

# A+ FOR ENERGY

## 2022/2023 PROJECT SUMMARY WINNERS

### 1. **Strathcona Christian Academy Secondary** *Sherwood Park*

#### **FARMBOT FOR THE HUNGRY** | \$5,000

Students will build an automated robotic gardening system, powered by solar energy. From seeding, to watering, weeding, and harvesting, students will monitor the usage of electricity depending on a variety of variables, while finding other efficiencies through use of rain harvested water and LED lighting for indoor growing during the winter season. The harvest will be used to support our ongoing local community food bank partnership and explore the viability of a small-scale agriculture business as a self-sustaining income. As students discover the future possibilities for urban agriculture amidst the real challenges of food security and local food production, sustainable energy is an inevitable part of the discussion.

### 2. **Rundle College Jr./Sr. High School** *Calgary*

#### **OFF-GRID LIVING IS THE GOAT** | \$4,995

“Inspired by the pandemic, our current grade 9 students came up with working prototypes to create electricity in their small quarantine spaces. Through a poster presentation and marketing campaign, students were able to showcase their ideas to the rest of the school body. This is where the inspiration for this next project happened. Our future grade 9’s were able to walk through this gallery and see all the amazing ideas that had been developed! Although it is clear that off-grid living is the GOAT (greatest of all time), our future grade 9’s are ready to take it a step further.

In this project, students will explore off-grid living in a way that will appeal to their age group. They will begin the project by exploring different methods of energy generation. This will include exploring different wind turbine designs, solar panels and pedal powered generators (to name a few). They will also use a climate energy coding kit to automate these systems using micro:bit technology. Once they get a handle on these systems, they will create a generator that will create electricity and run a product that they could market to the younger generation. This will allow them to educate others on the value of self-sustainability. The challenge will be, what will they create? A generator that will self-water their trendy terrarium? Enough electricity to run their diffuser? The possibilities are endless and will be presented to other Junior High students, Elementary students as well as invited parents and panel experts. Students will present their ideas in a dragon’s den style pitch that will crown one product as the winner and ultimate GOAT of off-grid living.

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### 3. **St. Richard School** *Edmonton*

#### **ALTERNATIVE ENERGY PEDAL-POWERED PROJECT** | **\$5,000**

“Students will use stationary pedal-powered generator (PPG) bikes to learn about energy conversion and using their bodies to create electrical energy. With the help of a local PPG expert, the students will build different models of PPG bikes. By pedaling on these bikes, students will be able to either power devices directly such as a blender, or feed energy into a generator that can later be used to power other devices/appliances, or by using an inverter to outsource the energy to the school.

The bikes will be used school-wide in a variety of ways, across grades and curriculum. They would serve as real-life examples of gear systems, electricity generation, and sustainable practices. The bikes would be used for student-led challenges and research projects. Students would investigate various questions such as the amount of time and energy it takes to blend various kinds of fruits/vegetables or to charge a phone or Chromebook cart. Students will share their findings within the school and the community. The bikes would also be used to teach health and exercise benefits, during recess, or self-regulation therapy.

Furthermore, students will choose and grow various fruits and vegetables in our school garden, which they will then harvest to make healthy smoothies using the PPGs and blenders. The students will make smoothies for the senior home nearby and other organizations in our community. We could explore the possibility of a small-scale smoothie business for fundraising.

Through all of this, the students will have a greater appreciation for alternative energy.”

### 4. **St. Angela School** *Edmonton*

#### **RENEW AND REFOCUS: THE ENERGY CENTRE** | **\$5,000**

We began our energy education journey as part of our Green STEM school program focus. Our journey is culminating this year, in an Energy Symposium. Wonderful renewable energy displays and kits are being demonstrated by the grade 4 and 5 lead classes to the whole school body, parents and community guests. But as we look to the future, we want to harness that momentum and continue to build on the connection of renewable energy sources to the environment and our natural resources. As we consider deeper learning, we began to think further about “energy” and how all is connected including to mental well-being. To harness our energy momentum we want to create an “energy centre” - a place in the school where we continue to build on the understandings and explorations of renewable energy, and the connection to natural resources, while being able to refocus personal energy toward care for the earth and care the human spirit. With the many differing needs we have in our student body, a low sensory place to explore and re-focus would be a wonderful opportunity for our students to continue to learn more deeply about energy education and the interconnectedness of energy, the environment and human needs .

## 5. Notre Dame High School

Calgary

### SOLAR POWER AND BEYOND | \$5,000

We are embarking on a 5 year journey to design and create renewable energy competence and understanding through hands on projects created by students. We are starting with small solar projects that will be used by future classes to engage with clean energy technologies. Our goal is to have a range of clean energy modules for our classes to use and build on year over year. By creating a classroom with a variety of renewable energy resource projects, we hope to create a learning environment that fosters clean energy stewardship.

## 6. Jasper Place High School

Edmonton

### PUTTING RENEWABLE ENERGY TO THE TEST | \$4,740

This project will continue the Arguing for Solar Power project students at Jasper Place embarked on last year. This year, students would like to continue the solar power research they began last year by filling in the gaps in their data and expanding their projects into a new area; students will research various wind turbine designs, and use the energy from these projects to power grow lights and hydroponics equipment in the school greenhouse.

## 7. Siksika Nation High School

Siksika Nation

### PROJECT PHOENIX ALGAE BIOREACTORS | \$5,000

“Students at Siksika Nation High school have been working on building an Algae Bioreactor. Over the past year, students in different classes have studied different aspects that contribute to the development of a bioreactor. The science 20 class has studied the process about how to produce biofuels from oils and has done initial research on bioreactors and algae strains. Culturing practices have also been researched and practiced along with small scale models. Our current biology class is practicing oil extraction methods from *C. Vulgaris* Algae. The Siksika High School Robotics team is currently developing and programming a 30L algae bioreactor. The team is hoping that this project will be able to develop into a kit that would be available for other schools to use and build bioreactors of their own.

As an extension of this project, we would like to request funding to invest in small scale algae Chi.bioreactors. The use of small scale reactors would help students rapidly test changes in conditions, algae strains, and nutrients and their effects on biofuel output potential. Students will use the Chi.bioreactors to create small scale test batches, and evaluate efficiency. Various strains of algae will be evaluated for testing biofuel production and potential. As an extension of our project, we intend to work with younger grades using Algae culture kits and presentations about the project to share our goal. The team has a goal of reducing carbon emissions to offset climate change, by creating bioreactors for students in all schools.

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## 8. Children's Village School *Calgary*

### **CVS GARDEN PROJECT: FROM GREENHOUSE TO KIDS KITCHEN** | **\$5,000**

"Our project is designed to increase student understanding about energy. Our focus is to build awareness about energy use, reliance, responsible use, and sustainability by building a greenhouse that will enable us to start the growing process early and grow food to be used in our Kids Kitchen year round. Students will learn about the need for energy in the food growing process. We will discuss the current energy use involved in growing, storing, shipping and preparing food. Students will then calculate the energy savings available by growing, harvesting and using our own produce right at our school.

The food grown in our greenhouse will be used in the breakfast and lunch program that our students access daily. Students will work with our culinary team to determine the savings to our school using home grown vegetables, and will discuss how growing our own vegetables reduces our environmental footprint by eliminating transportation and packaging needs. Students will learn the importance of environmental stewardship and how they can take action towards their energy conservation efforts.

In addition to our goal of growing vegetables to be used in our lunch program, we would like to grow plants indigenous to Alberta, as well as some sacred medicines (sweetgrass and sage) that we can use in our smudge with students. Forming a partnership with Elders from the Blackfoot community will ensure we learn about these sacred medicines in a respectful and authentic way."

## 9. Innisfree Delnorte School *Innisfree*

### **THE FUTURE OF FOOD: A SUSTAINABLE APPROACH** | **\$5,000**

We are building a net zero greenhouse that will not only educate students, but also the surrounding community about renewable sources of energy. We want to introduce the community to the idea of solar power and how easy and effective it can be to use as well as how to use solar power to reduce our ecological footprint. Students will research how far food travels before reaching our small rural community and discuss how their ecological footprint can be reduced by growing food in our net zero greenhouse. The fruits and vegetables that we will be growing will be enjoyed by both the students and the community, to help cut down on the amount of non-renewable energy that is required to get our food from field to fork. We will host community farmers markets where we can sell our local produce and other locally made products, as well as have students give presentations about our greenhouse to educate and inform our community about how they can reduce their ecological footprint. To wrap up the project, students will reevaluate their ecological footprint after incorporating the locally grown and sourced products from our market. We will present our findings at a school assembly, at a parent council meeting, and at a town council meeting.

## 10. **St. Josephine Bakhita** *Calgary*

### **SJB LEARNS FROM THE LAND** | \$4,397

We want our students to develop a connection to and a love of the land. We believe that in order to love the land we live on, we need to spend time on the land and learn about it. Our desire is to share some of the ingenuity the Indigenous peoples had in living off of the land without external sources of energy. We will spend time on the land, observing nature through the four seasons and students will plant seeds and seedlings indoors and outdoors. It is important that students develop a reciprocal relationship with their environment to understand cause and effect, and how we can work together to conserve energy.

## 11. **Louis Riel School** *Calgary*

### **THE 'NET-ZERO' EMISSIONS ALBERTA GAME** | \$5,000

To model on both map and spreadsheet how Alberta might achieve 'Net-Zero' emissions by 2050.

Purpose: To engage students in the means by which Alberta might transition to 'Net-Zero' GHG emissions between now and 2050 – via a mix of Electrification, use of Alternative Fuels (e.g. 'blue' Hydrogen), Carbon Capture and Storage (CCUS) and increased efficiency of energy usage. This is intended as a fully interactive exercise, wherein the students will estimate what facilities and infrastructure might be needed to achieve 'Net-Zero' (on a spreadsheet) and then to 'create' that infrastructure on a map of Alberta (e.g. in PowerPoint). It is hoped that this will engage them in the whole 'Transition' process and maybe even inspire them to consider a career in the field of Energy."

## 12. **New Myrnam School** *Myrnam*

### **LEADING OUR COMMUNITY TOWARDS NET ZERO** | \$5,000

We will move our community's shared-use Career Technology Education Centre towards Net Zero, while using the conversion as an educational opportunity for community members and students to learn how to apply these skills in their own home and/or future careers.

## 13. **Spruce Grove Composite High School** *Spruce Grove*

### **ELECTRO KART** | \$5,000

We would like to build an electric vehicle for next year's session. We plan to modify an existing Shifter Kart by removing the petrol burning bits and replacing them with an electric drivetrain. We plan to source this drivetrain from a golf cart, forklift, or a transport truck starter.

## 14. St Joseph School

Coaldale

### ITS NOT A PALM TREE, ITS A WIND TURBINE!\* | \$5,000

“Working with a local electrical company we plan to engage students in a collaborative effort to repair our school wind turbine. We will look at both the profession of alternative energy trades, but also at our own specific repair! Partnering with 1st TechniCall to provide an in class visit to not only describe what they do, what schooling they have, and the diversity of types of challenges they face, but to go beyond that and take our students on a diagnose and repair trip in our own backyard. Using their lift truck to access the turbine 1st TechniCall will access the turbine drivetrain and remove the necessary parts. They will then discuss what they have found, and whether existing parts can be repaired or if new components will need to be ordered.

Another local business energy smart will be brought in as well to explain the different ways they help people make greener choices in their home, whether it be heat on demand or setting up a solar array.

## 15. David Thompson High School

Condor

### DTHS SCIENCE OF RECLAMATION HERITAGE PROJECT | \$3,052

Ever wonder what happens to that oil lease or gas plant when the company who operates it no longer needs to utilize it? Do the buildings just sit there and rust away? Does the land turn into an infestation of weeds? Of course not - it gets reclaimed. But what does this process look like? How long does it take? How does this impact biodiversity? All good questions. And all questions that relate directly to the outcomes in the Alberta Biology 20 & 30 Program of Studies. Our energy industry is a vital part of the Alberta economy but it is important that as students and citizens we understand the commitments that the industry also makes to reclaim and repatriate sites that are no longer producing. Through this project, students in Biology 20 will visit a decommissioned gas site once per year to document reclamation in action. Students will take pictures and record both biotic and abiotic data. This data will then be compiled in a report that gets passed down to the next class so that we can do year-to-year comparisons and “see” reclamation in action.

## 16. E.S. Laird Middle School

Lloydminster

### FRYER FUEL | \$5,000

Students will divert used fryer oil from community businesses from being disposed in the land fill and convert it into Bio Diesel. The Bio Diesel created will be used to fuel our school bus on class trips, helping to offset the cost and reduce the carbon footprint of our class. The class will participate in each of the stages of collecting, cleaning, titrating, cooking and washing the discarded oil to create our Bio Diesel.

## 17. Fort McMurray Islamic School and Ecole McTavish High School

Fort McMurray

### FINAL FRONTIER PART TWO | \$5,000

A sense of community is a vital aspect of the FMPD School experience. This Project will build cooperative partnerships between students and community members centred around growing food using aquaponics and organic soil beds. Reaching out to a local charity and volunteer organization, our greenhouse will donate fresh, organically grown produce to help hundreds of families through our local YMM Food bank and soup kitchen. Students will develop and Pioneer a scalable modular aquaponic indoor farming that enables growing fresh food where there is no farmland, no electrical grid, and no distribution and infrastructure. This grant will only cover the energy aspect of the project. With last year's grant we have installed 16 solar panels to run all the indoor gardening systems producing 2800KW/day off grid net zero energy. This inspired us to further energy efficiency investigation and build a portable biogas plant for the future greenhouse/outdoor living laboratory. Also we would like to experiment hydrogen fuel cell and energy storage technology to enhance energy literacy in real world application.

## 18. Ecole St. Joseph

Whitecourt

### CYCLING INTO THE FUTURE | \$3,750

Students will investigate the demand of energy consumption within Canada using a simulator, and then compare it to the most recent IPCC report. From here, students will be asked to create reasonable goals which align with Alberta's future energy needs while being conscious of the IPCC proposal. Students will use innovative SportsArt ECO-POWR™ or a Pedal Generator technology to demonstrate how technology can be engineered to convert mechanical energy into electrical energy, and return power towards the grid. Students will explore how innovative energy technologies can provide approachable and reasonable actions for students to utilize a renewable energy source within a household and school.

## 19. Strathmore High School

Strathmore

### POWERING OUR OFF GRID COMMUNITY GREENHOUSE | \$5,000

We are currently constructing our Off Grid Community Greenhouse here at our school! This place will be a hub for multiple schools and community groups to come together and learn about sustainable growing practices and sustainable building design. This space will incorporate multiple energy sources as we run it year round, off grid. The last piece is the solar array to electrify this space!

## 20. Crescent Heights High School

Calgary

### THE CRESCENT WRENCH COMMUNITY BIKE SHOP | \$4,994

The purpose of this grant is to support our School's Bike Club in opening a community bike shop where members of the community can come get their bikes fixed and maintained (for free/by donation) while learning how to do it themselves. In addition to learning, fun, and community-building, the links to energy are clear: active transportation reduces use of fossil fuel based transportation (driving), which reduces greenhouse gas emissions and helps conserve our energy resources (oil). Reclaiming bikes also diverts products from the landfill, reducing greenhouse gas emissions from landfills, and lessens new bikes' production, thus saving resources (metal minerals, plastics, etc.) and energy resources used in manufacturing/transportation (oil/gas for electricity, heating, trucking/shipping, etc). It also shows the community that high schoolers are great neighbors. A significant component of our project will involve educating the community about the links between active transportation and energy consumption, through data collection, signage, student presentations & project showcasing (school announcements, social media, etc.).

We need several specialized tools and consumables (chains, tubes, etc.) for this next step to be successful. These funds would help us start something that will continue long into the future and create a template for other schools to follow. Right now is the time to push this forward because all the stars are aligning: we have admin and teacher support, we have space, we have students that are prepared and excited, there's huge demand, and eyes are on us from other schools looking to do similar projects.

## 21. Piikani Nation School

Brocket

### SUPII-PO'OMAAKSIN (PLANTING SEEDS) STUDENT GROWTH PLAN | \$5,000

"Piikani Nation School is inspiring students to engage with energy, environmental stewardship, and food responsibility by developing a comprehensive Greenhouse Program to address food security and traditional knowledge maintenance. The Program will utilize *niitstii·pó'·sin*, Blackfoot language, alongside renewable energy technologies, weaving science and cultural teachings to provide nutritional and educational opportunities to the community. In addition to the physical greenhouse, collaborations formed will offer diverse career experiences to students and connects to the Nation's Building Climate Resilience & Adaptation initiative activities, which brings a variety of community members onto the land to learn from leading experts in the fields of energy & climate, biology & conservation, water & food security, and culture & language. The Program will serve multiple functions within the school and broader community: