

**State of Iowa  
Energy Center Board  
Meeting Minutes of October 3, 2023  
at IEDA, 1963 Bell Avenue, Suite 200  
Helmick Conference Room  
Des Moines, Iowa  
Or Via Teams Webinar**

**Call to order 10:00 a.m.**

**Board Members Present**

Stuart Anderson, Board Chair  
Craig Just, Vice Chair\*  
Kelcey Brown\*  
Troy DeJoode\*  
Naomi DeWinter\*  
Debi Durham  
Anne Kimber\*  
Terry Kouba\*  
Dan Nickey\*  
Taaf Vermeulen\*  
Matt Washburn\*  
Lanny Zieman

**Absent**

Erik Helland

**Iowa Economic Development Authority Staff Present**

Brian Selinger  
Amber Buckingham  
Stephanie Weisenbach  
Lisa Connell  
Deanna Triplett  
Abbie Christophersen\*  
Michelle Cook  
Beau Hanson  
Staci Hupp Ballard  
Terry Roberson  
Kanan Kappelman  
Shelly Peterson  
Emily Hockins\*

**Iowa Finance Authority Staff Present**

Dave Powell\*  
Samantha Askland\*  
Tim Morlan\*

**Others Present**

Maison Bleam, Iowa Utilities Board\*  
Jace Mikels, Iowa Senate Democratic Caucus\*  
Jordan Elliott, Pearl Certification\*  
Jessica Flannery, Iowa House of Representatives Democratic Research Staff\*

\*Participated via Teams

### **Welcome & Introductions by Board Chair Stuart Anderson**

Stuart Anderson welcomed everyone to the October 3<sup>rd</sup> IEC Board meeting.

### **Roll Call**

Michelle Cook did roll call and a quorum was established.

### **Consideration of August 10, 2023 IEC Board Meeting Minutes**

Motion by	Lanny Ziemann
Motion	I move approval of the August 10, 2023 minutes as presented.
Second	Anne Kimber
Voice Vote	All ayes in favor. Motion approved.

### **Fiscal Update – Attachment A**

Terry Roberson explained the main grant program will have about \$12.3 million in obligated carryover funds coming into State FY24. The Energy Infrastructure Loan Program will have just around \$11.7 million coming forward into State FY24. Those numbers are not final because state accounting will not rebalance those funds for another couple of weeks but they should be very close. Terry Roberson stated he would be happy to answer any questions, but no questions were asked.

### **Competitive Grant Program Recommendations for Awards – Attachment B**

Amber Buckingham gave an update on the competitive grant program and the current funding cycle.

The Iowa Energy Center (IEC) Competitive Grant Program awards grants for projects that align with one of the key focus areas of the Iowa Energy Plan. Projects must also provide a benefit to Iowa ratepayers. Eligible applicants include Iowa based businesses, colleges and universities, and private non-profit agencies and foundations. The maximum grant award is \$1,000,000. The minimum award is \$10,000.

As established by 261 Iowa Administrative Code 404, the IEC Grant Committee reviews pre-applications and full applications and makes recommendations for funding to the IEC Board. The committee is comprised of four voting members of the IEC Board. The committee reviewed eleven full application submissions as a group and submitted one score sheet per application. Points were assigned based on the scoring matrix established in the Policies and Procedures Handbook. A minimum score of 160 is required to qualify for a grant award. Six full application submissions achieved a score above 160. All of the applications that achieved the minimum necessary score have been recommended for awards, totaling \$1,583,407.

### **514135 – A Low-Cost Bioinspired Hydroelectric System for Utilizing Untapped Riverine Hydropower in Iowa.**

Applicant Organization: Iowa State University

Grant Award Request: \$201,916

Partners: Blue Energy

Summary: A bio-inspired, low-cost hydroelectric system for utilizing Iowa's untapped riverine hydropower.

**514211 - Development of functionalized nanocomposite membranes for the selective, high-capacity recovery of critical materials for a clean energy transition.**

Applicant Organization: University of Iowa

Grant Award Request: \$315,133

Partners: Notre Dame

Summary: Create new materials for recovery of lithium, a critical resource for renewable energy.

**514229 - Resilient Iowa Communities Rural Support Project**

Applicant Organization: University of Northern Iowa

Grant Award Request: \$176,358

Partners: City of Charles City, City of Decorah, and Iowa Northland Regional

Summary: Engage 10-12 rural Iowa towns in an energy assessment and implement 1 energy / carbon project each.

**514132 - 3D bioprinting of microbial biofilms for gas pipeline corrosion prevention**

Applicant Organization: Iowa State University

Grant Award Request: \$300,000

Partners: Interstate Power and Light and Black Hills Energy

Summary: We will develop a 3D printed anticorrosion biofilm coating for underground gas pipelines.

**517589 – Modernization of Protection and Stability Techniques for 100% Clean Electricity**

Applicant Organization: Iowa State University

Grant Award Request: \$300,000

Partners: Interstate Power and Light, CIPCo, Cornbelt Power Cooperative, MidAmerican Energy

Summary: New protection and stability advances for the reliable operation of a 100% Iowa clean grid.

**520617 – AI-guided Lignin valorization to make bio-based batteries through interfacial engineering for waste-to-wealth conversion**

Applicant Organization: Iowa State University

Grant Award Request: \$290,000

Partners: Zymosense

Summary: AI-tweaked safe bacteria eat lignin, emit current, make bio-battery + Lignin membrane replace Nafion.

Amber Buckingham explained we have to do these recommendations in a few motions because of Board recusals.

Motion by Debi Durham  
Motion I move to approve IEC Grant Committee Funding Recommendation for Application Number 514211

Second Lanny Zieman  
Roll Call Yes: 11 Recuse: 1 (Craig Just)  
Motion approved.

Motion by Anne Kimber  
Motion I move to approve IEC Grant Committee Funding Recommendation for Application Numbers 514135 (Iowa State University), 514229 (University of Northern Iowa), 520617 (Iowa State University).

Second Craig Just  
Roll Call Yes: 12 Recuse: 0  
Motion approved.

Motion by Debi Durham  
Motion I move to approve IEC Grant Committee Funding Recommendation for Application Number 517589 (Iowa State University).

Second Lanny Zieman  
Roll Call Yes: 9 Recuse: (Kelcey Brown, Anne Kimber, Terry Kouba)  
Motion approved.

Motion by Dan Nickey  
Motion Approve IEC Grant Committee Funding Recommendation for Application Number 514132 (Iowa State University).

Second Craig Just  
Roll Call Yes: 11 Recuse: (Terry Kouba)  
Motion approved.

**Competitive Grant Program Recommendations for Denial – Attachment C**

Amber Buckingham stated the Iowa Energy Center (IEC) Competitive Grant Program awards grants for projects that align with one of the key focus areas of the Iowa Energy Plan. Projects must also provide a benefit to Iowa ratepayers. Eligible applicants include Iowa based businesses, colleges and universities, and private non-profit agencies and foundations. The maximum grant award is \$1,000,000. The minimum award is \$10,000.

As established by 261 Iowa Administrative Code 404, the IEC Grant Committee reviews pre-applications and full applications and makes recommendations for funding to the IEC Board. The committee is comprised of four voting members of the IEC Board. The committee reviewed eleven full application submissions as a group and submitted one score sheet per application. Points were assigned based on the scoring matrix established in the Policies and Procedures Handbook. A minimum score of 160 is required to qualify for a grant award. Five full application submissions failed to achieve a score above 160. All of the applications that failed to achieve the minimum necessary score have been recommended for denial.

Ms. Buckingham gave an overview of each application.

- (1) Application 514918 - Jumpstarting the Market for High Performance Homes in Iowa. Project partners are Pearl, Elevate, Iowa City Realtors, Kirkwood Community College.
- (2) Application 514237 - Iowa Ratepayer Carbon Sequestration 2023. Project partners are Iowa DNR, Iowa Composting Council.
- (3) Application 520275 - Rural Community Generation Planning with Carbon Management. Project partners are: IAMU, Harlan Municipal Utilities, Ames.
- (4) Application 514262 - Optimal Proactive Distribution Transformer Replacement Planning. Project partners are: Cedar Falls Utilities, Linn County Electric Coop.
- (5) Application 520448 - Analysis of the Feasibility of Small-Scale Green Ammonia Production as a Fossil Fuel, Energy Carrier, and Storage Alternative in Iowa. Project partners are Pacifica Energy.

Amber Buckingham stated we will have to consider these recommendations in multiple motions due to Board member recusals.

Motion by	Debi Durham
Motion	I move to approve IEC Grant Committee Denial Recommendation for Application Numbers 514918 (The Energy Group), 514237 (University of Northern Iowa), 520448 (Strategic Economic Group).
Second	Anne Kimber
Roll Call	Yes: 12 Recuse: 0 Motion approved.

Motion by	Lanny Zieman
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Motion I move to approve IEC Grant Committee Denial Recommendation for Application Number 514262 (Iowa State University).

Second Debi Durham  
Roll Call Yes: 11 Recuse: 1 (Anne Kimber)  
Motion approved.

Motion by Craig Just  
Motion I move to approve IEC Grant Committee Denial Recommendation for Application Number 520275 (Iowa State University).

Second Lanny Zieman  
Roll Call Yes: 11 Recuse: 1 (Troy DeJooode)  
Motion approved.

### **Other Business**

Stuart Anderson turned it over to Brian Selinger to give Energy Office updates.

### **Energy Center Office Updates**

I want to apologize and thank you for juggling with us today with the tech issues. Our next quarterly board meeting is on November 16<sup>th</sup>. We have some really good presentations in mind. Hopefully we will see you in person on the 16<sup>th</sup>.

**Public Comment Period** No public comments.

Chairperson Anderson adjourned the meeting.

**Adjournment** 10:36 a.m.

Respectfully Submitted,  
Michelle Cook, IEC Board Administrator

# Attachment A

INFO

**REPORT**  
**IOWA ECONOMIC DEVELOPMENT AUTHORITY BOARD**  
**OCTOBER 2023**

From: Administration

Subject: Financial Report

Attached please find the Final FY23 financial report for the Iowa Energy Center and the Energy Loan Programs.

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**Proposed**            **No Action Required**  
**Motion:**

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Submitted By: Terry Roberson

Attachments: Financial Reports

<b>IEDA</b>				
<b>Financial Report</b>				
<b>Iowa Energy Center</b>				
<b>Fiscal Year 2023</b>				
<b>Final Report</b>				
	<b>IEC MAIN ACCT</b>			
				<b>Total</b>
	Admin	Projects		<b>Fund</b>
<u>Revenue</u>				
Cash Balance Forward	275,000	18,561,590		18,836,590
FY21 IUB Transfer	0	0		0
Principal Repayments YTD	0	0		0
Interest Revenue	0	467,002		467,002
Other Revenue YTD	0	0		0
Deappropriations	0	0		0
Transfers	0	0		0
<b>Total Revenue YTD</b>	<b>275,000</b>	<b>19,028,592</b>		<b>19,303,592</b>
<u>Expenses</u>				
Administration YTD	(157,335)	0		(157,335)
Project Payouts YTD	0	(2,137,560)		(2,137,560)
Leg Auth Transfers (18 Acts Ch 1172 Sec 91)				0
<b>Total Expense YTD</b>	<b>(157,335)</b>	<b>(2,137,560)</b>		<b>(2,294,895)</b>
<u>Obligations</u>				
Obligations C/F	0	6,346,261		6,346,261
Current Year Obligations	0	1,051,872		1,051,872
Current Year Rescissions		(141,122)		(141,122)
Current Year Payouts	0	(2,663,927)		(2,663,927)
Balance of Current Year Admin	117,665	0		117,665
<b>Net Obligations YTD</b>	<b>117,665</b>	<b>4,593,084</b>		<b>4,710,749</b>
<b>Balance Available</b>	<b>0</b>	<b>12,297,948</b>		<b>12,297,948</b>



<b>IEDA</b>			
<b>Financial Report</b>			
<b>Iowa Energy Center</b>			
<b>Fiscal Year 2023</b>			
<b>Final Report</b>			
<b>ENERGY INFRASTRUCTURE REVOLVING LOAN PROGRAM</b>			
			<b>Total</b>
	Admin	Projects	<b>Fund</b>
<u>Revenue</u>			
Cash Balance Forward	250,000	14,157,520	14,407,520
FY21 IUB Transfer	0	0	0
Principal Repayments YTD	0	6,001	6,001
Interest Revenue	0	377,786	377,786
Other Revenue YTD	0	0	0
Deappropriations	0	0	0
Transfers	0	1,174,000	1,174,000
<b>Total Revenue YTD</b>	<b>250,000</b>	<b>15,715,307</b>	<b>15,965,307</b>
<u>Expenses</u>			
Administration YTD	(29,452)	0	(29,452)
Project Payouts YTD	0	(397,150)	(397,150)
Leg Auth Transfers (18 Acts Ch 1172 Sec 91)			0
<b>Total Expense YTD</b>	<b>(29,452)</b>	<b>(397,150)</b>	<b>(426,602)</b>
<u>Obligations</u>			
Obligations C/F	0	236,250	236,250
Current Year Obligations	0	3,753,900	3,753,900
Current Year Rescissions			0
Current Year Payouts	0	(397,150)	(397,150)
Balance of Current Year Admin	220,548	0	220,548
<b>Net Obligations YTD</b>	<b>220,548</b>	<b>3,593,000</b>	<b>3,813,548</b>
<b>Balance Available</b>	<b>0</b>	<b>11,725,157</b>	<b>11,725,157</b>

IEDA						
Financial Report						
Iowa Energy Center						
Fiscal Year 2023						
Final Report						
<u>OLD</u>						
<u>IEC/AEL LOAN ACCT</u>						
				Total		
		Projects		Fund	<u>IEDA</u>	<u>OCT 1 2017</u>
					<u>NOTES REC</u>	<u>NOTES REC</u>
<u>Revenue</u>						
Cash Balance Forward	0	1,174,610		1,174,610	1,044,667	718,354
FY21 IUB Transfer	0	0		0		0
Principal Repayments YTD	0	479,925		479,925	(196,286)	(283,639)
Interest Revenue	0	26,123		26,123		0
Other Revenue YTD	0	0		0		0
Deappropriations	0			0		0
Transfers	0	(1,174,000)		(1,174,000)		0
Total Revenue YTD	0	506,658		506,658	848,381	434,715
<u>Expenses</u>						
Administration YTD	0	0		0		
Project Payouts YTD	0	0		0		
Leg Auth Transfers (18 Acts Ch 1172 Sec 91)				0		
Total Expense YTD	0	0		0		
<u>Obligations</u>						
Obligations C/F	0	348,810		348,810		
Current Year Obligations	0	0		0		
Current Year Rescissions		0		0		
Current Year Payouts	0	0		0		
Balance of Current Year Admin	0	0		0		
Net Obligations YTD	0	348,810		348,810		
Balance Available	0	157,848		157,848		

# Attachment B

**ACTION**

**REPORT  
IOWA ENERGY CENTER BOARD  
OCTOBER 2023**

From: Iowa Energy Center

Subject: Iowa Energy Center Competitive Grant Program Funding  
Recommendations for Awards

**Background:** The Iowa Energy Center (IEC) Competitive Grant Program awards grants for projects that align with one of the key focus areas of the Iowa Energy Plan. Projects must also provide a benefit to Iowa ratepayers. Eligible applicants include Iowa based businesses, colleges and universities, and private non-profit agencies and foundations. The maximum grant award is \$1,000,000. The minimum award is \$10,000.

As established by 261 *Iowa Administrative Code* 404, the IEC Grant Committee reviews pre-applications and full applications and makes recommendations for funding to the IEC Board. The committee is comprised of four voting members of the IEC Board. The committee reviewed eleven full application submissions as a group and submitted one score sheet per application. Points were assigned based on the scoring matrix established in the Policies and Procedures Handbook. A minimum score of 160 is required to qualify for a grant award. Six full application submissions achieved a score above 160. All of the applications that achieved the minimum necessary score have been recommended for awards, totalling \$1,583,407.

The document “Iowa Energy Center Grant Committee Funding Recommendations October 2023” is attached.

The committee recommendations must be considered in multiple motions due to board member recusals.

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**Proposed Motions:** **Approve IEC Grant Committee Funding Recommendation for Application Numbers 514135 (Iowa State University), 514211 (University of Iowa), 514229 (University of Northern Iowa), 520617 (Iowa State University).**

**Approve IEC Grant Committee Funding Recommendation for Application Number 517589 (Iowa State University).**

**Approve IEC Grant Committee Funding Recommendation for Application Number 514132 (Iowa State University).**

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Submitted By: Amber Buckingham

Attachments: Iowa Energy Center Grant Committee Funding Recommendations  
October 2023

**Iowa Energy Center  
Competitive Grant Program  
Grant Funding Recommendations  
October 3, 2023**

**Total Recommended Funding: \$1,583,407**

**1. 514135 – A Low-Cost Bioinspired Hydroelectric System for Utilizing Untapped Riverine Hydropower in Iowa.**

**Applicant Organization: Iowa State University**

**Grant Award Request: \$201,916**

**Partners: Blue Energy**

**Summary: A bio-inspired, low-cost hydroelectric system for utilizing Iowa's untapped riverine hydropower.**

**Project:** This project aims to develop a bio-inspired hydroelectric system that unravels the energy potential of Iowa's extensive waterways. The goals include:

1. Exploring principles of bio-inspired energy harvesting, using our lab facilities to study how changes in flow speed, depth, and unsteadiness impact the optimal oscillation of a hydrofoil. This exploration will create a roadmap for tailoring optimal oscillation motions for maximum harvesting efficiency in diverse flow conditions.

2. Prototyping a bio-inspired hydrofoil system: Building upon the insights from task 1, we plan to create a prototype that strikes a balance between efficient energy harvesting and the demands of active control. The design will be flexible and responsive to changes in water flow, ensuring we get the most energy with the minimum active input.

3. Optimizing Iowa's historical waterway data: We'll put our prototype to the test in conditions that mimic the variety of Iowa's waterways. This process will allow us to continually refine our design and provide us with data to predict the potential energy that could be harnessed from Iowa's waterways using our system.

At the project's completion, we aim to present an optimized bio-inspired hydroelectric system prototype designed for Iowa's rivers and streams. Importantly, this project will also provide a thorough understanding of the physics underlying riverine energy harvesting and detailed performance data, paving the way for future advancements.

***Recommendation: Approve a total grant award of \$201,916***

**2. 514211 - Development of functionalized nanocomposite membranes for the selective, high-capacity recovery of critical materials for a clean energy transition.**

**Applicant Organization: University of Iowa**

**Grant Award Request: \$315,133**

**Partners: Notre Dame**

**Summary: Create new materials for recovery of lithium, a critical resource for renewable energy.**

**Project:** The goal is to produce a novel class of materials known as functionalized nanocomposite membranes (FNMs) for the recovery of lithium (Li) from sources in Iowa. To achieve this goal, the team will:

1. Fabricate FNMs and optimize their performance for Li recovery from sources like brines and groundwater. From existing materials (12), performance metrics guiding FNM design are: high capacity >50 milligram of Li per gram of FNM, fast Li capture of 90% material capacity within 1 hour, and selective capture of only Li from complex mixtures.
2. Demonstrate that optimal FNMs are robust and reusable across the harsh conditions of Li processing and refining. The team will demonstrate material stability at high temperature and toward acids and bases, with no loss in performance over repeated use (10 Li binding/release cycles).
3. Translate FNM production to the industrial scale, with a preliminary cost analysis. Dr. Myung has infrastructure to produce large FNM sheets that is unavailable in Iowa, making his involvement critical. Raw materials are commercially available, and the fabrication approach is industrially proven (17), yielding high potential for economic viability.
4. Initiate technology transfer via invention disclosure, patenting, and pursuing DOE SBIR/STTR start-up funds. We will seek out partners for post-grant technology prototyping and in-field performance validation including geothermal energy producers (e.g., Berkshire Hathaway Energy (18)) and water utilities with Li-rich sources.

***Recommendation: Approve a total grant award of \$315,133***

### **3. 514229 - Resilient Iowa Communities Rural Support Project**

**Applicant Organization: University of Northern Iowa**

**Grant Award Request: \$176,358**

**Partners: City of Charles City, City of Decorah, Iowa Northland Regional.**

**Summary: Engage 10-12 rural Iowa towns in an energy assessment and implement 1 energy / carbon project each**

**Project:** The goals of the proposed work are:

1. Involve 120 individuals, including students in UNI classes, in energy workforce skill development including energy benchmarking and collaboration with communities on energy and carbon projects
2. Engage 10/12 rural/underserved communities and offer technical support to complete greenhouse gas inventory assessments and community energy planning process to identify high impact project community leaders eager to implement
3. Support each community in completing 1 energy and 1 carbon management project based on the emissions inventory and best practices assessment conducted by UNI Center for Energy & Environmental Education staff
4. Facilitate a learning community of all participating rural communities and their leaders and staff to build their capacity to consider future projects.
5. Create web resources for other communities to access scorecard assessment and review case studies of projects for long term impact of the projects
6. Develop recognition levels for best practice implementation by cities to encourage ongoing participation in energy and carbon projects

***Recommendation: Approve a total grant award of \$176,358***

#### **4. 514132 - 3D bioprinting of microbial biofilms for gas pipeline corrosion prevention**

**Applicant Organization: Iowa State University**

**Grant Award Request: \$300,000**

**Partners: Interstate Power and Light and Black Hills Energy**

**Summary: We will develop a 3D printed anticorrosion biofilm coating for underground gas pipelines.**

**Project:** The goal of the project is to develop novel a 3D printed microbial coating that will prevent corrosion of underground pipes through 3 phases: (1) design of biofilms for corrosion inhibition; (2) development of a 3D bioprinting method; and (3) laboratory testing of coated pipe materials.

Phase 1 will determine effective mixtures of soil microbes and biofilm chemicals that prevent corrosion: [Task 1-1] screen for corrosion outcomes in biofilm-coated metals; [Task 1-2] characterize biological and chemical features of corrosion-inhibiting biofilms; [Task 1-3] conduct statistical analysis of key features leading to corrosion inhibition.

In Phase 2, a 3D bioprinting method will be developed to fabricate the corrosion-inhibiting biofilms using simple, single-nozzle 3D printers: [Task 2-1] develop bioinks that produce stable biofilms; [Task 2-2] 3D bioprint corrosion-inhibiting biofilms.

Phase 3 will involve exposure tests of treated pipeline materials buried in soil to test the coating's self-healing ability and longevity when exposed to realistic, corrosive environmental conditions: [Task 3-1] design lab-scale experiment; [Task 3-2] evaluate self-healing properties of 3D printed corrosion-inhibiting biofilm coatings; [Task 3-3] determine the stability of coatings under changing soil chemistries. Experiments will be conducted for at least 3 months using at least 3 different types of soils collected from around Iowa. We will seek industry input and collaboration.

***Recommendation: Approve a total grant award of \$300,000***

#### **5. 517589 – Modernization of Protection and Stability Techniques for 100% Clean Electricity**

**Applicant Organization: Iowa State University**

**Grant Award Request: \$300,000**

**Partners: Interstate Power and Light, CIPCo, Cornbelt Power Cooperative, MidAmerican Energy**

**Summary: New protection and stability advances for the reliable operation of a 100% Iowa clean grid.**

**Project:** There are seven goals (G1-G7): (G1) Engineer algorithms to protect ac transmission lines from tornado debris and lightning. It will be engineered algorithms to clear transmission faults under renewable current limitations. (G2) Understand the limitations of fuses and engineer protections to reliably clear distribution faults. It will be studied a radial distribution circuit (provided by Alliant Energy) to assess circuit impedance changes. (G3) Develop theory of 100% clean grids to prevent instabilities. It will be assessed renewable resources, transmission lines, and modern loads, e.g., electric vehicles (EVs). (G4) Demonstrate to Iowa industry the dynamic performance of 100% clean grids. To this end, Dr. Villegas will leverage the Advanced Energy Systems (AES) Lab at ISU. (G5) Engineer protections for air-conditioning (A/C) systems to prevent the low voltages of distribution grids. It will be developed algorithms to detect and disconnect stalled motors in A/C and heat-pump systems. (G6) Assess the impacts of modern loads on under-frequency load shedding schemes. The project will assemble and

study a 100%-clean power system model with EVs and A/C loads. (G7) Explain project outcomes for replication. Dr. Villegas and Dr. Kimber will respectively design and organize two short courses. All goals (G1-G7) will be pursued under Iowa industry advise and will resort to electromagnetic transient simulations (recommended by the North American Electric Reliability Corporation).

***Recommendation: Approve a total grant award of \$300,000***

**6. 520617 – AI-guided Lignin valorization to make bio-based batteries through interfacial engineering for waste-to-wealth conversion**

**Applicant Organization: Iowa State University**

**Grant Award Request: \$290,000**

**Partners: Zymosense**

**Summary: AI-tweaked safe bacteria eat lignin, emit current, make bio-battery + Lignin membrane replace Nafion.**

**Project:** 1.Sourcing, analysis, characterization, and creating public databases of different lignin sources from Iowa-Kansas-Nebraska agricultural belt

2.Design and demonstrate the construction of bio-battery components using lignin samples.

3.Engineer safe microbe (*R. palustris*) to breakdown lignin using these enzymes to produce ? (a) Steady stream of electrons (for battery) (b) Many small molecules with utility in drug manufacturing and biotech.

4.Prospect lignin using AI, biology, and interfacial engineering for proposals to USDA, NSF

Computing:

1.Use AI to make novel biocatalysts (enzymes) which will break lignin

2.Image-processing of microscopy images of different sources of lignin to predict how to chemically modify them as efficient membranes in the bio-battery

3.Molecular simulations of ion-transfer through lignin-membranes to predict and rank best lignin-derived membranes prior to experiment.

Microbes for battery electrode:

1.Measure efficiency of AI-designed enzymes to break lignin

2.Incorporate lignin-breaking enzymes in microbes to enable them to feed on a lignin-rich broth

3.Measure concentration of breakdown products as microbes grow in bio-battery setup

4.Engineer bacteria-polymer interfaces for enhanced electron transfer in electrodes

Battery membrane:

1.Modify lignin for proton-conducting membranes and study their properties

2.Show biodegradability and disposability of bio-battery components

3.Evaluate scalability of processes in bio-battery setup (Zymosense Inc.)

***Recommendation: Approve a total grant award of \$290,000***



**ACTION**

**REPORT  
IOWA ENERGY CENTER BOARD  
OCTOBER 2023**

**From:** Iowa Energy Center  
**Subject:** Iowa Energy Center Competitive Grant Program  
Recommendations for Denial

**Background:** The Iowa Energy Center (IEC) Competitive Grant Program awards grants for projects that align with one of the key focus areas of the Iowa Energy Plan. Projects must also provide a benefit to Iowa ratepayers. Eligible applicants include Iowa based businesses, colleges and universities, and private non-profit agencies and foundations. The maximum grant award is \$1,000,000. The minimum award is \$10,000.

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The document “Iowa Energy Center Grant Committee Denial Recommendations 2023” is attached.

The committee recommendations must be considered in multiple motions due to board member recusals.

- 
- Proposed Motion:**      **Approve IEC Grant Committee Denial Recommendation for Application Numbers 514918 (The Energy Group), 514237 (University of Northern Iowa).**
- Approve IEC Grant Committee Denial Recommendation for Application Numbers 514262 (Iowa State University), 520448 (Strategic Economic Group).**
- Approve IEC Grant Committee Denial Recommendation for Application Number 520275 (Iowa State University).**
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Submitted By: Amber Buckingham

Attachments: Iowa Energy Center Grant Committee Denial  
Recommendations October 2023

**Iowa Energy Center  
Competitive Grant Program  
Grant Recommendations for Denial  
October 3, 2023**

<b>Application Number</b>	<b>Application Name</b>	<b>Applicant Organization</b>	<b>Project Summary</b>	<b>Award Request</b>	<b>Project Partners</b>
514918	Jumpstarting the Market for High Performance Homes in Iowa	The Energy Group	Training of contractors and realtors is critical to consumers taking advantage of energy efficiency.	\$207,620	Pearl, Elevate, Iowa City Realtors, Kirkwood Community College
514237	Iowa Ratepayer Carbon Sequestration 2023	University of Northern Iowa	Assessing awareness, utilization, and attitudes/perceptions about decarbonization in Iowa	\$133,075	Iowa DNR, Iowa Composting Council
520275	Rural Community Generation Planning with Carbon Management	Iowa State University	Optimal energy mix generation plans are determined with carbon reduction for small, rural utilities.	\$148,773	IAMU, Harlan Municipal Utilities, Ames
514262	Optimal Proactive Distribution Transformer Replacement Planning	Iowa State University	Model electrification impacts on distribution transformers for infrastructure planning and operation	\$267,486	Cedar Falls Utilities, Linn County Electric Coop
520448	Analysis of the Feasibility of Small-Scale Green Ammonia Production as a Fossil Fuel, Energy Carrier, and Storage Alternative in Iowa	Strategic Economic Group	The analysis of green ammonia as a carbon-free fuel, energy storage and fertilizer alternative.	\$236,250	Pacifica Energy