2022/23 Annual Report

Arctic Energy Alliance

Contents

Table of abbreviations

AEA	Arctic Energy Alliance
ECM	Electronically commutated motor
EPA	Environmental Protection Agency
EEIP	Energy Efficiency Incentive Program
GNWT	Government of the Northwest Territories
LCELF	Low Carbon Economy Leadership Fund
NRCan	Natural Resources Canada
NWT	Northwest Territories

Foreword

For 26 years, the Arctic Energy Alliance has been leading the North in taking action on climate change. And we couldn't be prouder to lead that charge.

This was an interesting year for us: it the was last year of a four-year agreement under which we received a total of $9 million in additional funding. This new funding came from the governments of Canada and the Northwest Territories through the Low Carbon Economy Leadership Fund. It allowed us to provide more rebates, bigger rebates and new initiatives to help more people save energy, save money and reduce their carbon footprints. Luckily, this funding arrangement is set to continue—at least for the near future.

During the COVID-19 pandemic, we saw a sharp rise in the number of rebates we gave out under some of our programs. We suspect that, instead of travelling, people were spending their money on energy upgrades.

Terry Rowe, from the Rowe's Group of Companies, talks about a pellet boiler during a biomass tour in Hay River.

But as the pandemic wound down this year, the number of rebates we gave out started to fall. Still, the desire we see across the NWT for energy-efficient products and renewable energy is staggering.

Collectively, the clients we worked with this year will save 1,400 MWh of electricity annually, which is like taking two communities the size of Wekweèti off the grid. They will also reduce their carbon footprint by about 1,100 tonnes a year—equivalent to converting 70 percent of Fort Liard's power generation to renewable electricity.

Of course, our work is about much more than simply providing rebates and tracking savings. It's also about building relationships whenever we can so that we can do our part to help people understand how to best take action on lowering their energy bills and fighting climate change. Like when we partnered with three local governments to develop community energy plans. Or with two NWT communities to install new, efficient, code-compliant wood stoves for community members.

We think that the challenges of this year make our accomplishments all the more worthwhile. We look forward to continuing to make the NWT a cleaner, more energy efficient place to live.

Mark Heyck
Executive Director

2022/23 at a glance

The total number of rebates we gave out in the 2022/23 fiscal year was the lowest we've seen in three years. However, the results we've seen from the clients we worked with are still nothing short of impressive.

We're continuing to give out hundreds of rebates more than we did each year before 2020, when we received a significant boost in our annual funding. And our clients' projects from this year are saving 11,000 gigajoules (GJ) of fossil fuels and 1,100 tonnes of greenhouse gas emissions per year, compared to annual savings of 4,500 GJ and 1,000 tonnes for projects we funded in 2021/22. The fossil fuel savings alone are equivalent to 290,000 litres of heating oil.

As usual, our Energy Efficiency Incentive Program saw the most action, with more than 2,400 rebates and annual savings of approximately 550 tonnes of greenhouse gas emissions. What is unusual is that the Beaufort–Delta region was the leader this year in the number of rebates under that program, with 875, compared to 587 for the North Slave region.

Another point of note is that our capacity for home energy evaluations is growing. We completed 158 in-person evaluations this year (not including blueprint evaluations), compared to 97 last year. This is thanks to getting additional staff trained and certified in the process, and hiring qualified contractors to help when needed.

Our special projects this year included engaging with contractors, testing cold-climate air-source heat pumps, designing materials to teach school children about energy, and studying the feasibility of EVs in communities that use fossil fuels for electricity.

For a more in-depth understanding of our programs and services, be sure to read on.

An Arctic Energy Alliance sign gets set up in front of pingos during a visit to Tuktoyaktuk.

Overall results[1]

Programs and projects		
Number of programs		**12**
Number of special projects		**8**
Incentives		
Total incentives	Including Energy Efficiency Incentive Program (EEIP)	2,656
	Excluding EEIP	218
Total value of incentives	Including EEIP	$ 1,300,000
	Excluding EEIP	$ 990,000
Average incentive	Including EEIP	$ 490
	Excluding EEIP	$ 4,500
Payback*		
Total capital cost		$ 4,600,000
Estimated annual savings		$ 760,000
Simple payback	Before incentives	6.0 years
	After incentives	4.3 years
Energy savings		
Estimated annual electricity savings		1,400 MWh
Equivalent to taking two communities the size of Wekweètì off the grid		
Estimated power demand avoided[2]		180 kW
Equivalent to running 150 dishwashers at the same time		
Annual fossil fuel consumption avoided (oil and propane)*		11,000 GJ
Equivalent to 290,000 L of heating oil (1,800 barrels), or 330,000 L of gasoline (2,100 barrels)		
Rebate cost per lifetime[3] kWh avoided		$ 0.06
Greenhouse gas reduction		
Estimated annual greenhouse gases avoided		1,100 tonnes
Equivalent to converting 70 percent of the power generation for the community of Fort Liard to renewable electricity		
Rebate cost per lifetime tonne of greenhouse gases avoided		$ 74

**Not counting fuel used for community-level electricity generation.*

[1] *Throughout this report, numbers greater than nine and those with decimals have been rounded to two significant digits, unless otherwise noted—except for the number of rebates provided and energy audits/evaluations completed, which are presented accurately. In some cases, numbers may not add up correctly due to rounding.*

[2] *Power demand refers to the maximum amount of electricity that is used at any given time.*

[3] *The lifetimes of products and projects vary. For more information on assumed lifetimes see the sections on the individual programs.*

Highlights

The following are just a few of the highlights from our programs and projects over the past year.

Programs

Commercial Energy Conservation and Efficiency Program

Provides building energy audits and rebates to NWT businesses to make upgrades to conserve energy and improve their energy efficiency.

- Provided 15 rebates.
- Combined, annual electricity consumption avoided by all clients' projects is about 240,000 kWh—roughly 36 percent of the electricity consumed each year in the community of Wekweètì.
- The average client project will pay for itself through energy savings in just over two years.

Community Government Building Energy Retrofit Program

Provides building energy audits, rebates and project coordination to help community governments across the NWT better manage their energy use.

- Distributed approximately $110,000 in rebates in four communities.
- Completed nine desktop "yardstick" building energy audits and 15 on-site "targeted" building energy audits.
- Targeted energy audits identified roughly $170,000 in potential annual savings and 160 tonnes of potential annual greenhouse gas reductions.

Deep Home Energy Retrofit Program

Provides rebates on major home energy-efficiency upgrades, such as exterior wall insulation, windows and heating equipment.

- Completed seven EnerGuide home energy evaluations, plus one remote evaluation, in four communities, including pre-retrofit evaluations for potential clients and post-retrofit evaluations for clients who completed their upgrades.
- Provided five final rebates worth $29,000, plus an additional seven interim rebates valued at $25,000. The interim projects will be finalized next year.
- Combined, our five clients with completed projects are expected to save 200 GJ of heating fuel a year—equivalent to saving 5,200 L of heating oil (33 barrels), or 5,900 L of gasoline (37 barrels).

Designated Income Home Winterization Program

Provides homeowners with the supplies, knowledge and other resources to winterize their homes and save on heating fuel, as well as with means to reduce the consumption of electricity and water.

- Worked with six partner communities to hire and train local liaison workers.
- Hosted educational workshops for lower-income homeowners in five communities.
- Distributed 111 energy efficiency kits to workshop participants.

Energy Efficiency Incentive Program

Provides rebates on energy-efficient appliances and other products.

- Provided 2,438 rebates.
- For the first time, the Beaufort–Delta region outpaced the North Slave region in the total number of rebates, with 875 for the Beaufort–Delta compared to 587 for the North Slave.
- Combined, the energy-efficient products purchased will save the NWT 550 tonnes of greenhouse gases annually—more than any other AEA program this year.

Energy Rating Service Support Program

Provides home energy evaluations and advice.

- Completed 174 home energy evaluations.
- Performed evaluations on 146 existing homes (up 106 percent over last year).
- Combined, all recommended upgrades could save homeowners $410,000 and 460 tonnes of greenhouse gas emissions a year.

Non-Profit Energy Efficiency and Conservation Program

Provides building energy audits and rebates to NWT non-profit organizations to make upgrades to conserve energy and improve their energy efficiency.

- Distributed five rebates valued at approximately $78,000.
- Combined, all client projects will avoid approximately 32 tonnes of greenhouse gases and 520 GJ of fossil fuel use every year—equivalent to 14,000 L of heating oil (85 barrels), or 15,000 L of gasoline (97 barrels).
- The average client project is expected to pay for itself in less than two years.

Alternative Energy Technologies Program

Provides incentives for NWT residents, businesses and community-based organizations to adopt renewable and alternative energy systems, such as solar, wind, wood and more.

- Provided 36 rebates.
- The 36 systems that our clients installed are expected to save roughly 250 tonnes of greenhouse gases a year.
- The average system is expected to pay for itself in less than six years.

Biomass Energy Program

Provides northerners with accessible technical advice on existing or potential biomass projects.

- Held Biomass Week educational workshops and presentations for homeowners, students, and owners of larger buildings.
- Completed a project, launched in 2021/22, to help building owners install wood pellet boilers.
- Worked on pre-feasibility analyses for wood pellet district heating systems for four communities.

Community Wood Stove Program

Provides homeowners with new, efficient wood stoves through partnerships with community organizations.

- Installed 26 stoves in two partner communities.
- Combined, all installed stoves will save 690 kg of particulate emissions (a 93 percent decrease) and 50 tonnes of greenhouse gas emissions a year.

Electric Vehicle Incentive Program

Provides rebates for electric vehicles and charging stations in communities that use hydroelectricity.

- Third year of the program.
- Provided rebates on 11 vehicles and five charging stations.
- The 11 electric vehicles will save approximately 18 tonnes of greenhouse gases a year.

Community engagement

Community engagement, through all six AEA offices, allows the AEA to keep a close connection to communities throughout the NWT.

- Each office is involved in every program and project the AEA undertakes, and AEA staff attend trade shows, events and other community engagement activities in every NWT community.

Special projects

Automated vehicle plug-in controller fast-track project

Launched a project to help building owners install smart outlets in parking lots, which are designed to reduce the electricity needed to run vehicle block heaters.

Cold-climate air-source heat pump project

Installed air-source heat pumps in two homes to monitor how well they work in the NWT's climate.

Community energy planning

This year, we partnered with the Hamlet of Ulukhaktok, the Ka'aa'gee Tu First Nation in Kakisa, and the Village of Fort Simpson to develop their community energy plans. Also helped partners from previous years—the Community Government of Wekweètì, the Hamlet of Tulita and the Town of Fort Smith—to implement some of the projects from their plans.

Contractor outreach project

Held virtual workshops over the course of five weeks, designed to increase contractors' knowledge on a variety of energy-saving technologies.

ISO 50001 investigation project

Began tracking energy bills for our Yellowknife office to establish a baseline for meeting the ISO 50001 standard for managing and decreasing energy use. This data will be used to develop an energy-saving project in the near future.

School engagement project

In the first year of this multi-year project, developed material for Grade 7 classes on energy literacy, conservation and efficiency.

Status of energy management opportunities for community government buildings

Followed up with some of the community governments for whom we've completed an energy audit to determine the status of their energy management opportunities: which projects have been completed and which are left to complete?

Study on the potential for electric vehicles in non-hydro communities

Began a project to determine whether EVs will substantially reduce GHG emissions when they're charged in Northern communities that use fossil fuels to produce electricity.

Budget[4]

Source	Funding	Expenses	
		Operations	Incentives
Government of the Northwest Territories (GNWT) base & core program funding	**$ 2,740,000**	**$ 1,950,000**	**$ 790,000**
Base funding for Regional Office Program, administrative staff, offices, etc.	$ 1,600,000	$ 1,560,000	$ 0
Alternative Energy Technologies Program	$ 300,000	$ 19,000	$ 328,000
Biomass Energy Program	$ 100,000	$ 60,000	$ 0
Commercial Energy Conservation and Efficiency Program	$ 200,000	$ 48,000	$ 143,000
Community Government Building Energy Retrofit Program	$ 190,000	$ 73,000	$ 123,000
Energy Efficiency Incentive Program	$ 200,000	$ 40,000	$ 196,000
Energy Rating Services Support Program	$ 150,000	$ 150,000	$ 0
GNWT Low Carbon Economy Leadership Fund supplementary project funding	**$ 1,729,000**	**$ 348,000**	**$ 195,000**
Alternative Energy Technologies Program – LCELF top-up	$ 687,000	$ 99,000	$ 85,000
Commercial Energy Conservation and Efficiency Program – LCELF top-up	$ 200,000	$ 71,000	$ 0
Community Government Building Energy Retrofit Program – LCELF top-up	$ 255,000	$ 79,000	$ 4,000
Energy Efficiency Incentive Program – LCELF top-up	$ 587,000	$ 99,000	$ 107,000
GNWT Low Carbon Economy Leadership Fund new project funding	**$ 1,491,000**	**$ 401,000**	**$ 291,000**
Deep Home Energy Retrofit Program	$ 440,000	$ 116,000	$ 65,000
Designated Income Home Winterization Program	$ 87,000	$ 62,000	$ 7,000
Non-Profit Energy Efficiency and Conservation Program	$ 355,000	$ 87,000	$ 78,000
Community Energy Planning and Implementation	$ 335,000	$ 68,000	$ 0
Community Wood Stove Program	$ 275,000	$ 68,000	$ 140,000
GNWT – Anti-poverty funding	**$ 60,000**	**$ 6,000**	**$ 54,000**
Designated Income Home Winterization Program	$ 42,000	$ 6,000	$ 36,000
Community Wood Stove Program	$ 18,000	$ 0	$ 18,000
GNWT – Infrastructure funding	**$ 232,000**	**$ 87,000**	**$ 53,000**
Cold-climate air-source heat pump investigation	$ 25,000	$ 25,000	$ 0
Electric Vehicle Incentive Program	$ 207,000	$ 62,000	$ 53,000
Natural Resources Canada – Clean Energy for Rural and Remote Communities	**$ 406,000**	**$ 324,000**	**$ 0**
Community Energy Planning	$ 406,000	$ 324,000	$ 0
Membership dues[5]	**$ 228,000**	**$ 228,000**	**$ 0**
Government of the Northwest Territories	$ 150,000	$ 150,000	$ 0
GNWT – Crown corporations	$ 68,000	$ 68,000	$ 0
Other	$ 10,000	$ 10,000	$ 0
Other source income	**$ 222,000**	**$ 193,000**	**$ 0**
TOTAL	**$ 7,107,000**	**$ 3,536,000**	**$ 1,382,000**

[4] Numbers are rounded to the nearest thousand, and may not add up correctly due to rounding. Some programs were under or over budget, so in some cases funding was moved between programs for operations and incentives.

Introduction

About the Arctic Energy Alliance

The Arctic Energy Alliance (AEA) is a not-for-profit society, based in the Northwest Territories (NWT), that helps northerners find ways to conserve energy, become more energy efficient, and adopt alternative and renewable sources of energy. All of this leads toward reducing the North's carbon footprint, while saving our clients some money in the process.

The AEA was formed in 1997 to consolidate the activities of several organizations with an interest in energy. The intent was to eliminate duplication and overlap between the various departments and agencies, to provide a single point of contact for the public, and to allow for a more coordinated approach to public education and the delivery of energy conservation services.

Over the past 26 years, the scope of our work has grown substantially. Today, we help residents, businesses, non-profit organizations, community governments and Indigenous governments all across the NWT to lower energy costs, improve building efficiencies and comfort, reduce greenhouse gas emissions, and more. We have become the leading northern organization in bringing together communities, consumers, producers, regulators and policymakers to reduce the cost and environmental impacts of energy use in the NWT.

In fact, bringing people together is an important part of how we operate. Forming partnerships is at the core of our work, whether establishing official community partnerships on an individual project or building and strengthening relationships with vendors, contractors and clients across the territory every day.

With our main office in Yellowknife, five regional offices across the Northwest Territories and 19 staff members, we touch every community in the NWT.

Thanks to generous funding from the governments of the Northwest Territories and Canada, we offer a suite of core programs focused on energy efficiency and conservation, building evaluations, and alternative and renewable energy sources. We also conduct a range of energy-related special projects, devised by AEA staff, which are typically more short-term in nature.

This report highlights our programs and projects from the 2022/23 fiscal year, including their results, so our readers can see the impact we have made.

A crowd talks about electric vehicles during an event hosted by the Yellowknives Dene First Nation in Dettah.

[5] *GNWT members include the departments of Infrastructure, Environment and Climate Change, and Municipal and Community Affairs. Crown corporation members include Housing NWT, the NWT Power Corporation and the NWT Public Utilities Board. Other members include Northland Utilities (Yellowknife) Ltd. and the NWT Association of Communities.*

Charting our course

An overview of our strategic plan

The Arctic Energy Alliance's strategic plan shapes where we want to go and what we want to achieve as an organization. It defines everything we do. So understanding the core of our strategic plan—our vision, mission, goals, objectives and values—will provide context on the programs and projects we do and the results we achieve.

Our vision: *our ultimate goal*

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

Our mission: *why we exist*

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

Our goals: *what we will achieve*

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 Arctic Energy Alliance 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.

Our objectives: *how we will achieve our goals*

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. **Learn continuously:** To increase Arctic Energy Alliance's own capacity as the "go-to place" for efficient, renewable and carbon-neutral energy practices in the NWT.
3. **Inform:** To provide top-quality information and advice on efficient, renewable and carbon-neutral energy practices accessible to all members of NWT society.
4. **Motivate and support an increasing number of clients to act:**
   a. *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.
   b. *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.
   c. *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.

d. *Advise on policies and regulations*: To research and advise our partners on effective policies and regulations that would motivate NWT society to adopt efficient, renewable and carbon-neutral energy practices.

e. *Prompt and follow-up with clients*: To encourage NWT society to adopt efficient, renewable and carbon-neutral energy practices.

f. *Champion and recognize success*: To work with and monitor specific clients as "case studies" to efficient, renewable and carbon-neutral energy practices.

5. **Integrate:** To transfer established efficient, renewable and carbon-neutral energy practices into the institutions of NWT society.

Our values: *how we operate*

Mutual respect

We show genuine concern for each other, our clients and others, treating them with understanding and appreciation through fairness, equality and healthy dialogue. We listen carefully to what people say, remain open to all suggestions and questions, and respect others' points of view.

Service and partnership

We believe that the most important way to achieve our vision is through partnerships. We view all our clients as potential partners and are dedicated to ensuring they get top-quality service.

Learning

We are committed to continuous improvement. We build on good ideas, learn from our experiences and challenge ourselves and the status quo.

Results

We have a clear vision of where we're going and how to get there. We focus our resources to achieve our objectives.

Honesty and integrity

We say what we believe and we lead by example.

Positive work environment

We take pride in our professional work ethic, our "can-do" attitude and our informal and flexible work environment. We recognize a job well done.

High-quality work

We are dedicated to detail. We strive to provide top-quality and unbiased advice, based on solid, science-based research. We review each other's work to make sure we get things right.

Core programs

A significant amount of the work we do is tied to 12 core programs that are directly funded by the Government of the Northwest Territories (GNWT) Department of Infrastructure, as well as through the Government of Canada's Low Carbon Economy Leadership Fund.

These programs provide a range of services and support to residents, businesses, community governments, Indigenous governments and non-profit organizations throughout the territory.

The 12 programs can be grouped into three categories: energy efficiency and conservation, renewable and alternative energy, and regional offices.

Energy efficiency and conservation programs

Reducing energy use and using that energy efficiently are the easiest and most cost-effective ways to reduce greenhouse gas emissions and lower energy bills. This is why the AEA has seven programs geared toward energy efficiency and conservation across the Northwest Territories.

Commercial Energy Conservation and Efficiency Program

The Commercial Energy Conservation and Efficiency Program provides rebates to NWT businesses that make upgrades to conserve energy and improve their energy efficiency. The program is open to businesses both on-grid and off-grid.

Through this program, the AEA also offers businesses building energy audits to find the greatest savings in energy, greenhouse gases and money. If a business wants to investigate potential savings before taking on a project, the first step is to conduct a desktop "yardstick" audit, which analyzes utility bill data. Next would be an on-site "targeted" audit, in which an AEA Energy Management Specialist will evaluate a building in person.

Results

Audits

Building energy audits completed:

7 yardstick audits *(in 1 community)*

1 targeted audit

The targeted energy audit identified roughly $170,000 in potential annual savings on energy bills and 240 tonnes of potential annual greenhouse gas savings.

FOR
businesses

AEA FUNDING
$400,000 (from GNWT Department of Infrastructure and Government of Canada)

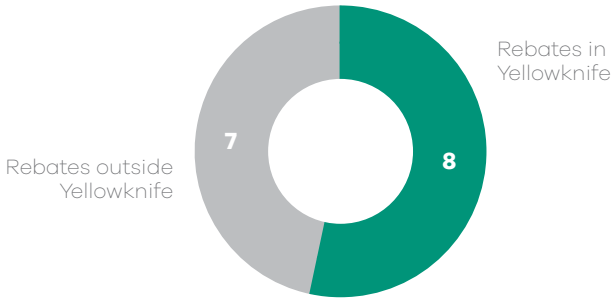
Completed projects

15 total rebates

total value of rebates **$140,000**

$9,500 average rebate

Communities



Communities receiving rebates: **3**

Payback

Capital cost (all projects, before rebates):

$350,000

Estimated annual savings (all projects):

$93,000

Simple payback (all projects, after rebates):

2.2 years

Greenhouse gases

Annual greenhouse gases avoided: **52** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 200,000 km)[6]

Rebate cost per lifetime[7] tonne reduced: **$140**

Energy savings

Annual electricity consumption avoided:

240,000 kWh

(equivalent to approximately 36 percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **$0.03**

Power demand avoided: **50** kW

(equivalent to running 42 dishwashers at the same time)

Annual fossil fuel consumption increased (oil and propane): **860** GJ

(equivalent to 22,000 L of heating oil [140 barrels], or 26,000 L of gasoline [160 barrels])

Why does oil and propane consumption increase in some communities?

Many businesses are converting their lighting to LEDs. LED lights use less electricity than other forms of lighting, but also produce less heat. This means that when the lighting in a building is converted to LEDs, the heating system will have to do a little more work to make up the difference. The situation can be similar for some other electricity-saving technologies such as lighting controls or ECM pumps.

The money saved by using less electricity for lighting is often greater than the extra spent on heating fuel. Eight of our business clients completed lighting retrofits this year. On average, each of them will save an estimated $6,200 a year, even after taking additional heating fuel into account.

All of the businesses that converted their lighting this year are located in communities that use hydroelectricity, which does not produce greenhouse gases. Using less hydroelectricity and burning more heating fuel means that greenhouse gas emissions increase slightly. On the other hand, our clients in communities that produce electricity by burning fuel such as diesel, natural gas or propane can sometimes both save money and reduce their overall greenhouse gas emissions.

The AEA promotes energy efficiency, regardless of the energy source, due to the many benefits of energy efficient practices.

[6] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[7] *Assuming a lifetime of 20 years for all upgrades.*

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
Fort Smith*	2	↓ 2	$ 820	26,000	$ 0.06	10	↓ 22
Hay River*	5	↑ 5	-$ 370	110,000	$ 0.02	22	↑ 120
Yellowknife*	8	↓ 55	$ 65	99,000	$ 0.04	18	↓ 960

** Hydro community*

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
North Slave	8	↓ 55	$ 65	99,000	$ 0.04	18	↓ 960
South Slave	7	↑ 4	-$ 1,000	140,000	$ 0.03	32	↑ 100

Community Government Building Energy Retrofit Program

Through the Community Government Building Energy Retrofit Program, the Arctic Energy Alliance supports community governments across the NWT to better manage their energy use and save money in the process.

FOR
community governments

AEA FUNDING
$440,000 (from GNWT Department of Infrastructure and Government of Canada)

The first step is to conduct a "yardstick" energy audit of community government buildings, which looks at utility bill data. Next is a "targeted" energy audit, in which an AEA Energy Management Specialist will evaluate a building in person. Both of these audits are subsidized by the AEA. They identify ways to save electricity, heating fuel, water, greenhouse gas emissions and money. From there, we help the community government make the recommended changes, including providing rebates and offering project coordination services for a fee.

Results

Audits

Building energy audits completed:

9 yardstick audits *(in 1 community)*

15 targeted audits *(in 2 communities)*

The targeted energy audits identified $170,000 in combined potential savings on energy bills and 160 tonnes of potential annual greenhouse gas savings.

We also updated previously completed targeted audits for two communities.

Completed projects

4 total rebates *(in 4 communities)*

12 buildings retrofitted by clients

total value of rebates: **$110,000**

average rebate: **$27,000**

Payback

Capital cost (all projects, before rebates):

$280,000

Estimated annual savings: **$48,000**

Simple payback (after rebates): **3.7** years

Greenhouse gases

Annual greenhouse gases avoided:

35 tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 140,000 km)[8]

Rebate cost per lifetime[9] tonne reduced:

$150

Energy savings

Annual electricity consumption avoided: **63,000** kWh

(equivalent to approximately 10 percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **$0.08**

Power demand avoided: **26**kW

(equivalent to running 22 dishwashers at the same time)

Annual fossil fuel consumption avoided (oil and propane): **85** GJ

(equivalent to 2,200 L of heating oil [14 barrels], or 2,500 L of gasoline [16 barrels])

[8] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[9] *Assuming a lifetime of 20 years for all upgrades.*

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
Fort Resolution*	1	↑ 1	-$ 150	6,100	$ 0.03	2	↑ 10
Inuvik	1	↓ 14	$ 170	0	N/A	0	↓ 250
Ulukhaktok	1	↓ 24	$ 100	39,000	$ 0.06	21	↑ 100
Yellowknife*	1	↑ 3	-$ 56	18,000	$ 0.01	3	↑ 53

** Hydro community*

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
Beaufort–Delta	2	↓ 39	$ 130	39,000	$ 0.13	21	↓ 150
North Slave	1	↑ 3	-$ 56	18,000	$ 0.01	3	↑ 53
South Slave	1	↑ 1	-$ 150	6,100	$ 0.03	2	↑ 10

Greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
Hydro	2	↑ 4	-$ 87	24,000	$ 0.01	5	↑ 410
Non-hydro	2	↓ 39	$ 130	39,000	$ 0.13	21	↓ 58

The importance of project coordination

One of the services that the AEA offers through its Community Government Building Energy Retrofit Program is project coordination. It's an important facet of the program. Community governments have limited resources, especially in the smaller communities, and administrative staff can be pulled in many directions at once. Taking on a building energy retrofit can be a big job; if community government staff were to handle project coordination duties, it could add to an already substantial workload.

That's why the AEA offers this service. We can help our clients determine which energy upgrades to make, determine the technical specifications, issue requests for proposals, select contractors, draft contracts and ensure the work is being done according to specifications.

More than anything, this offers our clients peace of mind, as evidenced by the fact that 16 of the 28 community governments that have used this program have also used our project coordination service. And considering we have been offering a $10,000 subsidy—which will be increasing to $15,000 next year—it's easy to take advantage.

Helping people save energy and money isn't always as simple as providing a rebate. Without effective project coordination in place, many of these projects couldn't happen. So we're happy we can offer our clients a way to make those projects a reality.

Progress to date

Since the AEA's targeted work with community governments began...

- 28 of the 33 community governments in the NWT have had targeted energy audits done by the AEA on most or all of their buildings.
- All of the community governments in the Tłı̨chǫ territory and the Dehcho region have had audits completed.
- 17 NWT community governments have accessed or applied for funding to implement their recommended energy management opportunities. Most have accessed funding for more than one building or project in more than one year.
- 16 community governments have used the AEA's project coordination services to help them complete their projects.
- 61 percent of the community governments that have had targeted energy audits completed by the AEA have received a rebate and/or project coordination services from us to implement some of the audit recommendations.

Deep Home Energy Retrofit Program

The Deep Home Energy Retrofit Program provides rebates to help owners of older, less energy-efficient homes reduce the costs and greenhouse gas emissions associated with heating. These rebates can help homeowners offset the costs of upgrading their insulation, windows, air sealing and heating systems.

The program allows homeowners to undertake more extensive upgrades than they might otherwise consider. Results are measured by conducting EnerGuide home evaluations before and after the upgrades.

During the COVID-19 pandemic, the AEA started offering remote home energy evaluations to allow clients to participate in the Deep Home Energy Retrofit Program while we were unable to conduct evaluations in person. We continued remote evaluations this year to keep the barrier to entry low for this program.

Unlike other AEA programs, participants who complete an exterior wall insulation upgrade, and who plan to complete additional upgrades, are eligible for an interim rebate when their wall insulation has been installed. The final rebate is issued when all upgrades are complete.

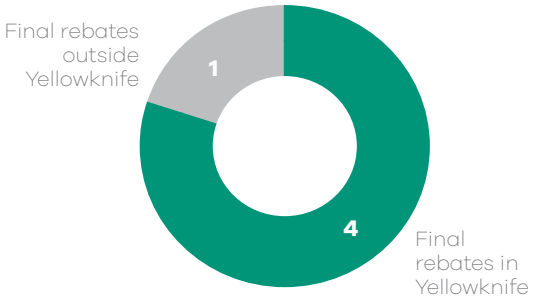
FOR

residents, businesses, community governments, Indigenous governments, non-profit organizations

AEA FUNDING

$440,000 (from GNWT Department of Infrastructure and Government of Canada)

Communities



communities receiving rebates: **2**

Results

Home energy evaluations

pre-retrofit evaluations: **3** (in 3 communities)

- on-site pre-retrofit evaluations: **2** (in 2 communities)
- remote pre-retrofit evaluations: **1** (in 1 community)

post-retrofit evaluations: **5** (in 2 communities)

The on-site home energy evaluations (both pre- and post-retrofit) are included in the evaluations reported for the Energy Rating Services Support Program (see page 27).

Completed projects

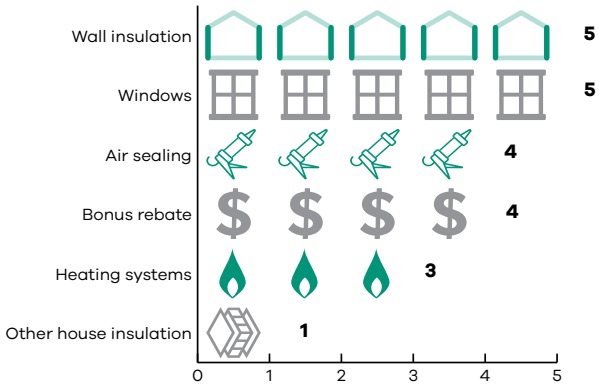
12 total rebates *(5 final plus 7 interim)*

total value of rebates: **$55,000**

- final rebates: **$29,000**
- interim rebates: **$25,000**

average final rebate: **$5,700**

Rebates by type



Payback[10]

Capital cost (all projects, before rebates):

$130,000[11]

Estimated annual savings (all products):

$6,900

Simple payback (all projects, after rebates):

12 years

Greenhouse gases

Annual greenhouse gases avoided: **13** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 53,000 km)[12]

Rebate cost per lifetime[13] tonne reduced:

$100

[10] Payback, savings and rebate cost calculations are for final projects only.

[11] The capital cost to date for unfinished projects receiving interim rebates is $130,000.

Energy savings

Annual electricity consumption avoided: **1,400** kWh

(equivalent to approximately 0.1 percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **$1.00**

Annual fossil fuel consumption avoided (oil, propane and natural gas): **200** GJ

(equivalent to 5,200 L of heating oil [33 barrels], or 5,900 L of gasoline [37 barrels])

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Inuvik	1	2	$ 190	290	$ 1.10	29
Yellowknife*	4	12	$ 88	1,100	$ 0.98	170

**Hydro community*

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Beaufort–Delta	1	2	$ 190	290	$ 1.10	29
North Slave	4	12	$ 88	1,100	$ 0.98	170

Greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Hydro	4	12	$ 88	1,100	$ 0.98	170
Non-hydro	1	2	$ 190	290	$ 1.10	29

[12] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[13] *Assuming a lifetime of 30 years for all upgrades.*

Designated Income Home Winterization Program

Winterization is a low-cost, high-impact way to save energy. This program provides homeowners with the supplies, knowledge and other resources to winterize their homes and save on heating fuel. It also provides LED light bulbs, low-flow showerheads and faucet aerators to reduce the consumption of electricity and water.

FOR
residents

AEA FUNDING
$130,000 (from GNWT Department of Infrastructure, GNWT Anti-Poverty Fund and Government of Canada)

Like our Community Wood Stove Program (see page 37) and Community Energy Planning Project (see page 47), this program is based on a community partnership model. Six community organizations partnered with us this year. Five of those hired a community liaison worker on a temporary contract as a way to ground the project in the community, raise awareness and capacity around winterization and support local employment.

The AEA trained three of the liaison workers to install contents of the winterization kits that are central to this program; the two other workers were already familiar with the equipment being installed. We also helped the communities hold workshops for lower-income homeowners to learn about winterization and how it saves energy.

Results

5 community workshops

111 energy efficiency kits distributed

total value of incentives: **$43,000**

average incentive: **$390**

Payback

Capital cost (all projects, before incentives): **$43,000**

Estimated annual savings: **$85,000**

Simple payback (after incentives): **0** years

Greenhouse gases

Annual greenhouse gases avoided: **160** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 650,000 km)[14]

Rebate cost per lifetime[15] tonne reduced: **$35**

Energy savings

Annual electricity consumption avoided: **50,000** kWh

(equivalent to approximately eight percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **$0.12**

Annual fossil fuel consumption avoided (oil): **1,700** GJ

(equivalent to 44,000 L of heating oil [280 barrels], or 50,000 L of gasoline [310 barrels])

[14] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[15] *The assumed lifetime of each product type installed under the Designated Income Home Winterization Program varies. Lifetime data presented for this program is an average of the assumed lifetimes of all products installed in the fiscal year.*

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Aklavik	20	32	$ 34	8,900	$ 0.12	360
Gamètì	18	26	$ 34	8,000	$ 0.12	290
Nahanni Butte	13	17	$ 43	5,800	$ 0.12	160
Tsiigehtchic	20	28	$ 35	8,900	$ 0.12	300
Tulita	20	30	$ 34	8,900	$ 0.12	340
Wrigley	20	28	$ 34	8,900	$ 0.12	300

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Beaufort–Delta	40	60	$ 34	18,000	$ 0.12	660
Dehcho	33	45	$ 37	15,000	$ 0.12	450
Sahtu	20	30	$ 34	8,900	$ 0.12	340
Tłı̨chǫ	18	26	$ 34	8,000	$ 0.12	290

Energy Efficiency Incentive Program

The Energy Efficiency Incentive Program provides rebates on the purchase of new, energy-efficient appliances and other products, with the goal of reducing energy costs and greenhouse gas emissions by conserving or reducing energy use.

FOR
residents, businesses, non-profit organizations, Indigenous governments, community governments

AEA FUNDING
$790,000 (from GNWT Department of Infrastructure and Government of Canada)

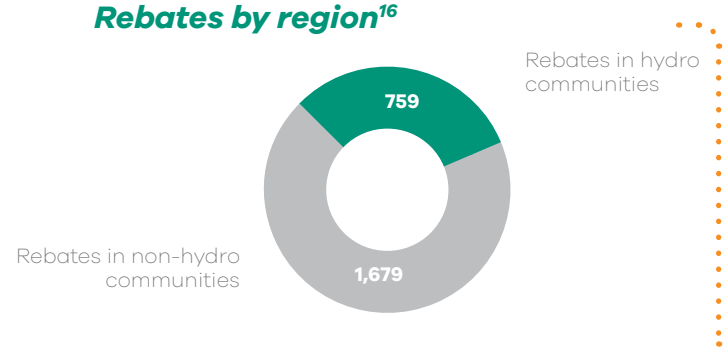
Results

2,438 total rebates

total value of rebates **$300,000**

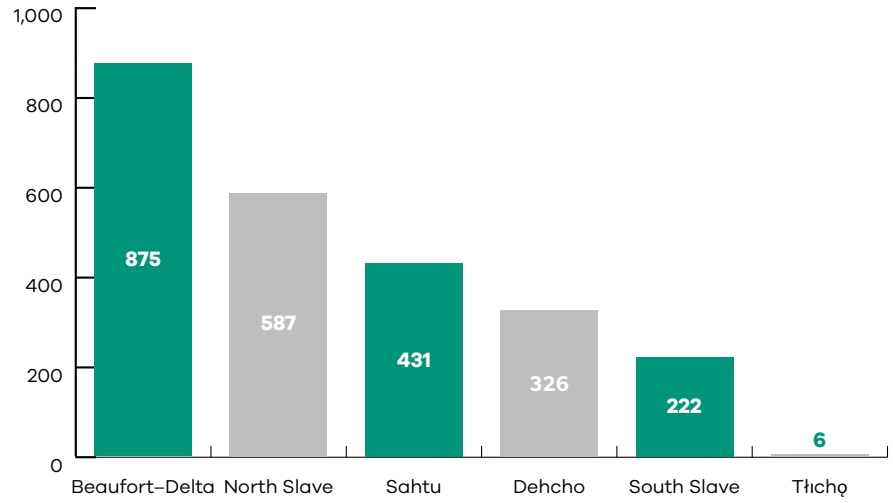
$120
average rebate

Rebates by region[16]



Darby, our Beaufort–Delta Regional Energy Project Coordinator, at a pop-up information booth at the Northern store in Tuktoyaktuk, ready to talk to people about the Energy Efficiency Incentive Program.

[16] *Hydro communities are those communities that receive most of their electricity from hydroelectric generators. This includes Behchokǫ̀, Dettah, Enterprise, Fort Resolution, Fort Smith, Hay River, Kátł'odeeche, Ndilǫ and Yellowknife. All other communities in the NWT are "non-hydro," which receive most of their electricity from generators that burn fossil fuels.*



Rebates by type

1644	LED Lighting
182	Washers
155	ECM pumps
125	Freezers
88	Wood and pellet stoves
83	Refrigerators
49	Programmable thermostats
35	On-demand water heaters
33	Furnaces
17	Combination boilers and water heaters
10	Boilers
8	Ventless dryers
5	Insulation
2	Automated vehicle plug-in controllers
1	Dishwashers
1	Drain water heat recovery

Payback

Capital cost (all products, before rebates):

$1,800,000

Estimated annual savings (all products):

$350,000

Simple payback (all products, after rebates):

4.3 years

Greenhouse gases

Annual greenhouse gases avoided:

550 tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 2.2 million km)[17]

Rebate cost per lifetime[18] tonne reduced:

$36

Energy savings

Annual electricity consumption avoided:

780,000 kWh

(equivalent to approximately 120 percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided:

$0.03

Annual fossil fuel consumption avoided (oil and propane): **4,100** GJ

(equivalent to 110,000 L of heating oil [690 barrels], or 120,000 L of gasoline [750 barrels])

Greenhouse gas and energy savings in hydro communities

Several communities in the NWT use hydroelectricity, including Behchokǫ̀, Dettah, Enterprise, Fort Resolution, Fort Smith, Hay River, Kátł'odeeche, Ndilǫ and Yellowknife. All other communities in the territory burn fossil fuels to create electricity.

In both hydro and non-hydro communities, saving electricity can help you lower your power bill. In a non-hydro community, it also means reducing greenhouse gas emissions because less fossil fuel has to be burned to create that power. Hydroelectricity, on the other hand, does not create greenhouse gas emissions. So saving electricity in a hydro community does not have associated greenhouse gas reductions.

Across the NWT, most households and organizations burn fossil fuels for space heating. Switching to a more efficient heating system, or to a less carbon-intensive fuel source such as wood, can help you directly reduce your greenhouse gas emissions—even in a hydro community.

For these reasons, you will see throughout this report that, in some cases, greenhouse gas savings are low in hydro communities, even though electricity savings are high. In other cases, greenhouse gas savings are relatively high because of improvements or efficiencies related to space heating.

[17] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[18] *The assumed lifetime of each product type under the Energy Efficiency Incentive Program varies. Lifetime data presented for this program is an average of the assumed lifetimes of all products rebated in the fiscal year.*

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided/ increased (GJ)
Aklavik	26	5	$ 38	3,200	$ 0.08	↓ 31
Behchokǫ̀*	4	0	-$ 140	4,800	$ 0.01	↑ 7
Colville Lake	1	1	$ 38	780	$ 0.04	↓ 1
Dél̨ı̨ne	64	5	$ 53	7,900	$ 0.03	↑ 17
Enterprise*	1	0	-$ 98	1,600	$ 0.01	↑ 2
Fort Good Hope	120	9	$ 30	14,000	$ 0.02	↑ 32
Fort Liard	81	5	$ 61	8,700	$ 0.03	↑ 23
Fort McPherson	79	7	$ 41	12,000	$ 0.03	↑ 19
Fort Providence	40	13	$ 18	11,000	$ 0.02	↓ 62
Fort Resolution*	2	0	-$ 86	1,700	$ 0.01	↑ 3
Fort Simpson	242	53	$ 23	32,000	$ 0.05	↓ 400
Fort Smith*	19	14	$ 36	7,200	$ 0.08	↓ 200
Hay River*	158	106	$ 31	110,000	$ 0.03	↓ 1,100
Inuvik	496	44	$ 28	65,000	$ 0.03	↓ 61
Kakisa	1	1	$ 19	0	N/A	↓ 20
Kátł'odeeche*	1	0	-$ 180	84	$ 0.04	0
Norman Wells	149	17	$ 44	23,000	$ 0.04	↓ 63
Paulatuk	74	5	$ 30	8,500	$ 0.02	↑ 25
Tsiigehtchic	11	1	$ 8	1,500	$ 0.00	↑ 5
Tuktoyaktuk	115	8	$ 32	14,000	$ 0.02	↑ 32
Tulita	97	6	$ 50	12,000	$ 0.03	↑ 35
Ulukhaktok	74	4	$ 44	7,400	$ 0.03	↑ 22
Whatì	2	1	$ 43	1,600	$ 0.04	↓ 2
Yellowknife*	574	230	$ 45	440,000	$ 0.02	↓ 2,300
Remote	7	17	$ 9	6,200	$ 0.02	↓ 130

**Hydro community*

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided/ increased (GJ)
Beaufort–Delta	875	74	$ 30	110,000	$ 0.03	↑ 11
Dehcho	326	66	$ 23	41,000	$ 0.05	↓ 490
North Slave	578	240	$ 43	440,000	$ 0.02	↓ 2,300
Sahtu	431	37	$ 42	57,000	$ 0.03	↑ 20
South Slave	222	130	$ 30	130,000	$ 0.03	↓ 1,300
Tłı̨chǫ	6	1	$ 110	6,400	$ 0.02	↑ 5

Greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided/ increased (GJ)
Hydro	757	350	$ 40	560,000	$ 0.03	↓ 3,500
Non-hydro	1,681	200	$ 27	230,000	$ 0.03	↓ 570

People at the Fisherman's Wharf market in Hay River check out the AEA's information booth on the Energy Efficiency Incentive Program.

Energy Rating Services Support Program

The Energy Rating Services Support Program provides homeowners across the NWT with access to affordable home energy evaluations.

The AEA's registered energy advisors evaluate new and existing homes under licence with Natural Resources Canada (NRCan). Using NRCan's EnerGuide Rating System for homes, the AEA can provide a measure of a home's performance according to a national standard. An evaluation also provides a homeowner with a detailed list of potential upgrades to use less energy.

In addition to conducting home evaluations, the AEA provides free, unbiased home energy efficiency advice to NWT homeowners. We also develop working partnerships with contractors and builders to increase their knowledge of residential energy efficiency, and how to create a healthy balance between envelope air tightness and adequate ventilation.

Results

146 evaluations of existing homes

1 walk-through advice session in existing home

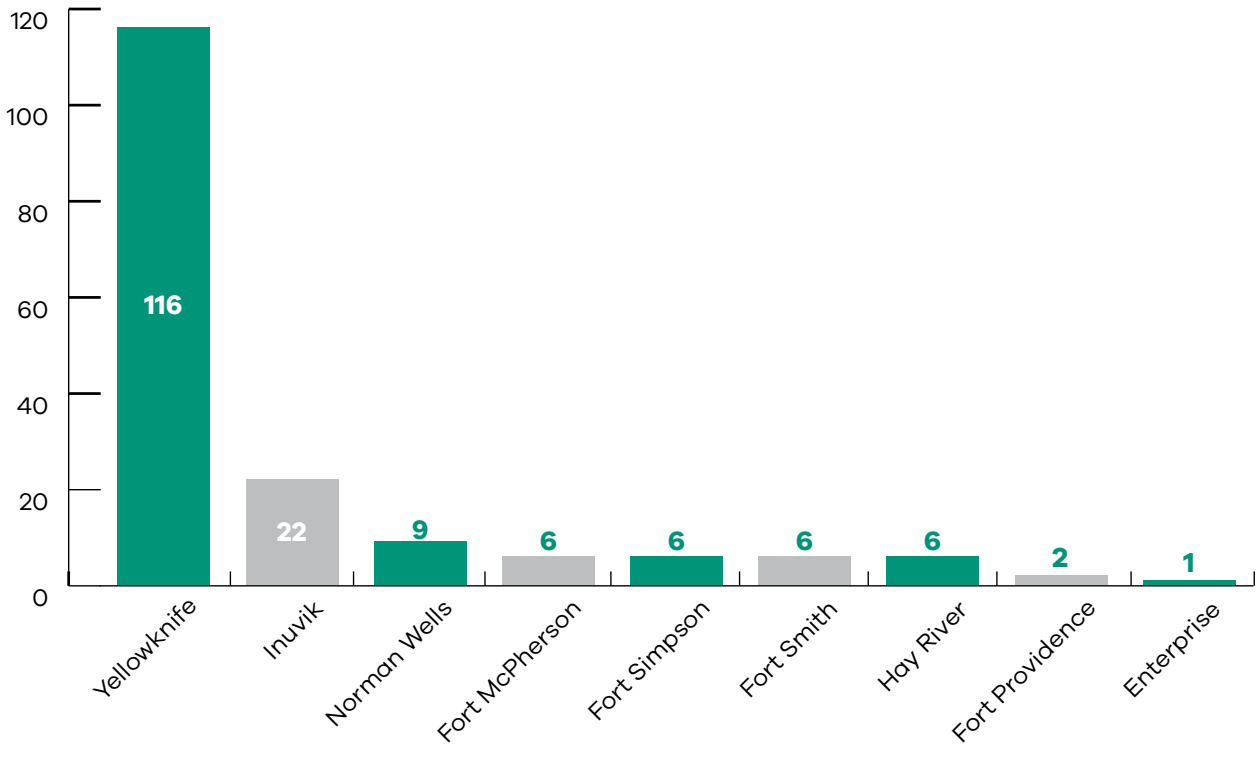
28 evaluations of new homes

174 total evaluations (plus 1 walk-through session)

FOR
residents

AEA FUNDING
$230,000 (from GNWT Department of Infrastructure) + fee for service

Total evaluations by community



Existing homes

For existing homes, the Arctic Energy Alliance provides two types of evaluations:

- Pre-retrofit: conducted before implementing energy-saving upgrades
- Post-retrofit: conducted after a homeowner implements recommended upgrades

The evaluations of existing homes listed below include those homes evaluated for the Deep Home Energy Retrofit Program (see page 17).

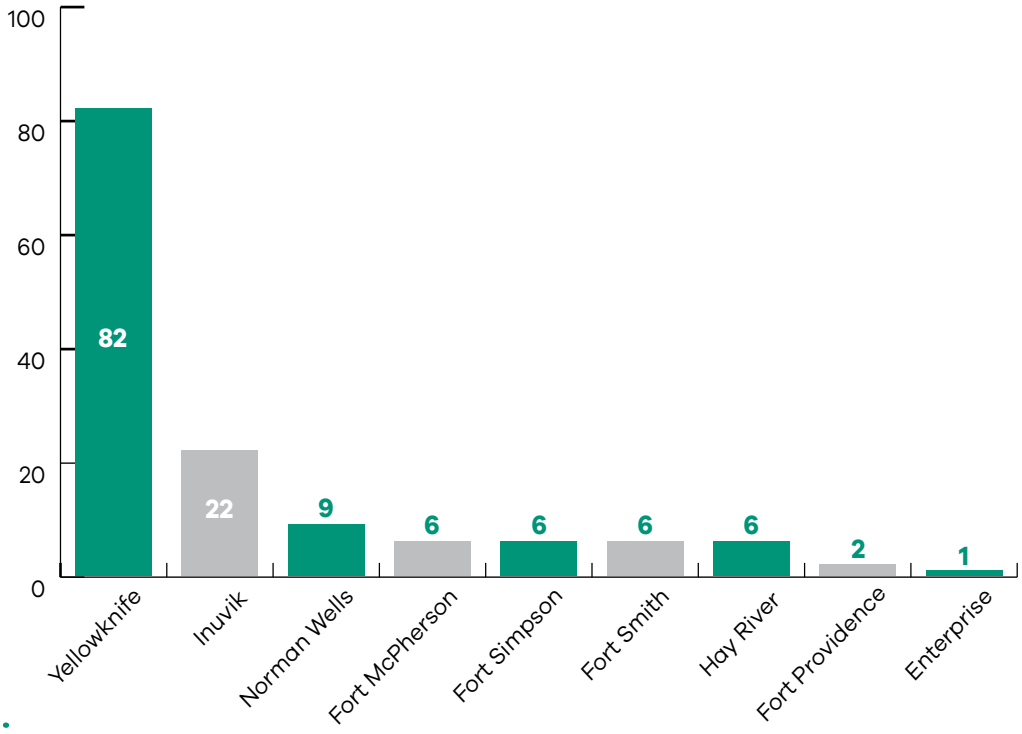
Post-retrofit evaluations

total post-retrofit evaluations: **6**

All six post-retrofit evaluations were in Yellowknife.

Pre-retrofit evaluations

total pre-retrofit evaluations: **140**



New homes

The AEA provides two types of evaluations for new home construction:

- Blueprint: conducted using building plans to calculate the expected energy use of a new home
- New home final: conducted when construction is complete

Blueprint evaluations

total blueprint evaluations: **16**

All 16 blueprint evaluations were for homes in Yellowknife.

New home final evaluations

total new home final evaluations: **12**

All 12 new home final evaluations were in Yellowknife.

Payback[19,20]

Potential annual savings (all existing homes):

$410,000

Greenhouse gases[20]

Potential annual greenhouse gases avoided: **460** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 1.8 million km)[21]

Energy savings[20]

Potential annual electricity consumption avoided: **300,000** kWh

(equivalent to approximately 45 percent of the electricity consumed each year in the community of Wekweètì)

Potential annual fossil fuel consumption avoided (oil and propane): **5,400** GJ

(equivalent to 140,000 L of heating oil [880 barrels], or 160,000 L of gasoline [1,000 barrels])

[19] *Estimated capital costs are unknown, as the AEA does not ask for quotes on its recommended upgrades for homes..*

[20] *These numbers represent the estimated annual savings in money, greenhouse gases and energy that would result if all homeowners who had pre-retrofit evaluations done were to complete all of the AEA's recommended upgrades. Actual savings can be measured with a post-retrofit evaluation, but comparatively few homeowners choose to complete this process.*

New home evaluations are not included in these numbers. Although new homes can be energy efficient, they cannot be considered to save energy unless they replace an older home.

[21] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

Potential greenhouse gas and energy savings by community

Community	Potential annual GHGs avoided (tonnes)	Potential annual electricity consumption avoided/increased (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Enterprise*	3	↓ 350	49
Fort McPherson	18	↓ 12,000	120
Fort Providence	16	↓ 11,000	92
Fort Simpson	48	↓ 4,000	580
Fort Smith*	12	↓ 24,000	120
Hay River*	13	↑ 1,400	210
Inuvik	85	↓ 32,000	1,100
Norman Wells	51	↓ 18,000	570
Yellowknife*	210	↓ 200,000	2,500

**Hydro community*

Potential greenhouse gas and energy savings by region

Region	Potential annual GHGs avoided (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Beaufort–Delta	100	43,000	1,300
Dehcho	48	4,000	580
North Slave	210	200,000	2,500
Sahtu	51	18,000	570
South Slave	44	33,000	460

Potential greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	Potential annual GHGs avoided (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Hydro	240	220,000	2,900
Non-hydro	220	76,000	2,500

Non-Profit Energy Efficiency and Conservation Program

The Non-Profit Energy Efficiency and Conservation Program provides rebates to non-profit organizations that make energy-efficient upgrades to their buildings, similar to the programs for businesses and community governments.

Under this program, non-profits can also take advantage of building energy audits.

FOR
non-profit organizations

AEA FUNDING
$350,000 (from GNWT Department of Infrastructure and Government of Canada)

Results

Audits

Building energy audits completed:

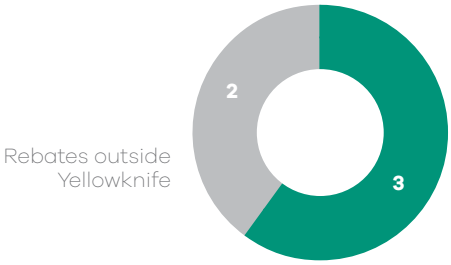
1 yardstick audit
1 targeted audit

The targeted energy audit identified $8,100 in combined potential savings on energy bills and 10 tonnes of potential annual greenhouse gas savings.

Completed projects

5 total rebates
total value of rebates: **$78,000**
average rebate: **$16,000**

Communities



Communities receiving rebates: **2**

Payback

Capital cost (all projects, before rebates):
$170,000

Estimated annual savings (all projects):
$50,000

Simple payback (all projects, after rebates):
1.7 years

Greenhouse gases

Annual greenhouse gases increased:
32 tonnes
(equivalent to the greenhouse gases emitted by driving a passenger car more than 130,000 km)[22]

Rebate cost per lifetime[23] tonne reduced:
-$120

[22] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[23] *Assuming a lifetime of 20 years for all upgrades.*

Energy savings

Annual electricity consumption avoided:
220,000 kWh
(equivalent to approximately 33 percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **$0.02**

Power demand avoided: **45** kW
(equivalent to running 38 dishwashers at the same time)

Annual fossil fuel consumption increased (oil and propane): **520** GJ
(equivalent to 14,000 L of heating oil [85 barrels], or 15,000 L of gasoline [97 barrels])

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
Fort Smith*	1	↓ 6	$ 180	530	$ 2.20	1	↓ 93
Hay River*	1	0	N/A	310	$ 0.02	0	0
Yellowknife*	3	↑ 39	-$ 69	220,000	$ 0.01	44	↑ 620

** Hydro community*

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided/ increased (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/ increased (GJ)
North Slave	3	↑ 39	-$ 69	220,000	$ 0.01	44	↑ 620
South Slave	2	↓ 7	$ 180	840	$ 1.40	1	↓ 93

Renewable and alternative energy programs

Replacing fossil fuels with renewable or alternative energy sources can greatly reduce greenhouse gas emissions. The Arctic Energy Alliance has four programs designed to help northerners adopt these technologies.

Alternative Energy Technologies Program

The Alternative Energy Technologies Program provides incentives for northerners to adopt alternative energy systems, such as solar, wind, wood and more. The program is divided into three streams:

- For residents
- For businesses (including off-grid businesses)
- For community-based organizations (including community governments, non-profit organizations and Indigenous governments)

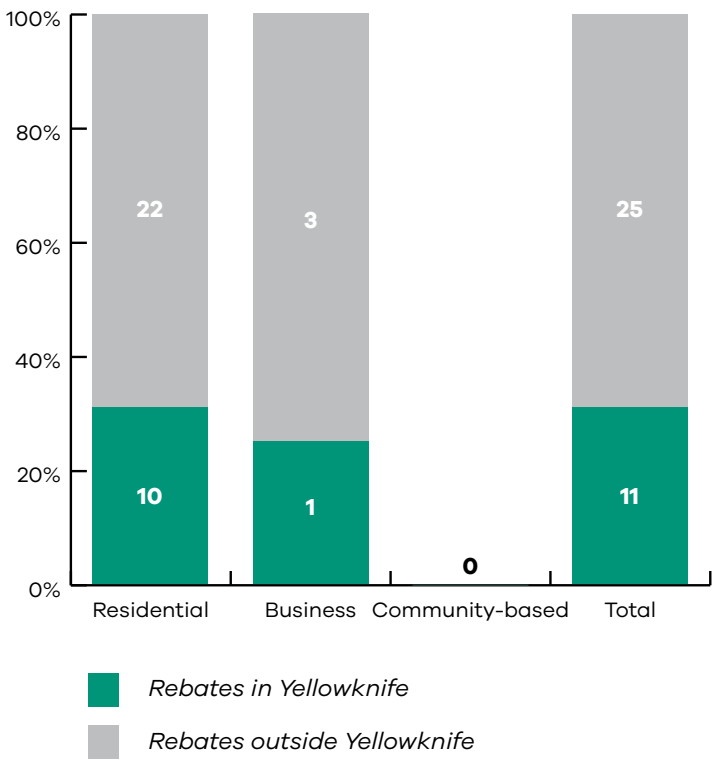
FOR
residents, businesses, community governments, Indigenous governments, non-profit organizations

AEA FUNDING
$990,000 (from GNWT Department of Infrastructure and Government of Canada)

Project types

	Residential	Business	Community-based	TOTAL
Biomass	6	3	0	9
Solar hot water	3	0	0	3
Solar photo-voltaic	22	1	0	23
Wind	1	0	0	1

Communities



Results

	Residential	Business	Community-based	TOTAL
Total rebates	32	4	0	36
Total value of rebates	$ 300,000	$ 110,000	$ 0	$ 410,000
Average rebate	$ 9,300	$ 27,000	$ 0	$ 11,000

Payback[24]

	Residential	Business	Community-based	TOTAL
Capital costs *(before rebates)*	$ 700,000	$ 230,000	$0	$ 920,000
Estimated annual savings	$ 65,000	$ 27,000	$0	$ 92,000
Simple payback *(after rebates)*	6.2 years	4.4 years	N/A	5.6 years

Greenhouse gases

	Residential	Business	Community-based	TOTAL
Annual greenhouse gases avoided (tonnes)	170	79	0	250
Rebate cost per lifetime[25] tonne reduced	$ 89	$ 69	N/A	$ 83

Norm Prevost from Prevost Electric Ltd. (right) talking to Derek, our Dehcho Regional Energy Project Coordinator (left) about the wood pellet boiler in the Kátł'odeeche First Nation's new youth centre. The highly energy-efficient building also boasts a 10.5 kW solar system.

Energy savings

	Residential	Business	Community-based	TOTAL
Annual electricity avoided/ produced (kWh)	47,000	8,100	0	56,000
Rebate cost/ lifetime kWh avoided/ produced	$ 0.31	$ 0.68	N/A	$ 0.37
Power demand avoided (kW)	49	8	0	57
Annual fossil fuel consumption avoided (GJ)*	1,400	1,100	0	2,500

**Does not include fuel savings from solar PV systems*

[24] *These figures are based on estimates used to pre-approve rebate applications, and may not accurately reflect the final systems as installed.*

[25] *Assuming a lifetime of 20 years for all projects.*

Combined greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided/ produced (kWh)	Rebate cost/ lifetime kWh avoided/ produced	Power demand avoided (kW)	Annual fossil fuel consumption avoided (GJ)†
Hay River*	3	54	$ 85	0	N/A	0	900
Tulita	1	1	$ 49	360	$ 0.18	0	0
Yellowknife*	11	110	$ 63	1,900	$ 3.70	3	1,600
Remote	21	82	$ 110	53,000	$ 0.17	54	0

** Hydro community*

† Does not include fuel savings from solar PV systems

Combined greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided/ produced (kWh)	Rebate cost/ lifetime kWh avoided/ produced	Power demand avoided (kW)	Annual fossil fuel consumption avoided (GJ)*
Dehcho	3	16	$ 70	8,000	$ 0.14	8	0
North Slave	26	170	$ 81	41,000	$ 0.33	43	1,600
Sahtu	2	2	$ 60	760	$ 0.17	1	0
South Slave	5	60	$ 93	5,400	$ 1.00	5	900

** Does not include fuel savings from solar PV systems*

Combined greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided/ produced (kWh)	Rebate cost/ lifetime kWh avoided/ produced	Power demand avoided (kW)	Annual fossil fuel consumption avoided (GJ)†
Hydro	14	160	$ 70	1,900	$ 6.20	3	2,500
Non-hydro*	22	84	$ 110	54,000	$ 0.17	54	0

** Includes off-grid locations near hydro communities.*

† Does not include fuel savings from solar PV systems

Biomass Energy Program

Through the Biomass Energy Program, the Arctic Energy Alliance provides northerners with accessible technical advice, project coordination, and education on existing or potential biomass projects. AEA staff also help clients by facilitating the development of partnerships with potential contractors and funders for projects.

There are several ways to use biomass energy, such as biomass heating (for example, a wood-pellet furnace or boiler), co-generation (heat and electricity from the same system) and district heating (using one heat source for several buildings).

In the 2022/23 fiscal year, the AEA continued our ongoing work by holding Biomass Week educational workshops and community-based Burn-It-Smart workshops, completing pre-feasibility analyses and concluding a project to help organizations install new pellet boilers.

FOR
residents, businesses, community governments, Indigenous governments, non-profit organizations

AEA FUNDING
$100,000 (from GNWT Department of Infrastructure)

Biomass Week workshops and presentations

In January we hosted a series of online workshops designed to help people in the NWT integrate biomass heating technologies. The workshops were for homeowners, students, and owners and operators of larger buildings.

The 35 presentations drew 300 participants—up from 70 last year. Presenters were from the industry, government and non-profit sectors, and covered topics such as wood stoves, pellet/chip boiler installation and operational logistics, the environmental benefits and savings of biomass, funding sources, and successful NWT and international projects.

Pellet boiler installation project

In the 2021/22 fiscal year, we launched a project under the Biomass Energy Program to help organizations across the NWT install new pellet boilers to offset the use of oil and propane. This year, we finished the work for that project.

We focused on smaller systems—boilers producing 100 kW or less that heat a single building. Last year, we narrowed down our list of project participants and completed pre-feasibility analyses. This year, we issued a rebate to the one participant that completed a system.

Seventeen organizations from seven communities originally expressed interest in the project. We completed pre-feasibility analyses for six of those. In the end, two clients wanted to move ahead with installing a boiler, but only one was able to find a contractor who could complete the work.

Pre-feasibility analyses in Behchokǫ̀, Hay River, Gamètì and Wekweètì

With biomass heating systems becoming more common across the NWT—and the savings being evident—more and more communities and organizations are looking to biomass for their heating needs. We can help these communities with pre-feasibility analyses. A pre-feasibility analysis looks at technical and financial aspects of a potential biomass project to help an organization decide whether to proceed.

The community governments of Behchokǫ̀ and Gamètì have been in discussion with the AEA in recent years about the possibility of installing new district heating systems

on community buildings. In 2022/23 we completed a pre-feasibility analysis in Behchokǫ̀. We completed an analysis for Gamètì last year, and this was presented at a community energy forum in 2022/23.

This year, we also provided input into a pre-feasibility study for the Community Government of Wekweètì and started a pre-feasibility analysis for a commercial system in Hay River.

Community Wood Stove Program

Under its Community Wood Stove Program, the AEA typically forms a two-year partnership with each participating community, where each partner has designated roles and responsibilities and provides 50 percent of the funding for new stoves. We can structure a project in one of two ways: we can have the stoves purchased, delivered and installed all in the same fiscal year, or we can handle purchase and delivery in one year and installation in the next.

FOR
residents

AEA FUNDING
$290,000 (from GNWT Department of Infrastructure, GNWT Anti-Poverty Fund and Government of Canada)

The goals of each project are to:

- increase wood burning safety by supporting code-compliant installations
- reduce particulate emissions in smoke from wood stoves
- increase local capacity around wood harvesting and seasonal local employment
- increase wood burning efficiency by installing EPA-certified wood stoves

Many of the stoves installed under the program are replacements for older, less-efficient stoves—some of which are no longer safe. This means the program may not create a large reduction in greenhouse gas emissions in any given year. It also may not have the relatively quick payback that could be seen by installing stoves in homes that previously did not have them. However, one of the program's main benefits is that by providing new, more efficient stoves that have been installed according to safety codes, it allows residents to continue to safely and affordably use wood heat instead of switching back to fossil fuels. And the newer stoves burn much more cleanly, improving local air quality.

We installed 26 stoves this year in Behchokǫ̀ and Délı̨nę, and delivered another 12 stoves to Nahanni Butte to be installed at the beginning of next year.

To make the project happen, we partnered with the Tłı̨chǫ Government, the Community Government of Behchokǫ̀, the Délı̨nę Got'ine Government, and the Nahʔą Dehé Dene Band.

Results

26 total stoves installed
10 new stoves installed
16 replacement stoves installed
total value of incentives: **$120,000**
average incentive: **$4,500**

Payback

Capital cost (all installed stoves, before incentives):

$240,000

Estimated annual savings (from heating oil avoided, all installed stoves):

$29,000

Simple payback (all installed stoves, after incentives): **4.0** years

Greenhouse gases

Annual greenhouse gases avoided: **50** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 200,000 km)[26]

Incentive cost per lifetime[27] tonne reduced (all installed stoves; incentives for purchase, delivery and installation): **$120**

Annual particulate emissions reduced:

690 kg *(a 93% decrease)*

Energy savings

Annual fossil fuel consumption avoided (oil):

730 GJ

(equivalent to 19,000 L of heating oil [120 barrels], or 22,000 L of gasoline [140 barrels])

For the purposes of this program, electricity savings are assumed to be zero.

Building success through partnerships

One of the AEA's core values is that the most important way to achieve our vision is through partnerships. And you can see that value in the work that we do. We take a partnership approach to just about every interaction we have.

Often, those partnerships are informal. We want to empower our clients and help them make decisions that are best for them. But other times we form partnerships in the true sense of the word. This is most easily seen in some of our programs and special projects, such as the Community Wood Stove Program, the Designated Income Home Winterization Program and the Community Energy Planning Project.

Creating these formal partnerships can achieve several things. It allows the other organizations to have a strong say in the projects that happen in their communities. It means that we have people involved who know the communities and what they need. And it can even help build local capacity.

Providing rebates and advice are important parts of what we do—they help make change happen. But we believe that partnerships make that change truly meaningful.

Savings from wood stove use

Because the 26 recipients who had stoves installed in 2022/23 are using new, efficient wood stoves, they are estimated to see the following savings each year compared to heating with oil alone:

- Annual greenhouse gas emissions: **115** tonnes
- Annual fossil fuel consumption: **1,600** GJ *(or 43,000 L of heating oil)*
- Annual heating cost: **$67,000**

[26] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[27] *Assuming a lifetime of 20 years for all stoves.*

Greenhouse gas and energy savings by community

Community	No. of installed stoves	Annual GHGs avoided (tonnes)	Incentive cost/ lifetime tonne of GHGs reduced	Annual firewood increased (cords)	Particulate emissions avoided/ increased (kg)	Annual fossil fuel consumption avoided (GJ)
Behchokǫ̀*	20	16	$ 290	3	↓ 710	230
Dél̨ı̨nę	6	34	$ 40	29	↑ 11	500

** Hydro community*

Greenhouse gas and energy savings by region

Region	No. of installed stoves	Annual GHGs avoided (tonnes)	Incentive cost/ lifetime tonne of GHGs reduced	Annual firewood increased (cords)	Particulate emissions avoided/ increased (kg)	Annual fossil fuel consumption avoided (GJ)
Sahtu	6	34	$ 40	29	↑ 11	500
Tłı̨chǫ	20	16	$ 290	3	↓ 710	230

Greenhouse gas and energy savings by hydro vs. non-hydro communities

Community type	No. of installed stoves	Annual GHGs avoided (tonnes)	Incentive cost/ lifetime tonne of GHGs reduced	Annual firewood increased (cords)	Particulate emissions avoided/ increased (kg)	Annual fossil fuel consumption avoided (GJ)
Hydro	20	16	$ 290	3	↓ 710	230
Non-hydro	6	34	$ 40	29	↑ 11	500

Electric Vehicle Incentive Program

Launched in 2020, the Electric Vehicle Incentive Program provides rebates to reduce the cost of purchasing and using an electric vehicle in the NWT. Switching to an electric vehicle can help consumers reduce the amount of greenhouse gas emissions released to the atmosphere from road vehicles that use fossil fuels.

The program provides rebates for battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and Level II charging stations.

This program is only available to clients in communities that use hydroelectricity.

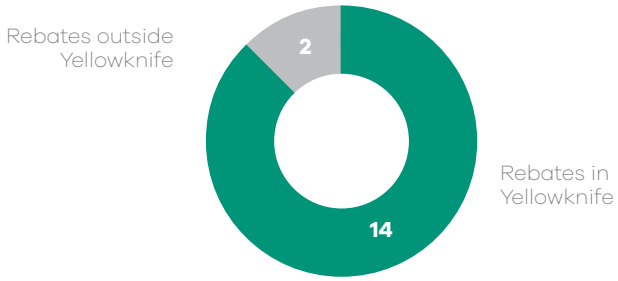
FOR

residents, businesses, community governments, Indigenous governments, non-profit organizations

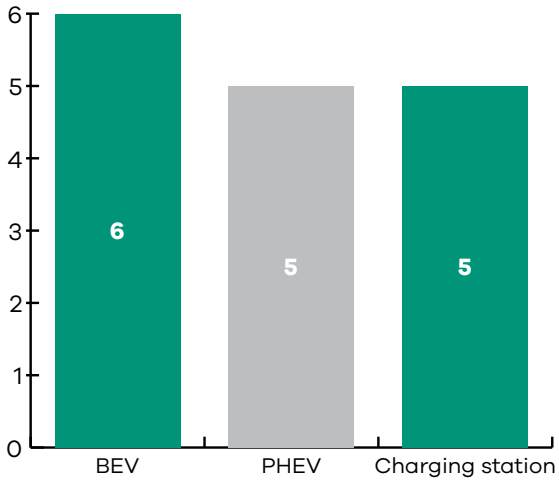
AEA FUNDING

$130,000 (from GNWT Department of Infrastructure)

Communities



Rebates by type



Results

16 total rebates

total value of rebates: **$58,000**

$3,600
average rebate

Payback

Capital cost (all products, before rebates):

$640,000

Estimated annual savings (all products):

$7,500

Greenhouse gases

Annual greenhouse gases avoided: **34** tonnes

(equivalent to the greenhouse gases emitted by driving a passenger car more than 73,000 km)[28]

Rebate cost per lifetime[29] tonne reduced: **$240**

[28] *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

[29] *Assuming a lifetime of 13 years for all vehicles and charging stations.*

Energy savings

Annual electricity consumption increased:

22,000 kWh

(approximately three percent of the electricity consumed each year in the community of Wekweètì)

Rebate cost per lifetime kWh avoided: **-$0.20**

Annual fossil fuel consumption avoided (gasoline): **260** GJ

(equivalent to 7,700 L of gasoline [48 barrels])

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption increased (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Hay River	2	2	$ 230	2,200	-$ 0.20	27
Yellowknife	14	17	$ 240	20,000	-$ 0.20	230

Greenhouse gas and energy savings by region

Region	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption increased (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
North Slave	14	17	$ 240	20,000	-$ 0.20	230
South Slave	2	2	$ 230	2,200	-$ 0.20	27

Community engagement

While the Arctic Energy Alliance is well known for its rebate and energy evaluation programs, community engagement is just as important. By engaging with community members, the AEA can provide education and advice, and promote and coordinate our programs across the NWT. When people are energy conscious, they are more likely to adopt efficient and renewable energy practices. Engagement is one of the main tools we use to foster that energy consciousness.

FOR
residents, businesses, community governments, Indigenous governments, non-profit organizations

AEA FUNDING
allocated from $1,600,000 core funding (from GNWT Department of Infrastructure)

The AEA has offices in six communities across the NWT: Behchokǫ̀, Fort Simpson, Hay River, Inuvik, Norman Wells, and Yellowknife. These offices allow us to keep a closer connection to the communities throughout the territory. Who better to understand the needs of each region than the people who live there?

Each of the AEA's offices is involved in every program and project that we undertake, but also engage in their own work, unique to each region. In fact, we have a Regional Office Program to coordinate the work of our regional offices, and community engagement is a huge component. One of the main ways we get involved in our communities is through trade shows, events and other community engagement activities. We partner with organizations throughout the NWT to help educate northerners on our programs and the importance of responsible energy use.

We were happy to be able to regularly visit communities and engage in a variety of activities again, following the restrictions during the pandemic. The following are highlights from just a few of those activities.

Beaufort–Delta office (Inuvik)

Pop-up info booth in Tuktoyaktuk

In August, we travelled to Tuktoyaktuk to set up an information booth at the local Northern store. We saw plenty of foot traffic while we were there, and got to talk to community members about our rebate program for energy-efficient products—especially instant rebates that are available on some products at most Northern stores in the NWT.

Name-that-tune contest at the Inuvik Legion

In December, we held an energy-themed name-that-tune contest and trivia night at the Royal Canadian Legion in Inuvik. Teams were able to win prizes as they learned about our programs and the energy infrastructure in the community. A particular success of the event was that it allowed us to reach some people who may not normally come to the events we host or otherwise engage with the AEA.

Dehcho office (Fort Simpson)

New office in Fort Simpson

Early in the new year, our Dehcho regional office moved to the brand new Łíídlı̨ Kų́ę́ First Nation building in Fort Simpson. The building is designed to be energy efficient, and allows us to share a roof not only with the First Nation, but also with Parks Canada and the Village of Fort Simpson.

Visit to Sambaa K'e

In March, we travelled to Sambaa K'e to check in with their community government and local development corporation. While there, we discussed the community's plans to add solar electricity, and the new housing initiative, among other things. We always enjoy discussing these sorts of plans to find out if there are ways we can help make them happen.

Sahtu office (Norman Wells)

Yellowknife staff visits to Norman Wells

Our Sahtu office in Norman Wells was unstaffed for a good chunk of the year. While trying to find a new Regional Energy Project Coordinator, some of our Yellowknife staff visited the community for two weeks over November and December to meet with the local council, set up pop-up info booths and more. We wanted to ensure that even though our office was temporarily vacant, we still had a presence in the region to answer people's questions. Luckily, we hired Candace, our new Regional Energy Project Coordinator, shortly afterward.

Open houses in Colville Lake and Fort Good Hope

In March, we held open house sessions in Colville Lake and Fort Good Hope so community members could learn about energy efficiency and our rebate programs. To make people feel at home, we served stew and bannock, and gave away door prizes.

South Slave office (Hay River)

Gateway Jamboree in Enterprise

The Gateway Jamboree is Enterprise's yearly summer festival, which usually draws a crowd from nearby communities—and sometimes not-so-nearby ones. Because of the COVID-19 pandemic, 2022 was the first time the festival had been held in three years, and it didn't disappoint, drawing people from Enterprise, Hay River, Fort Providence, Fort Resolution, Fort Smith, Yellowknife and even Kugluktuk, Nunavut. The AEA has regularly set up an information booth at the event in the past, and we were eager to do so again. The timing of the event—in August—is especially helpful for speaking to people about energy, because many of them are already starting to think about preparing for winter.

Dehcho Youth Climate Action Conference in Hay River

At the end of September and beginning of October, the Dehcho First Nations and Gonezu Energy hosted a conference for Dehcho youth to involve youth in addressing climate change. The event included a series of speakers, workshops and activities. The AEA took part in the icebreaker events on the first night and set up an information booth during one of the main conference days that participants could visit during their lunch break. We're happy we got to take part in this event that helped shape future energy leaders.

Tłı̨chǫ office (Whatì and Behchokǫ̀)

New Tłı̨chǫ regional office in Behchokǫ̀

Our longstanding Regional Energy Project Coordinator for the Tłı̨chǫ territory, Sonny, retired in 2022. His replacement, Shannon, started with us in early 2023, and we moved our Tłı̨chǫ regional office from Whatì to Shannon's home community of Behchokǫ̀. Since Behchokǫ̀ is the largest of the Tłı̨chǫ communities, and the centre of the Tłı̨chǫ Government, we feel we'll be able to serve local communities very well from our new office. An open house is scheduled for the new fiscal year to officially welcome people to our new locale.

Information session in Wekweètì

In March, we travelled to Wekweètì to hold an open information session to talk to community members about our rebate programs, and about saving energy in general. It was a fantastic opportunity for people from another community to meet Shannon in her new role with the AEA.

Participants at the Dehcho Youth Climate Action Conference in Hay River, hosted by the Dehcho First Nations and Gonezu Energy.

Yellowknife office

Earth Week e-bike meetup in Yellowknife

Earth Day comes around every April. And in the NWT, Ecology North extends the events to an entire Earth Week. The AEA regularly takes part by hosting or participating in some sort of event. This year, one of the events we participated in was an e-bike meetup, hosted by Ecology North. People from around the city were encouraged to bring out their e-bikes to show off their rides, ask questions and share their knowledge.

E-bikes are quickly becoming more popular, and this event was a great way to see some of what's out there and to talk to people who are interested in buying one. We even let people take our bike for a test ride to get a feel for what an e-bike is like.

People chat around the campfire during an Earth Day event at the Inuvik Ski Club, hosted by the AEA and Ecology North.

Yellowknives Dene First Nation EV events in Dettah and Ndilǫ

In July, the Yellowknives Dene First Nation (YKDFN) held an event in Dettah for community members to learn about electric transportation. Aurora Ford and the Yellowknife Car Share Co-op offered rides in their EVs, and the AEA brought along an e-bike to give people a taste of another form of electric transportation. Other organizations, like the GNWT, were also on hand to answer questions. There was a great Q&A session, where community members got to ask some tough questions, and representatives from the participating organizations took turns answering them.

In October, the YKDFN held a similar event in Ndilǫ so other members of the First Nation could take part.

The crowd of e-bikes at the Earth Week e-bike meetup in Yellowknife, hosted by Ecology North.

Special projects

In addition to our core programs, the Arctic Energy Alliance undertakes special projects as opportunities arise. These projects can support residents, businesses, community or Indigenous governments, or non-profit organizations in the NWT.

Over the 2022/23 fiscal year, the AEA conducted eight projects, with funding provided by the GNWT Department of Infrastructure (through its core funding to the AEA and the Low Carbon Economy Leadership Fund), Environment and Climate Change Canada (through the Low Carbon Economy Leadership Fund) and Natural Resources Canada.

Automated vehicle plug-in controller fast-track project

A few years ago, we began running fast-track projects to make it easy for businesses, community governments and non-profit organizations to switch to specific energy-saving technologies. These projects not only offer rebates, but the AEA also takes care of the project coordination to make everything happen.

Over the years, we've focused on technologies such as LED lighting and ECM pumps. This year, we focused on automated vehicle plug-in controllers. These are smart outlets, meant for parking lots, that are designed to turn vehicle block heaters on and off. They measure the ambient outdoor temperature to determine how much power a vehicle needs to be able to start smoothly.

We received 11 expressions of interest from organizations that wanted to take part in the project. We then conducted scoping visits for potential clients in Hay River and Inuvik. In the end, three clients decided to move forward, and they will have their controllers installed in the 2023/24 fiscal year.

Cold-climate air-source heat pump project

Air-source heat pumps are a highly efficient way to heat a home using electricity. Plus, when they use a renewable source of electricity—like hydropower—they can practically eliminate greenhouse gas emissions related to home heating. Traditionally, however, air-source heat pump technology has not been well suited to the NWT's climate.

In recent years, more and more cold-climate air-source heat pumps have come on the market, but we still have very little information on how they work in the North and how well they interact with existing heating systems. The Yukon Government is testing the technology in Whitehorse, but that city's climate is slightly warmer than most parts of the NWT. So this year we set up a project to test these heat pumps in Yellowknife.

With financial support from the GNWT departments of Environment and Climate Change and Infrastructure, we partnered with Housing NWT to install heat pumps and monitoring equipment in two homes in a single building, with a third home serving as a control (without a heat pump). We will continue to monitor the equipment over the coming winters to determine its suitability to the NWT.

Community energy planning

Since the AEA's inception it has engaged with a number of communities around the NWT on community energy planning. The exercise of community energy planning is about identifying and finding ways to implement local solutions to challenges around energy use (the types of energy that are used to heat and power a community), as well as energy conservation and efficiency. In the process, it also aims to build local capacity and energy literacy, and hold true to local values.

For the past three years, we have received funding from Natural Resources Canada, through its Clean Energy for Rural and Remote Communities Capacity Building Stream, to work with communities to develop new energy plans.

This year, we started the community energy planning process with the Hamlet of Ulukhaktok, the Ka'aa'gee Tu First Nation in Kakisa, and the Village of Fort Simpson. Each of these organizations hired a community energy champion to help with planning activities. These champions are key to the success of the project. In addition to guiding the community engagement process, they ensure the project is grounded in Indigenous community traditions, and that local governance and protocols are respected.

In the end, all three communities developed their energy plans, which we expect to be approved by their councils in the next fiscal year.

Plan implementation

In the previous year, we worked with the Community Government of Wekweètì, the Hamlet of Tulita and the Town of Fort Smith to develop their community energy plans, which were adopted by their councils in mid-2022. Following the adoption of the plans, each of these communities chose to begin implementing some of the projects they identified.

The Community Government of Wekweètì chose to continue an existing lighting project: swapping out incandescent lighting in their government buildings for LED lighting. They also decided to implement a winterization project for homeowners, which was separate from our Designated Income Home Winterization Program. The winterization project was completed in November 2022; the lighting project is expected to be fully completed in April 2023.

The Hamlet of Tulita decided to focus mainly on the community's arena this year: recommissioning the air handling units and performing complete maintenance on the heating system. The recommissioning, and the introduction of occupancy sensors and timing technologies, is expected to result in savings of up to $84,000 per year and a reduction in GHG emissions of 92 tonnes per year.

Among the projects the Town of Fort Smith adopted, they decided to replace inefficient pumps in their water treatment plant, which had reached the end of their lives, with more efficient VFD and ECM pump technology. The project began in January 2023 is expected to be complete by the end of April 2023.

Contractor outreach project

While the AEA provides rebates, advice and other services related to upgrading the energy efficiency of buildings, it's frequently contractors who do the work to make those upgrades happen. Usually our clients work with contractors, but sometimes we work with them directly. And they're always an important part of the process. So it makes sense for us to build relationships with them. Four years ago, we started a project to do formal outreach to contractors to strengthen our relationships and build more capacity in the NWT around energy-efficient technologies. That project continued in 2022/23.

In previous years, we held sessions over the course of a week, all based around a single set of technologies—such as ECM pumps. This year, we took a different approach: we held one virtual session a week for five weeks, each on a different topic.

Representatives from manufacturers and distributors presented on condensing oil heating appliances, automated vehicle plug-in controllers, drain water heat recovery systems, cold-climate air-source heat pumps and ECM pumps.

Anywhere from 12 to 30 people took part in each session.

ISO 50001 investigation project

ISO 50001 is an international standard that helps building owners manage and decrease their energy use by using an energy management system. It was developed by the International Organization for Standardization and is recognized in Canada and around the globe. Over the past three years, we've looked into whether ISO 50001 would be a good match for the AEA or other NWT organizations. After determining that it might be a good match, we decided to use AEA as a test case.

We initially spent time developing our policies, targets and objectives and identifying stakeholders and risks to meet the standard. In 2022/23, we began tracking the energy bills for our Yellowknife office according to the ISO 50001 framework to establish a baseline of energy use in the building. In the near future, this data will be used to develop a project to reduce our energy use or greenhouse gas emissions. Along the way, we will assess whether the standard would be a good tool for us to recommend to other building owners and who might find it useful.

School engagement project

The AEA has a significant amount of educational material, and we often visit schools to talk about things like energy efficiency and conservation. So we saw an opportunity to develop more extensive materials for school-aged children, that are in line with the NWT's new school curriculum.

This is a multi-year project that will develop new material every year about energy literacy. The idea is to develop information and activities that are simple, yet engaging, and can be delivered in one to two 50-minute sessions. This year, we focused on Grade 7.

Most of the material has been developed and we intend to do a test-run next fiscal year with a Grade 7 class to see if we need to make any refinements. Next year, we also intend to begin developing materials for another grade.

Status of energy management opportunities for community government buildings

The AEA has completed building energy audits for most of the community governments in the NWT. These audits find ways for a community government to save on energy bills. Within the AEA, we refer to these as energy management opportunities.

Once an audit is done, it's up to the client to decide if and when they start any projects to follow up on those opportunities. Things like budgets and staff capacity can determine which projects get done, and when they happen. Often, a community government isn't able to get to all of the opportunities on the list right away. Competing priorities and staff turnover can be further barriers—sometimes the energy management opportunities can be forgotten about.

This year we started a project to work with all of the community governments for whom we've completed an energy audit to determine the status of their energy management opportunities: which projects have been completed and which are left to complete? Through these conversations, we can discuss rebate options, help communities set priorities for energy-saving projects, and decide whether updated audits would be helpful. We will produce a report for each client that outlines our findings.

Work on this project will continue next fiscal year.

Study on the potential for electric vehicles in non-hydro communities

We know that electric vehicles (EVs) work well in the North. We also know that using EVs in communities with hydroelectricity will reduce greenhouse-gas emissions associated with transportation. What we don't know yet is whether EVs will substantially reduce GHG emissions when they're charged in Northern communities that use fossil fuels to produce electricity. So this year we laid the groundwork for a study to answer that question.

The first step is to collect data on fuel consumption and electric charging for vehicles in the NWT. This year, we developed our methodology for collection and began gathering data. Next year, we will analyze that information, assuming we have enough reliable data by then.

Alex James, Fort Smith's community energy champion, hosts a session for kids during a community energy planning open house.

Operations management

The Arctic Energy Alliance uses cash-based cost tracking, accrual accounting, and project resource-loading systems in our operations. Our cash-based project cost planning and tracking system, together with our accounting system, enables project- and ledger-level budgeting and expense tracking. These two systems are linked.

We use timesheet and billing software that includes project setup, budgets, resources assignment, timesheets, and advanced reporting tools. Using this software, each staff member is allocated time for each project and task to which they are assigned. This enables us to plan and report on staff activity at project and task levels.

The AEA has an established financial system including policies, procedures, budgeting and expenditure control. The system requires all expenditures at the project and ledger levels be planned and budgeted for. Once project and ledger-level budgets are loaded into our tracking and accounting software, purchase orders can only be issued if they are budgeted for, and only within prescribed spending thresholds. All purchase orders are electronically generated and are used to track planned, in-progress and actual expenditures against budgeted expenditures.

Salary time expenditures are tracked using our timesheet software and paid using our accounting system. Every two weeks, staff members submit their timesheets to the Executive Director for review and approval. This system restricts staff to only booking time against projects and tasks they are assigned. The approved timesheets are loaded into the accounting system and used to allocate staff costs to projects, and for payment purposes.

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

The table on the next page summarizes the outcome of the AEA's work, and the subsequent chart reports the total staff hours dedicated to achieving that outcome.

Tom Gross, a former AEA employee and now an occasional contractor for us, hosts a workshop on home winterization for members of the Kátł'odeeche First Nation.

Impact of AEA programs and projects

Metric	Commercial Energy Conservation and Efficiency Program	Community Government Building Energy Retrofit Program	Deep Home Energy Retrofit Program	Designated Income Home Winterization Program	Energy Efficiency Incentive Program	Energy Rating Services Support Program	Non-Profit Energy Efficiency and Conservation Program	Alternative Energy Technologies Program	Community Wood Stove Program	Electric Vehicle Incentive Program	Total
Total no. of incentives	15	4	5	111	2,438	-	5	36	26	16	2,656
No. of incentives in Yellowknife	8	1	4	-	574	-	3	11	-	14	615
No. of incentives outside Yellowknife	7	3	1	111	1,864	-	2	25	26	2	2,041
Total value of incentives	$ 140,000	$ 110,000	$ 29,000	$ 43,000	$ 300,000	-	$ 78,000	$ 410,000	$ 120,000	$ 57,500	$ 1,300,000
Average incentive	$ 9,500	$ 27,000	$ 5,700	$ 390	$ 120	-	$ 16,000	$ 11,000	$ 4,500	$ 3,600	$ 490
Total capital cost	$ 350,000	$ 280,000	$ 130,000	$ 43,000	$ 1,800,000	-	$ 165,000	$ 920,000	$ 240,000	$ 640,000	$ 4,600,000
Est. annual savings	$ 93,000	$ 48,000	$ 6,900	$ 85000	$ 350,000	-	$ 50,000	$ 92,000	$ 29,000	$ 7,500	$ 760,000
Est. annual electricity savings/ increase (MWh)	↓ 240	↓ 63	↓ 1	↓ 50	↓ 780	-	↓ 220	↓ 56	-	↑ 22	↓ 1,400
Incentive cost per lifetime kWh avoided/produced	$ 0.03	$ 0.08	$ 0.72	$ 0.12	$ 0.03	-	$ 0.02	$ 0.37	-	-$ 0.20	$ 0.06
Estimated power demand avoided/ produced (kW)	50	26	-	-	-	-	45	57	-	-	180
Est. annual fossil fuel savings/ increase (GJ)	↓ 860	↓ 85	↓ 200	↓ 1,700	↓ 4,100	-	↑ 520	↓ 2,500	↓ 730	↓ 260	↓ 11,000
Est. annual greenhouse gases avoided/ increased (tonnes)	↓ 52	↓ 35	↓ 13	↓ 160	↓ 550	-	↑ 32	↓ 250	↓ 50	↓ 18	↓ 1,100
Incentive cost per lifetime tonne of greenhouse gas emissions reduced	$ 140	$ 150	$ 72	$ 35	$ 36	-	-$ 120	$ 83	$ 120	$ 240	$ 74
Total no. of desktop energy evaluations (blueprint and yardstick evaluations)	7	9	-	-	-	16	1	-	-	-	33
No. of desktop energy evaluations in Yellowknife	7	-	-	-	-	16	1	-	-	-	24
No. of desktop energy evaluations outside Yellowknife	-	9	-	-	-	-	-	-	-	-	9
Total no. of on-site energy evaluations	1	15	8*	-	-	158	1	-	-	-	175
No. of on-site energy evaluations in Yellowknife	1	-	5*	-	-	100	1	-	-	-	102
No. of on-site energy evaluations outside Yellowknife	-	15	3*	-	-	58	-	-	-	-	73

** Also counted in Energy Rating Services Support Program. Not counted in total.*

Staff hours by program/project*

6,980	Regional Offices Program
6,710	Administration
3,480	Program Development and Delivery Support
1,940	Energy Rating Services Support Program
1,610	Community Energy Planning
1,530	Communications
1,120	Alternative Energy Technologies Program
1,070	Commercial Energy Conservation and Efficiency Program
1,050	Energy Efficiency Incentive Program
720	Community Government Building Energy Retrofit Program
600	Community Wood Stove Program
590	Designated Income Home Winterization Program
530	Deep Home Energy Retrofit Program
510	Biomass Energy Program
350	Non-Profit Energy Efficiency and Conservation Program
270	Energy Management Program (Buildings and Partnerships)
110	Community Energy Plan Implementation Project
29,160	TOTAL

** Rounded to the nearest 10.*

Financial management

Highlights

Results of operations for the year ending March 31, 2023

- Overall revenues totalled $5.0 million and overall expenses totalled $5.0 million.
- The AEA budgeted for an overall deficit of $180,000 this year, and ended the year with an overall surplus of $30,000, representing 0.6 percent of total revenues. This is an 88 percent decrease from the previous year's surplus of $250,000, which represented 5 percent of total revenues.
- Net financial assets increased $6,900 over the course of the year, compared to a $260,000 increase the previous year.

Key revenues	Value	Increase/ decrease from 2021/22	Comparison to budget
GNWT contributions	$ 4,200,000	↓ 9%	69%
Canada contributions	$ 320,000	↑ 44%	80%
Other source income	$ 220,000	↑ 39%	450%

Key expenses	Value	Increase/ decrease from 2021/22	Comparison to budget
Rebates distributed	$ 1,400,000	↓ 25%	48%
Consulting fees	$ 340,000	↑ 160%	140%
Travel and accommodations	$ 280,000	↑ 150%	69%
Advertising and promotion	$ 77,000	↑ 67%	81%

Financial position on March 31, 2023

Key assets	Value	Increase/ decrease from 2021/22	Primary reasons
Total assets	$ 2,900,000	↑ 28%	Increase in cash assets
Cash and short-term investments	$ 2,500,000	↑ 51%	
Accounts receivable	$ 330,000	↓ 42%	

Key liabilities	Value	Increase/ decrease from 2021/22	Primary reasons
Total liabilities	$ 1,100,000	↑ 120%	Increase in unspent contributions
Accounts payable and accrued liabilities	$ 1,100,000	↑ 120%	Increase in unspent contributions
Deferred revenues	$ 50,000	↑ 59%	Membership fee received in advance

Key net assets	Value	Increase/ decrease from 2021/22	Notes
Total net assets	$ 1,700,000	↑ 2%	Internal reserves and investments increased
Internally restricted reserves	$ 1,000,000	↑ 4%	Operating reserve increased for staff wages and other expenses
Unrestricted accumulated surplus	$ 700,000	↓ 3%	Represents membership fees and other revenue

Cash flow for the year ending March 31, 2023

- Gross cash from operations showed a surplus of $44,000, compared to a surplus of $240,000 the previous year.
- There was a net cash flow surplus of $870,000, up 51 percent over the previous year, largely due to an increase in government contributions and other source income.

Key cash receipts	Value	Increase/ decrease from 2021/22
GNWT contributions	$ 4,800,000	↓ 2%
Canada contributions	$ 420,000	↑ 330%
Other sources	$ 390,000	↑ 780%

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 our financial or operating environment quickly and effectively.

As evidenced in this 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.

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. Combined with the confidence governments have in funding a fiscally and operationally sound organization like the Arctic Energy Alliance, it is reasonable to expect funding stability over the next one to two years. The AEA saw an increase in funding partway through the 2018/19 fiscal year, which was provided by the Government of Canada and the GNWT through the federal Low Carbon Economy Leadership Fund. Beginning in 2019/20 the AEA ramped up its operations to take full advantage of this additional funding, including hiring and training new staff members to increase capacity, adding new programs and projects to address areas not covered by existing programs, and increasing incentive amounts to encourage more people to adopt energy-efficient and renewable-energy technologies.

Membership and governance

As on March 31, 2023.

Board of directors

- Robert Sexton, President; Director of Energy, GNWT Department of Infrastructure
- Daniel Korver, Vice-President; Director, Infrastructure Services (Projects), Housing NWT
- Gordon Van Tighem, Treasurer; Chairperson, Northwest Territories Public Utilities Board
- Mark Heyck, Secretary; Executive Director, Arctic Energy Alliance
- Sara Brown, Chief Executive Officer, NWT Association of Communities
- Cory Doll, Manager, Climate Change and Air Quality, GNWT Department of Environment and Climate Change
- Paul Grant, Chief Operating Officer, Northwest Territories Power Corporation
- Grace Lau-a, Director, Community Operations, GNWT Department of Municipal and Community Affairs
- Raymond McDonald, General Manager, Northland Utilities (Yellowknife) Ltd.

General members

- GNWT Department of Infrastructure
- GNWT Department of Environment and Climate Change
- GNWT Department of Municipal and Community Affairs
- Housing NWT
- NWT Association of Communities
- NWT Public Utilities Board

Sustaining members

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

Staff

- Sheena Adams, Program Coordinator
- Taylor Arsenault, Program and Administrative Assistant
- Kevin Cull, Communications Coordinator
- Darby Desrosiers, Regional Energy Project Coordinator, Beaufort–Delta
- Scott Dowler, Energy Management Specialist
- Derek Erasmus, Regional Energy Project Coordinator, Dehcho
- Marta Goodwin, Finance Officer
- Mike Goodwin, Senior Energy Management Specialist
- Mark Heyck, Executive Director
- Michelle Leger, Community Energy Planning Coordinator
- Faye MacDonald, Office Manager
- Shannon Mackenzie, Regional Energy Project Coordinator, Tłı̨chǫ
- Dharshan Maheswaran, Energy Management Specialist
- Margaret Mahon, Operations Manager/ Senior Energy Management Specialist
- Candace Maxwell, Regional Energy Project Coordinator, Sahtu
- Abdul Mohammed, Energy Management Specialist
- Louise Schumann, Regional Energy Project Coordinator, South Slave
- Linda Todd, Program Coordinator
- Jennifer Wicks, Human Resources and Program Assistant

"I, Mark Heyck, 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."

Mark Heyck,
Executive Director
July 27, 2023

Residents of Hay River taking part in an Earth Day cleanup around the community.

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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.

Arctic Energy Alliance