



2021/22 Annual Report



25 years
of serving the NWT



Arctic Energy
Alliance

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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

This year marks the 25th anniversary of the Arctic Energy Alliance—or AEA for short. For a quarter of a century, we have been leading the North in taking action on climate change. And we couldn't be prouder to lead that charge.

It was a big year for us: it was the third of four years in which we will receive a total of \$9 million in additional funding. This new funding comes from the governments of Canada and the Northwest Territories through the Low Carbon Economy Leadership Fund. It is allowing us to provide more rebates, bigger rebates and new initiatives to help more people save energy, save money and reduce their carbon footprints.

It was also a challenging year: the COVID-19 pandemic continued to affect how we operate some of our programs and special projects, and it is still difficult for some potential clients to take on their own energy-related projects. Despite this, we gave out roughly 100 more incentives than we did last year—mostly for smaller, residential upgrades under our Energy Efficiency Incentive Program.

Collectively, the clients we worked with this year will save 1,800 MWh of electricity annually, which is like taking three communities the size of Wrigley off the grid. They will also reduce their carbon footprint by about 1,000 tonnes a year—equivalent to converting one third of Tuktoyaktuk'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 six 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



Sonny, from our Tlicho regional office in Whati, gives a presentation on sustainable living.

2021/22 at a glance

The second year of the COVID-19 pandemic felt as if we were inching back to business as normal at the AEA offices. The number of rebates we gave out in most of our programs approached pre-pandemic levels. And, like last year, our Energy Efficiency Incentive Program continued to see staggering numbers of applications. The 2020/21 fiscal year had been a record-setting year for that program, and in 2021/22 we gave out more than 100 additional rebates for energy-efficient products.

Our Energy Efficiency Incentive Program offers rebates to Northerners who purchase energy-efficient products such as wood stoves, LED light bulbs and ENERGY STAR® certified refrigerators. The increase in the number of rebates under this program was largely due to a huge jump in purchases of LED lighting. For the 2021/22 fiscal year, people could get rebates on not only LED light bulbs and tubes, but also integrated fixtures. It's great to see that LED lighting is catching on so well.

Most of our other incentive-based programs also saw a rise in the number of rebates over last year. Only our non-profit and community wood stove programs saw decreases in the number of incentives given out compared to 2020/21. This indicates that businesses, community governments and non-profits are once again thinking about energy-efficiency projects and renewable energy systems.

The special projects we took on this year were generally smaller in scope than some of the projects we have completed in the past. We felt this was necessary, as there were some COVID-related restrictions still in place. These projects included a 2022 calendar, community energy planning, contractor outreach, an investigation into using the ISO 50001 standard in the AEA's Yellowknife office, and a look at how people in the Tlicho communities use power in their homes.

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



Benjamin Pea'a, from Wekweeti, learns how to install a wood stove during our project in the community as part of our Community Wood Stove Program.

Overall results¹

Programs and projects		
Number of programs		12
Number of special projects		5
Incentives		
Total incentives	Including Energy Efficiency Incentive Program (EEIP)	2,802
	Excluding EEIP	274
Total value of incentives	Including EEIP	\$ 1,800,000
	Excluding EEIP	\$ 1,400,000
Average incentive	Including EEIP	\$ 640
	Excluding EEIP	\$ 5,100
Payback*		
Total capital cost		\$ 6,200,000
Estimated annual savings		\$ 760,000
Simple payback	Before incentives	8.2 years
	After incentives	5.6 years
Energy savings		
Estimated annual electricity savings		1,800 MWh
Equivalent to taking three communities the size of Wrigley off the grid 		
Estimated power demand avoided ²		470 kW
Equivalent to 310 electric kettles running at the same time—at 1,500 W each 		
Annual fossil fuel consumption avoided (oil and propane)*		4,500 GJ
Equivalent to 120,000 L of heating oil—enough to fill 4 typical tanker trucks 		
Rebate cost per lifetime ³ kWh avoided		\$ 0.06
Greenhouse gas reduction		
Estimated annual greenhouse gases avoided		1,000 tonnes
Equivalent to converting one third of the power generation for the community of Tuktoyaktuk to renewable electricity 		
Rebate cost per lifetime tonne of greenhouse gases avoided		\$ 99

*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 30 rebates (up 1 rebate over last year).
- Combined, annual electricity consumption avoided by all clients' projects is about 430,000 kWh—roughly 100,000 kWh more than the amount of annual electricity used in the community of Nahanni Butte.
- The average client project will pay for itself through energy savings in just over three 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 \$120,000 in rebates in seven communities (up 126 percent over last year).
- Completed 1 desktop “yardstick” building energy audit and one on-site “targeted” building energy audit.
- Targeted energy audit identified roughly \$24,000 in potential annual savings and 34 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 26 home energy evaluations in four communities, including pre-retrofit evaluations

for potential clients and post-retrofit evaluations for clients who completed their upgrades.

- Provided 10 final rebates worth \$91,000, plus an additional five interim rebates valued at \$23,000. The interim projects will be finalized next year. (Four total rebates more than last year.)
- Combined, our 10 clients with completed projects are expected to save 480 GJ of heating fuel a year—equivalent to saving more than 1,000 propane cylinders for home barbecues.

Energy Efficiency Incentive Program

Provides rebates on energy-efficient appliances and other products.

- Provided 2,528 rebates (up 6 percent over last year).
- LED lighting continues to be the most popular eligible product, with 1,436 rebates—478 more than last year.
- 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 124 home energy evaluations (down 25 percent over last year).
- Performed evaluations on 53 new homes (down 46 percent over last year).
- Combined, all recommended upgrades could save homeowners \$110,000 and 180 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 6 rebates valued at approximately \$72,000 (down 40 percent over last year).
- Combined, all client projects will avoid approximately 15 tonnes of greenhouse gases and 230 GJ of fossil fuel use every year—

equivalent to 0.4 percent of the natural gas used to produce electricity in Norman Wells annually.

- The average client project is expected to pay for itself in just under nine years.

Specified 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 five partner communities to hire and train local liaison workers.
- Hosted educational workshops for lower-income homeowners in three communities.
- Distributed 105 energy efficiency kits to workshop participants (up 7 percent over last year).

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 65 rebates (up 59 percent over last year).
- The 65 systems that our clients installed are expected to save roughly 320 tonnes of greenhouse gases a year.
- The average system is expected to pay for itself in less than five 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.
- Launched a project to help building owners install wood pellet boilers.
- Completed work on a pre-feasibility analysis for one community on a district heating system, and continued working on an analysis for another community.

Community Wood Stove Program

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

- Coordinated the installation of 52 stoves in six partner communities.
- Combined, all installed stoves will save 2,800 kg of particulate emissions (a 96% decrease) and 19 tonnes of greenhouse gas emissions a year.

Electric Vehicle Incentive Program

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

- Second year of the program.
- Provided rebates on 16 vehicles and 10 charging stations (compared to five vehicles and one charging station last year).
- The 16 electric vehicles will save approximately 34 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

2022 AEA calendar

Produced our first-ever annual calendar as a way to show people the types of rebates and services we offer, and to provide some tips for saving energy.

Community energy planning

Partnered with the communities of Fort Smith, Tulita and Wekweeti to hire and train community energy champions. Completed all three draft energy plans.

Contractor outreach project

Held a contractor training session on oil and gas heating appliances to get contractors familiar with more options.

ISO 50001 investigation project

Developed policies, targets and objectives, and completed other background work needed for meeting the ISO 50001 standard for managing and decreasing the energy use in the AEA's Yellowknife office to set the organization up for implementation of the standard in the 2022/23 fiscal year.

Tlicho home power investigation project

Installed electrical monitoring units in 20 homes in Behchoko, Gameti and Whati, with the help of the Northwest Territories Power Corporation. The units allowed users to see—in real time—when the electrical loads in their homes were low, medium or high, and let them make informed decisions about conserving energy.



Our Sahtu office in Norman Wells sports a new mural painted by local artist Barb Cote.

Budget⁴

Source	Funding	Expenses	
		Operations	Incentives
Government of the Northwest Territories (GNWT) base & core program funding	\$ 2,740,000	\$ 2,022,000	\$ 716,000
Base funding for Regional Office Program, administrative staff, offices, etc.	\$ 1,600,000	\$ 1,582,000	\$ 0
Alternative Energy Technologies Program	\$ 300,000	\$ 46,000	\$ 244,000
Biomass Energy Program	\$ 100,000	\$ 69,000	\$ 0
Commercial Energy Conservation and Efficiency Program	\$ 200,000	\$ 74,000	\$ 108,000
Community Government Building Energy Retrofit Program	\$ 190,000	\$ 63,000	\$ 116,000
Energy Efficiency Incentive Program	\$ 200,000	\$ 38,000	\$ 248,000
Energy Rating Services Support Program	\$ 150,000	\$ 150,000	\$ 0
GNWT Low Carbon Economy Leadership Fund supplementary project funding	\$ 1,804,000	\$ 296,000	\$ 738,000
Alternative Energy Technologies Program – LCELF top-up	\$ 797,000	\$ 117,000	\$ 406,000
Commercial Energy Conservation and Efficiency Program – LCELF top-up	\$ 719,000	\$ 139,000	\$ 179,000
Community Government Building Energy Retrofit Program – LCELF top-up	\$ 113,000	\$ 11,000	\$ 7,000
Energy Efficiency Incentive Program – LCELF top-up	\$ 175,000	\$ 29,000	\$ 146,000
GNWT Low Carbon Economy Leadership Fund new project funding	\$ 2,026,000	\$ 380,000	\$ 289,000
Deep Home Energy Retrofit Program	\$ 578,000	\$ 114,000	\$ 109,000
Specified Income Home Winterization Program	\$ 288,000	\$ 91,000	\$ 24,000
Non-Profit Energy Efficiency and Conservation Program	\$ 509,000	\$ 77,000	\$ 72,000
Community Energy Planning and Implementation	\$ 469,000	\$ 0	\$ 0
Community Wood Stove Program	\$ 182,000	\$ 98,000	\$ 84,000
GNWT – Anti-poverty funding	\$ 42,000	\$ 0	\$ 42,000
Specified Income Home Winterization Program	\$ 42,000	\$ 0	\$ 42,000
GNWT – Environment and Natural Resources funding	\$ 43,000	\$ 43,000	\$ 0
Cold-climate air-source heat pump investigation	\$ 43,000	\$ 43,000	\$ 0
GNWT – Infrastructure funding	\$ 100,000	\$ 0	\$ 69,000
Electric Vehicle Incentive Program	\$ 100,000	\$ 0	\$ 69,000
Natural Resources Canada – Clean Energy for Rural and Remote Communities	\$ 300,000	\$ 226,000	\$ 0
Community Energy Planning	\$ 300,000	\$ 226,000	\$ 0
Membership dues⁵	\$ 228,000	\$ 228,000	\$ 0
Government of the Northwest Territories	\$ 150,000	\$ 150,000	\$ 0
GNWT – Crown corporations	\$ 68,000	\$ 68,000	\$ 0
Other members	\$ 10,000	\$ 10,000	\$ 0
Other source income	\$ 121,000	\$ 96,000	\$ 0
TOTAL	\$ 7,404,000	\$ 3,376,000	\$ 1,854,000

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 25 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 24 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 2021/22 fiscal year, including their results, so our readers can see the impact we have made.



Shirley King rides one of the AEA's electric bikes at a mini energy fair in Fort Resolution.

⁵ GNWT members include the departments of Infrastructure, Environment and Natural Resources, and Municipal and Community Affairs. Crown corporation members include NWT Housing Corporation, 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.



Margaret Nitsiza, from Whati, poses with her new wood stove from our Community Wood Stove Program.

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:

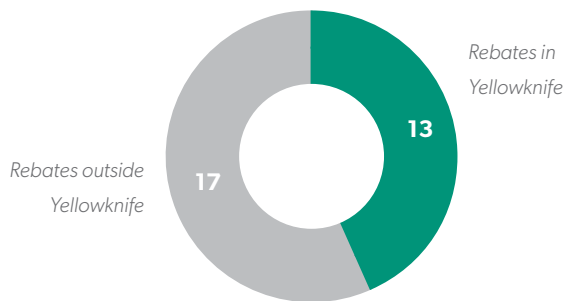
8 yardstick audits *(in 3 communities)*
1 targeted audits

The targeted energy audit identified roughly \$7,500 in potential annual savings on energy bills and 6 tonnes of potential annual greenhouse gas savings.

FOR
businesses

AEA FUNDING

\$920,000 (from GNWT Department of Infrastructure and Government of Canada)

Completed projects**30** total rebatestotal value of rebates **\$280,000****\$9,400**
average rebate**Communities**Communities receiving rebates: **8****Payback**

Capital cost (all projects, before rebates):

\$760,000

Estimated annual savings (all projects):

\$140,000

Simple payback (all projects, after rebates):

3.4 years**Greenhouse gases**Annual greenhouse gases avoided: **36 tonnes***(equivalent to the greenhouse gases emitted by roughly 1,500 propane tanks for home barbecues)⁶*Rebate cost per lifetime⁷ tonne reduced:**\$390****Energy savings**

Annual electricity consumption avoided:

430,000 kWh*(roughly 100,000 kWh more than the amount of electricity used annually in the community of Nahanni Butte)*Rebate cost per lifetime kWh avoided: **\$0.03**Power demand avoided: **100 kW***(equivalent to running 67 air fryers at the same time)*

Annual fossil fuel consumption increased

(oil and propane):

800 GJ*(equivalent to 21,000 L of heating oil, or roughly 19 residential oil tanks at 1,100 L [300 gallons])***Why did 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. Fourteen of our clients completed lighting retrofits this year. On average, each of them will save an estimated \$4,400 a year, even after taking additional heating fuel into account.

Most 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)
Aklavik	1	↓ 20	\$ 120	40,000	\$ 0.06	4	↑ 130
Deline	1	↓ 6	\$ 180	11,000	\$ 0.10	5	↑ 38
Fort Providence	1	↓ 1	\$ 200	0	N/A	0	↓ 23
Fort Simpson	2	↓ 18	\$ 75	32,000	\$ 0.04	5	↑ 82
Fort Smith*	1	↓ 3	\$ 180	0	N/A	0	↓ 40
Hay River*	7	↑ 5	-\$ 170	43,000	\$ 0.02	12	↑ 100
Inuvik	4	↓ 14	\$ 152	27,000	\$ 0.08	4	↑ 86
Yellowknife*	13	↑ 223	-\$ 240	270,000	\$ 0.02	68	↑ 430

* 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	5	↓ 35	\$ 130	67,000	\$ 0.07	8	↑ 210
Dehcho	2	↓ 18	\$ 75	32,000	\$ 0.04	5	↑ 82
North Slave	13	↑ 22	-\$ 240	270,000	\$ 0.02	68	↑ 430
Sahtu	1	↓ 6	\$ 180	11,000	\$ 0.10	5	↑ 38
South Slave	9	↑ 1	-\$ 1,500	43,000	\$ 0.04	12	↑ 41

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	21	↑ 24	\$ 280	310,000	\$ 0.02	80	↑ 490
Non-hydro	9	↓ 60	\$ 120	110,000	\$ 0.07	17	↑ 310

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

\$300,000 (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.

Last year, in 2020/21, the COVID-19 pandemic meant that few communities were willing and able to take on building upgrade projects. However, within just a year, the number of rebates we gave out under this program was almost back to normal.

Results

Audits

Building energy audits completed:

1 yardstick audit

1 targeted audit

The targeted energy audit identified \$24,000 in combined potential savings on energy bills and 34 tonnes of potential annual greenhouse gas savings.

Completed projects

7 total rebates (in 7 communities)
13 buildings and 1 parking lot retrofitted by clients
 total value of rebates: **\$120,000**
 average rebate: **\$18,000**

Payback

Capital cost (all projects, before rebates):

\$320,000

Estimated annual savings: **\$56,000**

Simple payback (after rebates): **3.6** years

Greenhouse gases

Annual greenhouse gases increased: **1** tonne
 (equivalent to driving one car almost 4,000 km)⁸

Rebate cost per lifetime⁹ tonne reduced:

-\$4,500

Energy savings

Annual electricity consumption avoided: **220,000 kWh**
 (equivalent to the amount of electricity it would take to run 500 ceiling fans 24 hours a day for a year—at 50 W each)

Rebate cost per lifetime kWh avoided: **\$0.57**

Power demand avoided: **24kW**
 (equivalent to running 270 LED TVs at the same time)

Annual fossil fuel consumption increased (oil and propane): **460 GJ**
 (equivalent to 12,000 L of heating oil—or 75 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)
Enterprise*	1	↓ 3	\$ 190	0	N/A	0	↓ 47
Hay River*	1	↑ 12	-\$ 130	100,000	\$ 0.32	2	↑ 270
Kakisa	1	↓ 10	\$ 114	11,000	\$ 2.00	1	0
Katl'odeeche*	1	0	\$ 3,400	8,700	\$ 0.23	0	0
Norman Wells	1	↓ 2	\$ 330	5,200	\$ 2.60	7	↑ 14
Tuktoyaktuk	1	↓ 7	\$ 88	13,000	\$ 0.99	2	↑ 44
Yellowknife*	1	↑ 11	-\$ 140	78,000	\$ 0.39	11	↑ 180

* 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	1	↓ 7	\$ 88	13,000	\$ 0.99	2	↑ 44
North Slave	1	↑ 11	-\$ 140	78,000	\$ 0.39	11	↑ 180
Sahtu	1	↓ 2	\$ 330	5,200	\$ 2.60	7	↑ 14
South Slave	4	0	\$ 12,000	120,000	\$ 0.55	3	↑ 230

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	4	↑ 21	-\$ 180	190,000	\$ 0.40	13	↑ 410
Non-hydro	3	↓ 19	\$ 130	30,000	\$ 1.60	10	↑ 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 15 of the 25 community governments that have used this program have also used our project coordination service. And considering we offer a \$10,000 subsidy, 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...

- 26 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 Tlicho territory and the Dehcho region have had audits completed.
- 16 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.
- 60% 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.

Because of the COVID-19 pandemic, the AEA continued to offer 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.

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,
non-profit organizations,
Indigenous governments,
community governments

AEA FUNDING

\$580,000 (from GNWT
Department of Infrastructure
and Government of Canada)

Results**Home energy evaluations**

pre-retrofit evaluations: **26**
(in 4 communities)

- on-site pre-retrofit evaluations: **24** (in 4 communities)
- remote pre-retrofit evaluations: **2** (in 2 communities)

post-retrofit evaluations: **10** (in 4 communities)

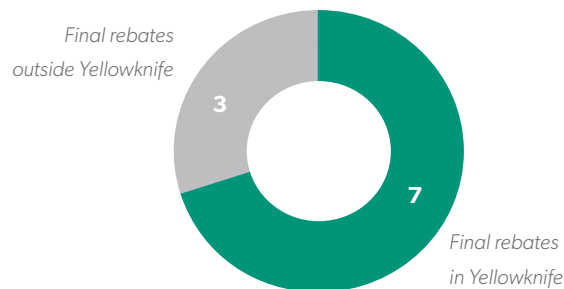
The on-site home energy evaluations (both pre- and post-retrofit) are included in the evaluations reported for the Energy Rating Services Support Program (see page 25). However, three of the post-retrofit evaluations for the Deep Home Energy Retrofit Program were conducted following remote pre-retrofit evaluations. Natural Resources Canada (NRCAN) does not recognize these as post-retrofit evaluations, and so they are counted as pre-retrofit evaluations for the purposes of the Energy Rating Services Support Program, which requires reporting to NRCAN.

Completed projects

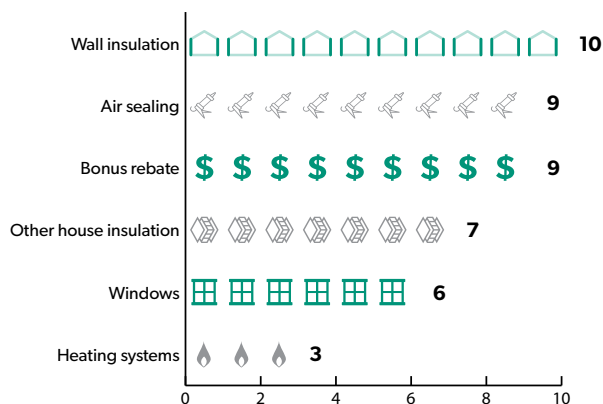
15 total rebates (10 final plus 5 interim)
total value of rebates: **\$110,000**

- final rebates: **\$91,000**
- interim rebates: **\$23,000**

average final rebate: **\$9,100**

Communities

communities receiving rebates: **4**

Rebates by type**Payback¹⁰**

Capital cost (all projects, before rebates):

\$530,000¹¹

Estimated annual savings (all products): **\$19,000**

Simple payback (all projects, after rebates): **22** years

Greenhouse gases

Annual greenhouse gases avoided: **34** tonnes
(equivalent to the greenhouse gases produced by
14,000 L of gasoline)¹²

Rebate cost per lifetime¹³ tonne reduced: **\$100**

¹⁰ All payback and savings numbers are based on final rebates only. All rebate cost calculations include both final rebates and interim rebates (if applicable) for each client.

¹¹ The capital cost to date for unfinished projects receiving interim rebates is \$80,000.

Energy savings

Annual electricity
consumption avoided: **14,000 kWh**

(equivalent to the power consumed by a coffee maker, at
1,000 W, running 24 hours a day for 1.6 years)

Annual fossil fuel consumption
avoided (oil, propane and natural gas): **480 GJ**

(equivalent to 18,000 L of propane—enough to fill more than
1,000 propane cylinders for home barbecues)

Rebate cost per lifetime kWh avoided: **\$0.26**

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)
Fort Resolution*	1	0	N/A	130	\$ 1.40	0
Hay River*	1	5	\$ 40	260	\$ 0.78	56
Inuvik	1	5	\$ 120	540	\$ 1.10	91
Yellowknife*	7	24	\$ 110	13,000	\$ 0.20	340

*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	5	\$ 120	540	\$ 1.10	91
North Slave	7	24	\$ 110	13,000	\$ 0.20	340
South Slave	2	5	\$ 77	380	\$ 1.00	56

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	9	29	\$ 100	13,000	\$ 0.22	390
Non-hydro	1	5	\$ 120	540	\$ 1.10	91

¹² <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

¹³ Assuming a lifetime of 30 years for all upgrades.

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.

In recent years, a significant addition to the program has been our partnership with the North West Company to offer in-store rebates at Northern and Northmart stores in several communities. Initially, these rebates were on LED bulbs. In 2019, we expanded the partnership to also offer instant rebates on ENERGY STAR certified refrigerators, washers and chest freezers. By removing the rebate application forms and processing the rebates at the till, we are able to make it even easier for customers to purchase energy-efficient products.

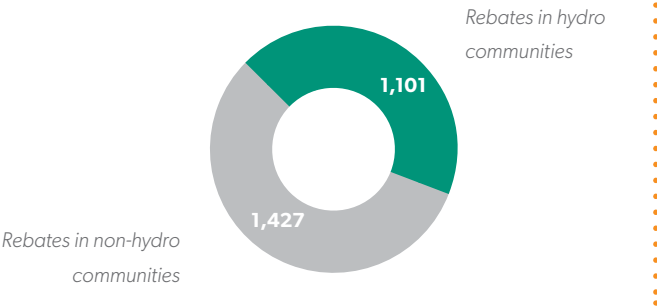
FOR
residents, businesses,
non-profit organizations,
Indigenous governments,
community governments

AEA FUNDING
\$380,000 (from GNWT
Department of Infrastructure and
Government of Canada)

Results

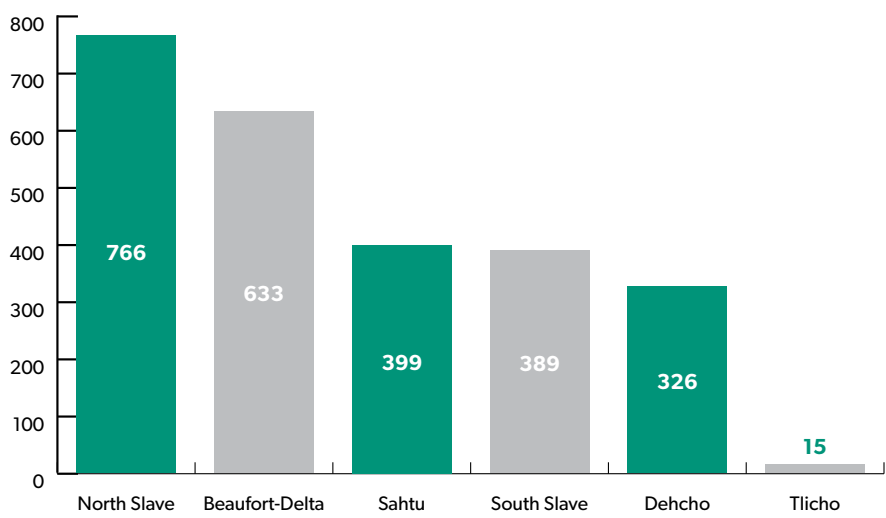
2,528 total rebates
total value of rebates **\$390,000**
\$160
average rebate

Rebates by region¹⁴

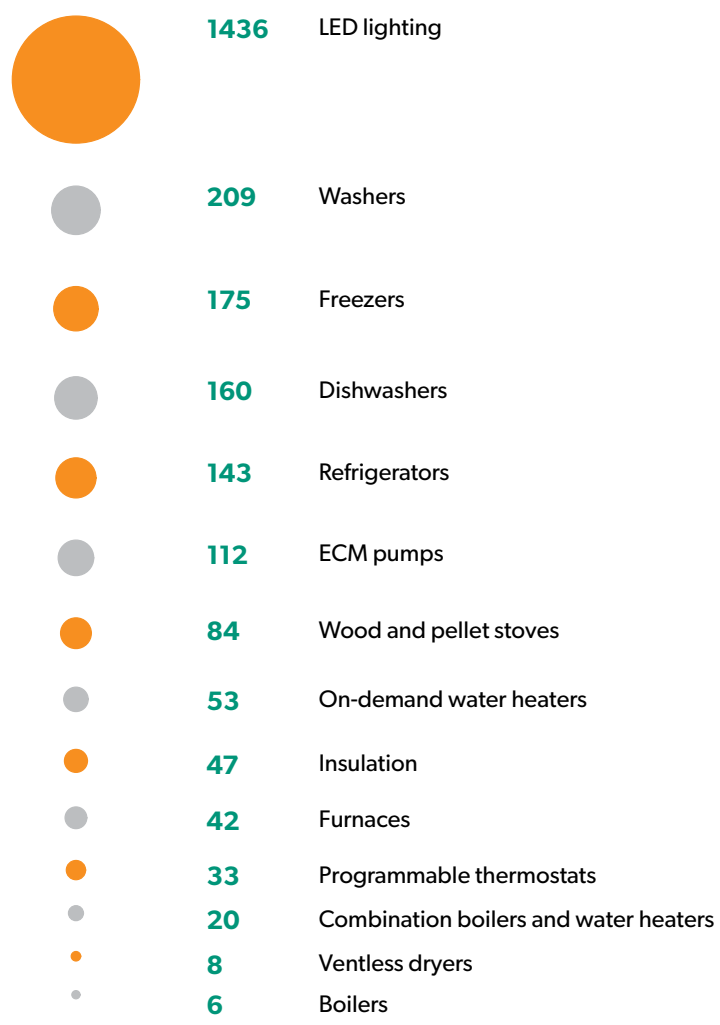


Wood stoves are just one of the many products eligible for rebates under the Energy Efficiency Incentive Program.

¹⁴ Hydro communities are those communities that receive most of their electricity from hydroelectric generators. This includes Behchoko, Dettah, Enterprise, Fort Smith, Hay River, Katl'odeeche, Ndilo 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



Payback

Capital cost (all products, before rebates):

\$1,600,000

Estimated annual savings (all products):

\$350,000

Simple payback (all products, after rebates):

3.4 years

Greenhouse gases

Annual greenhouse gases avoided: **550 tonnes**
(equivalent to the greenhouse gases produced by roughly
230,000 L of gasoline)¹⁵

Rebate cost per lifetime¹⁶ tonne reduced: **\$45**

Energy savings

Annual electricity consumption avoided:

1,000,000 kWh
(equivalent to half the electricity consumed each year in the
community of Fort Liard)

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

Annual fossil fuel consumption avoided
(oil and propane):

3,100 GJ
(equivalent to the energy in 170 cords of wood)

Greenhouse gas and energy savings in hydro communities

Several communities in the NWT use hydroelectricity, including Behchoko, Dettah, Enterprise, Fort Smith, Hay River, Katl'odeeche, Ndilo 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.

¹⁵ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

¹⁶ 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	2	\$ 140	3,900	\$ 0.08	↑ 12
Behchoko*	11	1	\$ 120	8,300	\$ 0.02	↓ 7
Deline	74	5	\$ 33	9,400	\$ 0.02	↑ 28
Dettah*	2	0	-\$ 220	1,700	\$ 0.02	↑ 3
Enterprise*	1	0	-\$ 690	85	\$ 0.14	0
Fort Good Hope	63	8	\$ 22	12,000	\$ 0.01	↑ 27
Fort Liard	72	6	\$ 40	12,000	\$ 0.02	↑ 32
Fort McPherson	83	10	\$ 65	16,000	\$ 0.04	↑ 23
Fort Providence	37	18	\$ 29	11,000	\$ 0.05	↓ 120
Fort Resolution*	5	0	-\$ 130	4,900	\$ 0.01	↑ 8
Fort Simpson	254	53	\$ 37	39,000	\$ 0.07	↓ 310
Fort Smith*	69	4	\$ 97	24,000	\$ 0.03	↓ 51
Gameti	1	0	\$ 520	84	\$ 0.28	0
Hay River*	271	92	\$ 45	170,000	\$ 0.02	↓ 780
Inuvik	345	72	\$ 26	83,000	\$ 0.03	↓ 210
Katl'odeeche*	1	0	-\$ 520	85	\$ 0.10	0
Lutselk'e	2	0	\$ 620	120	\$ 0.35	0
Norman Wells	111	13	\$ 45	26,000	\$ 0.03	↑ 23
Paulatuk	46	4	\$ 24	7,700	\$ 0.01	↑ 23
Tsiigehtchic	33	2	\$ 19	3,800	\$ 0.01	↑ 11
Tuktoyaktuk	60	4	\$ 25	8,100	\$ 0.01	↑ 21
Tulita	148	14	\$ 44	20,000	\$ 0.04	↑ 20
Ulukhaktok	39	3	\$ 93	3,200	\$ 0.05	↑ 10
Wekweeti	1	1	\$ 21	780	\$ 0.02	↓ 1
Whati	2	1	\$ 43	1,600	\$ 0.04	↓ 2
Yellowknife*	746	200	\$ 54	520,000	\$ 0.02	↓ 1,800
Remote	25	32	\$ 19	19,000	\$ 0.03	↓ 100

*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	633	100	\$ 31	130,000	\$ 0.03	↑ 150
Dehcho	326	59	\$ 37	51,000	\$ 0.06	↓ 270
North Slave	766	230	\$ 50	540,000	\$ 0.03	↓ 1,900
Sahtu	399	41	\$ 39	69,000	\$ 0.03	↑ 100
South Slave	389	110	\$ 46	210,000	\$ 0.03	↓ 950
Tlicho	15	2	\$ 76	11,000	\$ 0.02	↓ 10

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	1,101	300	\$ 52	720,000	\$ 0.02	↓ 2,700
Non-hydro	1,427	250	\$ 32	280,000	\$ 0.03	↓ 500

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

71 evaluations of existing homes

5 walk-through advice sessions in existing homes

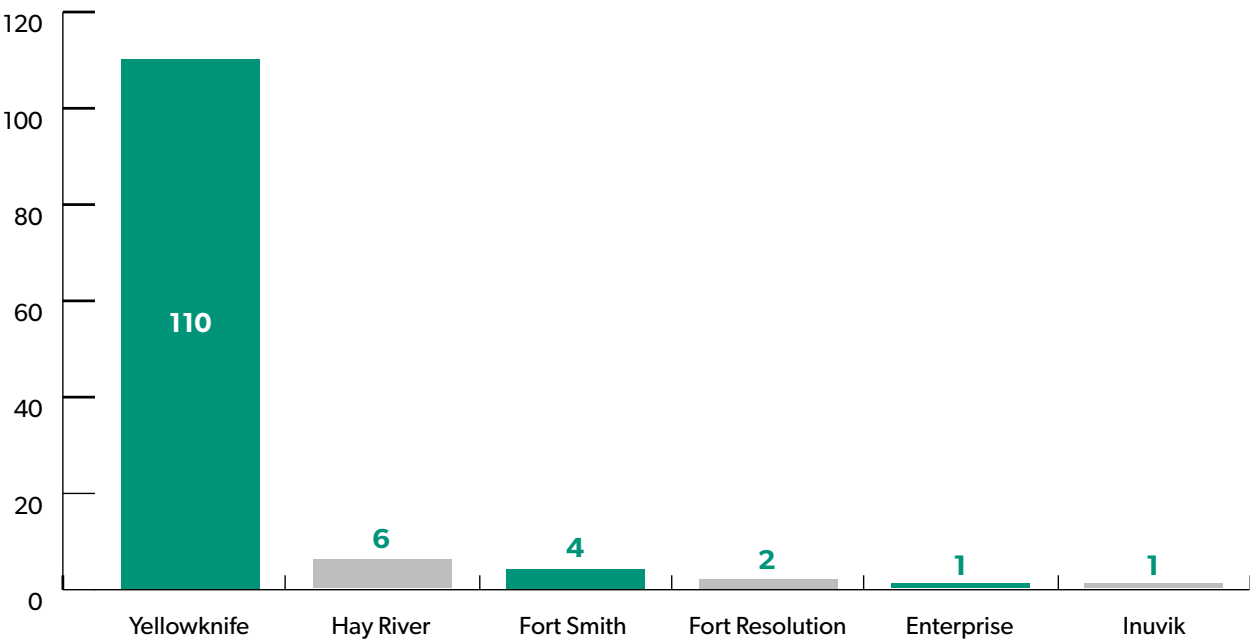
53 evaluations of new homes

124 total evaluations
(plus 5 walk-through sessions)

FOR
residents

AEA FUNDING
\$150,000 (from GNWT Department of Infrastructure) + fee for service

Total evaluations by community



Existing homes

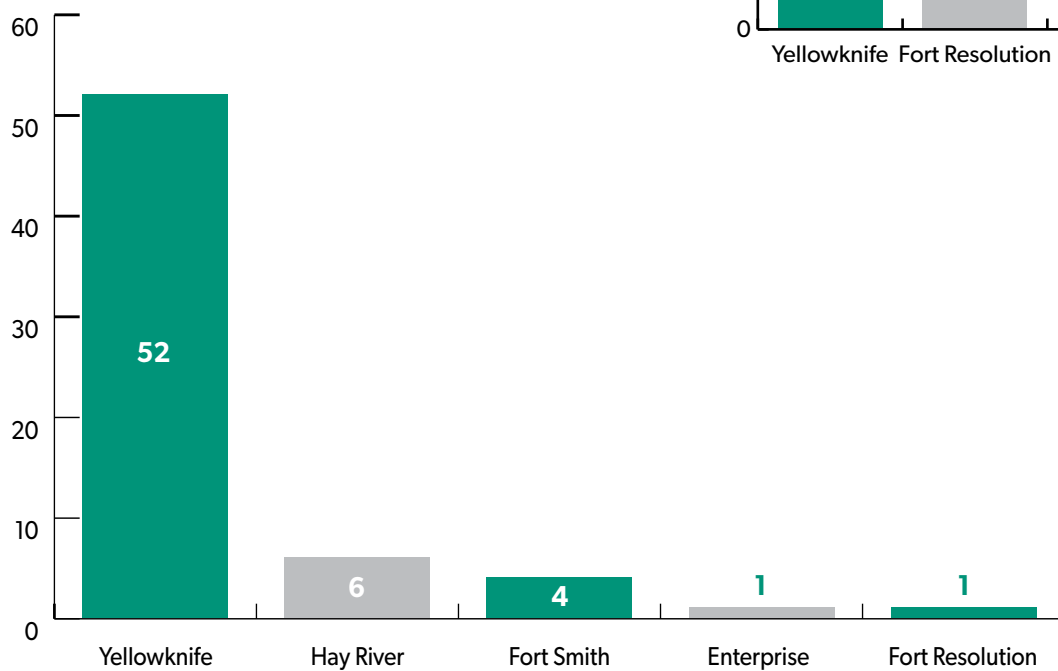
For existing homes, the Arctic Energy Alliance provides two types of evaluations:

- 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).

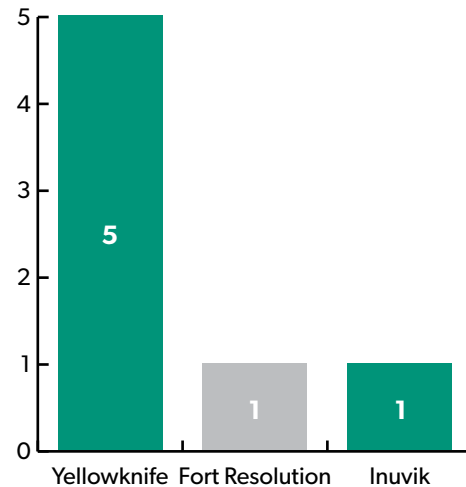
Pre-retrofit evaluations

total pre-retrofit evaluations: **64**



Post-retrofit evaluations

total post-retrofit evaluations: **7**



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: **27**

All 27 blueprint evaluations were for homes in Yellowknife.

New home final evaluations

total new home final evaluations: **26**

All 26 new home final evaluations were in Yellowknife.

Payback^{17,18}

Potential annual savings (all existing homes):

\$110,000

Greenhouse gases¹⁸

Potential annual greenhouse gases avoided:

180 tonnes

(equivalent to replacing 3,200 incandescent light bulbs with LED bulbs in the community of Whati)

Energy savings¹⁸

Potential annual electricity consumption avoided:

210,000 kWh

(equivalent to the electricity needed to run a 3,000-W clothes dryer 24 hours a day for eight years)

Potential annual fossil fuel consumption avoided (oil and propane):

1,800 GJ

(equivalent to 47,000 L of heating oil—enough to fill 2,300 20-L jerry cans)

¹⁷ Estimated capital costs are unknown, as the AEA does not ask for quotes on its recommended upgrades for homes.

¹⁸ 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.

Potential greenhouse gas and energy savings by community

Community	Potential annual GHGs avoided/increased (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided/increased (GJ)
Enterprise*	↓ 1	200	↓ 10
Fort Resolution*	0	340	↓ 7
Fort Smith*	↓ 1	43,000	↑ 37
Hay River*	↑ 6	2,700	↑ 110
Yellowknife*	↓ 180	170,000	↓ 2,000

*Hydro community

Potential greenhouse gas and energy savings by region

Region	Potential annual GHGs avoided/increased (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
North Slave	↓ 180	170,000	↓ 2,000
South Slave	↑ 4	46,000	↑ 130

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

\$510,000 (from GNWT
Department of Infrastructure and
Government of Canada)

Results

Audits

Building energy audits completed:

1 yardstick audit

Completed projects

6 total rebates

total value of rebates: **\$72,000**

average rebate: **\$12,000**

Communities



Communities receiving rebates: **3**

Payback

Capital cost (all projects, before rebates):

\$220,000

Estimated annual savings (all projects):

\$17,000

Simple payback (all projects, after rebates):

8.7 years

Greenhouse gases

Annual greenhouse gases avoided: **15** tonnes

(equivalent to eliminating 125 passenger car trips between
Yellowknife and Hay River)¹⁹

Rebate cost per lifetime²⁰ tonne reduced: **\$230**

¹⁹ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

²⁰ Assuming a lifetime of 20 years for all upgrades.

Energy savings

Annual electricity consumption avoided:

36,000 kWh*(equivalent to running 72,000 vacuum cleaners for an hour—
at 500 W each)*Rebate cost per lifetime kWh avoided: **\$2.00**Power demand avoided: **9 kW***(equivalent to running seven dishwashers at the same time)*Annual fossil fuel consumption
avoided (oil and propane):**230 GJ***(equivalent to 6,100 m³ of natural gas—0.4 percent of the
natural gas used to produce electricity in Norman Wells in 2018)***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)	
Inuvik	2	↓	8	\$ 89	3,500	\$ 4.20	1	↓	100
Hay River*	2	↓	13	\$ 190	0	N/A	0	↓	220
Yellowknife*	2	↑	6	-\$ 75	32,000	\$ 0.26	9	↑	90

* 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	↓	8	\$ 89	3,500	\$ 4.20	1	↓	100
North Slave	2	↑	6	-\$ 75	32,000	\$ 0.26	8	↑	90
South Slave	2	↓	13	\$ 190	0	N/A	0	↓	220

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	4	↓ 7	\$ 399	32,000	\$ 1.79	8	↓ 130
Non-hydro	2	↓ 8	\$ 89	3,500	\$ 4.20	1	↓ 100

Specified 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.

Each liaison worker was trained by the AEA and offered the option to hold a workshop for lower-income homeowners in their community. These workshops depended on whether each community was comfortable with gathering people together and had the indoor space available to maintain physical distancing. After each workshop the liaison workers distributed energy efficiency kits to the participants, which contained the winterization materials, LED bulbs and low-flow fixtures. They also helped ensure the contents of the kits were properly installed in each home.

FOR
residents

AEA FUNDING

\$330,000 (from GNWT Department of Infrastructure, GNWT Anti-Poverty Fund and Government of Canada)

Like our Community Wood Stove Program (see page 36) and Community Energy Planning Project (see page 45), this program is based on a community partnership model. Five community organizations partnered with us this year. Each community partner 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.

Results

3 community workshops

105 energy efficiency kits distributed

total value of incentives: **\$42,000**

average incentive: **\$400**

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, non-profit organizations, Indigenous governments, community governments

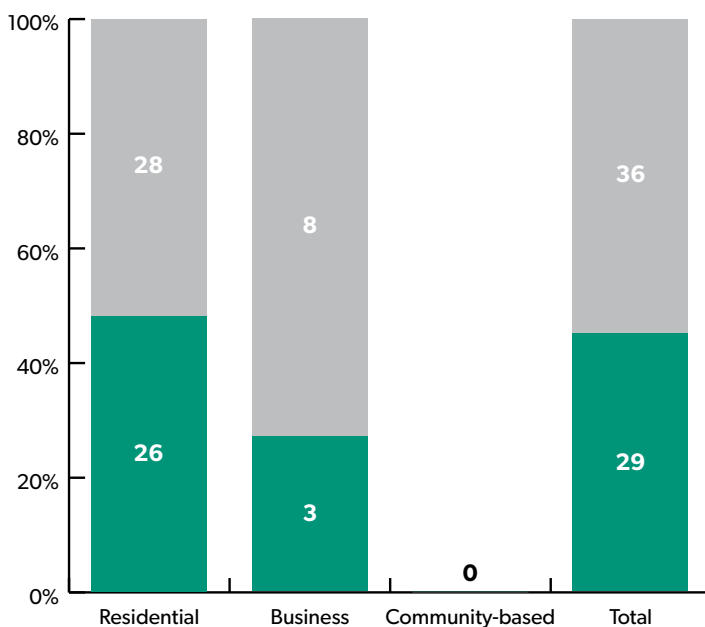
AEA FUNDING

\$1,100,000 (from GNWT Department of Infrastructure and Government of Canada)

Project types

	Residential	Business	Community-based	TOTAL
Biomass	0	3	0	3
Solar hot water	1	0	0	1
Solar photo-voltaic	53	8	0	61

Communities



■ Rebates in Yellowknife
■ Rebates outside Yellowknife

Results

	Residential	Business	Community-based	TOTAL
Total rebates	54	11	0	65
Total value of rebates	\$ 360,000	\$ 270,000	\$ 0	\$ 630,000
Average rebate	\$ 6,700	\$ 25,000	\$ 0	\$ 9,800

Payback²¹

	Residential	Business	Community-based	TOTAL
Capital costs (before rebates)	\$ 770,000	\$ 650,000	\$ 0	\$ 1,400,000
Estimated annual savings	\$ 82,000	\$ 81,000	\$ 0	\$ 160,000
Simple payback (after rebates)	5.1 years	4.7 years	N/A	4.9 years

Greenhouse gases

	Residential	Business	Community-based	TOTAL
Annual greenhouse gases avoided (tonnes)	170	150	0	320
Rebate cost per lifetime ²² tonne reduced	\$ 110	\$ 89	N/A	\$ 100



Solar panels on a houseboat in Yellowknife.

Energy savings

	Residential	Business	Community-based	TOTAL
Annual electricity avoided/produced (kWh)	93,000	71,000	0	160,000
Rebate cost/lifetime kWh avoided/produced	\$ 0.19	\$ 0.19	N/A	\$ 0.19
Power demand avoided/size of system (kW)	95	240	0	340
Annual fossil fuel consumption avoided (GJ)*	6	1,300	0	1,300

*Does not include fuel savings from solar PV systems

²¹ These figures are based on estimates used to pre-approve rebate applications, and may not accurately reflect the final systems as installed.

²² 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/ size of system (kW)	Annual fossil fuel consumption avoided (GJ) [†]
Fort Providence	5	16	\$ 61	10,000	\$ 0.10	10	0
Fort Simpson	1	4	\$ 140	3,100	\$ 0.18	3	0
Fort Smith*	1	2	\$ 87	710	\$ 0.20	1	0
Hay River*	1	17	\$ 54	0	N/A	48	310
Inuvik	1	21	\$ 120	29,000	\$ 0.09	29	0
Lutsel K'e	1	0	\$ 29	200	\$ 0.06	0	0
Norman Wells	3	15	\$ 220	21,000	\$ 0.16	23	6
Yellowknife*	3	66	\$ 47	850	\$ 3.60	120	940
Yellowknife area off-grid	26	110	\$ 130	66,000	\$ 0.23	66	0
Remote	23	64	\$ 79	33,000	\$ 0.15	36	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/ size of system (kW)	Annual fossil fuel consumption avoided (GJ)*
Beaufort-Delta	2	23	\$ 110	30,000	\$ 0.09	30	0
Dehcho	2	5	\$ 120	3,700	\$ 0.17	4	0
North Slave	31	190	\$ 100	72,000	\$ 0.27	190	942
Sahtu	6	42	\$ 140	36,000	\$ 0.16	40	6
South Slave	24	62	\$ 58	23,000	\$ 0.15	71	308

* 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/ size of system (kW)	Annual fossil fuel consumption avoided (GJ) [†]
Hydro	5	85	\$ 49	1,600	\$ 2.66	170	1,300
Non-hydro*	60	230	\$ 120	160,000	\$ 0.17	170	6

* 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 project funders.

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 2021/22 fiscal year, the AEA continued our ongoing work by holding Biomass Week educational workshops, completing pre-feasibility analyses and launching 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 October we hosted a series of online workshops and presentations to celebrate the NWT's leadership in adopting wood pellets for space heating, and to help northerners learn more about biomass heating technologies and how they can be used. The workshops were for homeowners, students, and owners and operators of larger buildings.

Twenty-three presenters from the industry, government and non-profit sectors 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. The array of international, national and local speakers drew an average of 40 participants to each of the 18 presentations.

Pellet boiler installation project

This 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. We focused on smaller systems—boilers producing 100 kW or less that heat a single building. The AEA completed pre-feasibility analyses, and for the projects that are moving ahead we are assisting with contracting and providing rebates of up to \$50,000 per system through the Alternative Energy Technologies Program.

Seventeen organizations from seven communities expressed interest in the project. We completed pre-feasibility analyses for six of those. In the end, two clients decided to move ahead with installing a boiler, both of which are in Yellowknife. The systems should be installed next fiscal year.

Pre-feasibility analyses in Behchoko and Gameti

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 projects to help an organization decide whether to proceed.

The community governments of Behchoko and Gameti have been in discussion with the AEA in recent years about the possibility of installing new district heating systems on community buildings. In 2021/22 we completed a pre-feasibility analysis in Gameti and most of the work for the analysis in Behchoko.

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. In the first year, the stoves and related materials are purchased and delivered to a community. The second year involves the code-compliant installation of the stoves and related materials in the homes of local residents.

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

FOR
residents

AEA FUNDING

\$180,000 (from GNWT Department of Infrastructure and Government of Canada)

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 52 stoves this year. Of those, 28 had been delivered in prior fiscal years: 27 were delivered at the end of the previous year to Deline, Gameti, Wekweeti and Whati, and an additional stove had been delivered to Gameti during a previous project but had yet to be installed. During the 2021/22 year, we coordinated the delivery of another 26 stoves to Behchoko and Lutselk'e, and installed 24 of those. Two stoves could not be installed this year: one because of a dangerous ice crossing that would have been required to get to the recipient's home, and another because of a storage issue. We will try to install those later.

In the Tlicho territory, we partnered with the Tlicho Government and each of the local community governments. In the remaining communities, we partnered with the respective community governments. In the case of Behchoko, we coordinated the purchase, delivery and installation of the stoves, and the Tlicho Government paid the full cost.

The COVID-19 pandemic had a huge impact on this program, delaying the installations and creating logistical challenges. However, with proper safety protocols in place, we were able to work with our community partners to proceed.

Results

52 total stoves installed

33 total incentives

4 new stoves installed

48 replacement stoves installed

total value of incentives: **\$84,000**

average incentive: **\$2,500**

Payback²³

Capital cost (all installed stoves, before incentives):

\$320,000

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

\$8,900

Simple payback (all installed stoves, after incentives):

26 years

Greenhouse gases

Annual greenhouse gases avoided: **19** tonnes
(equivalent to recycling more than 820 bags of garbage instead of putting it into a landfill)²³

Incentive cost per lifetime²⁴ tonne reduced (all installed stoves; incentives for purchase, delivery and installation): **\$220**

Annual particulate emissions reduced:

2,800 kg (a 96% decrease)

Energy savings

Annual fossil fuel consumption avoided (oil and propane): **250** GJ
(or 6,600 L of heating oil—enough to almost fill 1.5 commercial oil tanks at 4,550 L [1,000 gallons] each)

Annual wood savings: **31** cords

Estimated electricity savings not tracked in 2021/22.

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 and the Specified Income Home Winterization Program.

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 52 recipients who had stoves installed in 2021/22 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: **270** tonnes
- Annual fossil fuel consumption: **3,700** GJ
(or 99,000 L of heating oil)
- Annual heating cost: **\$140,000**

²³ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

²⁴ 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 avoided (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided (GJ)
Behchoko*	19	12	N/A	0	720	170
Deline	10	6	\$ 160	10	560	84
Gameti	4	0	\$ 5,000	4	250	0
Lutselk'e	5	0	\$ 7,600	5	330	0
Wekweeti	7	0	\$ 2,800	6	440	0
Whati	7	0	\$ 3,100	6	440	0

* 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 avoided (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided (GJ)
Sahtu	10	6	\$ 160	10	560	84
South Slave	5	0	\$ 7,600	5	330	0
Tlicho	37	13	\$ 130	16	1,900	170

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 avoided/ (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided/ increased (GJ)
Hydro	19	12	N/A	0	720	170
Non-hydro	33	7	\$ 610	31	2,000	84

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

allocated from funding for
Alternative Energy Technologies
Program

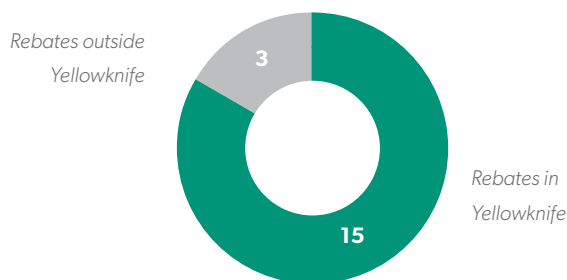
Results

18 total rebates

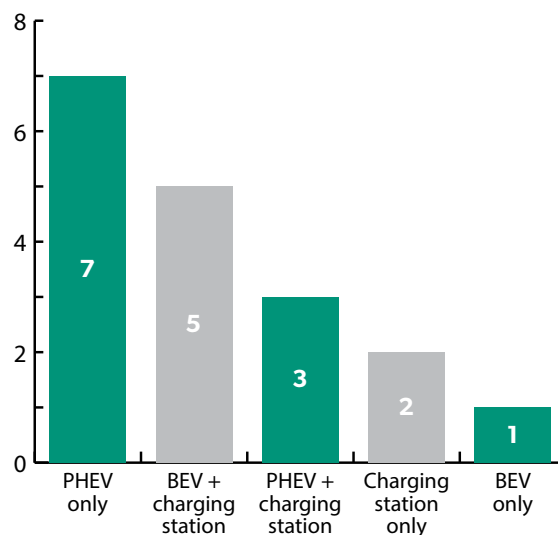
total value of rebates: **\$85,000**

\$4,700
average rebate

Communities



Rebates by type



Payback

Capital cost (all products, before rebates):

\$1,000,000

Estimated annual savings (all products):

\$8,300

Simple payback (all products, after rebates):

110 years

Greenhouse gases

Annual greenhouse gases avoided: **34** tonnes
(equivalent to planting 560 tree seedlings and growing them for 10 years)²⁵

Rebate cost per lifetime²⁶
tonne reduced:

\$190

²⁵ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

²⁶ Assuming a lifetime of 13 years for all vehicles and charging stations.

Energy savings

Annual electricity consumption increased:

38,000 kWh

(equivalent to running 100 coffee machines an hour a day for a year)

Rebate cost per lifetime kWh avoided: **-\$0.17**

Annual fossil fuel consumption avoided
(gasoline):

430 GJ

(equivalent to roughly 13,000 L of gasoline—or filling an 80-L tank every second day for a 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 increased (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Behchoko*	1	2	\$ 200	2,200	-\$ 0.18	27
Fort Smith*	1	2	\$ 220	1,600	-\$ 0.27	27
Hay River*	1	2	\$ 210	4,100	-\$ 0.09	27
Yellowknife*	15	29	\$ 97	30,000	-\$ 0.09	350

* 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 increased (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
North Slave	15	29	\$ 97	30,000	-\$ 0.09	350
South Slave	2	4	\$ 220	5,700	-\$ 0.14	53
Tlilcho	1	2	\$ 200	2,200	-\$ 0.18	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: Fort Simpson, Hay River, Inuvik, Norman Wells, Whati 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.

The pandemic again put a damper on some of our usual community engagement activities this year. We typically attend a number of events hosted by other organizations, but many of those were cancelled. It can be a challenge to deliver our programs and engage with people in smaller communities at any time; however, despite the pandemic we still found ways to get out into the communities and engage with the people there. The following are highlights from just a few of those activities.

Beaufort-Delta office (Inuvik)

AEA Combat Climate Change Bike Week in Inuvik

In August, we held Combat Climate Change Bike Week events in Inuvik, Fort Simpson and Hay River. We asked residents in each of those communities to ditch their cars for a week and use their bikes as much as possible. The goal was to reduce greenhouse gas emissions and encourage a healthy lifestyle.

In each community, we held small bike-related events throughout the week and even gave away bikes as prizes. In Inuvik, we also gave away chili and donuts to the riders who took part, thanks to Alestine's—the local food bus.

Energy Week presentation in Paulatuk

In December, the Paulatuk Energy Working Group hosted Energy Week events in the community, and the AEA was invited to present to community members. Our presentations covered energy efficiency in the home, and renewable versus non-renewable energy technologies. The aim was to encourage more use of renewable energy and to increase community members' energy literacy—in other words, their understanding of how energy is produced and used.

Paulatuk is undertaking some exciting energy-related projects and we were glad we got to take part.

Dehcho office (Fort Simpson)

AEA Combat Climate Change Bike Week in Fort Simpson

Like our events in Inuvik and Hay River, our Combat Climate Change Bike Week in Fort Simpson was not only a lot of fun, it was also a great way to educate participants about the amount of greenhouse gases they can save by riding a bike instead of driving.

The team from MBM Camp (a.k.a. Mountain Bike Madness Camp) in Yellowknife happened to be in town running a camp during the week. So we asked them to set up an obstacle course and provide tips and tricks on maintenance for Bike Week participants. In addition, the RCMP sent a member to discuss road safety, and the local Northern store donated two bikes as prizes.

Presentation to new Village Council in Fort Simpson

The Village of Fort Simpson held a council election in October. In December, our Dehcho Regional Energy Project Coordinator, Derek, had a chance to meet with the new council and discuss the community energy planning project that the Village would be participating in, starting in 2022 (see page 45). At the meeting, Derek introduced the council to the community energy champion position, which is integral to the program, so the council could consider how to proceed with finding the right person for the role.

Sahtu office (Norman Wells)

Mural unveiling in Norman Wells

Last fiscal year, the AEA decided to support northern artists by commissioning public artwork for two of our offices. One of the locations we chose was our Sahtu office. In May, the mural—painted by local artist Barb Cote—was ready for unveiling, and we held a barbecue on the deck to celebrate. Despite the unseasonably cold weather we had a great turnout. And every time people pass by, we hope the new mural will inspire them to think about renewable energy and using energy responsibly.

We also have a new mural for our Yellowknife office, but because new siding was being installed on the building, we weren't able to unveil it by the end of the fiscal year.

Burn it Smart presentations in Deline

We were in Deline just before Christmas to deliver a Burn it Smart workshop as part of our Community Wood Stove Program (see page 36). It was a cold, windy night, and not many people wanted to brave the weather. The workshop gives people tips and tricks for how to use their wood stoves safely and efficiently, and is an important part of the program. So Patricia Modeste invited us to deliver the workshop over the community radio station the next day, letting everyone take part from the comfort of their homes.

Our Sahtu Regional Energy Project Coordinator, Lise, gave the presentation in English and then Patricia repeated everything in the Sahtuot'ine language.

Mahsi for the help and the great suggestion, Patricia!

South Slave office (Hay River)

Technical information session and mini energy fair in Fort Resolution

In June, three of our staff members travelled to Fort Resolution. We held two events for the public while we were there. The first was an information session with one of our Energy Management Specialists. Community members were able to get in-person technical advice on their energy-related questions. While our Regional Energy Project Coordinators are always ready to give advice, our Energy Management Specialists have even more in-depth technical knowledge.

The second was a mini energy fair, with food, prizes, interactive energy information stations, an energy scavenger hunt, and test rides on one of our electric bikes. The event was a hit and participants were eager to take part.

Climate Change and Energy Fair and community tour of local energy projects in Hay River

The Polar Pond Hockey tournament in Hay River is one of the town's biggest events of the year. But it hadn't happened in a few years because of a combination of COVID restrictions and unseasonably warm weather. However, organizers were able to bring it back bigger and better than ever in 2022 with a climate change-related theme, and the AEA organized some accompanying events.

The Polar Pond Hockey organizers teamed up with the Climate and Sport Initiative and Save Pond Hockey for the tournament, which was held in March. Both of those organizations focus on climate change and how it affects sports, so our

events fit right in.

The first event was a tour of some of the major energy-related projects that people and organizations had installed around town, highlighting energy efficiency and renewable energy. The tour was designed to give participants an idea of what has already been done in Hay River and what they could do themselves.

The next day, we held a Climate Change and Energy Fair at the Fisherman's Wharf Pavilion, near where the games were being played. Energy-related organizations from Hay River and around the NWT had booths where they could speak with



Patricia Modeste, from Deline, translates a Burn it Smart workshop into the Sahtuot'ine language over the local radio station.

the public about their services.

Tlicho office (Whati)

Sustainable living presentations in Gameti and Whati

Being Tlicho, Sonny (our Regional Energy Project Coordinator for the Tlicho territory) is very tied to his culture. This is why he has developed sustainable living presentations, based on Indigenous culture, that he delivers in the Tlicho communities. The presentations are typically well-attended, and discuss not just ways to cut energy costs and reduce greenhouse gas emissions, but also the importance of traditional foods and cultural activities.

Yellowknife office

Earth Week movie night 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 we hosted a movie night at the local movie theatre, where we screened the documentary *David Attenborough: A Life on Our Planet*. The film is about the changes to the planet Attenborough has seen during his life as a documentary filmmaker.

Home winterization photo contest across the NWT

The pandemic made it harder to engage with the public. One way the AEA dealt with that was to hold an online photo contest. Dubbed “WIN, WIN, WINterize to Win!” the contest encouraged northerners to conserve energy and be more energy efficient. We asked people to submit photos showing how they got their homes ready for winter. By publicizing both the contest and the winning photos, we hope we encouraged more homeowners to save energy during the winter.

Kids take part in AEA Combat Climate Change Bike Week activities in Hay River.



Dave Wever's submission for our NWT-wide home winterization photo contest.



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 2021/22 fiscal year, the AEA conducted five 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.

2022 AEA calendar

A calendar is something that many people look at every day, so it's a great way to keep a subject at the front of their minds. We produced our first-ever annual calendar for 2022 as a way to show people the types of rebates and services we offer, and to provide some tips for saving energy. Since this is our 25th anniversary, we chose photos that highlight the projects and events we've been involved in over the past quarter century.

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.

This past fiscal year saw the second full year of a three-year project to work with partner communities to develop community energy plans. This project is funded by Natural Resources Canada through its Clean Energy for Rural and Remote Communities Capacity Building Stream.

In the previous year, we worked with the Hamlet of Tuktoyaktuk to develop their community energy plan, which was adopted by council in June 2021. A series of factors made it hard for the community

to begin implementing the projects identified in its plan this year, but we will look at whether we can help them get those projects started in the near future.

In the 2021/22 fiscal year, we started the community energy planning process with the Community Government of Wekweeti, the Hamlet of Tulita and the Town of Fort Smith. 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.

Normally, the community energy planning process involves a lot of in-person engagement. However, the COVID-19 pandemic made that difficult. Instead, we found ways to share and collect information using technology and with limited in-person interaction. For example, we held our orientation workshop for the community energy champions using Zoom. And the champions used tools like online meetings, surveys, pop-up information sessions, radio call-in shows and phone interviews to collect the information they needed from community members.

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

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. Three years ago we started a project to do formal outreach to contractors to supplement our more informal relationships. That project continued in 2021/22.

In the first year we held workshops on boiler controllers. For the next two years our workshops focused on pumps with electronically commutated motors (ECMs). This year, we looked at condensing oil and gas heating appliances, such as furnaces and boilers—a topic that's essential for efficient heating in the NWT.

Representatives from five manufacturers and distributors presented, including Altatech, Grundfos, NTI, Napoleon and Navien. They talked about their company histories, their product lines, servicing and maintenance, and cold weather operations. The idea was to get contractors and building maintainers as familiar as possible with the various options in the NWT.

Sixteen people took part. The workshop was held entirely online over the course of a week, with various sessions so participants could choose the options that interested them the most.

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 two 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've spent time developing our policies, targets and objectives and identifying stakeholders and risks to meet the standard.

Now that much of the background work has been completed, we intend to implement the standard in 2022/23. As we start to take steps to meet our targets and objectives, we are assessing whether the standard would be a good tool for us to recommend to other building owners and who might find it useful.

Tlicho home power investigation project

Residents throughout the NWT sometimes tell us that their power bills are much higher than expected. Sometimes we are able to determine the causes through conversations with people about how they are using energy. And sometimes the cause isn't apparent. This year we launched a pilot project in three Tlicho communities to further investigate some of these cases.

We installed electrical monitoring units in 20 homes in Behchoko, Gameti and Whati, with the help of the Northwest Territories Power Corporation. The units allow users to see—in real time—when the electrical loads in their homes are low, medium or high, and let them make informed decisions about conserving energy.

We heard from participants that they didn't fully understand the units, meaning people didn't use them to their full potential. In addition, the COVID-19 pandemic increased the number of people living in some of the participants' homes and the amount of time people spent at home, so their overall power consumption went up. These factors made it hard to find trends in the data we gathered. If we repeat the project, we will need to put more effort into coaching participants and include regular check-ins to remind participants to use the units.

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 achieve that outcome.



Getting ready to deliver wood stoves in Wekweeti as part of our Community Wood Stove Program.

Impact of AEA programs and projects

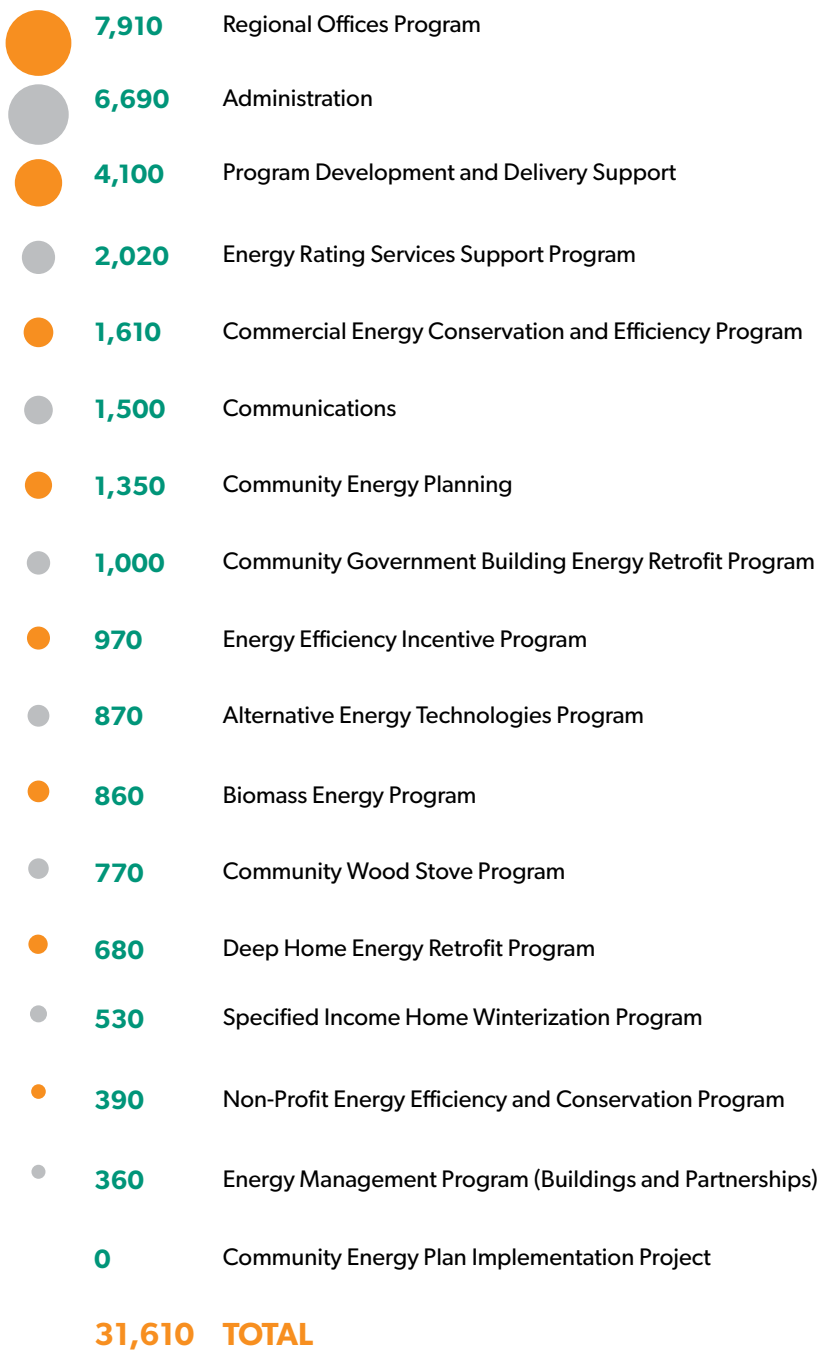
Metric	Commercial Energy Conservation and Efficiency Program	Community Government Building Energy Retrofit Program	Deep Home Energy Retrofit Program	Energy Efficiency Incentive Program	Energy Rating Services Support Program	Non-Profit Energy Efficiency and Conservation Program	Specified Income Home Winterization Program	Alternative Energy Technologies Program	Community Wood Stove Program	Electric Vehicle Incentive Program	Total	Percentage of total
Total no. of incentives	30	7	10	2,528	-	6	105	65	33	18	2,802	100%
No. of incentives in Yellowknife	13	1	7	746	-	2	-	29	-	15	813	29%
No. of incentives outside Yellowknife	17	6	3	1,782	-	4	105	36	33	3	1,989	71%
Total value of incentives	\$280,000	\$120,000	\$ 91,000	\$ 390,000	-	\$ 72,000	\$42,000	\$ 630,000	\$ 84,000	\$ 85,000	\$1,800,000	-
Average incentive	\$ 9,400	\$ 18,000	\$ 9,100	\$ 160	-	\$ 12,000	\$ 400	\$ 9,800	\$ 2,500	\$ 4,700	\$ 640	-
Total capital cost	\$760,000	\$320,000	\$530,000	\$1,600,000	-	\$220,000	\$42,000	\$1,400,000	\$320,000	\$1,000,000	\$6,200,000	-
Est. annual savings	\$140,000	\$ 56,000	\$ 19,000	\$ 350,000	\$110,000 [*]	\$ 17,000	-	\$ 160,000	\$ 8,900	\$ 8,300	\$ 760,000	-
Est. annual electricity savings/increase (MWh)	↓ 430	↓ 220	↓ 14	↓ 1,000	↓ 210 [*]	↓ 36	-	↓ 160	-	↑ 38	↓ 1,800 [†]	-
Incentive cost per kWh avoided/produced	\$ 0.03	\$ 0.57	\$ 0.26	\$ 0.03	-	\$ 2.00	-	\$ 0.19	-	-\$ 0.17	\$ 0.06	-
Estimated power demand avoided/produced (kW)	100	24	-	-	-	9	-	340	-	-	470	-
Est. annual fossil fuel savings/increase (GJ)	↑ 800	↑ 460	↓ 480	↓ 3,100	↓ 1,800 [*]	↓ 230	-	↓ 1,300	↓ 250	↓ 430	↓ 4,500 [†]	-
Est. annual greenhouse gases avoided/increased (tonnes)	↓ 36	↑ 1	↓ 34	↓ 550	↓ 180 [*]	↓ 15	-	↓ 320	↓ 19	↓ 34	↓ 1,000 [†]	-
Incentive cost per tonne of greenhouse gas emissions reduced	\$ 390	-\$ 4,500	\$ 100	\$ 45	-	\$ 230	-	\$ 100	\$ 220	\$ 190	\$ 99	-
Total no. of desktop energy evaluations (blueprint and yardstick evaluations)	8	1	-	-	27	1	-	-	-	-	37	100%
No. of desktop energy evaluations in Yellowknife	5	-	-	-	27	-	-	-	-	-	32	86%
No. of desktop energy evaluations outside Yellowknife	3	1	-	-	-	1	-	-	-	-	5	14%
Total no. of on-site energy evaluations	1	1	24 [‡]	-	97	-	-	-	-	-	99	100%
No. of on-site energy evaluations in Yellowknife	1	-	18 [‡]	-	83	-	-	-	-	-	84	85%
No. of on-site energy evaluations outside Yellowknife	-	1	6 [‡]	-	14	-	-	-	-	-	15	15%

* Potential savings only. Actual savings could not be accurately measured.

† Not including potential savings.

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

Staff hours by program/project*



* Rounded to the nearest 10.

Financial management

Highlights

Results of operations for the year ending March 31, 2022

- Overall revenues totalled \$5.2 million and overall expenses totalled \$5.0 million.
- The AEA budgeted for an overall surplus of \$410,000 this year, and ended the year with an overall surplus of \$250,000, representing 5% of total revenues. This is a 52% increase from the previous year's surplus of \$170,000, which represented 3% of total revenues.
- Net financial assets increased \$260,000 over the course of the year, compared to a \$160,000 increase the previous year.

Key revenues	Value	Increase/ decrease from 2020/21	Comparison to budget
GNWT contributions	\$ 4,600,000	↓ 7%	69%
Other source income	\$ 160,000	↑ 130%	110%

Key expenses	Value	Increase/ decrease from 2020/21	Comparison to budget
Rebates distributed	\$ 1,900,000	↑ 3%	58%
Travel and accommodations	\$ 110,000	↓ 1%	40%
Consulting fees	\$ 130,000	↑ 12%	51%
Advertising and promotion	\$ 46,000	↓ 72%	55%

Financial position at March 31, 2022

Key assets	Value	Increase/ decrease from 2020/21	Primary reasons
Total assets	\$ 2,200,000	↑ 18%	Increase in cash assets
Cash and short-term investments	\$ 1,600,000	↑ 51%	
Accounts receivable	\$ 570,000	↓ 25%	

Key liabilities	Value	Increase/ decrease from 2020/21	Primary reasons
Total liabilities	\$ 530,000	↑ 19%	Increase in unspent contributions
Accounts payable and accrued liabilities	\$ 490,000	↑ 28%	Increase in unspent contributions
Deferred revenues	\$ 32,000	↓ 37%	Unspent contributions; related expenses will not be recognized until later period

Key net assets	Value	Increase/ decrease from 2020/21	Notes
Total net assets	\$ 1,700,000	↑ 17%	Accumulated surplus increased
Internally restricted reserves	\$ 980,000	-	Operating reserve increased for staff wages and other expenses
Unrestricted accumulated surplus	\$ 720,000	↑ 55%	Represents membership fees and other revenue

Cash flow for the year ending March 31, 2022

- Gross cash from operations showed a surplus of \$240,000, compared to a surplus of \$250,000 the previous year.
- There was a net cash flow surplus of \$550,000, up 1,700% over the previous year, largely due to collecting outstanding receivables from prior years.

Key cash receipts	Value	Increase/ decrease from 2020/21
GNWT contributions	\$ 4,900,000	↑ 5%
Other sources	\$ 44,000	↓ 81%

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 project to address areas not covered by existing programs, and increasing incentive amounts to encourage more people to adopt energy-efficient and renewable-energy technologies. These increased operations are expected to last at least two more years.

Membership and governance

As on March 31, 2022.

Board of directors

- Robert Sexton, President; Director of Energy, GNWT Department of Infrastructure
- Daniel Korver, Vice-President; Director, Infrastructure Services (Projects), Northwest Territories Housing Corporation
- 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
- Paul Grant, Chief Operating Officer, Northwest Territories Power Corporation
- Cory Doll, Manager, Climate Change and Air Quality, GNWT Department of Environment and Natural Resources
- Grace Lau-a, Director, Community Operations, GNWT Department of Municipal and Community Affairs

General members

- GNWT Department of Infrastructure
- GNWT Department of Environment and Natural Resources
- GNWT Department of Municipal and Community Affairs
- NWT Association of Communities
- NWT Housing Corporation
- NWT Public Utilities Board

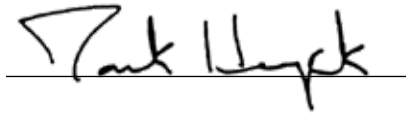
Sustaining members

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

Staff

- Sheena Adams, Program Coordinator
- Taylor Arsenault, Program and Administrative Assistant
- Ken Baigent, Senior Energy Management Specialist
- Kevin Cull, Communications Coordinator
- Darby Desrosiers, Regional Energy Project Coordinator, Beaufort-Delta
- Lise Dolen, Regional Energy Project Coordinator, Sahtu
- Scott Dowler, Energy Management Specialist
- Derek Erasmus, Regional Energy Project Coordinator, Dehcho
- Marta Goodwin, Finance Officer
- Mike Goodwin, Senior Energy Management Specialist
- Tom Gross, Project Coordinator
- Mark Heyck, Executive Director
- Michelle Leger, Community Energy Planning Coordinator
- Faye MacDonald, Office Manager
- Libby Macphail, Community Energy Planning Coordinator
- Margaret Mahon, Operations Manager/Senior Energy Management Specialist
- Leon Milner, Energy Management Specialist (in Training)
- Abdul Mohammed, Energy Management Specialist
- Louise Schumann, Regional Energy Project Coordinator, South Slave
- Linda Todd, Program Coordinator
- Jennifer Wicks, Human Resources and Program Assistant
- Sonny Zoe, Regional Energy Project Coordinator, Tlicho

"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."

A handwritten signature in black ink, reading "Mark Heyck", written over a horizontal line.

Mark Heyck,
Executive Director
August 4, 2022



A new solar hot water system in Norman Wells, which received a rebate under our Alternative Energy Technologies Program.

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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.