2017 brought exciting changes and developments within our five markets: solar, electric transportation, commercial and industrial, residential, and motors and drives. Enthusiasm was a common feeling around the office, as we saw numerous opportunities for employee growth, program development and member support. We continued our commitment to quality work and our passion for innovative energy solutions. We are excited to share our biggest achievements of the year with you through our annual report.
Electric Vehicle Planning for Electric Cooperatives

Advanced Energy has been working in the electric transportation market for 30 years. Our focus is on ensuring that people, communities, organizations and electric utilities learn about and prepare for electric vehicles. As new developments arise, we provide guidance, training, education and consulting to strategically shape the electric transportation market. One example of our customized work is our electric vehicle strategic plans for electric cooperatives. To help electric cooperatives encourage and prepare for electric transportation, we developed a step-by-step strategic planning process. The process includes an analysis of the current electric vehicle market in a cooperative’s territory, stakeholder education and the development of strategies to support electric transportation. As more people are plugging in and driving electric, it is exciting to see electric cooperatives embracing their new role as vehicle fuel provider.
Duke Energy PV Interconnection Commissioning

This year, Advanced Energy was selected to lead Duke Energy’s PV Interconnection Commissioning in its North Carolina and South Carolina territories. PV Interconnection Commissioning includes reviewing facility as-built construction for compliance with documentation studied and approved by the utility, assessing the facility’s AC construction to ensure it is built to quality standards, verifying inverter and/or customer recloser interconnection protection setpoints, and conducting three phase and single phase cease to energize testing.

Solar Interconnection Standards

We played a key role in facilitating the process for the review and update of the North Carolina interconnection standards, which define many of the requirements that regulated utilities and independent power producers must meet in order for solar, biowaste and other forms of electrical generation to be integrated into the electric grid. Bringing together stakeholders from around the state and in multiple sectors (solar developers, utilities, North Carolina Public Staff), we gathered input from various groups and facilitated meetings to allow stakeholders to present and share their perspectives. The end result will be a compilation of all of the proposed revisions to the current standards.
Electric Motors and Drives Projects

In 2017, our motors and drives team completed a variety of projects for motor manufacturers, original equipment manufacturers (OEMs), the motor repair industry and the U.S. Department of Energy. We helped motor manufacturers obtain and continue their certifications for selling in the United States and Mexico, and we successfully continued our relationship with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) by re-signing a contract to remain the only lab worldwide accredited to test to AHRI 1210 for variable frequency drives (VFDs) through 2020.

In the OEM market, we assessed the performance of hermetic compressor motor designs over several months so that the manufacturer could offer a more reliable and competitive product. For another customer, we calibrated the power input of an electric motor to help better determine system and component efficiencies in industrial fans. We assisted motor designers with testing new high power density permanent magnet technology and helped others evaluate electric motor build quality, efficiency and thermal performance.

Through our Proven Efficiency Verification (PEV) program and the Electrical Apparatus Service Association’s (EASA’s) accreditation program, we helped motor service centers improve the quality, reliability and efficiency of the motors they repair. This year, service centers who initially joined EASA’s program through Advanced Energy have been going through their second round of external on-site audits.

2017 HIGHLIGHTS

Renewed contract through 2020 to remain only lab worldwide able to test to AHRI 1210 standard for VFDs.

Renewed mutual recognition agreement with ANCE to test to NOM-016-ENER-2016 and NOM-014-ENER-2004.

Conducted second-round on-site audits for service centers who initially joined the EASA accreditation program in 2014.
To educate motor end users, we held three motor management workshops in North Carolina and South Carolina that covered motor best practices for maintenance, operation and repair. Partnering with Duke Energy, we developed training aids to help end users understand the importance of correct motor starting for equipment and utility systems.

Furthering our work with Duke Energy, we expanded our multiyear research to assess how the proliferation of solar installations in North Carolina is affecting the utility’s power network. We also led a long-term study on the potential demand reduction benefits of a distributed energy storage lighting platform to be used in demand response programs.
Regional Energy Efficiency Organization Partnerships

We continued partnering with the national network of regional energy efficiency organizations (REEOs), particularly the Northwest Energy Efficiency Alliance (NEEA) and the Southeast Energy Efficiency Alliance (SEEA). In our work with NEEA, we have been supporting their residential programs by providing instructional design recommendations and training deliverables for the new homes market, ductless heat pumps and heat pump water heaters. With SEEA, we assisted with a project focused on the U.S. Department of Energy’s residential energy code field study. We helped assess the potential energy savings in the Southeast through increased code compliance, and offered technical support in successfully meeting the energy code. As part of this effort, we also created three modules for the Southface Energy Institute’s learning management system. These modules presented compliance information and recommendations for duct sealing, insulation installation and lighting.

U.S. Department of Energy Weatherization Assistance Program Solution Summits

We designed and delivered four collaborative meetings (known as solution summits) for the U.S. Department of Energy National Renewable Energy Laboratory that focused on the Weatherization Assistance Program. The summits were held in Atlanta, Georgia; Philadelphia, Pennsylvania; Biloxi, Mississippi; and Phoenix, Arizona. Each event brought together stakeholders from a variety of roles in the weatherization program, with the goal of gathering feedback and documenting recommendations to improve the efficiency and effectiveness of the program on a national scale.
NC GreenPower

In 2017, NC GreenPower continued improving the environment with renewable energy, carbon offsets and supporting K-12 schools across North Carolina. Using voluntary contributions, NC GreenPower helped make solar, wind, landfill methane, and school solar photovoltaic (PV) projects feasible. The Solar Schools pilot program – which offers funding for small solar PV arrays and curricula to educate students about renewable energy – completed another successful year, its third, and five schools held ribbon-cuttings. Contributions to this program have helped install solar PV systems for more than 7,500 students at nine schools across our state. Since NC GreenPower’s inception in 2003, generous donations have provided incentives for 1,000+ local renewable energy projects that generated 892 million kilowatt-hours of green power from North Carolina solar PV, wind and landfill projects. Carbon offset donations supported 66,000+ tons of greenhouse gas mitigation through landfill methane capture projects, which is the environmental equivalent of planting 154 million trees.
Affordable Housing Projects

We continued to work with North Carolina’s affordable housing market through a partnership with the North Carolina Housing Finance Agency. For nearly two decades, our SystemVision program has been ensuring that new and existing homes are healthy, safe, comfortable, durable, energy efficient and affordable for the long-term. We are encouraged to see the energy efficiency assistance we provide improve people’s lives on a daily basis, and in 2017, SystemVision certified its 5,000th home! That is 5,000 families that have the opportunity to live in a comfortable and energy efficient house, saving money every month that can be put toward other uses.

We also had a great opportunity to work with Duke Energy on a low-income program and help them present the value of this program to the North Carolina Utilities Commission in the form of a final report. The program, known as the Helping Home Fund, assisted low-income customers with managing their energy costs and promoting their health and safety. It provided income-qualified homes with appliance replacement, weatherization, health and safety measures, and heating and cooling equipment replacement and repair. Part of our role was to assist with assessing the non-energy outcomes of the program, including comfort, well-being, economic benefits and safety.

Unique & Valuable

- We think of our builders as partners.
- We train builders and subcontractors within the context of a program.
- We train competency through mentoring.
- We acknowledge that people learn better when they can try out the tasks themselves and be offered opportunities to improve over time.
- We help our partners troubleshoot and come up with process improvements to prevent future failures.
- We build a culture of prevention rather than penalty.
- We care about our relationships with each partner.
- We work to resolve conflicts.
- We are open to feedback.
- We promote a culture of blaming process before people (internally and externally).
- We care about results.

“SystemVision has guaranteed the heating and cooling usage for 5,000 homes in North Carolina. That’s low-income households that have more predictable energy bills, while living in comfortable, durable homes.”

– Maria Mauceri
SystemVision Manager
Exploring North Carolina Smart Grid - Webinar Series

Since 2009, Advanced Energy has been working to educate North Carolina stakeholders on smart grid technologies. This year, our team of technical and training staff collaborated on a webinar series to provide non-technical government and business stakeholders with a convenient and economical option to learn how the smart grid is changing North Carolina’s future. The webinar topics included smart grid basics, solar power and grid integration, smart meters and advanced metering infrastructure, microgrids and grid resiliency, and self-optimizing grid technologies. We partnered with utilities on this effort to include expert guest speakers and create case studies that provide real-world examples of smart grid technologies. This effort will continue in 2018 with additional webinars and case studies on smart grid topics.
Industrial Consulting with ISO 50001 and SEP

Our industrial work had a very productive year in terms of the amount and diversity of energy efficiency assessments and consultations. As one example, we partnered with a large elevator systems manufacturing site in our first full, independent strategic energy management (SEM) engagement with an industrial customer. We coached and consulted with the company on preparing for ISO 50001, Energy Management System certification. We have also been helping Duke Energy reach out to customers with ISO 50001, SEM and Superior Energy Performance (SEP) engineering support. Duke Energy is looking to improve its customers’ overall site and process energy efficiency, and we have been selected as a subject matter expert for all aspects of this endeavor.

Advanced Energy Online Analytics & Training Metrics

Through online outreach and in-person trainings and events, Advanced Energy increased awareness and education on motors and drives, electric transportation, solar, residential, commercial and industrial, and smart grid topics.

- **39k** Website Visitors
- **95k** Website Page Views
- **83** Educational Events
- **65k** Twitter Impressions
- **85k** LinkedIn Impressions
- **4,380** Event Attendees
Supporting the Community

The Advanced Energy team loves volunteering in our community. This year, we organized three volunteer opportunities. We continued our work with Habitat for Humanity and assisted at Build-A-Block in Raleigh to help paint a few newly built homes. We also volunteered with Haven House Services to collect school supplies for their annual back to school drive. Lastly, we hosted our annual campaign to raise money for the United Way of the Greater Triangle. Each year, our team raises money to support the United Way's programs that lead to youth success, early childhood success and stable homes.