

## **Energy Challenge 2017-18**

**Sponsored by ComEd & ISU Center for Renewable Energy**

### **Introduction: About ComEd**

Commonwealth Edison Company, perhaps better known as ComEd, is a unit of Chicago-based Exelon Corporation (NYSE: EXC). Exelon is one of the nation's largest electric utilities, with approximately 5.4 million customers. ComEd provides service to approximately 3.8 million customers across Northern Illinois, or 70 percent of the state's population. ComEd is an energy *delivery* company – meaning that they do not own power plants or make electricity. Instead, they deliver electricity to homes or businesses. To do this, ComEd manages more than 90,000 miles of power lines in an 11,400-square-mile territory of Chicagoland. Since 2001, ComEd has invested more than \$5 billion in electrical transmission and distributions system to continue to provide customers with quality service.

Providing safe, reliable electric service to their 3.8 million customers is just part of what ComEd does. They also help customers discover new ways to save money on their electric bill and help the environment by decreasing their carbon footprint.

### **Introduction: About the Center for Mathematics, Science, and Technology (CeMaST)**

The **Center for Mathematics, Science, and Technology (CeMaST)** at Illinois State University is committed to helping people make active and knowledgeable decisions about energy usage, renewable energy, and sustainability practices. Since research and education in renewable energy have become national priorities, it is appropriate that Illinois State University coordinate its efforts in this area. A group of Illinois State University faculty from several disciplines and multiple colleges has been meeting since 2002 to discuss educational and research opportunities in renewable energy. CeMaST works with teachers, schools, the State of Illinois, and businesses to meet the growing need for education, outreach, and research. Illinois State University created CeMaST in 1992 and it serves as a research and public service unit formally recognized by the State of Illinois (For more information about the CeMaST, please visit <http://CeMaST.illinoisstate.edu/>).

### **Energy Challenge**

A **Community of the Future** is a neighborhood where local residents, businesses, and government leaders can collaborate to create a “smart community.” This community is connected, custom, livable, and sustainable. The smart grid and a host of other technologies and related services are used to enhance the everyday lives of community members. Residents and businesses are connected to smarter technology that enables them to reduce their energy consumption, cost for energy, and carbon footprint, while enhancing the livability, workability and sustainability of the community. Other services can include energy efficiency programs, sensor-enabled traffic, parking, and street lighting, electric vehicle charging stations, solar

storage technology, and a host of other innovations. Energy efficiency is a cost-effective way to reduce harmful carbon emissions which contribute to climate change.

A **Community of the Future** depends on a modernized smart grid or a microgrid, a small power grid that connects to the main grid or can operate independently. Smart meters, which allow for two-way communication between utility and customer, and smart switches, which help improve power reliability by rerouting electricity when an outage occurs, are two technologies used in a Community of the Future. Communities of the Future should consider critical public infrastructure, such as hospitals, universities, or police stations. A Community of the Future can support any neighborhood or city in their efforts to build a clean energy future.

These innovative communities must recognize a diverse population and work with local businesses, community groups, and residents to understand and address current and future community needs. They focus on helping residents save time and money while ensuring the community has a voice to participate in technologies and initiatives that influence their everyday lives and activities.

#### **Predicted Problem Statement:**

**You are being asked to create your own Community of the Future. This community should use renewable energy, smart meters, smart grids, and/or new innovative methods to create savings and sustainability for those living and working there.**

**Step 1. Define your community.** We are asking you to think outside of the box on this one. Your own community can't be the one that you select. Try to get out of your comfort zone and select a community that differs from your own in as many ways as possible. Think about the needs of people living in different geographic areas, and what kind of energy they already use.

- Choose between urban, rural, and suburban
- Think globally - your community does not have to be in the U.S.

**Step 2. Narrow your focus.** Tackling an entire community is overwhelming, so decide which aspect of your community your solution will address.

- Do you want to focus on a smart home, which can be replicated in a community
- Are you interested in creating a solution for a school or larger facility
- Do you want to create a smart grid, a micro-grid, or some alternative
- Maybe you want to focus on smart meters and how that data is collected and used to benefit your community
- Do you want to create an innovative product or app that all community members can use
- Do you want to focus on energy savings, financial incentives, and/or efficiency promotion?

The sky's the limit in terms of your creativity, and narrowing your idea will make your solution more applicable.

**Step 3. Pitch your idea!** You have the unique opportunity to work directly with experts in the field, who can help to turn your idea into an applicable solution. Please create a 5-minute pitch explaining your idea and why you've selected it. Your mentors will give direct feedback, which you will then incorporate before you move onto the next step. You can use visuals, slides, or products to explain your idea in the 5 minutes.

**Step 4. Design and research** the process you will go through to create your solution. Do some background research on similar communities, solutions that already exist, and familiarize yourself with smart home products and smart meters. Think about what you want your community to provide, what your desired outcome is (cost savings, 100% sustainability, greater security or safety, etc.), and what community factors you will need to consider. Use wireframes, and visual design to map out what you want this community to look like.

**Step 5. Prototype and present** your idea. You will have a designated amount of time to finalize and create your idea. Consider if you want your final product to be a prototype, design, app, visual presentation, etc. Make sure you are ready to do this by having your solution finalized before moving forward. Practice presenting your presentation to audiences that are unfamiliar with the Challenge and solution to make sure you're able to accurately explain your idea.

**Resources:**

[ComEd: Community of the Future Plans](#)

[Smart Meters | ComEd - An Exelon Company](#)

[Grid Modernization | ComEd - An Exelon Company](#)

[Smart Grid Resource Center | ComEd - An Exelon Company](#)

[Innovation & Technology | ComEd - An Exelon Company](#)

[For Your Home | ComEd - An Exelon Company](#)

[For Your Business | ComEd - An Exelon Company](#)

[Energy.gov](#)

[Smartgrid.gov](#)

[https://www.rd.usda.gov/files/UEP\\_RUSSmartGrid\\_BOC.pdf](https://www.rd.usda.gov/files/UEP_RUSSmartGrid_BOC.pdf)

(The USDA website for Rural Utilities Service has resources and guidance regarding public utilities)

<https://www.nrel.gov/workingwithus/learning.html>

<https://energy.gov/articles/how-microgrids-work>

<https://energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-syst-0>

<https://energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/role-microgrids-helping>

<https://energy.gov/eere/buildings/zero-energy-buildings>

<http://www.pgecurrents.com/2016/03/01/stockton-pge-habitat-for-humanity-dedicate-new-zero-net-energy-home-to-deserving-families/>



