

Natural Resources & Environmental Service System (NRES) & Energy & Natural Resources (ENR) Crosswalk

Skilled to Meet the Moment: Students working with soil, water, land and the natural environment are learning are skills vital to energy production

- ✓ Ag teachers are **already meeting energy standards** through NRES instruction
- ✓ Energy careers naturally align with **existing AFNR pathways**
- ✓ Lessons support **Perkins V, CTE program approval, and workforce readiness**

NRES (AFNR) Standard	ENR Standard	Shared Focus	Example Lesson Meeting Both Standards
MN.NRES.01 Ecology & Resource Management	ENR.01 – Energy Foundations	Energy flow in natural systems	Students model energy flow through an ecosystem and connect it to energy inputs/outputs and efficiency concepts.
NRES.01.02 – Atmospheric Systems & Climate	ENR.01.05 – Energy Sources & Environmental Impact	Climate change & greenhouse gases	Analyze how fossil fuel and renewable energy use affects atmospheric carbon and climate systems.
NRES.01.03 – Aquatic Systems	ENR.05 – Conservation & Land Management	Water as a managed resource	Compare watershed health before/after a hydroelectric dam or cooling-water discharge.
MN.NRES.02 Human Impact & Conservation	ENR.01.05 – Energy & Environment	Human energy use & sustainability	Conduct an energy audit of a school or farm and evaluate environmental impacts.
NRES.02.04 Economics of Resources	ENR.02 – Clean Energy	Energy economics & tradeoffs	Compare costs, benefits, and land impacts of wind, solar, and biofuels in Minnesota.
MN.NRES.03 Resource Production & Processing	ENR.02 – Clean Energy	Renewable energy as a resource	Trace the life cycle of biofuels from crop production to energy use.

NRES (AFNR) Standard	ENR Standard	Shared Focus	Example Lesson Meeting Both Standards
NRES.03.01 – Extraction & Processing	ENR.08 – Resource Extraction	Environmental impacts of extraction	Evaluate mining or fossil fuel extraction methods and propose mitigation strategies.
NRES.03.02 – Mapping & GIS	ENR.03 – Transmission & Distribution	Infrastructure & land use	Use GIS to map ideal locations for wind turbines or transmission lines.
MN.NRES.05 Environmental Research	ENR.06 – Ecological Research & Development	Data-driven decision-making	Collect and analyze water, soil, or air data related to energy production impacts.
MN.NRES.06 Environmental Policy	ENR.07 – Environmental Protection	Energy regulation & policy	Analyze how the Clean Air Act or state energy policy affects energy producers.
MN.NRES.04 Safety, Health & Ethics	ENR.01.01 / UT.01.06	Workplace & environmental safety	Identify hazards and PPE needs for utility, forestry, or energy site work.

Career Callouts: Natural Career Connections

Energy & Utilities

Lineworker • Power Plant Operator • Grid Technician • Energy Auditor

Renewable Energy & Bioenergy

Wind Technician • Solar Installer • Biofuels Technician • Energy Systems Technician

Natural Resources & Conservation

Conservation Technician • Watershed Specialist • Forester • Land Mgmt. Specialist

Environmental Science & Policy

Environmental Tech • Sustainability Coordinator • Environmental Compliance Specialist

Engineering, Research & Data

Energy Engineer • Environmental Research Assistant • GIS Technician

Mini Lesson Bank (Ready-to-Use Examples)

1. Energy Flow & Ecosystems

Students model energy flow in a local ecosystem and connect it to efficiency losses in energy generation systems.

2. Renewable Energy Siting Challenge

Using maps or GIS tools, students identify ideal locations for wind or solar while balancing land use, wildlife, and community impact.

3. Biofuels Life-Cycle Analysis

Trace biofuel production from crop to combustion, evaluating environmental and economic tradeoffs.

4. School or Farm Energy Audit

Students analyze energy use, propose conservation strategies, and calculate cost and emission reductions.

5. Policy & Community Debate

Role-play stakeholders debating an energy project, incorporating environmental data and regulations.



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