

Minutes of the
RENEWABLE ENERGY COUNCIL

Wednesday, June 5, 2019

2:00 p.m. (CDT)

ND Department of Commerce, Icelandic Room – Bismarck, ND

CALL TO ORDER

Members Present: Michelle Kommer, Chairwoman, Al Christianson, David Douglas, Rod Holth, Mark Nisbet, Gerald Bachmeier, Terry Goerger (phone)

Others Present:

Andrea Pfennig, ND Industrial Commission
Karlene Fine, ND Industrial Commission
Sherri Frieze, ND Department of Commerce
Jayme Orrack, Xcel Energy Operations
Jeff Berrington, Xcel Energy
Josh Riedy, Evolve Analytics
Dana Sande, UND Aerospace Foundations
Jim Higgins, Evolve Analytics/UND
Travis Desell, Evolve
Susan Felege/UND
Brandon Lewis, Northern Plains UAS Test Site
Erin Roesler, Northern Plains UAS Test Site
Tanya Spelhaug, Microsoft
Jim Piavis, Microsoft
Terri Zimmerman/Packet Digital
Linsey Culkins/Packet Digital

WELCOME AND OPENING COMMENTS

Commissioner Kommer, Chairwoman, called the Renewable Energy Council meeting to order and welcomed members and guests.

APPROVAL OF MINUTES

It was moved by Douglas and seconded by Nisbet to approve the April 24, 2019 meeting minutes. The motion carried unanimously.

PRESENTATION OF FINANCIAL STATEMENT

Fine presented the Financial Statement. The uncommitted dollars available for projects as of June 2019 is \$2,451,365.05

CONSIDERATION OF GRANT ROUND 40 APPLICATIONS

Pfennig stated that two applications were received for this grant round. Both were sent to technical reviewers for peer review.

R040-B “Enterprise Autonomy – Secure, Remote, Autonomous, Multi-Drone Operations within the Renewable Energy Sector”; Submitted by Evolve Analytics LLC

Principal Investigator: Joshua Riedy

Project Duration: 18 months

Requesting: \$500,000

Total Project Costs: \$1,403,256

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Pfennig gave an overview of the project. The applicant is contributing a 64% match with \$660,828 (cash) and \$242,600 (in-kind).

Project's Objective

Product development of Airtonomy, an autonomous multi-drone, operations solution. It will be: installed on site, powered by solar energy, operated remotely, first of its kind, and readily available (365 days x 24 hours.)

Reviewer's Ratings

- Funding May Be Considered – 150
- Fund – 215
- Fund - 172
- Average Weighted Score – 179 out of 250

Achievability

Two reviewers had concerns. One felt that more information was needed regarding the tasks in correlation with the time and budget. One had concerns about the timeline for the hardware development especially while tackling a software development process in parallel.

Methodology

All three reviewers were comfortable with the methodology.

Scientific/Technical Contribution

All three reviewers felt this was limited; one reviewer noted that the use of heat recovery has been underutilized, another reviewer felt that this argument is weak justification.

Knowledge/Awareness

One reviewer felt that the proposal seems less experienced at specific technical aspects. One reviewer indicated that there was not a discussion of competing research and commercial innovations. One reviewer indicated that a thorough literature review should be done before commencing the project.

Project management

One reviewer felt that it was very inadequate. One reviewer felt more specific details for each segment of the software stack would have been beneficial.

Value of Budget

One reviewer indicated that it was difficult to validate.

Overall Comments from Reviewers

- The project is a good idea, but the project plan and budget were difficult to understand. Unmanned Aerial Vehicles (UAVs) shouldn't be a solution looking for a problem. An example mentioned was that it may currently cost \$300K/year to inspect for birds on a wind farm, but no similar cost analysis using a drone was provided. The project management plan didn't follow industry standards and was the largest risk.
- This was an improved proposal with additional economic benefits more clearly spelled out and more detail on the team. Some of the suggested economic benefits seem aggressive. A software-centric team is taking on a hardware development project simultaneously. Seems like a good use case for ND; potential to increase the competitiveness of ND wind industry and leverage strong local capabilities.
- The project has the potential to reduce cost and potential hazards while at the same time increasing accuracy with the help of data science and drone sensors.

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Technical Advisor Recommendations

Funding may be considered. This project fits nicely with ND's strategic goals in advancing the Unmanned Aircraft Systems (UAS) industry in the State. It has significant potential impacts on the wind industry, however an estimated cost comparison would have been beneficial. The timetable was difficult to understand. It listed 8 tasks, but the methodology appeared to have 9. The concerns regarding a software-centric team taking on a hardware development project is also something to be considered. Additional information from the applicant addressing this concern would be beneficial. Two reviewers mentioned concerns with the awareness of current research.

Suggested Contingencies if Funded

- A revised timetable along with details of the 8 tasks are provided.
- More specific deliverables are provided to measure project success, including:
 - A cost comparison of traditional methods for monitoring at a wind farm vs. the new product.
 - Benefits for North Dakota, such as estimated income potential and jobs created.

Dr. Joshua Riedy, Founder/CEO for Evolve Analytics, presented the project along with Dr. Susan Felge, UND faculty in Biotechnology Department, answered questions on the phone.

In response to a question, Riedy stated that manufacturing the nests in North Dakota is a definite possibility. The assembly and solution should be made here for the critical assurance of the industry. We want to find the right manufacturer in the State of ND.

Holth questioned the granted process from Federal Aviation Administration (FAA.) The Northern Plains Unmanned Aircraft Systems Test Site has been working on the elements of Beyond Visual Line of Sight (BVLOS), over people and vehicles for regulatory approvals. FAA has announced a new process to utilize, that may be a tailored 90-day process certification in order for the operation to be approved. If this process does not work according to the FAA, other protocols can be worked out with FAA.

In response to a question, Erin Roesler stated that the drone can identify if a UAV is in the air or in the critical zone of the UAS. The site chosen by Evolve Analytics will be built with ground-based radar that will play into the autonomous system. The drone will have a containment zone and if a UAV is detected in that zone the mission can be halted by the drone to wait on the ground and reassess when safe. If the area is still unsafe the UAV can return to the home base or move to a safe contingency zone. A UAV can get close to a wind turbine blade, called infrastructure shadowing, that will assure a safe zone for the UAV as they are not allowed to be within 50 feet of a wind turbine, staying clear of the UAV's zone.

In response to a question, Riedy stated that the Evolve Analytic member/owners are native North Dakotans.

Holth questioned the pricing strategy used for blade inspection. Additional information on the down time associated with inspection was given, showing capitalization on internal turbine maintenance, along with blade inspection. This would allow the maintenance to be conducted inside the tower while the drone is launched simultaneously, resulting in added revenue to the state as the downtime to the turbine would be lessened.

Douglas asked what areas are being pursued with the platform. Riedy commented that Evolve Analytics would like to become the operating system that the applications will run from. Evolve Analytics will continue to develop this. This platform has been vetted by multiple organizations, along with the granting process; Grand Forks EDC and the Grand Forks Growth Fund, have given grants to Evolve Analytics. This will help with potential jobs in ND and provide energy companies with the services they need.

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Final Report

R032-041- Portable Solar Array Modules; submitted by Packet Digital

Project Duration:

Awarded: \$500,000

Total Project Costs: \$1,000,000

Terri Zimmerman, CEO of Packet Digital presented the final report. A copy of the non-confidential report is posted on the Renewable Energy Council website and is available in the Industrial Commission files.

R040-A Portable Solar Array Modules Phase III

Principal Investigator: Andrew Paulsen

Project Duration: 9 months

Requesting: \$500,000

Total Project Costs: \$1,000,000

Pfennig gave an overview of the project. Total project cost is \$1,000,000 with NRL contributing a 50% match.

Project's Objective

Enhance the design of the portable solar power generation system to prepare for production with the goal of: simplifying the manufacturing/assembly process, refining the system to comply with the customer requirements, and performing industry and military standard tests.

Reviewer's Ratings

- Funding May Be Considered – 140
- Fund – 176
- Fund - 188
- Average Weighted Score – 168 out of 250

Alignment of Goals with REC

Two reviewers had concerns. The applications are predominantly outside of ND. The jobs impact of assembling just the electronics portion of these systems was unclear; most of the rest of the overall hardware system is sourced elsewhere. There isn't a quantitative discussion on retention on production of jobs beyond the Phase II project. The applicant has responded that the employment of 6-8 people for the duration of the project is estimated for Packet Digital only.

Achievability

One reviewer noted that there was no detail on the expected costs or typical timeline for testing and there was no indication of how many or which specific tests are to be conducted. Another reviewer felt that a single product will not meet all the requirements from military, commercial and civilian use, indicating that different configurations should be produced.

Methodology

It was unclear what portion of the overall system is being tackled and that more information is needed about the testing to be done along with the operating characteristics that the system must achieve. There aren't quantities milestones. Different batteries could be used to provide flexibility for different uses.

Scientific/Technical Contribution

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Two reviewers felt this was limited. One reviewer wanted more information regarding utilization of local resources, local jobs, and more applications relevant to ND. Another felt that since the focus is military application, deployment in ND is limited. The applicant responded that they would like to concentrate on the military market first and progress toward civilian applications. Additionally, a percentage of the global market can be captured which is estimated to be \$1.15B in 2019.

Knowledge/Awareness

All three reviewers felt the awareness of current research activity was adequate. One felt that the operation performance advantage being pursued was unclear. One felt that there was a lack of discussion regarding completing products and known requirements for the target applications.

Project management

Two reviewers had concerns with the lack of milestones. One felt this was a critical shortcoming of the project.

Value of Budget

One reviewer had concerns with the budget, noting that the entire match is coming from NRL.

Overall Comments from Reviewers

- The information in the proposal was confusing or incomplete, noting that with additional information the proposal could have been strengthened.
- Improvements will be made to the design and the manufacturability will be increased, but there was a lack of quantitative metrics and specific test standards to be used. This indicates that the team may not fully know what is required or has not taken the time to identify application requirements to be used to create milestones for each task. Without milestones, the project plan suffers from a lack of indicators for when the task is successfully completed. A final reservation is that all of the match is coming from NRL through personnel support. This can create challenge in documenting and verifying compliance of cost share since it did not seem NRL personnel will be involved to such a level in the project tasks.
 - The reviewer made the following suggestions if funded. A table indicating the current and target goals of the Phase II effort for the PSG1 and PSG-C1000 systems is provided, making the end project deliverables very clear. Such a table should be based on the application requirements (cost, weight, efficiency, specific MIL-STD test compliances, etc.).
- The objective is clearly stated with a well-defined workplan. It is better to include testing the stability of the product at conditions for military application. It would be also promising to propose more than one product in Phase II towards commercialization.

Technical advisor recommendations:

Funding may be considered. The issues raised by reviewers regarding the total impact to ND and the budget is concerning. While much of the product will be manufactured out of the state at Nishati's facilities, Nishati is not contributing any funds to this phase. Packet Digital also is not providing any of the match.

This is not the first product that the REP has helped Packet Digital develop. To date, Packet Digital has received \$1,850,000 from the Renewable Energy Program. An update on the solar UAS and the associated jobs that have developed over time as a result would be helpful in determining potential economic impact to ND.

More detail on the budget is required for administrative purposes. The following expenses should be broken out and provided to the Council for their consideration and approval: salaries, indirect overhead, and G&A.

Suggested Contingencies if Funded:

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- A table is provided indicating the current and targeted goals of the Phase III effort for the PSG1 and PSG-C1000 systems, making the end project deliverables very clear. Such a table should be based on the application requirements (cost, weight, efficiency, specific MIL -STD test compliances, etc.)

Terri Zimmerman gave an overview on the changes made regarding the manufacturing of the system, improved design in the military and commercial markets. Partners will remain the same: Nishati, Naval Research Lab and Chiptronics.

In response to a question regarding developing countries, Zimmerman stated that there have been inquiries from Asia, Africa, and Saudi Arabia for use for computing, laptops, cell phones and a converter option would be available. We are developing a commercial path and need to get distributors talking to customers at market place.

A question was raised regarding the military market and what percent of their business is anticipated. Currently, there are limited options available in the market, so the outlook is good. Packet Digital is working with several different military vendor programs, such as the greens program, to get a contract.

COMPLETION OF BALLOTS

R-040-B: “Enterprise Autonomy-Secure, Remote, Autonomous, Multi-Drone Operations within the Renewable Energy Sector”;

Submitted by Evolve Analytics

Principal Investigator: Joshua Riedy

Fund: 7 No: 0

Conflicts of interest: Mark Nisbet

Contingencies:

- Revised timetable along with details of the 8 tasks are provided.
- More specific deliverables are provided to measure project success, including:
 - A cost comparison of traditional methods for monitoring at a wind farm vs. the new product
 - Benefits for ND, such as estimated income potential and jobs created.

R040-A: “Portable Solar Array Modules Phase III; submitted by Packet Digital”

Principal Investigator: Andrew Paulsen

Fund: 0 No: 7

Conflicts of interest: none

Contingencies:

- A table is provided indicating the current and targeted goals of the Phase II effort for the PSG1 and PSG-C1000 systems, making the end project deliverables very clear.
 - Such a table should be based on the application requirements (cost, weight, efficiency, specific MIL -STD test compliances, etc.)

The Council would like the following information in order to consider funding the project:

- The match breakdown from NRL,
- The level of cash match from Packet Digital,
- Clarification on G&A, and
- Clarification on long term jobs to be created.

OTHER ADMINISTRATIVE BUSINESS

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Pfennig presented a draft change to the application for the Council's consideration that would have the applicant self-report on participation of state programs and incentives.

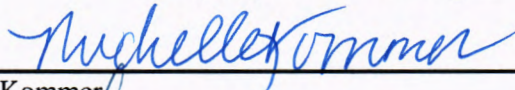
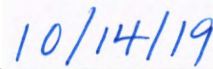
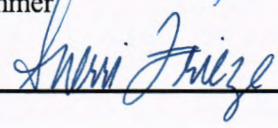
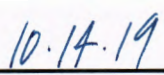
It was moved by Christianson and seconded by Holth to add the following language to the application form and policies:

State Programs and Incentives: Any programs or incentives from the State that the applicant has participated in within the last five years must be identified, along with the timeframe and value.

The motion carried unanimously.

ADJOURNMENT

Meeting was unanimously adjourned at 4:15 p.m.

	
Michelle Kommer Chairwoman	Date
	
Sherri Frieze Recording Secretary	Date