Part II: Project Overview

1. **Project Title:** Expanding Opportunity: A Minnesota Renewable Energy Challenge for All
2. **Estimated Start Date:** December 1, 2018
3. **Estimated End Date(must be no later than 05/31/2019):** May 23, 2019
4. **Target Audience:** Minnesota (Metro Area) educators and students
5. **Estimated number of participants:** 200-300 students, educators and parents
6. **Briefly describe your project using 100 words or fewer:**

   The Minnesota Renewable Energy Challenge (MNREC) is a day-long, energy innovation competition that engages students and educators in meaningful exploration of wind and solar technologies and careers. This grant seeks funding to expand participation of underrepresented populations in the 7th annual MNREC, to be held in April 2019. The three largest barriers to increasing participation are a lack of knowledgeable coaches, financial supports, and instructional materials. Grant funds will support more coaches training workshops, provide more continuous and location-specific support, offer under resourced teams more materials, and increase day-of logistics coordination.

7. **Amount of funding requested:** $5,000
8. **Total cost of project (including request and other fund sources):** $11,750

Part III: Project Narrative

Project Approach and Educational Value

The Minnesota Renewable Energy Challenge (MNREC) is a hands-on, day-long, energy innovation competition aimed at engaging 4th through 12th grade students and educators in meaningful exploration of wind and solar technologies and careers. This event is the regional manifestation of a national constellation of KidWind Challenges held across the U.S. The 7th annual MNREC will be held at Macalester College in April 2019. This grant will support coaches workshops, material distribution, team supports, and day-of event logistics.

Prior to the MNREC, student teams work with educators to design and construct small wind turbines and solar structures. They bring these structures to the MNREC, testing in wind tunnels and solar arrays that mimic real world conditions. Teams present their design process to a panel of expert judges, defending their design choices and addressing questions posed by the panel. In addition to the design, construction, and testing components of the Challenge, teams must also demonstrate their contextual knowledge of renewable energy by participating in two “instant challenges”. During these instant challenges, students are presented with an energy question that they must collaboratively address in real time.

The MNREC is open to all Minnesota students in grades 4-12. Teams come in all shapes and sizes, organized by public or private schools, afterschool clubs, Scout troops, and by

homeschoolers. Last year, 135 students from 9 organizations attended, presenting 19 wind and 12 solar constructions.Teams ranged from a dynamic all-girls of color 8th grade team from Northeast Middle to a energetic 4th grade team from Adams Spanish Immersion.

While the MNREC is a day-long event, it requires months of prior facilitation and instruction. To support these educators, we hold half-day trainings to introduce new and returning participants to the MNREC. These trainings invite coaches from all over Minnesota to broaden their knowledge of renewables, explore project-based curriculum, and learn about the process for participating in the event. At the conclusion of the training, we distribute wind and solar classroom kits to participants.

This training is then further supported with a wide-range of programming provided by KidWind. This includes classroom visits to help teams work through technical challenges, mentoring from our network of wind and solar professionals, and support with MNREC registration and logistics.

This year, we aim to increase the number of participants to 30 teams made up of over 200 students from across the region. Our event volunteers, including energy professionals, faculty, and college students, will assist by coordinating, evaluating, measuring, judging, and guiding these students as they tinker.

At the conclusion of the event, we will celebrate the work of these students and their educators, by awarding prizes to the top teams and offering an invitation to compete in the KidWind National Challenge held in May at the American Wind Energy Association's annual convention in Houston. At the national event, Minnesota teams will join nearly 500 students from across the nation to rub elbows with the wind industry as they deepen their understanding of and commitment to a renewable energy future.

Project timeline

When	Activity	Description	Participants
Fall 2018	Workshop Planning	Outreach and advocacy in educator communities; identifying local partners; coordinating workshop sites; confirming participating in MNREC	KidWind staff, local organizers, returning coaches
January - February 2019	Coaches Workshops	Regional and school-level workshops intended to prepare educators for coaching teams participating in MNREC; wind and solar classroom kit distribution	KidWind staff, local organizers, new and returning coaches
February - April 2019	Student Team Support	On-site support for participating teams including collaborative instruction and facilitation, technical guidance, and setting up testing environments; coordination of partner organizations to assign mentors; event-day logistics support	KidWind staff, local organizers, new and returning coaches, student teams
April 2019	MNREC	Day-long culminating competition at Macalester College attended by student teams, coaches, caregivers, and volunteers.	KidWind staff, local organizers, new and returning coaches, student teams, volunteers
May 21-23, 2019	KidWind National Challenge*	Top teams from MNREC are invited to participate in this three-day national event held in Houston, Texas in conjunction with the AWEA WINDPOWER convention	KidWind staff, regional organizers, top teams nationally, coaches, parents, volunteers

**Last year 3 Minnesota teams participated in this national event.*

Project Impact

Two of the fastest growing careers in the country are in the wind and solar industries. A recent Department of Energy report finds that we will need close to 380,000 skilled workers in wind energy fields by 2030. Fostering a pipeline of students able to not only engage in informed conversation about energy issues, but also comprise a well-trained workforce must be a priority for our educational endeavors. As a leader in clean energy, with over 59,000 workers currently working in this sector, it is clear Minnesota must continue to support the work of educators as they introduce students to these future workforce opportunities.

The MNREC is designed to address this need and immerse students in all aspects of the renewable energy landscape, from turbine design and solar power circuits to wind farm siting and wildlife impacts.

After fifteen years of experience in renewable energy education, we have learned that the three largest barriers to participation in events like this are a lack of: 1) knowledgeable coaches; 2) financial incentives for educators who want to gain new content knowledge; 3) well designed curricular materials and resources to accompany instruction. Our grant request addresses these barriers. In order to bring more diverse teams to MNREC, we are committed to using these additional funds to hold more workshops, provide more continuous and location-specific support, and offer under resourced teams more instructional materials.

Sustainability

This grant will help us expand the reach of our ongoing renewable energy education work by training more educators at our workshops, providing more classroom materials, and supporting pre-event work with on-site assistance.

By expanding the capacity of educators to engage meaningfully in renewable energy education, we are building a network of educators who, each year, bring more students into the fold. We have found that once an educator attends a workshop and participates in a Challenge, they are more likely to participate in the following years. In addition, teams who participate in the MNREC are often driven to come back the following year and challenge themselves to think bigger and more deeply about the possibilities of their designs. Our classroom kits are designed to be used again each year and only require minimal restocking of items like cardboard, glue sticks, markers, and wooden dowels. In short, training one educator and providing one classroom kit can transform a program for years to come and reach an unlimited number of students.

Diversity and Inclusion

We are committed to expanding the participation of underrepresented populations in the renewable energy sector. We approach this work in two ways. First, by engaging coaches and students from communities that are underrepresented in the field, including girls, students of color and students from low income households. Second, by striving to disrupt the traditional representations of who works and can work in the energy sector.

While MNREC already brings together a diverse pool of teams, this year we are doubling our efforts to reach underserved communities. In order to expand participation, we will draw on our existing relationships with the Saint Paul and Minneapolis Public Schools to reach an additional 10 Metro-area schools. Additionally, we are working with the University of Minnesota's teacher education program to bring our trainings and MNREC to teacher candidates who will soon enter public school classrooms. Last year this work with SPPS and MSP, in conjunction with the UMN, brought three Minneapolis middle school teams to MNREC, from which one team continued on to the National Challenge. This year, with the help of this grant, we hope to double this participation.

Additionally, partner organizations like the National Society of Black Engineers (NSBE) and Women of Renewable Industry and Sustainable Energy (WRISE) sponsor and serve as volunteers for our local and national events, as well as provide mentors for our student teams.

These partnerships allow us to disrupt traditional conceptions of who energy professionals are and help our students imagine themselves in the field.

Budget

Expense	Description	Price Per Unit	# of Units	Total Cost	Matching Funds (Source)	Funds Needed
Classroom Wind Energy Kit	A package of materials teams can use when building wind turbines for the competition.	$100	30	$3000	$2000 (Vernier)	$1000
Classroom Solar Energy Kit	A package of materials teams can use when building solar structures for the competition.	$100	30	$3000	$2000 (REcharge Labs)	$1000
Participation Stipend	Stipend provided to select coaches for attendance at one workshop and MNREC	$150	10	$1500	$500 (KidWind)	$1000
WWorkshop Facilitation	Cost of transportation, materials, and staffing for one half-day educator workshop	$500	3	$1500	$500 (KidWind)	$1000
MNREC Prizes	Prizes given to top 2 teams in each division (4-8 and 9-12), plus one prize for best rookie team	$100	6	$600	$600 (Xcel/ Mortenson)	0
On-Site Student Team and Educator Support (hours)	On-site instructional assistance provided by KidWind trainers to support teams and educators preparing for MNREC	$50	30	$1500	$250 (Vernier) $250 (Kidwind)	$1000
Event Day	Transportation, materials, and staffing for one day-long event; lunch for volunteers	$750	1	$750	$750 (Kidwind)	$0
		Total Cost		**$11,850**	**Total Requested**	**$5000**