Government of the Northwest Territories

Corporate Greenhouse Gas Emissions Report 2015

Government of
Northwest Territories

TABLE OF CONTENTS

Photos: John McKay

INTRODUCTION

The Government of Northwest Territories (GNWT) has made a commitment to report corporate greenhouse gas (GHG) emissions for its 2015 operations. The objective of reporting corporate GHG emissions is outlined in the Northwest Territories (NWT) Greenhouse Gas Strategy (2011-2015) and is achieved by reporting through The Climate Registry (TCR).

In 1998, the GNWT recognized the need to contribute to reducing global GHG emissions. The GNWT's dedication to this position is illustrated in the NWT Greenhouse Gas Strategy (2007). It builds upon the knowledge gained from earlier years and **committed the GNWT to reduce greenhouse gas emissions from its operations to 10 percent below 2001 levels by 2011**.

The NWT Greenhouse Gas Strategy 2011-2015 outlined plans for managing greenhouse gas emissions and provided long-term measures, which needed to be implemented to achieve set targets.

Using utility data from the GNWT's System for Accountability and Management (SAM) database, the ENR has prepared a GHG inventory since the 2011 calendar year for submission to The Climate Registry (TCR) to report on the target adopted in 2011.

The GNWT's GHG emissions from purchased fuel in 2001 were 54,000 tonnes in carbon dioxide equivalents (CO_2e) Scope 1. **By 2011, the GNWT emissions were 37,373 tonnes CO_2e (Scope 1), a 30 percent reduction below 2001**. Emissions were 40,883 tonnes CO_2e in 2012, 34,745 tonnes CO_2e in 2013, 38,482 tonnes CO_2eq in 2014 and 30,805 CO_2eq in 2015 (Scope 1).

Scope 1 emissions are defined by TCR as direct GHG emissions from sources owned or controlled by the GNWT. Scope 1 includes emissions from fossil fuels burned on site, emissions from GNWT-owned or GNWT-leased vehicles and other direct sources.

Scope 2 emissions are indirect GHG emissions resulting from the generation of electricity, heating and cooling or steam generated off-site, but purchased by the GNWT.

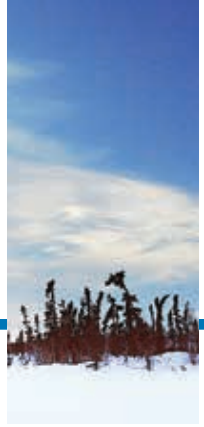
Scope 3 emissions include indirect GHG emissions from sources not owned or directly controlled by the GNWT, but related to the GNWT's activities. Examples of Scope 3 GHG emission sources include employee travel and commuting, contracted solid waste disposal, contracted wastewater treatment, GHG emissions from leased space, vendor supply chains, outsourced activities and site remediation activities.

In 2001, the GNWT only reported Scope 1 emissions. However, over time, inventory procedures have been refined and the GNWT now tracks Scope 2 emissions as well. In order to keep the 2011 emissions target comparable, the GNWT compared Scope 1 only for 2001 and 2011.

The Climate Registry is a not-for-profit organization, which brings together North American states, provinces, territories and native sovereign nations. TCR, in collaboration with members, sets consistent and transparent standards to calculate, verify and publicly report greenhouse gas emissions into a single registry. Membership and reporting to TCR is voluntary and provides public and private sectors with an internationally recognized reporting mechanism. Membership levels are structured to allow participating organizations to report varying levels of inventory detail.

Basic membership to TCR allows newer members a period of time to build capacity and develop internal systems to allow for the more detailed inventory requirements of a Climate Registered™ member. Once the later membership is declared, Climate Registered™ members submit Transitional Reports or Complete Reports, which are available to the public. The reporting requirements for Climate Registered™ members are more stringent and include a verification requirement.

An assessment of the GNWT's activity data (energy consumption) used for the development of this inventory showed significant improvements in energy tracking from previous years, but improvements are still required to be able to earn a positive third-party verification statement. The GNWT will remain a Basic member until data acquisition from internal records becomes more streamlined and verification of the information is completed by a third party. This will require working with financial services staff and the SAM sustainment office to make these improvements to the quality of data.



LOCAL CONTEXT

Northwest Territories

The Northwest Territories (NWT) covers an area of 1.35 million square kilometres, with a population of 44,244 residents in 2015. Due to its northerly location, the climate is classified as subarctic to polar with short and cool summers and long and harsh winters.

The NWT economy relies heavily upon its geological resources, which include gold, diamonds, natural gas and petroleum. As a result of the abundance of geological resources, the NWT has one of the highest per capita Gross Domestic Product of all provinces or territories in Canada.

Government of Northwest Territories

The GNWT is responsible for delivering a wide variety of services to people living and working in the NWT. In 2015, there were a total of 27 departments and agencies delivering services, including education, environment, health, social, industry, tourism, justice, public works and transportation services.

The GNWT owns and operates a large number of buildings and mobile equipment for the delivery of these services. For 2013, the GNWT listed approximately 60 different types of buildings for a total of approximately 700 buildings. These include offices, schools, hospitals, correctional facilities and airports. The total area of these buildings is approximately 422,000 square metres. Mobile equipment assets total approximately 1,400 and include buses, trucks, snow machines, ATVs, passenger cars, jeeps, SUVs, heavy equipment and aircraft.

INVENTORY SUMMARY

In 2015, the total greenhouse gas emissions from all sources was 43,329 tonnes CO_2e. Direct emissions (Scope 1) were 30,805 tonnes CO_2e, indirect emissions (Scope 2) were 8,443 tonnes CO_2e and biogenic emissions were 4,081 tonnes CO_2e (see Table 1).

Total direct emissions can be further subdivided into stationary and mobile combustion. Stationary combustion emissions represent mostly emissions from the GNWT's buildings, whereas mobile combustion represents GNWT's on-road and off-road vehicles, snow machines and aircraft. Total greenhouse gas emissions from stationary combustion was 18,879 tonnes CO_2e and total greenhouse gas emissions from mobile combustion was 11,926 tonnes CO_2e (see Table 1).

Climate Registry members must track and report biogenic CO_2 emissions separately from other emissions because the carbon in biomass was recently contained in living organic matter. This sets it apart from the carbon in fossil fuels, which has been trapped in geologic formations for millennia. The Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories requires that CO_2 emissions from biogenic sources be reported separately. The Registry's requirement to report biogenic emissions applies only to stationary combustion and mobile combustion. The Registry does not require the reporting of other biogenic emissions (e.g. fugitive CO_2 emissions from solid waste management) due to a lack of scientific consensus around the methods used to quantify these emissions. 2015 is the third inventory year the GNWT has reported its complete biogenic emissions.

Revised Framework for Calculating GHG Emissions

Canada prepares a National Inventory Report (NIR) every year in accordance with emissions reporting guidelines established under the United Nations Framework Convention on Climate Change (UNFCCC). This year's edition of the NIR includes new emissions factors for the Northwest Territories Electricity Generation and Consumption. In previous years, the Northwest Territories and Nunavut's electricity data was combined due to confidentiality issues. This year, however, the data has been separated to reflect each territories unique emissions factors. Previous calculations utilized 320 g GHG/kwh for electricity generated and 350 g GHG/kwh consumed. These numbers have now changed to 190 g GHG/kwh generated and 200 g GHG/kwh consumed.[1]

Table 1 – Government of the Northwest Territories Greenhouse Gas Emissions Breakdown for the 2015 Inventory Year

Scope	GHG Emissions (Tonnes CO_2e)	Scope Type	GHG Emissions (Tonnes CO_2e)	Activity Type	GHG Emissions (Tonnes CO_2e)
Direct Emissions (Scope 1)	30,805	Stationary Combustion	18,879	Heating Oil	14,296
				LNG/Propane	3,552
				Natural Gas	1,031
				Coal	0
		Mobile Combustion	11,926	Gasoline	2,694
				Diesel	4,057
				Av Gas	1,870
				Av Turbo (Jet A)	3,305
Indirect Emissions (Scope 2)	8,443	Indirect Emissions	8,443	Electricity	8,443
TOTAL	**39,248**		**39,248**		**39,248**
Biogenic Emissions $C0_2e$	4,081	Stationary Combustion	4,081	Biomass (solid)	4,081
TOTAL	**4,081**		**4,081**		**4,081**

Figure 1: Government of the Northwest Territories Greenhouse Gas Emissions Breakdown by Energy Source for 2015

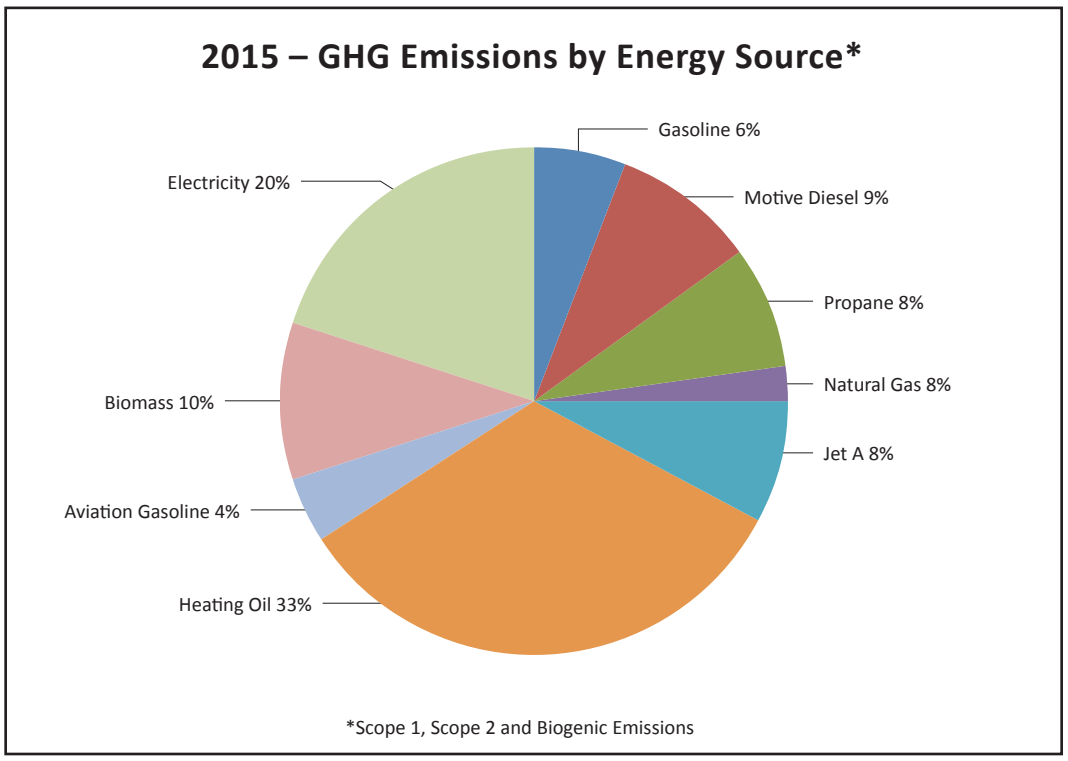


Figure 2: Government of the Northwest Territories Energy Consumption by Region for 2015

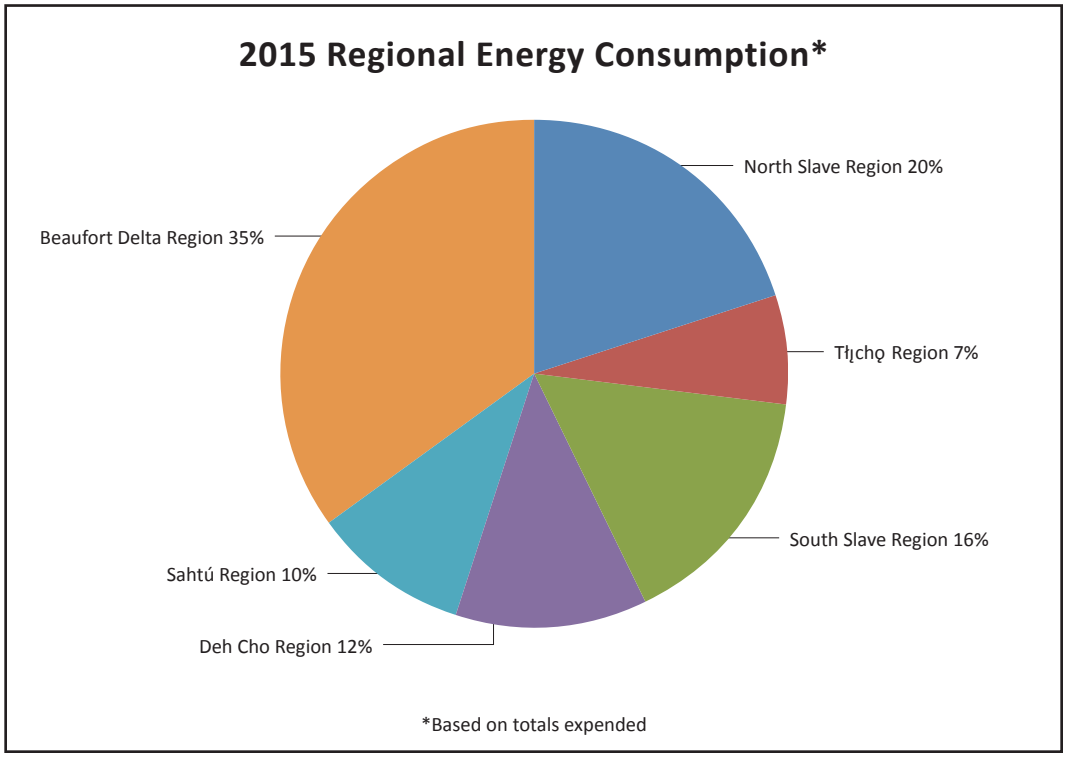
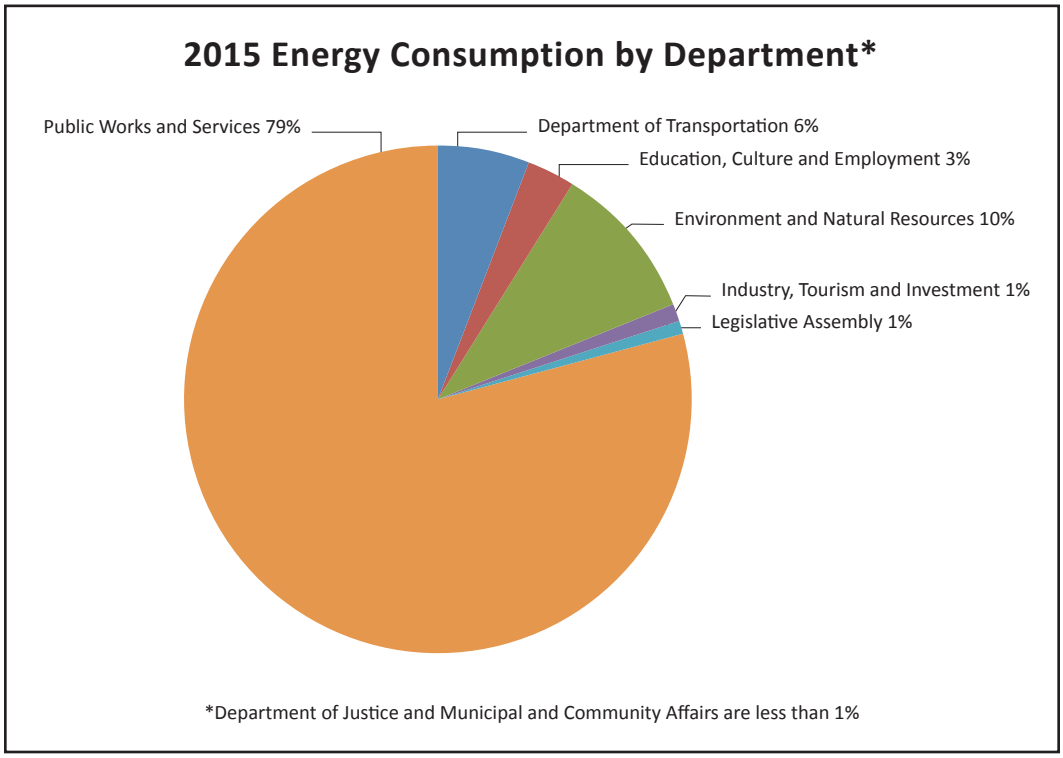
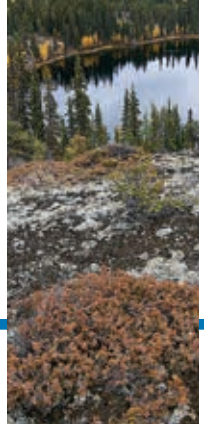


Figure 3: Government of the Northwest Territories Energy Consumption by Department for 2015



COMPARISON BETWEEN 2015 AND 2014 INVENTORIES



In 2015, the total greenhouse gas emissions from all sources was 43,328 tonnes CO_2e and in 2014 it was 50,137 tonnes of CO_2e. Reduced hours of operation from warmer weather resulted in lower GHG emissions than the previous year.

Figure 4: Government of the Northwest Territories Greenhouse Gas Emissions by Energy Source for 2011-2015 (Electricity has been recalculated to reflect 2016 Emissions Factors)

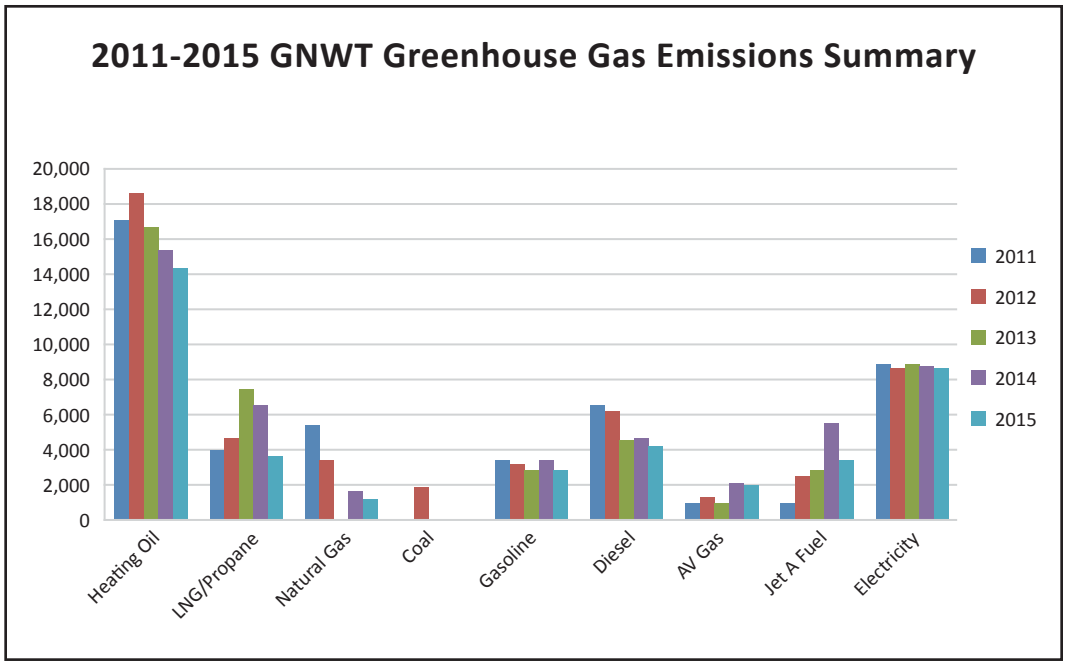


Table 2 – Government of the Northwest Territories Greenhouse Gas Emissions Breakdown for the 2014 Inventory Year (Electricity has been recalculated to reflect 2016 Emissions Factors)

Scope	GHG Emissions (Tonnes CO_2e)	Scope Type	GHG Emissions (Tonnes CO_2e)	Activity Type	GHG Emissions (Tonnes CO_2e)
Direct Emissions (Scope 1)	38,482	Stationary Combustion	23,222	Heating Oil	15,305
				LNG/Propane	6,449
				Natural Gas	1,468
				Coal	0
		Mobile Combustion	15,260	Gasoline	3,336
				Diesel	4,562
				Av Gas	2,000
				Av Turbo (Jet A)	5,362
Indirect Emissions (Scope 2)	8,538	Indirect Emissions	8,538	Electricity	8,538
TOTAL	**47,020**		**47,020**		**47,020**
Biogenic Emissions $C0_2$	3,117	Stationary Combustion	3,117	Biomass (solid)	3,117
TOTAL	**3,117**		**3,117**		**3,117**

Table 3 – Government of the Northwest Territories Greenhouse Gas Emissions Breakdown for the 2013 Inventory Year (Electricity has been recalculated to reflect 2016 Emissions Factors)

Scope	GHG Emissions (Tonnes CO_2e)	Scope Type	GHG Emissions (Tonnes CO_2e)	Activity Type	GHG Emissions (Tonnes CO_2e)
Direct Emissions (Scope 1)	34,745	Stationary Combustion	23,937	Heating Oil	16,559
				LNG/Propane	7,324
				Natural Gas	54
				Coal	0
		Mobile Combustion	10,808	Gasoline	2,731
				Diesel	4,450
				Av Gas	891
				Av Turbo (Jet A)	2,735
Indirect Emissions (Scope 2)	8,751	Indirect Emissions	8,751	Electricity	8,751
TOTAL	**43,496**		**43,496**		**43,496**

Biogenic Emissions $C0_2$	4,509	Stationary Combustion	4,509	Biomass (solid)	4,509
TOTAL	**4,509**		**4,509**		**4,509**

Table 4 – Government of the Northwest Territories Greenhouse Gas Emissions Breakdown for the 2012 Inventory Year (Electricity has been recalculated to reflect 2016 Emissions Factors)

Scope	GHG Emissions (Tonnes CO_2e)	Scope Type	GHG Emissions (Tonnes CO_2e)	Activity Type	GHG Emissions (Tonnes CO_2e)
Direct Emissions (Scope 1)	40,883	Stationary Combustion	28,234	Heating Oil	18,568
				Propane	4,562
				Natural Gas	3,299
				Coal	1,805
		Mobile Combustion	12,649	Gasoline	3,005
				Diesel	6,130
				Av Gas	1,128
				Av Turbo (Jet A)	2,386
Indirect Emissions (Scope 2)	8,486	Indirect Emissions	8,486	Electricity	8,486
TOTAL	**49,369**		**49,369**		**49,369**

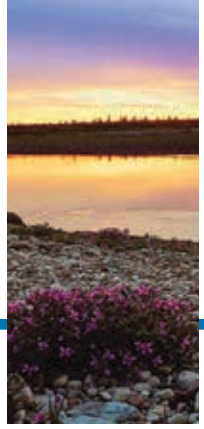


Table 5 – Government of the Northwest Territories Greenhouse Gas Emissions Breakdown for the 2011 Inventory Year (Electricity has been recalculated to reflect 2016 Emissions Factors)

Scope	GHG Emissions (Tonnes CO_2e)	Scope Type	GHG Emissions (Tonnes CO_2e)	Activity Type	GHG Emissions (Tonnes CO_2e)
Direct Emissions (Scope 1)	37,373	Stationary Combustion	26,081	Heating Oil	17,023
				SNG/Propane	3,798
				Natural Gas	5,260
				Coal	0
		Mobile Combustion	11,292	Gasoline	3,253
				Diesel	6,372
				Av Gas	839
				Av Turbo (Jet A)	828
Indirect Emissions (Scope 2)	8,734	Indirect Emissions	8,734	Electricity	8,734
TOTAL	**46,107**		**46,107**		**46,107**

COMPLETED REDUCTION INITIATIVES

Highlights from completed energy related activities during the 2015/2016 fiscal year include:

- Twenty-six energy efficiency projects on various GNWT facilities.
- A reduction of 8,847 tonnes of GHG emissions from energy investments in GNWT assets, representing a 20% reduction in annual emissions.
- Electricity and heating fuel consumption was reduced by four and eight percent respectively.
- LED streetlight conversions in eight more NWT communities.
- Six new biomass boiler installations, bringing the total number to 28 GNWT-wide.
- Sixty-nine kilowatts (kW) of new solar in Wrigley and Fort Liard, raising the total to 695 kW of local connected solar in the NWT.
- The 136 kW Colville Lake hybrid solar and battery project, the first of its kind in Canada, will test the benefits of integrating lithium batteries and large-scale solar in a remote diesel community.
- Liquefied Natural Gas (LNG) supply resulted in fuel savings worth $664,000 in 2015/2016 and a total of $1.7 million since the project started in February 2014.
- Annual greenhouse gas emission reductions of 2,257 tonnes from LNG displacing diesel in Inuvik.[2]

Renewable energy is a growing proportion of our energy mix. Biomass boilers accounted for 18 percent of GNWT heating needs and will grow to 24 percent by the end of the year.[2]

LOOKING FORWARD

Looking forward to the coming year, $3.8 million will be directed to energy retrofits and alternative energy projects, including LED lighting, building retrofits, biomass and solar across the GNWT. Five biomass boilers are included in new construction projects across the NWT, including the Stanton Territorial Hospital, which is well underway. Effective envelope design, ventilation heat recovery, efficient lighting, use of day lighting, and operation and maintenance standards are all included in the new facility, which will serve the entire NWT.[2]

In terms of emerging technologies, a variable speed generator to improve diesel efficiency and integrate higher levels of solar energy in remote diesel communities will be tested in Aklavik. The feasibility of LNG to displace diesel power generation will be investigated in Tuktoyaktuk. Planning, design and feasibility work will continue for a proposed wind project in Inuvik.

Five new biomass projects now in the design and construction phase include biomass boilers for base load heating at the following locations:

- 200 kW boiler for the Chief Julius School, Fort Good Hope;
- 200 kW boiler for the Chief T'selehye School, Tulita;
- 400 kW boiler for the new combined Health Centre and Long-term Care Facility, Norman Wells;
- A biomass boiler is included in the addition to the Territorial Women's Correction Centre, Fort Smith; and
- A biomass boiler system is included in the new Stanton Territorial Hospital, Yellowknife.[2]

Hydropower is the single largest source of renewable energy in the NWT. The North Slave Resiliency Study confirmed the NWT hydro system typically has surplus renewable energy, but there is a need to invest in aging infrastructure, enhance water monitoring and plan for low water events. In the 25 communities of our thermal zone, solar power systems are being successfully installed, most recently in Wrigley and Fort Liard. Although not yet economic in the north, solar is proven technology that can displace diesel while inviting northerners to engage in a discussion about our energy situation.[2]

On the policy and communications side, a **new Energy Plan will be developed in conjunction with a NWT Climate Change Strategic Framework**. Community engagement on both projects has begun, with an aim of releasing new strategies in 2017.

For 2016/2017, we will see more northern innovation along with a continued focus on energy conservation investments in projects across the north such as LED lighting, building retrofits, biomass and solar. A variable speed generator will be tested in Aklavik to improve plant efficiency. Work will also commence on the feasibility of LNG in Tuktoyaktuk and megawatt scale wind in Inuvik.[2]

REFERENCES

- Environment Canada, National Inventory Report 1990-2015, Greenhouse Gas Sources and Sinks in Canada
- Government of the Northwest Territories, Public Works and Services, Energy Conservation Projects, Annual Report 2015-2016
- The Climate Registry, General Reporting Protocol, Version 3.1