K-STATE Research and Extension

Explore Your Spark!

Electric and Renewable Energy

Discover the power behind everyday life through the Kansas 4-H Electric and Renewable Energy project! Youth explore how electricity works, how renewable energy is created, and how technology powers homes, tools, and devices we use every day. Through exciting hands-on activities like building circuits, alarms, motors, and electronic projects, members learn safe wiring practices, energy efficiency, problem-solving, and skills connected to future careers. Whether just beginning or ready for advanced electronics, youth gain confidence, creativity, and real-world knowledge while working alongside caring adult volunteers. This project helps young people become curious innovators and Beyond Ready to power the future safely, responsibly, and creatively.

Starting Out *Beginner*:

- Understand electrical safety including proper Personal Protective Equipment (PPE).
- Learn the proper tools and how to use them.
- Terminology used for electrical skills.
- Learn basic soldering skills.
- How is electricity made.
- Wire a simple circuit.

Learning More *Intermediate*:

- Learn about Ohm's Law and use a volt-ohm meter.
- Read and label a circuit diagram.
- Build a three-way switch.
- Identify conductors and insulators.
- Design and build a wind powered boat.
- Design and build a wind turbine.
- Discover where and why the wind blows.

Expanding Horizons *Advanced*:

- Learn Watt's Law.
- Determine your family's electrical usage.
- Measure electric usage of appliances.
- Test grounded outlets.
- Research the influence of electricity on society.
- Build simple radios, microphones, computers and other equipment.
- Investigate your home's electrical panel; label all circuits.

Beyond Ready

Ready to Lead

Youth involved in 4-H are **two times more likely to have the goal of becoming a leader.** Through real-world experiences and the guidance of caring mentors, they develop the confidence, communication, and decision-making skills needed to lead in today's changing world.

Ready to Serve

Youth who participate in 4-H are **three times more likely to engage in community service.** Service learning provides them with purpose and connection at a time when **more than 53% of Gen Z report feeling lonely.** Through 4-H, youth are empowered to serve with compassion and make a meaningful impact.

Ready to Build

With nearly **10 million unfilled jobs and 77% of employers seeking real-world skills,** 4-H helps youth build what matters. Through hands-on projects and career exploration, youth gain adaptability, problem-solving, and workforce readiness.

Ready to Conquer

While 52% of young people feel like they're failing at life goals, 4-H youth rise with resilience. Backed by research and supported by caring adults, they learn to overcome challenges, set goals, and take charge of their future with confidence.

Building a Ready Generation in a World of Change!

Electric and Renewable Energy Project

Expand Your Experiences!

Healthy Living:

- Learn safe electrical practices at home, outdoors and while traveling.
- Recognize common electrical hazards (overloaded outlets, damaged cords, unsafe wiring, downed power lines, etc.).
- Learn how renewable energy and energy conservation can support a cleaner, healthier environment.

Science and Agriculture:

- Explore how electricity powers modern agriculture and precision farming technology.
- Learn how renewable energy sources such as solar, wind and hydropower can support farms, homes and communities.
- Discover how technology and electricity help improve food production, transportation, communication and daily life.

Community Vitality:

- Share electrical safety knowledge with family, schools, and community members to help create safer homes and public spaces.
- Participate in community service projects involving energy conservation, recycling electronics or promoting renewable energy awareness.

Communication and the Arts:

- Create educational displays, posters, videos or demonstrations that teach others about electricity, electronics and renewable energy.
- Learn how sound, lighting and electrical technology are used in music, theater, photography and digital arts.

Career Exploration:

- Tour colleges offering electric and renewable energy education.
- Explore careers in electric and renewable energy.
- Shadow a professional electrician.
- Attend career exploration events.
- Investigate emerging careers in electric and renewable energy.
- Create a real/conceptual electric or renewable energy product or service business; participate in a YEC (Youth Entrepreneurship Challenge).
- Explore cybersecurity jobs in the electric or renewable energy career field.

Contact Information

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Website: kansas4-h.org

Resources & Events:

Attend events and take advantage of opportunities to expand your project learning and help enhance your communication skills.

- Club Day Presentation
- Kansas 4-H Discovery Days
- Summer Day Camps
- Project Workshops
- County and State Fair
- Career Exploration Tours
- Serve on PPT (Project Partnership Team)
- Regional and State Kidwind Challenge, Kansas Energy Program

Curriculum & Resources:

Contact your local Extension office.

- Kansas 4-H Website
- National 4-H Curriculum - Electric
- National 4-H Curriculum – Renewable Energy
- A Variety of Instructional Videos by EE In A Box
- How to Solder
- Series Circuit
- Parallel Circuit
- Extension Cord or Trouble Light Assembly
- How to Properly Connect Wires Together Using Wire Nuts

4-H Record Keeping:

Learning to keep accurate records is a life skill.

- Setting 4-H Project Goals (4H1100)
- Kansas 4-H Record Keeping
- Keep a project journal:
  - Wiring techniques learned
  - Renewable energy calculations or comparisons
  - Costs
  - Tools used
  - Time spent
  - Photos of progress

Project Exhibit Ideas:

- Series and parallel circuit boards
- Light bulb circuit display
- Conductors vs. insulators experiment
- Morse code circuit
- Homemade flashlight
- Mini solar car
- Doorbell or buzzer system
- Proper tool identification board
- Solar powered oven or fan
- Solar lighting system
- Wind turbine model
- Push-button light displays
- History of electricity

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Kansas State University Cooperative Extension Service
Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Extension, Kansas State University, County Extension Councils, Extension Districts. Kansas State University is an equal opportunity provider and employer. 4H1187 June 2026