



BY INSIDE EDUCATION



A+ FOR ENERGY

2020/2021 PROJECT SUMMARY WINNERS

1. Matthew Halton High School

Pincher Creek

MAKER CENTRE HANDS ON ENERGY INITIATIVE | **\$5,000**

Students will use the Maker Centre space to brainstorm, design, prototype, 3D print and build innovative solutions to improve the energy efficiency of the Maker Centre and the school. Along the way students will learn about the benefits and challenges of various renewable energy sources such as wind, solar, and fuel cells, and will see (and build!) the real-world applications of these technologies. Successful student projects will be developed further and integrated into the power grid for a measurable impact on non-renewable energy usage. Using the circuit meter technology and energy audit kits already accessible at the Maker Centre, students will be able to witness the effect their renewable energy project is having on the energy efficiency of the building. At the end of each semester we will host an “Energy Gala” where students can have the chance to show off their projects and their learning over the semester, a perfect cap to five months of hard work and fun learning.

2. St. Joseph School

Coaldale

SOLAR POWERED E-BIKE | **\$5,000**

The purpose of Solar Powered E-Bike is for students to become more environmentally conscious by understanding the benefits and challenges of solar technology power and how it works alongside conventional energy sources, as well as inspiring students to think differently when it comes to their transportation needs as they near the age of saving for that first car. Students will have the opportunity to discover the freedom, cost effectiveness and of course the environmental footprint of choosing a solar bicycle for that first form of powered locomotion. Costs and benefits will be weighed as well as meeting basic needs. Creative project based learning will be involved in the design and purchase of supplies to build a solar bike charging station.

3. Siksika Nation High School

Siksika

ENERGY EVALUATION TOWARDS SUSTAINABILITY | \$5,000

Siksika Nation High School's primary focus is to increase students' energy literacy. Our objective is to utilize data collected from technologies available such as circuit or metre readers, to record energy use of: appliances, various circuits within the school environment such as in shop and home economics rooms and also the school utility as a whole. Grant funding will support our ability to purchase and install various technologies available such as the Kill-a-Watt metre and respective equipment. The school's energy consumption information can be supplied by our partners at Siksika Public Works.

Each year the school will issue a final energy consumption report prepared by students for distribution to the community. 2020/2021 is YEAR 1 of the Energy Evaluation towards Sustainability Program (2ESP). As school programs expand to include solar panels and a greenhouse, statistics on energy consumption and efficiencies will be attained and reported upon back to the school and community. Through participation in the Energy Evaluation towards Sustainability Program within their courses, students' insights towards energy use will allow them to become energy leaders of Siksika Nation.

4. Rosemary School

Rosemary

SHINING A LIGHT ON A GREEN FUTURE | \$5,000

The centrepiece of this project is an off the grid solar electric installation. All grade levels will have access to the project, where we can teach them how it creates, stores and delivers renewable electricity from the sun. This project was developed mainly by one of our school's grade 12 students, he, with the help and oversight of the CTS teacher was able to design the greenhouse structure and the renewable energy system. Under his design insight, the system powers the greenhouse, aquaponics, and composting systems as an eco-friendly and efficient school/community nutrition component.

The majority of the work was all done through online teaching and instruction during the initial stages of the 2020 COVID -19 pandemic; throughout the process, the focus shifted into finding better ways to not only reach the school but the community and the school families finically affected by the pandemic. Centring on better goals and focusing on finding the best solution for both energy retention whereby maximizing the energy delivery output of the system for future years. Students can learn about how the system is installed and functions while also for years, be able to see its continued and lasting impact on their own families and the greater community.

From learning to build the system with the help of local experts, teachers and prior year students, this project will teach students what renewable energy means in a real-world context that affects their daily lives both in and out of the classroom.

5. J.C.Charyk Hanna School

Hanna

FUELING THE FOODIES | \$5,000

Our project is based on the processing of locally sourced oilseed into biodiesel which can be used to supplement the operation of our school's food truck. In the process of creating an end-use amount of biodiesel, students from elementary through high school will examine the biology, the role of energy in our community, diversification in the energy and agriculture industries and all of the societal implications of energy in today's society. On the science end, chemistry and biology classes will have the most intense involvement in the project, but everyone from foods and shop students through enterprise and innovation will have an interest in the success of this project.

6. The Hamptons School

Calgary

PEDAL POWER POSSIBILITIES | \$5,000

During the pandemic, I started to realize that there was an evolving global epidemic of childhood inactivity. Pedal Power Possibilities will focus on the transfer of energy, and children can become reliant on their own ability to create energy. Students will generate questions and look for answers by using books, websites, and involve experts.

They will record and discuss with others as they experiment with force as they push or pull on an object or from its interaction with another object. Then the students will share their new-found knowledge with others in the school and learn about energy, what makes it and how to use it. With the help of a guest artist, books and bikes, students will look at energy differently. By the end of the year, the students will understand the importance of kinetic energy and how differently our bodies can create, react and feel.

7. Westgate School

Calgary

THE NEW R | \$5,000

Our students are well versed in the 3 Rs- Reduce, Reuse and Recycle. Look out, students! There is a new R in town- Retrofit. Using the design thinking process, students will look at their current school environment to see how we are using energy and how we could use energy more efficiently. Retrofitting a water fountain into a hydration station as a tangible hook will help students to evaluate how their actions can reduce water bottle usage, therefore greenhouse gas emissions.

Students will then design and retrofit other energy inefficiencies in our school to reduce energy use all the while raising awareness of energy consumption. These designs and prototypes will be shared in a schoolwide energy fair. Students will be empowered to take action when they realize that any action however small can have a big impact on our environment.

8. **Central Memorial High School (Career & Technology Centre)** *Calgary*

FEELING WELL: EXPLORING THE ISSUE OF INACTIVE WELLS IN ALBERTA | **\$5,000**

For this project, we tried to find the most current and unique energy-related field for our students to get involved with. Our project involves getting students to learn about the scale of the Alberta orphaned well situation and then learn and get involved with some of the unique solutions, technologies and collaborations that are being proposed to deal with this issue. We would work directly with the Energy Futures Lab and the Alberta Regenerate Project's Juli Rohl - who is seen as the go-to person for hosting conversations about these wells for the last 5 years.

Students would tour several sites but also learn about the technologies being advanced like Blue hydrogen, geothermal, lithium extraction and other low carbon solutions. The potential of Hydrogen fuel development in Alberta in particular is very intriguing from a carbon reduction and economic development perspective. We are also interested in the cost (financially and ecologically) of reclaiming roads, well-pads and equipment. We'd love for students to be able to work with energy companies (via the EFL) to come up with suggestions for reclamation strategies.

Students would learn from people in the field, conduct lab-tests, meet with various stakeholders, including Elder participation, in order to get a full sense of what the issue is, but also the potential solutions. Our goal would be to present the issue to other schools via online conferencing and presentations - both the science and social aspects of the projects have potential curriculum links.

9. **Cappy Smart Elementary School** *Calgary*

ENERGY AND TRANSPORTATION | **\$4,150**

The Energy and Transportation project will engage the students in generating wonders, making deep connections and considering possible solutions. Transportation, which has seen tremendous technological innovations in the last hundreds years, is intertwined with the access and usage of natural resources. It allowed large masses of people to migrate to new places by using steam, petroleum and electric powered engines. On a large scale, it permitted the change of the natural environment to fit with our needs. In the context of trade, communication and globalization fostered by transportation, unfortunately the Aboriginal worldviews are underrepresented and discredited.

The learners will gain theoretical knowledge about energy by generating questions; looking for answers by using books, websites, videos; discussing with experts in the energy field and with Aboriginal Elders; recording / discussing their findings. Second, they will design experiments by manipulating diverse variables in order to investigate the transformation of different sources of energy into movement. Third, the students will analyze the data and they will recommend the best ways to use energy in our daily lives considering diverse perspectives. Finally, the learners will share the knowledge with various audiences.

10.**Westmount Charter School***Calgary***RIDE FOR ENERGY! | \$4,953**

Generator Bikes will be utilized in 2-3 classrooms for grades 5, 7 and 9 students. Students will use the generator bikes to create energy & stay motivated/focused in the classroom! Through the use of the bikes, students will be immersed in learning about how much energy it takes to power simple electrical devices such as a light bulb, their cell phones, and their laptops! The "Ride for Energy!" bike station will be first introduced as an interactive "exhibit" at the beginning of the school year where ~ 1000+ students in the school will have access to ride and generate electricity and supervised by staff members.

The generator bike will be moved to various Science 5, 7 and 9 classrooms. Each class using the bike at the time, will be provided with "learning information" about the bikes and various activities outlined by each grade group teacher. Students in these classrooms will take turns using the bike during science lessons, work periods or just for a break, exercise, health & well-being. Students will also have a hands on opportunity to use a solar & wind power generators. They will participate in a mentorship program by explaining how the Ride for Energy! bikes work to younger students, and an energy fair at the end of the school year!

11.**Dr. Gladys McKelvie Egbert School***Calgary***EGBERT'S ENERGY ESCAPE | \$5,000**

Students will be exposed to energy sources through an interactive collaboration with a Community Energy Education group. They will then explore energy sources to better understand what energy is, how we produce it, how we use it, how it impacts us as humans and its importance and impact here in Alberta and how we can conserve energy. Then, students will have the opportunity to experience an Escape Room through Mobile Escape Room with the intention that they will gain some insights and form ideas for developing their own escape room with an energy focus. Using the Engineering Design Model with planning, designing, testing, redesigning and building students will develop an Egbert Escape Room which other students will be able to experience and learn from.

We also host a community evening where families and members of our community will be able to use the Escape Room. Following these exploration, learning and application tasks students will have an opportunity to participate in a trip through Southern Alberta visiting Head Smashed In Buffalo Jump, Frank Slide, Old Man River Dam and wind farms.

These experiences will allow students to see the real-life application of what they have been learning about and instill a lasting connection to Alberta's energy sector with the added impact of giving the students direct understanding of how human connection to energy sources changes both with cultural differences and through time and how we can learn from others and from the past as we work to improve our energy sector.

12. Calgary French and International School *Calgary*

SUSTAINABLE ENERGY FUTURE | \$5,000

Students in grade 9/10 will engage in a 3-month inquiry project to look into and take action on one of 4 pillars related to energy and the environment: Awareness, Action, Research and Innovation. Community leaders will assess their projects and winners will be recognized during "Energy Day". An Energy Symposium will take place that same afternoon to hear multiple perspectives on Energy, Sustainability and our future. Experts and workshop facilitators will be invited to share their expertise to the school community after our grade 9 and 10 students have engaged in a similar activity that morning.

The projects seeks to build knowledge and skills for our grade 9/10 students as they choose a focus of inquiry and develop leadership and communication skills to express their ideas. The purpose is also to inspire them to look towards the future and present them with the opportunities that energy innovations can provide, as well as just learning more about the energy sector in and of itself.

13. New Myrnam School *Myrnam*

DESIGN AND FABRICATE A RENEWABLE ENERGY ZERO EMISSIONS VEHICLE | \$5,000

Students in grades 5 and 9 will work collaboratively to answer the following question: Can electrical technologies help the Village of Myrnam transition from petroleum based energy sources to increase energy efficiency and decrease greenhouse gas emissions? Our students will convert an electric golf cart into a renewable energy transport vehicle by retrofitting the golf cart with a PV module. Mechanical means of supplementing electrical generation will be explored by students.

They will explore questions like the following: Can a hamster running on a wheel be used to generate electricity that could add to the charge of the batteries on the golf cart? Can students construct an electrical energy producing exercise bike that can store energy to power the golf cart? Students will design and construct a hamster powered generator and a human powered generator.

14. St. Mary's Elementary School *Lloydminster*

PRINTING THE FUTURE: EMBEDDING RENEWABLE ENERGY CONCEPTS INTO 3D PRINTING | \$5,000

Utilizing MakerBot Sketch 3D printers, students will plan, fabricate materials for, and conduct experiments with the goal of developing a comprehensive understanding of renewable energy, both as a concept and as part of our future. All aspects of STEAM will be demonstrated by students as they design prototypes, make use of coding and problem-solving skills, and integrate their mathematical, scientific, and communications skills into creating real-world examples of the growing significance of renewable energy sources in our world.

15. E.S. Laird Middle school

Lloydminster

GOING THE DISTANCE | \$5,000

We run a hands-on, cross-curricula class for grade 9 that focus on academics through experience learning and adventure. Students spend a lot of time outside, doing tours, being physically active and learning about our community. Much of our travel is by bus, or walking, we would like to add a consistent biking component to the program.

The "Go the Distance" project is broken down into several parts, Bike equipment and repair, Construction and storage, physical fitness, Energy conservation and assessment and lastly energy generation. A local bike shop is willing to donate time and reduce prices on repairs for our growing bike fleet. They are also wanting to come in and work with the students to teach them how to keep the bikes maintained in house. This would involve buying appropriate bike repair equipment and parts to maintain our bikes.

To keep our bike safe, we have an area in our school shed the students can build a vertical bike rake, to keep the bikes safe and out of the way. Having and maintaining school bikes means nobody is left behind as we would always have bikes ready for any student.

The last component includes odometers and a GPS unit to track journeys where students will then calculate the amount of diesel saved by not taking the bus, and how much electrical energy they created while biking. A electro generating stand would be used in the classroom to illustrate how power can be generated.

16. Hughenden Public School

Hughenden

INQUIRY AT HPS & BEYOND 2! | \$5,000

This project, "Inquiry at HPS and Beyond 2!" will allow our school to purchase its first 3D printer! Using TinkerCad 3D Design software, incorporated with intentional learnings into lesson design, instructional leaders will further foster a culture of innovation, inquiry, problem solving and critical thinking particularly associated with the fields of STEAM (Science, Technology, Engineering, Art and Mathematics). Our project is school wide and cross-curricular. It will be a worthwhile investment that will continue to nurture learning for many years to come. It also is a project that can connect students to our school family from other schools in our division.

Our staff is excited to initially pursue an energy theme project for the 3D printer's first year in our building. All students within the school will showcase the growth in their energy literacy, enhanced by their design with the printer, in our school wide open-house/student led conferences that will occur in the spring of 2021. Staff also are committed to intentional teaching practice that plans for and causes positive mental health growth within students – in particular resilience. This project will also contribute to this. We are excited to 3D print artifacts that connect our energy learning to the Sun through collaboration with the maths & sciences; enhancing communication and understanding through involvement of the humanities; and of course our CTS courses of shop & art. Staff are super-excited at the endless opportunities a 3D printer can provide... we can 'fertilize' student thinking to dream bigger and better!

17. **École Champs Vallée School** *Beaumont*

NET ZERO LIVING - SPACE COLONY STYLE: ENERGY OPTIMIZATION PHASE | \$3,750

Space is often the “spark” that gets people excited about solving problems and designing solutions to carry us into the future. As educators we want to use space as the catalyst driving energy literacy and innovations that will ultimately benefit life on this planet first.

In previous A+ For Energy initiatives we have grown space gardens, coded automated plant care systems with Micro:bits, and attempted to quantify energy use to develop awareness and alternative energy sources. This year we want to bring it all together creating a sustainable and student-driven project where they will design a net-zero space colony, ultimately inspiring energy conservation and efficiency here on Earth and in their own communities. Through two intertwined phases of the project, students from two schools will determine energy requirements for daily living, test various methods for offsetting their energy needs and design systems to optimize their energy use.

During the later Energy Optimization Phase students will utilize technology and coding skills in order to research, design, and build automated systems to minimize the energy needed in their colony in order to conserve limited resources and to reduce CO2 emissions. Some ideas may include automated gardens, indoor climate control and monitoring systems, automatic lights, alternative power sources (solar, rechargeable batteries) and more, leaving room for student voice and choice to appeal to a wide variety of interests and abilities. Students will present their systems in a community showcase featuring parents, school board members, guest speakers/mentors and Inside Education representatives reduce our energy use. After this stage, we will develop ideas for generating renewable energy on site by performing cost benefit analysis scenarios and consulting industry experts.

18. **Michael Strembitsky School** *Edmonton*

NET ZERO LIVING - SPACE COLONY STYLE: ENERGY OFFSET PHASE | \$3,750

We know that students are excited by the idea of humans exploring, and potentially settling in, space. Why not harness this excitement to help them learn about energy offset and net-zero living? Through two previous A+ for Energy projects our students have gained an appreciation for limited energy resources and have been empowered to make small changes to have a big impact on greenhouse gas emissions.

This project takes these previous ideas to the next level with the design of a net-zero space colony in the hopes that the knowledge and understanding gained will bring an even greater appreciation for the need - and ability - to do this here on our home planet. Through two intertwined phases of the project, students from two schools will determine energy requirements for daily living, test various methods for offsetting their energy needs and design systems to optimize their energy use.

19. Queen Elizabeth High School

Edmonton

SOLAR ENERGY DEMONSTRATOR | \$4,500

We're going to build a solar energy kit that our students, and students from across our catchment (elementary and junior high schools that feed into Queen E) can use to generate and measure solar electricity. We'll have multiple solar modules, so that students can experiment with changing panel angles, placements, discover the effect of partial and full shading and cloud cover, on the energy generated in real time, with their own small arrays. Also built in will be a system where 12V water pumps can be added to show, via water column height, how much (comparative) electricity is being produced, and possible a phone charging component as well.

Students at Queen Elizabeth High School will be responsible for first building, using, and learning how to teach with the kit, and then will be made available to schools throughout our catchment as student ambassadors that can share the kit and the learning with younger students. The kit would be kept at Queen Elizabeth, but would be happily shared with anyone interested throughout the school's connections. Links are readily available to CTS courses of Design Studies, Electronics, Construction and Environmental Stewardship, as well as the Science (Energy) curriculum.

20. Donald R. Getty School

Edmonton

ENGINEERING FOR TOMORROW | \$3,124.70

Donald R. Getty's proposal is to outfit our maker space with tools and technology to design the future. By purchasing some high tech equipment (solar panels and motors, air powered racers, solar cell robotics, grow towers), everyday household items (kinex, lego, led light bulbs and crafts supplies) and using partnerships with our families and community businesses for donations of reusable materials, we believe we can build a maker space lab that allows our students to take on challenges for future-driven engineering.

Essential to this project will be collaboration between our students in our K-9 school. Our junior high complementary courses (foods, discovery, robotics, outdoor ed and leadership) and curricular science program will offer plenty of opportunities for students to experiment and tinker with the equipment in scenario based challenges to solve. But equally important in this endeavor would be the ability of our youngest students to have in school field trips to our maker space.

For some of our learners, this might be a first exposure to renewable energy and the impact our current way of life has on our world. Using hands on and discovery oriented learning, our youngest students would see energy reduction as not only a fun and engaging challenge to tackle but as a manageable and rewarding way to lead their everyday lives.

21. Next Step High School

Sherwood Park

SUSTAINABLE SKATEBOARD COMPANY | \$4,997.79

Students will work with Nigel Hood of Hotel Graphic Design Company to create their own brand and learn skills to run their own business with an urban and skateboard culture focus. Students will explore the fundamentals of manufacturing, marketing and design to create brand assets and merchandise such as T-shirts, skateboards and more that provide social commentary and awareness on student chosen energy conservation issues facing the local community, society and the globe.

The project will culminate with each student being provided an opportunity to curate a real-world product launch and pop-up sale in the local community with proceeds helping local conservation efforts.

22. St. Theresa Catholic School

Sherwood Park

CLEANER SCHOOLS, CLEANER WORLD: THE CURE FOR THE COMMON COAL | \$5,000

With the recent global events of the COVID-19 pandemic, schools have been forced to re-evaluate the context of what everyday schooling will look like. In the fall, we will be taking new measures to reduce the spread of viruses and microbes. The current measures to reduce transmission can have a negative impact on our environment through the use of single use vinyl plastics and disposable materials. "Cleaner Schools, Cleaner World: The Cure For the Common Coal," aims to educate students about energy consumption and nonbiodegradable waste in their everyday lives. With a focus on solar energy, our grade 7 and 8 students will make the connection that sustainable energy choices today, impacts our world tomorrow.

Students will monitor our current energy output in the school and put into use portable solar panels and solar generators to run air purifiers and power steamers. This will emphasize reduction of our school's collective carbon footprint while staying healthy within the school environment. Students will also research sustainable energy practices, and compare them to traditional methods. They will present their results at our "Reach for the Star" fair, which is a project based learning exhibition we have been doing for a few years now.

23. Spruce Grove Composite High School

Spruce Grove

TINY HOME 1.0 | **\$5,000**

We are building an eco-friendly tiny home on the chassis of a former holiday trailer with our Construction, Mechanics and Fabrication classes. This is a ground-up project with unique features such as solar power and battery storage, and an expandable living room section. We will be building an efficient layout incorporating all of the necessities for living in Canada including kitchen, dining, bathroom/ bathing, and sleeping/working areas.

The project will be a multi level, cross curricular project with a focus on community partnerships, based off of the intriguing culture surrounding such builds. A variety of social media platforms will be used during the process to connect people with it's progress. Planning and designing will be done with students, on site, as well as the physical build of this home. This project will require the combined energy and passion of many students, instructors and community members through its planning, preparation, building and finishing.

After completion, we hope that this project can be locally toured as an inspiration to other stakeholders on a variety of levels including building practices, energy use, efficient living and the power of working together. We hope this project will encourage our students, and others, to consider their own practices and how they might help create positive changes in our community and environment.

24. Ecole St. Joseph

Whitecourt

HEATING UP FOR ENVIRONMENTAL STEWARDSHIP | **\$5,000**

Energy Technology & Innovation/ Energy Careers. Through discovering energy innovations that are occurring in Alberta and the associated careers that are available in the Renewable Energy sector students will use what they know to create and manage a greenhouse that is heated by compost collected in the school and/or community using a boiler system which circulates water through the compost and in-floor heating pipes.

25. Peace Wapiti Academy

Grande Prairie

PASSIVE SOLAR GREENHOUSE | **\$5,000**

Food security is an important and increasingly important issue in our communities, made all the more difficult by living in a northern climate. While greenhouses can make it possible to grow fresh food year round, the energy costs to maintain these greenhouses can be incredibly high. While the biggest costs can come from heating requirements during the weeks of sub -20 degree weather may be obvious, there are also costs associated with cooling the greenhouse during the long and hot summer days.

The goal of this project is to teach students and community members how we can build with greater energy efficiency, even in a region of climate extremes. The initial greenhouse will be designed with a number of different energy efficiency methods from the start, including ground insulation to protect the base from temperature fluctuations, angling walls to optimally capture light during shoulder seasons, and various types of thermal masses to moderate temperatures.

As well, there are several other longer term projects that are planned to increase the efficiency and productivity of the greenhouse, including solar water heating, solar powered automation systems (ventilation, drip irrigation, etc.). All of these projects are meant to be developed and built directly with our high school students, giving them hands-on learning opportunities that they will be able to use as they enter the local workforce.