ELECTRI International Foundation

Green Energy Challenge

National Student Competition for NECA Student Chapters

2012 Competition Request for Proposal, Rules and Regulations

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2012 NECA Student Chapter Competition: The Green Energy Challenge

ELECTRI International (EI) and the National Electrical Contracting Association (NECA) are pleased to announce the 4th Annual EI/NECA Student Chapter Competition. The Green Energy Challenge competition is intended to provide university students and faculty advisors with an engaging and fulfilling annual event that will foster meaningful interaction between students and NECA member companies.

Competition Goals

- Create an annual event that will engage NECA Student Chapters members in a rewarding educational experience in electrical and energy services contracting.
- Challenge student chapter teams to develop technical skills vital to careers in electrical construction and professional skills in time management, oral, and written communication.
- Provide a mechanism for NECA Student Chapters to create interest in chapter membership and in careers in electrical construction at their university.

2012 Competition Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>Jan 5</td>
<td>RFP delivered to Student Chapter Advisors</td>
</tr>
<tr>
<td>February 1</td>
<td>Registration deadline for Student Chapter Teams</td>
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<tr>
<td>February 3</td>
<td>Conference call to field questions by teams and advisors (for registered teams only)</td>
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<td></td>
<td>12:30-1:30 PM EST</td>
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<td></td>
<td>(A summary of the questions will be circulated to all teams.)</td>
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<tr>
<td>February 6</td>
<td>Webinar about how to use NECAWORKS™ (for registered teams only)</td>
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<td></td>
<td>Time: 1:00-3:00 PM EST</td>
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<tr>
<td></td>
<td>(A recorded version of the webinar will be made available online for everybody who was not able to participate in the webinar.)</td>
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<tr>
<td>March 15</td>
<td>Submission deadline for Building Energy Survey</td>
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<tr>
<td>April 15</td>
<td>Submission deadline for final PDF proposals</td>
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<tr>
<td>April-May</td>
<td>Proposal review by ELECTRI International member panel</td>
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<tr>
<td>June TBA</td>
<td>Notification of results and finalists</td>
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<tr>
<td>Sept 29</td>
<td>Presentations by teams at NECA Convention and Award Ceremony, Las Vegas</td>
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<td></td>
<td>- Top three teams: 15 minute oral presentations + 10 minute Q &amp; A</td>
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<td></td>
<td>- Additional teams: Poster presentation of proposal</td>
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</tbody>
</table>

Competition Format

Teams are challenged to identify a facility on their campus that is in need of energy efficiency improvements. Teams then conduct an energy audit of the building power and lighting systems and a preliminary design of an energy retrofit for power and/or lighting systems. Teams will also design a new solar PV and/or wind energy generation system for the facility, and perform a financial analysis with the use of the NECAWORKS™ energy economic analysis tool.
In addition, teams will be asked to *advance efforts on their campus to improve energy awareness of students and campus employees*. Written proposals submitted by teams will be judged to determine finalist teams. Finalist teams will make 15 minute oral presentations at the Annual NECA Convention to determine overall the overall winner.

All teams may also enter the poster competition at the convention. In the event of a tie in the final round, we will revert back to the first round score.

**Awards**

Three finalist teams will receive the below listed prize money for their respective university program, a plaque and $ 2,000 in travel support to the NECA Convention. The award for the best presenter goes directly to the student winning this category.

<table>
<thead>
<tr>
<th>Team Presentation</th>
<th>Optional Poster Competition</th>
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<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; place</td>
<td>$2,000</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; place</td>
<td>$1,000</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; place</td>
<td>$750</td>
</tr>
<tr>
<td>Best Presenter</td>
<td>$500</td>
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</table>

**Travel Support and Complimentary Registration for the NECA Convention**

Six members of each finalist team and their faculty advisor will receive complimentary registrations to the convention. Three members of each team participating in the optional poster competition will also receive complimentary registrations to the convention.

**2012 Competition Rules**

**Participation**

a. All communications and submissions should be directed to *Sylvia Selwood*, selwood@necanet.org

b. Student participation is limited to undergraduate students. Students who have graduated within six months will be eligible to take part in the team presentation at the convention.

c. Student teams are expected to be between 4-6 core team members but are encouraged to engage fellow students in supporting roles. A maximum of 6 team members can present the proposal at the NECA Convention.

d. **Team members must register** for the competition by *February 1, 2012*. Registration must be completed via an email to Sylvia Selwood including university name, faculty advisor, a preliminary list student team members, and contact information (email) for each.

e. Only one entry/poster per university is permitted.

f. 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.

g. Use of the challenge problem by a faculty member as an assignment in an existing course is strongly encouraged.
External Input

h. The actual work completed must be original and prepared by the team members.

i. Teams are expected and encouraged to gain input and feedback on their proposal from NECA contractors, vendors, materials suppliers and faculty members.

j. No team member is permitted to have worked or earned wages for participation in the competition or the actual project selected by the team.

Client Interaction/Outreach

k. The project “client” for each NECA Chapter Team must be a campus facility at your university.

l. Student teams are expected to conduct themselves in a professional manner in all aspects of the competition.

m. Student teams are expected to plan visits and phone calls with clients in a professional manner that is not disruptive to the activities of the client.

n. Teams are expected to accurately represent the goals and intent of the competition in any website and publication materials that are used to develop sponsorship opportunities and outreach messages about their participation in the competition.

Travel Costs/Sponsorship/Expenses

o. Teams are expected and encouraged to seek financial sponsorship for their teams to support travel costs to the convention and other costs associated with the development of the proposal.

p. Travel awards to finalist teams will be provided through direct billing of airfare and accommodations for the team and will be made in coordination with Sylvia Selwood. Awards for winning presentations and posters will be made to the university department of the winning team and used to support general Student Chapter activities at the discretion of the NECA Chapter Faculty Advisor.

q. The best presenter award will be made in the form of an individual check made out directly to the winning student.

2012 Competition Scoring Summary

Scores will be assessed for both the RFP deliverables in addition to the process followed by the student chapters to complete the challenge. A summary of objective scores for deliverable timing and completion will be provided to judges. Judges will include members of the ELECTRI International and will be named by ELECTRI International leadership.

Competition Scoring

Technical Content

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project summary</td>
<td>50</td>
</tr>
<tr>
<td>Lighting analysis</td>
<td>50</td>
</tr>
<tr>
<td>Energy use analysis</td>
<td>50</td>
</tr>
</tbody>
</table>
PV/Wind Energy system design  
Schematic estimate and schedule  
Financing Plan/NECAWORKSTM tool  
LEED Existing Buildings Review  
Format / Appearance  

50 Points  
50 Points  
50 Points  
50 Points  
50 Points

400 Points

Process Scoring

- Participation in conference call: 20 points
- Site visit/Energy Survey summary: 80 points (-5 points for each day late)
- Team diversity: +5 bonus points / major on team

100 + up to 20 bonus points

Outreach

- Campus energy awareness advancement: 100 points
- Feedback letter from client: 40 points
- Article in Dept./University Newsletter: 30 points
- Local NECA Chapter interaction: 30 points

200 Points (700 points total)

Presentation Scoring

Technical Content

- Lighting Analysis: 100 points
- Energy Use Analysis: 100 points
- PV/Wind Energy Analysis: 100 points

Project Management Content

- Schematic Estimate and Schedule: 80 points
- Finance Plan: 50 points
- LEED EB 2.0 Assessment: 20 points

Experience

- Campus energy awareness plan: 50 points
- Client Interaction: 25 points
- NECA Interaction: 25 points

Professionalism

- Use of time: 50 points
- Exhibit Knowledge of EC Industry: 50 points
- Question and Answer Management: 100 points

(750 points total)
2012 Detailed Scoring - Green Energy Challenge: Campus Audit/Retrofit

Written Proposal Scoring Checklist

Technical Content (400 Points Total)

Project summary (50 Points)

- One page executive summary of proposal (25 points)
- One page summary of client including process of selection (20 points).
- Team resumes (current for each core team member) and mission statement (5 points)

Technical Analysis 1: Lighting Retrofit (50 Points) (it was requested that we itemize the points so that the scores are given more equally - this should apply to all the sections - similar to the financing plan section)

Teams are expected to assess one typical space and make recommendations for a more efficient/green lighting system based on criteria they feel is appropriate for the client (15 points). The new system design may include partial or complete replacement of fixtures, lamps, ballast, and controls. Reflected ceiling plans of existing and proposed design are required. Renderings or perspectives are suggested (20 points). Include impacts on day lighting and energy use in calculations of the cost and benefits of the new system (15 points).

Technical Analysis 2: Energy Use Analysis / Retrofit (50 Points)

Conduct an assessment of the energy used in the facility for heating, cooling, lighting, operations including metering data if available (15 points). Identify likely recommendations for improvements through an investment in energy efficiency (10 points). Select one recommendation and conduct a feasibility study of the return on investment that could be observed if your recommendation was carried out (25 points). Format your results as a proposal to the client for a retrofit project.

Technical Analysis 3: PV/Wind Energy system design (50 Points)

Identify an opportunity to incorporate on-site energy production via solar photovoltaic systems and/or wind energy production on the campus of your client. Include a general assessment of the advantages and disadvantages of options, and a schematic design of the PV/wind system (15 points). The use of the book “Photovoltaic Systems” by ATP is recommended for PV systems analysis. Develop a cost estimate using actual price quotes for system components (30 points). Discuss potential techniques to integrate the PV and/or wind system into the corporate image of the client (5 points).

Schematic estimate and schedule (50 Points)

Develop a cost estimate for the lighting, energy efficiency retrofit, and renewable energy system you propose. Provide sufficient detail to demonstrate your estimate is thorough and inclusive of major cost areas (40 points). Due to the nature of this problem, it is not expected that teams will be able to complete detailed quantity take-off estimates for all elements of the project. A schematic schedule for the proposed work should be limited on one page, and be based on the completion of work in a timeframe that is sensitive to the clients operations (10 points).
**Financing Plan/ NECAWORKS™ (50 Points)**

Energy efficiency and renewable energy projects are the subject of many types of state and federal assistance. The first part of your financing plan should identify all applicable state grants, rebates, and incentives that apply to your project (10 points). The next part of your financing plan should include a payback analysis of the energy cost savings that will be experienced through your project. Assume that energy savings are based on the peak demand cost structure of the applicable utility, AND, that the minimum cost of energy is $0.25/KW. Use the NECAWORKS™ energy economic screening tool to support your conclusions (30 points). Include the impact of the proposed design on the client’s current annual electrical utility costs. The final element of your financing plan should include specific financing strategies (such as power purchase agreements/lease plans) applicable to your solar PV/wind system design (10 points).

**LEED for Existing Buildings Review (50 Points)**

Review the LEED for Existing Buildings criteria provide by the USGBC and provide an assessment of how all facets of the proposed project would contribute to the achievement of LEED EB points. LEED EB Operations and Maintenance (2009 version) is expected to be used by teams.

**Format/Appearance (50 Points)**

Each team is expected to submit a PDF version final proposal including Table of Contents for each of the sections of the proposal in the order described in this checklist and outreach appendix. Proposals are expected to be of professional quality and in color. A page limit of 50 pages should not be exceeded for the technical proposal. An additional appendix may be added (10 pages limit) to provide examples of outreach documents and/or technical references/cut sheets. Submissions of PDF versions are required on the official deadline stated in the competition rules.

**Weight Factor Adjustment**

The nature of this competition will result in variable conditions for teams. Client participation, team skills, and project conditions will vary. It is anticipated that teams will have variable results and success for each of the technical analysis elements of lighting, transformer/distribution systems, and solar / wind topics. Teams will be permitted to request a (1.4) multiplier weight factor emphasis on a particular technical analysis they feel is strength of their team and a corresponding (0.6) multiplier factor to un-weight one section of their proposal that is not strength. This request must be indicted in the executive summary.

**Example:** A team indicating strength in lighting and de-emphasis in PV/Wind systems design would be scored in the following manner:

\[
\text{Adjusted Technical Analysis Score} = \frac{(\text{Lighting retrofit proposal})}{50} \times 100 \times 1.4 + \frac{(\text{Energy audit / retrofit proposal})}{50} \times 100 + \frac{(\text{PV and wind proposal})}{50} \times 0.6
\]

= Total adjusted score for technical analysis sections
Process Scoring (100 + bonus points)

Conference call Q&A participation (20 points)

Teams who register for the competition will be notified of a time in which they may attend a conference call to review the competition rules and format. It is expected that at least one team member or chapter advisor attend this important conference call. Questions about the interpretation of the rules and requirements will be permitted during this call, and will be responded to during the call or noted and responded to in an email notification distributed to all teams after the call. No penalty will be assessed for teams who do not participate in the call beyond the missed opportunity to have your questions addressed. Information about NECAWORKS™ will be discussed on this call.

Building Energy Survey (80 points) - Due March 15, 2012

Teams are expected to conduct an assessment of the existing conditions affecting technical analysis topics. Submit a brief PDF report (5-10 pages) summarizing the existing conditions of the project you will audit including images of a typical space, power systems, and potential locations for PV/wind systems. (5 points will be deducted for each day the submission is late)

Team Diversity (up to 20 bonus points)

The Green Energy Challenge is intended to engage a variety of student strengths and skills. Teams are encouraged to recruit students from multiple disciplines to join their NECA chapter and team. Five bonus points will be awarded to teams for each variable major or major option of study represented on the team (as indicated by official name of degree). Team diversity will be assessed using official major names to be included on team members' resumes.

Outreach Appendix (200 points)

Campus Energy Awareness (100 points)

Teams are expected to develop a plan to improve energy conservation awareness on their campuses that is complimentary to and built upon existing efforts currently taking place on their campus. Scoring will be based upon integration with existing programs (10 points), innovation in program design (30 points), testing and feedback obtained on plan (30 points) and an implementation of the idea completed by the team (30 points).

Feedback letter from client (40 points)

Teams are expected to solicit a letter from their campus operations leadership summarizing the performance of the team and the client’s comments on the project results. This letter is expected to be included in the appendix of the final proposal.

Article in Dept. /University Newsletter (30 points)

Publicize your team’s participation in the Green Energy Challenge! Include in your proposal appendix at least one copy of a planned or completed article that will describe the participation of your NECA Student Chapter in the competition and a summary of the team’s selected client/project. Be sure to include the name of the competition, your sponsors and team member names.
Local NECA Chapter interaction (30 points)

Teams are encouraged to partner/interact with NECA members in the development and refinement of Green Energy Challenge proposals. Provide a brief summary of the interaction your team completed with your sponsoring NECA Chapter and local NECA contractors. This may include face to face visits, phone calls, visits by the team to chapter events, and types of feedback solicited from NECA members on your proposal.

Poster Competition and Judging

All participating teams are invited to enter a poster summarizing their Green Energy Challenge project experience. Posters will be judged by members of ELECTRI International and displayed at the NECA Convention. Please note that you are not required to produce a poster for the Green Energy Challenge; participation in this additional competition is optional.

Poster Awards
1st Place Poster = $750
2nd place Poster = $500
3rd Place Poster = $250

Three members of each team participating in the poster competition will receive complimentary registrations to the NECA convention to present their poster. Travel and accommodation cost for the poster competition must be covered by participating teams.

Content

Posters should provide an attractive summary of your team’s experience. Images from site visits, before/after systems schematics, renderings are encouraged. Your poster should be versatile informative to multiple audiences. Consider stating your project goals, analysis details and results clearly with headings.

Include

- Competition Name: 2011 ELECTRI International/NECA Green Energy Challenge
- University name and logo, team member names, and names of advisor(s)
- Name and address of client and client representative
- Local NECA Chapter and NECA Contractors that assisted your team

Directions

Max size = 36” WIDE x 48” HIGH (Portrait format)

Bring posters to room (TBA) butterfly clips will be provided to attach your poster and display on an easel (also provided).

Judging Criteria

Judges will be provided with the following instructions on a paper ballot:
Poster Contest:
Green Energy Challenge: NECA Student Chapter Competition

Please assess NECA Student Chapter posters based on their overall professional appearance, technical content, and creativity.

Indicate the top posters by placing a 1, 2, and 3 next to the team names below.
(List of teams in alphabetical order)

Oral Presentation
Three finalist teams will be offered the opportunity to make an oral presentation to a panel of NECA industry leaders. This presentation will be used to rank the finalist teams in 1st, 2nd, and 3rd place positions. The oral presentations will also be used to identify a “Best Presenter” award.

Scenario
Teams have been asked to explore an energy retrofit/green energy project as a potential opportunity for their firm to pursue. Teams should assume the audience for the presentation to be senior members of their own firm who are seeking potentially lucrative energy projects to pursue as a turnkey design-build energy efficiency project.

Format
Teams will be invited into the presentation room in order and offered 2-3 minutes to greet judges and assemble for their presentations. They will be allowed 15 minutes to make an oral presentation that communicates the highlights of their project. Each team member is expected to participate. The presentation will not be interrupted by questions. After the presentation, a 10 minute question and answer session will begin. Once teams have completed their Q&A session they will be expected to join the audience for the remaining presentations.

Audio/Video
EI/NECA will provide a video projector and a laptop computer which must be used by all teams. Teams will not be permitted to substitute their own device. Teams will be expected to provide PowerPoint presentations to Sylvia Selwood at least 30 minutes prior to the start of the first presentation via a USB compatible storage device. Teams will NOT be permitted to submit their presentations via email.

Video Recording
The three finalist presentations will be recorded on video at the NECA Convention and made available online on the ELECTRI International and/or the NECA website(s). By participating in the Green Energy Challenge team members agree to be recorded during their presentation. The presentation videos will be used by ELECTRI or NECA for educational/instructional purposes only.

Room Set-up
The room set-up will not be finalized until the convention is in progress. Teams should expect to remain standing during their presentations.
**Scoring Rubric provided to judges**

<table>
<thead>
<tr>
<th></th>
<th>Fair</th>
<th>Average</th>
<th>Excellent</th>
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<tbody>
<tr>
<td><strong>Technical Content (weight = 300 pts)</strong></td>
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<tr>
<td>Lighting Analysis</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Transformer/Distribution Analysis</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>PV/Wind Energy Analysis</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td><strong>Project Management Content (weight = 150 pts)</strong></td>
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<tr>
<td>Schematic Estimate and Schedule</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Finance Plan</td>
<td>1</td>
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<tr>
<td>LEED EB 2.0 Assessment</td>
<td>1</td>
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<td>3</td>
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<tr>
<td><strong>Experience (weight = 100 pts)</strong></td>
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<tr>
<td>Student Energy Awareness</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Client Interaction</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>NECA Interaction</td>
<td>1</td>
<td>2</td>
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<td><strong>Professionalism (weight = 200 pts)</strong></td>
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<td>Use of time</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Exhibit Knowledge of EC Industry</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Question and Answer Management</td>
<td>1</td>
<td>2</td>
<td>3</td>
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Nomination for Best Presenter Award (circle one from list of team member names)
NECAWORKS™

NECAWORKS™ is a web-based energy and economic screening tool for the exclusive use by NECA members. This year, NECAWORKS™ will also be made available to student teams participating in the 2012 Green Energy Challenge.

NECA contractors are adapting their businesses to provide total energy solutions for their clients. Great value exists in working with existing and new clients to provide a variety of energy-related services, including energy audits, implementation of energy efficiency measures and installation of renewable energy solutions. These services ultimately involve a reduction in clients' energy costs with a more environmentally friendly solution. Typically, a client is asked to invest up-front capital in exchange for a reduction in energy costs over time. The client expects to see a return-on-investment of the project, taking into consideration the value of money spent in the present and future. Therefore, a project pro forma, or financial projection, based upon the costs and energy usage over the life of the project must be generated.

The NECAWORKS™ website offers the fundamental tools and information links to "screen" a project. Using data supplied by you and your client, it determines a "benefit/cost ratio", or "B/C ratio" for projects you intend to bid. What is a benefit/cost ratio? It is a calculation - based upon your input of the project's costs, energy and other applicable factors - that serves as an indicator of the project's worthiness of "next step" decision-making and should be used to rule out projects that have a low probability for success and highlight projects that may pass your client's return-on-investment objectives.

NECAWORKS™ requires accurate information about energy use and applicable utility rates and tariffs, and also requires accurate estimates of proposed energy savings/generation capacity of retrofits.

Information regarding access to NECAWORKS™ will be distributed to teams who register for the GEC. A webinar to present the use of NECAWORKS™ to teams will also be scheduled on February 6, 2012, 1:00-3:00pm EST. A recorded version of the webinar will be made available online after the webinar for information and review.

Each student chapter's advisor or manager will have an access level to log-on to the application online (here: http://www.necanet.org/ncaworks) they will also have access to manage their student chapter's profile on the NECA website (here: http://www.necanet.org/PortalTools/MyAccount.cfm)