NORTHWEST TERRITORIES POWER CORPORATION

2011/12 GREENHOUSE GAS REPORT




NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

An NT Hydro Company

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INTRODUCTION

Company Profile

The Northwest Territories Power Corporation is a Crown corporation wholly owned by the Government of the Northwest Territories. NTPC was created in 1988 when the Territorial Government purchased shares of the federally owned Northern Canada Power Commission. Today we are the primary power producer in the Northwest Territories (NWT). We distribute electricity to the end-use consumer in 25 communities and supply electricity on a wholesale basis to two distributing utilities. These utilities in turn retail electricity to customers in the Yellowknife and Hay River areas.

NTPC's facilities include hydroelectric, diesel, and natural gas generation plants, as well as transmission systems and numerous isolated electrical distribution systems. NTPC operates 31 power plants including the standby diesel generation facilities

within the Bluefish, Snare, and Taltson hydro systems and the Inuvik and Norman Wells natural gas systems. NTPC purchases and distributes natural gas generated power in Norman Wells. We also own and operate alternative energy assets used for the supply of residual heat, solar power, and cogeneration in several communities. Figure 1 shows the NWT and the locations of communities served by NTPC.

NTPC serves a population of approximately 42,700 people located in an area of 1.3 million square kilometers. Approximately 69% of the population lives in the North and South Slave regions, while the rest of the population resides in small communities widely dispersed throughout the NWT. The total electrical load for the NWT is approximately 73 MW, with isolated power systems having generating capacities ranging from 230 kW at Jean Marie River to 62 MW at Snare/Yellowknife (including Bluefish Hydro). As these systems are isolated and unconnected, each must be planned for and operated independently.

NTPC exists in a unique operating environment that has a profound impact on operations throughout its service area. Extremely low customer densities, a harsh climate, a mix of hydro/diesel/natural gas generation, and the lack of an integrated transmission system present logistical challenges that set NTPC apart from most utilities.

Figure 1: NTPC Service Area

Commitment to Reducing GHG Emissions

NTPC's long term vision includes a commitment to the environment. Each year Senior Management and the Board of Directors approve strategies to achieve specific goals with respect to environmental performance, including GHG reduction. In addition, NTPC has environmental and capital plans that are approved annually by the Board and reviewed quarterly. These plans include actions to reduce GHG such as alternative energy projects, streetlight conversions, and engine replacements.

Although we have already achieved our target to reduce GHG emissions by 10% of 1996/97 levels, we will continue to further decrease our production of GHG emissions where feasible.

NTPC has developed an ISO 14001 compliant Environmental Management System (EMS). The EMS includes a review of current climate change practices implemented by NTPC, which will help develop and monitor new targets.

Management System

Our GHG emissions are monitored at the most senior levels of NTPC by the Board of Directors and the President and CEO. Senior Management not only review and approve NTPC's Strategic Plan, but review and approve any GHG initiatives through the annual capital and financial planning process. The Minister responsible for NTPC is also advised of all major issues regarding NTPC including our GHG reduction programs.

Through our annual GHG report we analyze and monitor NTPC's success in reducing GHG emissions. NTPC data from the Environmental, Financial, and Engineering departments is compiled, analyzed and reviewed at a management level to generate the GHG report. NTPC's GHG emissions status is reported to both the Board of Directors and the Minister.

External Verification

The Auditor General of Canada annually carries out external verification of NTPC data, including fuel consumption and generation statistics.

In accordance with the Public Utilities Board (PUB) process for setting power rates all aspects of our operations, including our GHG initiatives and their associated costs and benefits, are reviewed publicly and by the PUB.

In 2003 Environment Canada's National Pollutant Release Inventory (NPRI) introduced Criteria Air Contaminants (CACs) into their list of toxic substances to be reported annually. In 2008 the Canadian Electricity Association (CEA) created the Sustainable Electricity (SE) Program which requires reporting of environmental, social and economic indicators.

NTPC now reports emissions annually to the NPRI, CEA, and voluntary to Environment Canada's GHG Emissions Reporting Program.

In 2012, Duerden & Keane Environmental Inc., an independent, qualified assessor, completed an on-site independent verification at NTPC's Head Office to determine NTPC's degree of adherence to the CEA's Policy on Sustainable Development, accuracy of the information submitted by NTPC for the SE report and conformance to the CEA's requirements for an ISO 14001 consistent EMS.

BASE YEAR QUANTIFICATION

NTPC used the 1990/91 fiscal year to create a Baseline for emissions against which to compare subsequent years.

Baseline Quantification

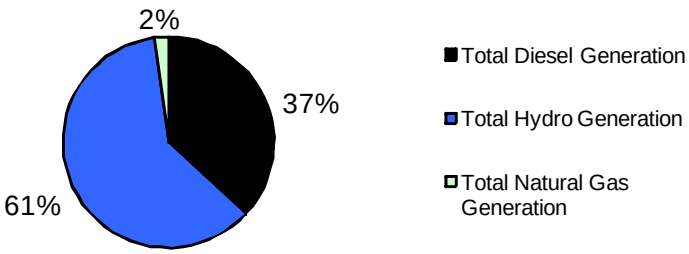
Emission factors from Environment Canada's GHG Inventory were used to calculate emissions. Table 1 illustrates our 1990/91 Baseline emissions according to GHG type.

Table 1: Baseline Emissions Estimates by Greenhouse Gas Type

	Tonnes			
Fiscal Year	CO_2	CH_4	N_2O	Total Emissions
1990/91	132,610	10	19	138,787

Hydro, diesel, and purchased natural gas generated power accounted for 61%, 37%, and 2% of total generation in 1990/91, respectively. Figure 2 illustrates 1990/91 percent generation according to source.

Figure 2: Power Generation by Source for 1990/91 (Baseline Year)



Direct and Indirect Emissions

NTPC's direct GHG emissions result from the combustion of fossil fuels to generate electricity in NTPC-owned diesel and natural gas facilities.

Indirect emissions are those created or saved by operations not directly controlled by NTPC, but affected by NTPC business decisions. These include emissions produced from purchased natural gas generated power and emissions saved as the result of residual heat projects providing heat to buildings not owned by NTPC.

In 1990/91 NTPC did not own any natural gas generating facilities. All natural gas generation emissions at that time were therefore indirect emissions resulting from the purchase of natural gas generated power in Norman Wells. Table 2 illustrates NTPC's emissions according to source for 1990/91.

Table 2: Baseline GHG Emissions by Source

	CO_2 Equivalent Tonnes		
Fiscal Year	Diesel Generation	Gas Generation	Total Emissions
1990/91	133,395	5,392	138,787

Emissions Calculations

Greenhouse gas emissions are calculated using actual fuel consumption data and emission factors. Emission factors are provided by Environment Canada's GHG Inventory (see Table 3).

Table 3: Emissions Factors by Gas Type

Source	CO_2	CH_4	N_2O
Natural Gas Env. Canada	2,454 g/m^3	0.49 g/m^3	0.049 g/m^3
Diesel Env. Canada	2,663 g/L	0.133 g/L	0.40 g/L

The following equivalency factors provided by Environment Canada were utilized to calculate GHG carbon dioxide equivalent (CO_2e) emissions:

Table 4: Carbon Dioxide Equivalency Factors

Greenhouse Gas Type	CO_2e Factor
CO_2	1
CH_4	25
N_2O	298

NTPC buildings heated by residual heat or electricity directly from NTPC power plants are included in emissions estimates, however emissions produced from oil-fired furnaces in NTPC owned housing, office buildings, etc. are not reported.

Due to the low number of NTPC owned vehicles (61 on average) and the limited distances driven annually, GHG emissions produced from vehicles are not included in this report.

Forecast Emissions

Forecast emissions are based on predicted future power generation values for 2012/13 to 2014/15, which are divided by three-year weighted averages for plant efficiencies to determine fuel consumption. This method of forecasting incorporates the previous year's improvements to fuel efficiencies, upgrades to streetlights and transmission lines, and reductions to station service.

Average hydro generation (assuming normal precipitation levels, as most water comes from runoff) is used to forecast the amount of diesel generation required for those communities where diesel generation supplements hydro generation.

2011/12 GHG EMISSIONS

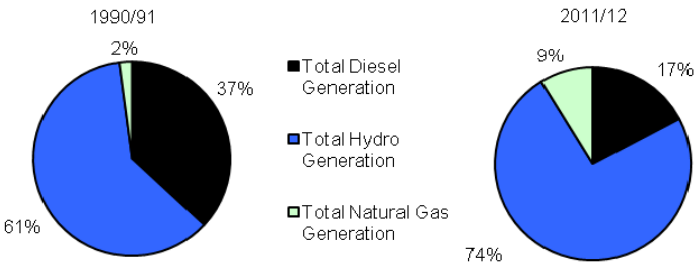
Diesel combustion for the production of power is our major source of GHG emissions. Since 1990 diesel generated emissions have accounted for an average of 78% of our total GHG emissions. The following section illustrates NTPC's production of GHG emissions and the efforts taken in the last year to reduce our reliance on diesel generated power.

Hydropower Generation

Hydropower generation is dependent on water levels and thus varies from year to year. In years of low hydropower generation, diesel generation is increased to meet hydro shortfalls. The majority of NTPC's GHG emissions result from diesel generation, so when hydro generation is low, GHG emissions increase. 2011/12 was an average water level year resulting in an average amount of hydro generation.

Hydropower is currently the cleanest power NTPC can provide to its customers. As diesel generation is utilized as backup power generation for the hydro systems, the more hydropower we are able to produce the more diesel generated power we displace. Figure 3 shows NTPC's average power generation by source for 1990/91 and 2011/12.

Figure 3: Average Power Generation by Source for 1990/91 and 2011/12



In 2011/12 the Bluefish, Snare, and Taltson hydro systems produced 33,885 MWh, 154,530 MWh, and 65,459 MWh of power respectively, totalling 74% of total generation (13% more than 1990/91). In the absence of hydropower, all this power would have been generated from diesel.

Diesel Generated Power

NTPC's consumption of diesel fuel for generation purposes, our major source of GHG emissions, has greatly decreased over the years. In 1990/91, 37% of total generation came from diesel generated power. In 2011/12, diesel generated power accounted for only 17% of total power generation. Our decreased reliance on diesel generated power has allowed us to reduce our diesel generated CO_2 equivalent emissions from 133,203 tonnes in 1990/91 by 65% to 46,923 tonnes in 2011/12. Table 5 shows NTPC's CO_2 equivalent emissions from both direct and indirect generation sources.

Table 5: GHG Emissions Produced/Gen. Source

	Direct		Indirect	
	CO_2e Emissions (Tonnes)			
Fiscal Year	Diesel Generation	Natural Gas Generation	Natural Gas Generation	Total Emissions
1990/91	133,203	0	5,392	138,598
1991/92	126,907	0	5,455	132,365
1992/93	128,978	0	5,492	134,473
1993/94	132,596	0	5,787	138,387
1994/95	173,318	0	5,753	179,073
1995/96	173,729	0	5,125	178,857
1996/97	120,600	0	4,858	125,460
1997/98	102,240	0	5,420	107,662
1998/99	91,203	0	5,451	96,657
1999/00	52,943	8,557	5,103	66,606
2000/01	48,074	14,618	5,034	67,729
2001/02	46,562	16,672	5,030	68,267
2002/03	61,733	16,460	5,135	83,331
2003/04	68,928	17,043	5,915	91,889
2004/05	59,846	17,183	5,650	82,682
2005/06	41,397	16,671	5,449	63,520
2006/07	37,938	20,308	5,926	64,175
2007/08	50,169	20,894	5,997	77,064
2008/09	42,475	20,786	5,810	69,074
2009/10	39,245	20,918	5,711	65,877
2010/11	46,250	16,664	5,556	68,473
2011/12	46,293	16,230	6,245	68,768

Natural Gas Generated Power

NTPC continues to replace diesel generated power with less GHG intensive natural gas generated power. In 1990/91 NTPC's only source of natural gas generated power was purchased power in Norman Wells, which accounted for 2% of NTPC's total generation. In 2011/12 NTPC produced 9% of its total generation from natural gas generated power; 6% NTPC-generated power and 3% purchased power. This means NTPC successfully produced approximately 7% more natural gas generated power in 2010/11 than in 1990/91. The replacement of remaining Inuvik diesel engines with natural gas engines in 2006/07 has resulted in a greater percentage of natural gas generated power and a decrease in emissions intensity.

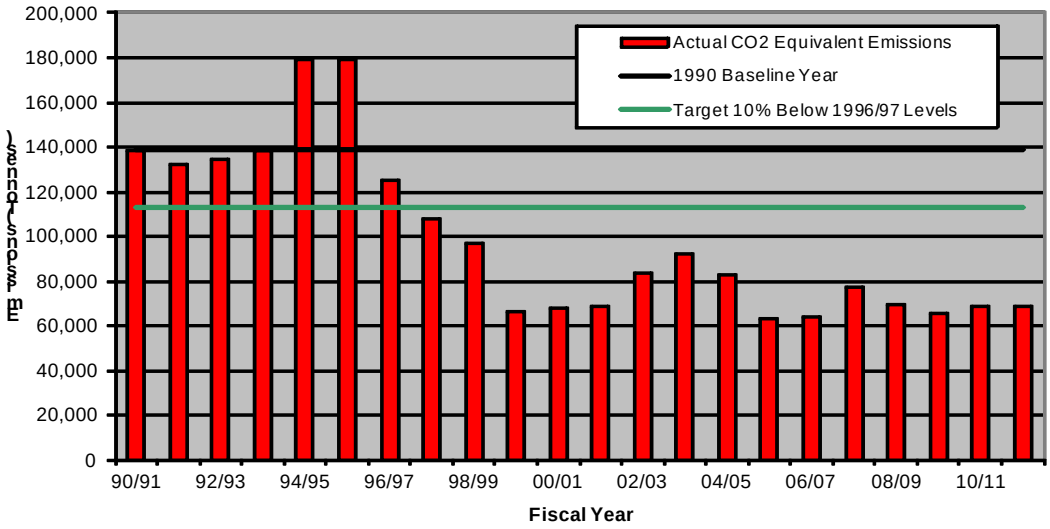
Actual Emissions for 2011/12

Once again NTPC was able to produce fewer emissions per MWh than in 1990/91. This was accomplished by maximizing hydro and natural gas generated power over the more GHG intensive diesel generation. In 2011/12 NTPC produced 68,768 tonnes of CO_2 equivalent emissions, a decrease of 50% from 1990/91 levels. NTPC's GHG emissions remain well below both the 1990/91 Baseline levels and NTPC's internal target of 10% below 1996/97 levels. Figure 4 illustrates NTPC's GHG emissions from 1990/91 to 2011/12 while Table 6 illustrates our GHG emissions according to gas type and emissions intensity from 1990/91 to 2011/12.

Table 6: GHG Emissions by Gas Type

	Tonnes				
Fiscal Year	CO_2	CH_4	N_2O	Total CO2 Equivalent Emissions	Emission Intensity (Tonnes/ MWh)
1990/91	132,610	10.37	19.22	138,598	0.371
1991/92	126,655	10.01	18.32	132,365	0.350
1992/93	128,672	10.12	18.62	134,473	0.335
1993/94	132,426	10.22	19.15	138,387	0.334
1994/95	171,323	12.11	24.99	179,073	0.440
1995/96	171,100	11.82	25.04	178,857	0.420
1996/97	120,042	9.25	17.40	125,460	0.298
1997/98	103,053	8.17	14.78	107,662	0.261
1998/99	92,547	7.09	13.20	96,657	0.261
1999/00	64,121	5.56	7.87	66,606	0.173
2000/01	65,402	6.18	7.29	67,729	0.176
2001/02	67,225	6.51	7.11	68,267	0.173
2002/03	80,382	7.21	9.29	83,331	0.208
2003/04	88,609	7.83	10.35	91,889	0.234
2004/05	79,802	7.37	9.04	82,682	0.222
2005/06	61,459	6.35	6.38	63,520	0.186
2006/07	62,223	6.99	5.97	64,175	0.186
2007/08	74,566	7.71	7.74	77,064	0.217
2008/09	66,918	7.28	6.62	69,074	0.200
2009/10	63,863	7.13	6.16	65,877	0.195
2010/11	66,198	6.60	7.08	68,473	0.197
2011/12	66,488	6.65	7.09	68,768	0.200

Figure 4: Total CO_2 Equivalent Emissions between 1990/91 and 2011/12



Emissions Intensity

Emissions intensity is a product of the CO_2 equivalent emissions produced in relation to total power generation from all sources (tonnes/MWh). As diesel generated power is our major source of GHG emissions, the lower our emissions intensity the more successful we are at meeting our power generation demands from other, cleaner sources.

NTPC's GHG emissions intensity for 2011/12 was 0.200 tonnes/MWh, well below the 0.371 tonnes/MWh from 1990/91.

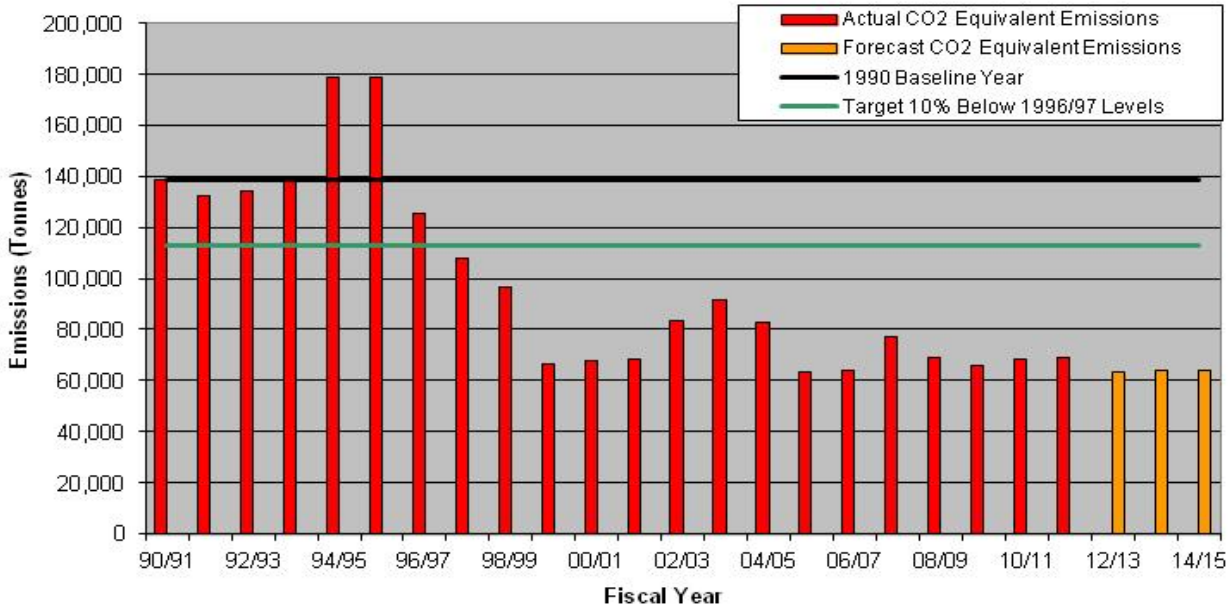
Forecast Emissions

NTPC's forecast GHG emissions for the period of 2012/13 to 2014/15 average 54% below the 1990/91 Baseline levels. Figure 5 illustrates actual CO_2 equivalent emissions and forecast emissions to 2014/15.

Forecast hydro generation is based on a long-term average water level forecast, and has a large influence on NTPC forecast emissions. With higher water levels anticipated total emissions are expected to be slightly lower than in 2011/12. This is due to the continued availability of Bluefish hydropower to displace diesel generated power in Yellowknife

The Bluefish Hydro facility, originally owned by Miramar, was built to supply power to Yellowknife's Con Mine, also owned by Miramar. In November of 2003 Con Mine terminated mining operations, significantly reducing its electrical requirements. NTPC purchased the Bluefish Hydro facility, and hydropower no longer required by the mine is now available to meet Yellowknife power demands, thereby reducing diesel fuel consumption. Between 2011/12 and 2014/15 we anticipate using an average of only 493 kL of diesel fuel annually to meet Yellowknife demands. This will produce only 1,843 tonnes of CO_2 equivalent emissions per year to service Yellowknife power demands, compared to the 54,529 tonnes produced in 1990/91. Figure 6 illustrates percent change in NTPC emissions relative to 1990/91 levels for actual and forecast years.

Figure 5: Forecast CO_2 Equivalent Emissions as a Product of Total Generation



Natural Gas Generation Developments

As a result of converting NTPC's main generating station in Inuvik from diesel to natural gas in 1999, NTPC made it feasible for the producers and distributors of natural gas to expand their local market. NTPC introduced another natural gas generator into the Inuvik plant in January 2006 giving the plant the capability of supplying 100% of the town's power demands with natural gas generated power.

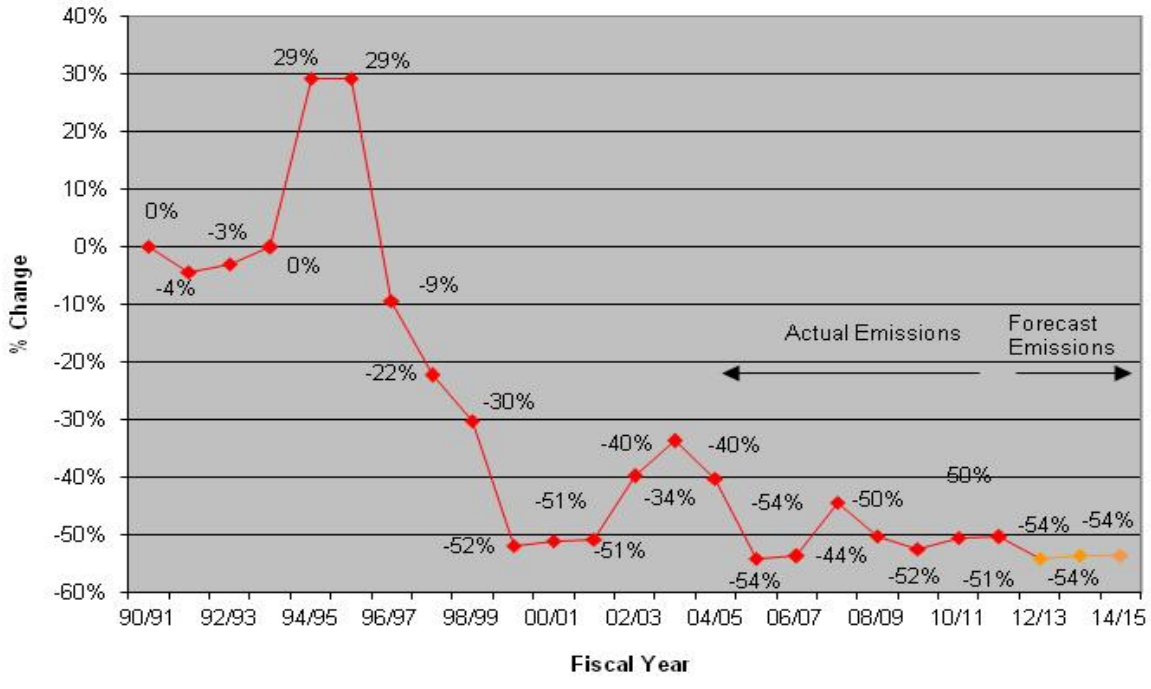
NTPC has been working with the Town of Inuvik since 2002 with the installation and operation of two natural gas fired micro-turbine units to supply combined electricity and residual heat to the Town's recreation complex. This demonstration project is NTPC's first venture involving micro-turbines. Although the units have not performed as expected to date, they have contributed to GHG reductions in the community from the combined electricity and heat production of the micro-turbines.

When natural gas becomes more readily available to northern communities, NTPC will consider the economics and GHG reduction benefits of retrofitting existing diesel power plants to natural gas.

Business As Usual Forecasting

Past projects that have resulted in GHG reductions are reflected in our forecast emissions for the period between 2012/13 and 2014/15. The use of techniques such as three-year weighted averages for fuel efficiencies and using the most recent year's data to forecast future years helps to capture the trends that result in GHG reductions and to represent them in forecasts. This is how we develop our "Business As Usual" forecasts, which include existing efforts. This helps to improve our supply-side management through improved diesel

Figure 6: GHG Emissions Percent Change Relative to Baseline Data



engine efficiency programs, reduced station service, residual heat projects, upgraded streetlights, and reduced line losses from transmission and distribution systems.

Emissions Reductions Targets

As NTPC has successfully decreased its emissions below the 1990 Baseline and our own internal target of 10% below 1996/97 levels, we feel our "Business As Usual" forecast, capturing improved trends in our existing initiatives, is sufficient for the time being. Any major changes to our operating infrastructure will be adopted if they represent an economic benefit as well as a savings in GHG emissions.

RESULTS ACHIEVED & MEASURES TO ACHIEVE RESULTS

NTPC has successfully reduced GHG emissions through a number of programs since 1990/91. The following section describes individual initiatives taken in 2011/12 that contributed to GHG reductions and/or their impacts on future reductions.

NTPC endeavours to improve overall efficiency. Improving operating efficiency reduces reliance on fossil fuels to generate and distribute energy to customers. The benefits of improving efficiency reach beyond NTPC's direct emissions.

The vast geographic area and remoteness of the region means that significant resources and energy must be expended in order to transport fuel to each of NTPC's sites. By reducing the volume of fuel required to generate power the overall energy required to transport fuel to generating sites (derived from fossil fuels) is also reduced.

Examples of individual projects undertaken by NTPC to reduce dependence on fossil fuels and production of GHG emissions during 2011/12 follow below. Table 7 summarizes the cumulative aggregate savings for all initiatives from 1990/91 to 2011/12. The table in Appendix A shows actual and forecast GHG emissions savings by gas type as well as total CO_2 equivalent emissions for all initiatives since 1990/91 forecast to 2014/15. Please note that 1991/92, 1992/93, 1993/94 and 1994/95 data has been removed from the table to allow room for table expansion. Please see previous years' reports for this data.

Table 7: Cumulative Aggregate Emissions Savings (Tonnes) from All Initiatives since 1990/91

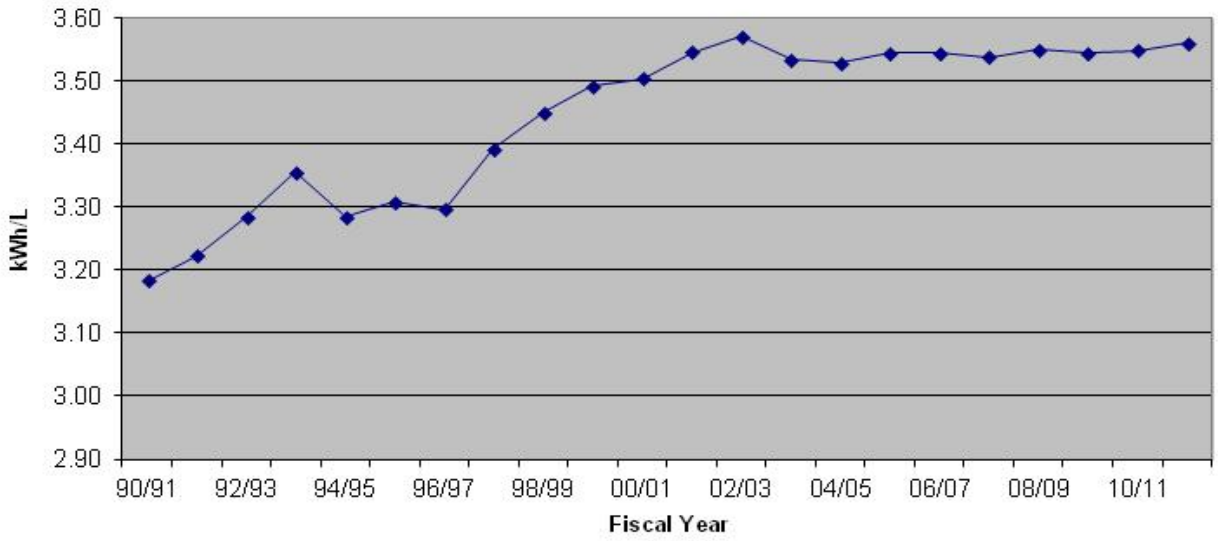
CO_2 Equivalent Reductions (Tonnes) 1990/91—2011/12				
Alternative Generation/ Fuels	**Station Service Reduction/ Residual Heat Projects**	**New Engine Upgrades/ PLCs**	**Streetlight Upgrades**	**Total**
922,637	10,567	77,417	4,335	1,014,956

Fuel Efficient Engine Upgrades

In recent years, diesel engine technology has aided in reducing the amount of emissions produced. Engine selection analysis is based primarily on life-cycle costs and the amount of emissions produced. The most significant of those life-cycle costs is fuel, which accounts for 85-90% of the capital and operating costs of a diesel engine over its life. Therefore it is extremely important to replace aging equipment with units that are fuel-efficient yet still produce the least amount of emissions possible. In 2011/12 NTPC installed eight new diesel engines in seven NWT communities.

Figure 7 illustrates NTPC's efficiency trend. Yellowknife and Inuvik, two of our largest diesel generating plants, operate as backup diesel generators in the event that hydro or natural gas generation become unavailable. Due to the low frequency with which these plants now operate, their fuel efficiencies have decreased accordingly. Therefore the Yellowknife and Inuvik plants have been excluded from this graph as they skew the data.

Figure 7: NTPC Fuel Efficiencies Excluding Yellowknife and Inuvik



The overall fuel efficiency for NTPC in 2011/12 (excluding standby plants) has improved by 12% over the 1990/91 efficiency.

Our day-to-day operations, maintenance, and capital planning focus on maintaining or improving our fuel efficiency. Therefore our upward trend in fuel efficiencies is reflected in our forecasts for fuel consumption, and hence our forecast GHG emissions.

Programmable Logic Controllers (PLC)

Programmable Logic Controllers automate power plant diesel engines and help ensure that the appropriate engine is operating to most efficiently service fluctuating loads. This contributes to improved plant fuel efficiency. As it is impossible to separate PLC efficiency improvements and gains from upgrading to more fuel-efficient engines, the benefits of PLCs and new engines are calculated together in the Fuel Efficient Engine Upgrades section.

The only plants without some level of PLC automation are Jean Marie River, a community of approximately 70 people, and Fort Smith, a backup plant to the Taltson hydro site.

Reduction in Station Service / Residual Heat Recovery

NTPC is continuously investigating ways to reduce its own consumption of power. Some of the equipment and design improvements utilized to reduce station service at our plants include:

- replacement of in-plant electric space heating with residual heat from engine jacket water systems;
- replacement of engine electric block heaters with residual heat circuits that utilize jacket water heat from operating engines;
- replacement of inefficient lighting;
- installation of separate lighting circuits so that only specific lights are on at certain times;
- installation of variable frequency drives on radiators; and
- installation of photo sensors on outside lighting.

Station service reductions have also come through the education and resulting heightened awareness of plant personnel. Small measures are highlighted, such as turning off lights when plants are unattended, turning heaters down or off when not required, and ensuring that any pipes or other

equipment that require heat tracing during winter months are shut-off during spring and summer months.

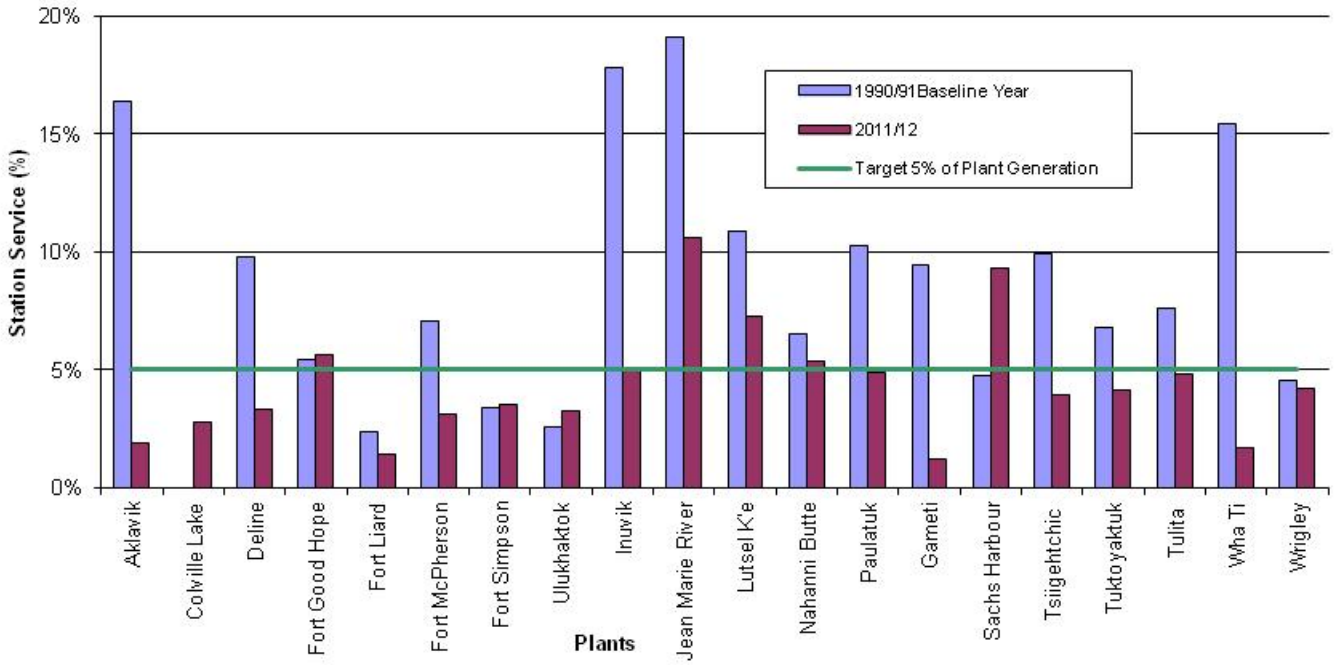
Since 1990/91 NTPC has successfully reduced overall station service. Through frequent audits of operations and diligent efforts to implement station service reducing technologies and practices we will continue to reduce our station service in future years. Figure 8 illustrates station service for NTPC diesel generating facilities (except standby plants) for 1990/91 and 2011/12. Note: there is no generation for Colville Lake in 1990/91 as the plant was commissioned in 1992.

Colville Lake Residual Heat Project

In recent years, NTPC has been a leader in a number of projects to recover and distribute waste heat from our diesel engines to both external customers and our own facilities.

Prior to 2001/02, the Colville Lake facility was heated electrically. Station service for this facility ranged from 20% to 37% of annual gross generation, well in excess of NTPC's acceptable level of 5%. In 2001/02, a retrofit of the modular plant was completed which provided residual heat for the plant, office/warehouse, and crew trailer. This resulted in a total station service decrease of 42,469 kWh between 2000/01 and 2011/12. This translates into a decrease of nearly 45 tonnes of CO_2 equivalent GHG emissions resulting primarily from the utilization of residual heat.

Figure 8: Station Service for Diesel Plants (excluding standby plants) for 1990/91 and 2011/12



By diligently monitoring facility statistics, NTPC is able to identify sites where station service requirements are in excess of acceptable levels. NTPC set a target for each facility to achieve and maintain a station service less than or equal to 5% of its total generation. NTPC will continue to monitor station service and work to reduce it at the six plants still exceeding the 5% target while maintaining all other site station service percentages below the target.

Fort Smith Electric Heat Project

In 2008, Breynat Hall and JBT Elementary School in Fort Smith were converted from diesel heating systems to electric heat. These electric heating systems are powered by excess generation from the Taltson Hydro facility. In 2009 a third building, the Department of Transportation parking and maintenance garage, was also converted to electric heat. The conversion of the three buildings to electric heat has resulted in a cumulative savings of 525,487 L of diesel fuel oil, displacing 1,464 tonnes of CO_2e.

Jackfish Electric Boiler Installation

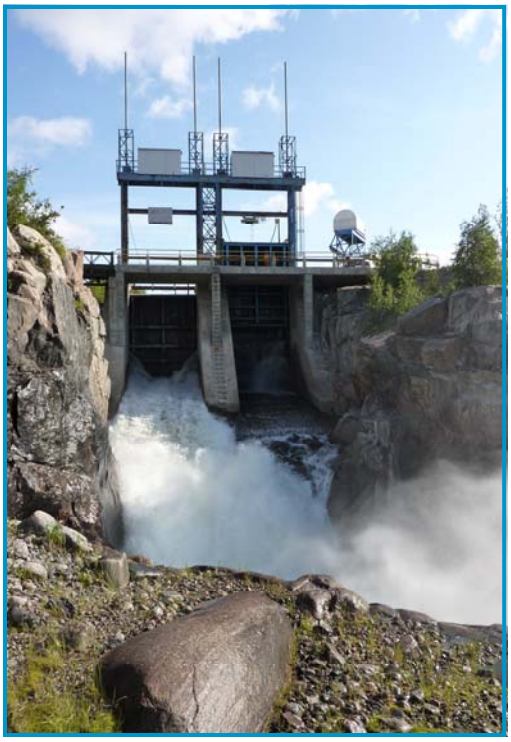
Electric boilers have been installed to heat the Yellowknife power plants, which are now used as backup to hydro generation, rather than using diesel fuel to heat the plants. This electricity is excess hydropower displacing approximately 84,000 L of diesel per year, which translates into a savings of 234 tonnes of CO_2e emissions. When the engines are running they are used to heat the facility.

Alternative Generation Fuels / Methods

In recent years NTPC has undertaken a number of initiatives to reduce GHG emissions by utilizing alternative methods or fuel sources to generate power. Some of these initiatives have involved major capital projects such as the Inuvik Gas Project and major changes to hydro infrastructures. Some alternative generation methods are summarized below.

Bluefish Hydro Purchase

NTPC purchased the Bluefish hydro facility in the spring of 2003. The Bluefish hydro facility was used primarily to serve Con Mine energy requirements. In November of 2003 Con Mine terminated mining operations and NTPC was able to displace diesel generation with Bluefish hydro generation to supply Yellowknife's electricity demands. Between 2012/13 and 2014/15 Bluefish hydropower will displace approximately 88,812 tonnes of CO_2e emissions.



Proposed Hydro Developments

NTPC continues to investigate the feasibility of additional hydro developments. The proposed Great Bear Hydro project has been researched since 2001 and is still in the pre-feasibility/conceptual stage. Although not included in the initial pipeline design, it is envisioned in the long term that energy from the Great Bear River would be used to supply power to the proposed Mackenzie Valley natural gas pipeline. The next major step in this project is to conduct feasibility and environmental studies.

NTPC's second proposed new hydro initiative is the Taltson Hydro Expansion Project. This would involve the expansion of the existing Taltson hydro site to power the proposed Gahcho Kue mine site and the three operating diamond mines (Ekati, Diavik, and Snap Lake). This is currently in the environmental assessment stage.

NTPC has worked closely with local aboriginal partners regarding power generation for each of the proposed projects. Life-cycle analyses of the pipeline and mines were carried out to determine both GHG and dollar savings when replacing natural gas and diesel generated electricity with hydroelectricity.

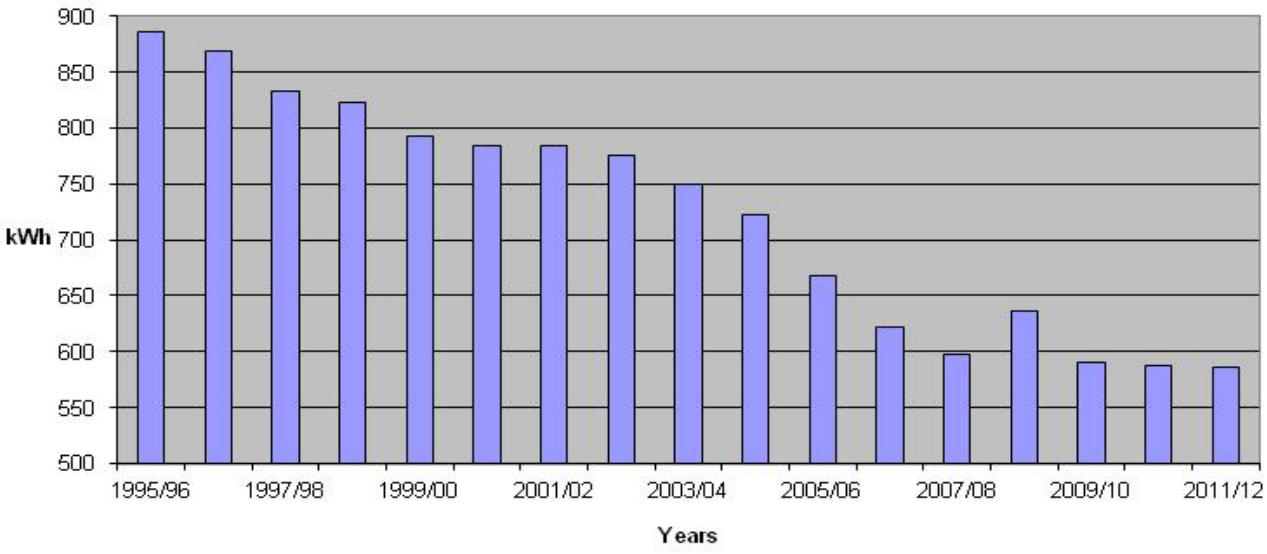
Mini Hydro in Lutsel K'e

NTPC is conducting a feasibility study on the Lutsel K'e Mini-Hydro project. The project involves building a 500-1000 kW mini-hydro plant on the Snowdrift River to serve the Lutsel K'e electricity and heating requirements. Upcoming work includes determining the business case with the community of Lutsel K'e and a detailed economic analysis of the project. If the project goes ahead it will reduce the community's annual diesel fuel consumption by about 800 kL, approximately 400 kL of which is currently used to generate electricity.

Streetlight Replacement

NTPC began converting community streetlights from Mercury Vapour (MV) to the more efficient High-Pressure Sodium (HPS) during the 1995/96 fiscal year. NTPC accessed funding available from the GNWT Department of Environment and Natural Resources (ENR). To date, twenty-one communities have had every streetlight converted to HPS. Four communities are still in the conversion process. For these communities, HPS lights will be exchanged following the end-of-life of the existing MV lights.

Figure 9: kWh per Streetlight per Year



Solar Energy

NTPC owns and operates the largest solar energy project in the Northwest Territories. The 60.6 kW solar photovoltaic system is installed in the Village of Fort Simpson and will provide up to 8.5% of the community's power requirements in the summer. The system will displace up to 58,000 kWh of diesel generation, which is equivalent to 15,000 L of diesel fuel or 44.5 tonnes of CO_2 equivalent emissions per year.

NTPC is also replacing spent HPS lights with Light Emitting Diode (LED) streetlights, which use less than half the power of HPS lights and have an expected life of 25-30 years. So far, 20 LED streetlights have been installed. Figure 9 illustrates the average amount of energy required per streetlight in NTPC serviced communities. As more LED and HPS lights are installed, the average kWh required per streetlight will decrease.

GHG savings from our continuing streetlight replacement program are shown in Table 7.

Transmission and Distribution Lines

Line losses increase generation requirements, which increase greenhouse gas emissions. As required, transmission and distribution systems will be upgraded with more efficient conductors and transformers in order to reduce line losses.

Residential/ Commercial Energy Efficiency Program

Customer Research Surveys completed in 2000 and 2002 confirmed that customers would like more information on how to make their homes more energy efficient. To meet their needs, NTPC implemented a Residential Energy Efficiency Program in 2002/03 targeting the 13 remote northern communities of the Delta-Sahtu region. This program proved highly successful with nearly 500 customers participating in the program. Each participant received valuable energy efficiency tips as well as energy saving light bulbs and an energy-efficient showerhead. The energy efficiency assessments showed that high power consumption was primarily caused by inefficient, outdated, or poorly maintained electrical appliances. Due to the success of this program in the Delta-Sahtu region, NTPC ran the program in the other regions in 2004/05 and 2005/06, and in 2006/07 to several of our largest commercial customers. The program includes the following key objectives:

- To conduct comprehensive energy efficiency audits of residential homes;
- To provide customers with information pertaining to energy efficiency solutions and how to obtain them;
- To provide customers with information pertaining to climate change and how energy conservation can make a difference; and
- To discuss with customers any concerns regarding the service and electricity currently supplied to them by NTPC.

Results in Comparison to Targets

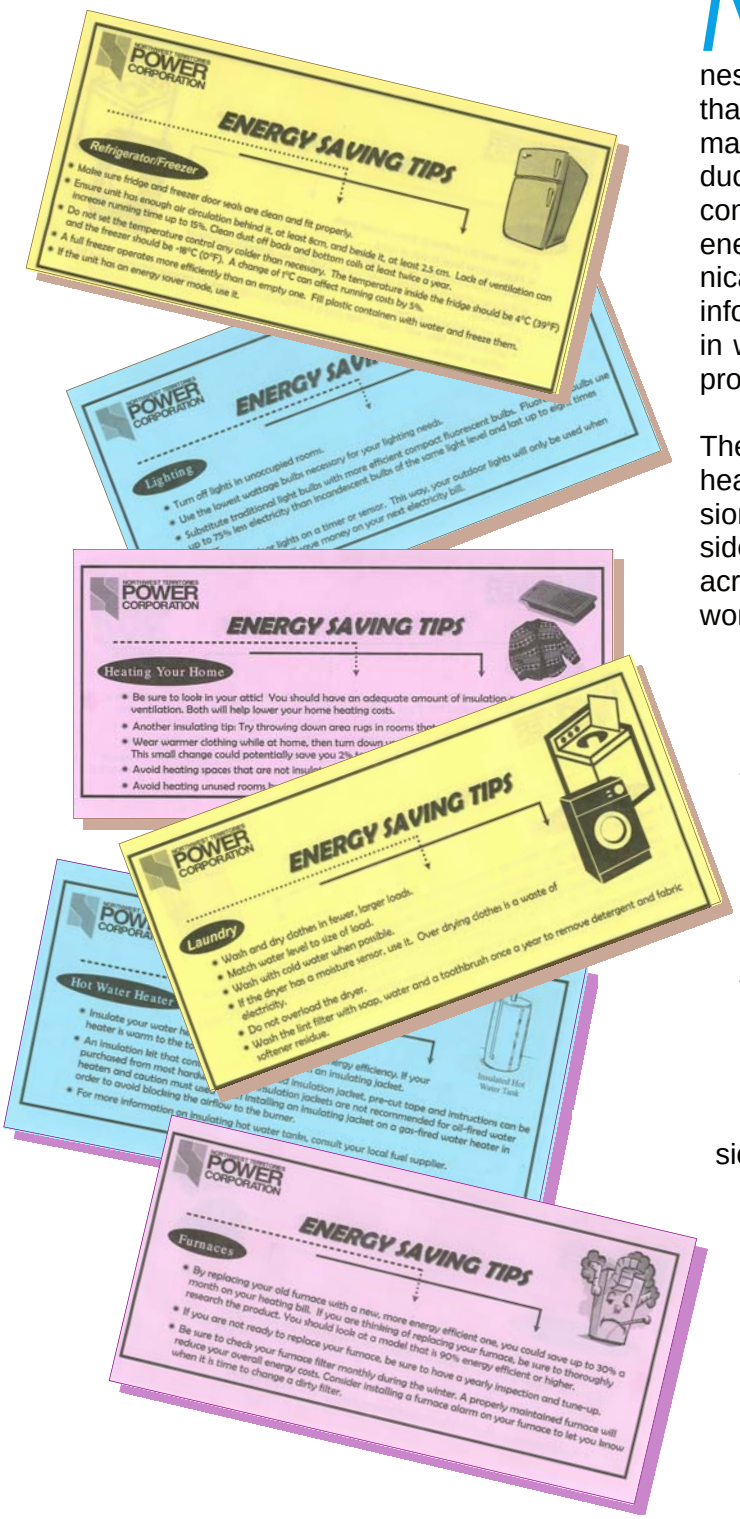
GHG Emissions

Our internal target to reduce GHG emissions by 10% of 1996/97 levels in 10 years was achieved by 1998/99. To date, we have reduced our cumulative CO_2 equivalent emissions by 1,013,806 tonnes and achieved a 50% decrease in 2011/12 from 1990/91 levels.

CO_2e Station Service Target

To date NTPC has successfully reduced station service at all but six facilities to less than 5% of their total generations. NTPC will continue to monitor station service and, where feasible, implement training and technologies to reduce station service at the remaining six diesel-generating facilities to meet the 5% target.

CLIMATE CHANGE AWARENESS



NTPC is committed to both employee and customer education regarding energy awareness. We hope to create an awareness of energy efficient practices and measures that can be implemented by all to ensure that the maximum benefit is derived from the electricity produced. Climate change issues are discussed in conjunction with many of our programs to promote energy awareness and conservation. The communication avenues discussed below are utilized to inform employees and the public of the many ways in which they can contribute to reductions in GHG production.

The simple addition of a bicycle rack outside of our head office has provided an incentive for emissions reduction by employees, both inside and outside of work. As well, a number of employees across NTPC make a point of walking to and from work. This is not only healthy for the individual and an environmentally friendly alternative to driving, but sets a good example for other members of their respective communities.

This report, along with all previous GHG reports, are made available on both our internal and external websites.

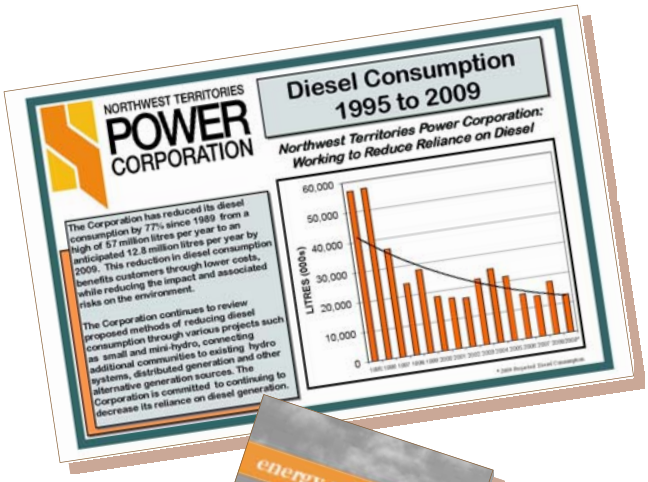
NTPC was a founding member of the Arctic Energy Alliance (AEA) and is a sustaining member today. The AEA is a not-for-profit organization established in 1997. The AEA's mandate is to help reduce the financial costs and environmental impacts associated with energy and utility services in the NWT, including GHG emissions.

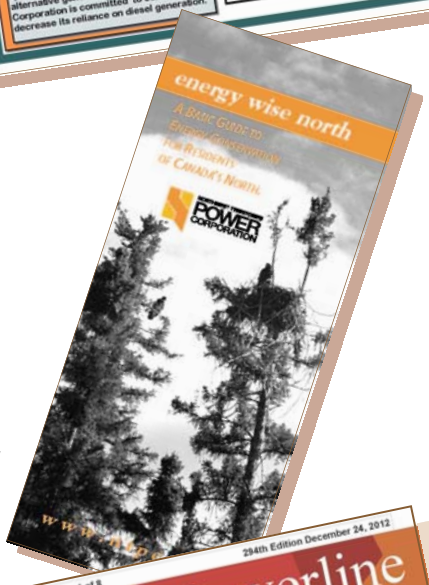
On the Supply-side Management end, NTPC purchases fuel oil that is low in sulphur content (0.05%), as specified by the Canadian General Standards Board.

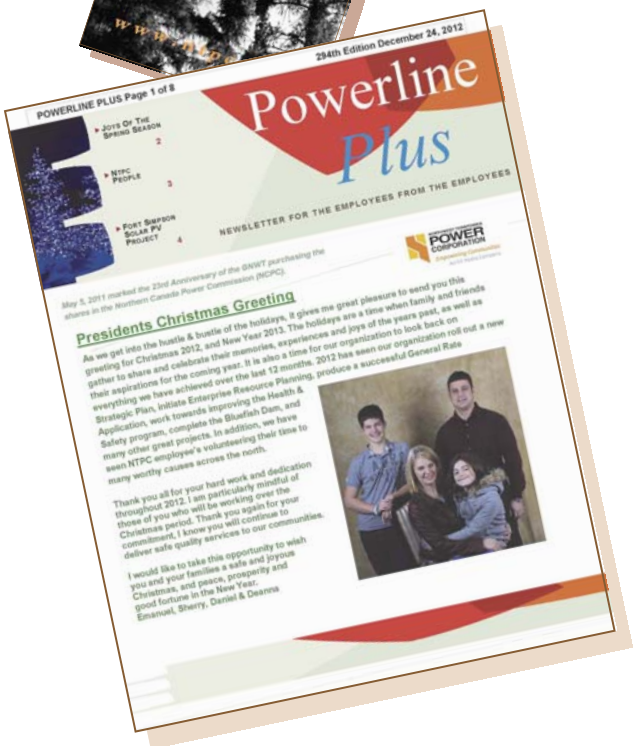
In 2001 NTPC ran a series of workshops for commercial customers to explain Demand-side Management. It was communicated that if customers could better manage their power usage to minimize peaking, they would save both money and power, at the same time reducing the production of greenhouse gases. In 2002, inspired by positive feedback from the workshops, NTPC began developing a fact sheet on demand-side management to be distributed to commercial customers.

These fact sheets, with such titles as *Understanding Demand Charges, Understanding your Power Bill*, and *Understanding Costs of Running Electrical Appliances* are distributed to both commercial and residential customers across the NWT. These brochures are produced to encourage customers to reduce their power consumption and to help understand how much electricity their electrical appliances really use.

As well, Good News Posters are now available to our employees and customers graphing such information as streetlight conversions, GHG emissions, and fuel usage.







All of our publications are available on our website at www.ntpc.com. The site also promotes NTPC's objective of reducing GHG emissions through reductions in customers' household energy usage.

Internal Communications

An employee-generated newsletter, Powerline Plus, is distributed to all employees on a monthly basis via email and our internal website. Articles include updates regarding NTPC's GHG emissions status and various ways to conserve energy. Employee updates are provided periodically by email and through regular meetings which provide information on proposed hydro developments and alternative energy generation.

NTPC annually provides environmental awareness training for employees covering topics such as minimizing station service, the importance of spill prevention,

CONCLUSION

The Northwest Territories Power Corporation has undertaken many successful initiatives towards reducing greenhouse gases. Our GHG reports demonstrate our commitment to combating climate change, as we believe that environmental issues should be at the forefront of all business. NTPC is committed to further reducing GHG emissions wherever feasible. We will continue to implement new ideas and strategies to conserve fuel usage and subsequent emissions while openly reporting our progress and initiatives.

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Appendix A: NTPC Greenhouse Gas Emissions Savings 1990/91 to 2014/15

																		Actuals	Forecast		
	1990/91	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Alternative Generation/ Fuels																					
Snare Cascades																					
CO_2			17,593	16,916	17,374	21,541	19,984	17,732	19,126	18,783	18,783	20,990	12,110	17,771	16,769	14,253	15,221	14,521	15,381	15,759	15,805
CH_4			0.88	0.84	0.87	1.08	1.00	0.89	0.96	0.94	0.94	1.05	0.60	0.89	0.84	0.71	0.76	0.73	0.77	0.79	0.79
N_2O			2.64	2.54	2.61	3.24	3.00	2.66	2.87	2.82	2.82	3.15	1.82	2.67	2.52	2.14	2.29	2.18	2.31	2.37	2.37
CO_2 Equiv.			18,403	17,694	18,173	22,532	20,903	18,548	20,006	19,647	19,647	21,955	12,667	18,588	17,541	14,909	15,921	15,190	16,089	16,484	16,532
Snare Rapids G2[1]																					
CO_2			2,329	1,906	1,906	1,466	2,488	2,351	846	186	113	113	1,027	790	1,304	2,014	2,161	2,072	-	-	-
CH_4			0.12	0.10	0.10	0.07	0.12	0.12	0.04	0.01	0.01	0.01	0.05	0.04	0.07	0.10	0.11	0.10	-	-	-
N_2O			0.35	0.29	0.29	0.22	0.37	0.35	0.13	0.03	0.02	0.02	0.15	0.12	0.20	0.30	0.32	0.31	-	-	-
CO_2 Equiv.			2,436	1,994	1,994	1,533	2,603	2,459	884	195	118	118	1,074	827	1,364	2,106	2,261	2,167	-	-	-
Norman Wells Purchased Power																					
CO_2	921	875	829	925	931	871	859	859	877	1,010	965	930	1,012	1,024	992	1,090	948	1,066	1,059	1,065	1,062
CH_4	-0.75	-0.72	-0.68	-0.76	-0.76	-0.71	-0.70	-0.70	-0.72	-0.83	-0.79	-0.76	-0.83	-0.84	-0.81	-0.79	-0.78	-0.87	-0.87	-0.87	-0.87
N_2O	0.83	0.79	0.75	0.84	0.84	0.79	0.78	0.78	0.79	0.91	0.87	0.84	0.92	0.93	0.90	0.90	0.86	0.96	0.96	0.96	0.96
CO_2 Equiv.	1,150	1,093	1,036	1,156	1,163	1,088	1,074	1,073	1,095	1,262	1,205	1,162	1,264	1,279	1,239	1,338	1,184	1,331	1,335	1,342	1,339
Inuvik Gas Project																					
CO_2						-275	51	-104	-909	-1,127	-1,129	-1,012	-1,981	-2,047	-1,712	-1,802	-1,212	-1,750	-15,299	-16,468	-16,581
CH_4						-1.28	-2.16	-2.47	-2.48	-2.58	-2.60	-2.52	-3.11	-3.20	-3.16	-3.19	-2.53	-2.49	-3.05	-3.29	-3.31
N_2O						1.06	1.89	2.13	1.98	2.03	2.04	2.00	2.32	2.38	2.42	2.42	1.96	1.83	-0.31	-0.33	-0.33
CO_2 Equiv.						9	561	470	-379	-588	-585	-480	-1,368	-1,417	-1,069	-1,159	-690	-1,268	-15,467	-16,648	-16,762
Bluefish Power																					
CO_2		23,929	33,388	31,814	26,731	34,464	37,489	38,720	35,938	34,758	24,361	31,030	27,834	15,810	27,319	38,145	24,482	24,521	28,302	28,302	28,302
CH_4		1.20	1.67	1.59	1.34	1.72	1.87	1.93	1.79	1.74	1.22	1.55	1.39	0.79	1.36	1.91	1.22	1.22	1.41	1.41	1.41
N_2O		3.59	5.02	4.78	4.02	5.18	5.63	5.82	5.40	5.22	3.66	4.66	4.18	2.37	4.10	5.73	3.68	3.68	4.25	4.25	4.25
CO_2 Equiv.		25,030	34,924	33,278	27,960	36,050	39,214	40,501	37,591	36,357	25,481	32,457	29,115	16,538	28,576	39,900	25,609	25,649	29,604	29,604	29,604

[1] Snare Rapids G2 unit does not operate during average to low water years. As forecasting for the hydro system assumes average water levels, zero G2 generation is also forecast. However, on average, the G2 unit has accounted for approximately 0.02% of the total Snare hydro generation since installation, so some generation is anticipated even if not forecast.

Note: 1991/92, 1992/93, 1993/94 and 1994/95 data has been removed from the table to allow room for table expansion. Please see previous years' reports for this data.

Appendix A: NTPC Greenhouse Gas Emissions Savings 1990/91 to 2014/15

	1990/91	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	Actuals 2011/12	Forecast 2012/13	2013/14	2014/15
Station Service Reduction/Residual Heat Projects																					
Station Service/Residual Heat Savings																					
CO_2		375	311	290	341	189	157	168	169	151	194	166	186	220	158	109	161	158	148	148	148
CH_4		0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
N_2O		0.06	0.05	0.04	0.05	0.03	0.02	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CO_2 Equiv.		392	326	303	356	198	164	175	177	158	203	173	195	231	165	114	168	165	155	155	155
Fort McPherson Residual Heat																					
CO_2				498	413	462	439	467	429	152	0	0	418	457	457	603	453	574	378	371	366
CH_4				0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.02
N_2O				0.07	0.06	0.07	0.07	0.07	0.06	0.02	0.00	0.00	0.06	0.07	0.07	0.09	0.07	0.09	0.06	0.06	0.05
CO_2 Equiv.				521	431	483	459	489	449	159	0	0	437	478	478	630	474	601	395	388	383
New Engine Upgrades/PLCs																					
Improved Fuel Efficiency Savings																					
CO_2		3,783	4,067	4,006	5,003	3,570	3,484	3,877	4,243	4,068	4,038	3,898	4,044	4,047	4,075	4,186	4,406	4,356	4,260	4,275	4,249
CH_4		0.19	0.20	0.20	0.25	0.18	0.17	0.19	0.21	0.20	0.20	0.19	0.20	0.20	0.20	0.21	0.22	0.22	0.21	0.21	0.21
N_2O		0.57	0.61	0.60	0.75	0.54	0.52	0.58	0.64	0.61	0.61	0.59	0.61	0.61	0.61	0.63	0.66	0.65	0.64	0.64	0.64
CO_2 Equiv.		3,957	4,254	4,190	5,233	3,734	3,644	4,056	4,438	4,255	4,224	4,077	4,230	4,233	4,263	4,378	4,609	4,556	4,456	4,472	4,444
Streetlight Upgrades																					
Streetlight Savings																					
CO_2			24	82	94	131	155	150	172	226	274	354	390	425	363	431	435	442	442	442	442
CH_4			0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03
N_2O			0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06
CO_2 Equiv.			25	85	98	137	162	157	180	237	286	370	408	444	380	450	454	462	462	462	462
Annual Totals																					
CO_2	921	28,962	58,542	56,437	52,791	62,418	65,106	64,219	60,890	58,208	47,599	56,468	45,040	38,497	49,725	59,027	47,055	45,959	34,670	33,894	33,792
CH_4	-0.75	0.69	2.20	2.02	1.83	1.09	0.34	-0.01	-0.16	-0.49	-1.00	-0.46	-1.64	-2.05	-1.46	-0.99	-0.93	-1.03	-1.47	-1.69	-1.71
N_2O	0.83	5.01	9.42	9.18	8.63	11.13	12.31	12.44	11.93	11.70	10.09	11.33	10.14	9.24	10.89	12.29	9.93	9.79	7.99	8.03	8.03
CO_2 Equiv.	1,150	30,473	61,379	59,136	55,311	65,627	68,621	67,770	64,261	61,445	50,294	59,464	47,614	40,756	52,556	62,216	49,537	48,391	36,566	35,796	35,693
Cumulative Totals Since 1990/91																					
CO_2	921	95,059	153,601	210,038	262,829	325,247	390,353	454,572	515,462	573,670	620,348	674,111	698,838	714,818	744,901	774,967	917,081	962,120	997,711	1,031,605	1,065,397
CH_4	-0.75	-0.14	2.06	4.08	5.91	7.00	7.34	7.33	7.18	6.68	6.43	6.65	4.81	2.49	0.91	-0.77	-1.85	-2.12	-4.35	-6.04	-7.75
N_2O	0.83	18.53	27.95	37.13	45.76	56.89	69.20	81.65	93.57	105.27	114.53	124.75	131.13	136.25	143.45	150.73	179.19	188.15	196.98	205.01	213.04
CO_2 Equiv.	1,150	100,578	161,957	221,093	276,404	342,031	410,652	478,422	542,683	604,128	654,423	713,886	760,350	798,089	829,205	867,667	966,565	1,013,806	1,051,522	1,087,319	1,123,012

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