

# Climate Change, Energy and Green Economy

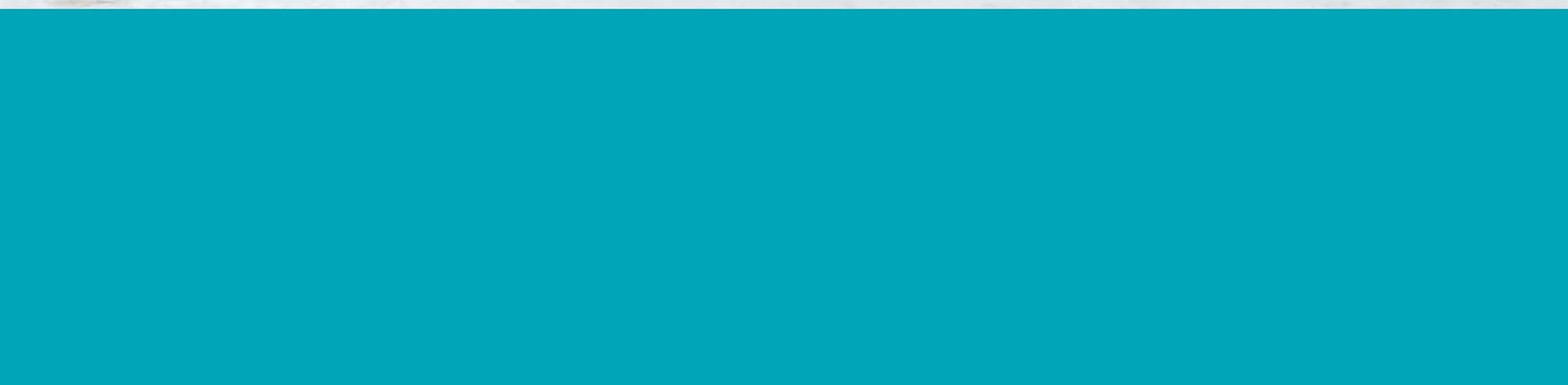
What is important to you?



  
Yukon



Photo: Government of Yukon



# Overview

## **Yukon intends to be a part of the global shift to address climate change by building resilient communities and low-carbon economies.**

The Yukon government is working with Yukon First Nations, transboundary Indigenous groups, and Yukon municipalities to develop a territory-wide strategy to address climate change, energy and a clean economy. The 10-year strategy will replace the 2009 Climate Change Action Plan and the 2009 Energy Strategy for Yukon.

While the Climate Change Action Plan and the Energy Strategy for Yukon helped the territory make headway in dealing with energy and climate change issues, a lot has changed since these documents were first released. We are ready for an updated, innovative approach to climate change, energy and green economy. The new strategy will enhance Yukon's capacity to thrive well into the future.

We want to hear what is important to you. This discussion document is intended to spark thoughts, ideas, and discussion on climate change, energy needs and building a green economy. What do you want for Yukon's energy and economic future? How is climate change affecting your life and your community? What are your ideas for developing resilient communities?

Your ideas, insights and concerns are an important part of how we will develop an approach to climate change, energy and green economy that works for Yukoners.

**Visit [EngageYukon.ca](https://engage.yukon.ca) to give your feedback and find a community meeting near you.**

# How we're developing the strategy

To develop the climate change, energy and green economy strategy, we are gathering feedback from the public, the business community, environmental groups, and other interested parties from now until December 2018.

There are multiple ways that you can provide your ideas and participate in the development of the new strategy:

- ▶ Participate in community workshops.
- ▶ Complete the online survey.
- ▶ Speak with a member of the project team.
- ▶ Review background information at [EngageYukon.ca](http://EngageYukon.ca).

Your input will be used alongside expert knowledge to develop a draft version of the strategy. Expert knowledge will help us identify how effective different options are, how much they cost, and other important factors that need to be considered. You will then get a second opportunity to provide input on the draft climate change, energy and green economy strategy.

With this input, the Government of Yukon will work collaboratively with Yukon First Nations, transboundary Indigenous groups, and Yukon municipalities to prepare a recommended strategy to be reviewed and approved by the Yukon government.

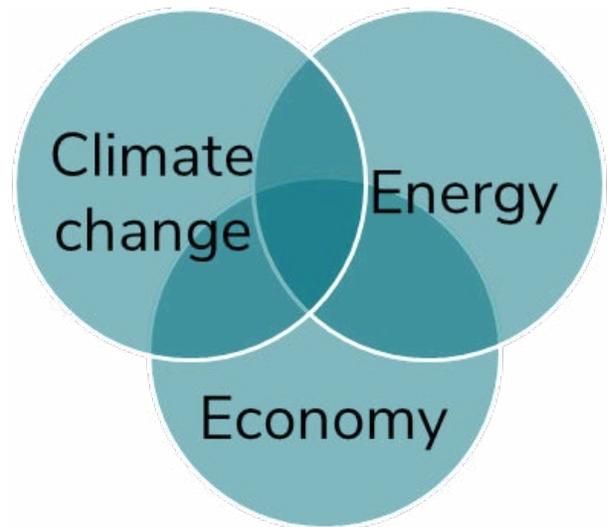
The final strategy will be released in late 2019. It will include priorities and actions that align with Yukon's climate change, energy, and economic needs.



# It is all connected

Climate change, energy and the economy are interconnected.

- ▶ Our economy relies on energy.
- ▶ The kinds of energy we use affect climate change.
- ▶ The impacts of climate change affect our energy supply and our economy.
- ▶ Economic decisions influence how much and what kinds of energy we use, and how resilient we are to the impacts of climate change.



By addressing all three together – energy, climate change and a clean economy – Yukon can effectively respond to the rapid changes happening in our territory.

## Climate change

Yukon is experiencing significant changes to its climate. Over the past 50 years, temperatures have warmed by 2°C and rain and snowfall have increased 6%.<sup>[1]</sup> Some of the resulting impacts we are experiencing are:

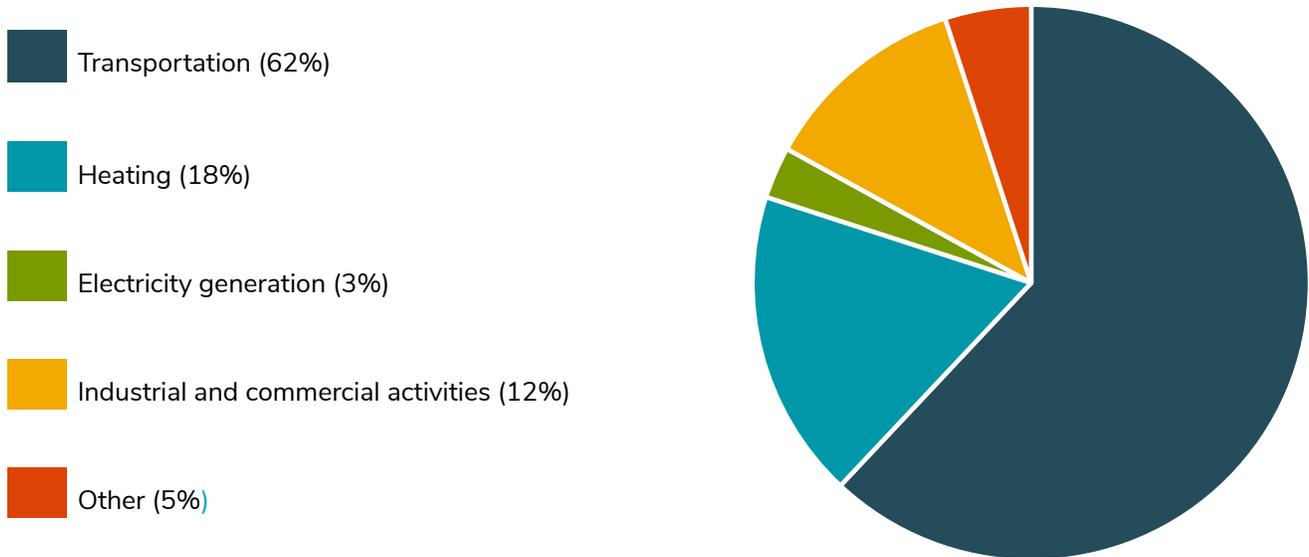
- ▶ Permafrost is thawing, damaging our buildings and roads;
- ▶ New plant and animal species are moving north, impacting our ecosystems and wildlife;
- ▶ Glaciers are melting, changing river flow patterns; and
- ▶ Higher risk of flooding and more frequent and severe forest fires.

To face these ongoing changes, Yukon can adapt to the impacts we are already experiencing and plan responses to the changes that are coming.

# Why is the climate changing?

Climate change is primarily caused by carbon dioxide and other greenhouse gas (GHG) emissions from burning fossil fuels. Other activities such as waste management, wastewater treatment, and a variety of land uses also release greenhouse gases.

Yukon's greenhouse gas emissions are primarily from the fossil fuels used for personal and commercial transportation and heating.

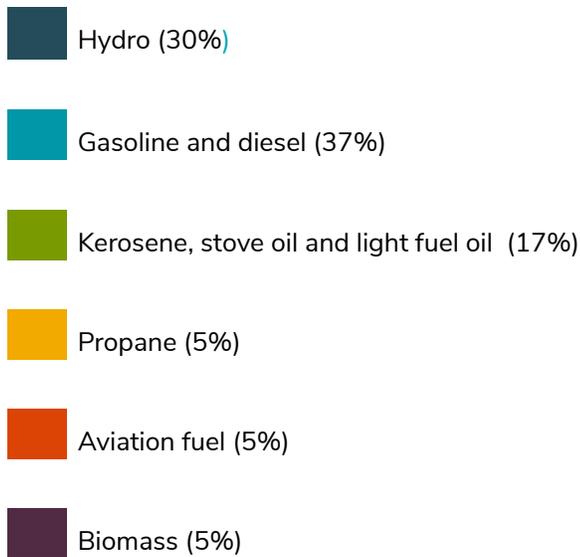


**Figure 1.** Yukon's sources of greenhouse gas emissions.<sup>[2]</sup>

While Yukon's emissions only account for a small fraction of Canada's overall GHG emissions (0.08%), our per person emissions are comparable to the rest of the country.<sup>[2]</sup> Reducing our GHG emissions means we are part of the national and global solution.

## Energy

Yukoners mainly use electricity or refined petroleum and propane products to meet our energy needs. About one-third of our energy comes from renewable energy resources like hydro and solar, while the remaining two-thirds comes from non-renewable sources like diesel and propane.<sup>[3]</sup>

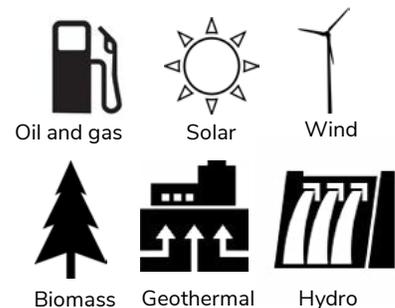


**Figure 2.** Yukon's energy consumption by source.<sup>[3]</sup>

Yukoners have access to many energy resources. These resources need to be cost-effective, reliable and environmentally sustainable. Energy efficiency and conservation can also help address our energy needs.

When considering potential energy choices for Yukon, it is important to ask:

- ▶ Is it affordable?
- ▶ Is it reliable?
- ▶ It is renewable?
- ▶ What are the GHG emissions and other negative impacts?



**Figure 3.** Energy sources available to Yukon.

**Energy efficiency** means **reducing** the amount of energy needed to make something work (e.g., ENERGY STAR® appliances, efficient furnaces, and fuel efficient vehicles)

**Energy conservation** means **avoiding** the use of energy when not needed (e.g., turning off the lights, turning down the heat, and carpooling)

# Green economy

A common way of looking at the economy is gross domestic product (GDP), which is a measurement of the value of the goods and services produced by the economy.

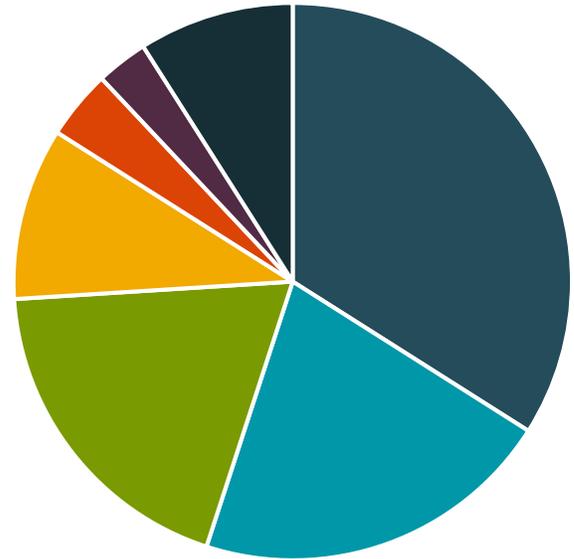
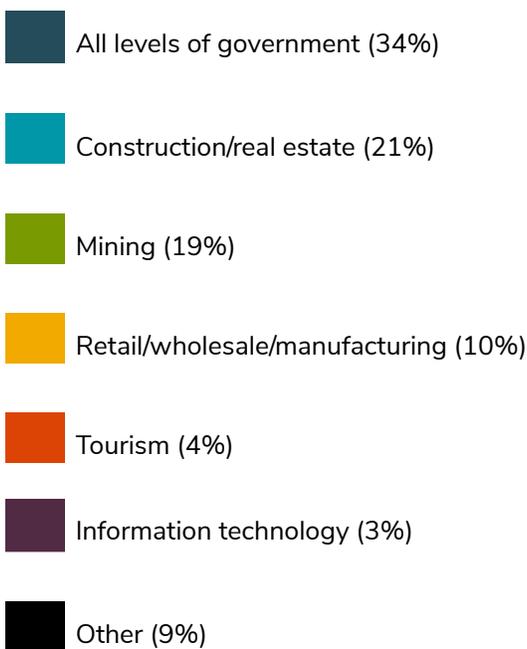


Figure 4. Yukon's economy by percentage of gross domestic product (GDP) per industry.<sup>[4]</sup>

## What is a green economy?

- ▶ **Resource efficient** – Businesses, households and industries use less energy and resources in their day-to-day activities or operations.
- ▶ **Low-carbon** – Economic activities and operations release fewer emissions of carbon dioxide and other greenhouse gases.
- ▶ **Resilient** – Communities, businesses and industries are able to adapt to the impacts of climate change and take advantage of new opportunities.

Taking action on climate change and energy will help build a diverse, green economy that creates economic growth with as little environmental impact as possible.<sup>[5]</sup> Yukon businesses will see new opportunities in areas like renewable energy and energy efficiency. The knowledge economy will grow as we innovate solutions to local and global challenges. All Yukon businesses will benefit from initiatives to use energy and other resources more efficiently.



# Areas of interest

We have identified seven key areas that need to be considered as we work to meet our energy needs, address climate change and build a green economy.

1. Electricity
2. Heating
3. Transportation
4. Land and resources
5. Communities
6. Skills and innovation
7. Knowledge

Here is some information about each suggested area of interest along with questions to help get you thinking about how a new strategy could relate to you and your community's needs. The feedback and input we receive may result in additional areas of interest in the final strategy.

You can provide feedback on these areas of interest through the online survey or in person at upcoming community workshops. Your input into the areas of interest is essential to creating a strategy that benefits all Yukoners. Visit [EngageYukon.ca](http://EngageYukon.ca) for more information.

## Carbon pricing

The federal government will be implementing a carbon price in Yukon in 2019. Carbon pricing is a cost-effective way to reduce emissions, but it is only one way to build a green economy. This strategy is about the other actions to ensure Yukon communities are resilient and sustainable.

The Yukon government conducted public engagement on how to return carbon pricing revenues to Yukoners. You can see the feedback provided at [EngageYukon.ca](http://EngageYukon.ca).

# Electricity

Yukon has an isolated electricity grid that is not connected to the rest of North America. When we run short, we are unable to import. When we have more power than we need, we cannot export it. We rely on backup diesel and natural gas when demand is high and for emergencies. These backup energy sources need to be quick and reliable to keep the heat and the lights on.

## Impacts

Climate change affects our electricity transmission and distribution infrastructure through things like thawing permafrost, forest fires, and storms.

## Energy and GHGs

Most of our electricity comes from hydro (94%), with 6% from diesel and less than 1% from liquefied natural gas (LNG), wind and solar. Four communities (Beaver Creek, Destruction Bay/Burwash Landing, Watson Lake, and Old Crow) are not connected to the main electrical grid and rely on diesel.

## Economy

Taking ownership of energy generation and creating local jobs is a priority for some Yukon communities. More Yukoners are generating their own electricity and selling the unused excess to the grid.

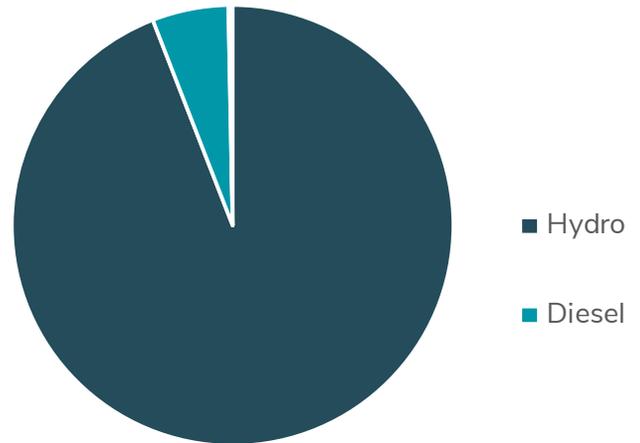


Figure 5. Yukon's sources of electricity generation.<sup>[3]</sup>

### Solar power

First Nation of Na-Cho Nyäk Dun's Government House, store, and restaurant in Mayo generate 64.7 kilowatts of solar electricity. Many other Yukon communities and First Nations are exploring solar and other renewable forms of electricity.

## What do you think?

- ▶ What types of electricity generation do you want in your community?
- ▶ How can Yukoners implement energy efficiency and energy conservation to help meet our electricity needs? What actions can you take?
- ▶ What impacts to our electricity system worry you the most and how can we prepare?

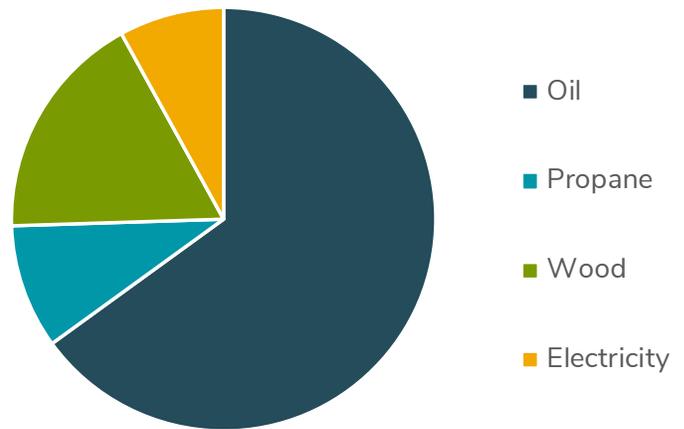
# Heating

## Energy and GHGs

Yukon homes and buildings are heated using a combination of oil, propane, wood and electricity. Most homes are heated by oil or propane (75%), with a smaller number heated by wood (17%) and/or electricity (8%).

## Impacts

Warmer temperatures could reduce the amount of heat we use, while simultaneously increasing demand for air conditioning. More forest fires may impact our biomass resources, but also create opportunities to harvest local wood while reducing forest fire risk.



**Figure 6.** Types of energy used to heat Yukon homes.<sup>[6]</sup>

### Biomass heat

Kluane First Nation, Teslin Tlingit Council, the Whitehorse Correctional Centre, Raven Recycling Society, the Dawson City wastewater treatment plant, Yukon Gardens, and Blueberry carwash are all equipped to use biomass to generate heat.

## Economy

Biomass projects in Yukon are reducing heating costs and dependence on imported fossil fuels, and creating new jobs in the local forest and heating industries. Some communities are exploring the potential for geothermal and other innovative forms of heat (e.g., waste heat).

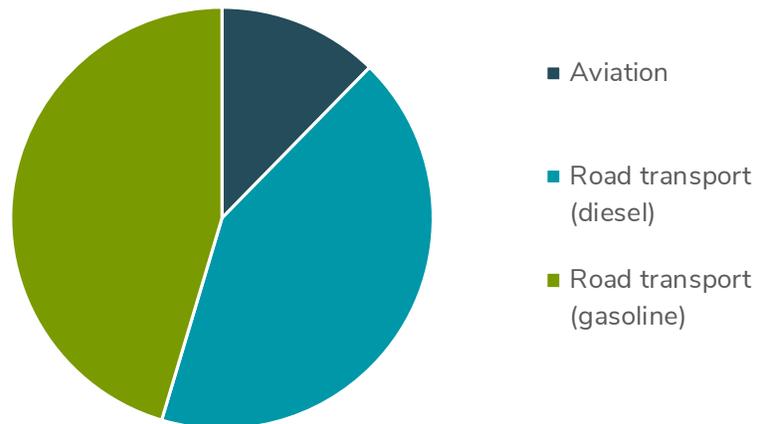
### What do you think?

- ▶ What forms of heating do you want to see in your community?
- ▶ How can Yukoners implement energy efficiency and energy conservation to help meet our heating needs? What actions can you take?
- ▶ What impacts to our heating system worry you the most and how can we prepare?

# Transportation

## Energy and GHGs

Our transportation needs are met almost entirely from fossil fuels. Transportation is the largest source of GHG emissions in Yukon, coming primarily from the cars, trucks, and other vehicles on our roads (88%). Personal gasoline and diesel vehicles make up a significant portion of those emissions.<sup>[7]</sup>



**Figure 7.** Yukon's greenhouse gas emissions from transportation.<sup>[2]</sup>

### Electric cars

There are a small number of electric vehicles in Yukon. The Mount Lorne Community Recycling Centre installed Yukon's first public electric vehicle charging station in February 2018.

## Impacts

Thawing permafrost continues to affect Yukon's roads and runways. Increasing precipitation could affect existing culverts and drainage systems. Changes to wind direction and visibility may affect air transport.

## Economy

Transportation is essential to our economy and personal wellbeing and to the quality of life we have come to enjoy. Our transportation system allows us to import, export and move products and people from one place to another.

### What do you think?

- ▶ What types of transportation do you want to see in Yukon?
- ▶ How can our transportation system be more sustainable?
- ▶ What impacts to our transportation system worry you the most and how can we prepare?



# Land and resources

## GHG Emissions

A small portion of our GHG emissions are from how we use land and resources, rather than the energy we use. For example, GHGs are released from landfills, wastewater treatment facilities, farms and land use changes.

## Impacts

Our lands and resources are changing. Elders and other community members are noticing changing plants and new species like cougars, mule deer and different kinds of insects entering Yukon's ecosystem. Animal migration patterns are shifting. The risk of severe forest fires and floods is increasing, ice and glaciers are melting, and river flows are changing.

### Impacts on fish

The Kluane First Nation is working with the Yukon and federal governments to understand how changes to the Kaskawulsh Glacier and A'ay Chü (Slims River) are affecting chum salmon habitat and spawning.

### Reduce, reuse, recycle

Yukonstruct hosts regular Repair Cafes in Whitehorse to help people fix and salvage broken or malfunctioning items and extend their use.

## Economy

Warmer, wetter conditions are creating opportunities for our local agricultural industry. More reuse and recycling saves money on landfill operating costs, delays the high cost of opening new landfills, and creates local jobs repairing and reselling old goods.

### What do you think?

- ▶ How can Yukoners manage our lands and resources to reduce GHG emissions and create economic opportunities?
- ▶ What impacts have you noticed to our land and resources and how can we respond? What impacts worry you the most?

# Communities

Yukon communities are already taking a leadership role in building low-carbon economies and increasing resilience to the impacts of climate change.

## Energy

The type and amount of energy used by communities depends partly on their layout and infrastructure. Communities need to identify specific land uses and develop community energy plans to determine how they can adopt sustainable electricity, heating and transportation.

## Impacts

Extreme weather events like forest fires and floods impact housing, air quality, drinking water, emergency preparedness, and access to food and medical care. Permafrost thaw is affecting buildings and infrastructure. As our landscape changes it becomes harder to continue traditional ways of living, and Indigenous communities are concerned about their cultural identity and wellness.

### Community adaptation

Seven Yukon communities worked with the Northern Climate ExChange, Yukon Geological Survey, and other experts to prepare geohazard maps to prepare for landslides, permafrost thaw, and other climate change impacts.

## Economy

Yukon communities need sustainable funding and the capacity to evaluate and undertake new projects. Communities need to keep working together and with their partners to achieve the most benefit. Youth, teachers, councillors, role models, and other community leaders are critical to shaping the future of Yukon's communities. They need to be informed and empowered within their communities to make change.

### What do you think?

- ▶ What does your community need to address climate change, energy and green economy?
- ▶ How has climate change impacted you, your family, and your community? What impacts worry you the most and how can we prepare for them?



# Skills and innovation

## GHG emissions

Clean technology like solar panels and energy efficient lights help reduce GHG emissions. These technologies are available and have been shown to work in Yukon. In other cases, the technologies we need are not available or have not been tailored to work properly in the north. This is an opportunity for Yukon to innovate new, clean technologies that work in remote and cold climates.

### Northern innovation

Cold Climate Innovation at Yukon College works with communities, innovators, scientists and industry to develop and commercialize northern solutions to northern challenges.

### Supply chain impacts

When flooding closed the South Alaska Highway in June 2012, grocery store produce shelves were empty a few days later. The stores were unable to restock by road and supply fresh produce to customers, resulting in increased costs and lost revenue.

## Impacts

Climate change can destabilize supply chains, increase operating costs, and affect the cost and type of insurance businesses need. Concern about climate change may make customers demand more sustainable products and services. Businesses want to understand how climate change is impacting their industry and plan for how they can adapt.

## Economy

Yukon businesses, entrepreneurs and workers will require the right skills to capitalize on new opportunities in a green economy. For example, trade and technical skills in energy efficient building construction or in renewable energy technology installations.

### What do you think?

- ▶ How can our businesses, entrepreneurs and workers gain the skills needed to take advantage of new opportunities offered by this strategy?
- ▶ How can businesses adapt to the impacts of climate change?
- ▶ How can Yukoners innovate and adopt new technologies?

# Knowledge

## Forms of knowledge

Traditional knowledge, local knowledge, and scientific knowledge are valuable in building a climate change, energy and green economy strategy that makes sense for Yukoners.

### Science and tradition

The Old Crow Solar Project is combining scientific studies with traditional knowledge from Elders to design a project that works for the community.

### Progress reports

The Yukon government has been reporting on the previous *Climate Change Action Plan* and *Energy Strategy for Yukon* through regular progress reports.

Learn more at [env.gov.yk.ca](http://env.gov.yk.ca) and [energy.gov.yk.ca](http://energy.gov.yk.ca).

## Tracking our progress

It is important we have an accurate picture of how our actions achieve our objectives. Creating clear goals and monitoring our progress keeps us moving in the right direction. Establishing targets can track progress toward meeting our collective goals. However, monitoring requires time and money, and it is necessary to strike the right balance.

## Outreach and education

Sharing information on climate change, energy and green economy will help inspire Yukoners to take action and educate them on which actions to take.

### What do you think?

- ▶ How do you think traditional, local and scientific knowledge can inform the development and implementation of this strategy?
- ▶ What are measures we can use to assess our progress?
- ▶ How can we inform Yukoners about climate change, energy and the economy?



# Your turn

Visit EngageYukon.ca to provide your input and find a community meeting near you. You can provide feedback until December 17, 2018. Once the draft strategy is developed, you will have an opportunity to review and provide feedback.

## Questions?

For background information on climate change and energy in Yukon, check out:

- ▶ The Yukon **Climate Change State of Play** available at [yukon.ca/en/climate-change-yukon](http://yukon.ca/en/climate-change-yukon)
- ▶ The **Yukon Energy State of Play** available at [energy.gov.yk.ca/pdf/yukon-energy-state-play.pdf](http://energy.gov.yk.ca/pdf/yukon-energy-state-play.pdf)

For information about the previous *Climate Change Action Plan* and *Energy Strategy for Yukon*, visit:

- ▶ **Climate Change Action Plan:** [yukon.ca/en/climate-change-yukon](http://yukon.ca/en/climate-change-yukon)
- ▶ **Energy Strategy for Yukon:** [energy.gov.yk.ca/energy\\_strategy.html](http://energy.gov.yk.ca/energy_strategy.html)

For more information, contact the Senior Project Manager at 867-456-5565 or [integratedstrategy@gov.yk.ca](mailto:integratedstrategy@gov.yk.ca).

# Key terms

**Adaptation:** Adjusting to climate change and the associated impacts on society. May include building resilience to hazards, avoiding risks, and taking advantage of opportunities.

**Clean technology:** Products, processes or services that reduce environmental impacts by improving energy efficiency, using resources more sustainably, or protecting the environment.

**Green economy:** An economy that makes efficient use of resources, releases few emissions of greenhouse gases, and is resilient to the impacts of climate change.

**Renewable energy:** Energy that is collected from sources that naturally replenish on a human timescale (e.g., wind, solar, hydro).

**Resilience:** The ability of social, economic, and environmental systems to cope with changes in a way that maintains their essential function, identity, and capacity to adapt to future challenges.

# Literature cited

[1] Streicker, J., 2016. Yukon Climate Change Indicators and Key Findings 2015. Northern Climate ExChange, Yukon Research Centre, Yukon College. [https://www.yukoncollege.yk.ca/sites/default/files/inline-files/Indicator\\_Report\\_Final\\_web.pdf](https://www.yukoncollege.yk.ca/sites/default/files/inline-files/Indicator_Report_Final_web.pdf)

[2] Government of Yukon. Reducing greenhouse gas emissions in Yukon [modified June 7, 2018; accessed August 2, 2018]. [www.env.gov.yk.ca/air-water-waste/reducing-GHG-emissions-yukon.php](http://www.env.gov.yk.ca/air-water-waste/reducing-GHG-emissions-yukon.php)

[3] Kischuk, P., 2018. Yukon Energy State of Play. Vector Research report. <http://www.energy.gov.yk.ca/pdf/yukon-energy-state-play.pdf>

[4] 2016 data from Statistics Canada CANSIM databases 281-0063, 379-0030, 051-0001. Accessed February 24, 2017.

[5] United Nations Environment Program, 2011. Towards a Green Economy – Pathways to Sustainable Development and Poverty Eradication: A Synthesis for Policy Makers. [https://sustainabledevelopment.un.org/content/documents/126GER\\_synthesis\\_en.pdf](https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf)

[6] Government of Yukon, 2017. Yukon's Energy Context. Energy Branch report. <http://www.energy.gov.yk.ca/images/Yukon-Energy-Context-Web.pdf>

[7] Taggart, M., 2015. Yukon Greenhouse Gas Emissions: The Transportation Sector. Research Northwest report. [http://www.env.gov.yk.ca/publications-maps/documents/Yukon\\_Transportation\\_Sector\\_GHG\\_Emissions\\_Final\\_Updated\\_Report\\_March\\_2015.pdf](http://www.env.gov.yk.ca/publications-maps/documents/Yukon_Transportation_Sector_GHG_Emissions_Final_Updated_Report_March_2015.pdf)



**NEXT 1 km**

This project is a collaboration between the Government of Yukon, Yukon First Nations, transboundary Indigenous groups and Yukon municipalities.

