

A photograph showing a cross-section of soil with various plant roots extending downwards. The top layer is dark, rich soil, while the bottom layer is lighter and more porous. Several roots are visible, some with small, round, brownish nodules attached to them. The plants above the soil include tall grasses and a dandelion with its characteristic yellow flower.

Turning carbon into cash

Offsetting greenhouse-gas emissions is a burgeoning district industry with an uncertain future

By PHIL DAVIES
Senior Writer

The grass is greener on Lisa Schmidt's ranch. Last March she and her husband enrolled their 3,500 acres of rangeland near Conrad, Mont., in a program that pays them for every ton of carbon dioxide (CO₂) the prairie grasses suck out of the air. Under a contract with a Montana aggregator of carbon credits, the couple has agreed to practice rotational grazing on their land for three years. Moving their cattle and sheep on a regular basis from pasture to pasture will promote healthy root growth and increase the amount of carbon stored in the soil. Schmidt expects to receive a \$1,200 check for those rangeland credits by the end of the year.

Together with a similar amount earned for growing grass

for hay, the money produces extra income from ranching practices that Schmidt and her husband were committed to before they had even heard of carbon credits. "We're trying to do it right, and take care of the land," she said. "The credits are just a bonus; they'll cover our property taxes."

Schmidt is one of hundreds of landowners in the Ninth District who participate in a small but rapidly growing U.S. market for carbon offsets, credits generated by projects that—at least in theory—counterbalance greenhouse-gas emissions produced by industry and other human activity elsewhere. "No-till" farmers, timber operators and owners of recreational woodland are also making money by sequestering carbon on their land.

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A few years ago the notion of paying someone to grow grass—or not plow a field—would have seemed ludicrous. There was no value in keeping greenhouse gases out of the air.



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And the nascent carbon economy in the district includes wind farms, methane-capturing systems and other offset projects that prevent greenhouse gases from getting into the atmosphere in the first place.

Increasing concern about global warming is driving the market for carbon offsets, often likened to church indulgences bought by sinners in the Middle Ages. Demand from U.S. greenhouse-gas emitters has trended upward this year, sharply increasing trading volume and prices on the Chicago Climate Exchange (CCX), a stock market for carbon credits purchased voluntarily by corporations, governments and individuals.

Many carbon market observers attribute the market surge to a shift in the political winds in February, in the midst of the presidential primaries. “Our little voluntary market responded hugely after Super Tuesday, when basically the three remaining candidates all committed to a

federal cap system in the U.S.,” said Liz Mathern of the North Dakota Farmers Union. The organization manages a carbon credit program sponsored by the National Farmers Union, one of the country’s biggest aggregators of carbon offsets on farms and ranches.

Rising carbon credit prices and anticipation of even higher prices under carbon cap-and-trade regulation proposed in Congress encouraged landowners to sign up in large numbers this spring with the Farmers Union and other aggregators operating in the district.

Despite all the excitement about carbon offsets, it’s questionable whether this environmental niche industry can grow, or play a significant role in reining in global warming. Critics of a voluntary approach to climate change say that U.S. demand for carbon offsets is too weak to put a dent in greenhouse-gas emissions—and is likely to remain so unless Congress enacts fairly strin-

gent limits on those emissions.

Moreover, much corporate and personal income being spent on offsets is wasted because program rules allow offset producers to claim credits for greenhouse-gas reductions that would have occurred regardless, without an offset incentive. Because of uncertainty about the effectiveness of offsetting, it’s unclear to what extent cropland, forestry and other types of offsets generated in the district will count toward mandatory caps under eventual federal carbon regulation or regional cap-and-trade schemes being developed in the Midwest, in the Northeast and on the West Coast.

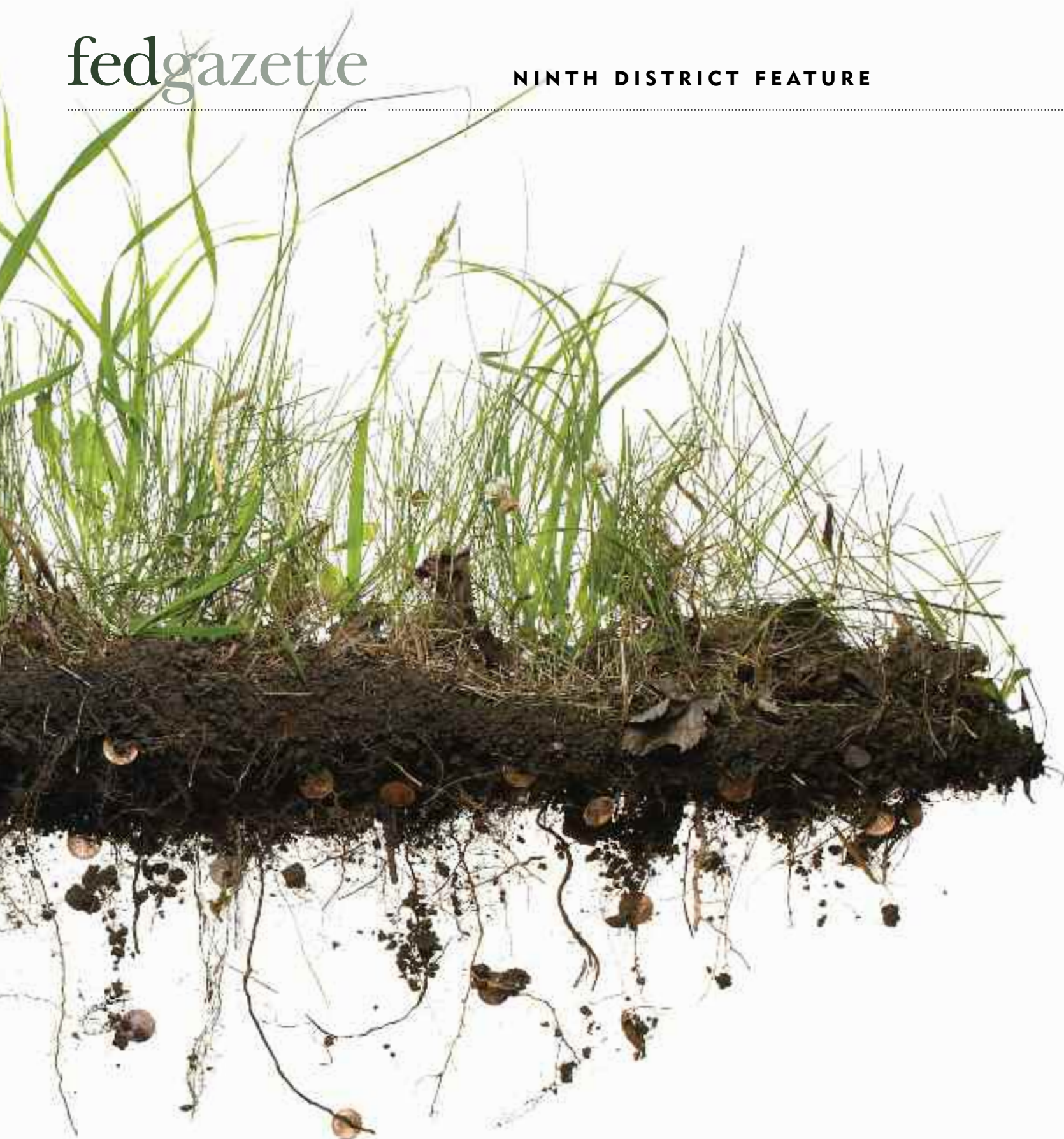
For now, carbon credit prices on CCX—and the hopes of offset producers in the district—are on the rise.

Rising stock in carbon

A few years ago the notion of paying

someone to grow grass—or not plow a field or siphon methane from a landfill—would have seemed ludicrous. There was no value in keeping greenhouse gases out of the air; they’re unregulated in the United States, which did not sign the Kyoto Protocol, an international agreement to tackle climate change. But sustained scientific and political debate over global warming has changed the value proposition for CO₂ and other greenhouse gases.

Electric utilities, manufacturers and other large firms have become keenly aware of their carbon footprint, said Chris Dufour, principal of GT Environmental Finance, an environmental brokerage and consulting firm in Austin, Texas. “A lot of consumers are looking at these companies and asking whether they’re green,” he said. That scrutiny is driving companies to buy offsets so as “to be proactive, to be seen as green.”



Everybody involved in the carbon offset trade—CCX, aggregators, credit speculators, offset producers—is waiting for the other shoe to drop: the passage of mandatory carbon regulation in the United States.

And emitters of greenhouse gases believe that carbon will be regulated within a few years, under either a federal cap-and-trade system or a patchwork of regional trading systems. Cap-and-trade regulation would set limits on industrial greenhouse-gas emissions, but allow companies that can't get under the cap to buy credits from those that can. In June Congress debated a cap-and-trade measure intended to sharply reduce nationwide greenhouse-gas emissions by 2050. The Lieberman-Warner bill was defeated, but supporters expect to reintroduce it next year. Meanwhile, states are pushing forward with regional pacts such as the Midwestern Regional Greenhouse Gas Reduction Accord, which would cap carbon emissions from multiple industrial sectors in Minnesota, Wisconsin and Michigan.

Looking to get their feet wet in the carbon market and possibly influence

future legislation, many companies are buying offsets now. Dufour said that hedge funds and commodity traders are also snapping up offsets in "precompliance plays," betting that today's cheap credits will count toward emission caps and command a premium under carbon regulation.

Increased demand has greatly expanded the voluntary market for offsets and other types of carbon credits that exists outside the Kyoto regulatory arena. That market is minuscule compared with the European Union's emission trading system, but it's growing apace. According to a report published last year on the global voluntary carbon market, 24 million metric tons of CO₂ or equivalent greenhouse gases were traded worldwide in 2006—a threefold jump over the previous year. Over 70 percent of customers for those credits were located in the United States.

CCX is a dominant player in the vol-

untary carbon trade. Transactions on the exchange accounted for 43 percent of the global voluntary market in 2006, and at least 60 percent of the carbon credits bought in the United States, according to the voluntary carbon market report.

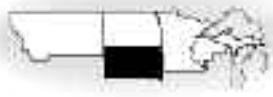
Founded by securities innovator Richard Sandor in 2003, CCX is essentially a voluntary cap-and-trade system. Members of the exchange—cities, counties and universities as well as electric utilities and industrial firms such as Cargill Inc. and DuPont—have committed to modest reductions in their greenhouse-gas emissions by 2010. Members that can't achieve the necessary cuts internally can get a little help from the market, buying either allowances—credits awarded to members who exceed their emissions goals—or offsets generated by projects that meet CCX's standards. Both types of credits are bundled into trad-

able contracts representing 100 metric tons of CO₂ or equivalent emission reductions.

After a slow start, CCX's carbon empire has grown dramatically in the past 18 months. This year the pace of trading is running well ahead of 2007: In April 7.2 million tons of CO₂ changed hands on CCX—more than eight times the volume of carbon contracts traded a year earlier. Last November a metric ton of CO₂ reduction could be had for \$2; by May the price had risen to \$7 (see chart on page 14).

Outside CCX, the voluntary "over-the-counter" market deals exclusively in offsets that are sold privately by project developers, aggregators and retailers who cater to small organizations and individuals. This market isn't as transparent and well tracked as CCX, but it's relatively large; the voluntary carbon markets study estimated that the volume of OTC offsets bought by U.S. customers in 2006 was

SOUTH DAKOTA



Plowing up more dough

On the back of strong growth in farm income, South Dakota residents saw their personal income grow by 7.4 percent (on an annual basis) in the fourth quarter of last year. That was the fastest rate of any state.

That's a dramatic turnaround from 2006, but also indicative of the outsized role that farming continues to have in the state. That year, persistent drought through much of the state held personal income growth to 2.6 percent, despite income growth of about 5 percent in 2006 for the state's two metropolitan counties, Minnehaha and Pennington, and almost 10 percent growth in Lincoln County, a fast-growing suburban county near Sioux Falls.

Since 2003, South Dakota's personal income growth is higher than that of any Midwest or Great Plains state, and about 10 percent above the national average.

When disease is good for you

Sioux Falls, and South Dakota in general, is hoping to leverage a spot on the research map from an ambitious expansion plan by Sanford Health, which was jump-started by a \$400 million donation from local philanthropist T. Denny Sanford.

The firm is planning a 185-acre development that will include a research park as well as office and manufacturing space that could eventually encompass 2 million square feet and employ up to 6,000.

Combined with other Sanford developments, including a new children's hospital and heart and vascular specialty facilities, the health firm is hoping to spur greater research capacity and biomedical development. The first facility will house joint research efforts already under way between Sanford and the University of South Dakota, which the firm hopes will help attract similar kinds of health firms. But the land development project also includes plans for hotels, retailers and other businesses.

But the conversational jewel of this project is Sanford's intent to cure a single disease. Helped by a research-based consultant group, Sanford's board of directors spent months studying disease options, narrowing the ultimate choice to four diseases: lupus, type 1 diabetes, pediatric multiple sclerosis and human papillomavirus-related cancers. In early June, Sanford Health chose type 1 diabetes, also known as juvenile diabetes, as its research focus and expects to spend \$30 million over the next five to seven years.

—Ronald A. Wirtz

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only slightly less than trading volume on CCX that year.

Ready, set—sequester

The district is well positioned to reap rewards in the carbon economy. Tens of millions of acres of cropland, grassland and forest constitute a huge potential carbon sink. And the region is rich in renewable energy, with a growing number of wind farms, anaerobic digesters and other facilities that reduce overall greenhouse-gas emissions. Nobody's making a fortune from carbon offsets—the price of greenhouse-gas emission reductions in this country is still dirt cheap compared with Europe, where carbon contracts were selling for about \$40 per metric ton in May. Nevertheless, offsets represent welcome additional income for landowners, utilities, manufacturers and even local governments.

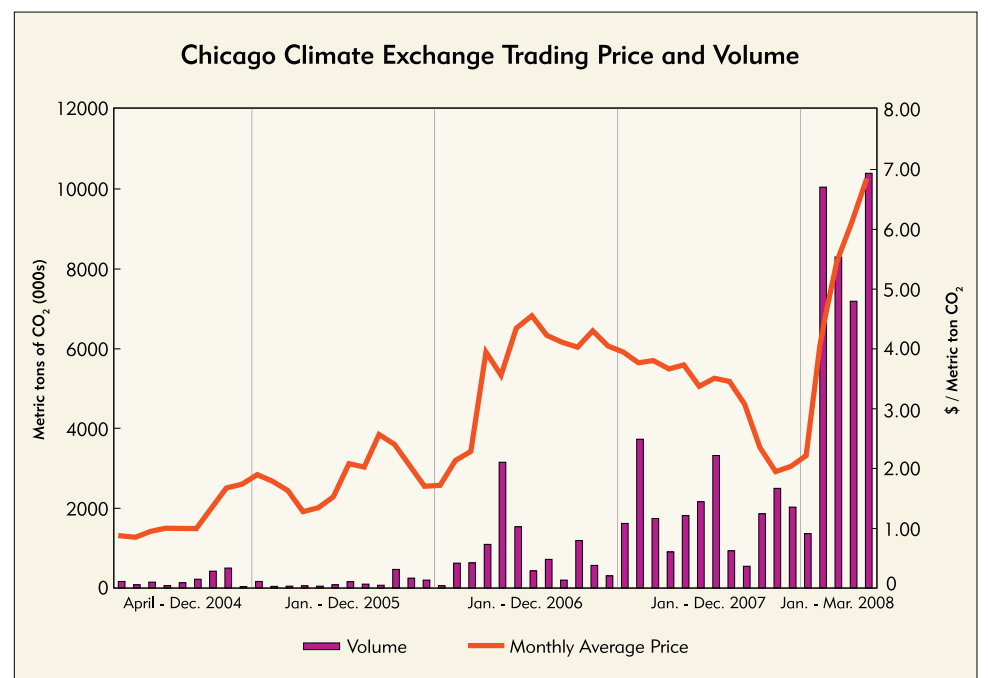
Opportunities in terrestrial sequestration—earning credits for storing carbon in the roots, stems and leaves of vegetation—have received the most attention in the district. Soil carbon projects such as prairie plantings, rotational grazing and minimal tilling of crops make up the largest category of offsets traded on CCX—about 43 percent of the total number of offsets issued by the exchange since 2003. Forestry projects account for another 5 percent.

In the past two years aggregators such as the Farmers Union, the National Carbon Offset Coalition (NCOC) and AgraGate Climate Credits Corp. have enrolled millions of acres of district land in soil carbon offset programs. Through May 1 the Farmers Union had signed up 2.6 million acres of cropland and rangeland in Minnesota, Wisconsin, Montana and the Dakotas. AgraGate, a subsidiary of the Iowa Farm Bureau, had 600,000 acres under contract in those states at the end of 2007.

Enrollments showed strong gains this spring, the first of two sign-up periods this year for offsets registered with CCX. Acreage of no-till cropland and newly seeded grass registered with the Farmers Union increased 8 percent over last fall (see chart on page 15), and the organization signed up an additional 530,000 acres in a new rangeland pool. Montana land enrolled with NCOC of Butte—the organization that signed up Schmidt—increased about 11 percent between March and May, to over 740,000 acres.

The rising price of carbon on CCX is a key factor driving the rush to sequester, said Ted Dodge, executive director of NCOC. “At a buck-ninety a ton like it was at the end of December, it was a pretty hard sell,” he said. “We’re getting a good response now that the credit price has increased on the exchange.”

Landowners get paid (less a commission charged by the aggregator) after an independent project inspector verifies their credits to CCX—a process that can take several months. This summer the



Source: Chicago Climate Exchange

Farmers Union expects to disburse about \$5 million in offset payments to 2,300 landowners in 29 states, Mathern said.

Another reason for the surge in sign-ups is CCX's increasingly broad eligibility rules for carbon offsets. Last year rangeland, in addition to no-till cropland and seeded grass, began earning credits in the Dakotas and Montana. In February established “managed forests” became eligible for CCX forestry offsets. Previously only afforestation or reforestation projects could earn credits.

Money from methane

Sequestration isn't the only way to earn offsets in the district. Carbon is also being turned into cash by activities that either destroy greenhouse gases or avoid emissions from power production.

Because methane has roughly 20 times the heat-trapping capacity of CO₂, collecting and burning it is an effective way to generate carbon credits. Various types of methane capture account for 40 percent of the offsets issued by CCX.

Smelling an opportunity, the city of Fargo joined the exchange in February in order to sell offsets produced from the harvesting of methane from the city's landfill. Wells sunk into the 160-acre mound of garbage tap gas rich in methane to generate electricity on-site and fuel boilers at a nearby oilseed processing plant. The city's contracts with the plant and a local electricity co-op bring in about \$425,000 a year—revenue that was augmented in March by a \$612,000 payment from CCX.

Rising carbon prices prompted the city to sell the bulk of its methane offsets amassed over several years, said Fargo Solid Waste Manager Terry Ludlum. He expects the city to market its next batch of credits—an estimated 80,000 metric tons of avoided methane emissions—next January. “We’ll sit down with our broker and put together a sales strategy,” Ludlum said. “If prices are high, certainly we’ll take advantage of that.”

Anaerobic digesters on farms extract methane from animal manure or crop waste, generating carbon offsets as well as heat or electricity. Cargill, a distributor of anaerobic digesters to dairy farms and beef feedlots, sells credits produced by its units on CCX and shares the revenue with the customer.

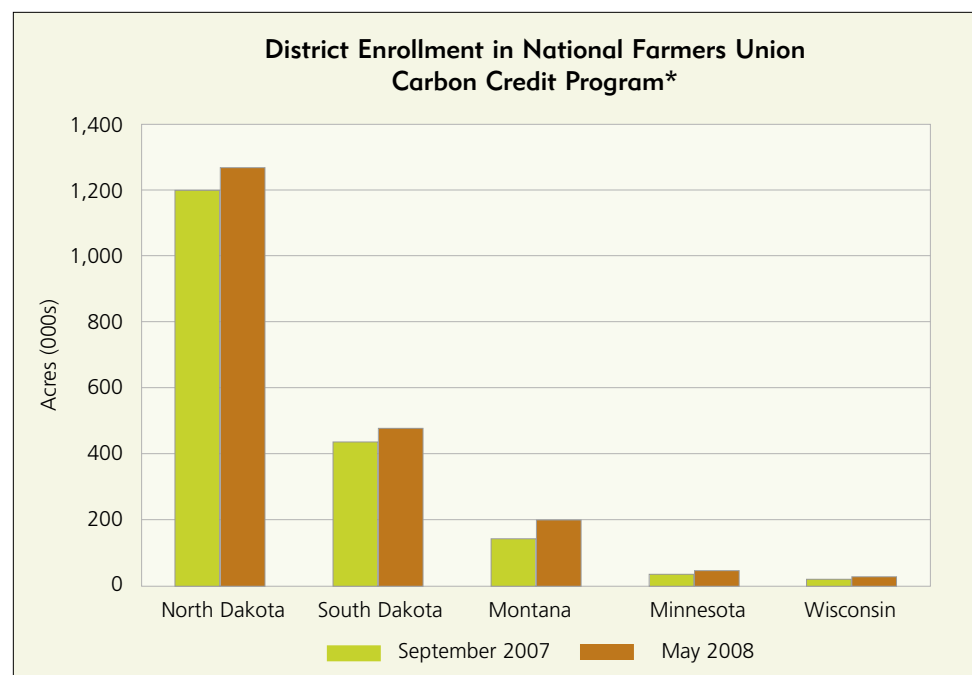
Other projects in the district eligible for carbon offsets include wind farms and biomass-fueled steam plants, which displace electricity generated from fossil fuels; efforts by manufacturers to reduce their output of hydrofluorocarbons and other potent industrial greenhouse gases; and energy-saving initiatives such as switching to more efficient fuels. In the case of wind farms, renewable energy credits not used to satisfy state renewable-electricity mandates (see July 2007 *fedgazette*) can be converted into carbon offsets by middlemen such as GT Environmental and sold on CCX or the OTC market.

Nothing but hot air?

All of these efforts to capitalize on carbon mitigation are hampered by limited demand for carbon credits. In the absence of greenhouse-gas emission mandates in the United States, corporations have no cause to buy large quantities of offsets. Prices on CCX—a barometer of demand in the overall voluntary market—may be rising, but experts say they're not likely to approach European levels and turn district offset producers into carbon barons.

“Until there's a mandatory national cap-and-trade scheme, farmers or anyone else cannot realistically expect this market to take off,” said Thomas Brewer, a professor at Georgetown University in Washington, D.C., who specializes in the business implications of climate-change policy.

More important for the future of the planet, offset sales in the district and across the country are unlikely to have a meaningful impact on global warming.



*No-till and seeded grass pool. Source: North Dakota Farmers Union

A major reason for this is the paltry tonnage of emission credits traded voluntarily. According to the voluntary carbon markets report, worldwide trades in 2006 amounted to only about 2 percent of transaction volume that year (over 1 billion tons of CO₂) in Europe's emission trading system. Nowhere near enough carbon offsets are being purchased for public relations or investment purposes to slow the upward trajectory of greenhouse-gas emissions.

There's another reason the use of offsets is likely to do little to cool the earth—and why they're viewed coolly by many analysts and policymakers working on climate-change regulation. Offsets marketed in the United States often reward producers for emissions-reducing activities that they would have done anyway, or have been doing for years, without the stimulus of carbon payments. Thus, no additional emission cuts beyond business-as-usual occur. And firms that buy offsets (and consumers who ultimately pay for them) receive nothing in return, save perhaps good PR and relief from environmental guilt.

CCX has been criticized for its liberal "additionality" rules for offsets. Not only can applicants claim credits for new projects, such as freshly planted prairie grass or a recently installed anaerobic digester; they also can receive credit for ongoing projects that were undertaken for reasons unrelated to climate change.

Schmidt and her husband were already fencing pastures and herding animals to and fro on their Montana ranch when they realized they could earn CCX credits for it. "We truly believe in rotational grazing; we would do it anyway," she said. Likewise, the Fargo landfill began capturing methane seven years ago not to reduce greenhouse-gas emissions but to address odor complaints from nearby residents.

CCX even issues credits for projects that predate its founding. For instance, grass planted and methane burned any-

time after 1998 can earn offset payments today. Trees planted as long ago as 1990 qualify as afforestation or reforestation projects.

On its Web site, CCX defends its offset rules on the grounds that "early actors" deserve credit for their carbon-reduction efforts and that giving credit only to new projects would encourage gaming of the system—cutting down trees and replanting in order to qualify for reforestation offsets, for example. Also, noted Mathern of the North Dakota Farmers Union, offset contracts lock in future carbon savings. In the case of no-till or conservation tillage contracts, which require farmers to refrain from plowing crop residue into the soil, "what we're selling is the promise to keep doing a conservation practice for five continuous years," she said.

Aside from the additionality issue, the carbon benefits from certain types of offsets have come under fire. For example, recent research at the University of Minnesota has found that while practicing no-till cultivation in the Midwest may reduce erosion and improve water quality, it doesn't store any more carbon in soil than conventional plowing. Forestry offsets have been criticized because sequestration rates are difficult to measure and trees that succumb to fire, insects or disease release carbon back into the atmosphere. Programs being developed to certify the quality of offsets include the Voluntary Carbon Standard, the Gold Standard and the California Climate Action Registry.

Because of doubts about the value of offsets as a weapon against climate change, a number of proposed cap-and-trade schemes restrict their use. The Lieberman-Warner bill limited the use of agricultural, forestry and certain other types of offsets to 15 percent of a company's allowable carbon output. At the regional level, a cap-and-trade system in Northeast states slated to go into effect next year would require electric

utilities to cover at least 90 percent of their emissions by making actual cuts or buying allowances from other utilities. Rules for the use of offsets in the planned Midwestern Greenhouse Accord haven't been finalized.

A market in waiting

Everybody involved in the carbon offset trade—CCX, aggregators, credit speculators, offset producers—is waiting for the other shoe to drop: the passage of mandatory carbon regulation in the United States. As Brewer indicated, national cap-and-trade legislation could be a transforming event for the offset market. New Carbon Finance, a carbon market research firm, has estimated that carbon emissions trading in the United States could become a \$1 trillion market by 2020 if such a measure became law.

That may not happen, pricking expectations driving the generation of offsets in the district and ensuring that the voluntary market remains a sideshow to carbon emissions trading under the Kyoto Protocol. Without a U.S. mandate, demand for offsets would probably grow slowly, if at all.

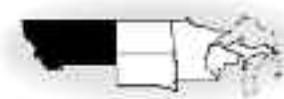
But most observers expect the federal government to adopt a cap-and-trade system with some provision for offsets within five years—if not the system outlined in the Lieberman-Warner bill then another that sets tighter or looser limits on greenhouse-gas emissions. "Unless there are unforeseeable changes in the Congress ... we're going to have a meaningful cap-and-trade system [enacted] in 2009," said Robert Stavins, director of environmental economics at Harvard University. Other experts see carbon legislation taking longer to wend its way through Congress.

Hard emission caps would increase demand for carbon credits, including offsets, raising prices on CCX or a new exchange created to handle greenhouse-gas emission transactions. Resulting higher prices would encourage greater production by farmers, landfill operators and other offset producers eager to cash in on the carbon boom.

Offsets being sold in the voluntary market today may not count toward compulsory emission targets. But it's likely that current registrants in CCX and other voluntary carbon credit programs would be grandfathered into a mandatory system and find themselves ideally positioned to profit from higher carbon prices going forward. Given their political pull in Washington, farmers and ranchers especially are likely to keep their place at the offset table, Brewer said.

Schmidt is cautiously hopeful that her rangeland credits, awaiting verification this summer for CCX enrollment, will gain value in the years ahead. "I'd be thrilled if the price went up; that would be great," she said. "However the politicians handle that is fine with me." ■

MONTANA



Dueling power plants

In an area of the state with limited transmission capacity, the struggle of one proposed power plant to attract financing has created an opportunity for another using a different technology.

A consortium of electric cooperatives and the city of Great Falls have sought to build a coal-fired generating plant east of the city for years, but recently the Highwood project suffered serious setbacks, including a failure to secure federal financing and the withdrawal of the consortium's largest member.

Into the breach stepped Montgomery Energy Partners, a Texas-based energy development company eager to serve Montana customers and power-hungry markets outside the state. The firm has proposed building two natural-gas-fired power plants in the area for \$400 million—about half the estimated cost of the Highwood plant.

In May federal regulators rejected Montgomery Energy's bid to move ahead of Highwood in the queue for access to available transmission, but the firm said it would persevere, relying on capacity already reserved by prospective customers. Construction could begin late this year or next spring.

City economic development officials want both power projects to go forward. That will probably require new transmission lines, also needed to transport power from several wind farms being developed in the area.

The road more traveled

Talks between Plum Creek Timber Co. and the U.S. Forest Service about long-standing road easements have raised concerns that the firm is preparing to convert large chunks of its forest holdings into residential real estate. Montana Sen. Jon Tester has asked the Forest Service to halt the talks until county governments and other stakeholders can weigh in.

Reciprocal agreements between the Forest Service and adjacent landowners spell out permitted uses of forest roads that cross property lines. County officials told Tester that they were worried that the agreements would be amended to allow use by residents of new subdivisions, increasing demand for public services.

The Forest Service maintains that Plum Creek has always had access rights for real estate development. A new draft agreement confirms those rights, as well as requiring private landowners to pay for upgrades of forest roads and keep them open to the public.

—Phil Davies