Arctic Energy Alliance

2015-2016
Annual Report

ARCTIC ENERGY ALLIANCE

Intentionally left blank

Contents

LIST OF TABLES

LIST OF FIGURES

Table of Abbreviations

AEA	Arctic Energy Alliance
AETP	Alternative Energy Technologies Program
CEA	Certified Energy Advisor
CECEP	Commercial Energy Conservation and Efficiency Program
CMHC	Canada Mortgage and Housing Corporation
CREP	Community Renewable Energy Program
CSA	Canadian Standards Association
DFN	Dehcho First Nations
ECE	Education Culture and Employment
EEIP	Energy Efficiency Incentive Program
EGH	EnerGuide for Houses
EGNH	EnerGuide for New Houses
EHWH	Electric Hot Water Heaters
EMP	Energy Management Program
ENR	Environment and Natural Resources
ERS	Energy Rating Service
EV	Electric Vehicle
FGH	Fort Good Hope
GHG	Greenhouse Gas
GNWT	Government of the Northwest Territories
GN	Government of Nunavut
GSO	Government Services Officers
HRV	Heat Recovery Ventilator
HWH	Hot Water Heater
IP	Insulated Panel
LED	Light Emitting Diode
MNECH	Model National Energy Code for Houses
MURB	Multi-Unit Residential Building
NRCan	Natural Resources Canada
NES	Nunavut Energy Secretariat
NGO	Non-Government Organization
NHC	Nunavut Housing Corporation
NFTI	Northern Farm Training Institute
NSERC	Natural Sciences and Engineering Research Council
NSH	Northern Sustainable House
NTPC	Northwest Territories Power Corporation
NWT	Northwest Territories

NWTAC	Northwest Territories Association of Communities
NWTBEA	Northwest Territories Biomass Energy Association
NWTHC	Northwest Territories Housing Corporation
PV	Photovoltaic
PWS	Public Works and Services
RFP	Request for Proposal
SCEE	Steering Committee on Energy Efficiency
SIP	Structurally Insulated Panel
SCEE	Subcommittee on Energy Efficiency
SNEBRN	Smart Net Zero Energy Buildings Research Network
SO	Service Organization
WETT	Wood Energy Technology Transfer
YK	Yellowknife

EXECUTIVE DIRECTOR'S REPORT

The Arctic Energy Alliance (AEA) is the lead not-for-profit organization helping communities, consumers, producers, regulators and policymakers to work together to reduce the cost and environmental impacts of energy usage in the Northwest Territories (NWT). This year marks 19 years of service to the residents of the NWT.

The AEA employs 22 staff, delivers services through five regional offices and is headquartered in Yellowknife. AEA's 2015-16 budget was $3,142,500 of which $277,500 was from membership dues which includes $50,000 from the Government of Nunavut (GN) Energy Secretariat. The Government of the NWT (GNWT) Department of Public Works and Services (PWS) funded almost all of AEA's budget, and the Canadian Mortgage and Housing Corporation provided $50,000.

The AEA delivered the following programs on behalf of the GNWT this year.

Table 1 AEA 2015-16 Budget Overview

Core Funding for Regional Projects, Coordinators and Offices	$1,200,000
Energy Management Program	$215,000
Alternative Energy Technology-Residential/Business/Community	$410,000
Energy Rating Service	$150,000
Energy Efficiency Incentive Program	$300,000
Community Government Retrofit Program	$200,000
Commercial Energy Conservation and Efficiency Program	$200,000
Community Biomass	$175,000
Electric Vehicle Demonstration Project	$15,000
Total GNWT	$2,865,000
Membership dues $227,500 GNWT, $50,000 GN)	$277,500
Total	$3,142,500

the GNWT also provided additional one-time supplementary funding to support existing programs and targeted projects for the 2015-16 and 2016-17 fiscal years.

Table 2 AEA Supplementary Funding

Projects	2015-16	2016-17
Alternative Energy Technologies Program (AETP)	$150k	0
Commercial Energy Conservation and Efficiency Program (CECEP)	$50k	0
Condominium Corporation Biomass	0	$50k
Community Light Emitting Diode (LED) Swap-Out	$150k	$300k
Community Government Solar Projects	$175k	$100k
Community Government Energy Retrofits	$50k	$50k
Commercial Energy Retrofits	0	$50k
Community Wood Stove Partnership	$150k	$100k
Energy Rating Services Support	$15k	$85k
Energy Information and Awareness	$100k	$25k
Total	$840k	$760k

From a financial standpoint the AEA provided $598,802 in rebates (excluding EEIP rebates). These rebates funded $3,468,957 in client energy efficiency and/or renewable energy capital expenditures. AEA issued rebates to 72 clients (excluding EEP) resulting in an average client rebate of $8,317.

The result of clients investing $3,468,957 in energy efficiency and/or renewable energy is an estimated annual savings of $425,492 and 375 fewer tonnes of CO2e.

Metric	TOTAL (not including EEIP)
Total no. of rebates	72
Total rebate $	$598,802
Average rebate $	$8,317
Total capital cost $	$3,468,957
Est. annual savings $	$425,492
Est. annual electricity savings (MWh/year)	56.2
Est annual oil savings (litres)	122,014
Est. annual CO2e savings (tonnes)	375
Financial Measures	
Ten Year IRR, Cash Basis	10.5%
Simple Payback on client capital cost $2,870,155 (Years)	7
Simple Payback (years)	8

This year the GNWT's efforts to support its residents save energy and money was recognized when the AEA was invited to speak before the Senate Standing Committee on the state of Northern energy systems. The Committee's report noted that "*Northerners use energy at a per capita rate double the national average, largely thanks to the cold, dark winters. Reducing that use is one of the easiest ways to cut both costs and greenhouse gas emissions, the Committee says, calling such practices 'low-hanging fruit'*."

The work of the AEA would not be possible without a dedicated hard working group of professionals that tirelessly seek to serve and support Northerners in their energy journey. If you are interested in saving energy, money and reducing your greenhouse gas emissions please visit our website at www.aea.nt.ca or call us at 867-920-3333. **We would love to hear from you!**

Respectfully,

Louie Azzolini
Executive Director

STRATEGIC PLAN

1. Vision

The AEA vision is what it strives toward, understanding that it may never achieve its vision on its own. AEA's vision is its "North Star" on which it sets its course, and for which it strives through the delivery of programs and services. AEA's vision is:

"NWT Society will become a global leader in clean, efficient, sustainable energy practices."

1.1 Mission

The AEA's mission explains in a sentence why it exists. The AEA's mission is:

"To promote and facilitate the adoption of efficient and renewable energy practices by all members of NWT Society."

1.1.1 Goals

AEA's goals state what it wants to achieve. AEA objectives express how AEA will achieve its goals. Its goals are that:

1. Members of NWT society will know more about the costs and environmental impacts of their energy use.
2. Members of NWT society will want to reduce costs and environmental impacts of their energy use.
3. Members of NWT society will adopt efficient, renewable and carbon neutral energy practices.
4. Members of NWT society will know the AEA as the best place to go when they want to adopt efficient, renewable and carbon neutral energy practices.
5. Members of NWT society will achieve significant reductions in the costs and environmental impacts of their energy use.
6. Members of NWT society will be celebrated as leaders in efficient, renewable and carbon neutral energy practices.

1.1.1.1 Objectives

1. **Provide services that cover all energy sectors of NWT society**: To expand programs to ensure all sectors of NWT energy use are covered: Ensure complete coverage outside of Yellowknife and expand coverage of industry and transportation.
2. **Inform**: To make top quality information and advice on efficient, renewable and carbon neutral energy practices accessible to all members of NWT society.
3. **Support an increasing number of clients to act:**
    1) Prompt, and then follow-up with clients to adopt efficient, renewable and carbon neutral energy practices,
    2) Champion and recognize success – To work with and monitor specific clients as "case studies" to showcase efficient, renewable and carbon neutral energy practices.
4. **Integrate – To transfer established efficient, renewable and carbon neutral energy practices into the institutions of NWT society.**
5. **Motivate an increasing number of clients to act**:
    1) Identify and Remove Barriers – To identify and work with our partners to remove barriers to the adoption of efficient, renewable and carbon neutral energy practices.
    2) Analyze Costs and Benefits - To enable the delivery of top quality energy audits and pre-feasibility studies to those who are contemplating taking action in NWT society.
    3) Provide Incentives - To research, design and provide effective incentives (financial and other) that motivate NWT society to adopt efficient, renewable and carbon neutral energy practices.
    4) Advise on Policies and Regulations - Research and advise our partners on effective policies and regulations that would motivate NWT society to adopt efficient, renewable and carbon neutral energy practices.
6. **Learn continuously:** To increase AEA's own capacity as the "go to place" for efficient, renewable and carbon neutral energy practices in the NWT.

PROGRAM DELIVERY

1. ENERGY MANAGEMENT PROGRAM

The AEA was provided $215,000, by the GNWT's Department of PWS, for the delivery of the Energy Management Program. This program consists of communications and energy management services.

1.1 Services Delivered

The communications component of the Energy Management Program promotes the public's efficient use of energy and alternative energy through various communications media and formats. Examples include AEA's Facebook presence and website. AEA recognizes Northerners Taking Action (communities, businesses and individuals) on its website. Communications and energy management services delivered throughout the NWT included:

- Website updates to reflect changes in our programs and provide information on our activities. AEA's web and social-media presence has taken a back seat and will need attention in the upcoming year.
- Supported Northern research projects by partnering with researchers for the purpose of developing northern capacity in renewable energy and energy efficiency; and, to support AEA's vision of becoming a centre of renewable and energy efficiency excellence.

1.2 Free Advice on Buildings

The energy management component of the program aims to provide high quality, science-based, unbiased, free advice on energy efficiency and renewable energy to building owners and maintainers in the NWT. This year AEA provided advice to clients from all of the NWT's regions. Typical advice includes calculations for funding programs, general information on renewable energy (such as solar, wind and biomass), and advice on options to improve the energy efficiency of buildings. While some requests are addressed quickly, some advice requires considerable time and effort to address the issue and work out recommendations with the clients.

1.3 Yardstick Audits

AEA delivered 154 "yardstick" energy audits in 2015-16 for buildings and projects throughout the NWT and two communities in Nunavut. Yardstick audits involve an analysis of building and/or utility data to identify trends and anomalies, and to compare against

benchmarks. The yardstick audit helps clients determine if an investment in a detailed energy audit/analysis is justified, or for ERS clients it helps them determine whether their proposed new house design will meet the minimum ERS score of 80, which is required by the City of YK for all new houses. Of the 154 yardsticks completed four were funded by the Energy Management program.

Table 3 Yardstick Energy Audits Delivered by Program

Yardstick Energy Audits	AETP Commercial	AETP Residential	CREP Comm. Gov. Non-Profit	ERS	CECEP	Com. Gov. Energy Retrofit	Non-business and non-Comm. Gov.	Nunavut	TOTAL (not including EEIP)
Total No. of Yardstick Audits	1	18	3	102	11	13	4	2	154
Total No. of Yardstick Audits - YK	1	10	1	96	3	0	2	0	112
Total No. of Yardstick Audits – outside YK		8	2	6	8	13	2	2	41

1.4 Fuel Cost Library and Technical Committee

To ensure a high quality client service, AEA has regularly scheduled technical committee sessions where staff discuss new standards and codes, and the areas where technical data needs to be researched or updated. One initiative of this committee, which takes place yearly, is the updating of the fuel cost library; a resource appreciated and used by parties outside of the AEA. It is used to calculate and compare energy costs by community by year.

1.5 Jean Marie River Electricity Monitoring

The AEA is working with the Tthets'éhk'é Déli (Jean Marie River) First Nation, the Northwest Territories Power Corporation (NTPC), the GNWT, and Natural Resources Canada (NRCan) to support the installation and use of electricity monitoring systems that can track real time energy usage.

NTPC has installed the new Advanced Metering Infrastructure (AMI) units on each building in the community and small monitors that communicate with these have been distributed to all interested residents. These units can display current and historical energy use. Residents who use the monitors can see how much the electricity use rises when they turn

on or off lights or appliances. The idea of this pilot project is to help community residents understand their electricity usage. Data gathered before the monitors were installed can be compared with data gathered after the fact to find out if residents used less electricity.[1]

Figure 1 Kill-A-Watt Meter

Complementing the installation of the electricity usage monitors the AEA's Dehcho Energy Project Coordinator, Teresa Chilkowich met with Chief Gladys Norwegian and the band office staff to show them how electricity use can be measured using with another small energy measuring device called a Kill-a-Watt® meter. This energy monitoring session spontaneously arose as Teresa endeavored to address questions the Chief had about the amount of energy being consumed by a few appliances around the Community Hall Band Office.

As a component of the Energy Information & Awareness project, Kill-a-Watt® meters will be made available in the Autumn of 2016 for NWT residents to borrow through all the libraries around the NWT.

Part of the project had NRCan data loggers installed on all the large buildings and some smaller ones with high electricity use to monitor the power use of individual circuits. The data from this project along with some from the AMI installed by NTPC will be used by NRCan to determine electricity consumption patterns in the community and will hopefully allow them to faciltate some demand-side management. NRCan will be using for research purposes. The monitoring information should prove helpful if/when the Community of Jean Marie River or NTPC decides to install additional photovoltaic (PV) panels in the community. The data will be instrumental in sizing the system and designing the interface between the diesel generators, energy storage and the new PV panels.

1.6 Steering Committee on Energy Efficiency (SCEE)

The AEA represents the NWT on the NRCan Subcommittee on Energy Efficiency (SCEE), a national consultative body in the area of energy efficiency. Participation provides the AEA

[1] News/North March 28, 2016

an opportunity to share and learn about energy efficiency policies, practices and learnings from across Canada.

1.7 NWT/NU (Nunavut) Construction Association (NNCA) Engagement

The AEA attended the NWT/NU annual general meeting to promote home energy system monitoring and the benefits of the service to northern contractors.

1.8 City of Yellowknife

1.8.1 Community Energy Planning

The AEA is a member of the City of Yellowknife Community Energy Planning Committee.

1.8.2 Information Sessions

AEA supported the City of Yellowknife Building Permit information sessions held on April 9, 2015. Topic discussions included the permit application process, required documents, applicable City Bylaws, Canadian building standards. The AEA delivered the Energy Efficiency Information Sessions on the types of energy evaluations available; options for achieving higher efficiency rates; blower door tests; and, alternative energy.

1.9 NSERC SNEBRN Network

The NSERC Smart Net Zero Energy Buildings Research Network (SNEBRN) is a Canadian research effort that includes 29 Canadian researchers from 15 universities and researchers and experts from NRCan, and industrial partners from the energy and construction sectors. The AEA was asked and joined SNEBRN as a network partner.

Figure 2 Asok Thirunavukarasu

The AEA is attempting to guide Northern research by having research conducted in the North for the North. Most recently, Asok Thirunavukarasu, a Master's student from Concordia University spent time in Yellowknife on an independent research project regarding energy efficient housing in Yellowknife in collaboration with the AEA.

Asok's field work included on-site evaluations, occupant and builder interviews, and benchmarking housing energy performance using the NRCan Energy Rating Service ERS (formerly referred to as EGH) evaluation data. He data mined the AEA's ERS database

which included years of ERSs. The fieldwork portion of his research in Yellowknife aims to find out if the City's ERS 80 standard is improving overall energy intensity. The results of his research showed that the City of Yellowknife EGH80 Bylaw contributed to 91 new homeowners collectively saving $272,000 a year with most of the savings coming from avoided heating costs. The most notable changes subsequent to the EGH80 bylaw occurred with building tightness (less drafty), increased wall and ceiling insulation levels.

A conservative financial analysis suggests that new homeowners post 2010 will see a 6 percent return on investment with a simple payback of 16 years. This assumes 15 per percent additional homeowner costs, e.g., $345,000 instead of $300,000, three (3) percent annual electricity cost escalation, two (2) percent annual fuel cost escalation and a 33 percent tax rate.

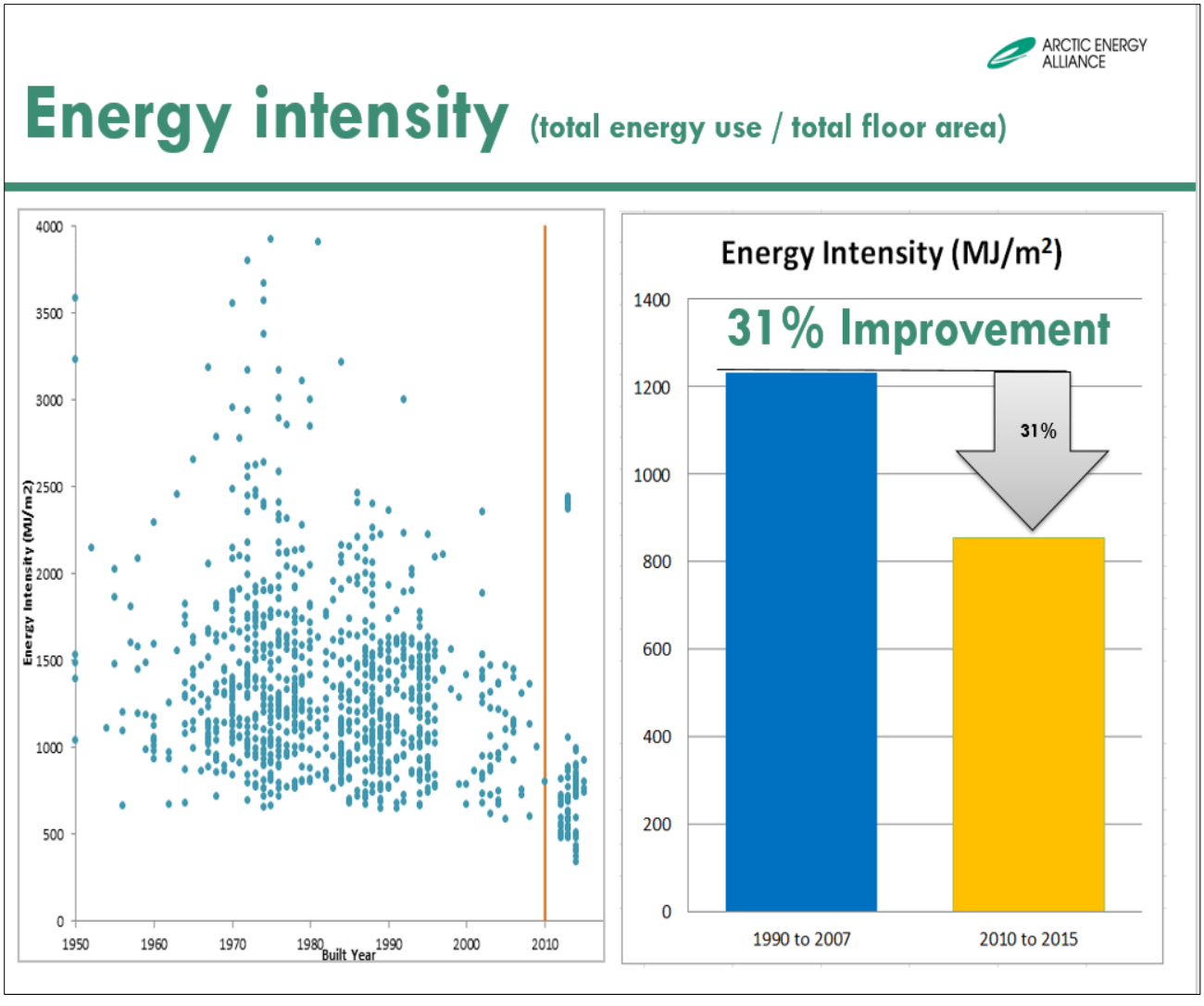
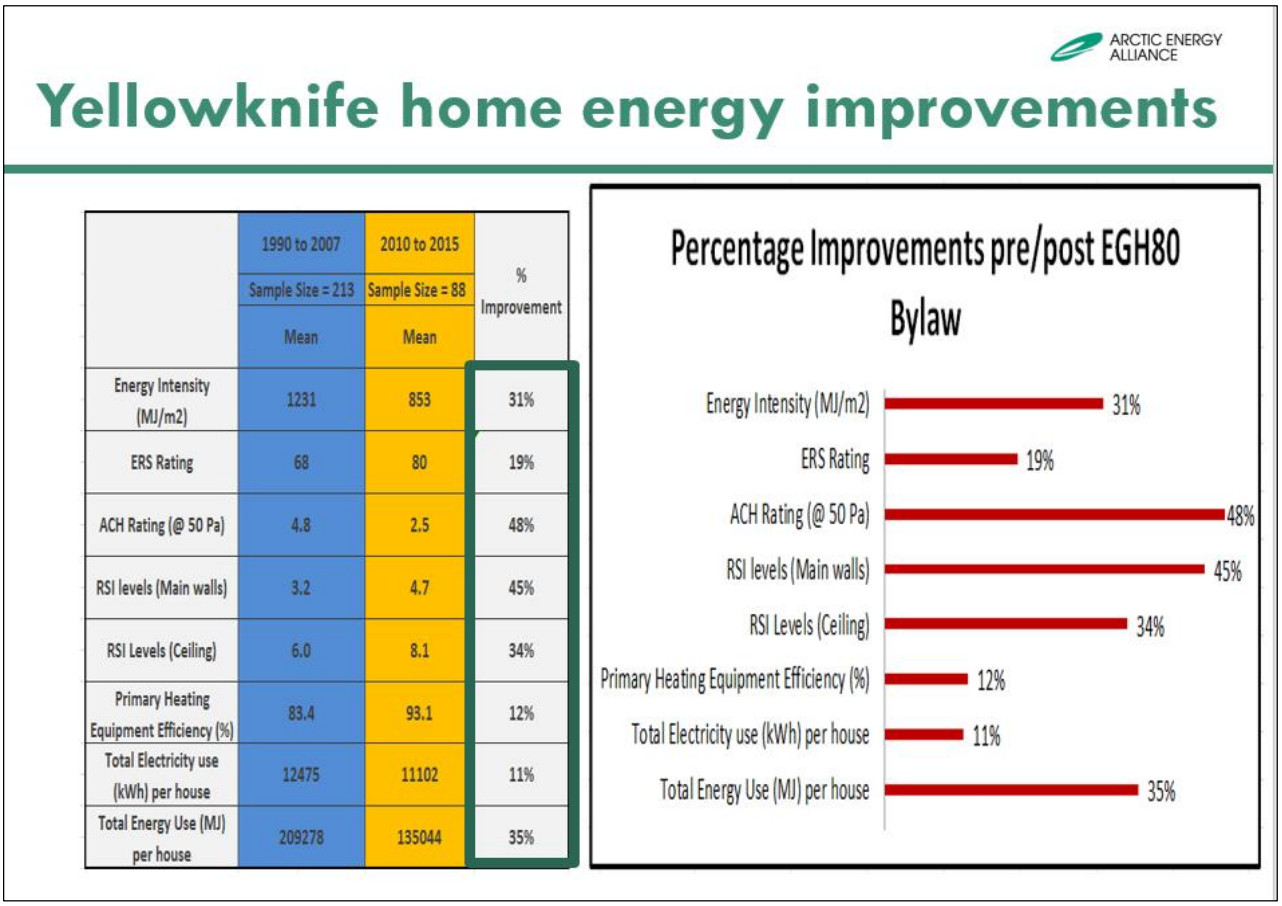


Figure 3 Source AEA

New Homes built in Yellowknife between 2010-2015 compared to homes built between 1990-2007 use 31 percent less energy per square metre. The red vertical line in the figure indicates the year the City of Yellowknife EGH80 Bylaw came into effect. Note the change in variability to the right of the red vertical line.



	1990 to 2007 Sample Size = 213 Mean	2010 to 2015 Sample Size = 88 Mean	% Improvement
Energy Intensity (MJ/m2)	1231	853	31%
ERS Rating	68	80	19%
ACH Rating (@ 50 Pa)	4.8	2.5	48%
RSI levels (Main walls)	3.2	4.7	45%
RSI Levels (Ceiling)	6.0	8.1	34%
Primary Heating Equipment Efficiency (%)	83.4	93.1	12%
Total Electricity use (kWh) per house	12475	11102	11%
Total Energy Use (MJ) per house	209278	135044	35%

Figure 4 Source AEA

1.10 Conference and Training Events

The AEA supported the delivery of the Residential Mechanical Ventilation Installation Course – Level 1. The training course which was delivered by the HRAI SkillTech Academy. The three-day course was held in both Yellowknife and Hay River with a total of 22 participants, eighty (8) attended in Yellowknife and 14 in Hay River, most of which were mechanical tradespeople. Tradespeople from the communities of Fort Smith and Fort Simpson also attended.

The course covered the areas pertaining to Residential Mechanical Ventilation based on the National Building Code and the CSA F-326 Standard "Residential Mechanical Ventilation Requirements."

Figure 5 Residential Mechanical Ventilation Installation Course participants

This course is very important because Northern housing is going through significant changes in construction standards to improve energy efficiency. One of the most significant improvements is in limiting natural air infiltration. When this is done effectively, it becomes imperative to install properly designed and controlled mechanical ventilation. Properly designed, installed, maintained and operated systems keep building and occupants healthy. For a list of certified installers go to this website.

The graduates of the course received certification and are also eligible to advance and complete the Residential Mechanical Ventilation Design Course - Level II.

1.11 Remote MicroGrids Conference

The AEA participated in and supported the second biannual Renewables in Remote MicroGrids conference organized by the Pembina Institute and hosted by the Government of NWT held in Yellowknife in September 2015. AEA staff presented at the event, facilitated round tables, delivered solar and biomass mini-courses, a walking tour for attendees. In addition, the AEA was asked to facilitate a round table of about 20 Community delegates to enable more specific community sharing and dialogues, and, AEA's Linda Todd lead a guided tour of the Lutsel K'e solar PV installation.

[2]Microgrids are essentially "small power systems" that fully meet local electricity needs. In a remote community, a microgrid provides residents with the same access to electricity that Canadians enjoy while living "on the grid," but with some extra challenges. Remote microgrids are small and hard to access by road, often only available for a few winter weeks per year, and must operate year-round without failure in remote, and often harsh, environments.

Figure 6 AEA Walking tour promotional

Figure 7 Conference participants touring the Lutsel K'e PV system.

EA participated in the opening panel at the Renewables in Remote MicroGrids conference titled "*What motivates us to do this work?*" featuring AEA's Linda Todd, Sean Magee (Bullfrog Power), Ian Loughran (First Nation Power Authority), and Jen Hiscock

[2] Source: http://gogreen.bullfrogpower.com/microgrids2015-preconference

(NRCan). Conference attendees also had the opportunity to tour the brand new 35kW solar PV system in Lutsel K'e Dene First Nation (see picture above).

1.12 Case Study of a Solar PV – Home Installation

During the winters of 2011 and 2012, Troy Bradbury of Kiwi Electric was involved with the installation of the 104 kW Solar PV array at the Fort Simpson Airport[3]. This experience led Troy to consider solar electricity for his residence in the Wild Rose area, and in July of 2013 he and his spouse Zina installed a 20 panel, 4 kW (AC) Solar PV system on the roof of their home.

The PV system is connected to the electrical "grid" and cost approximately $18,000 which was reduced to $13,000 through a $5,000 subsidy from the GNWT under the Alternative Energy Technology Program. Installation costs were estimated at an additional $4,500; however, Troy was able to minimize these due to his solar PV installation experience.

Figure 8 4 kW Solar PV system at Troy and Zina Bradbury's home

[3] For more information, visit: https://enlighten.enphaseenergy.com/pv/public_systems/wBzY58297

2. ENERGY RATING SERVICES SUPPORT PROGRAM

The GNWT Department of PWS provides AEA $150,000 to deliver the ERS Support Program. The AEA delivers ERS for new and existing homes in the NWT under licence agreement with NRCan. These programs were formerly known as the ecoENERGY Retrofit – Homes (EGH) program, and EnerGuide for New Houses (EGNH) program.

The ERS was developed by NRCan to provide a standard measure of a home's energy performance. The home's energy efficiency level is rated on a scale of 0 to 100. A rating of zero represents a home with major air leakage, no insulation and extremely high-energy consumption. A home energy evaluation also provides a homeowner with a detailed list of potential upgrades to reduce energy consumption.

2.1 ERS Program Administration

ERS evaluations are performed by NRCan Certified Energy Advisors (CEA) Ken Baigent, Nick Walker and Mike Stuhec. AEA is responsible for their on-going training and certification. AEA also maintains a database of all ERS work completed.

AEA has worked diligently to develop working partnerships with contractors and builders to increase their awareness and value for high building envelope air tightness and ventilation. The results as evidenced by NWT contractors achieving and exceeding their energy efficiency objectives suggest AEA is succeeding. AEA has also delivered 10 energy ratings in Rankin Inlet and 11 in Cambridge Bay through GN funding.

2.2 Home Energy Evaluations

The ERS Program provides NWT homeowners with affordable access to a home energy evaluation, wherever they are. The target fixed for Fiscal Year 2014-15 was 100 ERS evaluations. AEA completed 231 evaluations up 26 percent from last year's 183 evaluations. The AEA offers four types of ERS services:

- D Files (pre-retrofit evaluation)
- E Files (post-retrofit evaluation)
- P-Files (plan evaluation)
- N Files (new home evaluations)

In 2015-16 AEA delivered energy evaluations of 63 existing homes and 168 new homes. Table 4 summarizes ERS service by type and location.

Table 4 ERS Delivery by Type and Location 2015-16

ERS Service Delivered	Number of Homes
D Files	**62**
Yellowknife	18
Inuvik	10
Fort Smith	7
Hay River	6
Cambridge Bay	11
Rankin Inlet	10
E Files	**1**
Yellowknife	1
N Files	**66**
Yellowknife	63
Fort Providence	2
Hay River	1
P-Files	**102**
Yellowknife	96
Fort Providence	2
Tuktoyaktuk	4

2.3 Quality Assurance

The AEA complies with all NRCan Quality Assurance requirements as requisite of being a Service Organization in the delivery of the NRCan ERS program. Quality Assurance Level I (phone survey to assess overall client satisfaction), II (re-creation of a HOT2000 file from field notes), and III (full audit completed again and compared with the initial audit) took place.

Files of AEA's three CEA's have been randomly selected. This year, as in previous years, the feedback has been extremely positive and no area requiring improvement has been identified.

2.4 Advice

AEA delivers free, unbiased home energy efficiency advice to all NWT homeowners. Advice is provided in person, by telephone, or by e-mail.

3. Energy Efficiency Incentive Program (EEIP)

The GNWT Department of PWS provided the AEA $300,000 for the delivery of the EEIP, a program that supports residents, non-profit organizations and businesses with rebates aimed at encouraging them to purchase energy efficient products for the purpose of improving their energy efficiency.

Figure 9 AEA's Sheena Adams presents Louie Goose his EEIP rebate

Sheena Adams (AEA Inuvik Regional Energy Project Coordinator) was happy to present an AEA pellet stove rebate to Louie Goose. Louie is pleased with his new purchase and looks forward to reducing his carbon footprint and heating costs this winter.

2.5 EEIP Rebates

As of March 31, 2016, a total of $170,298.74 was paid in rebates for purchases of qualifying energy efficient products. The bulk of the rebates were for pellet or wood stoves and new homes in non-hydro communities.

Table 5 EEIP Rebates Summary 2015-16

Hydro & Non-Hydro	No.	Amount
Hydro	371	$38,623.01
Non-Hydro	89	$131,675.73
TOTAL	**460**	**$170,298.74**

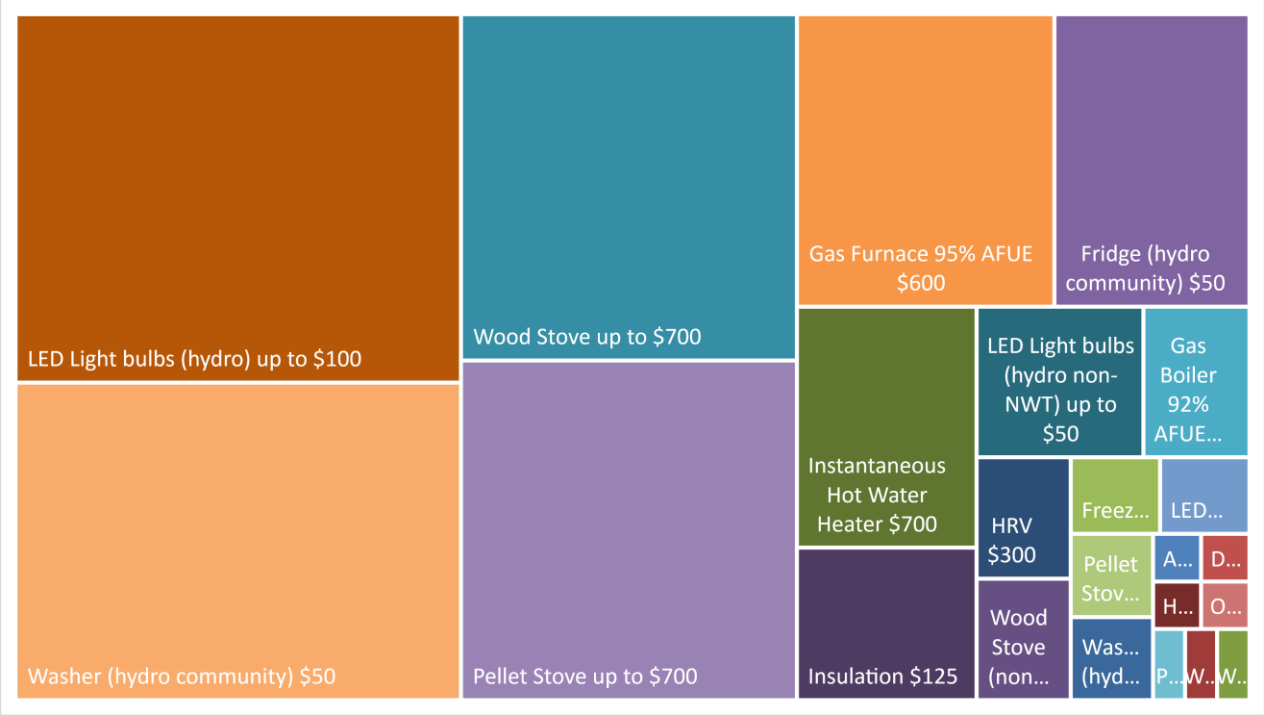


Figure 10 Number of Rebates by Type in Hydro Communities. See Table 7 for details.

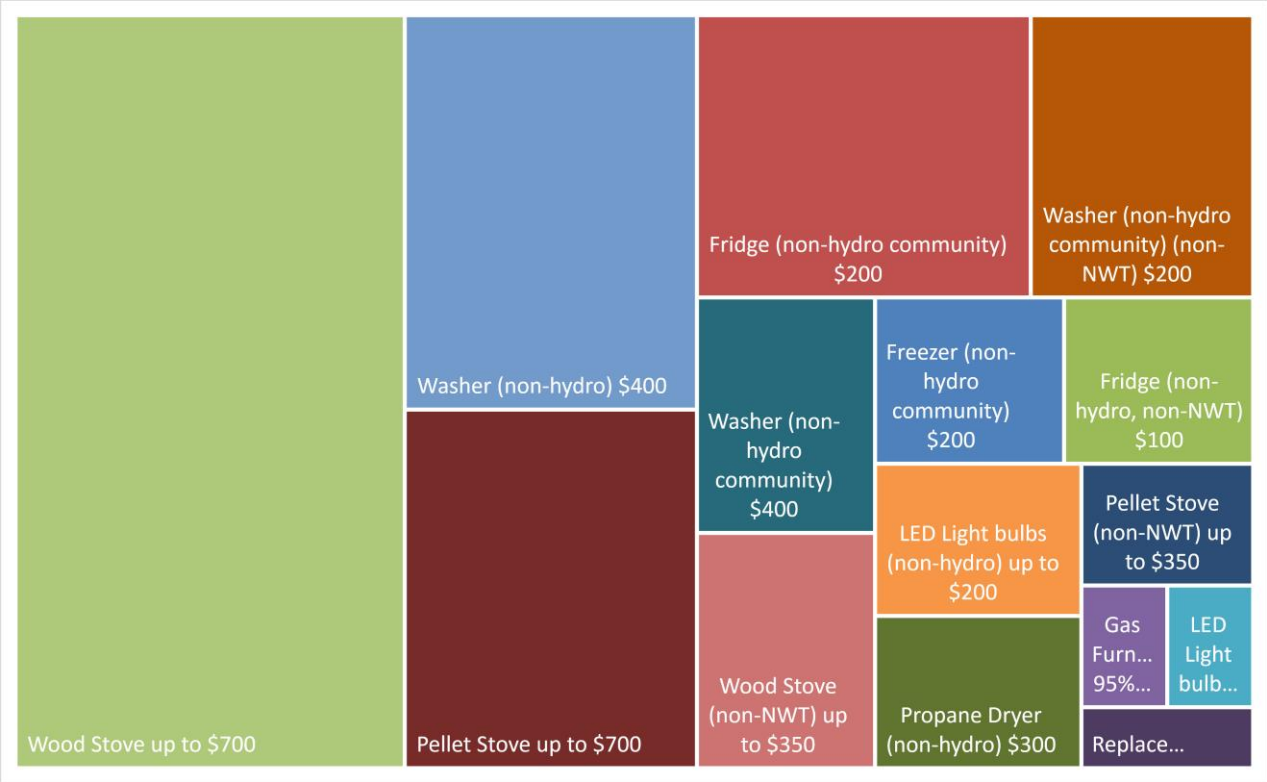


Figure 11 Number of Rebates by Type in Non-Hydro Communities. See Table 7 for details.

Table 6 Community Rebate Summary EEIP

Community	No.	Amount ($)
Aklavik	1	350
Fort McPherson	13	5,533
Inuvik	22	9,187
Tsiigehtchic	1	700
Fort Simpson	10	5,162
Yellowknife	269	87,999
Colville Lake	1	700
Deline	1	700
Fort Good Hope	5	3,500
Norman Wells	6	3,020
Tulita	2	1,400
Enterprise	1	700
Fort Providence	12	2,797
Fort Resolution	3	1,566
Fort Smith	11	4,560
Hay River	82	35,197
Lutsel K'e	1	700
Behchokǫ	5	1,654
Wekweeti	2	900
Wha Ti	4	717
Non-NWT communities e.g., Ingraham trail/cabin owners	8	3,257
Overall Total:	**460**	**$170,299**

Table 7 EEIP Rebates by Type 2015-16

Rebate Category	No.	Amount ($)
Overall Total:	**460**	**$170,299**
Non-Hydro		
Freezer (non-hydro community) $200	3	600
Fridge (non-hydro community) $200	9	1,700
Fridge (non-hydro, non-NWT) $100	3	300
Gas Furnace 95% AFUE $600	1	600
LED Light bulbs (non-hydro non-NWT) up to $100	1	37
LED Light bulbs (non-hydro) up to $200	3	155
Oil Furnace 92% AFUE $600	0	-
Pellet Stove (non-NWT) up to $350	2	700
Pellet Stove up to $700	10	6,828
Propane Dryer (non-hydro) $300	3	900
Replace electric HWH (non-hydro community) $1500	1	1,500
Washer (non-hydro community) $400	4	1,600
Washer (non-hydro community) (non-NWT) $200	6	1,200
Washer (non-hydro) $400	11	4,200
Wood Stove (non-NWT) up to $350	4	1,167

Rebate Category	No.	Amount ($)
Wood Stove up to $700	28	17,136
Non-Hydro Subtotal:	**89**	**$38,623**
Hydro		
Air Sealing 30% decrease $350	1	350
DWHR 42% $300	1	300
Freezer (hydro community) $50	3	150
Fridge (hydro community) $50	25	1,250
Gas Boiler 92% AFUE $600	7	4,200
Gas Furnace 95% AFUE $600	33	19,800
HRV $300	5	1,500
HWH Condensing $1,000	1	1,000
Instantaneous Hot Water Heater $700	19	13,300
Insulation $125	12	12,100
LED Light bulbs (hydro non-NWT) up to $50	11	163
LED Light bulbs (hydro) up to $100	72	3,191
LED Light bulbs (non-hydro non-NWT) up to $100	3	23
Oil Boiler 92% AFUE $600	1	300
Pellet Stove (non-NWT) up to $350	3	966
Pellet Stove up to $700	50	34,656
Propane Dryer (non-hydro) $300	1	300
Washer (hydro community) $50	62	3,100
Washer (hydro community) (non-NWT) $25	3	75
Washer (non-hydro community) $400	1	400
Washer (non-hydro) $400	1	200
Wood Stove (non-NWT) up to $350	5	1,741
Wood Stove up to $700	51	32,612
Hydro Subtotal:	**371**	**$131,676**
Overall Total:	**460**	**$170,299**

2.6 EEIP Promotion

All AEA staff promotes the EEIP during community visits by talking to individuals, putting up posters at public places, leaving application forms at the local stores and other highly visible locations. The AEA continues to provide free, unbiased advice for individuals, businesses, communities or any other stakeholder when it comes to the EEIP, or EEIP qualifying products. A considerable portion of this advice is provided to homeowners considering the insulation rebate, which requires pre-approval by

Figure 12 EEIP logo

AEA staff. Through this advice, AEA staff help homeowners undertake the measures that make the most sense for their situation.

Figure 13 ENERGY STAR logo

AEA also promotes ENERGY STAR®, the mark of high-efficiency products in Canada. The familiar symbol makes it easy to identify the best energy performers on the market. ENERGY STAR certified products meet strict technical specifications for energy performance, tested and certified. They save energy without compromising performance in any way. Typically, an ENERGY STAR certified product is in the top 15 to 30 percent of its class for energy performance. Saving energy saves you money and reduces your impact on the environment.

4. COMMUNITY GOVERNMENT BUILDING ENERGY RETROFIT

The Community Government Building Energy Retrofit program with $200,000 of funding assists community governments to identify and undertake energy efficiency improvements in community government buildings. The program has been very well received. Last year, AEA identified over 240 actions that community governments could undertake that would pay for themselves in less than 5 years. The result if all actions were implemented at a cost of $1 million spread over eight communities, would be an estimated savings of 130,000 litres of oil, 300,000 kWh of energy and $400,000 a year.

The results of the Community Government Energy Retrofit Program are shown in the next Table.

Table 8 Community Government Energy Retrofit Results

Metric	Community Government Energy Retrofit
Total no. of rebates	4
No. rebates in Yellowknife	0
No. rebates outside Yellowknife	4
Total rebate $	$49,000
Average rebate	$12,250
Total capital cost	$98,000
Est. annual savings	$58,000
Est. annual electricity savings (MWh/year)	12
Est. annual propane savings	$0
Est. annual oil savings (litres)	27,000
Est. annual CO2e savings (tonnes)	84
Total No. desk-top energy evaluations (includes P-files and yardsticks)	13
No. desk-top energy evaluations (includes P-files and yardsticks) - YK	0
No. desk-top energy evaluations (includes P-files and yardsticks) – outside YK.	13
Total No. on-site energy evaluations (ERS and audits)	18
No. on-site energy evaluations (ERS and audits) - YK	0
No. on-site energy evaluations (ERS and audits) – outside YK	18

This year AEA completed energy audits of community government buildings in Behchokǫ, Dettah and Jean Marie River. During a recent visit to Ulukhaktok, Sheena Adams, AEA's Inuvik Regional Energy Project Coordinator, supervised energy retrofit upgrades in Hamlet owned buildings and houses. Improvements included the installation of LED lights and programmable thermostats.

Figure 14 Joseph Kitekudlak Jr. pointing to a newly installed programmable thermostat

Joseph Kitekudlak Jr. (Hamlet of Ulukhaktok Employee) spent the week assisting with the installations. Joseph is seen here learning how to program the new thermostats so that buildings will automatically cool down when not in use – saving heating fuel. In all 18 LED lights and 27 thermostats were installed. The Hamlet looks forward to lower heating and electricity costs next winter!

In all 18 LED lights and 27 thermostats were installed. The Hamlet looks forward to lower heating and electricity costs next winter!

In early June, Sonny Zoe, AEA's Tłı̨chǫ Regional Energy Project Coordinator visited the community of Wekweeti. He was accompanied by Tom Gross, AEA's South Slave Regional Energy Project Coordinator, and an electrician from Ryfan Electric. Their visit was to install upgrades on all the community government buildings. The lighting was replaced with very efficient LED lights and the thermostats were replaced with thermostats that can be programmed to lower the temperature in the building when it will not be in use. These upgrades are expected to save energy and money. A typical audit report summarizes for each building the energy management opportunities, their estimated capital cost and payback; and, their respective priority and recommended timeline for implementation. The Energy Audit Report Summary shown in the next Table provides real life examples of the many practical, low cost, fast payback opportunities that exist to save energy and money.

Figure 15 Exterior LED Lighting Wekweeti

Table 9 Extract from an Energy Audit Summary Report

EMO	Estimated Capital Cost	Simple Payback
Community Building 1*		
Boiler Controller with outdoor reset and WWSD of boiler & pumps	$4,700	6.1
Unoccupied setback	$630	1.2
Install Timeclock to Turn Off Ceiling Fan	$1,800	3.3
Convert HID exterior lighting to LED	$5,100	6.7
Free Cooling by Outdoor Air for the Community Freezer	$21,000	5.7
Community Building 22*		
Unoccupied setback	$8,600	3.6
Insulate uninsulated heating pipes in the Crawlspace	$530	1.2
Adjust Timeclock to Turn Off Ventilation on Weekends	$110	0
Bathroom Exhaust Fans on Timers	$160	1.2
Convert HID exterior lighting to LED	$8,200	5.9
Occupancy Sensors	$1,300	6.2
Energy Star Freezer	$740	2.5
IPLC timers for parking plug-ins	$1,300	3.6

*** Building names not shown for confidentialy.**

5. BIOMASS PROGRAM

The AEA received $175,000 in funding from the GNWT Department of PWS for the delivery of the Biomass Program in support of the *NWT Biomass Energy Strategy 2012-2015*.

Biomass heating is very popular and AEA continues to support this popular and important energy sector by helping a variety of clients facilitate their use of biomass. Projects include:

- Inuvik biomass / pellet fair
- "Burn-it-smart" training in the Sahtu
- Wood Burning Basics - Traditional & New Technology in the Tłı̨chǫ and Sahtu
- Supporting Whatì and Gamètì to advance their biomass district heating projects
- Supporting the NWT Biomass Energy Association with administrative, human resource and financial resources

5.1 Biomass Project Development and Implementation

The Biomass Program provides NWT residents, businesses, Non-Government Organizations, and community governments with accessible technical advice on existing or potential biomass projects. AEA worked with various clients to encourage the use of biomass, and project work funded through the Biomass Program including:

- Supporting the communities of Whatì and Gamètì to advance their biomass district heating projects, thus building on the success of a similar project in Behchokǫ, Tłı̨cho region.
- Contributing to the NWT Biomass Energy Association's research, marketing, operations, and financial management; and, is secretary treasurer of the organization.
- Supporting the Katlodeeche First Nations (Hay River Reserve) consideration of biomass energy for their community.
- Helping the Ka'a'gee Tu First Nations (Kakisa) in the completion and commissioning of their Biomass District heating system which will be in full operation for the next heating season.

5.2 Supporting the Operations of the NWT Biomass Energy Association

AEA continued its financial and staffing support of the NWTBEA. The NWTBEA became a legally incorporated Society as of October 21, 2013. The society was created by private sector business and trades people with a pecuniary interest in the biomass energy sector.

NWT BIOMASS ENERGY ASSOCIATION

Figure 16 NWTBEA Logo

The NWTBEA's Andy Taylor and Ken Miller sit on two Canadian Standard Association (CSA) committees: Mr. Miller, on the CSA Technical Committee on the Installation Code for Solid-Fuel-Burning equipment (B365), and (B366.1) TSC Solid Fuel Fired Central Heating Appliances; and Mr. Taylor, on the CSA Harmonized Technical Committee on Solid Biofuels.

With AEA's Linda Todd's help and the supportive direction of past President Jan Larsson and President-elect Elaine Carr, the AEA helped prepare and deliver the NWTBEA's marketing campaign that included newspaper advertisements, creation of an NWTBEA website[4], the preparation of three articles that have been published and featured across Canada and the NWT; and, prepared and distributed a directory of all NWT biomass pellet boiler retailers; and, bulk and bagged pellet distributors.

5.3 Inuvik Biomass Energy Fair

AEA's Inuvik regional office hosted a week-long fair celebrating the benefits of Biomass and how it can be used in residential, multi-residential and commercial applications for energy efficient, cost-effective and environmentally friendly space heating. Brochures and displays promoted wood stoves and pellet stoves for residential use.

Figure 17 Inuvik Biomass Energy Fair. Source. AEA

Another highlight of the week was the tour of Inuvik's bulk pellet storage and delivery facility (operated by Vince Brown) - a reliable, clean fuel source that medium-large biomass installations in the area can access.

Vince took the time to show off a large scale pellet boiler and to point out the features and answer the many questions. Thank you to Vince and to everyone who attended, brought questions and shared their success stories using pellet and wood heating.

Some of those who attended Inuvik's Biomass Energy Fair shared stories and enjoyed fish chowder served around the campfire.

[4] http://nwtbiomassenergy.ca/

6. REGIONAL OFFICES PROGRAM

The AEA was provided $1,200,000 by the GNWT Department of PWS to support its core funding including its regional coordinators and their offices.

AEA's regional offices are fully staffed with Sheena Adams of Inuvik, Tom Gross and Louise Schumann of Hay River, Wayne Lennie of Norman Wells, Teresa Chilkowich of Fort Simpson and Sonny Zoe of Whatì.

6.1 Tradeshows and Community Events

The AEA made its work and presence in the regions its highest priority. AEA staff attempt to reach every NWT community at least once a year. AEA partnered with local organizations and built on its capacity to remain connected, be significantly involved, prompt and lead a variety of meaningful projects outside of Yellowknife. There is no doubt that AEA's presence in the regions has significantly increased over the last few years for the benefit of all NWT residents.

6.1.1 Fort Smith Trade Show 2015

AEA's Energy Management Specialist, Ken Baigent, and Regional Project Coordinator for the South Slave, Tom Gross, attended the 10th Annual Thebacha Trade Show held on May 2, 2015 at the Fort Smith Recreational Centre.

The one-day event kept Ken and Tom busy with a steady stream of people interested in the services AEA provides, and the cool draw prizes which included a Free EnerGuide Home Energy Evaluation, a BioLite camp stove complete with accessories, and for Children, a D.I.Y Eco-House kit that demonstrates solar power.

It was a great opportunity to engage the people of Fort Smith in conversations about energy use and conservation, as well as alternate forms of energy. Tom and Ken were also able to promote the new South Slave Regional office that opened in Hay River in October 2014, and encourage folks to visit the AEA website for details on what AEA has to offer. In all, there were 58 entries for the EnerGuide Home Energy Evaluation.

The most popular draw item was the BioLite stove with its accessories where a total of 158 people entered the draw with the lucky winner being Maxine Gladney of Fort Smith.

6.1.2 Hay River Chamber of Commerce's Spring Tradeshow 2015

Figure 18 Tom Gross at AEA's Hay River Trade Show Booth

AEA's South Slave Office staff, Tom Gross and Louise Schumann were on hand at AEA's colourful booth at the Hay River Chamber of Commerce's Spring Tradeshow. This one-day event was held on Saturday May 23, 2015 at the Royal Canadian Legion. The Hay River Chamber of Commerce decided to try something a little different this year by holding this tradeshow in the Spring with intentions of still holding another tradeshow in the Fall along with the Fall Fair. Above is Tom all set-up waiting to greet folks.

Figure 19 EnerGuide Home Energy Evaluation draw winner Jill Belanger (left) with AEA's Louise Schumann

Tom and Louise enjoyed taking this opportunity to introduce the new Hay River Office that opened in October 2014 to those who weren't aware of AEA's physical presence in the South Slave, and to engage people in conversations about energy use and conservation.

The awesome draws that AEA had at the table enticed many to also come and look at all the great information that was provided about what AEA has to offer in rebates and general information on energy conservation, use and alternate forms of energy. The Energy Savings Quiz challenged the booth visitors to test their energy knowledge, while the cool energy efficient gadgets and LED light bulbs got people thinking about

alternatives to what they use in their everyday lives. Tom also had a chance to talk to individuals about the potential of geothermal heating systems, solar PV systems, and other technical topics.

Figure 20 Mike Wilgosh left, Chuck Carson centre, and AEA's Louise Schumann right

Out of the 63 entries in the EnerGuide Home Energy Evaluation draw the winner was Jill Belanger. Out of the 66 entries for the Pallet of Pellets, the lucky winner was Chuck Carson, who informs us that this prize will definitely come in handy for him and his family as they have two pellet stoves in their home.

To the right is a picture of AEA's Louise Schumann with Chuck Carson and Mike Wilgosh, the Manager of the Hay River Home Building Centre, who generously discounted the pellets for AEA.

6.1.3 Paulatuk Community Energy Fair

The Mayor of Paulatuk (Ray Ruben Sr.) enjoyed talking about energy conservation at AEA's Community Energy Fair. AEA's Inuvik Regional Energy Coordinator Sheena Adams hosted the event and shared information about energy conservation, efficiency, AEA rebates, and alternative/renewable energy. Thank you to the Mayor and community members who attended the event. Special thanks to Milly for making delicious Caribou soup and bannock – everyone enjoyed it.

6.1.4 Inuvik's Science Rendezvous

Figure 21 AEA at Inuvik's Science Rendezvous

In the spring of 2015, the AEA participated in Inuvik's Science Rendezvous, which was coordinated by The Aurora Research Institute. The Science Rendezvous is an event that takes science out of the lab and onto the street.

AEA's Inuvik Regional Energy Project Coordinator, Sheena Adams, used a Lego model to demonstrate solar power and wind power. The solar panel fed by a lamp taught visitors how light energy (solar) can be converted then stored in a battery. The wind turbine was powered by a fan and the kinetic

energy collected in the same battery. Participant's both young and old were impressed with what can be done with Lego and the power of light and wind.

6.1.5 Sachs Harbour Solar Energy Project

The AEA supported the Hamlet of Sachs Harbour to apply for and secure $100,000 of Indigenous and Northern Affairs (INAC) EcoENERGY funding for a 15kW PV project. The system is ground mounted and first offsets the electricity consumption of the Hamlet Office. Excess electricity is fed back into the grid and banked as credit on an annual cycle, under a net metering program with the NTPC. The AEA was later retained to oversee the tendering and installation of the PV system on behalf of the Hamlet.

Figure 22 Installed Sachs Harbour PV system

Congratulations to the community for choosing renewable energy!

6.1.6 Northwest Territories Association of Communities AGM

The AEA was invited to present at the 49th annual gathering of the Northwest Territories Association of Communities (NWTAC) which took place at Katlodeeche (Hay River Reserve) May 6-11, 2015. Highlights of the Energy Audit Program, a collaboration project between NWTAC, AEA and some of the NWT communities were provided, as well as an update on AEA's current activities and initiatives.

Good feedback was received from a number of community representatives at the meeting and there was strong interest expressed in the need for building audits, solar and biomass information, and future energy planning. The gathering ended with an Open Discussion Forum with GNWT Ministers. In attendance were the Honourable Robert R. McLeod, the Honourable Glen Abernethy, the Honourable Tom Beaulieu and the Honourable J. Michael Miltenberger.

The NWT Association of Communities was formed in 1966 to represent the interests of municipal governments in the Northwest Territories. Every Community Government in the Northwest Territories is a member of the NWTAC.

6.1.7 NWT Skill's Competition

Yellowknife AEA staff had a great day at the NWT Skill's Competition. The interactive and hands-on activities generated plenty of interest from adults and youth. The booth demonstrated wind and solar power production, solar hot water and energy efficient LED lights. Students were surprised to learn that incandescent lights use seven times more electricity than the LED lights. Thank you to all the youth and adults who visited the competition.

Figure 24 AEA's Steve Outlet at the NWT Skills Competition

6.1.8 Community Health Fair in Fort Resolution

Figure 25 Louise Schumann and Tom Gross of AEA's Hay River office with NWTHC Staff at the Fort Resolution Community Health Fair

The AEA and the NWT Housing Corporation teamed up and shared a booth at the Community Health Fair in Fort Resolution on February 25, 2016. The Health Fair was very well attended by residents and positive 'energy' flowed throughout the event. Tom Gross, South Slave Regional Energy Project Coordinator and Louise Schumann, Regional Administrative Support took this great opportunity to share information on AEA's various rebate programs, energy conservation and efficiency and alternate energy sources. They also held two raffles for some neat

prizes. Thanks to Fort Resolution for hosting this event; and thanks to Kim Beaulieu with Northwest Territories Housing Corporation (NWTHC) for inviting us to their table.

6.1.9 Community Health Fair in Fort Simpson

Figure 27 AEA Teresa Chilkowich AEA Dehcho (in Ft. Simpson below) Community Health Fair

Figure 26 AEA Dehcho (in Ft. Simpson below) Community Health Fair

AEA's Teresa Chilkowich Dehcho Community Energy Coordinator participated in the Fort Simpson Health Fair in February, 2015. Many people stopped by the AEA table to check out a variety of energy-saving devices and to enter their names for a few draw prizes, which included block heater timers, low-flow showerhead, LED light bulbs, solar LED lamp, electrical power bar, and carbon monoxide detector.

6.1.10 Keeping Out Drafts in Fort Mcpherson

The Fort McPherson Tent and Canvas (FMT&C) has a new product that is hanging all over front doors in Fort McPherson. The product is a winter draft door protector, which is designed to hang on the outside of an exterior door to block drafts and keep the heat in. The protector is canvas on the outside and fleece lined on the inside and comes complete with grommets for easy hanging. The cover is designed to cover a standard door with over hang on all sides and the bottom. Custom sizes are available special order. Residents who are using them are giving the product great reviews. Congratulations to Fort McPherson Tent and Canvas for a local product that helps keep us warm while reducing heat loss.

Figure 28 FMT&C Energy Saving Product

6.1.11 Engaging Tłı̨chǫ Youth

Figure 29 Tlicho Youth in Whati Learning about Biomass Heating.

Youth in Whatì spent the day with AEA Regional Project Coordinator Sonny Zoe and learned about the benefits of locally harvested renewable energy.

The youth practiced their skills with the bow saw – an environmentally friendly alternative to the chainsaw. The wood will be used for firewood and heating. Sustainable healthy living with a touch of fresh air and exercise!

6.1.12 Inuvik Solar Information Session

AEA regularly hosts information sessions througout the NWT to inform and encourage residents to take action on their energy use such as the one advertised on the next page. Whether saving energy or considering renewable energy, the AEA makes sure people get the information they need to make wise energy decisions.

6.1.13 Getting the Word Out in the Tłı̨chǫ

Sonny Zoe (Regional Energy Project Coordinator – Whati) makes it a point to work with people one on one to help support their "Energy Conservation" goals. It starts with conversations with residents and eventually results in people taking action on energy.

6.1.14 Whatì Growing Local Food

Sonny Zoe, AEA's Tłı̨chǫ Regional Energy Project Coordinator is an active supporter and worker at the Whatì community garden. Every bite of food we grow locally saves energy. Trucking or flying in food to our communities requires energy and creates more greenhouse gases. Growing food locally means better tasting and fresher food too. The next picture shows residents of Whatì preparing for last year's growing season.

Figure 30 Whati Community Garden

6.1.15 Beavertail Jamboree 2015

Teresa Chilkowich, AEA's Dehcho Regional Energy Project Coordinator, took the Solar Demonstration Trailer to the Beavertail Jamboree in Fort Simpson. Teresa also had the opportunity to demonstrate the Dehcho office's new BioLite Basecamp, a portable wood-fired grill that generates electricity and stores it in a battery so that small devices such as cameras, mobile phones, and GPS units can be charged through a USB port integrated into this very efficient "rocket stove" technology.

Figure 31 AEA at the Beavertail Jamboree

The BioLite stove lit up quite easily and attracted the attention of Beavertail Jamboree participants as they waited for the adult traditional games to get started on a windy and cold March Saturday.

Figure 32 AEA's Teresa Chilkowich with the AEA Solar PV Demonstration unit at the Beavertail Jamboree

6.1.16 Fort Liard Community Visit

In mid-March, the AEA's Dehcho Energy Project Coordinator, Teresa Chilkowich, travelled to Fort Liard. Echo Dene students in Ms. Sarah's Grade 9-10 class and Ms. Amy's Grade 11-12 class were able to explore a variety of topics in the two sessions each class had with Teresa, covering the following questions …

- What kind of energy did we use to get to school today?
- What is energy and how is it measured?
- How much of our energy use relies on the production of electricity?
- How can I understand my family's power bill?

In addition, Teresa also connected with students at Aurora College where they discussed the impacts of our Energy Choices and the importance of using the knowledge we have of current challenges in order to create opportunities to make our communities healthier places to live. The Aurora College students were very keen and actively engaged in the topics discussed

The Aurora College and Echo Dene students also had the opportunity to see a demonstration of the BioLite Basecamp, to see how this very efficient wood stove can generate electricity that it stores in a battery so that small devices such as cameras, mobile phones, GPS units, can be charged through a USB port integrated into this very efficient "rocket stove" technology.

Figure 33 BioLite Stove in Action in Fort Liard

Picture of the Echo Dene elementary school students with the BioLite camp stove, L-R: first two students not identified, Kei McLeod, Syles Timbre, Naaka Duntra, Nathan Lomen, Kayne McLeod, William Gowans (Principal, Echo Dene School), Elizabeth Nelson, Kara Bertrand, Lorrissa Berrault.

6.1.17 Jean Marie River

AEA staff were in Jean Marie River in December. The regional project coordinator and an energy management specialist conducted energy audits on community buildings and hosted information sessions with a movie night. This infrared thermography image, taken during one of the information sessions, demonstrates a coffee pot sitting on its warming pad. The yellow shows the heat at the base of the pot, the orange shows the coffee, which isn't as hot as the warming pad, and the blues and blacks show that the surrounding temperatures are much cooler. The pink shows the heat loss from the warming pad and the coffee pot to the surroundings. This technology can be used to look at a building and see where heat is being lost so that energy efficient upgrades can be made.

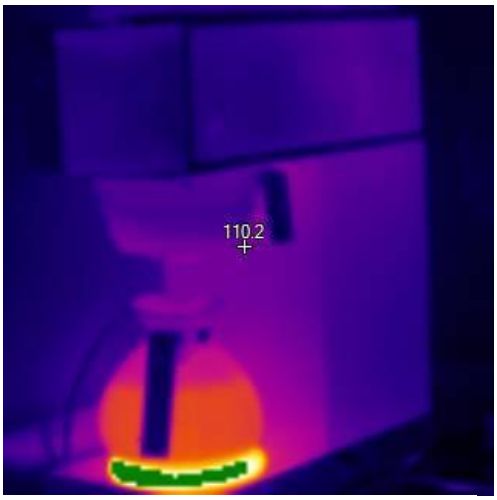


Figure 34 Infrared Camera Picture

6.1.18 Trout Lake

Teresa Chilkowich, AEA's Dehcho Coordinator, visited the community of Sambaa K'e First Nation (Trout Lake).

It was an opportunity to share energy conservation information and demonstrate how we can use renewable sources of energy to create heat & electricity. Students at Charles Tetcho School were keen to hear about & see the BioLite camp stoves that can not only cook your food but create & store electricity in a battery pack.


Figure 35 Trout Lake Students Learning about Renewable Energy

6.1.19 Talk Energy Week

During "Talk Energy Week" Myra Berrub (NTPC, Manager of Energy Services) and Teresa Chilkowich did a couple of presentations for the grade 9-10 and grade 11-12 High School students at Thomas Simpson High School on the 23rd of February.

Figure 36 Thomas Simpson High School Students (Grades 11 & 12) & Staff with Teresa and Myra during "Talk Energy Week"

This "Talk Energy Week" event was coordinated by Let's Talk Energy[5] was a great way to reach out to TSS High School students who were engaged throughout the two morning presentations. Teresa also shared a few video clips and an overview of the importance of energy in our daily lives by connecting the ways we use our personal energy with the way we need to attend to the energy we use to power our homes, vehicles, food security, and other systems.

> "Talk Energy Week provided NTPC with an opportunity to reach out to the junior high and high school students in Fort Simpson to talk about the utility's large solar farm in their community. I truly appreciated the unique opportunity, not only to present to the students, but to do this alongside the AEA, who presented a more holistic view of energy and gave our presentations context. As we all know, Teresa has an amazing ability to build excitement and was quite skilled at engaging the students and getting them involved in the discussion." Myra Berrub (Manager of Energy Services, NTPC)

[5] http://energy.techno-science.ca/ and http://energy.techno-science.ca/en/talk-energy-week.php

6.1.20 Northern Farm Training Institute – Greenhouse Conference

AEA attended the NWT CanGrow Greenhouse Conference on March 11 and hosted at the Northern Farm Training Institute (NFTI). "The purpose of the conference was to bring together researchers and industry professionals from around Canada and NWT growers to talk about greenhouse technologies and how we can use different things to grow better in the North," said Kim Rapati, the operations manager with NFTI.

6.1.21 EV and PV Promotion

6.1.21.1 LKFN 3rd Annual Spring Gathering

Dehcho Community Energy Coordinator, Teresa Chilkowich AEA's had the Plug-In Electric Hybrid car alongside the AEA's Solar PV Demonstration trailer at the Liidlii Kue First Nation's 3rd Annual Spring Gathering on June 20, 2015. Community members interested in learning more about Electric Vehicles were able to get a closer look at how it works.

6.1.21.2 Dehcho EV Tour

The AEA's Teresa Chilkowich demonstrated the Electric Vehicle (EV) and the PV demonstration trailer at the Dehcho First Nations (DFN) Annual Assembly in Ft. Simpson from June 24-26, 2015. Delegates and assembly guests were able to check out the very quiet EV and see the two PV modules with their instrumentation panel mounted on a utility trailer. Teresa then drove and demonstrated the EV in Fort Liard, Kakisa, the Hay River Dene Reserve, Hay River, Fort Providence and at Yellowknife's Folk on the Rocks.

6.1.22 LED Bulbs Available in Ulukhaktok

Patrick Joss is proud to announce the new arrival of energy efficient LED bulbs at the Northern Store in Ulukhaktok. LED bulbs use 1/5th of the energy that a traditional incandescent light bulb and has a longer life expectancy. They are also available in different light colours so it is possible to choose the light best suited to your use.

6.2 Domestic Hot Water Heater Test Analysis

6.2.1.1 Domestic Hot Water Heater Testing

The AEA's South Slave Office in conjunction with Aurora College's Thebacha Campus is conducting independent testing of various domestic hot water heaters. This initiative was conceived mainly to be able to provide public information showing an operating cost analysis on some of the standard oil, propane and electric hot water heaters and also

being able to compare them to the new "super" insulated tanks found in the market place.

Tests conducted on the hot water heaters will be done under controlled conditions measuring the amount of time and energy required for each tank to heat water from a set start temperature up to a maximum set temperature. A recovery test is then performed to simulate an average morning usage measuring water temperatures on 5 to 20 gallon drain down and time and energy required to recover back to the maximum set temperature. Standby losses for both power on and power off are also measured for both time and the energy required. Additional information will also be collected such as initial cost along with regular service and maintenance.

6.2.2 Heat Pump Hot Water Heater Testing

Testing is also being done using a 70-gallon heat pump hot water heater that has been installed in a 17-unit senior's independent living facility. This hot water heater uses waste heat from inside the mechanical room to produce hot water efficiently through a heat pump while expelling cool air to the room. Currently many multi-unit buildings are operated throughout the NWT where boiler rooms are in operation all summer providing domestic hot water through an indirect fired heater. While these indirect heaters work efficiently during the heating season there are considerable losses during the off-season that result in over heating of both mechanical rooms and adjacent living areas.

Overall the goal we hope to achieve will be to continue to conduct on-going testing on new technologies that emerge to provide information to homeowners in order for them to be able to make a conscious decision on what type of domestic hot water heater would be best suited for their needs whether it's in the construction of a new home or replacement of an existing appliance.

Working in conjunction with Aurora College provides its students with "hands-on" to new technology that will focus them toward energy conservation prior to entering into the workforce.

6.3 Safe Wood Stoves in The Sahtu

In August 2014, the AEA conducted three Wood Energy Technology Transfer (WETT) courses over a six-day period in Norman Wells to help train local and regional residents to become WETT Certified. The WETT training teaches how to safely install wood stoves and greatly reduce the risk of house fires, and to use the wood appliance efficiently in order to get the most heat possible. In anticipation of their wood stove program, Fort Good Hope

sent three students to participate so that their community was prepared and certified to install 30 wood stoves.

Figure 37 Picture was taken in Fort Good Hope by AEA

This was followed up by the Fort Good Hope wood stove project in March 2015 where a WETT Certified technician instructed the practical hands-on training to two local WETT. The practical hands-on component of the training assisted WETT students to further their knowledge and comply with the high standards of workmanship, and compliance with the manufacturer's instructions and WETT certification standards.

The project installed 10 EPA wood stoves in Fort Good Hope under an agreement with the GNWT Department of Environment and Natural Resources, and 20 wood stoves under the K'asho Got'ine Community Council and Ne'rahten Development wood stove project.

7. COMMERCIAL ENERGY CONSERVATION AND EFFICIENCY PROGRAM

The CECEP with funding of $200,000 plus an additional $50,000, all from the GNWT's Department of PWS, supported commercial building owner energy savings through rebates up to $15,000. This amount is calculated as the lower of one-third of renovation costs or five times annual energy savings.

Demand for the CECEP quickly exceeded available rebate funds and thanks to the GNWT an additional $50,000 was made available to support client rebates of $180,340. The rebates have supported over $1,281,117 in total spending in the economy. The Program is a commitment made in the GNWT Electricity Review and in response to the elimination of the commercial component of the Territorial Power Subsidy Program. The results of this year's CECEP efforts are summarized in the next Table.

Table 10 CECEP Results

Reporting Metrics	CECEP
Total no. of rebates	17
No. rebates in Yellowknife	8
No. rebates outside Yellowknife	9
Total rebate $	$181,250
Average rebate	$10,662
Total capital cost	$1,280,000
Est. annual savings	$243,000
Est. annual electricity savings (MWh/year)	450
Est. annual propane savings (litres)	3,900
Est. annual oil savings (litres)	40,000
Est. annual CO2e savings (tonnes)	280
Total No. desk-top energy evaluations (includes P-files and yardsticks)	11
No. desk-top energy evaluations (includes P-files and yardsticks) - YK	2
No. desk-top energy evaluations (includes P-files and yardsticks) – outside YK.	8
Total No. on-site energy evaluations (ERS and audits)	8
No. on-site energy evaluations (ERS and audits) – YK	2
No. on-site energy evaluations (ERS and audits) – outside YK	6

7.1 General Information

AEA provided advice and information about the CECEP Program to numerous clients throughout the NWT. Information was mostly delivered by AEA staff while delivering community information sessions. Technical staff also visited businesses to provide advice. Technical staff answered inquiries and all staff promoted the program to local businesses

while doing community visits. AEA also undertook some marketing activities to promote the program.

7.2 Yardstick Audits

When clients contact the AEA regarding CECEP, some already have a specific initiative(s) in mind and have a good idea of the estimated savings that would result from their implementation. Clients without this knowledge are provided a yardstick audit to identify, using utility data from previous years, the areas that indicate optimum improvement, and the estimated yearly savings that would potentially result from the implementation of suggested measures.

7.3 Site Audits

After identifying the areas where the most likely savings exist through a yardstick audit, AEA completes a site audit to provide the best advice to the client in terms of the specific options available and their respective value and limitations. These audits provide options with estimated savings, costs and paybacks specific to the building audited to help the clients prioritize spending on energy retrofits.

In 2015-16 clients in the following communities benefited from the CECEP program financially through rebates and on an ongoing basis through avoided energy expenses.

Table 11 CECEP Client Rebates 2015-16

Community	Client Type	Relevant total capital cost ($)	Funding provided by AEA ($)	Estimated annual savings ($)
Yellowknife	Business on-grid	41,126	13,709	11,374
Hay River	Business on-grid	67,208	10,755	2,151
Yellowknife	Business on-grid	47,336	15,000	5,952
Yellowknife	Business on-grid	207,829	15,000	66,453
Yellowknife	Business on-grid	42,248	14,083	6,602
Fort Good Hope	Business on-grid	97,641	15,000	36,450
Yellowknife	Business on-grid	18,981	6,327	3,372
Colville Lake	Business on-grid	36,742	2,203	1,073
Yellowknife	Business on-grid	11,029	2,761	2,593
Fort McPherson	Business on-grid	279,055	15,000	52,938
Yellowknife	Business on-grid	241,500	15,000	17,509
Inuvik	Business on-grid	7,968	2,656	5,815
Fort Smith	Business on-grid	65,241	15,000	9,953
Tulita	Business on-grid	48,678	15,000	12,757
Fort Good Hope	Business on-grid	42,452	14,151	3,646
Fort Providence	Business on-grid	17,000	5,667	2,471
Yellowknife	Business on-grid	9,083	3,028	1,829
Total		**$1,281,117**	**$180,340**	**$242,938**

8. ALTERNATIVE ENERGY TECHNOLOGIES PROGRAM - RESIDENTIAL AND COMMERCIAL

The AETP with $310,000 and supplemented with an additional one-time funding injection of $100,000 supported the delivery of two program streams; the Residential (clients are eligible to a maximum of $5,000), and the commercial/institutional (clients eligible to a maximum of $15,000).

The AETP provides funding for renewable energy sources such as solar, wind, and wood pellet heating for communities, businesses, residents, as well as Aboriginal governments and non-profits. This program has been very popular, and in 2015-16 the GNWT provided an additional $100,000 to meet some of the additional demand which included 18 Yellowknife, 9 Hay River and eight Regional Communities clients. The results of this year's AETP efforts are summarized in the next two tables.

Table 12 AETP Results

Metric	AETP Commercial	AETP Residential
Total no. of rebates	14	29
No. rebates in Yellowknife	3	10
No. rebates outside Yellowknife	14	19
Total rebate $	$143,358	$108,708
Average rebate	$10,240	$3,749
Total capital cost	$756,007	$381,712
Est. annual savings	$46,522	$27,970
Est. annual electricity savings (MWh/year)	6.9	
Est. annual oil savings (litres)	62,809	
Est. annual CO2e savings (tonnes)	191	
Total No. desk-top energy evaluations (includes p-files and yardsticks)	1	18
No. desk-top energy evaluations (includes p-files and yardsticks) - YK	1	10
No. desk-top energy evaluations (includes p-files and yardsticks) – outside YK		8
Total No. on-site energy evaluations (ERS and audits)	1	18
No. on-site energy evaluations (ERS and audits) - YK	1	10
No. on-site energy evaluations (ERS and audits) – outside YK		8

8.1 NWT Solar Energy Grows[6]

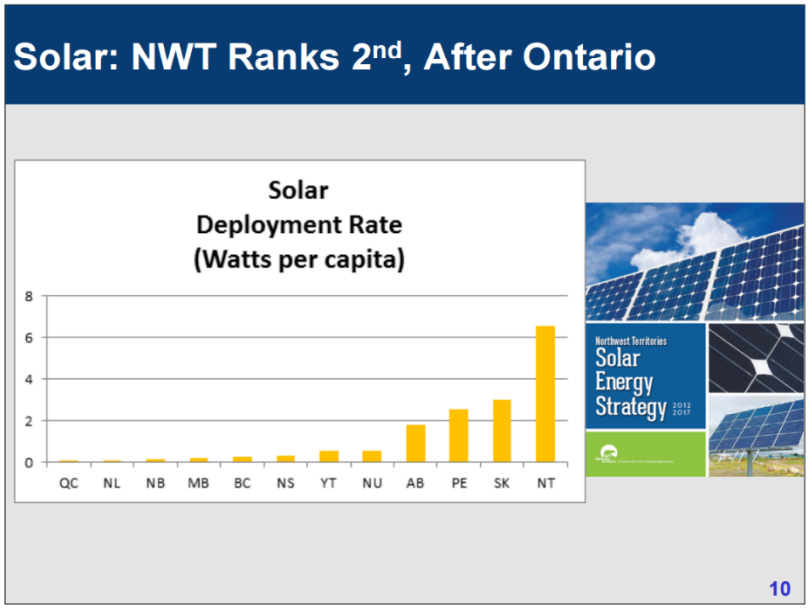


Figure 38 NWT Leads Canada in Per Capita PV Deployment

As reported by Kate Kyle of CBC News on December 28, 2015 Mike Freeland spent $20,000 to outfit his Yellowknife home with solar panels, with a government rebate covering a further $7,500.

He says it will take about 11 years to recoup his investment. "Solar is there. We should be using it," says Yellowknife homeowner Mike Freeland, who says he's saved hundreds of dollars since he installed a five-kilowatt solar photovoltaic (PV) panel system on his home in July. Along with reducing Freeland's environmental footprint, Freeland says the goal is to "end up with very little or zero power bill at the end of the year."

He admits the $28,000 project wouldn't have made sense without help from the territorial government, which offered a rebate of about $7,500 through its Alternative Energy Technologies Program. He says it could take up to 11 years to recoup the $20,000 cost to himself. Mike Freeland is among 47 homeowners and businesses from across the territory who applied for alternative energy rebates this year. The demand for PV was significant and it's proven by the NWT having the greatest PV deployment rate in Watts per capita in Canada.

8.1.1 AEA PV Support Services

AEA provides AETP clients with considerable staff time and professional expertise. For example, the public service delivered to an AETP client by way of a typical solar assessment includes the following work:

[6] Source: http://www.bullfrogpower.com/wp-content/uploads/2015/09/Day2-Part3-GNWT_09-17-2015.pdf

1. Initial interview with interested client (residential, business, or community).).
2. Further evaluation and review of the type of system the client wants.
3. Identify solar electricity generation and consumption requirements of the client. If grid-connected and net-metered, identify annual (April 1 – March 31) electricity consumption of the client.
4. An internet site review (Google Earth, Community Maps, available pictures) of the proposed site location.
5. An on-site assessment of the preferred site location(s).
6. Back at the office, complete the Solar Pathfinder software analyses.
7. Perform a RETScreen analyses based on the system production output of the Solar Pathfinder.
8. Summary report and meeting with interested client.

Tables 13 and 14 provide information about the type of residential and business renewable energy systems installations that received rebates from the AETP. In total 43 renewable energy systems were installed at a cost of $1,137,719, of which $252,066 was rebated back to the AETP clients by the AEA. It was an impressive busy year for the AETP.

Table 13 AETP Residential Clients Rebates

Project Type	Location	Size	Total Cost	Rebate
PV	YK Area Off Grid	0.5 kW	3,951	1,392
PV	Hay River	4.8 kW	15,296	5,000
PV	Yellowknife	5.035kW	16,627	5,000
PV	Yellowknife	3 kW	12,121	4,449
PV	Yellowknife	3.71 kW	12,293	5,000
Wind Turbine	Tuktoyaktuk	0.4 kW	2,819	1,180
PV & Wind	YK Area Off Grid	.6 kW	13,849	4,570
PV	YK Area Off Grid	1.56 kW	20,440	5,000
PV	YK Area Off Grid	.48 kW	15,285	4,192
PV	Yellowknife	3.445 kW	15,355	5,000
PV & Wind	Remote Location	1.4 kW	16,295	5,000
PV	Yellowknife	5.3 kW	22,040	5,000
PV	Hay River	3 kW	16,109	5,000
PV	Hay River	.9 kW	15,931	5,000
PV	Hay River	3 kW	16,109	5,000
PV	Yellowknife	1.59 kW	12,376	4,072
PV	Yellowknife	2.12 kW	10,655	3,552
PV	YK Area Off Grid	.5 kW	10,098	1,684
PV	YK Area Off Grid	1.56 kW	3,443	1,148
PV	Yellowknife	2.12 kW	9,778	3,259
Wood Pellet Boiler	Yellowknife	28 kw	29,392	5,000

PV	Inuvik	10.92 kW	33,850	5,000
PV	Yellowknife	2.12 kW	12,011	4,103
PV	YK Area Off Grid	.75 kW	11,668	3,889
PV	YK Area Off Grid	0.75 kW	7,760	2,619
PV	Hay River	3.12 kW	13,772	4,591
PV	YK Area Off Grid	2 kW	7,682	2,439
PV	YK Area Off Grid	2.19 kW	3,850	1,283
Wind Turbine	YK Area Off Grid	.4 kW	857	286
Total Residential Clients			**$381,712**	**$108,708**

Table 14 AETP Business Client Rebates

Business Clients				
Wood Pellet Boiler	Yellowknife	56 kW	45,924	15,000
PV	YK Area Off Grid	1.5 kW	10,564	3,538
Wood Pellet Boiler	Inuvik	64 kW	81,850	15,000
Solar Hot Water	Hay River	10 collectors	27,162	10,129
PV	Hay River	6 kW	41,012	15,000
PV	Hay River	8.1 kW	37,414	13,616
PV & Wind	Remote Location	2.1 kW	44,940	14,980
PV	Yellowknife	5.3 kW	22,388	7,463
PV	Yellowknife	2 kW	22,834	8,198
PV	Remote Location	.75 kW	15,021	5,946
Cord Wood Furnace	Inuvik	20 kW	5,505	1,835
PV	Remote Location	15 kW	352,257	15,000
PV	Remote Location	6 kW	33,793	11,264
Wind Turbine	Remote Location	1 kW	15,343	6,390
Total Business Clients			**$756,007**	**$143,358**
Grand Total			**$1,137,719**	**$252,066**

9. COMMUNITY RENEWABLE ENERGY PROGRAM

The GNWT funded AEA $150,000 of which $120,235 was provided as rebate funding to CREP clients that in turn spent about $1,000,000 on renewable energy projects. CREP applicants were eligible to receive funding of up to one-half (50 percent) of the project cost, up to $21,000. In 2015-16 there were 11 community applications; three of which were from the City of Yellowknife. The Table below summarizes community renewable energy projects funded through CREP. The results of this year's CREP efforts are summarized in the next two tables.

Table 15 CREP Client Summary

Project Type	Location	Installed kW	Total Qualify Costs	Rebate Amount
PV & Wind	Fort Providence		59,930	13,801
PV	Aklavik	3	23,341	17,169
PV	Sachs Harbour	15	230,000	21,000
PV	Yellowknife	25	22,050	11,025
PV & Wind	Fort Simpson	0.56	10,500	9,576
PV	Inuvik	5	31,000	5,664
Other	Yellowknife		221,000	21,000
Biomass	Whati		500,000	21,000
TOTAL			**$1,097,821**	**$120,235**

Table 16 CREP Results

Metrics	CREP Community Government Non-Profit
Total no. of rebates	8
No. rebates in Yellowknife	2
No. rebates outside Yellowknife	6
Total rebate $	$120,235
Average rebate	$15,029
Total capital cost	$1,100,000
Est. annual savings	$154,000
Est. annual electricity savings (MWh/year)	48
Est. annual oil savings (litres)	89,000
Est. annual CO2e savings (tonnes)	250
Total No. desk-top energy evaluations (includes P-files and yardsticks)	3
No. desk-top energy evaluations (includes P-files and yardsticks) - YK	1
No. desk-top energy evaluations (includes P-files and yardsticks) – outside YK.	2
Total No. on-site energy evaluations (ERS and audits)	3
No. on-site energy evaluations (ERS and audits) - YK	1
No. on-site energy evaluations (ERS and audits) – outside YK	2

*Not a calculated amount.

SPECIAL PROJECTS

10. SUPPLEMENTARY FUNDED GNWT PROJECTS

In 2015-16 the GNWT committed to providing the AEA $1.8 million over two years to deliver one-time supplemental projects confirming the AEA remains one of the most cost-effective and agile ways for the GNWT to deliver alternative energy, energy efficiency and energy conservation programs to the public.

Table 17 AEA Supplementary Funding

	2015-16	2016-17
Alternative Energy Technologies Program	$150k	0
Commercial Energy Conservation and Efficiency	$50k	0
Condominium Corporation Biomass	0	$50k
Community LED Swap-Out	$150k	$300k
Community Government Solar Projects	$175k	$100k
Community Government Energy Retrofits	$50k	$50k
Commercial Energy Retrofits	0	$50k
Community Wood Stove Partnership	$150k	$100k
Energy Rating Services Support	$15k	$85k
Energy Information and Awareness	$100k	$25k
Total	$840k	$760k

The Funding supports a new LED "community swapping out" program that will involve installing more energy efficient bulbs in homes, businesses, and government buildings; assistance for local governments to install solar panels; helping condo corporations in the North with biomass heating rebates; providing wood stove set-up partnership with community governments and their residents; and facilitating heating ventilation and air-conditioning inspections for both commercial and government properties.

There will also be further energy rating services to help especially low income people who have had energy rating service assessments in meeting their energy savings at home. The AEA is also working on a database project that will compile more precise information and trends about energy consumption in NWT communities.[7]

[7] Yellowknife, Friday, December 4, 2015

10.1 Condominium Corporation Biomass

The GNWT provided the AEA one-time funding to help two condominium associations install biomass heating systems. AEA advertised for two partner condominium corporations interested in installing pellet boilers to heat their condominium units. These installations will reduce heating costs and greenhouse gas emissions. AEA will provide up to $15,000 per installation, as well as assistance with project development.

AEA's responsibilities include: helping to build a business plan with financing options; presenting information sessions to condominium association members as required; and, support in choosing contractors.

Condominium corporation's responsibilities include: expressing interest in use of the project funding and providing AEA with two years' compilation of heating, power and water (if available) bills. This is important because AEA must complete yardstick audits before starting the project.

10.2 Community LED Swap Out

The AEA will undertake targeted replacement of inefficient lighting in homes, businesses, and government buildings with a focus on thermal communities.

The intention is to take a direct approach and actively swap out light bulbs for residents and businesses. This project will replace at least 10,000 screw-in bulbs with LEDs in homes in thermal communities and retrofit a portion of the T12/T8 and incandescent lighting in larger buildings in all Regions of the NWT. When finished this project will reduce demand of installed bulbs by 400 kW (reduction in demand if all bulbs are on at the same time); reduce consumption by 500 MWh per year and reduce GHG emissions by 350 tonnes CO2e per year.

Figure 39 Chief Executive Officer – Stephen Jackson, Avens receiving rebate from Louie Azzolini, Executive Director of AEA

To make sure the project is successful when it's rolled out throughout the NWT's thermal communities in 2015-2016 the AEA did a trial run of the LED project in Yellowknife. The AEA issued an Expression of Interest call-out to non-profit organizations in Yellowknife to participate in a pilot program to replace existing lighting within their facilities/workplaces and upgrade to high-efficiency LED lights. Funding of up to $10,000 was made available to selected non-profit organizations for LED lighting upgrades.

11 expressions of interest were received and the Avens Seniors Community, the Centre for Northern Families, the NWT Society for the Prevention of Cruelty to Animals (SPCA) and the Yellowknife Ski Club best met the selection criteria for participation in the pilot project.

To date the AEA has:

- **Purchased screw-in bulbs**. 11,600 bulbs purchased and stored in Hay River. With a targeted distribution by region in thermal communities in the Fall and winter of 2016/17.
- **Delivered a YK pilot for Community/Institutional buildings (ICI)**. Participating in the pilot were Avens, the Centre for Northern Families, the SPCA, and the YK Ski Club.
- **Agreements/Contracts for thermal community ICI buildings.** Released a call for Expressions of Interest from thermal communities for *a Fall of 2016 installation.*

10.3 Community Government Solar Projects

The AEA is supporting community governments in thermal communities with the integration ofto integrate solar energy into the existing community government buildings. This one-time opportunity includes money and technical help to plan and buy the solar photovoltaic systems. Seven communities responded to a call for Expressions of Interest to participate in the project and the community governments of Aklavik, Fort Simpson, Jean Marie River and Whatì best met the following detailed requirements/criteria.

The AEA entered into partnership agreements with the community governments. Through a competitive bidding process contractors were selected for each of the respective participating communities and all the materials for the project were purchased and delivered to the respective communities for summer of 2016 installation.

Figure 40 Fort Simpson Arena, wall mount solar system

Thanks to the supplementary funding the AEA is supporting these community government building PV projects.

- **Aklavik 15kW (Contractor: Northern Energy Innovations) arena:**
  Material delivery to site and install by June 30, 2016.

- **Fort Simpson 10kW (Contractor: Bradbury Interiors) arena:**
  Material delivery to site and install by June 15, 2016.

- **Whatì 10kW (Contractor: NWT Solar) cold storage facility:**
  Material delivery to site with installation by June 30, 2016.

- **Jean Marie River 6kW (Contractor: NWT Solar) water treatment plant:**
  Material delivery to site with install by August 30, 2016.

All installs will include a community event and training of relevant staff and community members. All systems will be monitored with online monitoring.

10.4 Community Government Energy Retrofit

The AEA, in partnership with community governments, is engaging contractors to inspect, repair and calibrate/optimize ("recommission") the heating, ventilation, and air-conditioning systems in select community government buildings to improve energy efficiency. The AEA is selecting which community government buildings to target for support based on most effective use of the money.

A system training component for local community maintainers will be incorporated into the project along with recommended upgrades for future retrofits. This is a one-time opportunity that includes money and technical help to prepare and assist in administering the Request for Proposal (RFP) and point based contractor selection process.

The community governments of Fort Simpson, Fort Resolution and Jean Marie River as well as the Liidli Kue First Nation responded to the call for Expressions of Interest. The Village of Fort Simpson's visitor information centre was ultimately selected for support based on an evaluation of the effective use of funds.

10.5 Community Wood Stove Purchase & Installation Partnership

The AEA is partnering with community governments to support the purchase and installation of wood stoves for its residents living in privately owned homes. Community governments that previously expressed interest in wood stove projects and demonstrated commitments to energy conservation were first offered the opportunity to partner with AEA.

AEA provided 50 percent of the costs associated with the purchase and transportation of the wood stoves (including chimney, hearth pads and additional materials need for installation). The AEA will provide 50 percent of the costs associated with the WETT Certified installation of the stoves during in 2016-2017.

The community government is responsible for all the work including selecting eligible residents, hiring the contractors, and for installing the stoves using a WETT Certified supervisor. As of March 31, 2016 this had been accomplished.

1. **Agreements made with five communities** (Gamètì, Behchokǫ, Deline, Tulita and Fort Good Hope) to work with AEA on this project and provide 50 percent of the funding for the purchase and delivery of wood stoves, flues, chimneys, hearth pads and other related materials.

2. **List of homeowners** provided and homes assessed to determine viability of wood stove installation, materials list, ensure homeowner understands their responsibilities.

3. **Cost estimates** for Phase 1 (wood stove, chimney and materials) based on home assessments provided to community government.

4. **Invitational RFPs sent out to 3 NWT contractors**, evaluated, and a contractor hired to supply and deliver the wood stoves to all five communities.

5. **Ordering of all materials** (stoves, chimneys and related materials)

6. **Delivery and secure storage of all materials** (stoves, chimneys and related materials) to all five communities – Deline – 10 stoves; Fort Good Hope – 10 stoves; Tulita – 8 stoves; Gamètì – 15 stoves; Behchokǫ – 16 stoves – Total 59 stoves & materials.

7. **Payment of costs for stoves**, chimneys and related materials by community governments and AEA.

10.6 Energy Rating Services Support Program (ERS) - Home Energy Rating Follow-up Rebate

The AEA contacted 90 homeowners that had an ERS performed on their home in the last 3 years to determine their interest in participating in a rebate project that would see 20 percent of material costs to a maximum of $5,000 rebated upon completion of energy upgrades. AEA found the rebate offered was an insufficient incentive for homeowners to undertake recommended home energy upgrades. Based on a review of the respective homeowner files, most AEA recommendations included air sealing, furnace servicing and programmable thermostats; all important items for any homeowner that would have great results in regard to saving them money.

10.7 Energy Information and Awareness

AEA used the supplementary funding to start or deliver four partnership projects with NTPC, the Department of Education Culture and Employment (ECE), PWS and Territorial Libraries.

10.7.1 NTPC Real Time Energy Generation

In partnership with NTPC, AEA is contributing funds and support toward putting NTPC's energy generation information online with real time updates. This pilot project will enable community residents to see how much fuel is being used and the amount of electricity being generated at any given time.

10.7.2 Great Northern Solar Car Race

In partnership with the GNWT Department of Education Culture and Employment (ECE), AEA is sponsoring the Great Northern Solar Car Race. Schools use the materials provided

by AEA to complete and test their solar powered car. Participants can test and retest their vehicle as often as they like in preparation for race day. There are three categories:

1. Fastest car (25 metres, time measured to the nearest second).
2. Longest distance travelled (in metres) at one time without stopping.
3. Lightest car (in grams) that travels the greatest distance, (in metres).

This is what teachers had to say about the Great Northern Solar Car Race.

> *"I love the kit! My students love it too! They are working individually, with a partner or with a group of 3 (which I think is a good maximum number of students per car) and they are so motivated and creative!! They are asking really great questions and I am letting them research answers, but told them I don't want their parents helping them because then it is not their work. My students are in grade 7 so renewable energy fits into the science curriculum. Thank you for this opportunity!"*

> *"I could see this being an annual event. I could see us making solar boats with the repurposed motors and the solar panels before the year is over. The modifications during the races provided lots of learning opportunities, kids connecting two solar panels changing gears, etc. The importance of having the car wheels aligned was realized as the races progressed."*

> *"I'm so glad the students had a ball. Would you like to see this as an annual spring activity?"*

> *"We do not have an outdoor asphalt space so we had to improvise a course with plywood. As a result our cars only raced for 9m instead of 25m. We calculated the distance travelled without stopping based on the distance that the cars can travel without bumping into the sidewalls of the track. From what we observed on solar trial day as well as during battery powered testing, the cars would continue on until something stopped them or the sun went away. There is a brief description for each car of both identifying colours or decorations as well as the type of vehicle it was (fan, pulley, or gear powered). This opportunity allowed for many opportunities for inquiry, experimentation and fun. The quality of the kits were exceptional, there were endless*

options for the students to choose from and experiment with allowing for a very open-ended project. Thanks so much for the amazing opportunity."

"The students had a BALL!"

10.7.3 PWS Enterprise Energy Database

In partnership with the GNWT Department of PWS, AEA is supporting the development of a relational database to house all AEA and GNWT energy data and information. This year a contractor was selected to create a relational database structure suitable for the Government of the Northwest Territories (GNWT) to house relevant energy information. The database structure should feed into the development of the actual database should funding and interest continue.

10.7.4 Territorial Libraries Lending Out Kill-A-Watt-Electricity-Monitors

In partnership with the Territorial Libraries, AEA purchased electric consumption devices (Kill-A-Watt-Electricity-Monitor) and the Territorial Libraries will lend them out as they would their library materials. In the Fall of 2016, every NWT Public Library will receive three Kill-A-Watt-Electricity-Monitors for the public to borrow. These meters will circulate like any other items. Each meter will have a barcode so they can be checked out. The Energy Usage Meter Project will be promoted in a number of ways – through newsprint, radio, online, and/or TV. There will be posters mailed to each library to advertise the availability of these meters in your community public library. There is the possibility of a "kick off" event in some of the communities that have AEA staff. Public Library Services will provide more information in early September 2016.

10.7.5 Community Energy Profiles

The AEA is undertaking to complete its third round of community energy profiles. The AEA created the first series of NWT community energy profiles in 2005 and released a second series in 2010. The profiles were presented in a "plain language" poster format that showed the information without technical jargon. They were very well received and word spread across the north - all communities in Nunavut and even Northern Labrador paid to have profiles done. But none of it would have been possible without the data provided by NTPC, Northland Utilities, the Petroleum Products Division and private fuel distributors.

11. PROGRAM EVALUATIONS AND ASSESSMENTS

11.1 Electric Hot Water Heaters (EHWH) Replacement Program

AEA undertook an independent evaluation of the EHWH replacement program examining its delivery and results using empirical data, participant assessments, and a review of internal AEA activities.
The learnings from the evaluation will be used to improve AEA's service delivery and management's service to the staff at the AEA.

Figure 42 Oil-fired hot water heater

Figure 41 Direct vent propane HWH

11.2 ERS Client Survey

The ERS program has the opportunity to expand its impact by addressing obstacles to lower income participation and engaging with the construction sector.

Of concern is the minimal uptake of recommended measures. The ERS program is a rigorous tool for providing advice to homeowners; however, the cost for each audit is approximately $1,000 which is then subsidized by the GNWT. Consideration should be given to either developing funding mechanisms and incentives to support greater uptake for all measures, or targeting the ventilation "low hanging fruit" and promoting this to a wider audience.

Whether the program remains as is or sees a refocus of efforts, AEA is viewed by NWT residents as a trusted source of energy efficiency information and a credible third party agency to support the delivery of GNWT's energy strategy.

11.3 Assessment of Low Income Energy Efficiency Programs and Opportunities for AEA

NWT has the third highest per capita residential energy consumption across Canada and energy subsidies represent a significant and unsustainable cost to the GNWT. As the

delivery agent for GNWT's energy efficiency activities, the AEA seeks "to promote and facilitate the adoption of efficient and renewable energy practices by all members of NWT society." However; a preliminary review of AEA program activities indicates that mid-to-low income households are not benefitting from currently available energy efficiency opportunities and further work is needed to identify this sector and address barriers to their participation. This is particularly important for this sector as energy costs to income are substantial as compared to higher income households.

The report's recommendations provided suggestions and approaches for:

- Developing energy efficiency goals and targets including consistent metrics for target measurement.
- Identifying potential funding opportunities.
- Targeting potential audiences.
- Clarifying partnerships with key agency and energy stakeholders.
- Strengthening training and education opportunities.
- Developing energy efficiency packages.
- Strengthening data exchange.
- Developing consistent evaluation approaches.

12. NUNAVUT ENERGY SECRETARIAT

The Nunavut Energy Secretariat (NES) and the AEA have been working together for several years to facilitate the implementation of energy efficiency measures and renewable energy technology in Nunavut. The organizations have similar mandates, and a pan-territorial sharing of knowledge and skills is aiding in the adoption of appropriate technology to solve problems specific to Canada's North. The NES retained the AEA to provide energy services in Rankin Inlet and Cambridge Bay in the winter of 2016.

AEA delivered residential, commercial energy rating and advisory services. As reported on September 29, 2015[8] by the GN, AEA, offered free energy audits to 10 Rankin Inlet homeowners. "This is a great opportunity for homeowners," said Monica Ell, Minister of Energy. "This audit rates the energy performance of your home and identifies energy saving measures. Not only does it assist homeowners, but the audits also help the community understand how housing construction and our behaviours affect our overall energy consumption."

[8] September 29, 2015 http://www.gov.nu.ca/edt/news/energy-audit-opportunity-rankin-inlet-homeowners

The audits allow CEA to perform energy audits through home evaluations and blower door tests. Each participating homeowner then received an energy report. Information gathered from the audits provides the GN with more data in order to promote energy efficiency standards and measures in the future.

AEA staff were asked by the NES to complete energy evaluations in Rankin Inlet this October. We were there for eight days doing energy evaluations of 10 homes and two Hamlet buildings and holding an evening Energy Awareness information session for community members.

Figure 43 AEA's Ken Baigent in Rankin Inlet

This photo shows Ken Baigent of AEA in front of the Solar Wall at Alaittuq High School. This type of solar wall captures the heat from the sun and uses it to heat the cold ventilation air coming into the building.

13. MURB STUDY

CMHC is funding a multi-year study of a MURB renovation. Last year AEA did a pre-renovation blower door test of Yellowknife's Aurora Ridge and this spring AEA completed a post-retrofit blower door test. AEA will analyse the results and provide the building owner a report of its findings. The second blower door test came together beautifully with AEA having seven staff on-board, plus 11 from Northview Property REIT.

Figure 44 The Northview participants included in the front row are: Jesse (Mechanical Systems & Controls), Scott (Maintenance Supervisor) and Mark (Building Maintenance Team Leader). The fellow in the back row beside Vince was one of the eight Hallway Monitors that Northview provided.

14. ELECTRIC VEHICLE

In the Fall of 2014, the AEA started their lease of an electric vehicle (EV), a 2015 Chevrolet Volt. With hydroelectricity being the main source of power in Yellowknife, an EV is able to take advantage of this and generate little to no emissions.

AEA has been monitoring the electricity and fuel used by the vehicle with an on-board data logger since January 2015. A study commissioned by AEA in 2013 entitled "EV Update" shows that EVs have potential in the north, especially in hydro powered communities where electricity generation creates less greenhouse gases (GHG).

The data logger used is made by FleetCarma and it keeps track of electricity used when driving, charging, and fuel consumption. Manufacturers always cold weather test their vehicles, however the winter testing conditions are often not representative of northern winters, and AEA wanted to get firsthand experience testing this EV in extreme winter conditions. An example of the FleetCarma dashboard is included at the end of the report.

The "real world" results to date suggest that, even with NWT's higher electricity costs using an EV, costs less than a conventional vehicle of comparable size – at least in hydro

communities. Also notable, is that the fuel efficiency of the Volt driving on gas alone is still better than a small sized 4-door like the Chevy Cruze. Data logger results show that summer driving in the City of Yellowknife is predominantly powered by electricity, while in the winter the gas generator operates quite a bit more to heat the battery and provide supplemental power. The Volt runs most efficiently in the summer and there is little difference in cost per kilometre between city and highway driving. The biggest difference is between winter and summer city driving where per kilometre driving costs double in the winter.

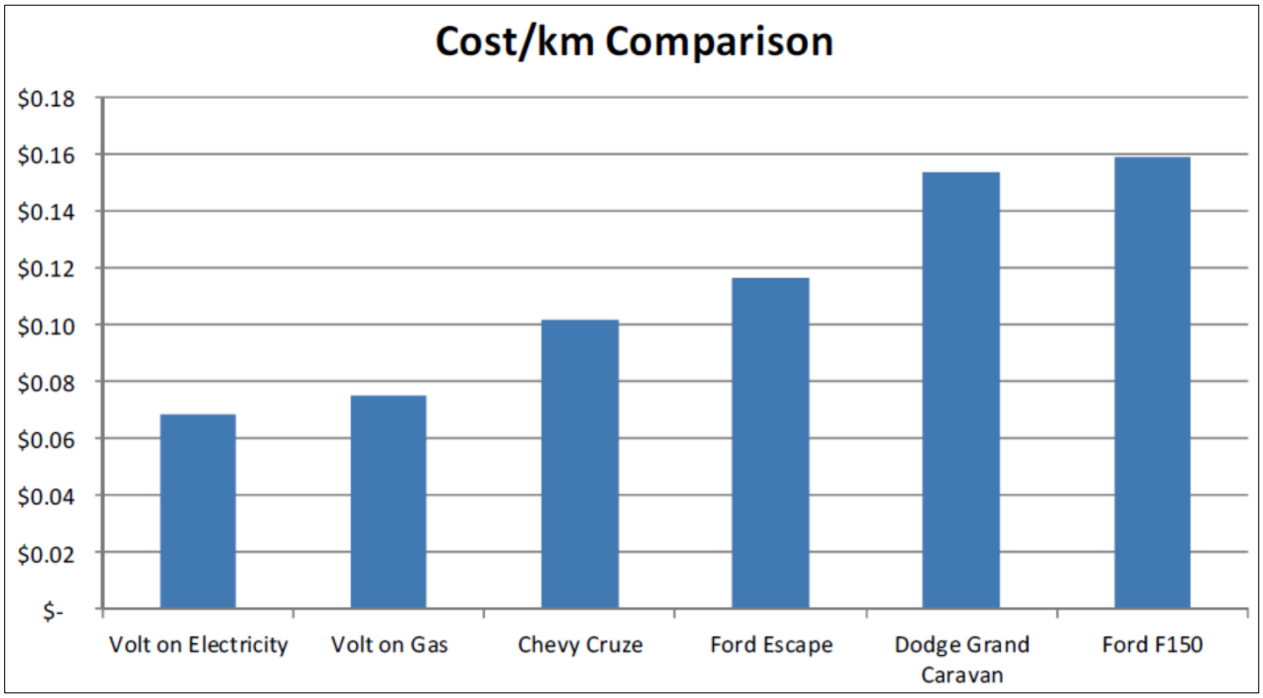


Figure 45 EV Comparison of Cost/km

Figure 58 is a cost per kilometre comparison of four passenger vehicle types as well as the Volt; the graph uses city driving fuel economy taken from NRCan testing. The fuel prices used in this graph are $0.32/kWh and $1.12/L. This cost comparison can obviously vary with changing fuel prices, and EVs become more attractive when gas prices are high and electricity prices are low. This demonstrates that even with NWT's high cost of electricity it is still less expensive to drive using electricity – at least in communities generating electricity using hydro. Also notable, is that the fuel efficiency of the Volt driving on gas alone is still better than a small sized 4-door like the Chevy Cruze.

15. CONTINUATION OF MONITORING OF NORTHERN SUSTAINABLE HOUSE (NSH), INUVIK NT

The AEA was retained by the NWTHC to provide monitoring, analysis, and a summative reporting of the NSH in Inuvik in 2012-13. The original scope of work envisioned one year of monitoring. Adaptive project management resulted in the NWTHC's desire for an additional year's monitoring. The AEA continued monitoring these energy producers and consumers in the NSH:

1. Electricity Use: Both units of the duplex comprising the NSH are wired with Site Sages (formerly emonitor) and they monitor electricity used on each circuit in the house. They are as detailed as possible since some circuits may contain multiple areas.
2. The photovoltaic panels are monitored using the Sunny Portal website.
3. Solar hot water – Temperature sensor and flow meter.
4. Boilers – Temperature sensor and flow meter.
5. Cold Water - Temperature sensor and flow meter.
6. HRV - Temperature sensor and flow meter.

The following Table describes the energy systems monitored on the NSH in real time.

Table 18 Energy Monitoring Parameters of the NSH

Unit	Parameter
kWh	Total electrical usage NSH A
kWh	Net electrical usage NSH A
kWh	Total electrical usage NSH B
kWh	Net electrical usage NSH B
kWh	Total electrical usage Mechanical Room NSH
kWh	Total PV production NSH A Site Sages (formerly eMonitor)
kWh	Total PV production NSH B Site Sages (formerly eMonitor)
kWh	Total PV production NSH A+B (Sunny Portal)
GJ	Heating Usage NSH A
GJ	Heating Usage NSH B
GJ	Heating Usage for Preheat on HRV NSH A
GJ	Heating Usage for Preheat on HRV NSH B
GJ	Hot Water Usage NSH A
L	Hot Water Usage NSH A
GJ	Total Energy Usage for Gas NSH A
GJ	Hot Water Usage NSH B
L	Hot Water Usage NSH B
GJ	Total Energy Usage for Gas NSH B
GJ	Solar Hot Water Production on NSH
L	Cold Water Consumption NSH A

Unit	Parameter
L	Cold Water Consumption NSH B
GJ	Net Hot Water Usage NSH A
GJ	Net Hot Water Usage NSH B

16. LUTSEL K'E PV SUPPORT SERVICES

Figure 46 Lutsel K'e's Solar PV System Installed.

The AEA was contracted by Lutsel K'e Dene First Nation to prepare a pre-feasibility study and an ecoENERGY proposal for a 35 kW Solar PV system (Project). AEA was then retained by the community of Lutsel K'e to project manage the project's delivery. The installation part of the project began with training in Lutsel K'e for interested community members. Eight people started the training, four completed the training and two people chose to work on the physical installation from start to finish.

This year AEA helped get the PV system fully operational and continues to provide on-going monitoring support. To top it all off, The CBC reported on March 27th 2015 the community of Lutsel K'e, N.W.T., had won a national award for its solar power project. The Canadian Solar Industries Association handed out the Game Changer awards in Toronto with Lutsel K'e winning in the Community/First Nations Solar Project category. Agatha Laboucan, Lutsel K'e's Senior Administrative Officer said "it's exciting to be recognized with a national award". "In the future it will give us money, a return back to the community," she said. " Lutsel K'e will lead the way to sustainable energy for other communities."

17. NEW HOMES IN THE CITY OF YELLOWKNIFE

The City of Yellowknife has a Building Bylaw requiring builders of all new residential housing to achieve a minimum EnerGuide Rating of 80. In order to receive a building permit, the builder must first present an EnerGuide plan file assessment analyses and report indicating the expected rating of the house, based on the information contained in the building plans, the mechanicals and ventilation systems the builder plans to install, and an assumed air leakage rate. If the house is not expected to achieve an 80, upgrade recommendations are provided that will bring the house up to (and exceed) the minimum 80.

The AEA is a licensed Service Organization with Natural Resources Canada to provide the EnerGuide for New Home evaluation service (aea.nt.ca/energy-evaluations).

Evaluating the house from a set of plans is only the beginning. With a building permit issued and construction underway, the AEA team of CEA provides builders with (construction advice, review of building materials performance, comparison of mechanical system efficiency, and a pre-drywall blower door test to check for air leakage). Once the house construction is complete and ready for occupancy, AEA undertakes a final "as-built" assessment to determine the EnerGuide Rating of the house, provides a report and rating label for the house, and registers it with NRCan.

OPERATIONS MANAGEMENT

The AEA uses cash based cost tracking, accrual accounting, and project resource-loading systems in its operations. The cash based project cost planning and tracking system and the Sage Quantum accounting systems enable project and ledger level budgeting and expense tracking. These two systems are linked.

ABAK is a timesheet and billing software that includes project set-up, budget, resources assignment, timesheets, and advanced reporting tools. Using ABAK, each staff member is loaded with time allocations for each project and task they are assigned to. This enables detailed project and task level staff activity planning and reporting.

The AEA has established policies, procedures, budgeting and expenditure control systems. The system requires all expenditures at the project and ledger level be pre-planned and budgeted. Once project and ledger level budgets are loaded into the cash based cost tracking and Sage Quantum accounting systems, purchase orders can only be issued if they are budgeted for; and, only within prescribed spending thresholds. All purchase orders are electronically generated and subsequently used to track planned, in-process and actual expenditures against budgeted expenditures.

Salary time expenditures are tracked using the ABAK software and paid using the Sage Quantum accounting system. Every two weeks' staff submit their ABAK time sheets to the Executive Director for review and approval. This system restricts staff to only booking time against projects and tasks they are assigned. Every two weeks, the approved ABAK time sheets are then loaded into the Sage Quantum accounting system and used to allocate staff costs to projects; and, for payment purposes.

AEA associates individual expenditures to vendors and projects. A single line item amount can be allocated to one or more projects, or AEA can allocate entire transactions to one or more projects. This provides AEA the flexibility to provide detailed project level expenditures such as those provided in AEA's Quarterly reporting.

Table 17 on the next page summarizes the outcome of AEA's work; Table 18 reports the total staff hours dedicated to achieve the outcome; and Figures 40 and 419 illustrate the information presented in Table 18.

Table 19 AEA Program Impact Summary

Metric	AETP Commercial	AETP Residential	CREP Community Government, Non-Profit	ERS	EEIP	CECEP	Community Government Energy Retrofit	Non-business and non-P11 NWT yardsticks	Nunavut	TOTAL (not including EEIP)	Analytical
Total no. of rebates	14	29	8		434	17	4			72	**100%**
No. rebates in Yellowknife	3	10	2		249	8	0			23	**32%**
No. rebates outside Yellowknife	11	19	6		185	9	4			49	**68%**
Total rebate $	$139,609	$108,708	$120,235		$163,888	$181,250	$49,000			598,801	
Average rebate	$9,972	$3,749	$15,029		$378	$10,662	$12,250			51,662	
Total capital cost	$674,157	$418,979	$997,821			$1,280,000	$98,000			3,468,957	
Est. annual savings	$46,522	$27,970	$50,000*			$243,000	$58,000			425,492	
Est. annual electricity savings (MWh/year)	6.9		37.3				12			56	
Est. annual propane savings							$0			-	
Est annual oil savings (litres)	62,809		32,205				27,000			122,014	
Est. annual CO2e savings (tonnes)	191		100				84			375	
Total No. desk-top energy evaluations (includes P-files and yardsticks)	1	18	3	102		11	13	4	2	154	**100%**
No. desk-top energy evaluations (includes P-files and yardsticks) – YK.	1	10	1	96		2	0	2	0	112	**73%**
No. desk-top energy evaluations (includes P-files and yardsticks) – outside YK.		8	2	6		8	13	2	2	41	**27%**
Total No. on-site energy evaluations (ERS and audits)	1	18	3	108		8	18		23	179	**100%**
No. on-site energy evaluations (ERS and audits) – YK.	1	10	1	82		2	0		0	96	**54%**
No. on-site energy evaluations (ERS and audits) – outside YK.		8	2	26		6	18		23	83	**46%**

Table 20 Staff Hours by Project 2015-16

Program / Supplementary Project	Total Staff Hours
Regional Offices P09	19,658
Program AEA	6,528
Residential Program P03	2,619
Community Wood Stove Project P26	2,285
Biomass P08	1,998
AETP P02	1,378
Communications P01b	1,357
Community Government Energy Retrofits P11	1,307
CECEP P10	1,295
Energy Management P01a	1,235
ERS - EGNH	1,141
EEIP P05	907
LED Communities P21	379
Nunavut Project C10	374
Solar Community Government P22	274
NWT Housing Corp NSH Monitoring C02	217
ERS Community Follow-up P27	201
Energy Information and Awareness P29	190
HVAC Recommissioning Community Gov. Buildings P24	146
Three CMHC Projects C30	139
Community Energy Profiles P28	134
Electric Vehicle C14	93
HR Biomass	84
For Service Client	40
Condo Corp Biomass P20	31
Electric Water Heater Replacement P06 (s/b in P09)	29
EnerGuide for New Homes - Monitor Two New Homes P04(s/b in P01a)	19
Grand Total	**44,056**

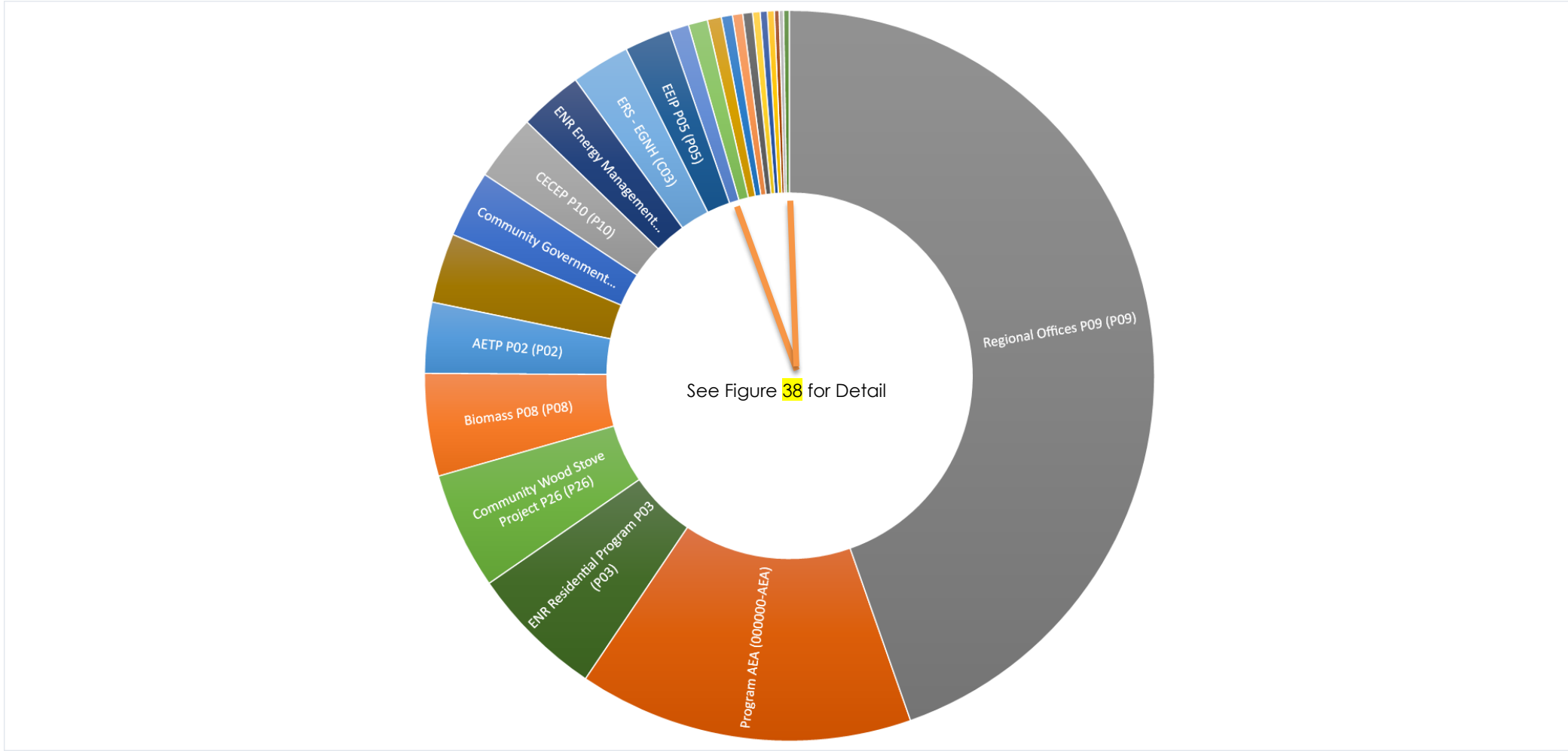


Figure 47 Staff Time by Program / Supplementary Project

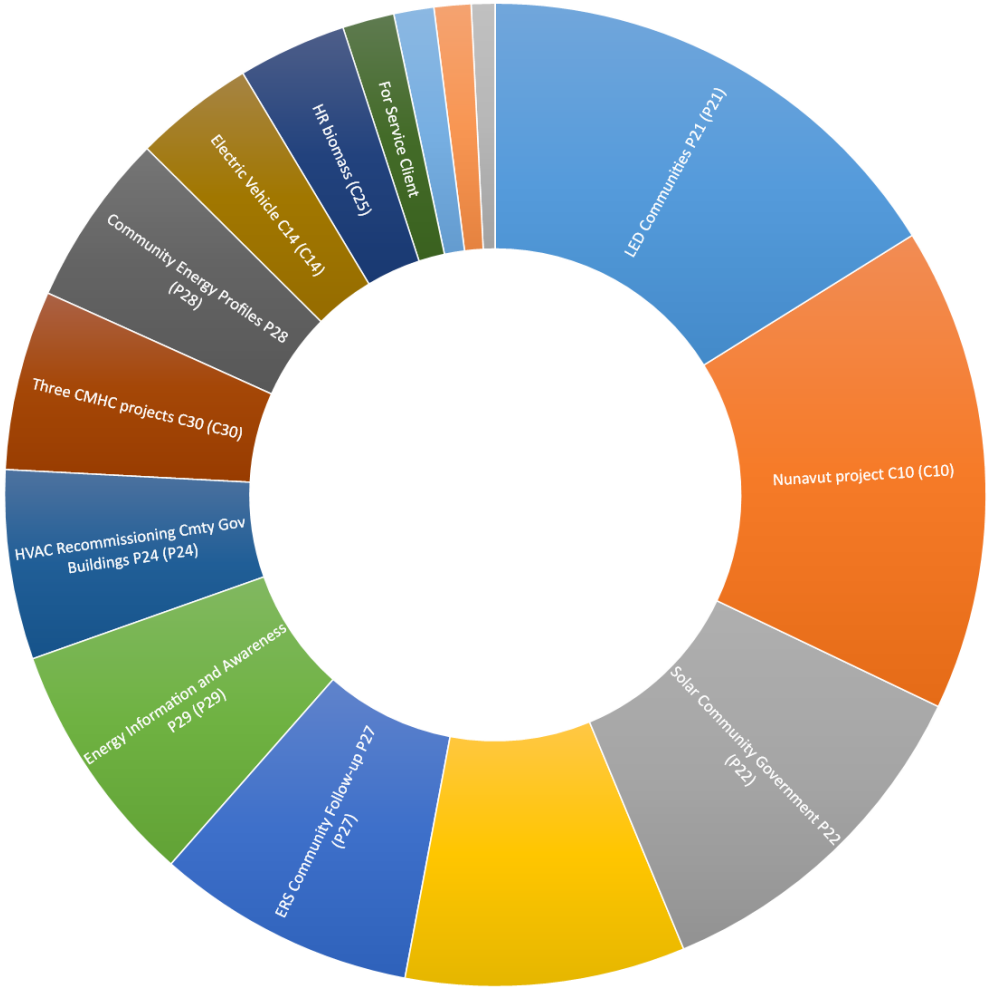


Figure 48 Staff Time by Program / Supplementary Project Detail

FINANCIAL MANAGEMENT

Results of Operations for the year ended March 31, 2016

- Annual Surplus of $62,000 representing 2% of total revenues, compared to the prior year $87,000 representing 3% of total revenues, a 29% decrease. The AEA's budgeted Annual Surplus for the year of $52,000 was met at a rate of 119% of the plan.
- Net financial assets decreased during the year $97,000 compared to an increase of $72,000 the previous year, due primarily to the nature of programs and prepaid unused airfares and LED lighting supplies
- Contributions from GNWT $596,000, up 22% from the prior year, meeting 87% of the plan.
- Other source income $188,000, down 47% from the prior year, meeting 90% of the plan.
- Consulting expenses $91,000, down 64% from the prior year, meeting 67% of the plan, due primarily to the nature of programs during the year and less consulting work than expected.
- Office and general expenses $244,000, up 88% from the prior year, meeting 62% of the plan, due primarily to the nature of programs during the year and unused LED lighting supplies for future use.
- Rebates expenses $906,000, up 41% from the prior year, meeting 94% of the plan, due primarily to increased activity in the AETP, CECEP, and EEIP programs.
- Travel and accommodation expenses $148,000, down 20% from the prior year, meeting 63% of the plan, due primarily to prepaid unused airfares.

Financial Position at March 31, 2016

- Total assets $1,693,000, up 24% from a year ago.
- Cash and short-term investments $1,059,000, up 46% from a year ago.
- Accounts receivable $359,000, down 32% from a year ago, due primarily to the collection of prior year's GNWT contributions program funding.
- Prepaid expenses $359,000, up 392% from the prior year, due to purchases of airfares and LED lighting supplies to be consumed in next year.
- Accounts payable and accrued liabilities $501,000, up 30% from a year ago, due primarily to more unpaid expenses incurred on programs.
- Deferred revenue $374,000, up 63% from a year ago, due primarily to deferred funding relating to airfares and LED lighting supplies to be consumed in the next year, and also unspent funding.
- Net assets $818,000, up 8% from the previous year, which includes $710,000 (2015 - $566,000) in internally restricted reserves.

- Unrestricted accumulated surplus of $51,000 compared to $134,000 a year ago, representing accumulated unspent core funding and consulting projects.

Cash flows for the year ended March 31, 2016

- Gross cash from operations $77,000 compared to $110,000 the previous year.
- Contributions from GNWT $3,692,000, up 41% from a year ago, due primarily to the nature of programs and collections of prior year program funding.
- Other source income $140,000, down 70% from last year, due primarily to less consulting work compared to prior year.
- Net cash from operations $359,000 up 392% for the same period a year ago, due primarily to the collection of receivables and program funding received.

Management Discussion and Analysis

The Arctic Energy Alliance prudently manages its people and money to deliver quantifiable results in line with the organization's strategic plan. The organization is financially sound, has a three month operating reserve and can respond to changes in its financial or operating environment quickly and effectively.

This year was also the culmination of AEA's two-year accounting and internal controls improvement. The result is a more efficient and accountable system of purchase order spending, budget amendment, and money controls. The organization responded effectively to an infusion of funding three quarters through the year amounting to one-third of its operating budget thanks to AEA's improved budgeting and real time cost tracking systems; and critically, filling the operations' manager position. As evidenced in the annual report, the Arctic Energy Alliance delivered an outstanding variety and number of public services this year, and was able to do so effectively with the right balance of management and financial controls thus ensuring an effective and prudent use of public money.

This year an independent evaluation of a program delivered by the Arctic Energy Alliance suggested strengthening internal document management, contracting and contract management systems. The recommendations in the evaluation will be prioritized for implementation. This year also saw the Arctic Energy Alliance deliver more 'on the ground' projects than ever before; with most of the projects rolled out on a partnership basis. If this trend continues, the organization will need to establish risk management tools and systems to address the increased financial risks resulting from this model of project and program delivery.

The financial future of the organization is positive because of two principal factors – the cost of heating and electric energy in the Northwest Territories, and the Government of Canada's commitment to addressing the factors underlying climate change. Therefore, demand for the services the organization delivers is expected to remain stable or grow. Combined with the confidence governments have funding a fiscally and operationally sound organization like the Arctic Energy Alliance, it is reasonable to expect funding stability over the next three to four years.

Below are excerpts from the 2015-16 Audited Annual Financial Statements approved for release by the Arctic Energy Alliance's Board of Directors.

AVERY COOPER & CO. LTD.
Certified General Accountants

4918—50th Street, P.O. Box 1620
Yellowknife, NT X1A 2P2
www.averycooper.com

Telephone: (867) 873-3441
Facsimile: (867) 873-2353
Toll-Free: 1-800-661-0787

INDEPENDENT AUDITOR'S REPORT

To the Members of
Arctic Energy Alliance

We have audited the accompanying financial statements of Arctic Energy Alliance, which comprise the Statement of Financial Position as at March 31, 2016, and the Statements of Changes in Net Assets, Operations, and Cash Flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Organization's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Organization's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the financial statements present fairly, in all material respects, the financial position of Arctic Energy Alliance as at March 31, 2016, and the results of its operations and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Avery Cooper & Co. Ltd.
Certified General Accountants
Yellowknife, NT

June 30, 2016

ARCTIC ENERGY ALLIANCE

STATEMENT OF FINANCIAL POSITION
March 31, 2016

ASSETS

	2016	2015
CURRENT		
Cash	$ 515,527	$ 664,045
Short term investments (note 3)	543,299	60,252
Accounts receivable (note 4)	358,643	525,066
Prepaid expenses	187,064	37,614
	1,604,533	1,286,977
TANGIBLE CAPITAL ASSETS (note 5)	87,970	82,739
	$ 1,692,503	$ 1,369,716

LIABILITIES

CURRENT		
Wages and benefits payable	$ 112,041	$ 61,094
Government remittances payable (note 6)	30,726	33,893
Trade payables and accruals (note 7)	340,931	245,976
Provision for rebates (note 8)	16,800	43,000
Deferred revenue (note 9)	351,828	203,487
	852,326	587,450
DEFERRED GOVERNMENT ASSISTANCE (note 10)	22,150	25,856
	874,476	613,306

NET ASSETS

RESERVES per page 2	709,605	566,000
INVESTED IN TANGIBLE CAPITAL ASSETS per page 2	57,820	56,884
ACCUMULATED SURPLUS per page 2	50,602	133,526
	818,027	756,410
	$ 1,692,503	$ 1,369,716

ARCTIC ENERGY ALLIANCE

STATEMENT OF CHANGES IN NET ASSETS

For the year ended March 31, 2016

	2016			
	Accumulated Surplus	Reserves	Invested in Tangible Capital Assets	Total
BALANCE, opening	$ 133,526	$ 566,000	$ 56,884	$ 756,410
Excess of revenues over expenses	61,617	-	-	61,617
Transfer to reserves (note 15)	(143,605)	143,605	-	-
Purchase of tangible capital assets	(28,537)	-	28,537	-
Amortization of tangible capital assets	23,307	-	(23,307)	-
Amortization of deferred government assistance	(3,706)	-	3,706	-
Asset retirement obligation	8,000	-	(8,000)	-
BALANCE, closing	$ 50,602	$ 709,605	$ 57,820	$ 818,027

	2015			
	Accumulated Surplus	Reserves	Invested in Tangible Capital Assets	Total
BALANCE, opening	$ 77,185	$ 541,000	$ 51,230	$ 669,415
Excess of revenues over expenses	86,995	-	-	86,995
Transfer to reserves	(25,000)	25,000	-	-
Purchase of tangible capital assets	(29,657)	-	29,657	-
Amortization of tangible capital assets	11,209	-	(11,209)	-
Deferred government assistance additions	15,000	-	(15,000)	-
Amortization of deferred government assistance	(2,206)	-	2,206	-
BALANCE, closing	$ 133,526	$ 566,000	$ 56,884	$ 756,410

ARCTIC ENERGY ALLIANCE

STATEMENT OF OPERATIONS
For the year ended March 31, 2016

	2016 Budget	2016 Actual	2015 Actual
REVENUES			
Contributions from GNWT	$ 3,761,035	$ 3,264,595	$ 2,668,776
Contributions from Canada	-	5,461	17,263
Other source income	210,022	186,710	351,196
Membership fees	277,500	277,500	277,500
Interest income	9,000	9,491	11,780
	4,257,557	3,743,757	3,326,515
EXPENSES			
Advertising and promotion	64,178	52,778	56,718
Amortization	16,900	23,307	11,209
Consulting fees	135,210	90,627	254,906
Equipment rental	24,682	24,426	12,563
Facility rental and tradeshow fees	10,377	14,577	6,941
Fees and dues	3,283	5,992	4,062
Hospitality	14,159	8,834	4,837
Insurance	13,362	12,190	13,672
Interest and bank charges	4,200	5,285	3,022
Office and general	392,788	243,858	132,099
Professional development	48,649	39,691	20,414
Professional fees	17,415	25,801	36,714
Rebates	965,065	906,207	641,916
Rent and utilities	153,300	146,336	138,542
Telephone, Internet and Website	27,456	34,870	26,705
Travel and accommodation	234,646	148,076	185,621
Wages and benefits	2,079,619	1,899,285	1,689,579
	4,205,289	3,682,140	3,239,520
EXCESS OF REVENUES OVER EXPENSES	$ 52,268	$ 61,617	$ 86,995

ARCTIC ENERGY ALLIANCE

STATEMENT OF CASH FLOWS
For the year ended March 31, 2016

	2016	2015
CASH FLOWS FROM OPERATING ACTIVITIES		
Cash receipts from GNWT	$ 3,691,532	$ 2,611,069
Cash receipts from Government of Canada	19,350	11,429
Cash receipts from membership fees	270,000	272,500
Cash receipts from other sources	139,949	471,309
Cash receipts from interest	6,444	10,980
Contributions repaid	(109,371)	(48,177)
Cash paid for wages and benefits	(1,851,507)	(1,703,711)
Cash paid for materials and services	(1,807,154)	(1,552,403)
	359,243	72,996
CASH FLOWS FROM CAPITAL ACTIVITIES		
Purchase of tangible capital assets	(28,537)	(21,658)
CASH FLOWS FROM INVESTING ACTIVITIES		
Redemption of short term investments	60,776	60,810
Purchase of short term investments	(540,000)	(60,000)
	(479,224)	810
(DECREASE) INCREASE IN CASH	(148,518)	52,148
CASH, opening	664,045	611,897
CASH, closing	$ 515,527	$ 664,045

18. Membership and Governance

Board of Directors

- President Paul Guy, Deputy Minister, Public Works and Services
- Vice-President, Tom Williams, Deputy Minister, Municipal and Community Affairs
- Treasurer, Gordon Van Tighem, Chairman, NWT Public Utilities Board
- Ernie Campbell, Deputy Minister, Environment and Natural Resources
- Charles Furlong, Mayor, Hamlet of Aklavik, President, NWT Association of Communities
- Scott Reid, NWT Housing Corporation
- Myra Berrub, Northwest Territories Power Corporation
- Duane Morgan, Northland Utilities (Yellowknife) Ltd.
- Secretary, Louie Azzolini, Executive Director, Arctic Energy Alliance

General Members

- GNWT Public Works and Services
- GNWT Environment and Natural Resources
- GNWT Municipal and Community Affairs
- Government of Nunavut
- NWT Association of Communities
- NWT Housing Corporation
- NWT Public Utilities Board

Sustaining Members

- Northland Utilities (Yellowknife) Ltd.
- Northwest Territories Power Corporation

Staff

- Tom Gross, Regional Energy Project Coordinator, South Slave
- Louise Schumann, Regional office administrative support, South Slave
- Teresa Chilkowich, Regional Energy Project Coordinator, Dehcho
- Wayne Lennie, Regional Energy Project Coordinator, Sahtu
- Sheena Adams, Regional Energy Project Coordinator, Beaufort-Delta
- Sonny Zoe, Regional Energy Project Coordinator, Tłı̨cho
- Mike Stuhec, Energy Management Specialist
- John W. Carr, Senior Technical Specialist
- Barbara Guay, Programs Assistant
- Ken Baigent, Energy Management Specialist
- Leanne Robinson, Energy Management Specialist
- Linda Todd, Program Coordinator
- Margaret Mahon, Energy Management Specialist
- Nick Walker, Energy Management Specialist
- Steve Outlet, Program Coordinator
- Vince Halushka, Program Coordinator
- Mike Goodwin, Energy Management Specialist

- Yichao Chen, Energy Management Specialist
- Craig Thomas, Operations Manager
- Faye MacDonald, Finance
- Jennifer Wicks, Human Resources and Program Assistant
- Louie Azzolini, Executive Director

"I Louie Azzolini, Executive Director *of* the "*Arctic Energy Alliance*", duly authorized on behalf of the Board of Directors of the Arctic Energy Alliance represent and warrant that this annual report is true and accurate.

Signature
Louie Azzolini,
Executive Director
June 30, 2016

ARCTIC ENERGY ALLIANCE

2015-2016 ANNUAL REPORT

SOUTH SLAVE REGIONAL OFFICE
Greenway Building, Suite #205
31 Capital Drive
Hay River NT X0E 1G2
Phone: 867 874 3434
Toll Free: call collect
Fax: 867 873 0303

BEAUFORT-DELTA REGIONAL OFFICE
Aurora Research Institute Building
191 Mackenzie Road / PO Box 1450
Inuvik NT X0E 0T0
Phone: 867 777 2068
Toll Free: call collect
Fax: 867 777 4264

SAHTU REGIONAL OFFICE
#20 Heritage Hotel
Norman Wells NT X0E 0V0
Phone: 867 587 2354
Toll Free: call collect

DEHCHO REGIONAL OFFICE
Dehcho First Nations Building
Box 89
Fort Simpson NT X0E 0N0
Phone: 867 695 2355
Toll Free: 1 866 995 3748
Fax: 867 695 2038

TŁĮCHǪ REGIONAL OFFICE
Community Government Building
Box 115 Whatì NT XOE 1P0
Phone: 867 573 3030
Toll Free:
Fax: 867 573 3018

YELLOWKNIFE OFFICE
101-5102 51st Street
Yellowknife NT X1A 1S7
Phone: 867 920 3333
Toll Free: 1 877 755 5855
Fax: 867 873 0303

The Arctic Energy Alliance is a non-profit, non-government agency whose Vision is that "NWT Society will become a global leader in clean, efficient, sustainable energy practices." The Arctic Energy Alliance's Mission is to promote and facilitate the adoption of efficient and renewable and energy practices by all members of NWT society.

Printed on recycled paper