



ELECTRI International Foundation

Green Energy Challenge

RULES AND REGULATIONS

2019 National Student Competition for NECA Student Chapters

“Net Zero Energy Project”

GEC Program Manager:

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2019 Competition Rules

Participation

- ✚ All communications should be directed to **Deborah Halpern**, dhalpern@electri.org
- ✚ Student participation is limited to undergraduate students. Students who have graduated within six months of the NECA Convention will be eligible to take part in the team's on-site presentation at the Convention.
- ✚ Student teams are expected to have four to six core team members and are encouraged to engage fellow students in supporting roles. A maximum of 6 team members can present the proposal at the NECA Convention.
- ✚ Each university team may submit only one entry and one video.
- ✚ All team members are expected to be NECA Student Chapter Members. Teams are encouraged to recruit students from other disciplines to join their chapter and the team.
- ✚ Use of the challenge problem by a faculty member as an assignment in an existing course is strongly encouraged.

External Input

- ✚ The completed proposal work must be original and prepared by the team members.
- ✚ Teams are expected and encouraged to gain input and feedback on their proposal from NECA contractors, vendors, material suppliers, and faculty members.
- ✚ No team member is permitted to have earned wages for participating in the competition or wages for working on the project selected by the team.

Client Interaction/Outreach

- ✚ The project "client" for each NECA Chapter Team must be a representative directly from the facility selected by the team.
- ✚ Student teams are expected to conduct themselves in a professional manner in all aspects of the competition.
- ✚ Student teams are expected to plan visits and phone calls with their client in a professional manner that is not disruptive to the activities of the client organization.
- ✚ Teams are expected to represent accurately the goals and intent of the competition in any website and publication materials they use to develop sponsorship opportunities and outreach messages about their participation in the competition.

Travel Costs/Sponsorship/Expenses

- ✚ Teams are encouraged to seek financial sponsorship to support their team’s travel costs to the Convention and other costs associated with the development of the proposal.
- ✚ ELECTRI International will provide travel support up to \$2000 to the three finalist teams.
- ✚ Awards for winning presentations and videos will be made to the university department of the winning team.
- ✚ Prize money is to be used to support general NECA Student Chapter activities, at the discretion of the NECA Chapter Faculty Advisor.
- ✚ The Best Presenter award will be given as an individual check, made out directly to the winning student.

2019 Detailed Scoring

Project Summary	Total Possible Points
1. Written Executive Summary (10 POINTS), including mission statement (5 POINTS) and an explanation of the roll each team member will perform (5 POINTS).	20
2. 2-page summary (10 POINTS) including the role the facility plays in the community (5 POINTS), the clientele they serve (5 POINTS) and a quick summary of what interaction you had with the facility either through awareness or community service (5 POINTS).	25
3. Team resumes – 1-page max for each core team member (1 POINTS), uniform (2 POINTS) and professional (2 POINTS) appearance.	5
Technical Analysis 1: Energy Efficiency Analysis	
1. Conduct assessment of the existing electrical systems in the facility focusing on and discussing the existing lighting fixtures (4 POINTS), lighting controls (4 POINTS), and HVAC motor controls (2 POINTS).	10

<p>2. Energy use/benchmark: Benchmark the energy used in the facility using the EPA Portfolio Manager Tool (5 POINTS). Interpret the results for the client (5 POINTS).</p>	<p>10</p>
<p>3. Analyze the building using the DOE Building Asset Score Tool (5 POINTS). Interpret results for the client (5 POINTS).</p>	<p>10</p>
<p>4. Based on the findings of the above analysis, make recommendations for long and short-term improvements to the building. (10 POINTS)</p>	<p>10</p>
<p>5. Make a recommendation utilizing data (power and cost) to achieve a Net Zero Energy facility. (10 POINTS)</p>	<p>10</p>
<p>Technical Analysis 2: Lighting Retrofit</p>	
<p>1. Based on the information you gathered during the energy efficiency assessment of the existing lighting system in your facility, make recommendations for a more efficient lighting system. Identify the negative attributes of the existing lighting system and explain the impact that each of your new recommendations will have on decreasing the facility’s power consumption. (10 POINTS)</p>	<p>10</p>
<p>2. Select products that meet the needs of your lighting retrofit recommendations. Explain why the light fixtures and lighting control system you chose best suites the customer’s needs. Provide product data sheets (submittals) of new light fixtures and controls that are to be installed in your lighting retrofit recommendation. (Product data sheets shall be placed in the appendix section of your proposal.) (10 POINTS).</p>	<p>10</p>
<p>3. Provide reflected ceiling drawing(s) of your proposed lighting retrofit indicating locations of new light fixtures and controls. Drawings shall include a light fixture schedule listing (at a minimum) Manufacturer, Catalog Number, Fixture Description, Lamp Type, Input Watts, and Voltage. Drawing(s) shall also include a symbol legend for control devices. (10 POINTS)</p>	<p>10</p>

<p>4. Provide photometric analysis drawings for the lighting retrofit areas of the facility. Confirm and document that your lighting retrofit meets the Illuminating Engineer Society's (IES) illuminance recommendations. Briefly explain the negative effects on building occupants of lighting levels that are too high or too low. (10 POINTS)</p>	<p>10</p>
<p>5. Provide a detailed Return on Investment (ROI) report for your lighting retrofit proposal in order to convince the customer that proceeding with the lighting retrofit makes good financial and environmental sense. (10 POINTS)</p>	<p>10</p>
<p>Technical Analysis 3: Solar Energy System</p>	
<p>1. Evaluate your client's facility for potential photovoltaic Solar Energy System applications and locations (i.e. roof, grounds, facade, independent structure, etc.). Analyze each of the potential systems and locations. Document for your client the positive and negative aspects of each. Based on your team's analysis, recommend a PV system and location that best suites the needs of your client. (10 POINTS)</p>	<p>10</p>
<p>2. Determine if the PV system will be Grid-Direct (Grid-Tied), Grid-Interactive (Grid/Hybrid with energy storage), or Off-Grid with energy storage. Explain to your client the advantages and disadvantages of each type of system and which system you would recommend for their facility. (5 POINTS)</p>	<p>5</p>
<p>3. Provide scaled plan view drawing(s) of your PV system including (but not limited to) locations of PV panels, combiner boxes, inverters, safety switches, batteries, and net metering equipment (if applicable). Provide a shading analysis for your proposed PV system. (10 POINTS)</p>	<p>10</p>
<p>4. Provide a 3-line diagram of your team's proposed PV system. <u>The 3-line diagram shall be unique to your PV system design and based on the equipment selected in requirement 5 of this Technical Analysis.</u></p>	<p>10</p>

<p>Include and identify all equipment and wiring requirements necessary for a complete PV system. (10 POINTS)</p>	
<p>5. Select the PV equipment that meets the needs of your PV system design. Explain why your team selected these products. Provide product data sheets (submittals) for all components necessary for a complete PV system installation. (Product data sheets shall be placed in the appendix section of your proposal.) (5 POINTS)</p>	<p>5</p>
<p>6. Provide a detailed summary for your client that will convince them to install your proposed PV system. Your report should address (at a minimum) the following questions: (10 POINTS)</p> <ul style="list-style-type: none"> a. What is the upfront cost of installing the PV system? b. What are the life cycle costs and challenges of maintaining the PV system? c. What grants and/or tax incentives are available to offset the cost of the PV system? d. How much energy will the PV system generate? Will it allow your client to achieve a Net Zero Energy building? If not, how much larger would your PV system need to be to achieve Net Zero? e. How long will it take the PV system to generate a positive cash flow? f. How much CO2 pollution will be eliminated annually by the PV system? Over the life of the PV system? 	<p>10</p>
<p>Schematic Estimate, Schedule and Finance Plan</p>	
<p>1. Develop a cost estimate for the lighting retrofit and solar energy system that you are proposing for your client. Provide sufficient detailed information to demonstrate that the team’s estimate is thorough and inclusive of all cost areas including material, direct labor, indirect labor, labor escalation, subcontractors, general conditions, equipment, overhead, and profit. Line item takeoff extension documents can be placed in the appendix if necessary. (40 POINTS)</p>	<p>40</p>
<p>2. Prepare a Gantt chart schedule for the proposed work. It should be based on the completion of work in a timeframe that is sensitive to the client’s operations while limiting disruption. Provide a brief</p>	<p>30</p>

<p>narrative of the schedule for your client highlighting major project milestones and crew information so they know how their facility will be affected during the project. (30 POINTS)</p>	
<p>3. Provide a financing plan for you customer to provide the capital necessary to proceed with the project. Consider all options, including capital investments, financing options, fundraising opportunities, and government and private incentives. Provide a cash flow plan that graphically represents your clients return on investment. Provide a brief narrative of your cash flow plan and specifically highlight the date in which your client achieves positive cash flow on this project. (30 POINTS)</p>	<p>30</p>
<p>Energy Awareness or Community Outreach Campaign</p>	
<p>Teams should complete <u>one</u> of the following projects:</p> <ol style="list-style-type: none"> 1. <u>Energy Awareness</u>: improve energy efficiency & conservation awareness among members/participants at the chosen organization through a project solution that is complementary to and/or built upon existing programming and efforts at the facility. 2. <u>Community Outreach</u>: develop a plan to raise awareness of the chosen organization/facility on campus and/or in the local community. <p>Scoring will be based upon:</p> <ol style="list-style-type: none"> a) creativity & design of the campaign (20 POINTS); b) a description of how the team effectively integrated the campaign with existing programs at the chosen organization, on campus, or in the community (10 POINTS); and c) a detailed description of how the team executed the plan, how many members of the target audience engaged with the campaign, and the campaign’s impact on/engagement with the target audience (20 POINTS). 	<p>50</p>
<p>Volunteer Service</p>	
<p>The Green Energy Challenge is also a community service project. Teams are expected to volunteer their time and services at the facility they have chosen.</p> <ol style="list-style-type: none"> 1. The team should obtain a letter from the organization summarizing the volunteer performance of the team and the project’s results. (45 POINTS) 	<p>75</p>

<p>2. Photographs documenting the community service aspect of the proposal are also required. (10 POINTS)</p> <p>3. Maintain a log of the team’s volunteer activities and include it in the proposal’s appendix (20 POINTS). At a minimum, the log must include the date and type of volunteer activity performed on each separate occasion; how many hours the team volunteered on each occasion; how many team members participated; and one cumulative ‘average volunteer hours per team member’ calculation. (Each team member should only be counted once in the average calculation if they volunteered on multiple separate occasions.)</p>	
<p>Local NECA Chapter Interaction</p>	
<p>1. Teams should partner and interact with NECA members in the development and refinement of their Green Energy Challenge proposals. Provide a brief summary of the interaction the team completed with its sponsoring NECA Chapter and local NECA contractors (50 POINTS). (This may include face-to-face visits, phone calls, visits by the team to chapter events, and types of proposal feedback solicited from NECA members.)</p> <p>2. Maintain a log of the team’s communication and interactions with the NECA chapter and contractors regarding the GEC project and include it in the proposal’s appendix (25 POINTS).</p>	<p>75</p>
<p>Campus/Local Media Engagement</p>	
<p>Teams are encouraged to publicize participation in the Green Energy Challenge in university/department newsletters and local media. The submitted proposal should include at least one planned or published article describing the participation of your NECA Student Chapter in the competition and summarizing the team’s selected project. For each media outlet, be sure to include the name “ELECTRI International Green Energy Challenge,” the name of the chosen organization, the team’s NECA partners and sponsors for the competition, and team member names. Teams will be awarded (15 points) for the written article, (10 points) for first publication, and (2 <u>bonus</u> points) for each additional publication (maximum 10 bonus points). Include copies of all additional published articles in the proposal’s appendix.</p>	<p>25 (plus up to 10 bonus points)</p>

Format/Appearance	
<p>Each team is expected to submit a final proposal as though it would be presented to the client for consideration. The proposal should be in PDF format and with a Table of Contents including each of the sections in the order they are listed on this scoring checklist.</p> <p>Five (5) points will be deducted each time content is not placed in the requested order. Omitting the Table of Contents will result in a score of zero (0) out of 25 points for the Format/Appearance section.</p> <p>Proposals are expected to be of professional quality—with no spelling or grammatical errors, cohesive formatting throughout, and written in a uniform voice & style. Proposals should be no longer than 40 pages and submitted in color. (15 POINTS)</p> <p>An appendix may be added to provide additional material. The appendix may <u>only</u> include volunteer & contractor engagement logs, media articles, product data sheets/cut sheets, and estimate backup documentation. There is no page limit on the appendix, but <u>each item</u> in the appendix <u>must</u> be cited in the proposal using the format: (See Appendix, page ____). (10 POINTS)</p>	25
TOTAL POSSIBLE POINTS	550

Oral Presentation

ELECTRI International will provide the Rules and Regulations for the Oral Presentation to the three finalist teams when selected by the competition jury.

Video Presentation

Your GEC team is encouraged to digitally document your GEC proposal preparation, interactions with NECA contractors, and community service events. The video that you submit for the 2019 ELECTRI GEC Video Competition will be a compilation of the highlights of your team’s effort and positive experiences putting together your GEC proposal. The video can be set to music and/or narrated. **The more creative the better!** Your video shall have a maximum duration of 3 minutes. All videos will be shown during the Green Energy Challenge oral competition at the NECA Convention and some of the videos will be posted to the ELECTRI website. The videos will

be scored by contractors in attendance. The teams with the top three scores will receive awards.

Awards

Three finalist teams will receive a financial award for their respective university program, a plaque, and \$2,000 in travel support from ELECTRI International to attend the NECA Convention. The award for the Best Presenter goes directly to the student winning this category.

Team Presentation

1 st place	\$4,000
2 nd place	\$3,000
3 rd place	\$2,000
Best Presenter	\$ 500

Video Competition

1 st Place Video	\$1,000
2 nd place Video	\$ 750
3 rd Place Video	\$ 500

Travel Support and Complimentary Registration for the NECA Convention

All members of each finalist team will receive complimentary registrations to the NECA Convention. Each team's faculty advisor will receive a discounted registration.

Three members of each team participating in the Video Competition will also receive complimentary registration to the NECA Convention.