BOOST FOR DIGESTERS

Nutrient Credits Start To Surge

Nutrient credit initiatives are proceeding with relative speed in several states. This could be good news for anaerobic digestion projects.

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WHEN *BioCycle* last looked at nutrient credit procurement in Chesapeake Bay states ("Nutrient Procurement Update," Feb. 2017) the bottom line was "emergent." Maryland was still overhauling its nutrient trading rules and had informally proposed a $10 million pilot to procure "verified nutrient reduction credits" through public Requests for Proposals (RFPs), the way governments procure other commodities. The Pennsylvania legislature was just beginning to address bills that proposed creating a statewide nutrient credit procurement program that might cost up to $200 million annually.

Acronyms in this article

NCP: Nutrient Credit Procurement
NCT: Nutrient Credit Trading
NPS: NonPoint Source (pollution)
VNRC: Verified Nutrient Reduction Credit

But unlike past efforts to address nonpoint source (NPS) pollution — compared by some observers to "glacier watching" — these initiatives have proceeded with relative speed. Anaerobic digestion (AD) projects could benefit from the potential changes.

Nutrient credit measures are driven by powerful economic forces. Billions of dollars required of hard-pressed states to meet Chesapeake Bay (Bay) restoration targets through subsidies for rural septic and urban storm water reductions, or "voluntary" reductions from Best Management Practices (BMPs) installed at farms, virtually shout for less costly solutions. It's normally difficult for Bay states and other states to seek expensive on-site incremental reductions from tightly regulated wastewater treatment plants (WWTPs) that already have assessed ratepayers for stringent past pollution controls. Now state post-recession revenues are shrinking due to lowered U.S. tax brackets that will reduce receipts in jurisdictions that follow the federal Tax Code, plus a new cap on federal deductibility of state/local levies that indirectly taxes such receipts. (See "Will the Tax Cuts Act Cut Back AD?" Feb. 2018.)

Maryland faces an estimated $6-plus billion in additional outlays (mostly NPS) to meet the Bay's 2025 total loadings targets for nitrogen (N), phosphorus (P), and sediment (S). Pennsylvania's total projected tab may be between $11 billion and $20 billion. One Pennsylvania county is looking at over $1 billion for nitrogen reductions alone. Puget Sound in the Northwest, the Midwest Great Lakes, and hundreds of other U.S. jurisdictions with water quality limits confront similar heavy lifts. Environmentally sound steps to help lighten these loads — and perhaps sustain water quality programs' credibility — seem required.

CREDIT FUNDAMENTALS

Enter nutrient credit trading (NCT), also known as water quality trading.

NCT encourages nonpoint sources to create low cost reductions in N, P or S beyond applicable regulatory baselines, then sell these reductions at cost plus a profit for compliance largely by municipal or industrial dischargers facing astronomical costs of further "end-of-pipe" controls. Credited reductions do not displace mandates requiring those "point source" dischargers to install stringent "categorical" reduction measures — they only apply where categorical reductions are not enough to deliver clean water. NCT seeks to mobilize financial incentives that can secure needed additional reductions from difficult-to-regulate NPSs, reducing large state payments while cutting overall compliance costs.

But NCT also uses point sources — mostly municipal WWTPs — as levers to reach NPSs. Stressed regulators may not intend actually to extract "last mile" incremental reductions from WWTPs, but they may find it easier to impose further WWTP requirements that are expected to be met less expensively by trades. WWTPs understandably resist paying for reductions by previously unregulated farm or septic tank dischargers. They also dislike being exposed to further requirements should these dispersed sources not provide enough reductions.

Due to these tensions and precautionary state limits on what reductions can be traded how far and to whom, many nutrient credit trades have been short-term "bridge" transactions covering single year compliance shortfalls or the time needed to build additional treatment works. Demand for nutrient reduction credits often has been feeble, and credit markets have been "thin." In Pennsylvania, for example, between 2006 and 2015 less than 800,000 pounds of nutrient reduction credits for N, P and S apparently were traded — a tiny fraction of the state's required Bay-only reductions, which total about 200 million pounds for the three pollutants.

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Links to resources about nutrient credit trading in online edition of this article at BioCycle.net.

Nutrient credit procurement (NCP) aims to supercharge demand for credits in Bay and similar areas. It generally would supersede source-to-source trades, bypassing trade-related transaction costs as well as outreach hurdles, education barriers (e.g., persuading farms to participate), and government-funded clearinghouses to connect credit sellers with buyers. Instead the state would buy long-term NPS reductions directly from AD or other credit generators, through public RFP procurements that seek low-cost reductions in highly mobile nitrogen but also count "co-benefits" like stream improvements or decreases in P or S, whose effects are comparatively stable and local.

RFP criteria would reflect regulatory standards that seek to assure credits' water quality benefits given location, transport effects and other factors. "Safety ratios" (e.g., two pounds of modeled NPS reduction = one pound of credit) to mitigate remaining uncertainties typically would be deployed. The state would only pay winning bidders when their credits are certified and their real-world reductions or reduction plans are verified. It would use purchased credits to meet its nitrogen reduction mandates, in theory with sharply reduced NPS subsidies now borne by taxpayers.

Proponents assert that NCP will transform needlessly costly water quality regimes. Allocating proportional chunks of total required reductions to rigid point source or NPS "sectors," they argue, may be an efficient way for governments to organize a massive program. However, they add, sector specific reduction mandates deter cost-effective outcomes by creating regulatory "silos" whose boundaries are difficult to cross. They suggest nutrient trades are band-aids that may mitigate isolated costs but have difficulty jumping out of the silos, producing marginal gains.

AD IMPLICATIONS

Readers need not buy proponents' assertions to see the potential benefits of NCP for AD developers whose projects can directly reduce air- or water-borne nitrogen from the nearly 200 million tons of dairy, beef, swine and poultry manure the U.S. generates each year. Among other advantages:

- Unlike most BMP-type measures, AD tackles N emissions and discharges on-site at the source, largely before they evaporate to ammonia or otherwise are diluted by time and transport.
- NCP offers AD projects a long-term guaranteed revenue stream from direct sale of certified nutrient reduction credits. It also can make these revenues financeable because the state is the buyer, minimizing creditworthiness issues that often slow or kill NPS/point source deals.
- NCP can encourage use of credits as interchangeable commodities like corporate stocks or corn futures, with the hedging and secondary market benefits commodity status implies.
- AD projects usually will not face high fixed safety ratios, because their reductions are far more measurable than those from cover crops or swales. Thus they may generate more credits per unit of input than most NPS measures.

BAY STATE UPDATES

Maryland

Nutrient credit approaches took two steps forward and one step back. The NCP pilot fell by the wayside due to budget issues, though it reportedly will advance in the near future. Still, the state did not change its fundamental determination that:

"Total cost estimates for adopting [BMPs] and/or installing controls to reduce nutrient discharges are enormous and vary widely from sector to sector. ...It is imperative to ... implement strategies to lower these costs... .Under [nutrient trading, sources within] sectors are given the flexibil-

Quantifying Reductions

VERY generally, states use modeled reductions from specific Best Management Practices (BMPs) to quantify gross expected nutrient reductions. (The Chesapeake Bay Program website contains a long list of approved BMPs and associated model-derived reduction factors.) They may reduce modeled results by various technical factors such as minus 20 percent to factor in distance between trading sources or their distance from the Bay. Next, a general safety ratio is applied to compensate for remaining uncertainties in the underlying models or in general assumptions about pollutant transport or ultimate "fate."

For example, applying the Pennsylvania Department of Environmental Protection's (PADEP) current general 3:1 "safety ratio" generally would reduce modeled reductions of nitrogen (N) by 66 percent for trading purposes (3 pounds of modeled reductions = 1 pound of tradeable credit), other factors being equal. However, methods may differ in other states.

Under PADEP's current protocols, one pound of "verified" N reduction apparently would generate close to one pound of credit, if applicable verification criteria are met and reduction measurements are sufficiently precise to generate a high level of statistical confidence. The exact credit amount might have to be negotiated.

ity to meet their load limits by purchasing credits ... generated from load reductions elsewhere... . Accordingly, attention has shifted to the agricultural community and other [nonpoint] sources where compliance may be ... exceeded at a much lower cost per pound than [further] pollution reduction [at WWTPs] on site... .This program envisions trading not only between sectors ... within Maryland, but ... between Maryland and the other Bay states."

In October 2017, Maryland's Department of the Environment (MDE) proposed new rules for certifying and broadly using verified nutrient reduction credits (VNRCs) to meet water quality standards, across sectors and (on a trial basis) state lines. MDE noted that agricultural runoff in Maryland costs up to $200/pound reduced, versus urban storm water reductions averaging $3,800/pound. Its proposed rules seek to build on such differentials. They would authorize "nitrogen, phosphorus and sediment [credits], traded independently or in any combination"; require third party credit verification and a 2:1 safety ratio for NPS/WWTP trades unless "a lower ratio is justified"; and upgrade an existing electronic registry meant to speed trades. The proposed rules rejected environmental group requests for more stringent general trade ratios and for percent limits on the quantity of credits a source may trade. If adopted, they could provide a solid basis for NCP.

Pennsylvania

Nutrient credit action was more sweeping in Pennsylvania. Early this year, the state Senate merged a revised NCP bill (S.B. 799) with must-pass "Growing Greener" legislation reauthorizing statewide conservation measures. On January 31, it passed the combined bill 47-2. The measure's revamped NCP program would cover only bids for reductions in nitrogen — the most chemically active and mobile NPS pollutant, and the main driver of Bay-related NPS reduction costs. It also would:

- Take associated P and S reductions into account for RFP "bid-scoring" purposes, and count those reductions against the state's Bay-related P and S requirements, which apparently would remain in place.
- Fund state purchases of 10-year streams of VNRCs largely by direct appropriations, not problematic hikes in water use or other fees.
- Consolidate program administration in a single market oriented agency (the state Infrastructure Investment Authority, "PENNVest") while clarifying that RFP awards by PENNVest must reflect not merely low bids, but the bids' environmental co-benefits and their ability to satisfy Pennsylvania Department of Environmental Protection's (PADEP) guardrails that help assure environmental progress.

For AD, those guardrails expressly recognize "manure nutrient destruction and conversion technologies" as valid NPS credit generators. They exempt projects from current state 3:1 NPS safety ratios "where actual reductions in nutrients can be measured and verified," not merely modeled. (See sidebar on p. 36 for a primer on safety ratios.) They also would encourage participation of family farms and other small NPS generators by guaranteeing them at least a 20 percent share of each RFP award, without their having to navigate potentially daunting RFP processes

As noted below, cost savings and reduction efficiencies were critical factors to move S.B. 799 forward. But what apparently broke a legislative logjam were data indicating that deposition of manure-based nitrogen (as ammonia) to groundwater via air and soil was bypassing conventional surface runoff measures and seemed mainly responsible for high nitrate levels in Pennsylvania drinking water, threatening large-scale public health incidents.

A month after Senate passage the state's powerful Legislative Budget and Finance Committee updated its 2013 NCP analysis, concluding that a properly designed NCP program could save Pennsylvania over 90 percent — up from 80 percent — of the projected cost of required water quality nitrogen reductions, not counting the nitrogen benefits of BMPs which primarily address P or S. The Committee acknowledged certain implementation issues. It also attached to its report a list of questions raised by the PADEP. But its report nevertheless stated:

"We estimate achieving the required nitrogen reductions [by current methods] for agriculture and urban runoff through BMPs, after applying a 3:1 ratio for agricultural BMPs, would cost [the state] about $6.5 billion by 2025. We estimate a competitive RFP program could achieve these same levels of reductions at a cost of about $340 million [by] 2025. These estimates do not ... [reflect] how BMPs designed to satisfy sediment or phosphorus reduction [requirements] might also impact nitrogen reductions ... as often efforts to reduce sediment also ... reduce phosphorus and nitrogen."

The General Assembly is scheduled to take up S.B. 799 before July 2018. ■

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