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IN THIS ISSUE

Water affordability: Comparing rate tiered discounts to percentage of income programs

NOTE TO READERS

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Tiered rate discount is less affordable, less efficient for Philadelphia water affordability.

In December 2016, the Philadelphia City Council unanimously decided that the Philadelphia Water Department should set water rates[1] explicitly using the affordability of water bills based on income as a rate determinant for low-income households. As with corresponding affordability programs adopted by natural gas and electric utilities, a multitude of alternative ways exist through which the PWD might implement such a directive.

Not all alternatives are equal, however, either in their costs, or in their administrative ease, or, most importantly, in the degree to which, if at all, they achieve the desired outcome of "affordability." This issue discusses the analysis presented to the City of Philadelphia comparing PWD's proposal for a tiered rate discount model against the Public Advocate's proposal for a percentage of income payment plan model.

The discussion below reviews the PWD's model against a percentage of income payment plan model (utilizing the same income tiers proposed by PWD, in order to have a consistent basis for comparison).

[1] In this discussion, "water" affordability should be construed to include water, wastewater/sewer and stormwater costs.

THE TIERED-DISCOUNT MODEL.

The basic structure of the Philadelphia Water Department (PWD) proposal is to provide a percentage discount on water bills sufficient to reduce the city-wide average bill to four percent (4%) of income at the average income for three specified income tiers. The income tiers were proposed to be set at 0% to 50% of Federal Poverty Level; 51% - 100% of Federal Poverty Level; and 101% - 150% of Federal Poverty Level. The average income was set within each poverty range assuming a household size of 2.5 persons per household.

The data and analysis presented below concludes that the PWD proposal, as a matter of program design, will fail to achieve affordable bills.

The Failure of the PWD Proposal to Achieve Affordable Water Rates.

As a matter of program design, PWD's proposed tiered rate discount will achieve affordable water bills – as defined by the PWD proposal--[2] for only a few Philadelphia households. The PWD proposal would generate a bill that is 4% of income only in the rare instance when a household:

- has an income precisely equal to the fictional average income for the discount tier (i.e., the median of the tier using a household of 2.5 persons); _and_
- has a water bill equal to the average city-wide water bill; _and_
- has arrears in excess of the sum of the copayments required during participation in PWD's program.

For bills to meet the affordability criterion of the PWD proposal (4% of income), _all_ of these factors must be met.

The FSC analysis for the City of Philadelphia, however, found that this rarely occurs.[3] As a result, the PWD program would significantly over-pay many Philadelphia residents while significantly under-paying many others, with the result being that the vast majority of the benefits delivered representing an ineffective and inefficient use of ratepayer funds. In addition, the PWD proposal would redistribute benefits from lower income Philadelphia neighborhoods to higher income neighborhoods.[4]

The tiered discount proposed by the Philadelphia Water Department (PWD) would not, and could not, result in affordable bills for a substantial portion of Philadelphia's low-income population. The proposed discount is based on an average income for the City as a whole. It is further based on average water consumption for the City as a whole.

The analysis below, however, is performed somewhat differently than PWD's. Rather than utilizing a fictional average household, calculat-

[2] Referring to a water bill equal to four percent (4%) of income as "affordable" herein should not be construed as accepting 4% as an appropriate affordability demarcation. In fact, water bills at 4% of income are not generally considered to be affordable to low-income households.

[3] The analysis presented herein does not specifically calculate the impact of arrears balances; there is inadequate data available for this purpose.

[4] All recipients under the PWD proposal will be "low-income." Nonetheless, as the data will show, this redistribution not only will occur, but will inherently occur because of the very design of the program as proposed by PWD.

ing its median income for each PWD-proposed income tier, this discussion relies upon actual Census data for the analysis. Similarly, instead of utilizing a monthly average bill of $67.43 which PWD used for its analysis, the analysis below uses bills reported by the Census bureau through the annual American Community Survey (ACS) and made available through the Census Bureau's on-line Data Ferrett program.[5]

The hypothetical city-wide average used by PWD does not reflect the wide diversity of income and water usage throughout Philadelphia. The Table below divides Philadelphia into eleven (11) regions called Public Use Microdata Areas (PUMAs), using data from the 2013 American Community Survey from the U.S. Bureau of the Census. The Table presents, for the City as a whole (as well as for each PUMA), the average household income and average water bill for that specific geographic area. The Table further disaggregates the data into two of the three ranges of Federal Poverty Level (FPL), as used by PWD in its discount proposal (0-50% FPL and 51-100% FPL).[6]

0-50% FPL	Average Household Income	Average Household Water Bill
Total City of Philadelphia	$13,066	$665
Far Northeast PUMA	$15,089	$712
Near Northeast-West PUMA	$8,600	$817
Near Northeast-East PUMA	$5,980	$778
North PUMA	$10,342	$478
East PUMA	$16,840	$643
Central PUMA	$8,889	$837
West PUMA	$11,052	$658
Center City PUMA	$17,465	$655
Southwest PUMA	$17,015	$568
Southeast PUMA	$18,176	$737
50-100% FPL	Average Household Income	Average Household Water Bill
Total City of Philadelphia	$22,497	$712
Near Northeast-West PUMA	$24,890	$863
Near Northeast-East PUMA	$22,450	$754
North PUMA	$21,475	$634
East PUMA	$24,358	$596
Northwest PUMA	$28,163	$585
Central PUMA	$15,504	$374
West PUMA	$19,652	$772
Center City PUMA	$10,662	$545
Southwest PUMA	$16,760	$868
Southeast PUMA	$25,151	$1,047

The data is important in that if the PUMA income is lower than the City average, or if the PUMA water bills are higher than the City average, the PWD proposal will fail to deliver affordable bills. In five of the ten PUMAs studied for the 0-50% FPL range,[7] the average income of households in the specific PUMA was less than the City average, sometimes significantly

[5] Additional analysis has confirmed that utilizing a higher average bill would exacerbate, rather than improve, the mis-targeting of benefits demonstrated in this analysis. Similarly, adjusting the discount in PWD's model (e.g., targeting 3% instead of 4% of household income) in an effort to bring more households into the range of affordability continues to demonstrate the geographic disparity in outcomes.

[6] On average, 4% of income for the 100% to 150% range exceeds actual water bills. As a result, that range is excluded from this analysis.

[7] Excluded from the 0 – 50% of Poverty analysis is the PUMA for Northwest Philadelphia. Its reported average income for 0-50% of FPL of $78,831 indicates a data entry error. For similar reasons, the Far Northeast is excluded from the 50 – 100% of Poverty analysis.

so. The average income for households with income below 50% FPL in Philadelphia was $13,066. In contrast:

- In three of the individual PUMAs, the average income for that individual area was less than $10,000: (1) Central ($8,889); (2) Near Northeast-West ($8,600); and (3) Near Northeast-East ($5,980). The average income in these areas of the City, in other words, was 32% to 54% less than the average income for the City as a whole, just looking at households with income less than 50% of FPL.

- In both the North PUMA ($10,342) and West PUMA ($11,052), while average income was more than $10,000 for households with income below 50% of FPL, the income in those areas was still 15% to 20% below the average for the City as a whole.

If these below-average incomes were not enough unto themselves, the 2013 ACS further indicates that the average water bill for these specific areas was higher than average as well. The three areas of Philadelphia with the highest water bills all fall within the four areas with the lowest incomes: (1) Near Northeast-West ($871); (2) Near Northeast-East ($778); (3) Central ($837). The number of households involved with these under-served areas is not small. Of the 63,770 Philadelphia households in the ten (10) PUMAs with income below 50% of FPL, 31,706 (49.7%) live in the areas that the program as proposed by PWD would inadequately serve.

As can be seen in the Table above, similar conclusions can be drawn for households with income between 50% and 100% of FPL. Three of the five PUMAs in which the 0 – 50% of FPL population is underserved by the PWD proposal are PUMAs in which the 50-100% of FPL population would be underserved also.[8]

The Table below presents an analysis of the impacts of the PWD proposal in each PUMA for the City. The Table determines a bill based on four percent (4%)[9] of income using the city-wide average income and water bills for households at or below 50% of Federal Poverty Level. It then calculates the percentage discount needed to achieve that 4% burden using these city-wide averages.

The discount calculated below differs from PWD's discount for two reasons. First, this discount calculation is based on the use of actual Census data and annual billing amounts from the U.S Census Bureau's most recent American Community Survey as described above, rather than a fictional household and a monthly bill of $67.43. Second, this discount calculation reflects the discount on a current bill basis, without regard to arrears, rather than calculating a higher discount, and then increasing the bill by a monthly copay on arrears.

The Table applies the city-wide percentage discount to the actual water bills for each PUMA throughout the City. It finally examines the extent to which the PWD proposal would underpay and/or over-pay low-income households in each Philadelphia PUMA.

[8] The average incomes for the 11PUMAs examined for the 100% to 150% of FPL are more tightly grouped around the City-wide average.

[9] The 4% figure is used for analysis here because that is the burden proposed by PWD, not because it is acknowledged as an appropriate demarcation of "affordability."

Over- and Under-Payment Under PWD Model by Philadelphia PUMAs (0 – 50% Poverty)							
0-50% FPL	Average Household Income	Average Household Water Bill	Bill at 4% of Income /a/	Dollar Discount Needed to Achieve 4% /b/	Percent Discount Needed to Achieve 4% (City Avg) /c/	Dollar Discount Using City Avg Pct Discount /d/	Over-payment / (Under)-payment Using City Avg Pct Discount /e/
Total City of Philadelphia	$13,066	$665	$523	$142	21%	---	
Far Northeast PUMA	$15,089	$712	$604	$108		$152	$44
Near Northeast-West PUMA	$8,600	$817	$344	$473		$174	($299)
Near Northeast-East PUMA	$5,980	$778	$239	$539		$166	($373)
North PUMA	$10,342	$478	$414	$64		$102	$38
East PUMA	$16,840	$643	$674	($31)		$137	$168
Central PUMA	$8,889	$837	$356	$481		$179	($302)
West PUMA	$11,052	$658	$442	$216		$141	($75)
Center City PUMA	$17,465	$655	$699	($44)		$140	$184
Southwest PUMA	$17,015	$568	$681	($113)		$121	$234
Southeast PUMA	$18,176	$737	$727	$10		$157	$147

NOTES:

/a/ Average Household Income x 4% (e.g., $13,066 x .04 = $523).
/b/ Average Household Water Bill – Bill at 4% of Income (e.g., $665 - $523 = $142).
/c/ Dollar Discount Need to Achieve 4% (city average) / Average Household Water Bill ($142 / $665 = 0.213).
/d/ Average Household Water Bill x Percent Needed to Achieve 4% (city average) (e.g., $712 x 21.3% = $152).
/e/ Dollar Discount Using City Average Percent Discount – Dollar Discount Needed to Achieve 4% (e.g., $152 - $108 = $44. Positive number indicates an OVER-payment. Negative number indicates an UNDER-payment.

The inability of the PWD proposal to achieve an affordable bill becomes evident from the Table above.

- The Near Northeast-East PUMA is underpaid (relative to that needed to achieve a 4% burden) by more than $370 a year (i.e., a need of $539 while the PWD program provides a discount of $166), while the Near Northeast-West and Central PUMAs are each underpaid by roughly $300 a year.[10] In both of these instances, the average income is significantly less than the city-wide average, while the average water bill significantly exceeds the city-wide average.

- At the same time these PUMAs are underpaid, four PUMAs (East, Center City, Southwest, Southeast) are *over*paid by between roughly $150 and $250 a year. The Center City PUMA is overpaid by $184 a year, while the South-

[10] The Near Northeast-West PUMA has an identified need of $473 while the PWD program would provide a discount of $174; the Central PUMA has an identified need of $481 while the PWD program would provide a discount of $179.

west PUMA is overpaid by $234 a year.

- The PWD proposal delivers benefits in roughly the amount needed in only two of the PUMAs studied (with overpayments of only $38 in the North and $44 in the Far Northeast).

These results arise due to the very design of the PWD proposal. Irrespective of whether the cost of the PWD program alternative is "more" or "less" than the model recommended by the Public Advocate, the expenditure of money under the PWD proposal fails to achieve the desired affordability outcome. In many instances, the PWD's proposed program design pays too much; in other instances, the PWD's proposed program design pays too little. The extent to which the PWD proposed program design fails to adequately target assistance is not small; the PWD proposed design misses by a lot.

The conclusion must be that the use of a discount based on city-wide average income and city-wide average water bills is inappropriate. The divergence of income below the city-wide average, and the divergence of water bills above the city-wide average, shows that PWD's proposed discounts would continue to provide unaffordable bills to a huge proportion of the low-income residents of the City.

Money would be more wisely spent if a true affordability program, explicitly taking into account a household's water bill as a percentage of income, were to be adopted in Philadelphia.

THE PERCENTAGE OF INCOME MODEL.

A percentage of income program can be adopted that, given reasonable program assumptions, costs roughly what PWD estimates the costs of its tiered discount to be, improves affordability by offering a lower percentage of income burden, and improves targeting by eliminating the use of city-wide averages.

In order to compare a percentage of income-based rate discount against the PWD proposal, FSC designated the following tiered set of water burdens to demarcate "affordability": (1) two percent (2%) of income for households with income at or below 50% of FPL; (2) three percent (3%) of income for households with income greater than 50% of FPL but at or below 100% of FPL; and (3) four percent (4%) of income for households with income between 100% and 150% of FPL.

It is expected that, at the higher income levels, such a program will function as a payment agreement, with the majority of customers in the higher tier, and a substantial number of customers in the middle tier, only participating to the extent such payment agreement is more advantageous than another payment agreement offered by the City.[11] This tiered structure recognizes that households at lower levels of income have a lower threshold of unaffordability, not only in absolute dollar terms but in percentage of income terms as well. A tiered income structure is used by nearly all Pennsylvania energy utilities implementing a percentage of income program,

[11] Although not factored into this analysis, customers with income between 150% and 250% of FPL should be eligible for a payment agreement that results in a total bill of 4% of income if such agreement is more advantageous than another payment agreement offered by the City.

including both PGW and PECO (Philadelphia's gas and electric companies respectively).[12]

Achieving Affordable Water Burdens under a Percentage of Income Proposal

A percentage of income-based rate discount is found to offer substantial advantages over the PWD proposal in terms of achieving affordable water bills. The comparative advantage of the Public Advocate's recommended program design can be seen in data developed by PECO Energy (the electric utility serving Philadelphia) when PECO agreed to abandon the tiered discount program it had historically operated (and as is now proposed for the water department by PWD). PECO instead moved to a percentage of income based program.

In a mediation designed to consider an appropriate low-income program structure for PECO, PECO developed data that tested the extent to which the tiered discount program and the percentage of income program resulted in affordable bills.

PECO considered changes in both the "breadth" of unaffordability (i.e., how many customers would face unaffordable bills) and the "depth" of unaffordability (i.e., dollars of bills over an affordable bill). PECO found that a move to a percentage of income plan would improve its ability to achieve an affordable bill from both perspectives.

In explaining to the state Public Utility Commission why it was proposing to move from the tiered rate discount to a percentage of income program, PECO said:

> PECO conducted extensive pro forma analyses of affordability for its current program and the [proposed] program as set forth in the Term Sheet, and it expects to see significant improvements in affordability, both for breadth of unaffordability (percentage of customers who receive unaffordable bills) and depth of unaffordability (amount by which an unaffordable customer misses the affordability target). It should be noted that, because of certain Commission-required cost containment mechanisms such as the minimum monthly bill. . ., the program cannot achieve 100% affordability.[13]

In addition, the Office of Consumer Advocate (OCA), the state equivalent to Philadelphia's Public Advocate, charged with representing the interests of all residential ratepayers before the PUC, endorsed the move from the tiered discount to the percentage of income program, stating:

> The [proposed] model targets these energy burdens to individual customer circumstances rather than to broad tiers of customers as in PECO's current program. By more closely targeting the individual customer, affordability is achieved for more customers. Under PECO's current program, 30% of the CAP customers receive unaffordable bills, but under the [new PECO proposal], this is reduced to 13% for [non-heating] customers and 9% for [heating] customers, primarily due to the minimum bill requirements and maximum CAP

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[12] PECO's percentage of income program was approved by the Pennsylvania PUC in July 2015 with an implementation date of October 2016.

[13] PECO Energy Company's Statement in Support of Joint Settlement, PUC Docket M-2012-2290911, April 30, 2015.

credit.[14] Moreover, in PECO's current program, many customers receive a discount although their bills are already at an affordable level. The [proposed model] utilizes the available funding more efficiently and redirects dollars to only what is needed to achieve affordability.[15]

Summary

There is no serious question but that, in contrast to the PWD proposal, which underpays a substantial proportion of customers and overpays a substantial proportion of customers, thus ineffectively and inefficiently using ratepayer dollars in the effort to achieve affordability, the affordability model recommended by the Public Advocate will reduce both the "depth" of unaffordability and the "breadth" of unaffordability.

For more information regarding the Philadelphia IWRAP program, or for a copy of Colton's analysis comparing the tiered discount program in Philadelphia to an income-based water bill, please write:

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Fisher, Sheehan and Colton, Public Finance and General Economics (FSC) provides economic, financial and regulatory consulting. The areas in which *FSC* has worked include energy law and economics, fair housing, affordable housing development, local planning and zoning, energy efficiency planning, community economic development, poverty and telecommunications policy, regulatory economics, and public welfare policy.

[14] These two factors, the minimum bill requirements and maximum program benefit, are the two "required cost containment mechanisms" PECO references in the language quoted immediately above.
[15] Statement of the Office of Consumer Advocate in Support of Settlement, March 20, 2015.