



2020/21 Annual Report



ARCTIC ENERGY
ALLIANCE

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Table of abbreviations

AEA	Arctic Energy Alliance
DGG	Deline Got'ine Government
EPA	Environmental Protection Agency
EEIP	Energy Efficiency Incentive Program
GNWT	Government of the Northwest Territories
LCELF	Low Carbon Economy Leadership Fund
NRCan	Natural Resources Canada
NWT	Northwest Territories

Foreword

For 24 years, the Arctic Energy Alliance—or AEA for short—has been leading the North in taking action on climate change. And we're proud to lead that charge.

It was a huge year for us: it was the second 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 changed how we had to operate some of our programs and special projects, and meant that fewer potential clients were taking on their own energy-related projects. Despite this, we gave out roughly 1,000 more rebates 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 1,900 MWh of electricity annually, which is like taking the community of Ulukhaktok off the grid. They will also reduce their carbon footprint by about 1,300 tonnes a year—equivalent to converting Lutsel K'e's power generation entirely 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 two local governments to upgrade to LED lighting and ECM pumps for residents. 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



Members of the Yellowknife Fire Division check out an electric vehicle at Yellowknife Motors during an event for National Drive Electric Week.

2020/21 at a glance

This was an interesting year for the AEA. We continued with the second of four years of expanded programs and other initiatives, but the COVID-19 pandemic meant we had to adapt those initiatives.

The pandemic affected us, as it has affected every person and organization across the NWT. Fortunately, with stable annual funding, we were able to continue to operate. Our staff worked from home for five months, we made significant changes to projects to align with public health orders and keep both staff and community members safe, and we saw fewer potential clients taking on significant energy upgrades than in recent years, but we were still able to see noteworthy results.

The most noteworthy change was in our Energy Efficiency Incentive Program, which offers rebates to Northerners who purchase energy-efficient products such as wood stoves, LED light bulbs and ENERGY STAR® certified refrigerators. Under this program, we gave out roughly 1,000 more rebates than we did last year—which had already been our most active year to date. This could be due in part to a greater demand this year for energy-efficient products. It could also be related to the increased number of products under the program in recent years. However, the average rebate under this program was smaller than it was last year, indicating that people are making smaller individual purchases of energy-efficient equipment.

Unlike the Energy Efficiency Incentive Program, most of our other incentive-based programs were slower than last year, giving out 35 fewer rebates in total—a 10 percent decrease. Only our renewable energy-based programs—the Alternative Energy Technologies Program and the Community Wood Stove Program—saw an increase. These other programs, which cover commercial and community-based clients as well as residents who install renewable energy systems, cover much larger purchases and projects than the Energy Efficiency Incentive Program does. So each rebate indicates a fair amount of work for the client, their contractors and the AEA.





The special projects we took on this year were a mix of laying the groundwork for the years to come and completing projects that were already in the works. These included community energy planning, community energy profiles, contractor outreach, and equipment upgrades.

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



Chad Bonnetrouge from Fort Providence (left) and Clarence Nasken from Wekweeti (right) training as community liaison workers as part of the Specified Income Home Winterization Program.

Overall results¹

Programs and projects		
Number of programs		12
Number of special projects		6
Incentives		
Total incentives	Including Energy Efficiency Incentive Program (EEIP)	2,694
	Excluding EEIP	312
Total value of incentives	Including EEIP	\$ 1,800,000
	Excluding EEIP	\$ 1,300,000
Average incentive	Including EEIP	\$ 670
	Excluding EEIP	\$ 4,000
Payback*		
Total capital cost		\$ 6,100,000
Estimated annual savings		\$ 820,000
Simple payback	Before incentives	7.4 years
	After incentives	5.2 years
Energy savings		
Estimated annual electricity savings		1,900 MWh
Equivalent to taking the community of Ulukhaktok off the grid 		
Estimated power demand avoided ²		320 kW
Equivalent to 213 electric kettles running at the same time—at 1,500 W each 		
Annual fossil fuel consumption avoided (oil and propane)*		8,100 GJ
Equivalent to 210,000 L of heating oil—enough to fill more than 6 typical tanker trucks 		
Rebate cost per lifetime ³ kWh avoided		\$ 0.06
Greenhouse gas reduction		
Estimated annual greenhouse gases avoided		1,300 tonnes
Equivalent to converting the power generation for the community of Lutsel K'e entirely to renewable electricity 		
Rebate cost per lifetime tonne of greenhouse gases avoided		\$ 76

*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 29 rebates (down 41 percent over last year).
- Combined, annual electricity consumption avoided by all clients' projects is roughly the amount of annual electricity used in the community of Kakisa.
- The average client project will pay for itself through energy savings in less than 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 \$53,000 in rebates in two communities (down 76 percent over last year).
- Completed 22 desktop "yardstick" building energy audits and one on-site "targeted" building energy audit in four communities.
- Targeted energy audit identified roughly \$35,000 in potential annual savings and 63 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 39 home energy evaluations in five communities, including pre-retrofit evaluations for potential clients and post-retrofit evaluations for clients who completed their upgrades.

- Provided five final rebates worth \$37,000, plus an additional six interim rebates valued at \$26,000. The interim projects will be finalized next year. (One total rebate more than last year.)
- Combined, our five clients with completed projects are expected to save 250 GJ of heating fuel a year—equivalent to saving more than 500 propane cylinders for home barbecues.

Energy Efficiency Incentive Program

Provides rebates on energy-efficient appliances and other products.

- Provided 2,382 rebates (up 88 percent over last year).
- LED lighting continues to be the most popular eligible product, with 958 rebates—573 more than last year.
- Combined, the energy-efficient products purchased will save the NWT 810 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 166 home energy evaluations (up 11 percent over last year).
- Performed evaluations on 98 new homes (down 8 percent over last year).
- Combined, all recommended upgrades could save homeowners \$100,000 and 200 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 10 rebates valued at approximately \$100,000 (one rebate fewer than last year).
- Combined, all client projects will avoid approximately 150 tonnes of greenhouse gases and 2,100 GJ of fossil fuel use every year—equivalent to four percent of the natural gas used to produce electricity in Norman Wells annually.

- The average client project is expected to pay for itself in approximately five 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 six partner communities to hire and train local liaison workers.
- Hosted educational workshops for lower-income homeowners in four communities.
- Distributed 98 energy efficiency kits to workshop participants (down 18 percent from 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 41 rebates (up 37 percent over last year).
- The 41 systems that our clients installed are expected to save roughly 240 tonnes of greenhouse gases a year.
- The average system is expected to pay for itself in just over five years.

Biomass Energy Program

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

- Continued work on pre-feasibility analyses for two communities on district heating systems.
- Coordinated work to help one community government expand an existing district heating system.

Community Wood Stove Program

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

- Completed one two-year project that began in 2019/20, and began a new project.
- Coordinated the installation of 92 stoves in six partner communities and arranged for 30 additional stoves to be delivered to four communities.
- Combined, all installed stoves will save 4,400 kg of particulate emissions (a 90% decrease) and 25 tonnes of greenhouse gas emissions a year.

Electric Vehicle Incentive Program

Provides rebates for electric vehicles and charging stations.

- New program for 2020/21.
- Provided rebates on five vehicles and one charging station.
- Just five electric vehicles will save approximately 10 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

Community energy planning

Helped partner communities, Deline and Tuktoyaktuk, hire community energy champions. Completed energy plan with Tuktoyaktuk.

Community energy profiles

Completed updated energy profiles for 32 of the 33 communities in the NWT.

Contractor outreach project

Held a contractor training session on pumps with electronically commutated motors—using a different brand from the pumps highlighted in last year’s training session—to get contractors familiar with more options.

ECM pump fast-track project

Helping six organizations—businesses, non-profits and community governments—switch to efficient water pumps with electronically commutated motors (ECMs), which involved issuing rebates and providing free project coordination services. The project will wrap up in 2021/22.

Tlicho LED fixture retrofit project

Continued a partnership with the Tlicho Government to replace 2-pin and 4-pin compact fluorescent fixtures in privately-owned homes in all four Tlicho communities. (The project was scheduled to end in March 2020 but was extended because of the pandemic.) Replaced 574 light fixtures.

Yellowknife residential ECM pump pilot project

Provided rebates for ECM circulation pumps that the City of Yellowknife upgraded in 34 homes, which will ultimately save on electricity costs for the homeowners.



Wood stoves are moved around in Gameti as part of our Community Wood Stove Program.

Budget⁴

Source	Funding	Expenses	
		Operations	Incentives
Government of the Northwest Territories (GNWT) base & core program funding	\$ 2,740,000	\$ 2,298,000	\$ 525,000
Base funding for Regional Office Program, administrative staff, offices, etc.	\$ 1,600,000	\$ 1,775,000	\$ 0
Alternative Energy Technologies Program	\$ 300,000	\$ 75,000	\$ 247,000
Biomass Energy Program	\$ 100,000	\$ 90,000	\$ 0
Commercial Energy Conservation and Efficiency Program	\$ 200,000	\$ 91,000	\$ 123,000
Community Government Building Energy Retrofit Program	\$ 190,000	\$ 80,000	\$ 1,000
Energy Efficiency Incentive Program	\$ 200,000	\$ 47,000	\$ 153,000
Energy Rating Services Support Program	\$ 150,000	\$ 150,000	\$ 0
GNWT Low Carbon Economy Leadership Fund supplementary project funding	\$ 1,464,000	\$ 258,000	\$ 823,000
Alternative Energy Technologies Program – LCELFF top-up	\$ 518,000	\$ 58,000	\$ 240,000
Commercial Energy Conservation and Efficiency Program – LCELFF top-up	\$ 460,000	\$ 73,000	\$ 119,000
Community Government Building Energy Retrofit Program – LCELFF top-up	\$ 145,000	\$ 50,000	\$ 52,000
Energy Efficiency Incentive Program – LCELFF top-up	\$ 341,000	\$ 77,000	\$ 411,000
GNWT Low Carbon Economy Leadership Fund new project funding	\$ 2,073,000	\$ 566,000	\$ 420,000
Deep Home Energy Retrofit Program	\$ 370,000	\$ 144,000	\$ 7,000
Specified Income Home Winterization Program	\$ 551,000	\$ 109,000	\$ 0
Non-Profit Energy Efficiency and Conservation Program	\$ 315,000	\$ 95,000	\$ 101,000
Electric Heating Incentive, South Slave Region	\$ 162,000	\$ 52,000	\$ 0
Community Energy Planning and Implementation	\$ 325,000	\$ 50,000	\$ 0
Community Wood Stove Program	\$ 350,000	\$ 117,000	\$ 262,000
GNWT – Anti-poverty funding	\$ 42,000	\$ 2,000	\$ 33,000
Specified Income Home Winterization Program	\$ 42,000	\$ 2,000	\$ 33,000
Natural Resources Canada – Clean Energy for Rural and Remote Communities	\$ 195,000	\$ 145,000	\$ 0
Community Energy Planning	\$ 195,000	\$ 145,000	\$ 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	\$ 10,000	\$ 10,000	\$ 0
Other source income	\$ 77,000	\$ 50,000	\$ 0
TOTAL	\$ 6,819,000	\$ 3,623,000	\$ 1,800,000

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.

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.

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 24 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 2020/21 fiscal year, including their results, so our readers can see the impact we have made.

Mark presents Fort Simpson resident Sarah Arnold with a prize for her entry in the AEA's WIN, WIN, WINterize to Win photo contest.



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.

Louise and Tom present Noel Demarcke, Manager of Stittco Utilities in Hay River, with a rebate cheque for the company’s LED lighting retrofit.



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:

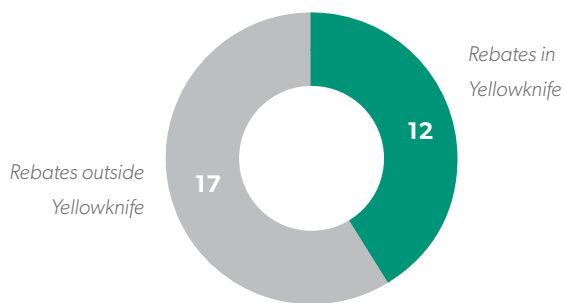
4 yardstick audits *(in 1 community)*
1 targeted audits

The targeted energy audits identified roughly \$520 in combined potential annual savings on energy bills and 1 tonne of potential annual greenhouse gas savings.

FOR
businesses

AEA FUNDING

\$660,000 (from GNWT Department of Infrastructure and Government of Canada)

Completed projects**29** total rebatestotal value of rebates **\$240,000****\$8,400**
average rebate**Communities**Communities receiving rebates: **9****Payback**

Capital cost (all projects, before rebates):

\$560,000

Estimated annual savings (all projects):

\$120,000

Simple payback (all projects, after rebates):

2.6 years**Greenhouse gases**Annual greenhouse gases avoided: **58 tonnes***(equivalent to the greenhouse gases emitted by roughly 2,400 propane tanks for home barbecues)⁶*Rebate cost per lifetime⁷ tonne reduced:**\$200****Energy savings**

Annual electricity consumption avoided:

330,000 kWh*(roughly the amount of electricity used annually in the community of Kakisa)*Rebate cost per lifetime kWh avoided: **\$0.04**Power demand avoided: **100 kW***(equivalent to running 67 air fryers at the same time)*

Annual fossil fuel consumption avoided

(oil and propane):

24 GJ*(equivalent to 630 L of heating oil, or more than half a 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 money saved by using less electricity for lighting is often greater than the extra spent on heating fuel. Twenty of our clients completed lighting retrofits this year. On average, each of them will save an estimated \$4,700 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, some of our clients in communities that produce electricity by burning fuel such as diesel, natural gas or propane are both saving money and reducing 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)
Enterprise*	1	↑ 2	-\$ 150	16,000	\$ 0.02	5	↑ 34
Fort Liard	1	↓ 3	\$ 170	4,800	\$ 0.10	2	↑ 14
Fort Simpson	1	↑ 1	-\$ 440	5,000	\$ 0.09	3	↑ 15
Fort Smith*	1	↓ 34	\$ 36	630	\$ 1.95	0	↓ 280
Hay River*	8	↑ 2	-\$ 1,100	59,000	\$ 0.04	21	↑ 53
Inuvik	2	↓ 6	\$ 93	10,000	\$ 0.05	3	↑ 31
Norman Wells	2	↓ 19	\$ 44	45,000	\$ 0.02	18	↑ 100
Tuktoyaktuk	1	↓ 3	\$ 210	0	N/A	0	↓ 44
Yellowknife*	12	↑ 1	-\$ 5,600	190,000	\$ 0.03	50	↑ 50

* 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	3	↓ 9	\$ 130	10,000	\$ 0.11	3	↓ 13
Dehcho	2	↓ 2	\$ 560	9,900	\$ 0.09	6	↓ 30
North Slave	12	↑ 1	-\$ 5,600	190,000	\$ 0.03	50	↑ 50
Sahtu	2	↓ 19	\$ 44	45,000	\$ 0.02	18	↑ 100
South Slave	10	↓ 30	\$ 140	75,000	\$ 0.05	26	↓ 190

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	22	↓ 29	\$ 320	270,000	\$ 0.03	76	↓ 140
Non-hydro	7	↓ 29	\$ 99	65,000	\$ 0.04	27	↑ 120

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

\$335,000 (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.

Not surprisingly, the COVID-19 pandemic meant that few communities were willing and able to take on building upgrade projects this year. Both the number of rebates we gave out and the number of building energy audits we completed were down significantly compared to recent years. However, we were glad to see that a few projects were still able to go ahead.

Results

Audits

Building energy audits completed:

22 yardstick audits (in 4 communities)

1 targeted audit

The targeted energy audit identified \$35,000 in combined potential savings on energy bills and 63 tonnes of potential annual greenhouse gas savings.

Completed projects

2 total rebates (in 2 communities)

2 buildings retrofitted by clients

total value of rebates: **\$53,000**

average rebate: **\$27,000**

Payback

Capital cost (all projects, before rebates):

\$240,000

Estimated annual savings: **\$15,000**

Simple payback (after rebates): **16** years

Greenhouse gases

Annual greenhouse gases avoided: **8** tonnes

(equivalent to taking two cars off the road)⁸

Rebate cost per lifetime⁹ tonne reduced: **\$330**

Energy savings

Annual electricity consumption avoided: **32,000 kWh**

(equivalent to the amount of electricity it would take to run 73 ceiling fans 24 hours a day for a year—at 50 W each)

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

Power demand avoided: **9 kW**

(equivalent to running 100 LED TVs at the same time)

Annual fossil fuel consumption avoided (oil and propane): **140 GJ**

(equivalent to 3,600 L of heating oil—or 23 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)	
Inuvik	1	↓	12	\$ 200	0	N/A	0	↓	210
Yellowknife*	1	↑	4	-\$ 42	32,000	\$ 0.01	9	↑	68

* 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	↓	12	\$ 200	0	N/A	0	↓	210
North Slave	1	↑	4	-\$ 42	32,000	\$ 0.01	9	↑	68

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	1	↑	4	-\$ 42	32,000	\$ 0.01	9	↑	68
Non-hydro	1	↓	12	\$ 200	0	N/A	0	↓	210

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.

While we regularly offer project coordination through our community government program, we also offer it through some of our special projects. For example, our Tlicho LED fixture retrofit project (see page 46) and ECM pump projects (see pages 46 and 47) offered services similar to those we offer community governments. And our Community Wood Stove Program (see page 35) regularly includes coordination services to get stoves ordered, delivered and installed.

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...

- 25 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.
- 5 community governments have used the AEA's project coordination services to help them complete their projects.
- 64% 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 temporarily introduced 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

\$370,000 (from GNWT
Department of Infrastructure
and Government of Canada)

Results

Home energy evaluations

pre-retrofit evaluations: **32**
(in 5 communities)

- on-site pre-retrofit evaluations: **17** (in 5 communities)
- remote pre-retrofit evaluations: **15** (in 4 communities)

post-retrofit evaluations: **7**

All 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).

Completed projects

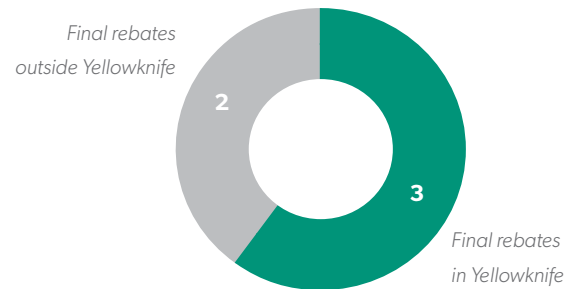
11 total rebates (5 final plus 6 interim)

total value of rebates: **\$64,000**

- final rebates: **\$37,000**
- interim rebates: **\$26,000**

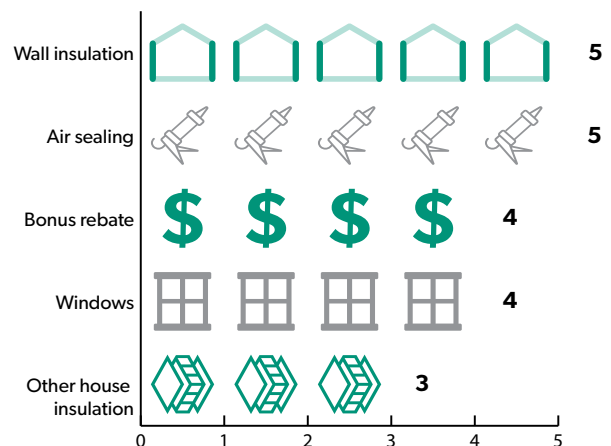
average final rebate: **\$7,500**

Communities



communities receiving rebates: **3**

Rebates by type



Payback¹⁰

Capital cost (all projects, before rebates):

\$120,000¹¹

Estimated annual savings (all products): **\$8,200**

Simple payback (all projects, after rebates): **19** years

Greenhouse gases

Annual greenhouse gases avoided: **15** tonnes

(equivalent to the greenhouse gases produced by
6,300 L of gasoline)¹²

Rebate cost per lifetime¹³ tonne reduced: **\$84**

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 \$140,000.

Energy savings

Annual electricity consumption avoided: **7,100 kWh**
(equivalent to the power consumed by a coffee maker, at 1,000 W, running 24 hours a day for 296 days)

Annual fossil fuel consumption avoided (oil, propane and natural gas): **250 GJ**
(equivalent to 9,200 L of propane—enough to fill more than 500 propane cylinders for home barbecues)

Rebate cost per lifetime kWh avoided: **\$0.18**

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)
Hay River*	1	8	\$ 47	690	\$ 0.53	130
Inuvik	1	1	\$ 160	61	\$ 2.00	15
Yellowknife*	3	6	\$ 120	6,400	\$ 0.12	95

*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	1	\$ 160	61	\$ 2.00	15
North Slave	3	6	\$ 120	6,400	\$ 0.12	95
South Slave	1	8	\$ 47	690	\$ 0.53	130

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

Community type	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Hydro	4	14	\$ 80	7,100	\$ 0.16	230
Non-hydro	1	1	\$ 160	61	\$ 2.00	15

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

\$541,000 (from GNWT
Department of Infrastructure and
Government of Canada)

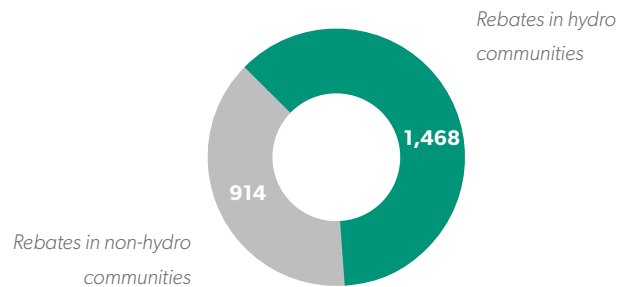
Results

2,382 total rebates

total value of rebates **\$540,000**

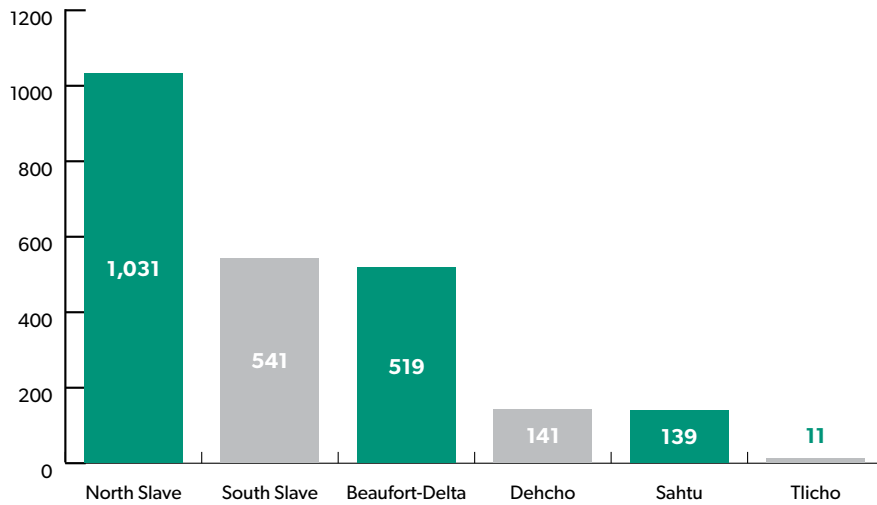
\$225
average rebate

Rebates by region¹⁴

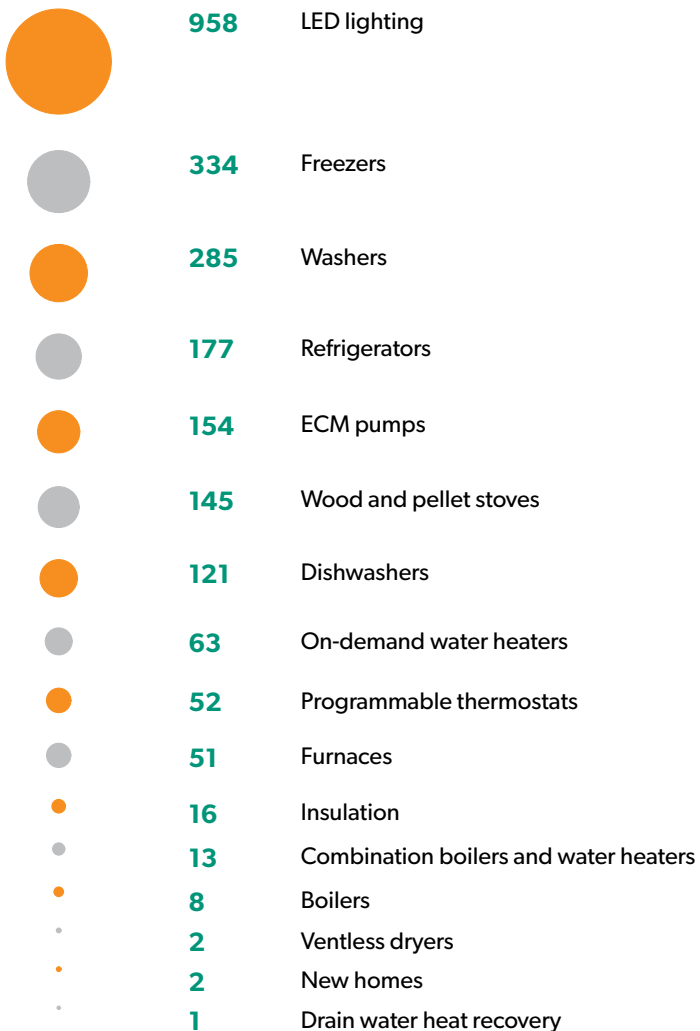


LED light bulbs at the Northern store in Aklavik, which are available for point-of-sale rebates thanks to a partnership with the North West Company.

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):

\$2,900,000

Estimated annual savings (all products):

\$500,000

Simple payback (all products, after rebates):

4.7 years**Greenhouse gases**Annual greenhouse gases avoided: **810** tonnes
(equivalent to the greenhouse gases produced by roughly 350,000 L of gasoline)¹⁵Rebate cost per lifetime¹⁶ tonne reduced: **\$42****Energy savings**

Annual electricity consumption avoided:

1,400,000 kWh

(equivalent to the electricity consumed each year in the community of Lutsel K'e)

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

Annual fossil fuel consumption avoided (oil and propane):

4,800 GJ

(equivalent to the energy in 260 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/increased (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	24	↓ 15	\$ 25	17,000	\$ 0.03	↓ 30
Behchoko*	5	0	-\$ 810	3,300	\$ 0.02	↑ 1
Colville Lake	2	↓ 2	\$ 37	1,600	\$ 0.04	↓ 2
Deline	29	↓ 15	\$ 36	26,000	\$ 0.02	↑ 59
Dettah*	2	0	-\$ 130	3,100	\$ 0.01	↑ 5
Enterprise*	2	0	-\$ 1,100	120	\$ 0.22	0
Fort Good Hope	24	↓ 10	\$ 41	16,000	\$ 0.03	↑ 36
Fort Liard	18	↓ 7	\$ 32	13,000	\$ 0.02	↑ 30
Fort McPherson	85	↓ 23	\$ 69	31,000	\$ 0.06	↓ 6
Fort Providence	31	↓ 12	\$ 28	16,000	\$ 0.05	↓ 220
Fort Resolution*	27	↓ 1	\$ 130	4,500	\$ 0.06	↓ 16
Fort Simpson	119	↓ 64	\$ 42	68,000	\$ 0.05	↓ 200
Fort Smith*	155	↓ 13	\$ 52	47,000	\$ 0.03	↓ 190
Gameti	3	↓ 1	\$ 63	1,600	\$ 0.05	↓ 2
Hay River*	312	↓ 120	\$ 43	230,000	\$ 0.03	↓ 1,100
Inuvik	299	↓ 98	\$ 42	150,000	\$ 0.04	↓ 120
Kakisa	1	↓ 1	\$ 40	780	\$ 0.04	↓ 1
Katl'odeeche*	6	↓ 4	\$ 35	3,200	\$ 0.05	↓ 58
Lutsel K'e	1	↓ 2	\$ 23	0	N/A	↓ 29
Nahanni Butte	2	↓ 3	\$ 20	0	N/A	↓ 45
Norman Wells	49	↓ 22	\$ 36	42,000	\$ 0.02	↑ 28
Paulatuk	26	↓ 8	\$ 59	15,000	\$ 0.03	↑ 42
Sachs Harbour	40	↓ 20	\$ 8	34,000	\$ 0.00	↑ 100
Sambaa K'e	1	0	\$ 16	0	N/A	↓ 4
Tsiigehtchic	8	↓ 4	\$ 28	2,800	\$ 0.06	↓ 20
Tuktoyaktuk	15	↓ 7	\$ 21	13,000	\$ 0.01	↑ 39
Tulita	31	↓ 14	\$ 38	24,000	\$ 0.02	↑ 67
Ulukhaktok	22	↓ 5	\$ 81	7,600	\$ 0.05	↑ 19
Whati	3	↓ 1	\$ 110	950	\$ 0.09	↓ 1
Yellowknife*	986	↓ 250	\$ 50	630,000	\$ 0.02	↓ 2,300
Remote	54	↓ 79	\$ 17	13,000	\$ 0.13	↓ 930

*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	Annual fossil fuel consumption avoided/increased (GJ)
Beaufort-Delta	519	↓ 180	\$ 43	270,000	\$ 0.04	↑ 27
Dehcho	141	↓ 78	\$ 38	81,000	\$ 0.04	↓ 260
North Slave	1,031	↓ 310	\$ 44	640,000	\$ 0.03	↓ 2,900
Sahtu	139	↓ 72	\$ 30	110,000	\$ 0.03	↑ 39
South Slave	541	↓ 175	\$ 41	300,000	\$ 0.03	↓ 1,700
Tlicho	11	↓ 2	\$ 110	5,900	\$ 0.04	↓ 1

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	Annual fossil fuel consumption avoided/increased (GJ)
Hydro	1,468	↓ 380	\$ 48	910,000	\$ 0.03	↓ 3,600
Non-hydro	914	↓ 430	\$ 34	490,000	\$ 0.04	↓ 1,200

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

68 evaluations of existing homes

13 walk-through advice sessions in existing homes

98 evaluations of new homes

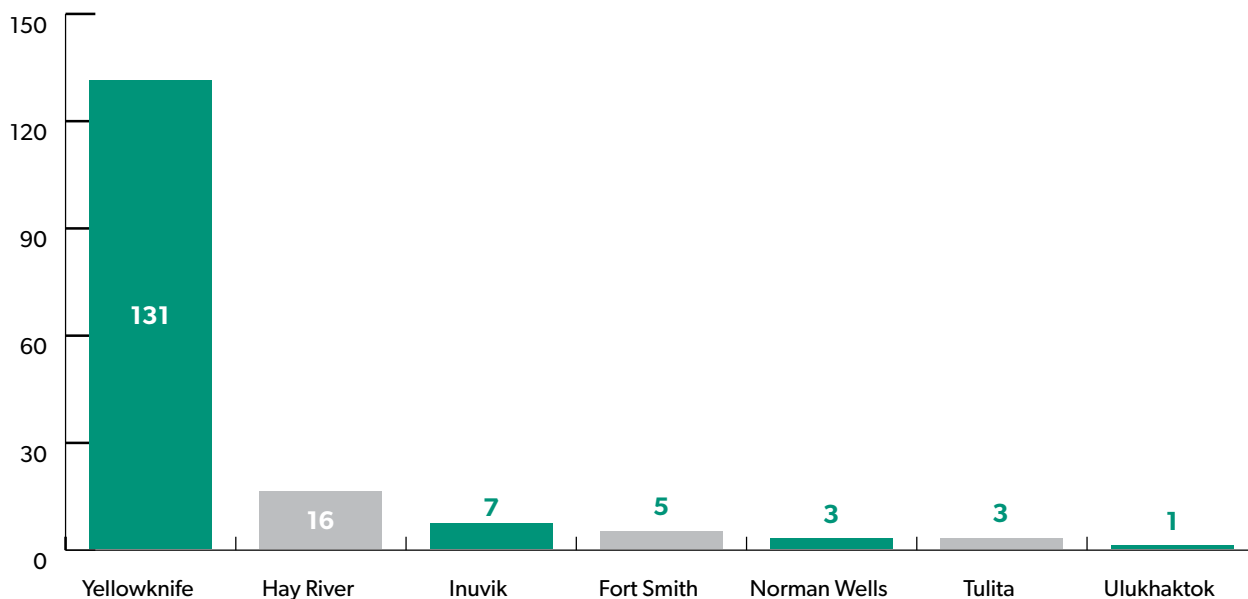
166 total evaluations
(plus 13 walk-through sessions)

FOR
residents

AEA FUNDING

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

Total evaluations by community



Existing homes

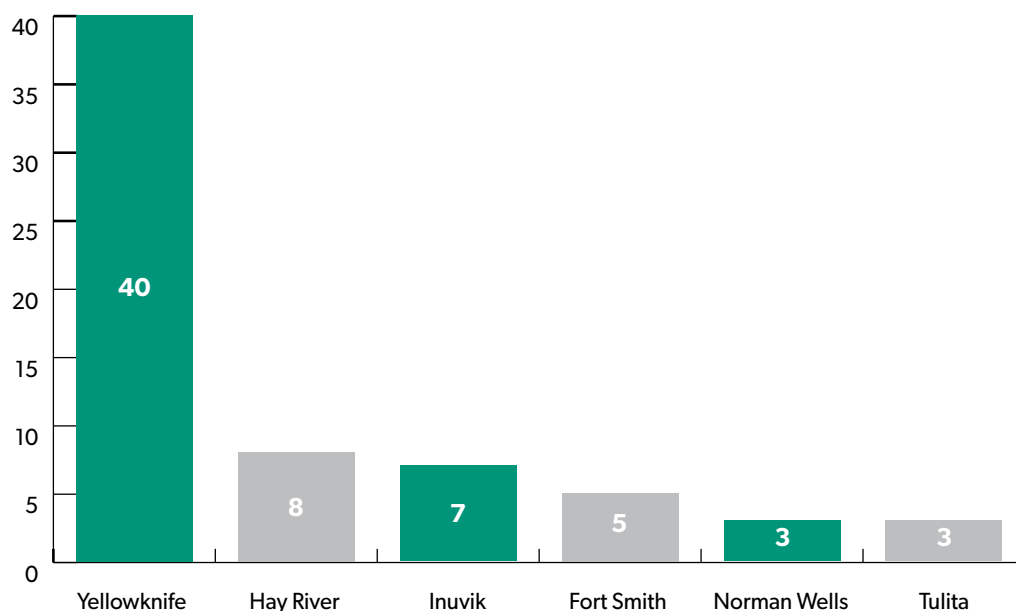
For existing homes, the Arctic Energy Alliance provides two types of evaluations:

- 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: **66**



Post-retrofit evaluations

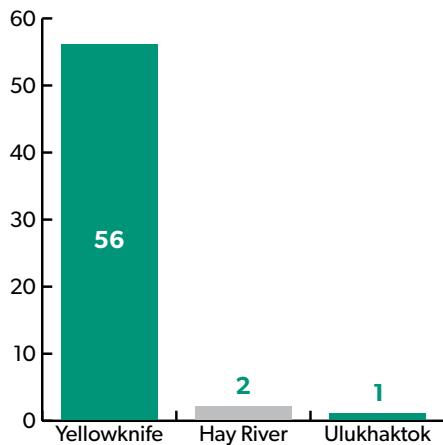
total post-retrofit evaluations: **2**

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: **59****Payback^{17,18}**

Potential annual savings (all existing homes):

\$100,000**Greenhouse gases¹⁸**

Potential annual greenhouse gases avoided:

200 tonnes*(equivalent to replacing 3,000 incandescent light bulbs with LED bulbs in the community of Wrigley)***Energy savings¹⁸**

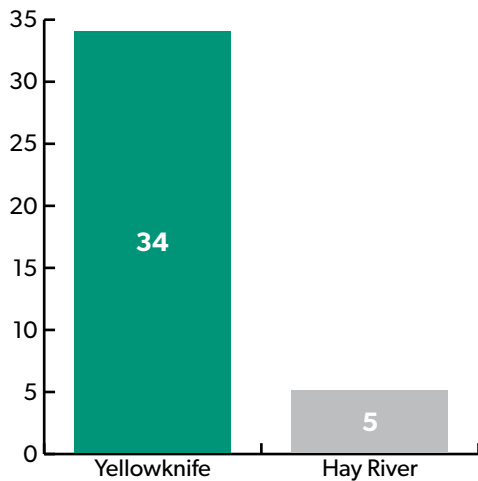
Potential annual electricity consumption avoided:

140,000 kWh*(equivalent to the electricity needed to run a 3,000-W clothes dryer 24 hours a day for more than five years)*

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

2,300 GJ*(equivalent to 60,000 L of heating oil—enough to fill 3,000 20-L jerry cans)*

New home final evaluations

total new home final evaluations: **39**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 (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Fort Smith*	7	43,000	24
Hay River*	27	1,700	410
Inuvik	21	5,900	290
Norman Wells	15	6,100	170
Tulita	12	6,600	100
Yellowknife*	110	80,000	1,300

*Hydro community

Potential greenhouse gas and energy savings by region

Region	Potential annual GHGs avoided (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Beaufort-Delta	21	5,900	290
North Slave	110	80,000	1,300
Sahtu	28	13,000	270
South Slave	34	44,000	440

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

Community type	Potential annual GHGs avoided (tonnes)	Potential annual electricity consumption avoided (kWh)	Potential annual fossil fuel consumption avoided (GJ)
Hydro	150	120,000	1,700
Non-hydro	49	19,000	560

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

\$315,000 (from GNWT
Department of Infrastructure and
Government of Canada)

Results

Audits

Building energy audits completed:

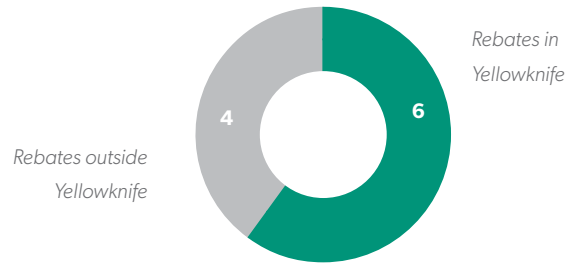
4 yardstick audits *(in 2 communities)*
1 targeted audit

The targeted energy audit identified roughly \$61,000 in potential annual savings on energy bills and 120 tonnes of potential annual greenhouse gas savings.

Completed projects

10 total rebates
total value of rebates: **\$100,000**
average rebate: **\$10,000**

Communities



Communities receiving rebates: **4**

Payback

Capital cost (all projects, before rebates):

\$440,000

Estimated annual savings (all projects):

\$68,000

Simple payback (all projects, after rebates):

5 years

Greenhouse gases

Annual greenhouse gases avoided: **150** tonnes
(equivalent to eliminating nearly 1,300 passenger car trips between Yellowknife and Hay River)¹⁹

Rebate cost per lifetime²⁰ tonne reduced: **\$33**

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:

13,000 kWh*(equivalent to running 26,000 vacuum cleaners for an hour—
at 500 W each)*Rebate cost per lifetime kWh avoided: **\$0.39**Power demand avoided: **4 kW***(equivalent to running three dishwashers at the same time)*Annual fossil fuel consumption
avoided (oil and propane):**2,100 GJ***(equivalent to 56,000 m³ of natural gas—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)	
Fort Providence	1	↓	2	\$ 23	4,100	\$ 0.01	2	↑	10
Inuvik	3	↓	17	\$ 55	7,300	\$ 0.13	2	↓	200
Yellowknife*	6	↓	130	\$ 31	1,600	\$ 2.48	0	↓	1,900

* 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	3	↓	17	\$ 55	7,300	\$ 0.13	2	↓	200
North Slave	6	↓	130	\$ 31	1,600	\$ 2.48	0	↓	1,900
South Slave	1	↓	2	\$ 23	4,100	\$ 0.01	2	↑	10

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

Community type	No. of rebates	Annual GHGs avoided/increased (tonnes)	Rebate cost/lifetime tonne of GHGs reduced	Annual electricity consumption avoided (kWh)	Rebate cost/lifetime kWh avoided	Power demand avoided (kW)	Annual fossil fuel consumption avoided/increased (GJ)
Hydro	6	↓ 130	\$ 31	1,600	\$ 2.48	0	↓ 1,900
Non-hydro	4	↓ 19	\$ 51	11,000	\$ 0.09	4	↓ 190

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.

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

\$593,000 (from GNWT Department of Infrastructure and Government of Canada)

Results

4 community workshops

98 energy efficiency kits distributed

total value of incentives: **\$33,000**

average incentive: **\$340**

Like our Community Wood Stove Program (see page 35), this program is based on a community partnership model. Five community organizations partnered with us, representing six communities. 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.

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

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 two 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

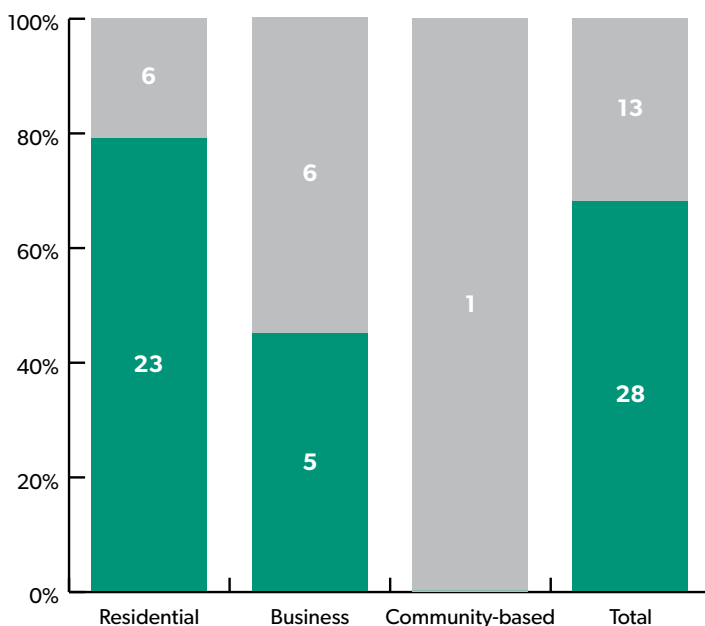
AEA FUNDING

\$818,000 (from GNWT Department of Infrastructure and Government of Canada)

Project types

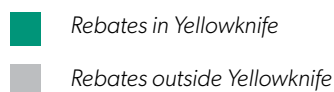
	Residential	Business	Community-based	TOTAL
Solar photo-voltaic	27	8	1	36
Biomass	1	2	0	3
Heat recovery	0	1	0	1
Hybrid water heater	1	0	0	1

Communities



Results

	Residential	Business	Community-based	TOTAL
Total rebates	29	11	1	41
Total value of rebates	\$ 220,000	\$ 260,000	\$ 7,400	\$ 490,000
Average rebate	\$ 7,500	\$ 24,000	\$ 7,400	\$ 12,000



Payback²¹

	Residential	Business	Community-based	TOTAL
Capital costs (before rebates)	\$ 470,000	\$ 570,000	\$ 18,000	\$ 1,000,000
Estimated annual savings	\$ 46,000	\$ 57,000	\$ 890	\$ 100,000
Simple payback (after rebates)	5.4 years	5.3 years	12 years	5.4 years

Greenhouse gases

	Residential	Business	Community-based	TOTAL
Annual greenhouse gases avoided (tonnes)	98	140	2	240
Rebate cost per lifetime ²² tonne reduced	\$ 110	\$ 92	\$ 190	\$ 100



Solar panels on a building at a remote hunting camp.

Energy savings

	Residential	Business	Community-based	TOTAL
Annual electricity avoided/produced (kWh)	49,000	40,000	1,900	91,000
Rebate cost/lifetime kWh avoided/produced	\$ 0.22	\$ 0.33	\$ 0.20	\$ 0.27
Power demand avoided/size of system (kW)	63	150	2	210
Annual fossil fuel consumption avoided (GJ)*	8	260	0	270

*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) [†]
Deline	1	4	\$ 230	5,600	\$ 0.15	5	0
Fort Smith*	4	1	\$ 220	4,200	\$ 0.07	1	0
Hay River*	1	2	\$ 220	750	\$ 0.47	1	0
Inuvik	1	3	\$ 63	1,200	\$ 0.14	1	0
Katl'odeeche*	1	2	\$ 190	1,900	\$ 0.20	2	0
Norman Wells	1	5	\$ 150	7,700	\$ 0.09	8	0
Yellowknife*	4	110	\$ 47	0	N/A	130	270
Yellowknife area off-grid	24	95	\$ 140	53,000	\$ 0.25	53	0
Remote	4	27	\$ 130	16,000	\$ 0.20	16	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	1	3	\$ 63	1,200	\$ 0.14	1	0
Dehcho	1	3	\$ 340	3,800	\$ 0.28	4	0
North Slave	28	200	\$ 91	53,000	\$ 0.34	180	270
Sahtu	3	25	\$ 100	21,000	\$ 0.12	20	0
South Slave	8	12	\$ 190	12,000	\$ 0.19	8	0

* 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	110	\$ 47	3,500	\$ 1.43	130	270
Non-hydro*	36	140	\$ 140	89,000	\$ 0.22	87	0

* Includes off-grid locations near hydro communities.

[†] Does not include fuel savings from solar PV systems

Biomass Energy Program

Through the Biomass Energy Program, the Arctic Energy Alliance provides northerners with accessible technical advice, project coordination, and education on existing or potential biomass projects. AEA staff also help clients by facilitating the development of partnerships with potential 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 2020/21 fiscal year, the AEA worked with three community governments to discuss options for installing new systems or expanding existing systems.

FOR

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

AEA FUNDING

\$100,000 (from GNWT Department
of Infrastructure)

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.

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 2020/21 we completed most of the work for the analysis in Gameti, and expect to finish it early in the new fiscal year. The work in Behchoko is partially complete and will continue into 2021/22.

System expansion in Whati

We have been working with the Community Government of Whati since the 2019/20 fiscal year to expand the existing district heating system to additional buildings in the community. In this case, some of the buildings identified for inclusion belong to other organizations, so the AEA has played a coordinating role between the community government and the other parties. Our work started with a pre-feasibility analysis in that year. The actual work of expanding the system was set to begin in the fall of 2020, but due to contractor availability it could not be undertaken before the ground froze. Work to connect the additional buildings will resume in spring 2021.

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

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.

In the first part of the fiscal year, we installed 92 stoves that were delivered at the end of the previous year to Behchoko, Deline, Gameti, Jean Marie River, Sambaa K'e and Whati. At the end of the year, we delivered another 30 stoves to Deline, Gameti, Wekweeti and Whati. These will be installed in 2021/22.

FOR

residents

AEA FUNDING

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

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.

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 receive permission from our community partners and territorial health officials to proceed. Toward the end of the year, pandemic-related industry shutdowns at stove and chimney manufacturing plants meant that the costs for both stove materials and delivery were higher than normal, which affected our budget.

Results

122 total incentives
5 new stoves installed
87 replacement stoves installed
30 stoves delivered (to be installed in 2021/22)
 total value of incentives: **\$260,000**
 average incentive: **\$2,100**

Payback²³

Capital cost (all installed stoves, before incentives):

\$640,000

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

\$11,000

Simple payback (all installed stoves, after incentives):

29 years

Greenhouse gases

Annual greenhouse gases avoided: **25 tonnes**
(equivalent to recycling more than 1,000 bags of garbage instead of putting it into a landfill)²⁴

Incentive cost per lifetime²⁵ tonne reduced (all installed stoves; incentives for purchase, delivery and installation): **\$640**

Annual particulate emissions reduced:

4,400 kg (a 90% decrease)

Energy savings

Annual fossil fuel consumption avoided (oil and propane): **330 GJ**
(or 8,500 L of heating oil—enough to almost fill two commercial oil tanks at 4,550 L [1,000 gallons] each)

Annual wood savings: **70 cords**

Estimated electricity savings not tracked in 2020/21.

²³ All numbers for payback, greenhouse gas savings and energy savings include only stoves that have been installed. Capital cost and simple payback include costs and incentives over two fiscal years—for purchase and delivery (year 1), and installation (year 2). The two-year incentives for 92 installed stoves total \$320,000.

Savings from wood stove use

Because the 92 recipients who had stoves installed in 2020/21 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: **458 tonnes**
- Annual fossil fuel consumption: **6,500 GJ**
(or 170,000 L of heating oil)
- Annual heating cost: **\$240,000**

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/ increased (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided (GJ)
Behchoko*	26	5	\$ 1,000	↓ 18	1,000	57
Deline	10	0	\$ 5,800	↓ 12	610	0
Gameti	12	0	\$ 4,700	↓ 12	580	0
Jean Marie River	17	19	\$ 140	↑ 3	620	270
Sambaa K'e	15	1	\$ 4,400	↓ 14	720	0
Whati	14	1	\$ 6,500	↓ 17	820	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/ increased (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided (GJ)
Dehcho	32	19	\$ 250	↓ 12	1,300	270
Sahtu	10	0	\$ 5,800	↓ 12	610	0
Tlicho	52	6	\$ 1,700	↓ 46	2,400	57

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/ increased (cords)	Particulate emissions avoided (kg)	Annual fossil fuel consumption avoided/ increased (GJ)
Hydro	26	5	\$ 1,000	↓ 18	1,000	57
Non-hydro	68	21	\$ 560	↓ 52	3,300	270

²⁴ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

²⁵ Assuming a lifetime of 20 years for all stoves.

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.

Electric Vehicle Incentive Program

Launched in June 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.

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

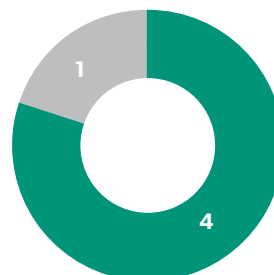
5 total rebates

total value of rebates: **\$26,000**

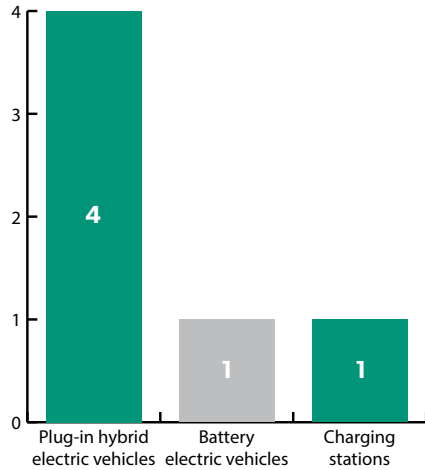
\$5,100
average rebate

Communities

Rebates outside
Yellowknife



Rebates in
Yellowknife

Rebates by type**Payback**

Capital cost (all products, before rebates):

\$240,000

Estimated annual savings (all products):

\$1,800

Simple payback (all products, after rebates):

120 years**Greenhouse gases**

Annual greenhouse gases avoided: **10 tonnes**
 (equivalent to planting 160 seedlings and growing them for 10 years)²⁶

Rebate cost per lifetime²⁷ tonne reduced: **\$210**

Energy savings

Annual electricity consumption increased:

9,200 kWh

(equivalent to running 25 coffee machines an hour a day for a year)

Rebate cost per lifetime kWh avoided: **-\$0.21**

Annual fossil fuel consumption avoided (gasoline): **140 GJ**

(equivalent to roughly 4,000 L of gasoline—equivalent to filling an 80-L tank every week for a year)



Electric vehicles, like this one the AEA did a study on a few years back, are now eligible for rebates in the NWT.

²⁶ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

²⁷ Assuming a lifetime of 13 years for all vehicles and charging stations.

Greenhouse gas and energy savings by community

Community	No. of rebates	Annual GHGs avoided (tonnes)	Rebate cost/ lifetime tonne of GHGs reduced	Annual electricity consumption increased (kWh)	Rebate cost/ lifetime kWh avoided	Annual fossil fuel consumption avoided (GJ)
Hay River*	1	2	\$ 210	2,200	-\$ 0.18	27
Yellowknife*	4	8	\$ 210	7,100	-\$ 0.22	110

* Hydro community

Greenhouse gas and energy savings by region

Community type	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	4	8	\$ 210	7,100	-\$ 0.22	110
South Slave	1	2	\$ 210	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 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 most 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)

Home winterization in Tsiigehtchic

Our Specified Income Home Winterization Program (see page 31) is about working with communities to help homeowners save money on their energy bills. While each community partner hires a liaison worker to hold workshops for participants and to install energy-saving kits in participants' homes, part of the AEA's role is to train these workers and help ensure they can get the kits installed properly. The latter task falls on our Regional Energy Project Coordinators.

Tsiigehtchic was one of our community partners this year. In December, Elye, our Regional Energy Project Coordinator for the Beaufort-Delta region, travelled to the community to work alongside Jamie Cardinal, the local liaison worker. Elye assisted Jamie in installing winterization kits in participating homes throughout the community.

As with every program and project this year, we had to adapt to the pandemic. The community accommodations in Tsiigehtchic were not available, so Elye had to do day trips during the installation period.

Community visits in Tuktoyaktuk

In March, the AEA took back-to-back trips to Tuktoyaktuk.

For the first trip, Elye from our Beaufort–Delta regional office was joined by Mark, our Executive Director, to meet with Hamlet officials about what the future of the community could look like and how the AEA could help. They also met with local churches about potential building upgrades and available rebates.

On the second trip—roughly a week later—Elye joined Michelle, from our Yellowknife office, to meet with Hamlet council members as part of our community energy planning project (see page 45 for more information). He also took the time to write a completion report on an ECM pump installation in the community’s Kitti Hall as part of the ECM pump fast-track project (see page 46).

Dehcho office (Fort Simpson)

Burn it Smart workshop in Jean Marie River

As part of our Community Wood Stove Program (see page 35 for more information), our Regional Energy Project Coordinators hold Burn it Smart workshops in partner communities after the stoves have been installed. These workshops are designed to help the recipients of the stoves learn how to use them as safely and efficiently as possible. In December, Derek from our Dehcho regional office travelled to Jean Marie River to deliver a workshop there.

The participants seemed particularly keen to change their practice of mixing dry wood with “green” (unseasoned) wood, in favour of dry wood only. Mixing dry wood and green wood is a common practice with older stoves to get a longer burn time. But using green wood in newer, more efficient stoves can cause dangerous creosote deposits to build up.

Community engagement in Fort Simpson

Tuktoyaktuk wasn’t the only community that our Executive Director, Mark, visited this year. In January, he travelled to Fort Simpson to

join Derek for some community engagement activities. These included meeting with Village of Fort Simpson staff and officials to discuss possible energy-saving projects, taking a tour of the community’s warming shelter, and delivering prizes to the winners of two of the contests we held this year.

Sahtu office (Norman Wells)

Home energy evaluations in Tulita

While home energy evaluations are one of the main services that the AEA offers, travel logistics mean that we aren’t able to offer them frequently in the smaller communities. However, when several people in a community have signed up for an evaluation, we can make a trip happen.

In January, Lise, our Sahtu Regional Energy Project Coordinator, travelled to Tulita to register home owners for energy evaluations. She returned in February with one of our energy management specialists to complete the evaluations. In addition to the official home energy evaluations, our team also performed home walkthroughs to help residents find ways to save on energy bills even when they didn’t need full evaluations.

Open houses in Colville Lake and Fort Good Hope

In March, we travelled to both Colville Lake and Fort Good Hope by winter road to hold open houses and help community members learn how to save energy and money. The Fort Good Hope session also involved getting residents registered for home energy evaluations so that we can schedule a trip there in the future.

We brought along an e-bike for display, which was a hit in both communities—many participants hoped it was a door prize!

South Slave office (Hay River)

Information sessions in Fort Smith

In November, Louise from our South Slave regional office travelled to Fort Smith to engage with community members there. To comply with social distancing recommendations and as an alternative to spreading people over a large space, she opted to hold one-on-one meetings. In addition to these meetings, she was also able to get status reports from the many homeowners who are doing energy efficiency upgrades to their homes through the Deep Home Energy Retrofit Program, and met with local organizations to discuss potential energy-saving projects.

Open house and Burn it Smart workshop in Lutsel K'e

Lutsel K'e is set to be a partner in our Community Wood Stove Program next year. Although no stoves have been installed there yet under the program, the community has a high number of wood stove users and was still a great candidate for a Burn it Smart workshop. While we were there we also held an open house session for community members to learn ways to save on energy bills, and gave a presentation to the Lutsel K'e Dene First Nation to help them better understand our programs and services.

Tlicho office (Whati)

Burn it Smart workshop in Behchoko

Continuing the trend of Burn it Smart workshops this year, we also held one in Behchoko in February. Newer style wood stoves can operate somewhat differently than older models, so as part of our Community Wood Stove program we want to ensure the people who receive new stoves know how to use them safely and efficiently.

Home visits in Gameti

Sonny, our Tlicho Regional Energy Project Coordinator, has found that one of the most effective ways to communicate with people in his region is to visit them in their homes to discuss their individual energy needs. Even during the pandemic he was able to continue this practice, but with social distancing protocols in place. In March he visited Gameti to speak with community members there about how to save on their energy costs.



Jamie Cardinal, a community liaison worker in Tsiigehtchic, installs a hot water tank insulation blanket as part of the Specified Income Home Winterization Program.

Yellowknife office

Youth building science session in Yellowknife

In August, some of our Yellowknife-based staff members took advantage of the warm weather to host an outdoor information session for youth on building science. The session was held in conjunction with the Foster Family Coalition of the NWT.

Youth participants built mini houses out of popsicle sticks and craft supplies, learning about insulation, air sealing, and how the layers inside a wall of a house work together to keep heat inside your home. We then tested the performance of the houses using a heat source and an IR camera. A great way to show how different construction assemblies affect house performance, and enjoy the summer weather at the same time!

National Drive Electric Week in Yellowknife

In October, we teamed up with Yellowknife Motors to host an event for National Drive Electric Week. We set up an information booth at the dealership to talk about electric vehicles in general, and about our Electric Vehicle Incentive Program. Yellowknife Motors had EVs available for viewing and test drives. The event was a hit, and we even got visits from the Yellowknife fire department and the GNWT's Chevy Volt plug-in electric hybrid, which the AEA did a study on back in 2015.

Presentation to NWT Association of Communities members

In March, the AEA held an online presentation in conjunction with the NWT Association of Communities to help community leaders and administrators learn about our rebate programs and special projects. We covered how people can use our community energy profiles (see page 45), and how communities can benefit from community energy planning (see page 45), our ECM pump fast-track projects (see page 46) and our Specified Income Home Winterization Program (see page 31).

Boris Sangues and Victoria Gargan take away door prizes from a Burn it Smart workshop in Jean Marie River.



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 2020/21 fiscal year, the AEA conducted six 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.

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 first full year of a three-year project to work with two 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 did some initial planning and recruited a Community Energy Planning Coordinator. In 2020/21 we signed partnership agreements with two community organizations—the Hamlet of Tuktoyaktuk and the Deline Got'ine Government (DGG). 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.

The pandemic significantly changed how we had to roll out the project. We had initially planned to do in-person training sessions with the community energy champions and workshops with community

members. However, COVID-19 restrictions meant that we had to do these activities online and by phone—later than anticipated. Although remote communication had its challenges, we were able to hold bi-weekly training sessions with the community energy champions, and use a combination of surveys and limited-capacity in-person workshops (with an AEA representative joining online) to gather the information we needed.

After some discussions and a review of the activities completed as part of the project, the Deline Got'ine Government and the AEA decided to conclude our roles with Deline's portion of the project. The DGG is focusing on other priorities, including a number of renewable energy projects. We have agreed to review the status of the project next year.

The Hamlet of Tuktoyaktuk completed its plan and will decide on the energy projects it wants to implement beginning next fiscal year.

Community energy profiles

Community energy profiles are a tool used by organizations such as community governments, the AEA, the GNWT and contractors to show how communities across the NWT are using energy. They include the costs and amounts of various energy sources (such as petroleum products, wood and electricity), where and how those energy sources are used, and related greenhouse gas emissions. This information is useful so communities can understand their energy use and opportunities for saving energy and money, reducing their environmental footprints and

making their communities more sustainable.

For 2003/04, 2007/08 and again for 2014/15, the AEA produced community energy profiles to show how communities across the NWT are using energy.

The 2014/15 update was incomplete due to the AEA's inability to access key data. The AEA saw the need to update these profiles so that the information was current. However, one of the ongoing challenges with producing community energy profiles has been collecting reliable data on heating fuel use.

In 2018/19, AEA staff spent time developing partnerships and initiated a strategy for collecting usable data. In 2019/20, we were able to collect and analyze enough data to begin building new profiles.

Access to reliable and complete data remains a barrier to providing this type of service; however, in 2020/21, we were able to complete an updated profile for virtually every community in the NWT—with the exception of Yellowknife. With the help of a plain language expert, we adopted a new visual format that is easier to understand. These new profiles are available on our website and are being used in a variety of scenarios, such as in community energy planning sessions.

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. In the 2019/20 fiscal year we started a project to do formal outreach to contractors to supplement our more informal relationships. That project continued in 2020/21.

Last year's training workshop on pumps with electronically commutated motors (ECMs) was such a success that we decided to repeat it. ECMs can be found in energy-efficient pumps and ventilation equipment, but many contractors are not yet familiar with the technology.

Last year, the workshop was facilitated by the Grundfos Training Group, as Grundfos is a popular choice for pumps in the NWT. This year, we asked the TACO Comfort Group and Altatech Agencies Ltd. to facilitate the workshop, as TACO pumps are an increasingly popular option. The idea was to get contractors and building maintainers as familiar as possible with the various options in the NWT.

Twenty-two 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.

ECM pump fast-track project

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

For the first two years, we focused on LED lighting. This year we switched to water pumps with electronically commutated motors (ECMs). ECM pumps save a considerable amount of energy compared to standard pumps, but they have still not been widely adopted in the NWT. They are getting more popular, however, and a fast-track project makes it easier for organizations to make the switch.

Six organizations are taking part in the project, and are replacing a total of 24 pumps. The work is ongoing and is set to wrap up near the beginning of the 2021/22 fiscal year.

Tlicho LED fixture retrofit project

In the 2016/17 fiscal year, the AEA swapped roughly 12,000 incandescent and compact fluorescent light bulbs across the territory for more efficient LEDs. However, there are a number of houses across the NWT that used 2-pin and 4-pin compact fluorescent bulbs instead of the more common screw-in type. We were able to swap some of these bulbs for LEDs at the time, but certainly not all.

In 2019/20, we partnered with the Tlicho Government to replace these 2-pin and 4-pin

fixtures in privately-owned homes in all four Tliche communities. The old fixtures would be replaced with screw-in models and fitted with LED bulbs at no cost to the homeowners. This means they would have a greater choice in lighting options.

We identified 574 light fixtures for replacement in Behchoko, Gameti, Wekweeti and Whati. The work was originally scheduled to be completed by March 31, 2020, but the onset of the COVID-19 pandemic put plans on hold until we knew it was safe to proceed. Just over half of the lights were installed by March 2020 and the rest were completed by November.

Results

- Fixtures installed: 574
- Annual electricity savings: 20,000 kWh
- Annual power demand reduction: 9 kW
- Annual cost savings: \$6,200
- Annual greenhouse-gas reduction: 13 tonnes

Yellowknife residential ECM pump pilot project

The City of Yellowknife had planned water line upgrades in 2020 for several homes. Part of the project involved replacing aging circulation pumps used for freeze protection. Instead of installing standard pumps, the City and the AEA decided to form a partnership to install energy-saving ECM pumps. The City of Yellowknife would manage the contracting and project coordination, and the AEA would provide a rebate for every pump installed to reduce the cost to the City—and ultimately reduce the energy costs paid by the homeowners.

Pumps were upgraded in 34 homes.

Results

	Value of rebates	Annual electricity savings (kWh)	Annual cost savings	Lifetime cost savings (10 years)	Rebate cost/lifetime kWh avoided
Per pump	\$ 180	230	\$ 61	\$ 610	\$ 0.08
Total (34 pumps)	\$ 6,000	8,000	\$ 2,100	\$ 21,000	\$ 0.08



Tom speaks with Chaal Cadieux, with the public works department at the Hamlet of Enterprise, about installing energy-saving ECM pumps in the Hamlet's buildings.

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.



Peter Moosenose shows off the new light fixtures he received as part of the Tlilcho LED fixture retrofit project.

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	29	2	5	2,382	-	10	98	41	122	5	2,694	100%
No. of incentives in Yellowknife	12	1	3	986	-	6	-	28	-	4	1,039	39%
No. of incentives outside Yellowknife	17	1	2	1,396	-	4	98	13	122	1	1,655	61%
Total value of incentives	\$ 240,000	\$ 53,000	\$ 37,000	\$ 540,000	-	\$100,000	\$33,000	\$ 490,000	\$ 260,000	\$ 26,000	\$1,800,000	-
Average incentive	\$ 8,400	\$ 27,000	\$ 7,500	\$ 225	-	\$ 10,000	\$ 340	\$ 12,000	\$ 2,100	\$ 5,100	\$ 670	-
Total capital cost	\$ 560,000	\$240,000	\$120,000	\$2,900,000	-	\$ 440,000	\$33,000	\$1,000,000	\$520,000 [‡]	\$240,000	\$ 6,100,000	-
Est. annual savings	\$ 120,000	\$ 15,000	\$ 8,200	\$ 500,000	\$100,000 [*]	\$ 68,000	-	\$ 100,000	\$ 11,000 [§]	\$ 1,800	\$ 820,000	-
Est. annual electricity savings/increase (MWh)	↓ 330	↓ 32	↓ 7	↓ 1,400	↓ 140 [*]	↓ 13	-	↓ 91	-	↑ 9	↓ 1,900 [†]	-
Incentive cost per kWh avoided/produced	\$ 0.04	\$ 0.08	\$ 0.18	\$ 0.03	-	\$ 0.39	-	\$ 0.27	-	-\$ 0.21	\$ 0.06	-
Estimated power demand avoided/produced (kW)	100	9	-	-	-	4	-	210	-	-	320	-
Est. annual fossil fuel savings/increase (GJ)	↓ 24	↓ 140	↓ 250	↓ 4,800	↓ 2,300 [*]	↓ 2,100	-	↓ 270	↓ 330 [§]	↓ 140	↓ 8,100 [†]	-
Est. annual greenhouse gases avoided/increased (tonnes)	↓ 58	↓ 8	↓ 15	↓ 810	↓ 200 [*]	↓ 150	-	↓ 240	↓ 25 [§]	↓ 10	↓ 1,300 [†]	-
Incentive cost per tonne of greenhouse gas emissions reduced	\$ 200	\$ 330	\$ 84	\$ 42	-	\$ 33	-	\$ 100	\$ 640 [§]	\$ 210	\$ 76	-
Total no. of desktop energy evaluations (blueprint and yardstick evaluations)	4	22	-	-	59	4	-	-	-	-	89	100%
No. of desktop energy evaluations in Yellowknife	4	-	-	-	56	3	-	-	-	-	63	71%
No. of desktop energy evaluations outside Yellowknife	-	22	-	-	3	1	-	-	-	-	26	29%
Total no. of on-site energy evaluations	1	1	37	-	107	1	-	-	-	-	147	100%
No. of on-site energy evaluations in Yellowknife	1	-	20	-	75	1	-	-	-	-	97	66%
No. of on-site energy evaluations outside Yellowknife	-	1	17	-	32	-	-	-	-	-	50	34%

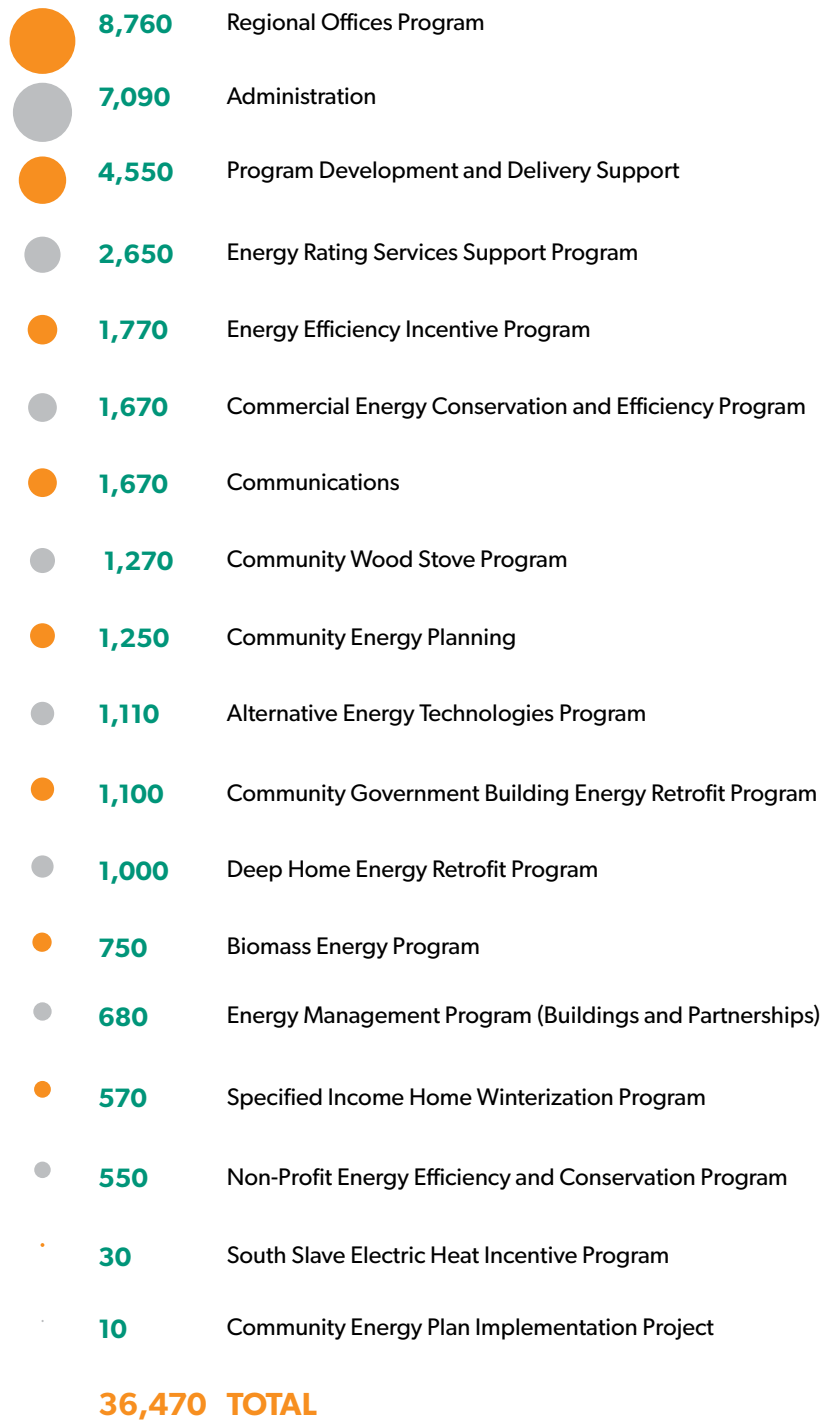
* Potential savings only. Actual savings could not be accurately measured.

† Not including potential savings.

‡ Capital cost from 2020/21 fiscal year. Does not match two-year capital cost from page 36.

§ Installed stoves only.

Staff hours by program/project*



* Rounded to the nearest 10.

Financial management

Highlights

Results of operations for the year ending March 31, 2021

- Overall revenues totalled \$5.4 million and overall expenses totalled \$5.2 million.
- The AEA budgeted for an overall surplus of \$480,000 this year, and ended the year with an overall surplus of \$170,000, representing 3% of total revenues. This is a 46% decrease from the previous year's surplus of \$310,000, which represented 6% of total revenues.
- Net financial assets increased \$160,000 over the course of the year, compared to a \$310,000 increase the previous year.

Key revenues	Value	Increase/ decrease from 2019/20	Comparison to budget
GNWT contributions	\$ 4,900,000	↓ 1%	78%
Other source income	\$ 80,000	↓ 18%	100%

Key expenses	Value	Increase/ decrease from 2019/20	Comparison to budget
Rebates distributed	\$ 1,800,000	↓ 6%	67%
Travel and accommodations	\$ 110,000	↓ 53%	36%
Consulting fees	\$ 120,000	-	41%
Advertising and promotion	\$ 170,000	↓ 130%	130%

Financial position at March 31, 2021

Key assets	Value	Increase/ decrease from 2019/20	Primary reasons
Total assets	\$ 1,900,000	↑ 2%	Receivables increased; cash decreased
Cash and short-term investments	\$ 1,100,000	↓ 4%	
Accounts receivable	\$ 770,000	↑ 16%	

Key liabilities	Value	Increase/ decrease from 2019/20	Primary reasons
Total liabilities	\$ 450,000	↓ 23%	Decrease in deferred revenues
Accounts payable and accrued liabilities	\$ 380,000	↓ 2%	Decrease in trade payables
Deferred revenues	\$ 50,000	↓ 71%	Unspent contributions; related expenses will not be recognized until later period

Key net assets	Value	Increase/ decrease from 2019/20	Notes
Total net assets	\$ 1,500,000	↑ 13%	Operating reserve and accumulated surplus increased
Internally restricted reserves	\$ 990,000	↑ 11%	Operating reserve increased for staff wages and other expenses
Unrestricted accumulated surplus	\$ 460,000	↑ 15%	Represents accumulated unspent core funding and consulting projects

Cash flow for the year ending March 31, 2021

- Gross cash from operations showed a surplus of \$250,000, compared to a surplus of \$280,000 the previous year.
- There was a net cash flow deficit of \$35,000, up 94% over the previous year, largely due to an increase in accounts receivable.

Key cash receipts	Value	Increase/ decrease from 2019/20
GNWT contributions	\$ 4,700,000	↓ 7%
Other sources	\$ 230,000	↑ 66%

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. In 2019/20 the AEA ramped up its operations to take full advantage of this additional funding, including hiring and training new staff members to increase capacity, adding new programs and projects to address areas not covered by existing programs, and increasing incentive amounts to encourage more people to adopt energy-efficient and renewable-energy technologies. These increased operations continued in 2020/21 and are expected to last at least until the end of 2021/22.

Membership and governance

As at March 31, 2021.

Board of directors

- Robert Sexton, President; Director of Energy, GNWT Department of Infrastructure
- Scott Reid, Vice-President; Director, Northwest Territories Housing Corporation
- Gordon Van Tighem, Treasurer; Chairman, 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
- Julian Kanigan, Acting Director, Conservation, Assessment and Monitoring, 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

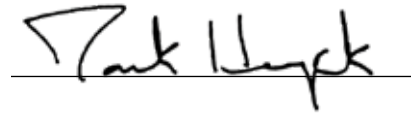
Sustaining members

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

Staff

- Sheena Adams, Program Coordinator
- Ken Baigent, Senior Energy Management Specialist
- John W. Carr, Senior Technical Specialist
- Elye Clarkson, Regional Energy Project Coordinator, Beaufort-Delta
- Kevin Cull, Communications Coordinator
- Naoufal Dahbi, Energy Management Specialist
- Lise Dolen, Regional Energy Project Coordinator, Sahtu
- Scott Dowler, Energy Management Specialist
- Derek Erasmus, Regional Energy Project Coordinator, Dehcho
- Alexandra Giroux, Energy Management Specialist
- Marta Goodwin, Finance Officer
- Mike Goodwin, Energy Management Specialist
- Tom Gross, Project Coordinator
- Barbara Guay, Administrative Assistant
- Mark Heyck, Executive Director
- Michelle Leger, Community Energy Planning Coordinator
- Faye MacDonald, Office Manager
- Margaret Mahon, Senior Energy Management Specialist
- Abdul Mohammed, Energy Management Specialist
- Louise Schumann, Regional Energy Project Coordinator, South Slave
- Craig Thomas, Operations Manager
- 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 10, 2021



The e-bike from the AEA's Sahtu office, sitting at the Coast Guard dock in Norman Wells.

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



ARCTIC ENERGY
ALLIANCE