 47 | Adding electric vehicles on our street and roads does little to eliminate carbon emission. The more electric vehicles come on stream the demand for power will increase and fossil fuels will have to be used to generate the shortfall to sustain. Electric vehicles only mask the carbon emission problem. Carbon emission will be produced from fossil fuel power generators instead of internal combustion engines on our streets and highways. (out of sight out of mind public mentality) |
| 48 | I also have environmental/ecological concerns regarding current and projected projects. Are environmental and ecological impact studies part of the plan? Also, I'm interested in how these projects affect people and their way of life. I really was pleased to read about the 'rates' for First |

| | |
|----|--|
| | Nations governments, communities, individuals and businesses, youth and development corporations. I look forward to the progress made in developing renewable and sustainable electric energy. My thanks for the opportunity to express some thought in regards to your “..vision for being a Canadian leader in sustainable electricity”. |
| 49 | |

Facebook input

- This organization needs to be took back over by the Yukon we don't need an outside utility running our utilities they're just driving the price up and you're not working with you Yukoners on an alternatives electricity vote we take this organization back over and First Nations work collectively with government to look at alternative electricity we proposed geothermal Greenhouse housing and geothermal electricity but we were undermined by the Yukon government this needs to change
- Um, this is a company that falls under Yukon Development Corporation, which is a board selected by the Yukon Government. It is not an "outside utility"
- Yeah that's a good point the fact is maybe this Board needs to be selected outside of the Yukon government that way you Connors would have some certainty of the corporation good pint
- Do you mean selected by folks outside of government or do you mean non-government folks being selected?
- Its like the police investigating the place if you have a board that is not part of corporation that should be selected by the people not by governments or Chiefs and council's like they have been for a few years
- Yea run by fricin CLOWNS. NEW BLOOD PLEASEn THANK YOU
- We pay ATCO an Alberta company for our electricity
- Yukon Energy is taking land for mining industry
- Distribution is a block to clean energy goals. Residents can't go renewable because the distribution system is inadequate
- It appears that many households cannot swap out the oil furnace for an electric furnace because the ATCO supply service is insufficient, this is apart from the upgrade to 200 amp service.
- Hard to make sense of Federal money going to purchase infrastructure to produce renewable energy, and then giving it to First Nation government or development corps. Then to turn around and buy it back at what is hopefully a reasonable price.
- Thanks for the reply. A true partnership is an equal investment by both parties. The projects that have been covered by the media are almost totally funded by tax dollars.
- I see no problem with First Nation investments in communities that are off the grid moving to renewable energy rather than diesel. But you also have to admit, if the Feds were not paying for the infrastructure it would not be happening.
- Now with the release of the government plan, done by a company in Vancouver as if we don't have enough brainpower here in the Yukon doing something like that, it is written in stone what YEC won't do.
- Why is LNG entirely off the table? It is cleaner than diesel, affordable and easily sourced from northern BC. There is a lot of demand from opening mines that will not be met by hydro during the winter
- I only see the solar from individuals that is put into the grid as "renewable". You guys must be joking if you think the Yukon public will buy pumping hydro uphill with the use of fossil fuel into a holding pond as renewable energy.
- Your Yukon Energy corporation (owned by ATCO) has to stop the false advertising. Your projects involve the use of a lot of fossil fuel to make them work. Secondly, the burning of our Yukon forests for biofuel in an era of climate change is irresponsible.
- Hard to forget LNG...trash project....

- Look at California on how well many of these initiatives can go bad they produce less power now then they used to resulting in their contact rolling black outs.
- And a lot of the cost The Yukon is cleanest Territory in Canada
- Is part of the clean energy plan biofuel?
- This gov.can't run a 3 door s**thouse..look at heckle hill wind power prop has not spun for 5 years. 150 000 to set up prop, crane from down south. Helicopter 1500.00 one hour. Useless clowns!
- What percentage are we now, as a primarily hydro powered region?
- Keep up the good work
- Yukon Energy won't have that worry this year with the amount of precipitation we've had and having or will there be another "excuse" to raise the rates
- Short term, move to clean LNG and build an LNG storage facility. Plan to move to small, scaleable nuclear reactors in the future. Nuclear is safe, reliable and clean. Wasting money on foolish battery storage and large solar systems really aren't sustainable.
- Keep renewing diesel generator rentals. Yukon energy's renewable resource.
- Nuclear has come a long way a small 20 megawatt thermal plant would be the same size as your natural gas plant
- If all the nay sayers about building clean energy projects came up with constructive ideas instead of criticisms we might get somewhere! Everyone in Yukon demands more energy but objects to dam projects or other productive solutions
- Wow?
- Maybe check out nuclear energy as stated
- Look at what Ontario did. Installed time-of-use Hydro meters, and saved billions in new power plant construction costs.
- I'm planning on retirement and my heat bill keeps going up I don't like it its tough
- And the cost to consumer is \$\$\$\$\$
- Part of the UN and agenda 30
- Exactly, criminals
- Oh you don't want to know what I think!
- Is this in any way related to UN agenda 2030?
- Rebuild the Dam its not rocket science make it good for few million ppl and sell the power
- So our rates will go down?
- Your rates are already ridiculous....
- What will that cost us?
- Nice. I would love this
- At my expense keep up the good work NOT!
- That's Kaska way
- Nukes please
- I'll be dead by then
- Ask Quebec hahaha

Submissions by mail and email

CARMACKS DEVELOPMENT CORPORATION



September 15, 2020

Andrew Hall
President, Yukon Energy Corporation
#2 Miles Canyon Road
Box 5920, Whitehorse, Yukon
Y1A 6S7
Andrew.Hall@yec.yk.ca

Dear Mr. Hall:

I would like to thank you for the time made available to the Carmacks Development Corporation Monday evening this week and the presentation from Yukon Energy on the 10 year plan. Many exciting opportunities and projects on the horizon both for Yukon Energy as well as for Independent Power Producers.

As we discussed with the group, the Carmacks Development Corporation has recently partnered with Eavor Technologies to develop baseload geothermal energy opportunities here in Yukon.

We realize we are at an earlier stage of development but the Eavor Loop technology is a game changer. It needs commitment to ensure that it contributes the requisite base-load energy year-round to provide what Yukoners need now and well into the future. We would ask that you include our technology in the 10 year plan noting that it is anticipated that it will have an impact on the plan as it evolves moving forward. It is this kind of commitment from you that will assist us in moving this business vision forward. We have made a significant ½ million-dollar commitment. We hope the YEC is willing to help support our efforts to make this an answer for the future.

Thanks for your support and we look forward to joining in on the many opportunities.

Sincerely,

A handwritten signature in blue ink that reads "C. Bellmore". The signature is written in a cursive, flowing style.

Cory Bellmore
President, CDC

Jean-Paul (JP) Pinard, PhD, P.Eng.
703 Wheeler Street, Whitehorse, Yukon, Y1A 2P6
Tel: 867-336-2977, jpp@northwestel.net



Tuesday, July 14, 2020

To potential stakeholder partner,

Re: A Yukon Wind Heat Working Group

A working group focused on removing barriers to developing a 25 to 80 MW wind farm near Whitehorse, Yukon.

Group objectives:

- Secure land, establish partnership (MoU), define roles and responsibilities, develop working group structure and procedures, create business plan and action plan,
- establish wind resource measurement campaign,
- Assess market value, calculate pricing along market chain and partnership benefits,
- develop localized training program on energy storage for electricity market,
- negotiate purchase agreements, create policies, and
- develop wind farm (power line, road, wind turbines)

Proposed initial partners: Kwanlin Dun First Nation/Chu Níikwän Development Corporation, Ta'an Kwachan Council/Da Daghay Development Corporation, Yukon Government/Yukon Development Corporation, Yukon Energy, ATCo Electric, Northern Energy Innovation, Yukon Conservation Society, and possibly others.

Project duration 10 years ending in 2030. Working Group annual budget to be shared by partners.

The first step is to convene an ad hoc wind heat program development steering committee.

I look forward to your questions.

Thank you and have an enjoyable day.

Jean-Paul Pinard



YUKON PRODUCERS' GROUP

Delivery via email.

August 4, 2020

Andrew Hall
President and CEO
Yukon Energy Corp.
2 Miles Canyon Road - Box 5920,
Whitehorse, Yukon Y1A 6S7

Re: Yukon Mineral Industry and Yukon Energy's 10-Year Renewable Energy Plan

Dear Mr. Hall,

Thank you for the opportunity for members of the Yukon Producers' Group to receive your presentation on Yukon Energy's draft *10-Year Renewable Energy Plan*. We appreciate your time and inclusion of the territory's mineral exploration and development industry in this stage of the engagement process.

The Yukon Producers' Group is a member-driven organization made up of Victoria Gold Corp., Minto Explorations, Alexco Resource Corp., and Casino Mining Corp., as well as key companies which serve the industry, including Pelly Construction, Alkan Air, Cobalt Construction, JDS Energy and Mining and ALX Mining Equipment and Supplies.

Together, we work to advance the common interests of the industry and energy is of course critical to our sustainability and to the significant socio-economic benefits our industry can provide Yukon residents and communities; not least of which being our industry's significant contributions to price-predictable power generation.

In order to help ensure affordability for existing rate payers and industrial customers over the longer-term, we believe it responsible for Yukon Energy to continue to consider energy options beyond what is proposed in the draft plan, that include, but are not limited to: pursuing additional hydro-electric sites and thermal generation capacity, as well as the potential to connect to BC's electrical grid.

In addition, I would note that the existing plan does not recognize, nor factor, future industrial customers which may reach development within a decade. This potential demand supports the rationale to continue the consideration of additional generation and transmission opportunities so that future generations of Yukoners and developers may continue to experience competitive and predictable rates.

Thank you again for the presentation and please don't hesitate to reach out with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Brad Thrall". The signature is fluid and cursive, with the first name "Brad" and last name "Thrall" clearly distinguishable.

Brad Thrall
President, Alexco Resource Corp.
Chair, Yukon Producers' Group
T: 604.633.4888
E: bthrall@alexcoresource.com



September 18, 2020

Yukon Energy Corporation
#2 Miles Canyon Road
Box 5920, Whitehorse, Yukon
Y1A 6S7

Stephanie Cunha, Manager, Communications
Via email: stephanie.cunha@yec.yk.ca
cc: yecbatteryfeedback@stantec.com

Re: Yukon Energy Corporation 10 Year Plan

To: Stephanie Cunha, Manager, Communications

The Yukon Conservation Society (YCS) welcomes the opportunity to provide further information on our response to the draft 10-yr plan of the Yukon Energy Corporation (YEC). We have provided earlier comments, particularly concerning our support for connecting to the Atlin hydroelectric scheme and the plan to construct a pumped storage at Moon Lake.

YCS is generally supportive of the Yukon Energy Corporation's Ten Year Plan. YCS does see potential improvements to the Ten Year Plan, but generally YCS is supportive of individual projects within the Ten Year Plan.

YCS maintains that the Yukon should reduce territory wide GHG emissions by at least 50% by 2030. YEC plays a key role in doing this, not only providing existing amounts of renewable energy but also being in the position to displace future amounts of fossil fuel generated energy with renewable energy. For example, as electric vehicles become more common they will replace existing gasoline and diesel powered vehicles with potentially renewable energy powered ones, and oil and propane furnaces will be replaced with electric options.

The key, as always, is to increase the amount of renewable energy and drastically reduce the amount of fossil fuel generated energy. Here is YCS's review of Yukon Energy's Ten Year Plan (points taken from the Yukon Energy website on this issue at <https://yukonenergy.ca/energy-in-yukon/electricity-in-2030/our-draft-10-year-plan/project-descriptions>).

PROJECTS UNDER DEVELOPMENT

Whitehorse Hydro #2 Uprate

YCS is supportive of this. Increasing and improving the efficiency of existing renewable energy infrastructure is one of the most cost efficient and usually the most environmentally benign way to go.



Battery Storage

This is the battery storage project that received federal funding in 2019, not to be confused with the Moon Lake hydro battery storage project. YCS is supportive of this project. However, careful consideration must be given to the economics of this and future similar projects. The high cost of this project suggests distributed technologies such as electric thermal storage may be more cost effective than a grid-scale battery in terms of \$ per kWh installed, \$ per kW installed, and \$ per lifetime CO_{2,eq} reductions. Further analysis will be necessary in coordination with Yukon Energy to explore that possibility.

Electricity purchases from Independent Power Producers

YCS is conditionally supportive of this program but a lot depends on how the power is being produced. Projects that are renewable and small-scale (in a Yukon context) are probably acceptable, whereas those that are not will be of concern to YCS. Each IPP project will require an environmental assessment that YCS will participate in and from that YCS will either support or oppose each particular IPP project.

Micro-Generation Program

YCS is conditionally supportive of this program but a lot depends on how the power is being produced. Projects that are renewable and small-scale (in a Yukon context) are probably acceptable, whereas those that are not will be of concern to YCS.

PLANNED PROJECTS (BASED ON APPROVALS)

Whitehorse Hydro #4 Uprate

YCS is supportive of this. Increasing and improving the efficiency of existing renewable energy infrastructure is one of the most cost efficient and usually the most environmentally benign way to go.

Incremental Diesel Replacement

YCS is not generally supportive of this. The capacity of the diesel generators should be replaced with renewable energy options. However, the need for emergency backup generating capacity is understood. Emergency backup diesel generators should be efficient and will, in this concept, require ongoing replacement.

Southern Lakes and Mayo Enhanced Storage Projects

YCS understands the logic behind the proposed Marsh Lake and Mayo Lake enhancement projects (existing infrastructure, extremely short timeline to bring on line). However, YCS has environmental concerns regarding substantial fluctuations in water levels, particularly in regards



to fish habitat along the shore line, and impacts on wetlands (Roop Wetlands on Mayo Lake, Marsh Lake wetlands by the lake outlet). Completion of detailed environmental assessment is required on this issue. Until such time as these are complete YCS reserves judgement on these projects. It is worth noting that similar concerns occur at Aishihik Lake.

Demand Side Management Programs

YCS is generally a strong supporter of Demand Side Management Programs. YCS support would, of course, depend on the particulars of each program. Initiatives such as the Electric Thermal Storage project is a good example of a positive DSM program.

POTENTIAL FUTURE PROJECTS

Moon Lake Pumped Storage

The Moon Lake could provide 20 MW of power with 20 GWh annually of self-generated (from its surrounding watershed) electricity. Moon Lake can store up to 69 GWh annually if there is excess renewable electricity available from the Yukon grid for pumped energy. If this is understood correctly Moon Lake would allow for the additional storage of 49 GWh of excess electricity from wind, PV, and other existing hydro. This is about 3 months of energy storage at 20 MW.

This has to be balanced against the value of the habitat loss at Moon Lake compared against reducing GHG emissions and/or alleviating stresses on the other hydro reservoirs that are impacting their surrounding habitat.

Generally, though, YCS is supportive of the Moon Lake Pumped Storage.

Electricity Purchases from the Atlin Hydro Expansion

The Atlin hydro project could potentially provide 8 MW of power with 46 GWh annually of renewable electricity to the Yukon grid. YCS is supportive of this project.

Southern Lakes Transmission Network

YCS is supportive of major upgrades to the Southern Lakes Transmission Network. However, environmental assessments would still be required on issues such as widening or changes to powerline Rights of Way corridors, access roads and tails to proposed powerlines, location of supporting infrastructure such as transformer substations etc.

YCS has long been concerned that Rights of Way corridors are not planned adequately to reduce their environmental and areal footprints. YCS feels strongly that new transmission lines should be placed within highway rights of way, where they exist.



OTHER CONSIDERATIONS

Wind

The most serious capacity limitation and renewable energy shortfall in the Yukon occurs in the winter and that these limitations are already obvious. The strategy of making up the deficit with diesel and LNG generators may be necessary in the short term but is an expensive and highly undesirable option.

YCS therefore urges acquisition of significant wind power sources in the 10-year plan (either directly through Yukon Energy or by making use of the IPP and micro-generation initiatives) as this offers additional fossil fuel-free electrical generation in the winter as well as a shorter implementation time line than other sources. It is also highly compatible with the Moon Lake pumped storage scheme by providing additional power for storage in the warmer weather season.

Solar

The Yukon has had some solid progress in solar projects lately, with two moderately sized Independent Power Producer solar projects on the horizon. Winter renewables like wind should be more of a focus, especially with ETS and Moon Lake. That being said, solar is particularly useful in the spring when the skies are typically clear, and the days are long and hydro reservoirs are still depleted. There are existing programs in place through the Yukon Government, and these should be developed further. Similar to wind, increases in solar power could either be done directly by YEC or by making use of the IPP and micro-generation initiatives.

Should you have any questions, please contact the undersigned.

Sincerely,

Coral Voss
Executive Director

From: [REDACTED]

Sent: September 15, 2020 1:34 PM

To: Communications@yec.yk.ca

Subject: electricity for 2030

In regard to your quest for input regarding power generation I would like to offer my thoughts. I believe our need for a better future requires bold thinking. Under water generators stretching the length of the Yukon River would provide power for Yukon, NWT and Alaska as well. All done with no damage to land or Wildlife. Independent generators tied to a single grid, easily removed and replaced as needed. The power in this river is astounding and can be used with no harm and all the benefits of endless power for all. Because these would rest close to the bottom of the waterway no fish should be impacted, I see little in the way of downsides. Simply the inspiration of bold thought.... Thank-you for your interest. [REDACTED]

Thank you for the opportunity to read and comment on Yukon Energy's draft 10-year Renewable Electricity Plan, it is much appreciated.

My comments are based on the January 2020 8-page document Electricity for 2030, and the May 2020 34-page slide presentation. I agree with and support the supply projects described on page 4. These are those already in development or in place and the proposed three major new projects – the transmission expansion to the southern lakes, purchasing power from the Atlin hydro project expansion, and the development of the Moon Lake pumped storage project.

However, it is my impression that some of these projects are not yet certain, the southern lakes enhanced storage and the Mayo Lake enhanced storage projects in particular. What is absent from the plan as described is any significant new source of winter-focused energy supply. Moon Lake's net energy gain is about 10 GWh (scaled from May 2020 slide 24), Atlin is a year round facility and also has useful winter energy and capacity, and the enhanced storage projects offer a bit of additional winter energy but not a lot. In the slide presentation the high growth scenario (slide 34) includes a 20 MW wind project added in 2025. I think that this would be a very desirable project along with the Moon Lake pumped storage even in the present base case load scenario. Such a wind project effectively reduces the energy storage requirement (summer surplus energy requirement) for a given dependable capacity. The pumped storage will only need to fill in the capacity gaps when the wind capacity is low.

Scaling from slide 24 it appears that the 35 MW Moon Lake phase 1 development would generate about 36 GWh per year from pumped storage. At an assumed round trip efficiency of 75% this implies that about 48 GWh per year of surplus energy is required for pumping the required water to the Moon Lake reservoir. Obviously I do not have access to Yukon Energy's detailed figures, but given that we had about 30 GWh per year of hydro surplus in the summer before Victoria Gold connected to the grid it seems unlikely that with this additional 12 MW summer mining load (plus other system load growth) there would be 48 GWh per year of surplus energy available for pumping. We also had 12 GWh per year of secondary sales loads that generated net revenues in the past and presumably could be serviced again.

The past 3 years has shown how vulnerable the Yukon grid is to low water inflows into the existing hydro plants, and some renewable energy safety reserve would be justifiable. It does seem to me that expecting 48 GWh per year of surplus energy to be available on the grid in 2028 is unrealistic. Overall, I think the project selection is good except for the absence of a winter focused new energy supply project in conjunction with Moon Lake pumped storage. In my view a 20 MW wind project in conjunction with the Moon Lake project would make for a much more robust plan.

With respect to the stated need for federal funding, my view is that it would be very nice to be able to get some, but I think we could manage to do it ourselves if it was not available. Yukon Energy can do more detailed analyses than I am capable of, but I did a quick calculation based on the graph on Andrew's slide 34, the high growth scenario. Our present electricity use is about 450 GWh costing us about \$0.16 per kWh. From slide 34 it appears we would need about 650 GWh in 2030 so 200 GWh more than we presently have. If this new supply costs \$0.30 per kWh (and I think some projects, including a 20 MW wind farm, would be less costly than that) then the average cost for the 650 GWh is \$0.203 per kWh. While this is an increase of about 25% over present costs it is still less than what Yellowknife NWT pays for power today. In my view this is still affordable, and it is a political statement if we call this unaffordable. I know that politicians want to keep (our present heavily subsidized) costs

where they are now. I believe that \$0.203 per kWh is affordable in the interest of mitigating climate change. But, of course, it would be nice to get the federal capital contribution to reduce that increase and stay on our present subsidized path.

One closing thought. While we are hoping for federal funding to support our projects, I think that there is a good possibility that the post Covid-19 debts at all government levels may be so high that there will need to be significant increases in taxes to pay these debts and or cuts to programs (such as federal subsidies for our desired electrical energy projects) and services. I suspect that government subsidies will be harder to come by in future than they have been. Our expectations need to be realistic.

Again thank you for the opportunity to provide you with comments on the 10-year Renewable Electricity Plan. [REDACTED] May 12,2020

Appendix C

Yukon Energy Draft 10-Year Renewable Electricity Plan



AN UPDATE TO OUR
Future-Focused Portfolio

electricity for 2030

An introduction to Yukon Energy's draft 10-year renewable electricity plan

January 2020



the big picture

Yukon Energy currently meets over 90% of Yukon's electricity needs each year with clean renewable power because of our large supply of hydroelectricity.

In July 2019, we released our 5-year strategic plan with a bold 10-year vision to be a Canadian leader in sustainable energy by 2030. Later that year, based on the input of Yukoners, we also decided not to move forward with the development of a new 20-megawatt thermal generation facility to supply electricity during emergency conditions.

In November 2019, Yukon government released a draft of its *Our Clean Future* strategy, with a vision for addressing climate change by building thriving, resilient communities powered by clean energy and supported by a sustainable green economy. In it, the government proposes an average of 93% of electricity generated on the grid be produced from renewable sources, and includes specific actions to electrify the territory's transportation and heating sectors.

Yukon needs more renewable electricity

As Yukon's economy and communities grow, and as Yukoners increasingly invest in electric vehicles and electric heating technologies – particularly in new buildings – demand for electricity will also grow.

In order to continue providing most of our electricity from renewable sources, we must invest in new dependable renewable electricity sources that add firm winter capacity to our grid. This will allow us to continue meeting Yukoners' growing demands for renewable power – even on the coldest and darkest of days – while also supporting government's emission reduction targets.

Key goals outlined in the Yukon government's draft *Our Clean Future* strategy include reaching the following milestones by 2030.

1. Produce an average of 93% renewable electricity on the Yukon grid.
2. Have 6,000 zero-emission vehicles on the road.
3. Replace fossil fuel heating systems with electric heat pumps in 1,500 buildings.

The Yukon government's Our Clean Future strategy also proposes to reduce the amount of diesel used to generate electricity in communities not connected to the grid by 30% by 2030. While this action also increases the need for renewable electricity solutions in Yukon, Yukon Energy does not generate power in these communities. ATCO Electric Yukon does. For this reason, actions to increase the use of renewable electricity in off-grid communities are outside the scope of this plan.

Both the Yukon government and our own plans align with Yukoners' vision for reliable, sustainable electricity and a clean, unspoiled environment.

The pages that follow show how, together, the visions of the Yukon government, Yukon Energy and Yukoners themselves can be interlocked in a way that will bring about the Yukon we all envision.

It's a big plan that features opportunities for individuals, communities and First Nations. It's a plan that features innovation and challenges.

It's a plan that depends on all of us for ultimate success.

The Yukon of the future – one where renewable electricity continues to fuel our lives, work and economy – is within our reach. But we must act now and we must act together.

Join us in building the Yukon of the future.

Our plan to support a green future

Our draft 10-Year Renewable Electricity Plan presents a once-in-a-lifetime opportunity for Yukon to invest in the critical renewable electricity projects needed to fuel our lives, our work and our economy with clean energy. It creates opportunities for our corporation, First Nations governments and development corporations, the Yukon and federal governments, and Yukoners to jointly shape our electricity future.

Our plan outlines the portfolio of key projects and partnerships needed by 2030 to address the substantial demand for renewable electricity that will result from the policies and actions outlined in the Yukon government's draft *Our Clean Future* strategy. The projects are based on the science behind our 2016 Resource Plan and account for updated electricity load forecasts.

The result is our updated Future-Focused Portfolio. In addition to the new supply projects we already have in place or under development – such as battery storage, hydro uprates and storage enhancements, electricity purchases from Independent Power Producers, micro-generation, demand-side management programs, and the replacement of end-of-life thermal generation – we are proposing three key new projects.

All three new projects are located primarily in the Southern Lakes region, an area rich with potential for hydro power and pumped storage. The three projects are as follows.

- 1. Construct a new pumped storage facility on Moon Lake.**
- 2. Source renewable electricity from the planned expansion of the Atlin hydro plant owned by the Taku River Tlingit First Nation.**
- 3. Expand and upgrade the transmission network in the Southern Lakes region.**

The proposed pump storage facility would add the dependable renewable capacity that our territory urgently needs. This would allow surplus renewable electricity currently being generated in summer to be stored and then used to decrease dependency on fossil fuel power generation in winter.

Sourcing renewable electricity from Atlin would allow us to tap into an existing renewable project. This is a quicker and more cost-effective solution than building a new hydro plant. If the cold snap in January 2020 reinforced anything for us, it is that we need more renewable sources of power that can be available mid-winter, at the flip of a switch.

The expanded Southern Lakes transmission network would serve to connect the Atlin hydro plant and Moon Lake pumped storage facility to the Yukon grid, as well as potential First Nation-owned renewable projects in the Southern Lakes region. The transmission network would also create the opportunity for future sales of surplus renewable electricity to Skagway.

Plans for each of these projects are in very early stages. Our work with First Nations governments and development corporations to explore partnership opportunities and to further assess the projects are critical to success.

Projects in this plan will cost in excess of \$500 million, our largest investment ever made in Yukon's electricity system. Federal funding of this plan will be key to keeping the plan affordable for customers and minimizing risks.

The projects in this plan will take time. That's why it's a 10-year plan. And there can be no picking and choosing. Every project in this plan is needed. Further, until the projects can be fully implemented, we will have little to no choice but to continue to rent back-up diesel generators each winter to ensure reliability of power service.

However, when complete in 2030, the projects in this plan set us up to be, on average, greater than 97% renewable.

A clean future is ahead.

Filling the capacity gap

As the chart demonstrates, demand for electricity is growing in Yukon. In order to meet the need for more renewable electricity, all projects in the portfolio are needed. Remove any of the planned projects and we will need to rent more costly diesel generators to meet

future peak demands for electricity. To implement each of the projects in our plan will require close partnerships with First Nations governments and development corporations, federal funding, and the support of Yukoners.

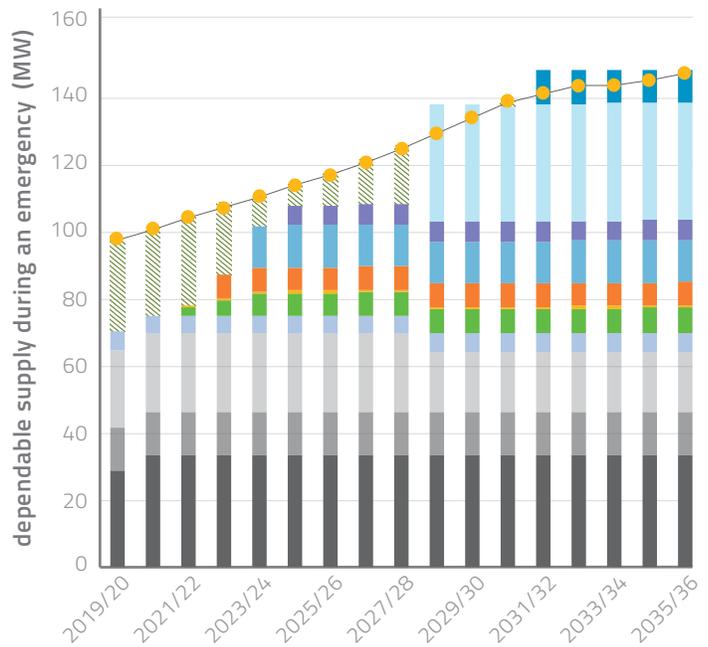
● **peak demand** (without mines)

planned projects

-  temporary rental diesel
-  Moon Lake pump storage possible expansion
-  Moon pump storage phase 1
-  Electricity purchase from Atlin expansion
-  incremental diesel replacements
-  battery storage
-  Whitehorse #2 uprate
-  demand side management programs

existing resources

-  ATCO Electric Yukon dependable thermal
-  Yukon Energy dependable diesel
-  Yukon Energy dependable LNG
-  Yukon Energy dependable hydro



Understanding the difference between capacity and energy



Capacity is how much is available at a point in time.



When you only need a little energy, having extra capacity is fine.



Energy is how much you use over time.



But when you need a lot of energy and your vessel isn't big enough, you can't get what you need. The result, power outages.



key projects

Project Benefits

The projects proposed in this plan are the best mix of projects because they:

- » promote energy conservation;
- » maximize the amount of renewable electricity generated at existing hydro facilities;
- » connect new sources of First Nation-owned renewables to the grid;
- » store and use excess renewable power generated in the summer to decrease dependency on fossil fuels during the winter;
- » open new markets for surplus renewable electricity generated during the summer; and
- » ensure enough back-up liquefied natural gas and diesel resources are available to provide reliable electricity when renewables are not available.

Key Projects in our 10-Year Plan

EXISTING RESOURCES

- » All current assets except for three diesel engines set to retire before 2030.

PROJECTS UNDER DEVELOPMENT

- » Whitehorse Hydro #2 Uprate
- » Battery Storage
- » Electricity purchases from Independent Power Producers
- » Micro-Generation Program

PLANNED PROJECTS (BASED ON APPROVALS)

- » Whitehorse Hydro #4 Uprate
- » Southern Lakes and Mayo Enhanced Storage Projects
- » Incremental Diesel Replacement
- » Demand Side Management Programs

For details and project descriptions on any of these projects, visit yukonenergy.ca.

The Southern Lakes transmission network expansion



Future potential projects

What Yukon needs even more than increased energy is increased capacity. The combination of these three future potential projects not only stores and uses excess renewable power generated in the summer to decrease dependency on fossil fuels during the winter, but also makes connecting potential sources of First Nation-owned renewables in the Southern Lakes region more viable, and creates opportunities for future sales of surplus renewable electricity to Skagway.

MOON LAKE PUMPED STORAGE

- » A reversible hydroelectric facility where water is pumped uphill into a reservoir.
- » Water flowing back down the hill is harnessed to generate electricity in the same way as a conventional hydro plant when needed.
- » Adds much-needed renewable capacity required to meet demand during the winter and in emergencies.
- » Provides a way to store excess renewable electricity in the summer to decrease dependency on fossil fuels during the winter.

ELECTRICITY PURCHASES FROM THE ATLIN EXPANSION PROJECT

- » Sourcing renewable energy from the planned expansion of the Atlin hydroelectric facility owned by the Taku River Tlingit First Nation.
- » Capitalizes on an already existing project.
- » Presents a near-term opportunity to make more dependable renewable electricity available in Yukon.
- » Its close proximity to existing transmission infrastructure keeps project costs reasonable.

SOUTHERN LAKES TRANSMISSION NETWORK

- » An upgraded transmission line between Whitehorse and Tutshi–Moon to deliver excess renewable power to the pumped storage facility in the summer to make that power available on the Yukon grid during the winter.
- » An upgraded transmission line to Jakes Corner allows the Atlin hydro plant to connect to the Yukon grid.
- » Enables the connection of future community-based renewable projects in southern Yukon to the grid.
- » Creates the opportunity for future sales of surplus renewable electricity to Skagway.



what does success look like?

Ultimately, the success of our 10-Year Renewable Electricity Plan hinges on everyone working together. With full participation we can implement our plan and reduce our reliance on fossil fuels. Without the complete plan, we will have little choice but to build more diesel and liquefied natural gas plants to meet the growing demand for electricity. We don't want this, and we know Yukon doesn't either. Let's work together to meet Yukon's climate goals.



LEARN MORE

To learn more about each of the projects outlined in this draft plan, as well as to provide your feedback, visit yukonenergy.ca.

Feedback collected will be used to inform our final 10-Year Renewable Electricity Plan that will be released in June 2020.

Keys to success

Federal funding requirement

As outlined in this document, every project in this plan is needed. We cannot pick and choose. The cost of projects in this plan are estimated to cost in excess of \$500 million, our largest investment in the electricity system. Federal funding for the plan will be key to keeping the plan affordable for customers and minimizing risks.

First Nations partnerships

First Nations governments, development corporations and Citizens will have a key role in helping us shape and deliver this plan over the next 10 years. We recognize First Nations as governments and potential energy proponents, partners and investors. In developing this plan, we will work proactively and collaboratively with First Nations governments and development corporations to forge partnerships and create opportunities for investment, contracting, employment and training. First Nations will also be at the forefront of assessments, permitting and approval stages.

Your support and participation

Everyone has a role to play in helping build Yukon's sustainable energy future. First Nations governments and development corporations, and local communities can participate by way of Independent Power Production, while individuals can participate in programs like Peak Smart, InCharge and the Micro-Generation program. We must work together to achieve the clean future we want.

Appendix D

A sample of the Yukon Energy Presentation used at engagement sessions



10-Year Renewable Electricity Plan

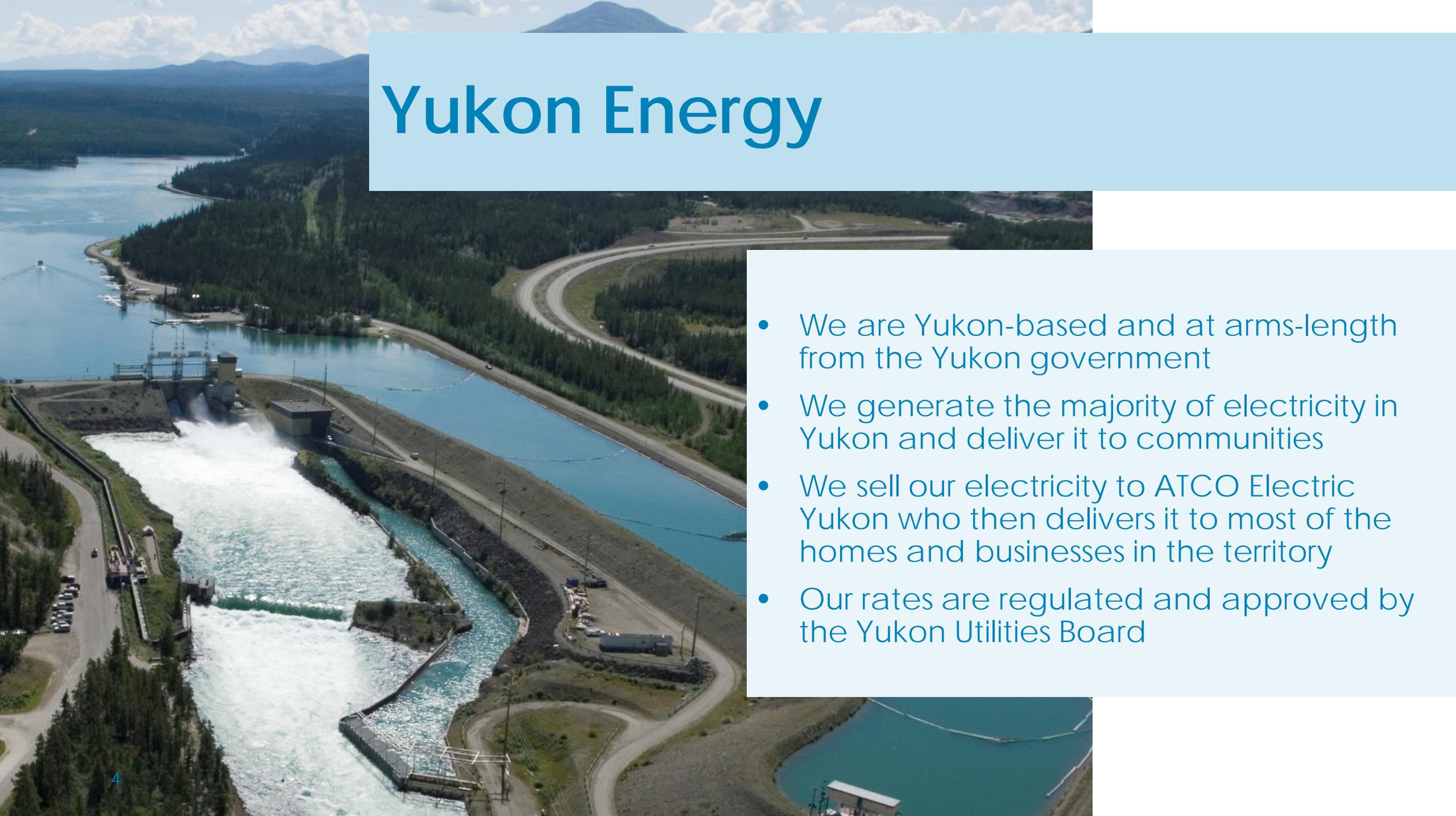
Community Meetings
2020

With Thanks and Gratitude

Yukon Energy recognizes that we live and work on the Traditional Territories of Yukon First Nations.

Agenda

- Who We Are
- The Need
- Our 2030 Vision
- Projects in Progress
- New Projects
- Your Role
- Next Steps
- Discussion

An aerial photograph of a hydroelectric dam on a river. The dam is a concrete structure with water cascading over it, creating white rapids. The river is surrounded by dense green forests and a winding road. In the background, there are mountains under a blue sky with scattered clouds. A light blue banner is overlaid on the top right of the image, containing the title 'Yukon Energy'.

Yukon Energy

- We are Yukon-based and at arms-length from the Yukon government
- We generate the majority of electricity in Yukon and deliver it to communities
- We sell our electricity to ATCO Electric Yukon who then delivers it to most of the homes and businesses in the territory
- Our rates are regulated and approved by the Yukon Utilities Board

The Need

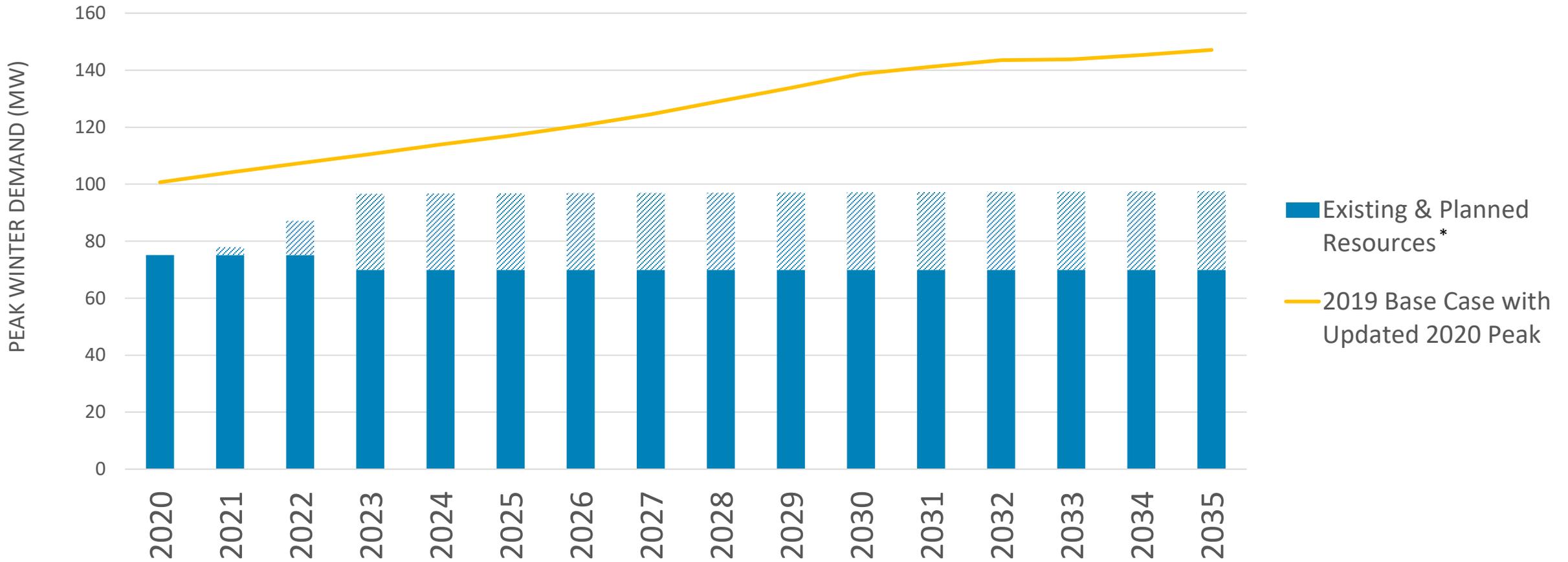
We need more resources to meet growing demands for electricity.



Government strategies



Yukon's Growing Demand for Electricity



* In case of an emergency. Assumes the loss of Aishihik generation (37 MW)

Our 2030 Vision



Clean

Electricity generated is 97% renewable. Less LNG and diesel are used to generate electricity. Emissions in the heating and transportation sector are reduced by electrification.

Affordable

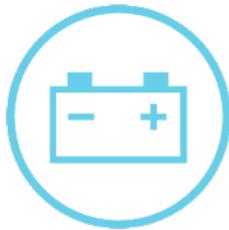
Significant Federal funding is required in order to minimize impacts on electricity rates and ensure our plan is affordable.

Reliable

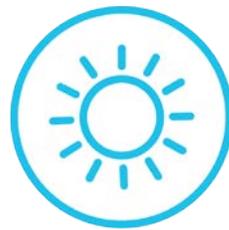
The projects focus on the delivery of dependable winter capacity to ensure reliable electricity is available during cold winter nights.

Projects In Progress

Our portfolio includes projects that are under development or planned (based on approvals).



BATTERY
STORAGE



MICROGEN



INDEPENDENT
POWER
PRODUCERS



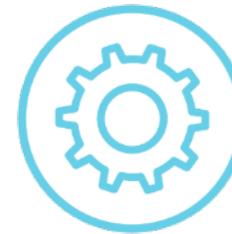
ENERGY
CONSERVATION



ENHANCED
STORAGE



THERMAL
REPLACEMENT



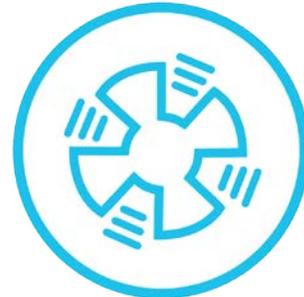
HYDRO
UPGRADES

New Projects

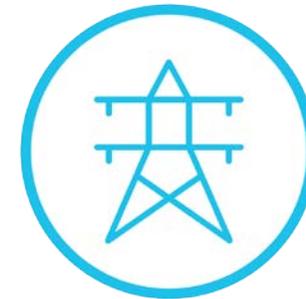
Three critical new projects are needed in the next 10 years:



Atlin Hydro
Expansion &
Connection to Yukon



Moon Lake
Pumped Storage



Southern Lakes
Transmission
Network Expansion

Electricity Purchases from Atlin Hydro



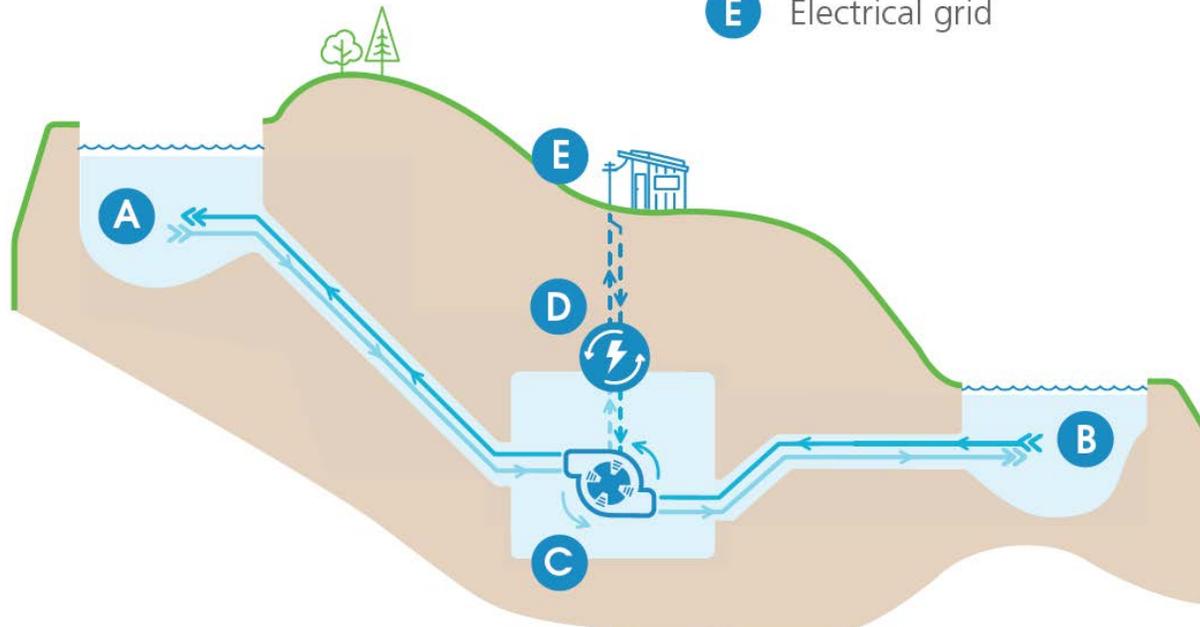
- Owned by Tlingit Homeland Energy LP (THELP)
- 2.1 MW hydro facility exists
- 8.5 MW expansion planned
- Target completion: 2024

Moon Lake Pumped Storage

PUMP STORAGE CONCEPT



- A** Upper reservoir
- B** Lower reservoir
- C** Pump/ turbine
- D** Motor/ generator
- E** Electrical grid



- Stores excess renewable electricity in summer for use during winter
- Adds much-needed winter capacity
- Two phases:
 - 35 MW with 10 MW expansion
- Target completion:
 - Phase 1: 2028
 - Phase 2: 2031

Southern Lakes Transmission



Electricity in 2030



SOURCES OF ELECTRICITY THAT DELIVER ENERGY

NEW PROJECTS

Electricity purchases from the Atlin expansion, Moon Lake Pumped Storage, Southern Lakes Transmission Expansion

ENERGY CONSERVATION

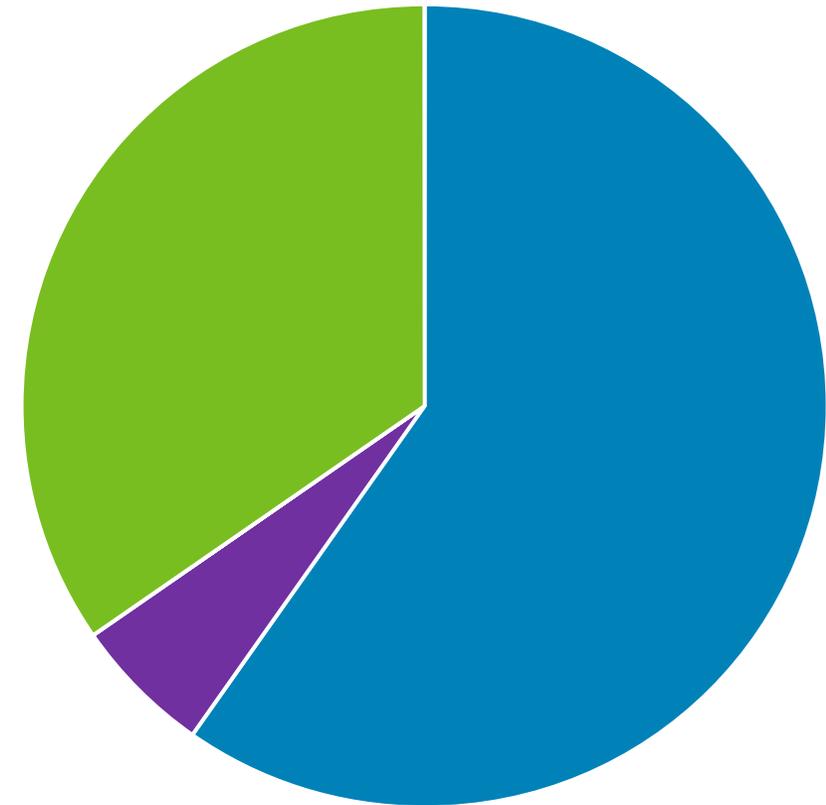
Individual, youth and business participation

COMMUNITY RENEWABLES

Solar, wind and hydro projects from independent power producers, homes and businesses.

EXISTING AND PLANNED PROJECTS

Existing power plants; hydro upgrades and storage enhancements; battery storage



DEPENDABLE SOURCES OF ELECTRICITY TO MEET WINTER PEAKS

Your Role



First Nations governments and development corporations

- Energy proponents, partners and investors
- Participants in project assessments



Communities and Municipalities

- Independent Power Producers
- Participants in energy conservation, peak-shifting and retro-fitting programs



Individuals and Businesses

- Participants in energy conservation, peak-shifting and retro-fitting programs
- Owners of rooftop solar panels
- Contractors



Youth

- Advocates for a clean and responsible energy future
- Pioneers of new renewable technologies
- Students and trainees in new electricity projects

Next Steps

- Continue discussions with Yukoners, First Nations and Municipal governments, and Local Advisory Councils.
- Finalize the plan.
- Have project specific discussions and obtain Federal funding.