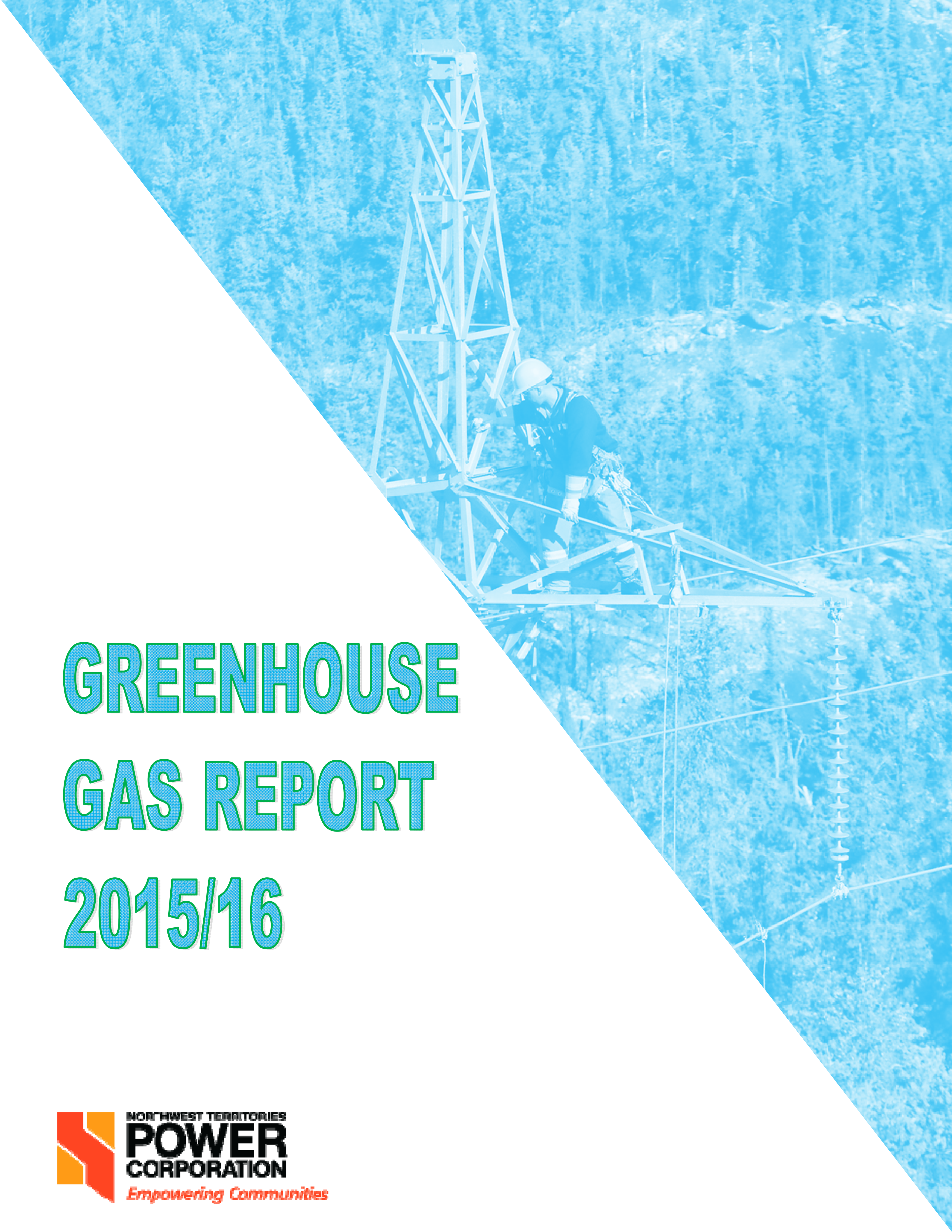

GREENHOUSE GAS REPORT 2015/16

NORTHWEST TERRITORIES
POWER
CORPORATION
Empowering Communities

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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.

NTPC employs an ISO 14001 compliant Environmental Management System (EMS). The EMS includes a review of current climate change practices implemented by NTPC, which helps 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 and CEA.

In 2012, Duerden & Keane Environmental Inc., an independent, qualified assessor, completed an onsite 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.

The verification confirmed NTPC's commitment to sustainable business practices and principles, as well as having a well documented and implemented EMS system.

BASE YEAR QUANTIFICATION

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

Baseline Quantification

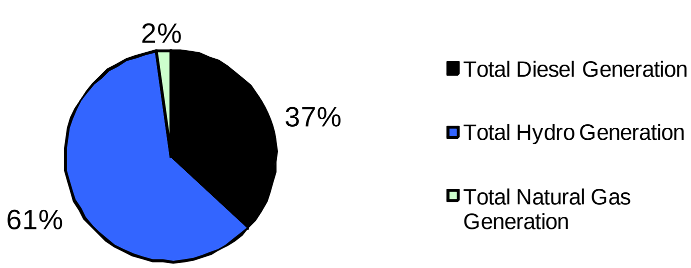
Emission factors from Environment Canada's GHG Inventory were used to calculate emissions. Table 1 illustrates our 1990/91 Baseline emissions according to GHG type.

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. In previous reports emission factors were provide by Environment Canada. Emission factors are not provided by the Intergovernmental Pan on Climate Change (see Table 3). The new emission factors were applied to all previous year's data to provide a valid comparison.

Source	CO_2	CH_4	N_2O
Natural Gas	56,100 kg/TJ	1 kg/TJ	0.1 kg/TJ
LNG	64,200 kg/TJ	3 kg/TJ	0.6 kg/TJ
Diesel	74,100 kg/TJ	3 kg/TJ	0.6 kg/TJ

The following equivalency factors provided by the IPCC 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 2016/17 to 2018/19, 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.

2015/16 GHG EMISSIONS

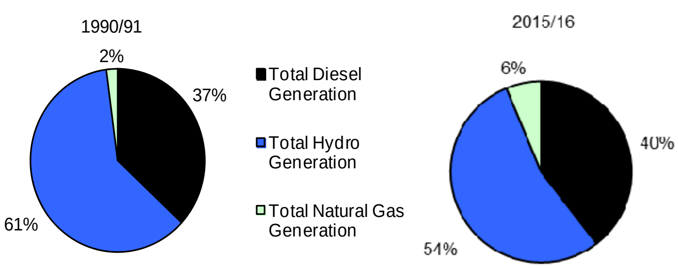
Diesel combustion for the production of power is our major source of GHG emissions. Since 1990 diesel generated emissions have accounted for an average of 93% of our total GHG emissions. The following section illustrates NTPC's production of GHG emissions and the efforts taken in the last year to reduce 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. 2015/16 was an extremely low water level year resulting in a low 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 2015/16.

Figure 3: Average Power Generation by Source for 1990/91 and 2015/16



In 2015/16 the Bluefish, Snare, and Taltson hydro systems produced 17,644 MWh, 95,615 MWh, and 65,011 MWh of power respectively, totalling 54% of total generation. 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 2015/16, diesel generated power accounted for 40% of total power generation. This increase in diesel was a result of extremely low water levels in the North Slave hydro region. Our decreased reliance on diesel generated power has allowed us to reduce our diesel generated CO_2 equivalent emissions from 125,960 tonnes in 1990/91 by 19% to 101,895 tonnes in 2015/16. 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	125,960	0	4,601	130,561
1991/92	120,044	0	4,655	124,699
1992/93	121,978	0	4,686	126,664
1993/94	125,291	0	4,938	130,229
1994/95	163,314	0	4,909	168,223
1995/96	163,601	0	4,373	167,974
1996/97	113,976	0	4,145	118,121
1997/98	96,661	0	4,625	101,286
1998/99	86,062	0	4,651	90,713
1999/00	49,635	7,298	4,354	61,287
2000/01	44,961	12,467	4,296	61,724
2001/02	43,548	14,219	4,292	62,059
2002/03	57,711	14,038	4,382	76,131
2003/04	64,397	14,535	5,047	83,979
2004/05	55,911	14,654	4,821	75,387
2005/06	38,676	14,217	4,650	57,543
2006/07	35,444	17,319	5,057	57,820
2007/08	46,871	17,819	5,118	69,808
2008/09	39,2682	17,727	4,957	62,367
2009/10	36,665	17,840	4,873	59,378
2010/11	43,210	14,212	4,741	62,162
2011/12	43,249	13,841	5,326	62,417
2012/13	56,076	2,682	5,610	64,368
2013/14	55,947	1,356	5,874	63,177
2014/15	81,393	6,936	5,750	94,078
2015/16	106,068	1,971	5,325	113,364

Natural Gas Generated Power

NTPC continues to look for opportunities to replace diesel generated power with less GHG intensive natural gas generated power. Due to a natural gas shortage in Inuvik NTPC began to investigate possible solutions to meet Inuvik's power needs. To counteract the negative economical and environmental effects of converting back to diesel generation NTPC completed the construction of a Liquefied Natural Gas (LNG) storage facility in 2014. LNG is projected to meet Inuvik's electricity needs for the next 20 years. Inuvik now relies on a mix of 60% LNG and 40% diesel.

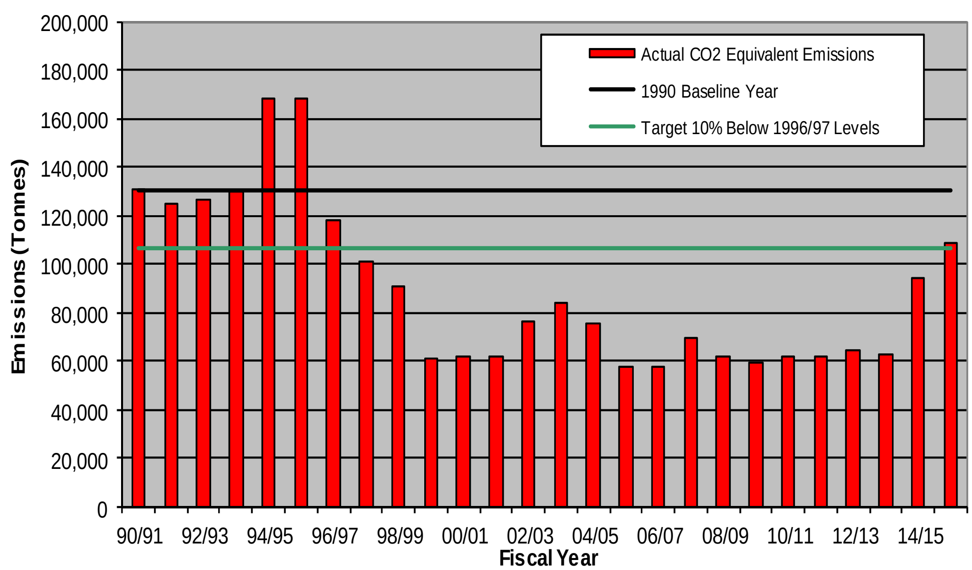
Actual Emissions for 2015/16

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 2015/16 NTPC produced 109,190 tonnes of CO_2 equivalent emissions, a decrease of 16% from 1990/91 levels. NTPC's GHG emissions remain well below both the 1990/91 Baseline levels. Figure 4 illustrates NTPC's GHG emissions from 1990/91 to 2014/15 while Table 6 illustrates our GHG emissions according to gas type and emissions intensity from 1990/91 to 2015/16.

Table 6: GHG Emissions by Gas Type

Fiscal Year	Tonnes				Emission Intensity (Tonnes/ MWh)
	CO_2	CH_4	N_2O	Total CO2 Equivalent Emissions	
1990/91	129,122	8.28	4.14	130,561	0.350
1991/92	123,302	7.98	4.02	124,699	0.330
1992/93	125,261	8.05	4.03	126,664	0.315
1993/94	128,859	8.05	3.92	130,229	0.314
1994/95	166,737	9.54	4.19	168,223	0.413
1995/96	166,553	9.34	3.99	167,974	0.394
1996/97	116,862	7.36	3.61	118,121	0.280
1997/98	100,193	6.34	3.14	101,286	0.246
1998/99	89,848	5.32	2.46	90,713	0.245
1999/00	60,992	2.57	0.78	61,287	0.159
2000/01	61,524	2.12	0.49	61,724	0.160
2001/02	63,104	2.10	0.48	62,059	0.157
2002/03	75,893	2.67	0.57	76,131	0.190
2003/04	83,740	2.95	0.56	83,979	0.214
2004/05	75,177	2.61	0.49	75,387	0.202
2005/06	57,392	1.90	0.35	57,543	0.168
2006/07	57,677	1.83	0.33	57,820	0.167
2007/08	69,625	2.31	0.42	69,808	0.196
2008/09	62,209	2.01	0.36	62,367	0.181
2009/10	59,230	1.89	0.34	59,378	0.176
2010/11	61,996	2.09	0.38	62,162	0.179
2011/12	62,250	2.09	0.38	62,417	0.182
2012/13	64,168	2.42	0.47	64,368	0.186
2013/14	62,979	2.39	0.46	63,177	0.180
2014/15	93,771	3.67	0.72	94,078	0.278
2015/16	112,989	4.49	0.88	113,364	0.345

Figure 4: Total CO_2 Equivalent Emissions between 1990/91 and 2015/16



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 2015/16 was 0.332 tonnes/MWh, below the 0.350 tonnes/MWh from 1990/91.

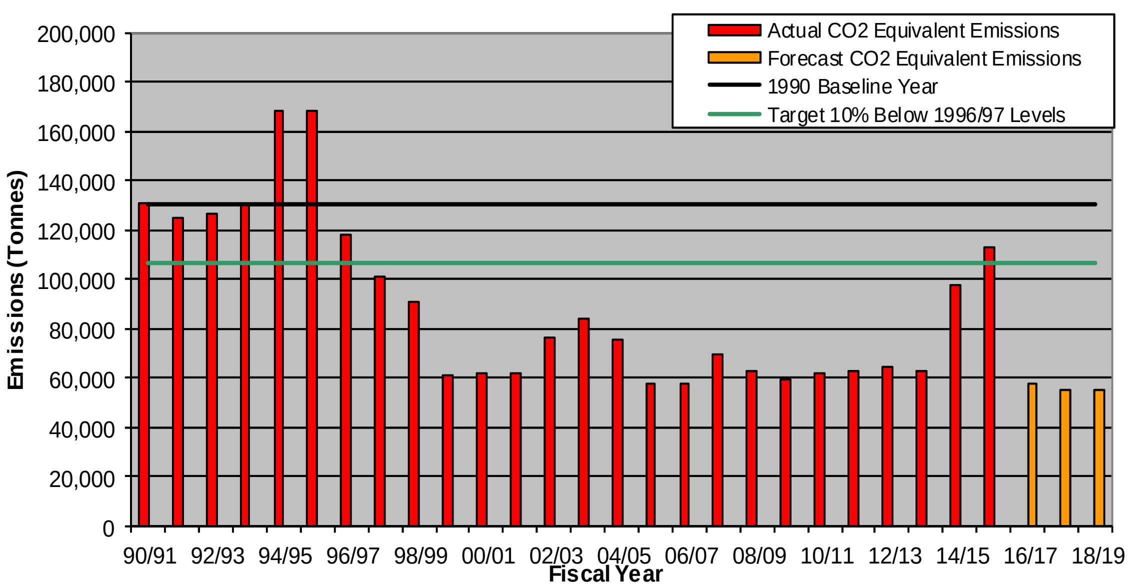
Forecast Emissions

NTPC's forecast GHG emissions for the period of 2016/17 to 2018/19 average 57% below the 1990/91 Baseline levels. Figure 5 illustrates actual CO_2 equivalent emissions and forecast emissions to 2018/19.

Forecast hydro generation is based on a long-term average water level forecast, and has a large influence on NTPC forecast emissions. With average water levels anticipated for 2016/17 total emissions are expected to be lower than in 2015/16.

In 2003 NTPC purchased the Bluefish Hydro facility from a decommissioned mine. Hydropower no longer required by the mine is now available to meet Yellowknife power demands, thereby reducing diesel fuel consumption. Despite forecasted low water levels between 2016/17 and 2018/19 we anticipate using an average of 1,718 kL of diesel fuel annually to meet Yellowknife demands. This will produce 4,471 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



Liquefied Natural Gas

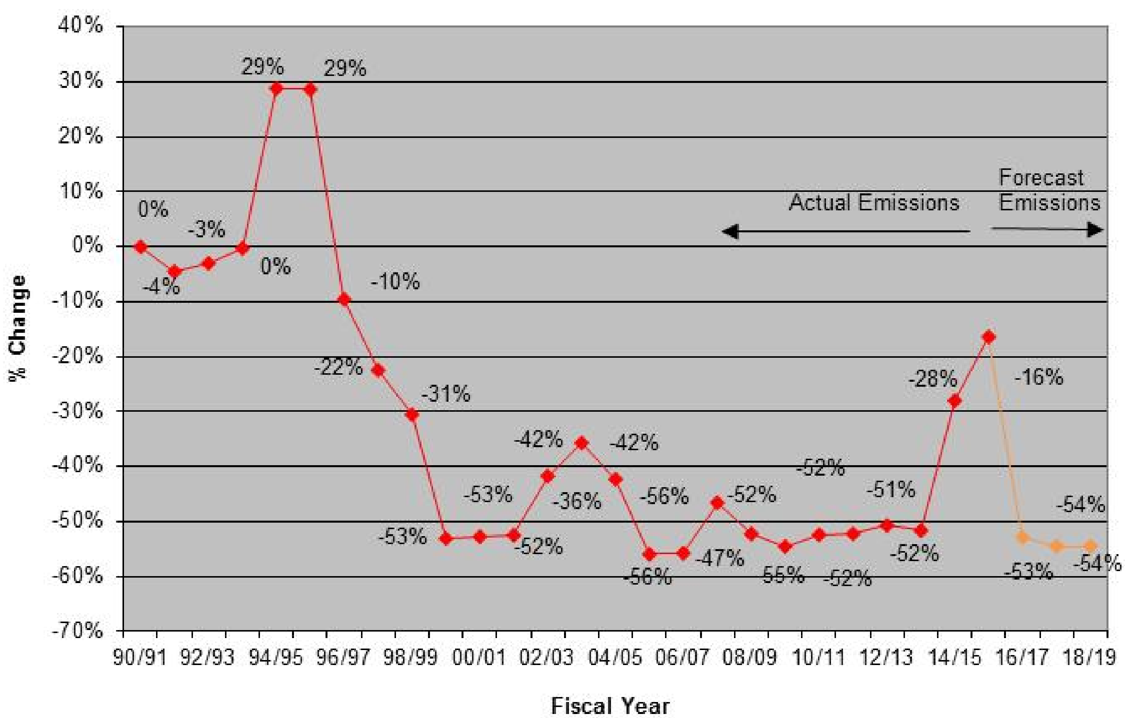
NTPC has completed the construction of the first ever long haul Liquefied Natural Gas (LNG) storage facility in the Town of Inuvik. The installation allows up to 60% of the town's electricity to be generated through LNG. LNG is more environmentally friendly, as LNG fired plants emit less GHG and criteria air contaminates then diesel plants.

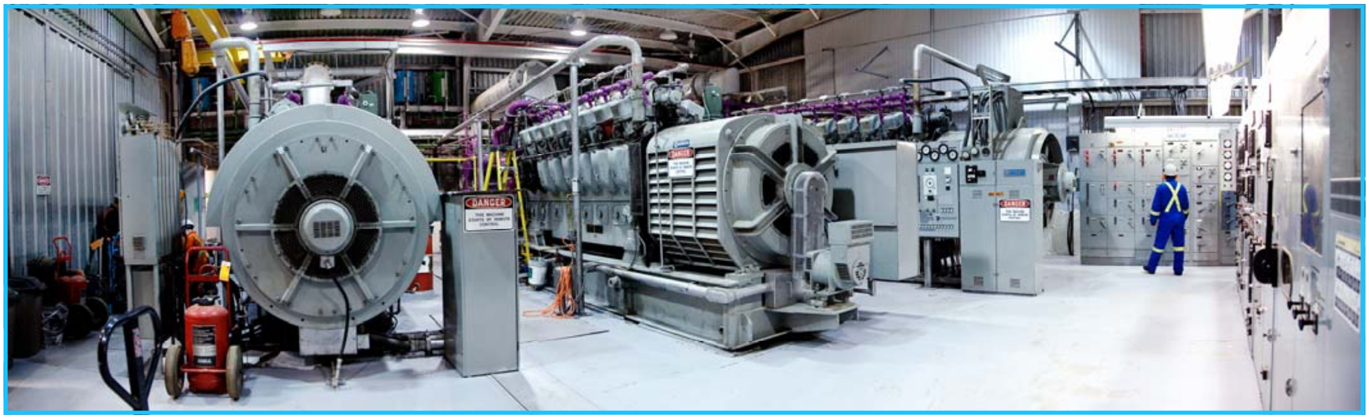
The success of the project will also help NTPC determine if other northern communities with road access can also be powered by LNG. NTPC is currently investigating the potential for LNG in the community of Tuktoyaktuk

Business As Usual Forecasting

Past projects that have resulted in GHG reductions are reflected in our forecast emissions for the period between 2016/17 and 2018/19. 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 engine efficiency programs, reduced station service, residual heat projects, upgraded streetlights, and reduced line losses from transmission and distribution systems.

Figure 6: GHG Emissions Percent Change Relative to Baseline Data





Emissions Reductions Targets

NTPC has successfully decreased emissions below the 1990 Baseline. NTPC will continue to strive to reduce GHG emissions through increases to energy efficiency, energy conservation programs and alternative energy projects. 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 2015/16 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 2015/16 follow below. Table 7 summarizes the cumulative aggregate savings for all initiatives from 1990/91 to 2015/16. 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 2017/18. Please note that data from 1991/92 to 1997/98 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

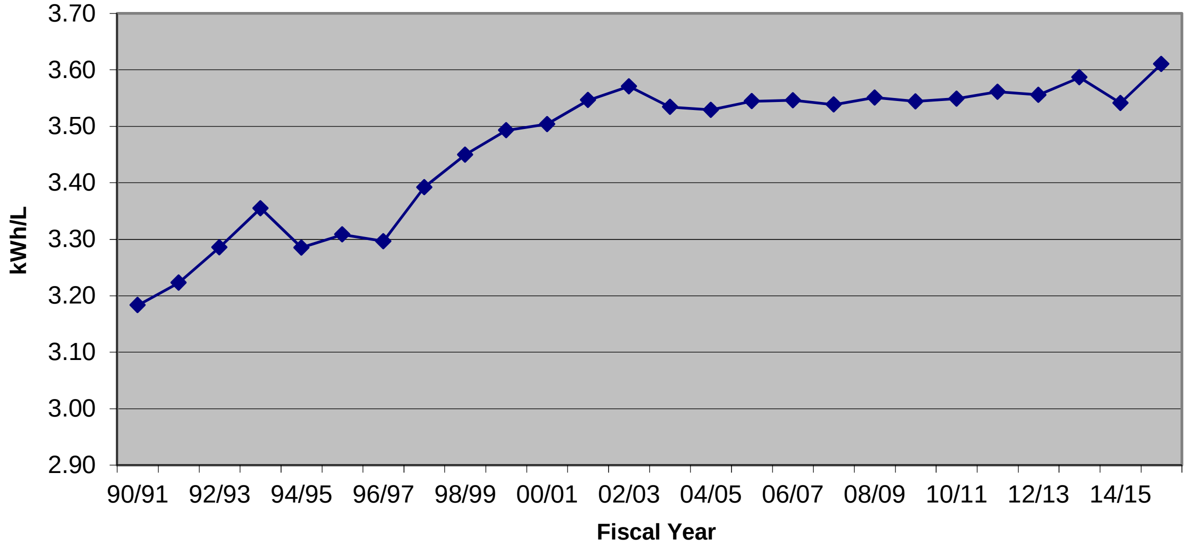
CO_2 Equivalent Reductions (Tonnes) 1990/91—2015/16				
Alternative Generation/ Fuels	Station Service Reduction/ Residual Heat Projects	New Engine Upgrades/ PLCs	Streetlight Upgrades	Total
992,775	12,105	85,983	7,550	1,098,413

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 2015/16 NTPC installed six new diesel engines in four 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 2015/16 (excluding standby plants) has improved by 13% 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 plant without some level of PLC automation is 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.

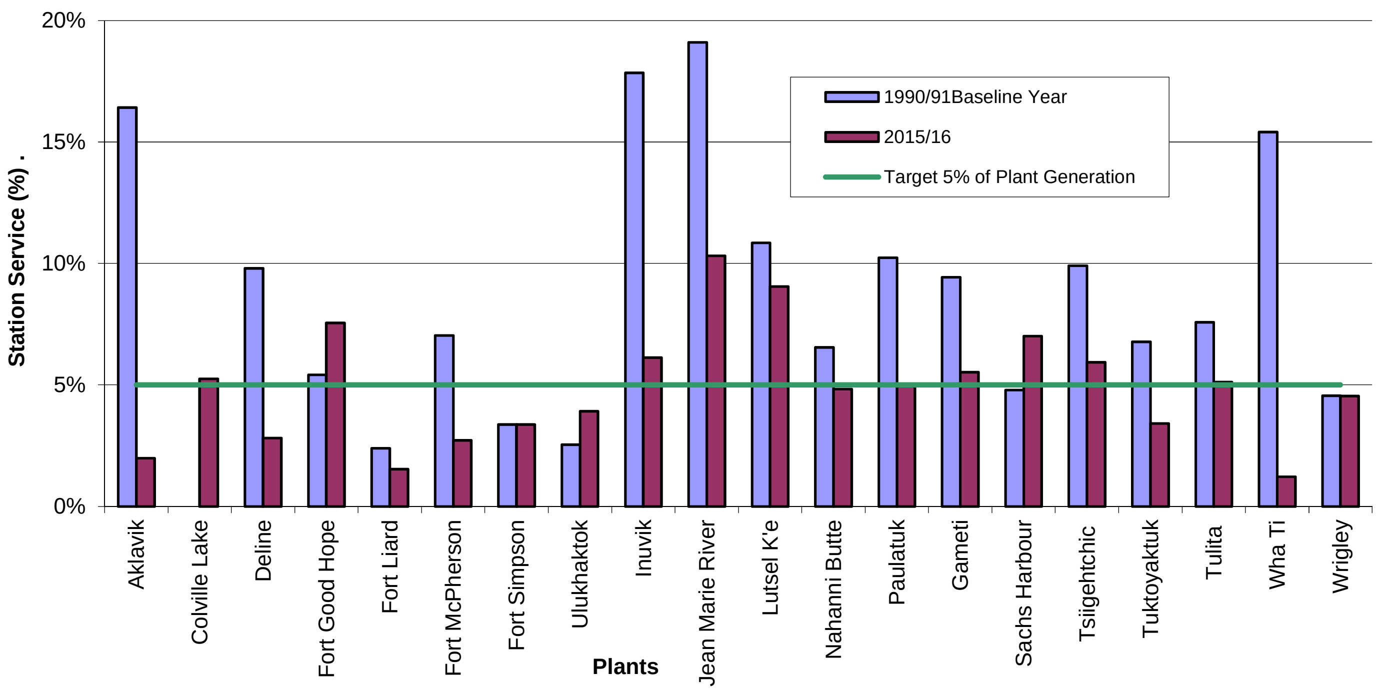
Station service reductions have also come through the education and resulting heightened awareness of plant personnel. Small measures are highlighted, such as turning off lights when plants are unattended, turning heaters down or off when not required, and ensuring that any pipes or other equipment that require heat tracing during colder months are shut-off during warmer 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 2015/16. 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.



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 seven 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 converted to electric heat, along with the Fort Smith Catholic Church in 2012.

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 LNG Project, solar arrays in Fort Simpson and Colville Lake 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 the energy requirements of a now decommissioned mine. Bluefish Hydro displace diesel generation with hydro generation to supply Yellowknife's electricity demands. Between 2016/17 and 2018/19 Bluefish hydropower will displace approximately 88,812 tonnes of CO_2e emissions.

Proposed Hydro Developments

NTPC continues to evaluate the feasibility of building a transmission line to connect Whati to the Snare transmission line. This would take the community off diesel generation and establish a corridor upon which future transmission could be built. If constructed, the Whati transmission line would be owned, operated and maintained by NTPC

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 Gahcho Kue mine site, which is currently in construction and the three operating diamond mines (Ekati, Diavik, and Snap Lake).

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

Solar Energy

NTPC owns and operates the two largest solar energy project in the Northwest Territories. In 2012 the 60.6 kW solar photovoltaic (PV) system was installed in the Village of Fort Simpson. In 2013 NTPC expanded the project by 43.6 kW. The solar panels can now power up to 15% of Fort Simpson's energy requirements. In 2015/16 the solar panels displaced 63.5 tonnes of carbon monoxide equivalents (CO2e).

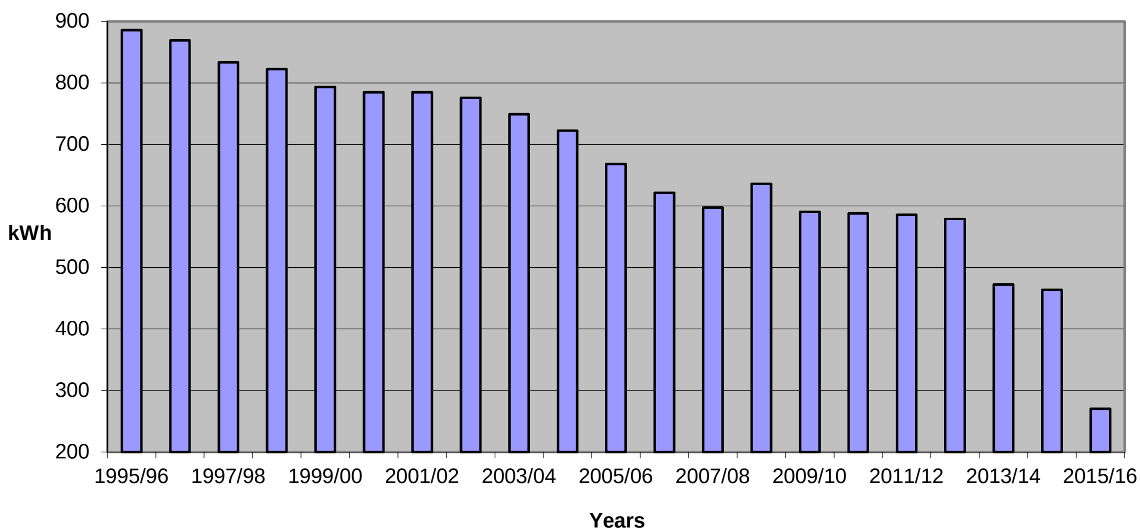
In 2015/16 NTPC completed the installation of a new power plant in the community of Colville Lake. The plant consists of new diesel generators, 136.5 kW of solar and 200 kWh of battery storage. Diesel fuel consumption is expected to be reduced by 31,600 L each year. In 2015/16 40 tonnes of CO2e were displaced thanks to the solar/battery hybrid system.

At the end of the 2016 fiscal year a 39 kW solar PV array was successfully built and connected to the power plant in Fort Lard. The PV system is expected to displace 3,000 L of diesel fuel each year resulting in a reduction of 7.8 tonnes of CO2e.

Streetlight Replacement

Light Emitting Diode (LED) lights use less than half the power of High-Pressure Sodium (HPS) lights and have an expected life of 25-30 years. LED streetlight replacement projects have been completed in twenty-two communities, replacing all HPS streetlights with LED lights. Figure 9 illustrates the average amount of energy required per streetlight in NTPC serviced communities. As more LED lights are installed, the average kWh required per streetlight decreases. GHG savings from our continuing streetlight replacement program are shown in Table 7.

Figure 9: kWh per Streetlight per Year



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 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, 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.

In 2013/14 NTPC launched its PowerWise energy conservation campaign. The campaign includes a website, posters, bill stuffers and pamphlets which present power-saving tips and suggestions for NTPC's customers.

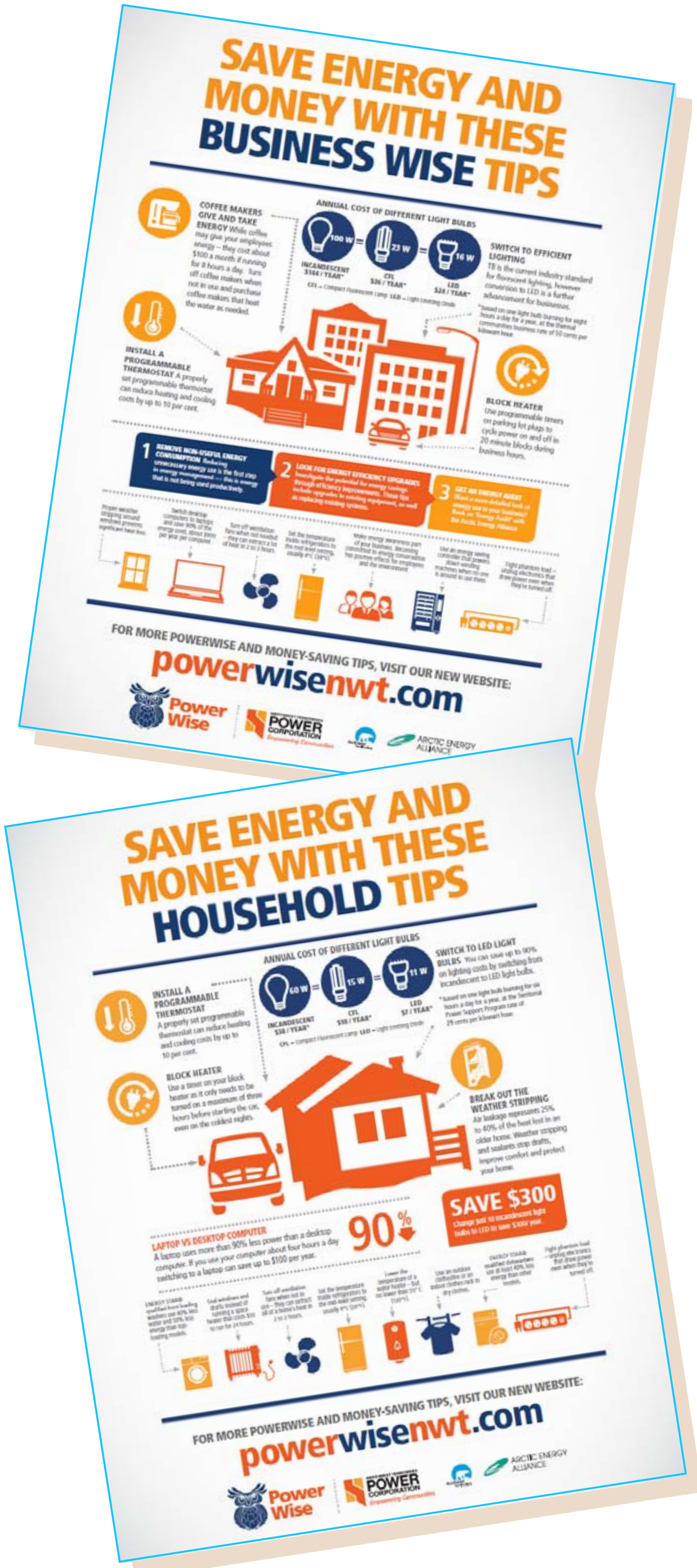
Results in Comparison to Targets

GHG Emissions

To date, we have reduced our cumulative CO_2 equivalent emissions by 1,047,418 tonnes and achieved a 16% decrease in 2015/16 from 1990/91 levels.

CO_2e Station Service Target

To date NTPC has successfully reduced station service at all but seven 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 eight diesel-generating facilities to meet the 5% target.



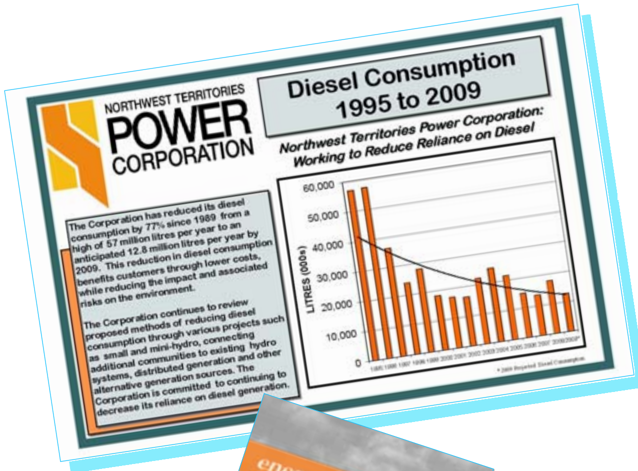
NTPC is committed to both employee and customer education regarding energy awareness. We hope to create an awareness of energy efficient practices and measures that can be implemented by all to ensure that the maximum benefit is derived from the electricity produced. Climate change issues are discussed 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.

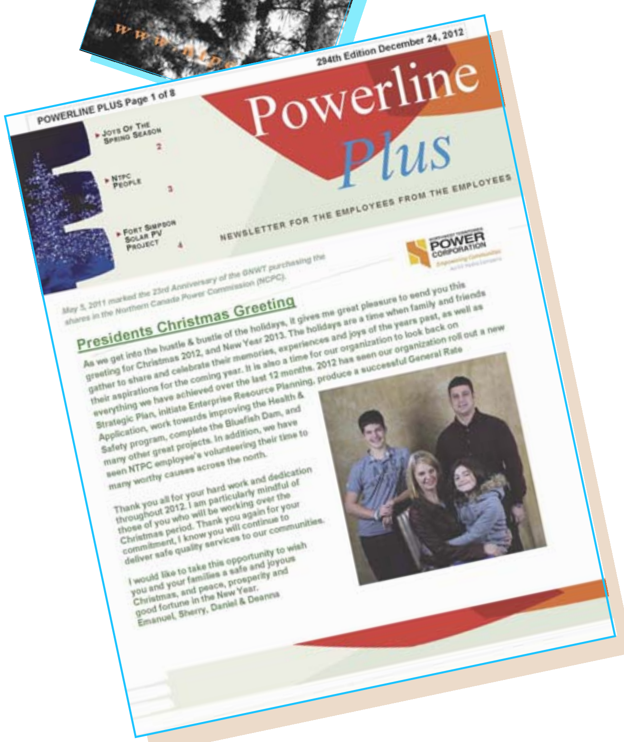
NTPC was a founding member of the Arctic Energy Alliance (AEA) and is a sustaining member today. The AEA is a not-for-profit organization established in 1997. The AEA's mandate is to help reduce the financial costs and environmental impacts associated with energy and utility services in the NWT, including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



Good News Posters are 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.

NTPC has also launched PowerWiseNWT.com, a website aimed a providing tips regarding energy usage and ways our customers can save energy and money. Tools on the website include energy saving tips for various household appliances, as well as an energy calculator to help customers add up the cost of their energy usage per room.

Internal Communications

News articles including updates regarding NTPC's GHG emissions status and various ways to conserve energy are posted on NTPC's internal website's news feed. 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, and an update on our greenhouse gas emissions.

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 2018/19

	←																	Actual	Forecast		→
	1990/91	**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**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Alternative Generation/ Fuels																					
Snare Cascades																					
CO_2		20,978	19,462	17,269	18,627	18,293	18,293	20,442	11,794	17,307	16,331	13,881	14,824	14,142	14,491	19,188	13,990	25,423	20,797	20,928	20,884
CH_4		0.85	0.79	0.70	0.75	0.74	0.74	0.83	0.48	0.70	0.66	0.56	0.60	0.57	0.59	0.78	0.57	1.03	0.84	0.85	0.85
N_2O		0.17	0.16	0.14	0.15	0.15	0.15	0.17	0.10	0.14	0.13	0.11	0.12	0.11	0.12	0.16	0.11	0.21	0.17	0.17	0.17
CO_2 Equiv.		21,050	19,529	17,328	18,691	18,355	18,355	20,512	11,834	17,366	16,387	13,929	14,874	14,191	14,541	19,253	14,038	25,510	20,868	20,999	20,956
Snare Rapids G2[1]																					
CO_2		1,427	2,423	2,289	824	181	110	110	1,000	770	1,270	1,961	2,105	2,017	1,058	1,445	520	520	-	-	-
CH_4		0.06	0.10	0.09	0.03	0.01	0.00	0.00	0.04	0.03	0.05	0.08	0.09	0.08	0.04	0.06	0.02	0.02	-	-	-
N_2O		0.01	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.00	0.00	-	-	-
CO_2 Equiv.		1,432	2,432	2,297	826	182	110	110	1,003	772	1,274	1,968	2,112	2,024	1,061	1,450	522	522	-	-	-
Norman Wells Purchased Power																					
CO_2	370	350	345	345	352	406	388	374	407	411	399	483	381	428	451	472	462	428	412	420	418
CH_4	-0.98	-0.92	-0.91	-0.91	-0.93	-1.07	-1.02	-0.99	-1.07	-1.09	-1.05	-1.03	-1.01	-1.13	-1.19	-1.25	0.01	0.01	0.01	0.01	0.01
N_2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Equiv.	346	327	323	322	329	379	362	349	380	384	372	457	356	400	421	441	463	429	413	420	418
Inuvik Gas Project																					
CO_2			-327	-532	-1,310	-1,538	-1,543	-1,415	-2,454	-2,533	-2,204	-2,295	-1,611	-2,123	-1,217	-604	-2,846	-3,282	-9,556	-9,511	-9,483
CH_4			-2.32	-2.65	-2.64	-2.75	-2.77	-2.68	-3.30	-3.39	-3.36	-3.39	-2.69	-2.64	-0.54	-0.27	0.08	0.11	-0.17	-0.17	-0.17
N_2O			-0.17	-0.20	-0.20	-0.21	-0.21	-0.21	-0.26	-0.27	-0.26	-0.26	-0.21	-0.21	-0.05	-0.02	0.03	0.04	-0.02	-0.02	-0.02
CO_2 Equiv.			-437	-657	-1,437	-1,670	-1,676	-1,544	-2,613	-2,697	-2,366	-2,458	-1,740	-2,251	-1,244	-618	-2,834	-3,266	-9,565	-9,520	-9,492
Bluefish Power																					
CO_2		33,565	36,511	37,709	35,000	33,851	23,725	30,220	27,108	15,397	26,606	37,149	23,843	23,881	33,103	23,251	21,867	12,434	27,563	27,563	27,563
CH_4		1.36	1.48	1.53	1.42	1.37	0.96	1.22	1.10	0.62	1.08	1.50	0.97	0.97	1.34	0.94	0.89	0.50	1.12	1.12	1.12
N_2O		0.27	0.30	0.31	0.28	0.27	0.19	0.24	0.22	0.12	0.22	0.30	0.19	0.19	0.27	0.19	0.18	0.10	0.22	0.22	0.22
CO_2 Equiv.		33,680	36,636	37,838	35,120	33,967	23,806	30,323	27,201	15,450	26,697	37,276	23,925	23,963	33,217	23,331	21,941	12,477	27,657	27,657	27,657

[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, 1994/95, 1995/96, 1996/97, 1997/98 and 1998/99 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 2018/19

	←																Actual	Forecast		→
	1990/91	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	2015/16	2016/17	2017/18	2018/19
Station Service Reduction/Residual Heat Projects																					
Station Service/Residual Heat Savings																					
CO_2		184	153	163	165	148	189	161	182	215	154	106	157	159	160	164	204	186	176	176	176
CH_4		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
N_2O		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Equiv.		185	153	164	165	148	190	162	182	215	154	106	157	160	160	165	205	187	177	177	177
Fort McPherson Residual Heat																					
CO_2		450	427	455	418	148	0	0	407	469	469	611	442	559	557	393	484	0	0	365	361
CH_4		0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.01	0.01
N_2O		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 Equiv.		451	429	457	419	148	0	0	408	470	470	613	443	561	558	394	485	0	0	366	362
New Engine Upgrades/PLCs																					
Improved Fuel Efficiency Savings																					
CO_2		3,477	3,393	3,776	4,132	3,962	3,933	3,796	3,939	3,941	3,969	4,076	4,291	4,458	3,797	3,829	5,000	4,255	3,772	3,752	3,754
CH_4		0.14	0.14	0.15	0.17	0.16	0.16	0.15	0.16	0.16	0.16	0.17	0.17	0.18	0.15	0.16	0.20	0.17	0.15	0.15	0.15
N_2O		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03
CO_2 Equiv.		3,489	3,405	3,789	4,146	3,976	3,946	3,809	3,952	3,955	3,982	4,090	4,306	4,473	3,810	3,843	5,017	4,270	3,785	3,765	3,767
Streetlight Upgrades																					
Streetlight Savings																					
CO_2		125	148	144	165	217	262	366	442	480	414	500	498	508	509	709	723	1,029	1,029	1,029	1,029
CH_4		0.18	0.18	0.18	0.18	0.25	0.26	0.27	0.41	0.41	0.41	0.30	0.40	0.40	0.40	0.41	0.03	0.03	0.04	0.04	0.04
N_2O		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
CO_2 Equiv.		129	152	148	170	223	268	372	452	490	423	507	508	518	519	719	725	1,032	1,032	1,032	1,032
Annual Totals																					
CO_2	370	60,067	62,535	61,619	58,373	55,667	45,356	54,053	42,824	36,457	47,407	56,472	44,930	44,029	52,910	48,848	40,404	41,213	44,192	44,721	44,702
CH_4	-0.98	0.32	-0.52	-0.88	-1.00	-1.27	-1.66	-1.19	-2.16	-2.53	-2.03	-1.78	-1.44	-1.54	0.82	0.84	1.82	1.89	2.00	2.02	2.02
N_2O	0.00	0.38	0.33	0.30	0.28	0.25	0.16	0.24	0.11	0.05	0.14	0.21	0.17	0.16	0.39	0.37	0.38	0.40	0.42	0.42	0.42
CO_2 Equiv.	346	60,060	62,468	61,538	58,260	55,486	45,094	53,722	42,348	35,916	46,972	55,981	44,433	43,520	52,525	48,260	39,837	40,348	43,334	43,864	43,846
Cumulative Totals Since 1990/91																					
CO_2	370	311,276	373,811	435,430	493,803	549,470	594,456	646,408	669,985	685,078	713,918	742,684	876,969	920,628	971,437	1,001,0	1,020,077	1,042,724	1,148,565	1,193,286	1,237,988
CH_4	-0.98	1.53	1.01	0.13	-0.86	-2.14	-2.82	-3.09	-5.02	-7.35	-9.07	-11.03	-14.93	-15.49	-13.75	-12.68	-10.66	-8.46	-9.09	-7.08	-5.06
N_2O	0.00	2.40	2.73	3.03	3.31	3.56	3.72	3.94	3.89	3.77	3.76	3.75	4.62	4.79	5.16	5.38	5.59	5.84	6.74	7.16	7.58
CO_2 Equiv.	346	311,704	374,173	435,711	493,970	549,456	594,550	648,272	690,274	724,107	751,793	786,364	873,923	917,097	967,540	996,513	1,014,940	1,036,685	1,141,747	1,185,611	1,229,457

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