

Filling critical gaps toward carbon neutrality with leadership from the US Upper Midwest

The Challenge – Achieving Carbon Neutrality

If the world is to avoid catastrophic climate change, nations, corporations, and individuals must reduce greenhouse gas emissions by 50% by 2030.¹ Related practices are necessary and complementary, such as creating healthy soils to feed a growing human population, reducing water pollution to prevent disease and sustain healthy ecosystems, and protecting 30% of land and water for biodiversity conservation. We achieve lofty goals with steady, strategic progress, with all parties playing their role, the most responsible taking the lead, and coordination among efforts and sectors.

Fortunately, most countries have agreed to non-binding Nationally Determined Contributions under the UN Paris Agreement, such as the US commitment to reduce greenhouse gas emissions 50% before 2005 levels by 2030.² Corporations have set goals that correspond to Paris Agreement targets including Ecolab, Target, and General Mills, global corporations based in the Upper Midwest US.³ Many corporations are also committed to complete carbon neutrality – a goal of net-zero greenhouse gas emissions, though the timetables and methods for achieving this more lofty goal vary widely.

Technology does exist to make our way to many of the goals companies and governments have set for 2030 or 2040, and failures to meet those goals will emerge from *gaps in implementation*. Implementation gaps exist because of lack of capital, capacity, and delays in policy implementation, but not for lack of solutions. For example, existing technology can reduce 12.5 Gt of emissions annually in the energy sector, by switching to renewables and putting energy efficiency into place.⁴ Existing cover crops are known to reduce soil health and enhance carbon storage, but only a fraction of US farmers deploy them⁵. Policy in the form of incentives and regulations, corporate leadership, consumer pressure, and other steps are needed to ensure the adoption of such technologies. This will take considerable will and investment but action is both necessary and feasible.

¹ Bistline et al. 2022. Actions for reducing US emissions at least 50% by 2030. *Science* 276: 922.

² White House, April 2021.

<https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

³ <https://www.theclimatepledge.com/us/en>; <https://sciencebasedtargets.org>;
<https://zerotracker.net/#companies-table>

⁴ UN Environment Program, Emissions Gap Report, Dec. 2020

⁵ Wallander et al. 2021. Cover Crop Trends, Programs, and Practices in the United States, EIB 222, U.S. Department of Agriculture, Economic Research Service; see also <https://www.fao.org/3/cb7514en/cb7514en.pdf>.

Longer-term targets that reach toward carbon neutrality are more elusive, however. In many cases, we lack not only political will and financial resources to make deep emissions cuts, but we lack technology and policy solutions to achieve them.

In other words, deep emission reduction – toward true carbon neutrality – involves *not* just an implementation gap but a *knowledge gap*. Filling this gap requires new ideas, experimentation and demonstration, and direct collaboration between researchers, innovators, and implementers.

The size of the knowledge gap varies in different sectors. For example, significant progress has been made in transitioning electricity generation to low-carbon sources but techniques for carbon storage in agricultural soils, permanent carbon sequestration in forests, and other carbon negative techniques and technologies remain elusive⁶. Some studies suggest that as much as 35% of global carbon emissions could be taken up and stored in managed and natural ecosystems, but other research suggests that 5% is a more realistic estimate.⁷ Further research is needed to resolve this critical uncertainty.

Meeting the Knowledge Gap

While a great deal of political attention is focused on the implementation gap and the need to reduce emissions within the next decade, far less attention is paid to the longer-term knowledge gap that is needed for true carbon neutrality.

Sometimes it's uncomfortable to talk about the knowledge gap. Admitting that we don't know how to achieve carbon neutrality might confuse or delay the actions that are necessary now. But it's possible to work toward both the achievement and knowledge gaps at the same time, in a coordinated and strategic way. While the achievement gap is one of action and commitment of individual governments, corporations and individuals, the knowledge gap takes collective action and coordinated attention to close. It's *not* an individual pursuit.

One of the most important collaborations needed to close the knowledge gap lies between *the private sector and academia*.

Corporations have the reach, capacity for action, and implementation pathways for large-scale carbon reductions. Academia provides a forum for all stakeholders to identify knowledge gaps and a platform for discovery, experimentation, ideation, and pilot testing. Together these sectors – with funding from government and philanthropy and oversight from society at large – can make great strides against the knowledge gap, if they work strategically and collaboratively.

⁶ Sulman et al. 2018. Multiple models and experiments underscore large uncertainty in soil carbon dynamics. *Biogeochemistry* 141: 109–123.

⁷ Schlesinger and Amundson. 2019. Managing for soil carbon sequestration: Let's get realistic. *Global Change Biology* 25: 386.

In doing this work, academic and corporate actors should heed a commitment to climate justice and prioritize the most vulnerable among us. Filling the knowledge gap will bring deep and profound transformations in technology and society and many positive and negative side effects. There's also potential to rediscover ways of doing and knowing lost to colonization and capitalism that can fill critical gaps in knowledge to achieve and sustain carbon neutrality. Doing this work responsibly and successfully requires conversation and collaboration among a diversity of voices including Black, Indigenous, and people of color.

Midwest Carbon Leadership

The US Midwest is a leading emitter of greenhouse gasses, ranking #5 globally if it were a country.⁸ It supplies ~20% of US GDP, is a global breadbasket and home of major manufacturing, mining, and managed forests.⁹ The Upper Midwest is home for dozens of Fortune 500 companies in food/agriculture, automobiles, and retail. The region also experiences a number of challenges in confronting climate change including a cold climate that consumes large amounts of energy in building heating, an agricultural sector that has made relatively little progress in reducing emissions, one of the world's largest freshwater and river systems with persistent water quality issues, and wide open spaces between urban centers that confound high-density transportation solutions. A number of racial, economic, and risk injustices also plague the US Midwest including racial differences in wealth, access to education and nature, incarceration, and exposure to climate hazards.

These conditions demand action, but they also present important opportunities for leadership from the Midwest that can be translated around the world.

Our Commitment: the Midwest Carbon Leadership Project

To meet the needs described above, we commit to creation of the *Midwest Carbon Leadership Project*, a platform of sustained engagement involving the private sector, academia, and affected communities that works to fill the knowledge gap that currently slows or precludes deep decarbonization. The Project will draw upon the Midwest region's most influential and ambitious thinkers and doers who will take responsibility for the climate changes caused by activities in our region and commit to using our region as a natural laboratory for change. We know that this work is only possible when meaningful relationships are formed around shared understanding, trust, and accountability. Therefore, the Midwest Leadership Project is composed of three collaborative engagements that expand and grow over time. During our collaborative work, the Project will regularly report on its activities and refine the agenda of necessary work.

The Midwest Leadership Project also commits to environmental justice, the process of overcoming environmental and climate disparities that disproportionately impact communities of color and other historically marginalized people. Environmental justice requires the inclusion of all voices in problem identification and solution development, especially Black, Indigenous,

⁸ <https://fresh-energy.org/the-midwest-leads-u-s-emissions-heres-why>

⁹ Angel, et al. 2018: Midwest. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 872–940.

and people of color throughout our region, with the goal of creating a sustainable, healthy, and equitable place to live; and includes unbiased mutual learning and knowledge creation, leadership development, and storytelling to advance data-driven solutions and policies. In our Midwest Leadership Project we acknowledge this need and give agency to these communities in our collaborative work, prioritizing these voices in deliberation and action.

Critical Pathways in the Midwest Carbon Leadership Project

A Steering Committee has identified four critical pathways to achieving the Project's goals.

These pathways inform development of the Project's recurring conference platform:

- Emphasize innovation and a commitment between academia and private sector industry to fill knowledge gaps essential to achieving carbon neutrality;
- Bring a "bench" of contributors to research, education and outreach that draws upon the University of Minnesota (UMN), a world-class research university, and the Institute on the Environment, a unit within the UMN that reaches all disciplines, including leaders in food, agriculture, water, biodiversity/ecosystems and energy;
- Fulfill a commitment to environmental justice that enables a future where all people and planet prosper together;
- Engage UMN Students as full Project participants, for their perspective on the future and for their own educational and professional development.

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The Midwest Carbon Leadership Project will be launched December 8, 2022 at a collaborative workshop and symposium hosted by the Institute on the Environment at the University of Minnesota.¹⁰

That launch will forge collaborative relationships and shared commitments to deep decarbonization across academia and industry, and it will establish the Critical Pathways described above. Two additional gatherings will further those objectives in the coming years.

People and organizations sharing the vision and mission of the Midwest Carbon Leadership Project can sign up for information about Project gatherings and are invited to join our growing collaboration by emailing mwcarbonproject@umn.edu.



¹⁰ Funded with a generous gift from the Ecolab Corporate Foundation.