



Cross-sector Solutions

"Shifting Currents"
by Aaron D. Laux



Collaborative efforts will be imperative to accomplish the innovative projects in this CAP and meet our goals. Fortunately, Dane County has many partnerships already in place to facilitate a faster response time, and entities throughout the County have already indicated their support and willingness to work together.

Clean Energy Districts

Clean Energy Districts (CED) will be a way for Dane County to partner with local municipalities, neighborhood associations, business districts, and others to mitigate climate change through local clean energy development and build resiliency at the community level. The Dane County Office of Energy & Climate Change will designate identifiable geographic areas – neighborhoods, business parks, communities – as official Dane County Clean Energy Districts when those jurisdictions meet specific criteria including:

- **Renewable resources** – The district must obtain energy from multiple clean, renewable electricity generation sources.
- **Energy efficiency** – The CED must have a dedicated energy efficiency program or effort made up of some combination of administrative support, technical assistance, and/or rebate incentives.
- **Clean transportation** – The CED must host and incentivize opportunities for clean transportation options, such as EV charging, RNG, or clean vehicle ridesharing.
- **Energy storage** – The Office of Energy & Climate Change will work with the CED to develop and fund energy storage projects.
- **Critical infrastructure** – The Office of Energy & Climate Change and Dane County Emergency Management will work with the CED to identify all critical infrastructure and vulnerable facilities and collaborate on ways to increase resilience.
- **Research and development** – The CED, with support from the Office of Energy & Climate Change and other partners, will establish baselines and collect data on energy use and transportation patterns as well as track and monitor the performance of all clean energy initiatives related to the CED.
- **Equity and justice** – The CED will, with support from the Office of Energy & Climate Change, develop a plan for ensuring that the benefits of all of the other CED requirements above, are targeted to include the most vulnerable residents within the CED.

Communities will apply to the Office of Energy & Climate Change for CED designation, and the requirements above will be fulfilled on the basis of a memorandum of understanding executed between the community and the Office

of Energy & Climate Change. The purpose statement of the memorandum of understanding will identify numerous objectives of the CED designation including:

- To recognize and give credit to communities, neighborhoods, businesses, and others who make a commitment to develop clean energy and transportation infrastructure that will make their community more resilient, increase the energy security, and help mitigate climate change.
- To make our buildings, facilities, and transportation systems more efficient, and to help business owners, homeowners, and renters reduce their energy bills and create other local economic benefits.
- To strengthen and modernize the electric energy grid and transportation systems in Dane County in ways that increase resiliency and help protect critical infrastructure facilities and vulnerable facilities to protect the well-being of Dane County's most vulnerable citizens.
- To contribute to a network of clean energy resources and transportation options that will help Dane County as a whole reach the climate mitigation, adaptation, and resiliency goals identified in the Dane County CAP.
- To gain experience with emerging clean energy and energy security technologies such as energy storage technologies.

Climate/Clean Energy R&D

In this CAP we have made the case that Dane County needs to be carbon neutral by the middle of this century. Yet this CAP cannot lay out all the specific actions showing exactly how to get there. Madison Gas and Electric announced earlier this year their goal of "net-zero carbon electricity by 2050." In their press release, MGE President and CEO Jeff Keebler stated "Our net-zero carbon goal is aggressive, and it will require technologies not yet commercially available or cost-effective, but it is where we need to be."

The fact is, to get where we need to go on GHG emission reductions, we'll need science advancements, technology advancements, market innovations, and policy changes. We need research and development (R&D); R&D investments are critical. Dane County is in a position to be a regional, if not a national, leader. We recommend that Dane County establish a climate/clean energy R&D fund, to support research specific to Dane County climate solutions. This could be established in partnership with other organizations such as the Wisconsin Initiative on Climate Change Impacts (WICCI).

Wisconsin, and more specifically, a number of individuals in Dane County, have considerable experience with administering a clean energy R&D fund. When the



- ▲ At the UW-Madison Space Science and Engineering Center (SSEC) scientists collect data from satellites around the globe for forecasting, monitoring, and researching the atmosphere. The data center (pictured here) receives more than 8TB of data per day from space, more than any other single location, and distributes around 6TB to partners across the globe daily. SSEC has been a leader in satellite remote sensing for more than 55 years and continues to provide important research and data to entities like the National Weather Service and the Federal Aviation Administration.

Focus on Energy program was created as part of 2000 Act 9, it included an R&D fund to complement the energy efficiency and renewable energy programs. That R&D fund began with a focus on the broader impacts of the power sector. Later economic impacts were added to the scope, and over time the focus shifted more to R&D supporting energy efficiency and renewable energy technologies, program design, and delivery. The idea here is a Dane County climate and clean energy R&D fund that will contribute directly to the County's ability to mitigate climate change and/or adapt and build resilience to climate change in Dane County.

Here are a couple of examples of the type of research that would allow Dane County to become even more of a national leader in climate R&D and addressing climate change in general.

Groundwater monitoring research

A community groundwater monitoring network would greatly enrich the understanding of groundwater and groundwater-surface water interactions, within in the four watersheds of Dane County. A nation-leading network could be built thanks to the technology developed by, and in partnership with, the Wisconsin company WellIntel Inc. which provides a cloud-based platform for building networks of high-value monitoring points to collect real-time groundwater-level data. The information is immediately available through the WellIntel Analytics Dashboard for analysis, decision support, community reporting and engagement, and County-specified applications.

The WellIntel monitoring device can turn almost any private submersible-pump well into a monitoring point for groundwater level while also connecting legacy monitoring wells into a network that automates data collection and assembly. Hence, the ability to establish community-scale groundwater networks, enabling citizen science and participation for groundwater that was not possible before.

Critical hydrologic assessments would be advanced by the real-time data generated by this network. The WellIntel Analytics Dashboard will provide the tools for the County to analyze and visualize the groundwater resource, including:

- **Water availability/saturated thickness** – Long-term trends, seasonal trends, event-driven changes, and cumulative impacts of pumping.
- **Nutrient loading** – Vertical and horizontal hydraulic gradients, defining groundwater transport and loads.
- **Groundwater-surface water interaction** – Reveal dynamics of groundwater systems in relation to surface water.

In 2016, the Dane County Land and Water Resources Department, the Madison Metropolitan Sewerage District, the Madison Water Utility, and other municipalities and public water utilities across Dane County funded the Dane County Groundwater Flow Model, a software-based tool to attempt to predict hydrologic responses to weather, climate, and human impacts in the area. However, due to high acquisition costs, the model has depended on only existing groundwater level data.

The Dane County model would be greatly strengthened with data collected by the community groundwater monitoring network, providing real-time data with temporal and spatial density that will increase the value of the model as a decision support tool and adding time-series data in locations of greatest interest.

Modeling to optimize flood mitigation strategies

Dr. Shane Hubbard is an Associate Researcher at the UW-Madison Space Science and Engineering Center who specializes in modeling infrastructure that is vulnerable due to natural hazard events such as flooding and tornadoes. Hubbard recently conducted modeling, in collaboration with the Georgia Department of Natural Resources, to understand how the boundaries of the floodplains in coastal Georgia will change with more intense and severe rainfall events due to climate change. Hubbard points out that this same type of modeling and analysis could be done in Dane County to identify those areas where green infrastructure and conservation practices such as native perennial plantings would achieve the greatest impact in terms of water retention, and reducing runoff and nutrient loading. This would be a watershed-specific analysis that would be immensely informative in terms of flood mitigation, water quality, and carbon sequestration.

The UW-Madison, as well as the Wisconsin Initiative on Climate Change Impacts are both world-class research institutions. An R&D fund at the County level would leverage the incredible talent at these institutions, as well as at Wisconsin state agencies, to build the County's resilience and reach the mitigation goals we must reach.

Municipal Leadership

Governments play multiple roles in helping achieve deep-decarbonization: they are large energy users; they set energy, land use, and other important policies; and they are in a position to lead by example. There are many municipalities in Dane County that have already shown considerable leadership in addressing climate change. We have highlighted a few examples below of municipalities who were members of the Dane County Climate Council. There are many others making major strides to use clean energy and reduce carbon emissions. We look forward to highlighting and telling the stories of others doing their part to contribute to reaching our GHG reduction goals.

Fitchburg

The City of Fitchburg demonstrated clean energy leadership by installing solar PV panels on four City buildings to power municipal facilities, and by achieving LEED Gold recognition for the public library completed in 2010. That project included

geothermal wells for heating and cooling, significant use of recycled materials, and extensive water-reduction technologies.

Fitchburg passed a clean energy resolution with some of the state's most aggressive energy-reduction goals in 2019, including targeting 100% renewable electricity for municipal operations by 2030. The City is also taking steps to further engage the community and streamline processes for private solar installations by achieving designation as a "SolSmart" community. SolSmart, funded by the U.S. Department of Energy, is a national designation program recognizing municipalities that foster the development of mature local solar markets. With SolSmart's technical assistance City departments, including building inspection, public works, and planning, reviewed permitting, zoning, and other practices that impact solar development. The City also launched a new Solar Resources page on the city website to consolidate information for residents.

Fitchburg prioritizes energy reduction in transportation as well: Fitchburg has been recognized as a Bicycle-Friendly Community by the League of American Bicyclists, and energy reduction is also impacted by the City's land use policies which prioritize walkable, traditional neighborhood design through the form-based "SmartCode," and through policies that support urban infill and redevelopment.

Madison

In March 2017, the City of Madison was the first city in Wisconsin to set a goal to achieve 100% renewable energy and zero net carbon emissions. This led to the development of the "100% Renewable Madison Report" that laid out a roadmap on how to achieve these goals, and was adopted in 2019. By 2030, local government operations will cut carbon emissions by 55%, with at least 25% of the city's electricity sourced by self-generated renewable energy. Use of transportation fuels, such as gasoline and diesel, will be reduced to zero. Investments in renewable energy credits (RECs) and/or carbon offsets will make up the remaining 45% of the carbon balance. The "100% Renewable Madison Report" also includes additional suggestions to accelerate progress toward reaching 100% renewable energy and zero net carbon goals for the larger Madison area community by 2050. The City of Madison has already begun to take several steps towards achieving this goal, including a \$1.4 million investment in five utility-scale solar projects throughout rural Wisconsin, and its Green Power trainee program, through which the City has trained residents in acquiring solar installation skills and has installed nearly 1 megawatt of solar on City facilities.

Climate Champions

Henry Vilas Zoo & the Polar Bear

The polar bear has become, to some extent, the climate change impacts' poster child. The loss of arctic sea ice is making it increasingly difficult for polar bears to find and capture their primary prey, seals. It is critically important that we educate ourselves about the extent to which climate change is impacting many people in our communities. We have entered an era where we are always a major flood or a major heat wave away from a life-threatening weather event, and where vulnerable communities live with climate-related public health impacts on a daily basis. Polar bears seem far away but they help develop our understanding of climate change's impacts.



▲ Polar bears are one of thousands of species threatened by climate change. The Henry Vilas Zoo is committed to addressing climate change and protecting as many of these species as possible.

The Henry Vilas Zoo is one of a handful of zoos that have no admission charge (Chicago and St. Louis also have free zoos). And yet, even without that source of revenue, the zoo's director, Ronda Schwetz has made a major commitment to investing in sustainable operations and facilities and reducing GHG emissions. The Henry Vilas Zoo has solar arrays on several buildings, a geothermal heat pump, solar lighting, a policy that all new buildings are designed with LEED principles, a climate-friendly purchasing policy, and much more.

The zoo places a great emphasis on climate education and awareness for its 800,000 annual visitors. There are signs that describe how climate change is impacting animals' habitat and food sources, and signs that talk about climate solutions like renewable energy, and "Go Green" signs giving visitors direct actions they can take to conserve. The zoo holds climate-change-related events, such as an annual international polar bear event raising awareness about Arctic sea ice and climate change.

While we need to increase our focus on the myriad adverse health, economic, and other impacts climate change has on humans in our community, when you have an 800-pound polar bear standing right in front of you, the impending losses of climate change take on additional meaning. ☀

As a city that prides itself on its progressive approach to solving community challenges, Madison is eager to be a leader in tackling climate change.

Middleton

The City of Middleton Common Council unanimously passed a resolution in 2018 resolving to address global warming through clean energy (100% Renewable Energy Goals). The resolution establishes goals to meet 100% of all City operations' energy needs with renewable energy by 2040 and 100% of communitywide energy needs with renewable energy by 2050. The sustainability committee worked on this resolution for seven months in concert with the Sierra Club, 350.org, and UW Cooperative Extension. It built upon the city's Sustainability Plan adopted in 2010, and a ballot referendum on climate change in November 2016 which showed a strong 81% mandate from City residents in support of mitigating climate change.

Since that time Middleton has been working in conjunction with six other local municipalities on an Office of Energy Innovation planning grant to develop comprehensive energy plans and a roadmap for achieving energy goals. Most recently, the City of Middleton received final approvals for a 5-megawatt solar project at the Middleton Municipal Airport. Of the 5 megawatts, 10% will be dedicated to City of Middleton operations and 20% will be for the Middleton Cross Plains School District. The remaining 70% will be available through MGE's Shared Solar Program.

Sun Prairie

The City of Sun Prairie is committed to meeting the needs of their community while protecting resources, so they are accessible for future generations. It is a community aspiration that takes the work of everyone in the community as they strive to prioritize and enhance the natural environment, social equity, and economic stability. In the past year, the City of Sun Prairie has embarked on energy efficiency projects. They completed a solar installation and a green roof installation with an additional solar installation to take place later this year. They are in the midst of an LED light replacement project at City Hall. In collaboration with six other municipalities in Wisconsin, Sun Prairie received a municipal energy planning grant and is taking part in collaborative planning to better understand their current energy use and develop plans to save energy, reduce costs, and limit greenhouse gas emissions. In 2019, the City of Sun Prairie and Madison Metro formed a partnership to provide express commuter bus service

to downtown Madison from Sun Prairie during peak commuting times. This is a critical step in moving toward providing region-wide bus service that supports active transportation connections and alternative modes of transportation.

Please contact any of these cities to learn more about what they are doing to address climate change.

Throughout Dane County

On August 15th, 2019 County Executive Parisi and Madison Mayor Rhodes-Conway convened a meeting of city, village, and township officials to share actions they have taken, or plan to take, in clean energy investments. Approximately 35 city, village, and town officials attended the meeting which resulted in an agreement to move forward together in their efforts to reduce GHG emissions. The group goes by the name Dane County Sustainability Leaders Collaborative and has spun off four work groups: renewable resources, energy efficiency, vehicle fleets, and green infrastructure. All Dane County governments are welcome and encouraged to participate in as many of the work groups as they have time for. The larger group will likely meet twice a year. Please contact the Office of Energy & Climate Change for the date of the next meeting of the collaborative or any of the work groups.



◀ UW-Madison Science Hall was built in 1887. It was originally the home for all UW-Madison sciences: geology, geography, anatomy, zoology, botany, physics, etc. Today, it is the home for the Geography Department, the state Cartographer's Office and the Gaylord Nelson Institute for Environmental Studies, a member of the Dane County Council on Climate Change.

The University of Wisconsin–Madison

The University of Wisconsin–Madison is a world leader in climate science and applied research that provides solutions to the global challenges presented by climate change. The University's long tradition of responsible environmental leadership, social responsibility, and an enduring commitment to The Wisconsin Idea ensure that the campus is a vested partner in the health and well-being of Dane County, and the state of Wisconsin. UW-Madison tracks its sustainability

work across 63 relative indicators through the national higher education reporting tool called STARS (Sustainability Tracking, Assessment and Rating System). The depth and breadth of the metrics allow for a cross-sector alignment with the climate-related goals of host communities. The university is a signatory to Second Nature's Resilience Commitment which calls for an integrated task force to address climate change mitigation and adaptation. Addressing the public health impacts resulting from climate change is a critical piece of the university's work, therefore public health and well-being considerations are core to their approach. The campus is proud to partner with the City of Madison and Dane County to come together in the development and implementation of solutions for the community. Information on campus resources, subject matter experts, and opportunities for collaboration can be found at sustainability.wisc.edu.

State, Regional, & National Networks & Solutions

Carbon pollution doesn't stop at geographic or geopolitical borders, and neither should our climate solution efforts. This CAP is an early step in an ongoing commitment and effort by Dane County government to work collaboratively with our neighbors, and the state, regional, national, and international communities to protect and improve the quality of life for all people.

This CAP begins that collaborative effort by describing potential programs and projects we hope to engage with our immediately adjacent counties and their municipalities: Columbia, Dodge, Green, Jefferson, Iowa, Rock, and Sauk Counties. Once this plan is complete and widely distributed, the Office of Energy & Climate Change will begin actively pursuing partnerships and collaboration with all the other 71 counties in Wisconsin. As we write this plan, the Office of Energy & Climate Change is already collaborating with the state of Wisconsin, both with the Governor's office and state agencies dealing with climate change.

The Office of Energy & Climate Change staff members have considerable experience collaborating with other Midwest and Midcontinent states on climate solutions, and have developed strong relationships with non-governmental organizations, utilities, consultants, and government officials in Illinois, Iowa, Michigan and Minnesota, and Ohio. We will share this CAP with as many of those colleagues as possible and work to identify potential partnerships and best practices in areas of this CAP.



- ▲ Madison artist Aaron Laux created this piece as part of Phoenix from the Ashes, a multi-artist project to highlight the devastation of ash trees by the emerald ash borer, which is made worse by climate change. The piece, titled "Their Story Our Story" is made from glass, metal, and ash wood.

The Arts & Climate Change

In 1976, Dane County created a Cultural Affairs Commission (today also known as Dane Arts), with a mission to foster and celebrate creative expression among citizens, validating the significant role art, culture, and history play in contributing to the quality of life in Dane County.

Dane Arts' vision is to strengthen the arts, history, and culture throughout Dane County and to support all Dane County citizens and residents leading expressive lives in connection with one another. Dane Arts champions the economic, cultural, creative and community impact the arts generate throughout Dane County.

Effective communication will be a critical component to any successful climate mitigation effort. One of the most important steps in this CAP is catalyzing and facilitating discussions about climate change locally, and Dane County' robust



◀ Katie Musolff is a full-time artist/painter who lives and works in Southwest Wisconsin. Katie uses her art to capture the climate impacts of shifting ecosystems. This watercolor painting titled "Lord Plant My Feet on Higher Ground" appeared in a climate change art exhibit at the James Waltrous Gallery. Here she has documented her observations of many plant and animal species that were disrupted, displaced, and dispatched by the rising Mississippi River floods of 2018.

arts community has a unique ability to raise awareness, educate, and tell stories about climate change.

Eve Mosher was featured in the August 2018 issue of The New York Times Style Magazine in an article titled “12 Artists On: Climate Change” ([nytimes.com/2018/08/22/t-magazine/climate-change-art.html](https://www.nytimes.com/2018/08/22/t-magazine/climate-change-art.html)). Mosher said this about how artists can contribute to climate solutions:

“Climate change is a wicked problem, and it affects everything else that we are grappling with on a daily basis: social justice, housing, immigration, food and water access. Artists have the capacity to shape climate communications, solutions, and engagement. We can use our unique skill sets to heal communities, tackle complex challenges and even create innovative answers.”

The Office of Energy & Climate Change will work with Dane Arts and local artists to infuse climate impacts and solutions into art programs, exhibits, displays, and performances.

For a larger view of artists’ contributions to climate change solutions we recommend Artists and Climate Change (artistsandclimatechange.com), a blog with a goal of tracking, assembling, and facilitating networking among artists who specialize in climate change-related subjects. As members of our community work together to implement solutions, artists working in all types of genres and venues will inspire and motivate while they address the issues we must face.

