



AUDUBON CENTER OF THE NORTH WOODS

A Proud Leader in Environmental Education and Renewable Energy

Our Mission:

To protect, improve and promote the enjoyment of the natural environment through formal and informal education programs and research; to assist and encourage environmental education programs, centers and careers.

Our Campaign Goal:

To eliminate our carbon footprint through on-site use of renewable energy, reduction of energy consumption, and the use of appropriate energy resources

Sustainable Energy Campaign



About the Audubon Center of the North Woods

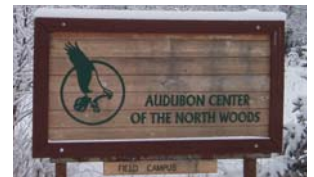
The Audubon Center of the North Woods (ACNW) is a non-profit 501(c)(3) educational institution dedicated to sustainable environmental conservation. As a residential environmental learning center, retreat and conference center, and a leader in renewable energy production, ACNW offers a variety of environmental learning experiences for people of all ages and backgrounds. Nestled in a beautiful, peaceful setting on the shores of Grindstone Lake in east-central Minnesota, our diverse 535-acre sanctuary offers a range of dispersed classrooms in a variety of habitats, including old-growth red and white pines, hardwood forests, restored wetlands and prairies.

Our programs use the environment as the blackboard and laboratory to educate ACNW's constituents - students, teachers, academic and research institutions, the general public and community leaders - on the need to support a sustainable relationship between their health and the state of the environment. We are committed to developing an understanding, ethics and responsibility regarding the environment and the role of humans through formal and informal experiences that link nature and humans.

Our vision: The environment is the blackboard for the center's educational programs; the common ground that brings us together with the natural world. This is where people from around the globe come to share concerns for one another and the future. It is through positive and shared experience that we hope we can affect the values and actions of people to shape a world of harmonious diversity.

A Glimpse of What We Offer

- Residential environmental programs (RELC) for K-12 school children
- Environmental and energy education outreach programs
- Conference and retreat facilities
- Adult, youth, community and family events and weekends
- Elderhostel and intergenerational elderhostel programs
- Undergraduate and graduate field campus for a number of colleges and universities
- Adventure, naturalist and team-building programs
- Miles of trails and dispersed classrooms
- Accredited by the North Central Association of Colleges and Schools.





— *Walking the Walk* —

The Audubon Center of the North Woods Commitment

Through our programs, facilities, energy systems, atmosphere and way of life, we strive to model and teach the philosophy of living a sustainable, carbon-neutral lifestyle. All visitors to ACNW develop a deeper understanding of environmental stewardship. Empowered by new knowledge about environmental systems, and how these systems are connected to personal health and the health of the planet, visitors become more informed decision-makers. An informed population yields more environmentally responsible policies that benefit immediate and long-term sustainability throughout the world's communities.

Our Program Areas

RELC and Outreach:

ACNW has had 35 years of residential environmental education which we cover through a complex set of program departments. The Center is accredited as a school by NCA CITA (North Central Commission on Accreditation and School Improvement). Our K-12 program is divided into three thrusts: residential programming for schools that is 3-5 days in length for 75 schools, many of which have 40% or greater free and reduced lunch participants; a day use program for local schools; and an outreach program that goes to schools with our veggie oil burning EcoRV, birds of prey, and programs on alternative energy.

Community Programming:

We reach the surrounding 5-county area with dinner lecture series, brunches, concerts, farmers market, ecotourism events, speakers, and public education events. These are essential to extending our influence to the local area, providing quality education and entertainment. We are dedicated to working with our local area while we address our schools and colleges from other areas.

College Programs:

ACNW has been a field campus for Northland College since 1976, Inver Hills Community College since 1982, and Hamline University's Graduate Degree in EE since 1998. Our January term attracts students from 27 colleges. We have now added Concordia College, Anoka-Ramsey Community College, Carroll College, Luther College, and Dubuque University to our college partners. These are important to our mission since they allow us to train teachers and prepare students for careers in education and the environment.

Conferences and Retreats:

We provide a quality "green" location for groups and add information about our sustainable energy program, organic and/or locally produced food, and other options that provide an excellent conference or retreat experience as well as contribute to a deeper appreciation and understanding of our natural surroundings.

"Minnesota's Environmental Learning Centers are the perfect place to demonstrate one of humankind's most urgent requirements: reducing our global warming emissions by 80% before it's too late."

Michael Noble, Executive Director Fresh Energy



Our Current Renewable Energy Systems

Grid-connected Solar System

We have three photovoltaic arrays (towers). Each array consists of 16 panels that produce 2900 kw/hour, for a total of 8,700 kw/h. The DC current produced by the panels is sent through an inverter, changing DC to AC, which then goes right to our electrical panel. This system is grid-connected—if there is excess electricity produced from the arrays, it is sold back to the electric company.

Solar Hot Water System

We have recently installed two 4 ft x 10 ft flat panel collectors on the roof of Crosby Lodge to supply hot water to that building.

Wind Generator

Like our solar arrays, our Hummingbird Wind Generator is grid-connected and supplies 3 kw/h.

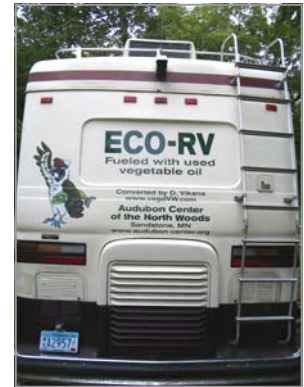
EcoRV

We have converted a donated 36-foot RV to run on used, filtered vegetable oil (biodiesel) and dubbed it our “EcoRV”. We use this vehicle in our outreach and community programs.

Ground Source Heating & Cooling System

ACNW is now primarily heated and cooled with a geothermal heat pump system. There are different types of geothermal systems and we chose a closed vertical loop. Our system consists of 30 vertical holes, 208 feet deep and 25 feet apart. Loops of pipe, inserted into the holes, are connected to a horizontal underground pipe that carries fluid in a closed system to and from the indoor heat exchange unit. That closed loop fluid is circulated by a ground pump to the heat pumps and then through circulating pumps to distribute it to individual fan coils.

Before our geothermal system was installed, we heated with LP gas. We have been able to eliminate two 1,000 gallon LP tanks and save about \$5,000 per heating season – the remaining LP tanks are used for cooking, hot water and emergency boiler usage. The electric usage of our geothermal system (due to the pumps) is offset by the solar arrays and elimination of window A/C units.



“It is imperative that environmental education ‘walk the talk’ when it comes to demonstrating environmental stewardship actions to the public. Minnesota’s Residential Environmental Learning Centers are doing just that by getting to zero carbon emissions. This is an impressive but attainable goal and an example to us all.”

Dr. Tony Murphy, Author MN Environmental Literacy Report Card, College of St. Catherine

Our Energy Education Programs (RELC and Outreach)

As part of our environmental K-12 curriculum, we have developed the following Energy Education classes, used in both our RELC and outreach programs:

Acid Rain – Students investigate the causes and effects of acid rain through experiments and observation.

Energy Conservation – Students explore different ways of conserving energy while conducting an energy audit of their school.

Energy (1-hr & 3-hr) – Designed to lay the groundwork for further study about energy. Students are introduced to the concept of energy, where it comes from, who uses the most, the different forms of energy and alternative energy sources.

Energy for Life – Designed to teach students the difference between renewable and nonrenewable resources

and to introduce them to alternative energies. Students learn ways to be more energy efficient and be prepared for making sustainable choices in their use of resources.

Geothermal Energy – Students learn about geothermal energy by studying the basic geology of the earth and exploring why geothermal is a good alternative to fossil fuels through hands-on experiments.

Global Warming – Students learn about global warming: its causes, effects and what we can do to stop it through discussion, demonstrations and experiments.

Solar – Students explore the different applications of solar energy through games and hands on activities

Wind – Students explore the different uses of wind energy, as well as the wind’s potential in electricity generation.





Dining Hall/Main Office



Crosby Lodge



Intern House



Wildlife Barn



Schwyzer Lodge



Wetlands Log Cabin



Yurt

— *Our Future Initiatives* — The Audubon Center of the North Woods Goals

As part of ACNW's strategic plan, our goal is to reduce our carbon footprint by 80% within 10 years. As a first step, we are currently evaluating all of our facilities and processes to determine the current 'carbon footprint' of ACNW's operations. To achieve our carbon reduction target, we have identified a number of shorter-term goals (one, three and five years) :

Solar Energy

Add solar hot water capacity: Expand passive solar collector units for hot water from the current two on Crosby Lodge to six units on Crosby and 12 units on the Dining Hall

Add grid-connected solar arrays: Increase our photovoltaic arrays from the current three near Crosby Lodge to nine by Crosby Lodge and two by the Barn

Add photovoltaic lighting: Improve remote lighting by adding photovoltaic collectors for lights at the Yurt, the low ropes course and the Wetlands Log Cabin

Add photovoltaic pumps: Use photovoltaic pumps to deliver water from rainwater collection cisterns to gardens and greenhouse

Geothermal

Improve existing ground source heating/cooling system: Capture the heat off the ground source heat pumps from the existing system for heating water

Install new ground source systems: Add ground source heat pump systems near the Barn, at the Intern House, and for the Schwyzer and Lowry Lodges

Wind and Hydro Power

Add hydro power capacity: Install a micro-hydro turbine on the stream at the mitigation pond

Evaluate current wind power: Analyze effectiveness of current wind generator to consider further expansion

Water Conservation

Add rainwater collection capacity: Install a cistern system to collect rain water off roofs of buildings to use for irrigation purposes

Add grey water system: Install a grey water collection system near Crosby and the Dining Hall to capture water from kitchen and showers to use in toilets

Add rain garden: Develop a rain garden to enhance groundwater recharge and use as a water quality education tool

Food Production and Compost

Improve our composting system: Rebuild our compost collection area and incorporate composting tasks into program curriculum

Food production: Construct a greenhouse for use by students and to grow for kitchen use



Existing Construction Retrofit

Increase efficiency of existing buildings: Perform an energy audit on each of our existing buildings; improve insulation and retrofit with new windows where indicated



New Construction

Energy classroom: Construct an off-the-grid Energy Building to provide energy curriculum classroom space and storage for our EcoRV that will:

- Utilize 'green' construction materials (such as straw-bale construction or recycled/salvaged wood products) or certified forest wood
- Use passive solar collectors to supply hot water for in-floor heating
- Use rainwater & greywater collection systems and composting toilets
- Use a biodiesel-converted generator (that runs on used vegetable oil) and/or photovoltaics to meet electrical needs



The Audubon Center of the North Woods was able to install its current renewable energy systems thanks to the generous support and assistance from our Senators and Representatives, the Green Institute, East Central Electric, Great River Electric, and Solar Power of Mora.

It is essential to our mission, goals and education program to continue to increase our energy independence and model sustainable energy systems for the community and our constituents.

Our anticipated expenses for the short-term initiatives proposed on these pages are \$840,000, itemized as follows;

Energy audit and planning =	\$35,000
Passive solar collectors for hot water (16) =	\$25,000
Grid-connected solar arrays (8) =	\$160,000
Additional ground source heat pump systems =	\$250,000
Wind and solar monitor =	\$10,000
Micro-hydro turbine system =	\$20,000
Rainwater and grey water collection systems; rain garden =	\$35,000
Greenhouse and composting construction =	\$25,000
Energy classroom construction =	\$120,000
Increase efficiency of existing buildings =	\$100,000
EcoRV maintenance, wind turbine, energy panels, laptop, teaching supplies, staffing =	\$60,000





**AUDUBON CENTER OF
THE NORTH WOODS**

P.O. Box 503
54165 Audubon Drive
Sandstone, MN 55072

Phone: 320-245-2648
Toll-free: 888-404-7743
Fax: 320-245-5272
audubon1@audubon-center.org

audubon-center.org

A Proud Leader in Environmental Education and Renewable Energy

The Audubon Center of the North Woods (ACNW) is proud to be a part of the Sustainable Energy Campaign—a collaborative project of six accredited Minnesota Residential Environmental Learning Centers (RELCs). This campaign is a sustainability initiative to reduce and ultimately eliminate, where possible, the six centers' collective CO₂ contribution to climate change.

Established objectives of ACNW correspond with the primary goals of this campaign:

- Transform each RELC into a more environmentally sustainable facility by converting to a range of sustainable energy technologies that gradually reduce and ideally eliminate each center's reliance on fossil fuels.
- Make each center's operations a model for teaching and demonstrating sound renewable energy practices.
- Stand as a model for municipalities and rural communities throughout Minnesota and be a catalyst for others who are looking for sustainable energy self-sufficiency solutions.

“Global warming is affecting our environment on every level, from coral and shellfish in our oceans to water-supplying glaciers in the Himalayas. Global warming knows no borders and effects the cycles and habitat of every plant and living thing on the planet. It is not a matter of ‘needing’ to do something about global warming but that we ‘must’. To do nothing, the rouge climate would bring drought, flooding, famine and disease on a level not seen before by man.

Please support the six resident environmental education sites - Audubon Center, Wolf Ridge, Eagle Bluff, Laurentian, Deep Portage, and Long Lake which have banded together to create a campaign to reduce their carbon emissions. It is their goal to go as close to zero carbon as they can through use of sustainable energy (solar, wind, ground source) as possible and then to look to other means to offset anything they cannot do on their sites.

Together, one individual, one organization at a time, we can turn this thing around. We owe it to our children , we owe it to the earth.”

Lonnie Dupre, Polar Explorer

Questions? For more information or if you'd like to set up an appointment or come out to visit us, please feel free to contact Mike Link, Executive Director at:

Audubon Center of the North Woods
PO Box 530
54165 Audubon Drive
Sandstone, MN 55072

Phone: 320-245-2648 or 888-404-7743
Email: audubon1@audubon-center.org
www.audubon-center.org