Credits as Economic Incentives for On-Site Stormwater Management: Issues and Examples

Amy Doll and Paul F. Scodari
Apogee/Hagler Bailly, Inc.
Bethesda, Maryland

Greg Lindsey
Indiana University, School of Public and Environmental Affairs,
Indianapolis, Indiana

Stormwater utilities provide an institutional mechanism for incentives such as credits or reduced user charges in the implementation of onsite stormwater management. Such incentives create greater flexibility by allowing each user to chose the least-cost option—paying the stormwater utility charge or implementing onsite stormwater management. This paper provides examples of stormwater utilities with credits for onsite storm water management, including credits for peak runoff controls, implementation of water quality best management practices, and proper maintenance of onsite stormwater facilities. Also discussed are credits as economic incentives to encourage prevention or reduction of stormwater runoff problems. As economic incentives, credits must be sufficient to induce changes in behavior; however, their impact on total utility revenues must be examined carefully.

Introduction

A stormwater utility is a public utility established to provide stormwater management services. Stormwater utilities, like other utilities, rely on dedicated user charges related to the level of service provided. These user charges are usually based on the amount of impervious area on a property (i.e., a proxy for the estimated amount of runoff discharged from a property). Stormwater utility charges typically are paid by property owners and managed in a separate enterprise fund, which is dedicated to financing local stormwater management services. Most stormwater utilities are administered under public works departments or local departments of utilities that also provide wastewater or water services.

Experience with stormwater utilities has shown that they are capable of generating substantial revenues for local stormwater management programs at relatively nominal charges. Typical monthly charges for residential users range from $2 to around $6 per month. Nonresidential property owners typically pay more because their property is generally larger and developed more intensively.

Stormwater utilities offer three major advantages over financing local stormwater programs from the general fund through property tax revenues. A stormwater utility:

- Provides a dedicated, and stable source of funds for all facets of stormwater management programs (pollution prevention, capital investments, and operation and maintenance);
- Raises funds through charges based on a user's contribution to local stormwater runoff problems an approach often seen as more equitable to rate payers or the public; and
- Provides an institutional mechanism to incorporate incentives (e.g., reduced charges) for implementation of onsite stormwater management.

Overview of Credits as Incentives for Onsite Stormwater Management

The impetus for establishing credits in a stormwater utility rate structure is that a utility may achieve greater flexibility in protecting water quality and aquatic habitat in urban watersheds at a lower overall cost to the community. This greater flexibility can also help a utility lower the total costs of stormwater management for the community. A utility could also reward those users that go beyond minimum requirements in the local stormwater management code, if a credit approach is structured accordingly.

Credits are usually made available only to nonresidential property owners. For utilities where charges to residential properties account for a significant proportion of total revenues, there is less potential for the efficiency gains possible through lowering the total costs of stormwater management.

From an economic perspective, the extent to which a credit will increase the efficiency of a stormwater program

depends partly on the conditions in which it applies. For example, if individuals who develop property are not given the option either to build stormwater management facilities and receive a credit or to pay charges and avoid building facilities, then some of the incentive effect is lost. In cases where retrofitting is desired, whether or not a credit will induce property owners to build new stormwater management facilities where none exist or retrofit existing facilities to reduce stormwater charges depends on the size of the charge and the magnitude of the credit.

Examples of Credit (Fee Reduction) Approaches

A recent survey of stormwater utilities (NAFSMA, 1996) asked utilities whether they included incentives, such as reduced user charges, for commercial and industrial properties that implement onsite stormwater management. Of the 38 utilities that responded, 71% (27 utilities) had no fee reduction. Of the remainder of (11 utilities), two major types of fee reduction approaches were reported: 16% (6 utilities) had fee reduction for peak runoff controls, and 8% (3 utilities) had fee reduction for implementation of water quality best management practices or proper maintenance of onsite stormwater facilities. An earlier report on stormwater utilities (USEPA, 1992) found over 20 utilities with various types of credits as incentives for onsite stormwater management.

Some stormwater utilities offer credits for onsite stormwater detention/retention facilities in new developments. Credits can also provide incentives for onsite stormwater detention/retention through retrofitting older dry detention basins to extended detention basins or controlling peak flows through rooftop or underground storage tanks. Examples of credit approaches for selected utilities are highlighted below and summarized in Table 1.

Gainesville, Florida

The City of Gainesville's Stormwater Management Utility provides reduced monthly fees for nonresidential properties with privately maintained, onsite stormwater management retention systems. The maximum allowable credit is 100% of the utility's "base" fee, which is based on the amount of impervious area and one-half of pervious parking areas. The percentage of fee credit is determined by the volume of onsite retention provided (detention volume is not considered since that stormwater is discharged). The required volume is determined by the 25-year, 24-hour storm. Most credits range from 15 to 35%.

Orlando, Florida

In the City of Orlando, the stormwater utility provides a lower rate for commercial and multi-family residential properties with onsite stormwater management facilities. Such properties with approved onsite retention or detention get a credit on the rate charged per ERU (equivalent residential unit). The typical rate is $66.00 per ERU. The lower rate for properties with approved onsite stormwater facilities is $38.28 per ERU. Overall, this provides a 42% credit on the stormwater utility fee.

Wichita, Kansas

The City of Wichita's Stormwater Utility offers credits only for properties with 50 or more equivalent residential units. Two credits on the drainage fee are available. First, up to 40% credit on the fee is available for detention that equals or exceeds the city's new development standards (based on 100-year design storm). Second, an 80% credit on the fee is available for retention (no runoff from site). No credits are being given because the stringent standards are difficult to achieve.

Louisville & Jefferson County Metropolitan Sewer District, Kentucky

Credits are provided primarily for commercial properties with onsite detention for control of peak flows in the Louisville/Jefferson County Metropolitan Sewer District (MSD). A range of credits is available depending on how the detention basin functions. Basins must be sized for the 2-year, 10-year, and 100-year storms and also limit discharges to the pre-development rate of runoff. Credits are available for each type of storm, with an 82% maximum credit if all criteria are met. MSD is currently evaluating how to incorporate stormwater quality measures into its credit approach.

St. Paul, Minnesota

The City of St. Paul provides a rate of discharge credit for nonresidential properties on its storm sewer system charge. For nonresidential properties, this charge is based on actual parcel acreage and a standardized peak runoff rate determined for selected land use classifications. Where the peak stormwater runoff rate is limited by onsite facilities such as detention ponds owned and maintained by the property owner, up to a 25% credit is available. A 10% credit is provided for parcels that provide onsite storage for the 5-year design storm that also limit its discharge to a maximum of 1.64 cubic feet per second per acre. An additional 15% credit is provided for parcels that provide onsite storage for the 100-year design storm that also limit its discharge to a maximum of 1.64 cubic feet per second per acre. Both new developments and redevelopment are eligible for apply for credit. Existing nonresidential properties can retrofit to provide onsite storage for the 5-year design storm and get the 10% credit. Most credits were provided in the first few years after the credit approach was established. Currently, around 3-4 credits are approved annually. In St. Paul, the credit approach increased the political acceptability of the storm sewer system charge.

Charlotte, North Carolina

The City of Charlotte provides one or more credits for commercial, industrial, institutional, and multi-family residential properties and residential homeowner associations that mitigate the impacts of runoff on the stormwater system. Eligibility for one or more credits to the service rate

Table 1. Summary of Credit Options

Utility	Eligible Users	Basis for Credit	Design Storm	Maximum Credit	Typical Credit
Gainesville, FL	Nonresidential	Volume of onsite	25-year, 24-hour storm	100% of base fee	15-35%
Orlando, FL	Commercial and multi-family residential	Onsite retention or detention	NA	42%	42%
Wichita, KS	Properties ≥ 50 ERUs	Two credits: volume of detention or retention	1) 100-year storm 2) Complete retention	1) 40% 2) 80%	Currently no applications
Louisville-Jefferson County, KY	Commercial properties	Onsite detention of peak flows	2-year, 10-year, 100-year storms; pre-development runoff	82%	Varies with degree of control
St. Paul, MN	Nonresidential properties	Onsite detention of peak flows; acreage, peak flows	5-year, 100-year storms; release limited to 1.64 cfs/acre	10% (5-year storm) 25% (100-year storm)	Varies with degree of control
Charlotte, NC	Commercial, industrial, institutional, multi-family residential; homeowner association	1) peak discharge 2) total runoff volume 3)annual pollutant loading reduction	1) 10-year, 6-hour 2) 2-year, 6-hour 3) reduction in loading	1) 50% 2) 25% 3) 25% Up to 100%	Varies with degree of control
Durham, NC	Nonresidential properties	Pollution credits for Water quality and quantity controls	State standards for facility design; estimated pollutant removal efficiency	25%	Few applications
Cincinnati, OH	Commercial properties	Onsite retention	Limit discharge to pre-development runoff	50%	Credit never used
Tulsa, OK	Privately maintained facilities	50% greater detention; maintenance costs of onsite facilities		60%	Varies
Austin, TX	Commercial properties	Onsite detention, inspection		50%	50%
Bellevue, WA	All properties	Onsite detention; intensity of development		Reduction of one rate (intensity of development) class	Varies
King County, WA	Commercial properties	Private maintenance		Reduction of one rate class	Varies
Indianapolis, IN	Nonresidential properties	Discharge to specified streams; onsite retention or detention watershed size	Tier Two:2-, 10-, 25-, 50-, 100-year events	Tier One: 25%; ≤$50 Tier Two: 35%; <$250	(proposed)

charge is proportional to the extent those stormwater management measures address the impacts of peak discharge, total runoff volume, and annual pollutant loading from the site. Portions of the service rate charge are available for credit as follows: up to 50% for reducing peak discharge from a 10-year, 6-hour storm; up to 25% for reducing total runoff volume from a 2-year, 6-hour storm; and up to 25% for annual pollutant loading reduction. Each credit allowed against the service charge is conditional on continued compliance with the Charlotte Mecklenburg Land Development Standards Manual and may be rescinded for noncompliance with those standards. If 100% credit is given, the affected property will receive no stormwater service charges.

Durham, North Carolina

The City of Durham provides up to a 25% pollution credit on the stormwater utility fee for selected structural stormwater controls on nonresidential properties. Currently, the maximum pollution credit goes to standard basin designs that are identified as achieving maximum pollutant removal efficiency in state performance standards. For other structural controls in the state's standards, the city's pollution credit will be linearly variable, with no credit given for a removal efficiency of 0% of total suspended solids to a 25% credit for a removal efficiency of 85% of total suspended solids. The city recently approved sand filters in addition to the approved onsite basin designs, but no pollution credits are established yet for sand filters. Durham receives few applications for credits.

Cincinnati, Ohio

The City of Cincinnati's Stormwater Management Utility offers a credit for commercial properties that install onsite

retention that goes beyond normal building requirements (i.e., limit discharge to pre-development level of runoff). Such properties can apply for a credit of up to 50% on the utility's storm drainage service charge. This credit has never been used in Cincinnati.

Tulsa, Oklahoma

Under the City of Tulsa's stormwater drainage system service charge, credits are provided for private maintenance of approved onsite detention or retention facilities. An approved onsite facility must provide at least 50% more detention than required by the city. The amount of credit varies based upon the estimated maintenance costs if the city were providing the maintenance. The maximum credit is 60% of a property's annual stormwater charge. This maximum was established at 60% because around 60% of the stormwater utility budget in Tulsa goes to maintenance. Upon inspection, if an onsite facility is not performing adequately, then the property owner must pay the typical stormwater drainage service charge.

Austin, Texas

The City of Austin's Drainage Utility provides a 50% credit on the drainage fee for commercial property owners that construct and maintain approved onsite detention facilities. The city inspects these onsite facilities annually to ensure proper maintenance.

Bellevue, Washington

The City of Bellevue Storm and Surface Water Utility provides a credit on its storm and surface water drainage service charge for approved onsite detention facilities. This credit has worked well to get approved detention facilities built on large residential and commercial plats. Bellevue's utility rate structure classifies each property according to its percentage of developed property (from undeveloped land to very heavy development). A reduction of one intensity of development classification is provided for installation and maintenance of approved onsite detention facilities. This reduces the rate (based on the intensity of development classification) and the storm and surface water drainage service charge for such properties.

King County, Washington

Under the new King County Surface Water Drainage Design Manual, any development of parcels with over 5,000 square feet of impervious area must provide onsite detention/retention. For commercial properties, King County provides a credit through a reduction of one rate classification for the utility fee for private maintenance of an approved onsite detention/retention facility. The facility must be built to code and meet King County maintenance standards.

Issues in Establishing Credits for Onsite Stormwater Management

Like stormwater utility charges, there is no "correct" method for establishing credits. Each utility must consider local stormwater management goals in deciding whether to incorporate such incentives into their utility rate structure. The amount of impervious area on a property is usually the basis for stormwater utility charges. The quantity of stormwater runoff is generally the rationale behind charging property owners for stormwater management services (e.g., a user-pay approach). The adverse environmental impacts of urban runoff are related to both stormwater quality and quantity. To date, few stormwater utilities have attempted to incorporate measures of the quality of runoff as a basis for utility charges. Additionally, few utilities incorporate site characteristics other than impervious area (e.g., slope and soil characteristics) that also influence the adverse impacts of runoff. These factors may be important in setting charges and credits to induce the expected behavior of choosing the least-cost option. On the other hand, if stormwater quantity (as measured by the amount of impervious area) is closely correlated with adverse impacts of runoff related to both stormwater quantity and quality, the amount of impervious area may be a sufficient basis for setting charges that create the desired incentives.

Although credits must be sufficient to induce changes in behavior, their impact on total utility revenues must be examined carefully. An approach that gave large credits for onsite stormwater management could significantly reduce revenues for a local stormwater management program. Each community should evaluate whether charges and credits proposed for its utility are likely to promote onsite stormwater management and whether mechanisms are in place to ensure that onsite stormwater management achieves the desired environmental results.

Finally, public acceptability and political support is important to establishing a utility rate structure, whether or not it includes a credit approach. The nature of local government is that key players in utility design and implementation are seldom the key players in local politics. In designing a credit approach, a utility can attempt to minimize controversy by developing education and involvement programs for informing and gaining the support of local government officials and the public.

Case Study of Issues Associated with Proposed Credits in Indianapolis, Indiana

The City of Indianapolis is currently attempting to design a credit approach for its proposed stormwater utility. Considerable controversy has arisen over the proposed utility and a credit system is under consideration in part to help overcome general opposition to new charges or taxes. Through a credit system, utility planners and local elected officials are attempting to make the proposed stormwater utility charges more equitable and acceptable politically. The credit system in the most recent draft ordinance (Proposal No. 657, 1997) is a relatively complex approach to provide a reduction in stormwater user fees for nonresidential properties based on 1) certain qualifying conditions (location in relation to a major waterway), 2) activities that mitigate the impact of increased stormwater runoff from a property on a continuing basis, or 3) activities that reduce the city's cost of providing stormwater management ser-

vices to a property. The draft ordinance outlines a two-tiered credit that is based on watershed area as well as the size of the onsite detention/retention basin. The city will also develop a proposed Storm Water Credit Manual for use in reviewing and acting upon applications for credit. A credit application fee is also authorized in the draft ordinance. Efforts to establish a credit system for onsite detention/retention have addressed concerns of property owners and generally increased the perceived fairness of the proposed rate structure, and it is clear that the proposed utility could not be adopted without some type of credits. Inclusion of a credit system, however, has not been sufficient to ensure adoption of the stormwater utility and overcome other objections.

Conclusion

Economists have long advocated pollution charges as an approach to achieve greater flexibility and efficiency in pollution control. If such charges are set to reflect the environmental damage actually caused by polluted discharges, economic theory suggests they can create incentives for each user to choose the least-cost option—paying a pollution charge or implementing pollution control requirements. Making credits available on stormwater utility charges for implementation of onsite stormwater management can create comparable incentives for users and potential efficiency gains by lowering the total costs of a stormwater management program. Additional research is needed to evaluate the efficiency and equity issues associated with credits and stormwater utility charges. Until the economic and data issues in establishing a credit approach are better understood, communities considering a credit approach should examine the experience of those utilities that have implemented credits to evaluate whether such approaches are appropriate for local stormwater management goals and problems.

References

Doll, Amy, John Cameron, and Rick Albani. "Stormwater Utilities: A User Pay Approach to Stormwater Management," *Partners for Smart Growth Conference*, sponsored by the Urban Land Institute and U.S. Environmental Protection Agency, December 2-4, 1997, Baltimore, MD.

Doll, Amy, et al., "Storm Water Management: Financing Local Programs with a Utility Approach," *Finance Alert* (Summer 1992), pp. 2, 89.

Lindsey, Greg. "Charges for Urban Runoff: Issues in Implementation." Water Resources Bulletin (February 1990), pp. 117-125.

National Association of Flood and Stormwater Management Agencies. "1996 NAFSMA Survey of Local Stormwater Utilities." Washington, DC: National Association of Flood and Stormwater Management Agencies (1996).

U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation. "Storm Water Utilities: Innovative Financing for Storm Water Management." Unpublished report prepared by Apogee Research, Inc. (March 1992).