

# Improving the Evaluation of Household-Level Affordability in SDWA Rulemaking: New Approaches

An Expert Panel Report

Prepared with support from the American Water Works Association. The views expressed are strictly those of the authors and should not necessarily be attributed to the American Water Works Association or to the employers of any of the panelists.

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## Foreword

Ensuring that households can receive affordable water service is a long-standing priority for the American Water Works Association and its members. Affordability permeates numerous aspects of the delivery of water services through rate setting, cost-effective service delivery, and long-term sustainable water resource planning. Affordability is also an aspect of sound water policy decisions, including regulatory standard setting. Understanding the implications of affordability for water policy requires considering both the capacity of low-income households to afford service and the financial capability of community water systems to reliably provide adequate service and make necessary improvements over time.

In 2017 the National Academy of Public Administration (NAPA) released a congressionally mandated report, *Developing a New Framework for Community Affordability of Clean Water Services*. The report included a number of recommendations for why and how EPA should revise its methodology for evaluating affordability across its Clean Water Act and Safe Drinking Water Act programs.<sup>1</sup> AWWA, in collaboration with the National Association of Clean Water Agencies and the Water Environment Federation, funded a report, *Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector*.<sup>2</sup> Elements of this framework include recognition of:

- The reality that individual customers bear the ultimate cost of multiple water services (e.g., drinking water, wastewater, and stormwater).
- The need for broadly applicable and practical metrics for measuring customer affordability and water systems' financial capability. With growing income disparities and with highly community-specific costs of living, no one metric can serve as a bright line for when water service is affordable for individual households.
- The relationship between affordability at the household level and the financial capability of the water system requires clarification.

This previously developed “New Framework” was focused on both system-level and household-level affordability for the consideration of wastewater consent order implementation timelines, but did not specifically address affordability of water service at the Federal rulemaking level. Therefore, the purpose of this report is to promote better understanding and management of how drinking water standards affect affordability and public health for low-income households, including for small systems, in a manner that provides these households equivalent protection of health. *The panel wishes to emphasize that improving the analysis of affordability should be used to improve the lives of low-income individuals and communities. The purpose of these metrics is to support access to safe, clean drinking water for all Americans on an equitable basis that does not deny to low-income individuals access to drinking water of a quality that is enjoyed by those who are at higher income levels.*

EPA proposed amendments to its current Clean Water Act (CWA) affordability guidance in late 2020 and is expected to finalize them in 2021. The proposed guidance provided recommendations for an expanded financial capability assessment matrix for use in revisions to water quality standards for designated uses, water quality standard variances, and antidegradation reviews. But the guidance does not address the treatment of affordability with respect to setting national SDWA water quality standards, as

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<sup>1</sup> National Academy of Public Administration (October 2017), [Developing a New Framework for Community Affordability of Clean Water Services](#).

<sup>2</sup> Raucher, Robert et al. (April 2019), [Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector](#).

recommended by the NAPA report. Aware that the then-proposed guidance would not address the NAPA recommendations, AWWA supported the development of this panel report exploring additional steps EPA could undertake to better address household-level affordability under SDWA.

Since the initiation of this panel, the nation has been forced to contend with the COVID-19 pandemic. One measure commonly taken by many water suppliers during the pandemic was to suspend the termination of water service for nonpayment of bills. This was done to assure that households of all income levels had access to sanitation. While we lack a robust compilation of what this measure has meant for households and water systems, in California, the State Water Resources Control Board estimates that 1.6 million households owe an estimated \$1 billion in unpaid water bills or fees. Roughly 155,000 households owe more than twice the average (\$500); analysis by the Water Board indicates that many of the households with higher levels of unpaid water bills are in zip codes with higher concentrations of Black and Latino residents.<sup>3</sup> The Environmental Finance Center at University of North Carolina has estimated that roughly 5 percent of North Carolina water utility customers were eligible for disconnection due to nonpayment of bills during the late spring and early summer months of 2020.<sup>4</sup>

The combination of ongoing and newly discovered challenges only heightens the need to address affordability in EPA's rulemaking process. Although a wide variety of policy solutions will be needed to address affordability, the additional information developed through these recommended analyses should help both EPA and other stakeholders (Congress, states, utilities, and others) better understand the scale of these issues and make informed decisions to address affordability while continuing to assure public health protection for all communities.

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<sup>3</sup> California Water Resources Control Board, [Drinking Water COVID-19 Financial Impacts Survey, New Survey Results \(01/19/21\)](#).

<sup>4</sup> Environmental Finance Center at the University of North Carolina, <https://efc.web.unc.edu/2021/02/05/ongoing-impacts-of-the-covid-19-pandemic-conditions-on-north-carolinas-water-and-wastewater-utilities/>

# Executive Summary

Regulatory actions should neither decrease vulnerable persons' access to affordable water service nor neglect their needs for public health protection. To give due consideration to all members of the public affected by federal water policy, household-level affordability of water services can be evaluated within the SDWA regulatory process both to inform the rule requirements and affect the implementation of the rule to reduce burden on low-income households.

Regulations under the SDWA are already subjected to cost-benefit analysis (CBA), so one might ask why is there also a need for affordability analysis? When CBAs are conducted under the SDWA, it is assumed that all households are willing and able to pay the same amount for safer drinking water, even though households vary enormously in their ability to pay. Thus, even if a regulation has greater aggregate benefits than costs for the average household in America, the regulation may still not be affordable for lower-income households. Affordability analysis considers the welfare of low-income Americans.

There is already a specific statutory duty under the SDWA and in longstanding executive order provisions requiring EPA to conduct affordability analysis. In addition, consideration of household-level affordability is an important aspect of evaluating environmental justice concerns. As the technical quality of affordability analysis improves in the future, such analysis can enhance the implementation of public policy to ensure the nation has safe, reliable, accessible, and affordable drinking water.

The panel recommends that, in economic analyses supporting future primary standard development under the SDWA, EPA expand its analysis of household-level affordability. Moreover, the Agency should seek to use affordability analysis to inform SDWA policy development (including but certainly not limited to standard setting) so that it can enhance public health protections while ensuring affordability.

Specifically, the panel suggests that EPA:

1. Analyze rule impacts relative to regional lowest quintile household incomes and costs of living rather than relying solely on comparisons to national median household income.
2. Review and expand on current cumulative cost analyses so as to estimate the anticipated household water bill relative to a series of household-level income metrics for a more complete array of water system sizes. Impacts of combined water, wastewater, and stormwater costs should also be considered
3. Illustrate the incremental net benefit of the rule on households having different income levels and rule burdens (e.g., exemplars including high net benefit – high cost burden,

## **Policymaking Must Recognize**

Water is an essential service that must be available for a home to be inhabitable.

When provided through a utility, drinking water must be adequate in quantity, pressure, and quality to protect public health.

At present the primary source of funding for drinking water service derives from water rates charged to households and businesses receiving service.

Drinking water is one of several water services the costs of which are borne directly or indirectly by the same rate payers.

low net benefit – low cost burden) in addition to continuing to estimate net-benefit analysis for the average US household.

4. Estimate the number and distribution of systems evidencing high potential for affordability challenges from the rule based on community measures of household or community fiscal stress (e.g., percent of homes with incomes at or below 200% of poverty level). Reflect, if possible, the degree of fiscal impact on distressed households and communities.
5. Conduct additional data collection and analysis on specific research questions that will be useful in conducting future affordability analysis, such as on the relationship between costs on lower-income households as estimated in agency regulatory analyses and the actual water rates incurred by such households.
6. Use affordability metrics and estimates to conduct ex-post evaluation of SDWA rules and compare the ex-post findings to the ex-ante estimates for the same rules.
7. Use affordability analyses to identify needs for research and development, modification of federal funding provisions, and recommendations for utility practices (e.g., rate structures) to mitigate affordability stresses.

Four specific new analyses are suggested, as well as a series of suggestions on data sources that could be enhanced to support this analysis. The four new suggested analyses address the following questions:

1. How many households bear the costs and accrue the benefits from a rule option, and what is the income distribution of those households (e.g., by household income quintile)?
2. How are the net benefits of policy options distributed as a function of household income for a cross-section of income strata?
3. What amount of hypothetical federal subsidy would be required to ensure all target water systems can comply without significantly increasing household level burden on lowest quintile? How can this hypothetical subsidy level be compared to the actual level currently available and how much shortfall is there likely to be?
4. Does the rulemaking have consequences that are occurring in a timeframe that overlaps with other water-related regulatory requirements that place an undue burden on financially challenged households (e.g., evaluate single rate payer burden)?

To date, the EPA has sought expert panel review of its response to statutory duties to provide for small-system variances. Given the extensive expert commentary on that provision, our recommendations do not focus on that SDWA provision. Similarly, SDWA includes provisions for general variances and exemptions<sup>5</sup>. Based on available data, these SDWA provisions are so infrequently used as to be an unrealistic strategy for addressing either household-level or community-level affordability constraints.

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<sup>5</sup> The application of a variance or exemption means that some aspect of a regulation will not be met, or an alternative endpoint met instead of the primary one, during the duration of said variance or exemption. For this reason, those seeking a variance or exemption must demonstrate how their efforts protect public health in an alternative manner. Variances and exemptions for health-based measures within SDWA are uncommon, although data issues make it difficult to know exactly how uncommon (an issue discussed later in this report)



Nevertheless, although our primary focus in this report is directed to SDWA standard-setting, EPA may want to utilize the above recommendations to inform its approach to small-system variances and its guidance for evaluating general variance and exemptions.

## Introduction: The Water Affordability Crisis

Since the 1960s, the US federal government has used an official measure of poverty that varies by household size. In 2019, the poverty level was set at an annual income of \$13,011 or less for a single-member household and \$26,172 or less for a family of four.

Using this official measure, about 10.5% of Americans, or about 34 million people, were living in poverty in 2019. This pre-pandemic level was the lowest rate of poverty in the US since poverty statistics were first collected in 1959.<sup>6</sup>

The rate of poverty varies in subpopulations. It is higher among blacks (18.8%), Hispanics (15.7%), women (11.5%), young people under age 18 (14.4%), those who are not US citizens (16.3%), those living in the South (12%), inner-city dwellers (13.1%), the disabled (22.5%), and those without a high school diploma (23.7%).<sup>7</sup>

The official poverty measure has several technical weaknesses that are corrected in the Census Bureau's "supplemental" poverty measure.<sup>8</sup> The supplemental measure accounts for, among other factors, non-cash assistance programs, tax payments, medical expenses, work expenses, and geographical differences in the cost of living. The overall rate of poverty using the supplemental measure is similar to the official measure, but the estimated composition of poverty is different. Compared to the official measure, the supplemental measure reports lower rates of poverty among young people, higher rates of poverty among the elderly, higher rates of poverty in the northeast and West, and lower rates of poverty in the South. A key technical weakness is that the poverty level is a national estimate that does not address major inter- and intra-regional variations in the cost of living relative to the national metric; the supplemental measure does account for regional variations in the cost of living.

The official data for 2020 will not be published by the Census Bureau until September 2021 but preliminary monthly data using the supplemental measure show the impacts of the COVID-19 pandemic. Poverty in America is increasing again, the first time since the Great Recession of 2007-2009, despite expansion of unemployment compensation and the COVID relief checks sent to millions of Americans in 2020. The exacerbation of poverty appears to be larger among blacks and Hispanics than among whites, and measures of "deep" poverty (incomes less than 50% of the federal poverty threshold) have worsened significantly.<sup>9</sup>

### *Affordability, Water Bills, and Poverty*

"Affordability" is a multi-faceted term that can be described in many ways. A common definition of affordable is "reasonably priced" (relative to value) and "accessibly priced" (relative to income).

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<sup>6</sup> Semega, Jessica. Koller, Melissa, Shrider, Emily A, Creamer, John F. Income and Poverty in the US: 2019. US Census Bureau, Washington, DC. P60-270. September 2020. <https://www.census.gov/library/publications/2020/demo/p60-270.html>

<sup>7</sup> Ibid

<sup>8</sup> 2020. U.S. Census. [Income, Poverty and Health Insurance Coverage in the United States: 2019](#). CB20-145.

<sup>9</sup> Parolivi, Zachary et al. Monthly Poverty Rates in the US During the COVID-19 Pandemics. Center on Poverty and Social Policy. School of Social Work. Columbia University. Poverty and Social Policy Working Paper October 15, 2020. <https://www.povertycenter.columbia.edu/news-internal/2020/covid-projecting-monthly-poverty>.

Affordable water service can also be viewed as the ability of a customer to pay the water bill in full and on time without jeopardizing the customer's ability to pay for other essential expenses.

Overall, workers have experienced no growth in real earnings in the United States for decades. The average hourly wage for workers today, when adjusted for inflation, is about what it was in 1978. In contrast, the average rates charged for drinking water and wastewater services in the US have increased significantly from 2000 to 2017. During this same period, overall median household income did rise 35% (as there are more two-earner households now) but the average rates for water and wastewater services grew 136% (Bipartisan Policy Center, 2017). The growth of water bills also outpaced the growth of bills for other utilities such as electricity, natural gas, and phone service.<sup>10</sup> To pay for the rising costs associated with water treatment and delivery, rates for drinking water, sewer management, and stormwater services are expected to continue to rise and do so at a pace greater than inflation.<sup>11</sup>

A variety of factors are contributing to the growth of water bills: aging infrastructure; management decisions to diminish the systematic underpricing of water services that has persisted in the US for decades; the increasing costs of infrastructure upgrades; the growing costs of climate-emergency defenses for floods and droughts; and compliance expenditures for federal and state regulatory requirements. Demographic factors are also exacerbating the problem, both in terms of population declines in some urban centers and population growth in some water-strapped areas. Meanwhile, declining demand for water from conservation efforts creates fiscal challenges for some water utilities.<sup>12</sup> During this same period, as Figure 1 shows, the local funding for water services increased significantly while federal funding has remained relatively flat.<sup>13, 14</sup>

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<sup>10</sup> Vock, Daniel. Utilities Worry that Water's Becoming Unaffordable. Governing.com. December 4, 2014.

<https://www.governing.com/archive/gov-water-utilities-worry-about-high-costs-for-low-income-customers.html>.

<sup>11</sup> U.S. Bureau of Labor Statistics (October 2020). United States-CPI: Urban Consumer- Water and sewer and trash collection services. Retrieved from <https://economy.com/united-states/cpi-urban-consumer-water-and-sewer-and-trash-collection-services>

<sup>12</sup> Stratton, Hannah et al (October 2017). Keeping Pace with Water and Wastewater Rates. Journal AWWA 109(10):E426. <https://doi.org/10.5942/jawwa.2017.109.0101>.

<sup>13</sup> Lakhani, Nina, Adolphe, Juweek. Key Findings: The Guardian's Water Poverty Investigation in 12 US Cities. Theguardian.com. June 26, 2020. <https://www.theguardian.com/us-news/2020/jun/26/running-drinking-water-poverty-us-cities>.

<sup>14</sup> Congressional Budget Office (October 2018) Public Spending on Transportation and Water Infrastructure, 1956 to 2017. <https://www.cbo.gov/system/files/2018-10/54539-Infrastructure.pdf>.

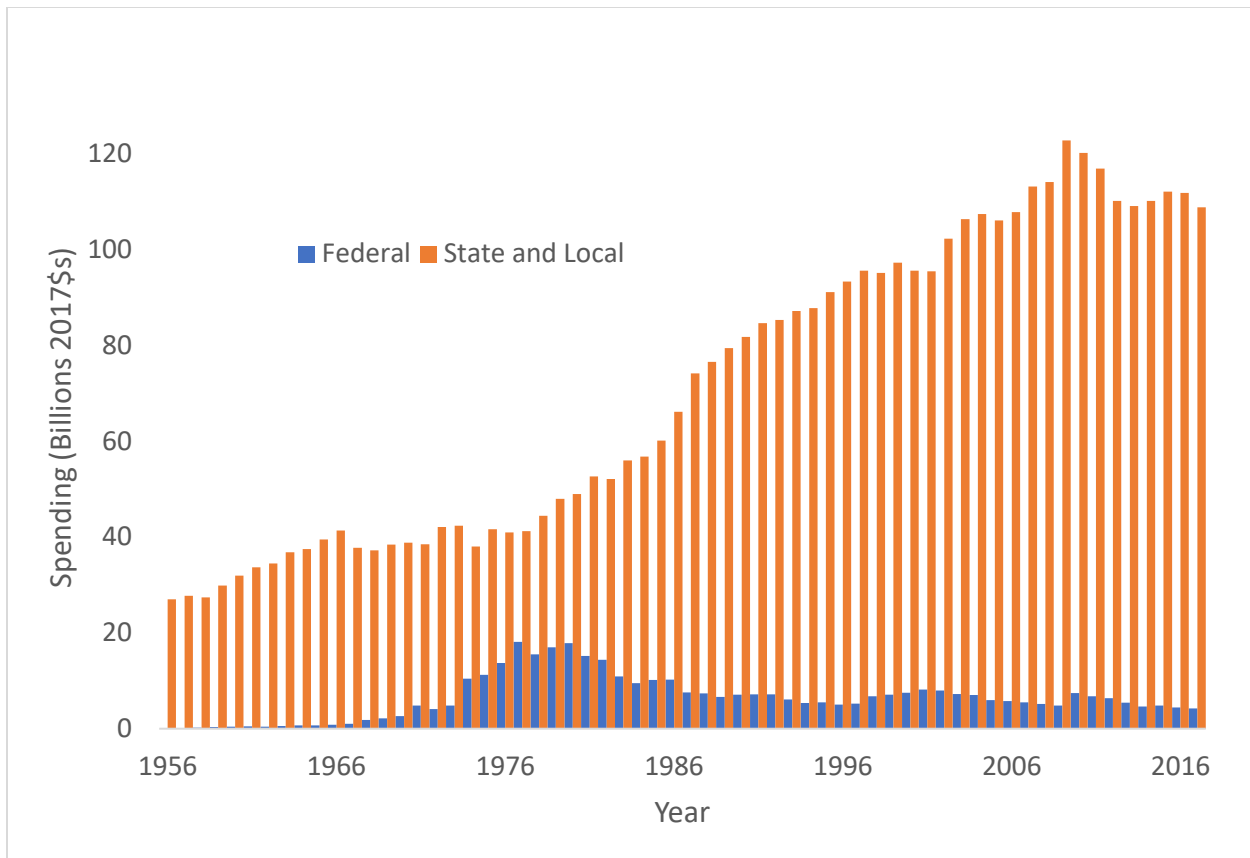


Figure 1. Federal and state/local investment in water utilities, 1956-2017, in 2017 US Billions (CBO 2018)

The rise in water rates has not been uniform in cities across the country. A recent study compared trends in water bills in twelve US cities from 2010 to 2018 and projected bills through 2030. The study found that, for the twelve cities, the average annual water bill in 2018 was \$476, but with a range from \$196 in Fresno to \$869 in Austin. The change in water bills from 2010 to 2018 ranged from a 27% increase in Santa Fe to a 154% increase in Austin. In several of the cities studied (e.g., Cleveland and Austin), large percentages of low-income households are facing or will face water bills in excess of 4% of household income. In the other cities (e.g., Fresno), water affordability for low-income households is a less serious challenge. However, water affordability has long been an issue for at least some low-income households, even before the recent acceleration of water rates.<sup>15</sup>

For a household in the middle of the US income distribution, an annual water bill of roughly \$500 (about \$42 per month) is a necessary expense unlikely to be a hardship, as the national median household income was \$68,703 in 2019. For households with lower incomes, the same water bill can be quite worrisome. The 20<sup>th</sup> percentile of the US household income distribution in 2019 was \$28,084, slightly greater than the official poverty line of \$26,172 for a family of four. Of the 34 million Americans living in poverty in 2019, almost half were living in “deep poverty” (\$13,086 for a family of four).

<sup>15</sup> Kayaga, D, Franceys, R. Costs of Urban Utility Water Connections: Excessive Burden to Poor. Utilities Policy. 15(4). 2007, 270-277. <https://doi.org/10.1016/j.jup.2007.06.002>.

The rapid rise in water rates since 2000 has inflicted serious adverse impacts on low-income households. Since a typical response to a chronically unpaid water bill is a lien on a person's house and shutoff of the water connection, the water affordability crisis is linked to a housing affordability crisis in the United States. Each year, millions of residences are disconnected from water service or foreclosed due to non-payment of water bills.<sup>16</sup> When low-income households do manage to pay their water bills, they too often do so by reducing expenditures on other necessities or by not paying other essential utility bills (e.g., energy). Some low-income households do receive public assistance to help pay other bills (e.g., Section 8 housing vouchers, nutrition assistance), but these programs are currently not adequate to pay for rapidly rising water bills.<sup>17</sup> Generally, the availability and design of both water rates and customer assistance programs are left to utilities and the boards or state commissions that oversee them.

The current regulatory system governing water services does not adequately take affordability into account. Water services are themselves provided by local public and private entities. The rates these entities can charge customers are regulated at the state and local level of government. To the extent that affordable water is an official issue for to EPA, such as in the context of rulemaking proceedings under the Safe Drinking Water Act (SDWA), it is typically addressed by computing the percentage of median household income (MHI) dedicated to water. MHI is a metric that is irrelevant for low-income households, including those surviving below the poverty line—households that disproportionately comprise people of color.<sup>18</sup> The precise extent of adverse consequences on low-income households is basically unknown because there are no requirements that the federal government, the states, localities, or utilities report regularly on the impacts of rising water bills on low-income populations.<sup>19</sup>

### *Cross Subsidies in Water Rates*

The rates charged for water do not emerge from a classically competitive, free market. The price of water for municipally owned water systems is generally based on the cost of providing service to customers, and water rates are set and approved either by the utility's governing body (e.g., a city council) or by a government regulatory body (such as a state utility commission). In most states, privately owned water systems are economically regulated, and in those states water prices are usually subject to state public utility commission rate regulation, which is typically based on cost of service. Some states may consider household affordability in the rate setting process. That being said, the nature of the economic regulation varies considerably by state, and in a few states (including Wisconsin, Maine, West Virginia, and Indiana), publicly owned utilities are also subject to at least some portions of the same rules.

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<sup>16</sup> Colton, Roger. The Affordability of Water and Wastewater Services in Twelve US Cities: A Social, Business and Environmental Concern. Report prepared for The Guardian. May 2020.

<https://www.theguardian.com/environment/2020/jun/23/full-report-read-in-depth-water-poverty-investigation>.

<sup>17</sup> Rockowitz, Dahlia et al. Household Water Security in Metropolitan Detroit: Measuring the Affordability Gap. University of Michigan. August 2018. <https://poverty.umich.edu/research-publications/policy-briefs/household-water-security-in-metropolitan-detroit-measuring-the-affordability-gap/>.

<sup>18</sup> Montag, Coty. Water/Color: A Study of Race and the Water Affordability Crisis in America's Cities. Report by the Thurgood Marshall Institute. NAACP Legal Defense and Education Fund, Inc. 2019. [https://www.naacpldf.org/wp-content/uploads/Water\\_Report\\_Executive-Summary\\_5\\_21\\_19\\_FINAL-V2.pdf](https://www.naacpldf.org/wp-content/uploads/Water_Report_Executive-Summary_5_21_19_FINAL-V2.pdf).

<sup>19</sup> Jones, Patricia A, Moulton, Amber. The Invisible Crisis: Water Affordability in the US: Report for the Unitarian Universalist Service Committee. May 2016. <https://www.uusc.org/the-invisible-crisis/>.

With affordability often playing little formal role in the rate setting, it is important to appreciate the nature of the cross-subsidies accomplished through administered pricing and some limited assistance provided to low-income households.

A common feature of water rates is an adjustment in the residential rate based on the amount of water consumed, with the lowest rates for low-volume users known as a “lifeline” rate or rate feature. Whether lifeline rates constitute a subsidy depends on the construct of the rate structure used by the utility, as in some cases this is reflective of the baseline utility costs whereas in others the lowest volumes are sold below cost. Regardless, they do not specifically target low-income households because low volume does not typically directly correlate to low income. They have been shown to be regressive in their impact on low-income households. On average, low-income households capture only half as much of the subsidy as they would under a random subsidy program.<sup>20</sup> To help address this, some utilities run conservation and efficiency programs targeted towards low-income customers to help them take greater advantage of lifeline rates.

Generally, states do not require water utilities to adopt customer assistance programs (CAPs) for low-income households. Indeed, in some states, utilities are barred from adjusting rates for different groups of customers.<sup>21</sup> Nonetheless, a growing number of utilities have adopted CAPs, such as discounts on bills, flexible terms, lifeline rates, temporary assistance, and water efficiency. An EPA survey in 800 communities shows significant use of CAPs but it also shows that this assistance does not always reach the neediest households. CAPs vary in structure and size, they often address only short-term needs such as household financial emergencies, they suffer from uneven outreach efforts, and they typically require special funding sources (e.g., donations) beyond revenues from rates to finance them.<sup>22</sup> Even in northern California, where CAPs are relatively generous, the programs vary greatly between providers in terms of the amount of assistance provided. There is no publicly available national data set to determine the impacts of CAPs on water affordability for low-income households.<sup>23</sup> Furthermore, public agencies in California cannot charge their customers or ratepayers a higher price for water than the actual cost of providing the service, which means that, if CAPs are not carefully designed to meet such a requirement, it can be difficult to fund robust CAPs.

Moreover, many low-income households pay for water, but not in the form of a water bill. Among US renters with incomes below 150% of the federal poverty line, 49% do not directly receive a water bill.<sup>24</sup> In most major cities, water costs incurred by landlords of rental properties are typically passed on as part of

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<sup>20</sup> Komives, Kristin et al. Water, Electricity and the Poor: Who Benefits from Utility Subsidies? World Bank, Washington, DC. 2005. <https://openknowledge.worldbank.org/handle/10986/11745>.

<sup>21</sup> University of North Carolina at Chapel Hill Environmental Finance Center, “Navigating Legal Pathways to Rate-Funded Customer Assistance Programs: A Guide for Water and Wastewater Utilities,” July 2017. Available at: <https://efc.sog.unc.edu/project/navigating-legal-pathways-rate-funded-customer-assistance-programs>.

<sup>22</sup> US Environmental Protection Agency. Drinking Water and Wastewater Utility Customer Assistance Programs. Washington, DC. March 2016. [https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww\\_utilities\\_cap\\_combined\\_508.pdf](https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww_utilities_cap_combined_508.pdf)

<sup>23</sup> Pacific Institute. 2013. Water Rates: Water Affordability. <https://pacinst.org/publication/water-rates-water-affordability-need-to-know-brief/>.

<sup>24</sup> Bipartisan Policy Center, 2017. Safeguarding Water Affordability. <https://bipartisanpolicy.org/wp-content/uploads/2019/03/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>.

the tenant's overall rent, but not as a separate water charge. It is difficult to target CAPs at low-income renters who are not paying the water bill directly.

In 2013, the National League of Cities sponsored a five-city pilot project (Savannah, St. Petersburg, Louisville, Newark NJ, and Houston) that connected households at risk of service shutoff with various programs for financial assistance and advice. Subsequently, Philadelphia implemented a special assistance program based explicitly on the percentage of a household's income consumed by water payments. From 2012 to 2017, more than 40% of households in Philadelphia experienced at least one water shutoff.<sup>25</sup> The city's Department of Water began in 2017 to enroll applicants in a "Tiered Assistance Program" (TAP). TAP is funded by rate increases on ratepayers not enrolled in the program. Prior to TAP, water bills (that is, water, wastewater, and stormwater) for low-income households ranged from 3.2% to 8.1% of monthly income. Under TAP, the city Water Department caps bills between 2% and 3% for households earning less than 150% of the federal poverty level and 4% for those earning less than 250% of the federal poverty level

Enrollment numbers and program costs in Philadelphia have increased steadily from 2018 to 2021, with the 2021 program scheduled for 26,397 enrollees at a cost of \$17 million. As the program grows to scale, questions will be raised as to whether it is fiscally sustainable. No other city in the country (including the five pilot cities) have chosen to replicate Philadelphia's TAP.

#### *SDWA and Drinking Water Affordability*

The SDWA was first signed into law in 1974 and the cost of implementation has been a facet of drinking water policy over the duration of the Act's history.<sup>26, 27</sup> In SDWA stakeholder dialogues, there is a rich history of considering the cost implications of regulatory requirements on water systems and states, and implicitly these considerations take into account the cost of drinking water service that will subsequently be transferred to households through water rates as a result of regulatory requirements. In the latest amendments to SDWA in 1996, there was a specific focus on the system affordability of primary drinking water standards with respect to small water systems.<sup>28</sup>

In seeking to understand household-level affordability in the context of recent and anticipated regulatory actions under SDWA, EPA has expressed interest in a range of metrics to consider and evaluate but, in the end, the agency has relied almost exclusively on a single metric—the cost of drinking water service as a percent of median household income. This is particularly true of its statutorily mandated analysis to determine if technology-based small system variances will be available. EPA has proposed additional

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<sup>25</sup> Colton, Roger, Ballenger, Robert, Dahme, Joanne. 2016. Water Affordability Based on Income: The Tiered Assistance Program in Philadelphia. Water Center. University of Michigan. Retrieved November 21, 2020. [http://bcpiac.com/wp-content/uploads/2016/06/Colton\\_Water\\_Affordability\\_Philadelphia\\_October-2015.pdf](http://bcpiac.com/wp-content/uploads/2016/06/Colton_Water_Affordability_Philadelphia_October-2015.pdf).

<sup>26</sup> [P.L. 93-523 \(1974\)](#) Section 1401 provides for consideration of whether an MCL is "economically ... feasible"

<sup>27</sup> [P.L. 93-523 \(1974\)](#) Section 1412 provides for setting standards to protect public health to the extent feasible, ... taking costs into consideration, as well as, describe feasible in terms of technology that is "generally available (taking cost into consideration).

<sup>28</sup> [P.L. 104-182 \(1996\)](#) Section 116 specifies that EPA must only make small system variances available if an eligible system "cannot afford to comply, in accordance with affordability criteria established by the Administrator (or the State)."

metrics for financial capability assessment for Clean Water Act issues, laying the groundwork for additional consideration of additional SDWA affordability measures.<sup>29, 30, 31</sup>

Current practice has done little to enable EPA to respond to growing concerns about the impact of its actions on environmental justice, such as on the impacts to households that face financial and societal disadvantages. In particular, the Agency's typical analysis to support rulemaking decisions focus exclusively on the impact of *system size* on treatment cost and not on the impacts at the household level.

The current analytical framework used by EPA does not adequately address a number of important emerging trends important to the agency's drinking water rulemaking process, including:

1. The income distribution in America is increasingly bimodal<sup>32</sup>, such that reliance on a central tendency estimate of income is a misleading criterion when considered in isolation.
2. SDWA regulations entailing substantial capital and operational costs can have implications for low-income households within larger water systems, making household-level affordability analysis as important as system-level financial capacity analysis.

Examples include:

- a. The final Lead and Copper Rule Revision, where full lead service line replacement has an estimated annual national cost between \$47 -133 million over at least the next 35 years.<sup>33</sup>
- b. The recently initiated Microbial / Disinfection Byproduct Rule Cluster discussion, which if it results in treatment costs on the same order of magnitude as the last such discussion would lead to an additional annual national cost of \$297 - 324 million.<sup>34, 35</sup>
- c. The Anticipated MCLs for perfluorooctanoic sulfonate (PFOS) and perfluorooctanoic acid (PFOA) for which EPA has already proposed a positive regulatory determination are estimated to lead to \$2.7 – 25 billion in annual treatment costs nationally depending on the MCL concentration and monitoring

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<sup>29</sup> International Consultants et al. 1998. National-Level Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act (prepared for U.S. EPA Office of Ground Water and Drinking Water).

<sup>30</sup> USEPA. 1998. [Information for States on Developing Affordability Criteria for Drinking Water](#). EPA 816-R-98-002.

<sup>31</sup> USEPA. 2021. Financial Capability Assessment for Clean Water Act Obligations.

<https://www.epa.gov/waterfinancecenter/2021-financial-capability-assessment-clean-water-act-obligations>.

<sup>32</sup> United States Census Bureau. 15 September 2020. *Income and Poverty in the United States: 2019*.

<https://www.census.gov/library/publications/2020/demo/p60-270.html>.

<sup>33</sup> EPA. 2021. National Primary Drinking Water Regulations: Lead and Copper Rule Revisions. [86 FR 4198](#) (value inflated to 2020\$ using CPI).

<sup>34</sup> EPA (December, 2005) [Economic Analysis for the Final Stage 2 Disinfectants and Disinfection Byproducts Rule](#). EPA 815-R-05-010 [Values inflated to from 2003 to 2020 dollars].

<sup>35</sup> EPA (December 2005) Economic analysis for the Final Long Term 2 Enhanced Surface Water Treatment Rule. EPA815-R-06-001 [Values inflated to from 2003 to 2020 dollars].

<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=901S0000.TXT>.



regime.<sup>36</sup> These are two of the 29 per- and poly-fluoroalkyl substances which will be monitored under the fifth round of Unregulated Contaminant Monitoring Rule.

The benchmark cost-wall (i.e., a technology that increases treatment costs significantly) for drinking water treatment is granular activated carbon (GAC) contactors.<sup>37</sup> Today's policy discussions embrace the application of multiple advanced treatment processes to address very low concentrations of a range of contaminants, some with costs substantially higher than GAC.<sup>38</sup> Discussing the merits of regulatory options in this policy environment must adequately consider both the risk reduction potential for low-income households and the cost of service and affordability implications.

## The Need for Analysis of the Impact of SDWA Standards on Household-Level Affordability

Regulatory actions should not have the effect of reducing health protections for vulnerable populations by decreasing either the safety of or access to water services. Although increased costs associated with compliance with SDWA standards are only one factor driving increases in the overall costs of water services, it is not a factor that should remain hidden to both policymakers and members of the public. It merits meaningful analysis.

While the analysis of affordability within the SDWA regulatory process is not a primary driver in developing EPA rule requirements, it can be helpful in numerous ways. Such improved analysis could drive critical federal, state, and local policy decisions to address the fundamental disconnect between water service costs and the revenue that a given community can generate—such as subsidies or rate policies that can reduce burdens on low-income households.<sup>39</sup> Currently, in many areas of the country, water rates still remain too low to generate the revenues needed to upgrade, operate, and maintain community water, wastewater, and stormwater systems. The analyses can also help highlight situations where an intensive research and development effort is needed to develop more cost-effective solutions, thus reducing affordability impacts.

The need for meaningful analysis of affordability is reflected in a series of existing legal provisions in the SDWA and in applicable rulemaking procedures that either encourage or require EPA to consider a variety of distributional and equity implications of their regulatory decisions. These provisions include:

1. The SDWA requires EPA to conduct several analyses in developing a National Primary Drinking Water Regulation, each of which entails assessing system-level rule

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<sup>36</sup> AWWA (August 2019) Correspondence to Congressional Budget Office Regarding S.1507 - PFAS Release Disclosure Act (estimate conveyed in 2019\$)

<sup>37</sup> [42 USC § 300g-1\(b\)\(4\)\(D\)](#)

<sup>38</sup> Triple-bottom line decision-making entails considering implications for sustainability including loss of water supply, creation of waste streams with significant disposal costs / environmental implications, energy requirements, carbon footprint, etc.

<sup>39</sup> Patterson, L. 2020. Water Affordability & Equity: Re-imagining Water Services. The Aspen Institute. <https://www.aspeninstitute.org/wp-content/uploads/2020/12/Water-Forum-Consolidated-Report-2020.pdf>.

implementation costs and inviting an analysis of household-level affordability. These analyses are to address the following questions:

- a. Is a standard “feasible while taking cost into consideration”?<sup>40</sup>
  - b. What is the benefit of the standard relative to the cost of the rule?<sup>41</sup>
  - c. Is the rule so unaffordable that an alternative treatment technology should be available to small systems through a special variance?<sup>42</sup>
2. SDWA Section 1420 requires EPA to analyze the likely effect of compliance with the regulation on the technical, financial, and managerial capacity of public water systems.
  3. Executive Order 12866 and subsequent related executive orders require analysis of benefits and costs for all rules deemed significant (i.e., having “an annual effect on the economy of \$100 million or more or adversely affect[ing] in a material way the economy, a sector of the economy, productivity, competition, [or] jobs,”).<sup>43</sup> This order specifically calls upon agencies such as the EPA to consider both “distributive impacts” and “equity” when choosing among regulatory alternatives. A memorandum issued by President Joseph Biden on January 20, 2021, reaffirmed Executive Order 12866 but also called for OMB to work with agencies to develop recommendations that, among other things, would ensure that regulatory review will “take into account the distributional consequences of regulations, including as part of any quantitative or qualitative analysis of the costs and benefits of regulations, to ensure that regulatory initiatives appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities.”<sup>44</sup>
  4. Executive Order 12898 requires EPA to consider disparate impacts, particularly disparate impacts on households with low-income and environmental justice challenges, when crafting a regulatory action.<sup>45</sup>
  5. The Unfunded Mandates Reform Act of 1995 and associated OMB guidance requires EPA to consider unfunded mandates when crafting a regulatory action, setting the stage for the identification of federal subsidy strategies and prioritization within those strategies.<sup>46</sup>
  6. Executive Order 14008, although focused primarily on addressing climate-related impacts, sends a strong signal that environmental justice will be a significant part of environmental rulemaking procedures moving forward.<sup>47</sup> Subsequent notices have

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<sup>40</sup> SDWA §1412(b)(4)(D); 42 U.S.C. §300g-1(b)(4)(D)

<sup>41</sup> SDWA §1412(b)(6)(A); 42 U.S.C. §300g-1(b)(6)(A)

<sup>42</sup> SDWA §1412(b)(6)(B); 42 U.S.C. §300g-1(b)(6)(B)

<sup>43</sup> 1993, Executive Order 12866, [Regulatory Planning and Review](#).

<sup>44</sup> 2021, Presidential Memorandum on Modernizing Regulatory Review.

<https://www.federalregister.gov/documents/2021/01/26/2021-01866/modernizing-regulatory-review>.

<sup>45</sup> 1994, Executive Order 12898. [Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations](#).

<sup>46</sup> Congressional Research Service (July 2020), [Unfunded Mandates Reform Act: History, Impact, and Issues](#), R40957.

<sup>47</sup> 2021. Executive Order 14008, [Tackling the Climate Crisis at Home and Abroad](#).

indicated that EPA will likely use its EJ Screen tool as a part of that decision-making process.<sup>48</sup>

Improving the analysis employed to comply with these provisions would help inform more than just the design, stringency, and enforcement of federal water quality standards. When the impacts of regulatory choices on affordability are analyzed and communicated effectively, the implementation of federal drinking water standards can be improved through more effective allocation of federal, state, and local resources to compensate for these standards’ disparate impacts on lower-income households.

## The Limitations of Median Household Income as an Affordability Metric

To the extent that affordability is analyzed today, such as in EPA regulatory impact assessments, it is based on median household income (MHI) as a metric. This MHI-based approach to the analysis of affordability does capture some of the implications of water system scale on household-level cost of compliance. But it does not reflect the level of burden on low-income households themselves nor on systems with large numbers of low-income households as customers. By definition, low-income households have little or no discretionary income and any increased cost of service will make up a larger proportion of their income than for a median household income. Furthermore, overall household expenses are expanding more rapidly for the lowest quintile as shown in the Consumer Expenditure Survey summary, Figure 2.<sup>49</sup>

**Chart 4. Percentage change in average annual expenditures by income quintiles, 2014–19**

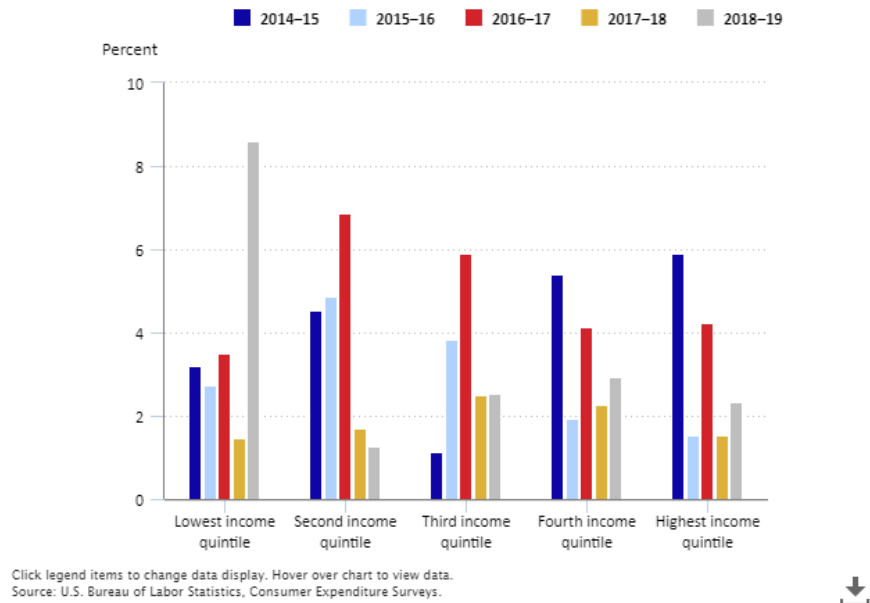


Figure 2. Percentage change in average annual expenditures by income quintiles (Chart 4 from source)

<sup>48</sup> U.S. EPA. 2021. [EJSCREEN: Environmental Justice Screening and Mapping Tool](#).

<sup>49</sup> U.S. Bureau of Labor Statistics. 2019 Consumer Expenditure Survey. <https://www.bls.gov/opub/reports/consumer-expenditures/2019/home.htm>

For more than two decades, multiple reviews have considered the use of a percentage of MHI as a metric of affordability for purposes of water policy decision-making, typically finding that it has limitations for understanding the full distributional effects of regulatory policies. These reviews have included:

1. US EPA Science Advisory Board. [An SAB Advisory on the National-Level Affordability Criteria and Technologies for Small Systems Under the 1996 Amendments to the Safe Drinking Water Act](#). EPA-SAB-DWC-ADV-99-001 (1998)
2. NDWAC Workgroup. “Recommendations of the National Drinking Water Advisory Council to U.S. EPA on Its National Small Systems Affordability Criteria” (2003)
3. Rubin, Scott J., Criteria to Assess the Affordability of Water Service, in *Critical Issues in Setting Regulatory Standards* (National Rural Water Assoc. 2<sup>nd</sup> ed. 2003)
4. National Academy of Public Administration (NAPA), “Developing a New Framework for Community Affordability of Clean Water Services” (2017)
5. Teodoro, Manuel P., “Measuring Household Affordability for Water and Sewer Utilities.” *Journal of the American Water Works Association*, 110(1), 13-24. (2018)

These expert reviews have pointed to a series of shortcomings from reliance on MHI alone in economic analysis. Specifically, the recognized limitations of MHI as a metric in regulatory analysis include:

- MHI is a poor indicator of economic distress, bearing little relationship to poverty or other measures of economic need within a community.
- MHI does not capture impacts across diverse populations, particularly for low-income households or the most economically vulnerable users. It can hide “pockets of poverty” within a utility’s service area.
- MHI-based analyses are often computed based on average levels of per household use of water-related services rather than on levels of basic water use. Basic water use refers to water used for drinking, cooking, health, and sanitation, not including non-household or luxury water uses.
- MHI-based analyses inadequately address non-discretionary household costs, such as the cost of housing or other utilities, which can exacerbate affordability challenges for low-income households.<sup>50</sup>

Appendix A details other limitations that have been identified with EPA’s current approach that relies on median household income as a metric.

There are a number of approaches that can assist low-income households when rules are found to be unaffordable. Among these are various forms of financial assistance or subsidies from a variety of different program structures. Whenever the analysis of the feasibility of regulatory options focuses only on the median household, the need for financial assistance remains hidden. Subsidies to support enhancements in water quality while ensuring low-income households have access to safe water could be

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<sup>50</sup> Corona Environmental Consultants et al. (April 2019)

provided through (1) local water system customer assistance programs, (2) rate structure design, (3) utilization of state or federal low-cost financing, or (4) other means.

## Current Consideration of Household-Level Affordability and Community Financial Capacity

Under the SDWA (42 USC 300g-1(c)(3)), when EPA prepares a primary drinking water standard the Agency must adhere to a number of specific statutory requirements, including:

1. Document the estimated public health benefits, expected risk for specific populations, and uncertainties in the assessment.
2. Estimate the incremental costs and benefits associated with each alternative maximum contaminant level (or treatment technique option) considered.
3. Determine if the selected rule option is “affordable” for customers of *small systems*, and, if not, list alternative, more affordable technologies for small systems or other means that will make it affordable for small public water systems to comply. Small systems are divided into three categories based on the number of customers they serve: those serving (a) 25-500 customers, (b) 501-3,300 customers, and (c) 3,301-10,000 customers.

In many rulemakings, EPA calculates the incremental increase in the average household water bill for a range of system sizes as part of its analysis of the cost of the rule.<sup>51</sup> The agency is not required by the SDWA to consider affordability for large systems, even though affordability remains an issue for many customers of both large and small water systems.

In addition, even though EPA performs an overall benefit-cost analysis when setting SDWA standards, the implicit assumption in such analysis is that all households are equally able and willing to pay for health protection. This assumption is also made when the same monetary “value of statistical life” (or illness) is applied to all households, regardless of their income and asset positions. As a result, the benefit-cost analysis under the SDWA does not address affordability as it relates to low-income households.

When a SDWA standard is not a microbial standard, small system affordability is evaluated using a comparison of the average household water bill after the addition of rule requirements to a designated yardstick for household-level affordability, set at 2.5% of MHI.<sup>52</sup> This national level affordability threshold is limited to the estimated ongoing cost of drinking water operations (e.g., capital and operating expenses) and the additional costs imposed by the rule. Ongoing costs of operation are based upon the Community Water System Survey. The CWSS was last conducted in 2006, so EPA economic analyses

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<sup>51</sup> In general EPA utilizes 9 system size categories in its SDWA economic analyses 0–100, 101–500, 501–1,000, 1,001–3,300, 3,301–10,000, 10,001–50,000, 50,001–100,000, 100,001–1,000,000, and >1,000,000 persons served

<sup>52</sup> Small system variances are not available for microbial standards per SDWA, 40 CFR § 142.304(a).

conducted since then use the consumer price index to adjust for the passage of time, as shown in

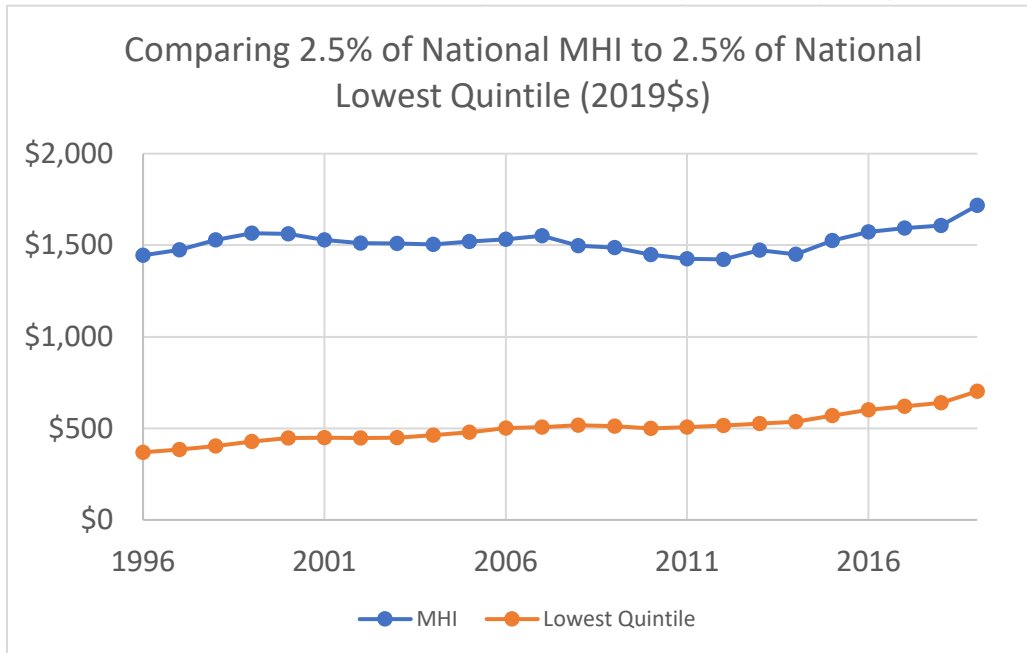


Figure 3<sup>53</sup>.

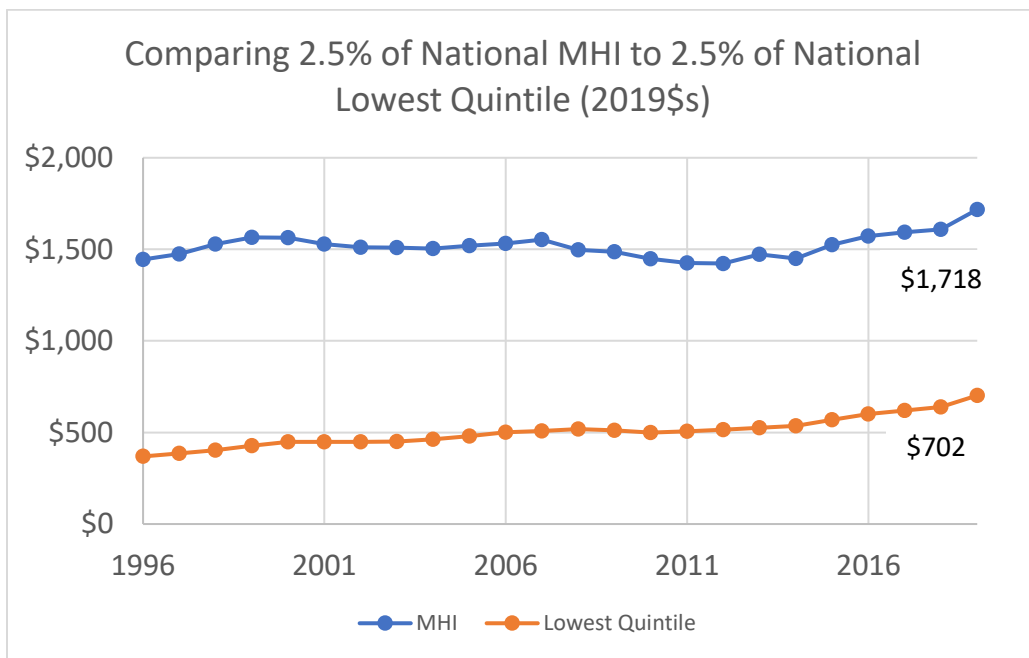


Figure 3. Comparison of MHI and lowest quintile 2.5% metrics 1996-2019, in 2019\$

<sup>53</sup> United States Census Bureau. Historical Income Tables: Households. Accessed 25 February 2021. <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html>

The analysis called for under SDWA Section 1420—namely, an evaluation of a new rule’s impacts on the technical, managerial and financial capability of affected systems—has to-date generally been limited to a qualitative overview, as indicated in Table 1.

Table 1. Review of Section 1420 Evaluations in Selected SDWA Rulemakings

Rule	Year	Characterization
<a href="#">Arsenic Rule, Final</a>	2000	General review of issues; no analysis
<a href="#">Stage 2 DBP Rule, Final</a>	2005	Qualitative analysis for two groups of systems, those serving <10,000 pop. and >10,000 pop.
<a href="#">Groundwater Rule, Final</a>	2006	Qualitative analysis for two groups of systems, those serving <10,000 pop. and >10,000 pop.
<a href="#">Lead and Copper Rule, Final</a>	2007	None
<a href="#">Perchlorate, Proposed</a>	2019	Not enough systems impacted to justify analysis
<a href="#">Lead and Copper Rule Revisions, Proposed</a>	2019	Unable to locate in Economic Analysis

Environmental justice (EJ) analysis varies across SDWA rulemakings. In general, there is a lack of information to identify any disproportionate impacts from SDWA rulemakings on low-income and disadvantaged communities.<sup>54</sup> Existing EPA guidance encourages EPA to “consider the distribution of economic costs (i.e., private (compliance) and social costs) from an EJ perspective when appropriate, feasible and relevant.”<sup>55</sup> The most recent EPA SDWA proposal, the Lead and Copper Rule Revisions, concluded that the affordability of lead service line replacement may represent a barrier for some households to benefit from the lead service line replacement provisions but it did not include any quantitative analysis of differential household burden by income, race or ethnicity. A summary of selected environmental justice analyses in SDWA rulemakings is included in Table 2.

Table 2. Review of Environmental Justice Analysis in Selected SDWA Rulemakings

Rule	Year	Reference
<a href="#">Lead and Copper Rule Revisions, Proposed</a>	2019	<a href="#">Environmental Justice Analysis for the Proposed Lead and Copper Rule Revisions</a>
<a href="#">Perchlorate, Proposed</a>	2019	See HRRCA, statement of finding (page 7-4)
<a href="#">Revised Total Coliform Rule</a>	2013	See <a href="#">Economic Analysis</a> , statement of finding (page 8-15)
<a href="#">Long-Term 2 Enhanced Surface Water Treatment Rule</a>	2006	See <a href="#">Economic Analysis</a> , statement of finding (page 7-30)

<sup>54</sup> In this respect, EPA’s SDWA rulemakings are little different than EPA rulemakings more generally, which tend not to be undertaken with serious attention to the distribution of their impacts (see, for example, Robinson, L.A., J.K. Hammitt, and R. Zeckhauser. 2016. “Attention to Distribution in U.S. Regulatory Analysis” *Review of Environmental Economics and Policy*, 10(2): 308-328.

<sup>55</sup> U.S. EPA. June 2016. *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*. [https://www.epa.gov/sites/production/files/2016-06/documents/eitg\\_5\\_6\\_16\\_v5.1.pdf](https://www.epa.gov/sites/production/files/2016-06/documents/eitg_5_6_16_v5.1.pdf).

### *Limited Existing Subsidy Options*

In general, affordability at the community level also plays an important role under the SDWA and in various state and federal loan and grant programs. A water system's financial capability to implement a drinking water regulation can be evaluated based on the system (or community's) ability to pay for or finance the costs necessary to achieve compliance. Individual households' ability to pay water bills that include the cost associated with regulatory compliance is an important consideration in evaluating whether a community water system can afford to comply with the regulation.

Assessing the subsidy necessary to affect a regulatory requirement is pertinent because currently there is very little federal subsidy available for SDWA regulatory requirements relative to the number of affected water systems. At present, available subsidies target water systems and, in particular, small water systems with SDWA compliance challenges. Even with that emphasis:

1. Less than 4% of total water and wastewater system expenditures come from federal sources, and only a small fraction of that is in grants.<sup>56</sup> (CBO 2018).
2. No federal grants are available to fund the operation and maintenance of a community water system, although loans and grants may be available to help fund certain types of capital expenditures.
3. States generally provide support primarily in the form of low interest loans for the construction of drinking water infrastructure necessary for regulatory compliance. But the overall level of state support is generally less than even the low level of federal government support.<sup>57</sup>

Currently, retrospective reviews of EPA SDWA assistance programs summarize the allocation of funds to disadvantaged communities and illustrate the distribution of funding based on system size and type of construction project.<sup>58,59</sup> EPA does not publish information that allows tracking relative to compliance with specific regulatory standards or community financial condition. As a result, it is not possible at this time to assess how much past federal and state grants or low-interest loan programs have ameliorated the burden of new SDWA regulations on disadvantaged households at the national level (although it is possible some states may have relevant data) nor is it possible to project the capacity of such programs to reduce the impact of future requirements. However, such subsidies will have the general effect of reducing rates for all customers, as the subsidies are to the system as a whole and not targeted to low-income households.

Nevertheless, community water systems maintain a high level of regulatory compliance<sup>60</sup> and do so by raising funds locally, primarily through water rates. The burden of subsidizing low-income households for

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<sup>56</sup> 2018. CBO. [Public Spending on Transportation and Water Infrastructure](#), 1956 to 2017.

<sup>57</sup> EPA (October 2020), [Drinking Water State Revolving Fund 2019 Annual Report](#).

<sup>58</sup> EPA(downloaded, December 2020), [Drinking Water State Revolving Fund National Information Management System Reports](#).

<sup>59</sup> EPA (October 2020), [Drinking Water State Revolving Fund 2019 Annual Report](#).

<sup>60</sup> EPA (downloaded December, 2020), [GPRA Violation Report \[Active CWS, Submission Year Quarter = 2020Q3\]](#).



the associated increases in water rates currently rests primarily on individual water systems (where allowed by state laws), yet that impact of rate subsidization is not considered in EPA analyses.

#### *Benefit-Cost Analysis in SDWA Standard Setting*

Under the 1996 SDWA Amendments, EPA is required to use a science-driven process that documents evidence in the rulemaking record. The agency is required to use the best available, peer-reviewed science and other data collected by accepted best available methods.<sup>61</sup> Within that record, EPA has a duty under SDWA to prepare both a health risk reduction and cost analysis (HRRCA). The HRRCA must include:

- Quantifiable and nonquantifiable health risk reduction benefits that are likely to occur as the result of treatment to comply with each maximum contaminant level (MCL).
- Quantifiable and nonquantifiable health risk reduction benefits that are likely to occur from reductions in co-occurring contaminants that may be attributed solely to compliance with the MCL.
- Quantifiable and nonquantifiable costs that are likely to occur solely as a result of compliance with the MCL, including monitoring, treatment, and other costs.
- The incremental aggregate costs and benefits associated with each alternative MCL considered.
- The effects of the contaminant on the general population and on groups within the general population, such as infants, children, pregnant women, the elderly, individuals with a history of serious illness, and other subpopulations that are identified as likely to be at greater risk of adverse health effects due to exposure to contaminants in drinking water than the general population.
- Any increased health risk that may occur as the result of compliance, including risks associated with co-occurring contaminants.
- Other relevant factors, including the quality and extent of the information, the uncertainties in the overall analysis, and factors with respect to the degree and nature of the risk.<sup>62</sup>

However, benefit-cost analysis under the SDWA does not address affordability because it is designed to evaluate overall compliance costs and public health benefits. In effect, EPA assumes that all households are equally able and willing to pay for drinking water protection. In its assessment of “increased health risk that may occur as the result of compliance,” EPA also does not address the health effects of losing water access due to affordability issues.

#### *Small System Variance Affordability Analysis*

After developing an initial rulemaking approach (e.g., an MCL of “X” mg/L), EPA must then evaluate if it can be implemented by small systems.

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<sup>61</sup> 42 USC §300g–1(b)(3)(A) and (B).

<sup>62</sup> 42 USC §300g–1(b)(3)(C).

To date, EPA has determined the ability of small CWSs to comply with standards by comparing the average compliance cost in small systems to median household income. Often analysis of household burdens is not explicitly conducted as they are only required for the setting of primary drinking water standards that are to address non-microbial risks. The small system variance analysis is required by SDWA as a component of standard development and is a national analysis. It must also occur within several statutory constraints, including limitation to certain system sizes and comparable treatment technology efficacy to default treatment options. *This requirement was added to SDWA in the 1996 amendments, and to-date EPA has never identified such a small-system technology as being needed.*

These evaluations are largely limited to evaluation of the need to trigger SDWA's small system variance provisions and seldom, if ever, include a consideration of low-income households.

Furthermore, although EPA has sought and obtained public input and peer review commentary on how to consider household-level affordability with respect to SDWA's small system variance provision (see Appendix B for selected examples), the agency has conducted much more limited consultation about affordability in other aspects of the SDWA. A more transparent presentation of how water policy decisions impact households of different income levels, particularly low-income households, is warranted, whether by EPA, state or local agencies, or other bodies.

### **Additional Analytical Approaches for Assessing Affordability**

The AWWA convened an expert panel that met multiple times throughout 2020. The panel identified questions to facilitate federal, state, and local government improved consideration of affordability in decision-making associated with a new or revised drinking water standard. The panel initially framed its discussion in terms of possible use of such improved analysis in informing EPA's national regulatory standards setting process but it also recognized that such analysis could be modified to serve a broader range of applications, such as informing the need for subsidies by Congress, the states, or localities or rate structure modifications by utilities. After a series of policy relevant questions emerged from the discussion, the panel then identified potential analytical approaches to answer those questions, which are presented here.

#### *Elements of Existing Analysis to Retain*

Before introducing the analytic approaches presented in this report, it should be noted that these approaches are suggested as additional analyses to inform decision-making, building on current data collection and analytical practice. They are not necessarily intended to substitute for analyses that are currently used, nor are they necessarily put forward as firm decision criteria that would override or substitute for existing legal requirements. In fact, rather than seeking to replace existing analytic efforts, this report considers how existing information systems could be used and buttressed to support the kind of improved affordability analysis proposed here.

Furthermore, it should be noted that current EPA guidance for economic analyses is to incorporate either a quantitative or qualitative analysis of uncertainty, based on feasibility and criticality of the uncertainty analysis to the decision-making process. Such ancillary analysis is assumed to be prudent with respect to any of the affordability analyses identified here.

### *Additional Analysis of Affordability to Inform Decision-making*

EPA economic analyses for rulemakings are already extensive documents. The panel identified a handful of additional analyses that the Agency could feasibly incorporate into its current workflow to advance both governmental decision-making and public understanding of drinking water affordability. An emphasis was placed on providing additional informational value with available information, although below we also identify priorities for additional information collection and research studies. A primary objective of these recommendations is to advance both the analysis and policy discussion of equity about EPA decisions and how the results are implemented by states and utilities.

It is hoped that by pursuing these analyses the Agency would be able to better discern: (1) how to use household level affordability to inform decision-makers, (2) how data collection and data organization needs could best support and improve such analyses, and (3) which analyses should be routinely incorporated into the analysis of SDWA rulemakings. In all of these analyses, household affordability for low-income households should be a key consideration. However, depending on the specific analysis, in some cases the household will be the primary target of the analysis and in others the water system will be, recognizing that the two are related but in many respects different.

Additional analyses of affordability could be conducted that would provide answers to the following four questions:

- 1. How many households bear the costs and accrue the benefits from a rule option, and what is the income distribution of those households (e.g., by household income quintile)?**

Improved affordability analysis would look at how the costs and benefits of different policy options are expected to be allocated as a function of household income. Given that contaminant occurrence may not be uniform across communities in the U.S., this analysis should take into account regional differences about both contaminant occurrence and concentrations and household income distributions. By better understanding how many households bear the costs and accrue the benefits of any given rule option (and their distribution amongst income quintiles), the total cost and benefit will be put into a more useful context, given the burden and benefit is unlikely to be distributed perfectly evenly across geography or income quintiles.

- 2. How are the net benefits of policy options distributed as a function of household income for a cross-section of income strata?**

The purpose of the analysis would be to help understand if low-income households are reaping sufficient benefits to justify the costs they will likely incur, recognizing that there are tradeoffs because they may pay for benefits in the form of a larger water bill, which may reduce expenditures for other household goods and services that can, in turn, undermine health.<sup>63</sup> Undertaking such an analysis would require (1) a clear linkage between rule's cost analysis and individual systems, (2) a clear linkage between the risk factors in the rule's health-benefit model to the populations of individual systems, and (3)

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<sup>63</sup> Raucher, Robert S., et al. (2011), Benefit-Cost Analysis for Drinking Water Standards: Efficiency, Equity, and Affordability Considerations in Small Communities, *Journal of Benefit-Cost Analysis*: 2:1: Article 4. <https://doi.org/10.2202/2152-2812.1004>.

an understanding of how individual systems allocate the costs of compliance and whether any measures are in place to shield low income customers from increased compliance costs.

This analysis could be simplified by assuming that the cost to a water system would be allocated to all households and businesses proportionally based on water usage. While this simplification may not be precise due to differences in rate structures (including fixed charges), it could be a reasonable default starting point and a credible approach on average. It would also simplify the EPA's analysis but permit more in-depth analyses as specialized data are supplied by states, localities and stakeholders.

The above analyses would be most informative if the Agency had the information to undertake full distributional analyses based on household income, implementation costs, and risk reduction distributions for water systems across the U.S. Some of the distributions necessary for these analyses are incomplete or can only be roughly estimated. Examples include:

1. Contaminant occurrence in water systems serving fewer than 10,000 persons,<sup>64</sup> and
2. Differences in estimated health benefits as a function of household income (e.g., accounting for multiple stressors, differences in exposure behaviors).<sup>65</sup>

An alternative to a distributional analysis is a four-square or similar analysis, where the analysis tests the conditions that frame the decision space, as shown in Figure 4.

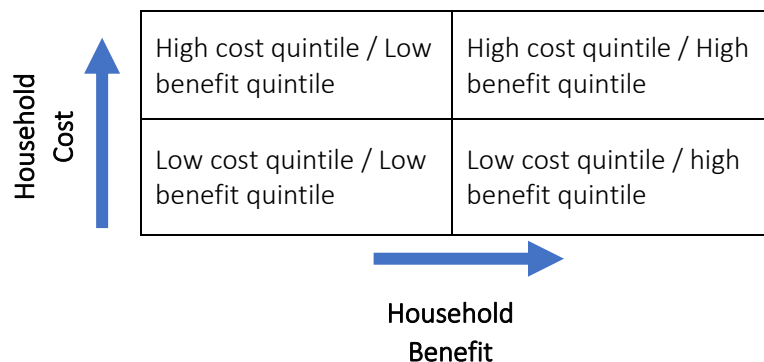


Figure 4. Four square analysis showing costs and benefits by quintile

<sup>64</sup> Past UCMR monitoring is a census of systems serving above 10,000 persons served but a statistical sample for smaller systems. If funding is available, future rounds of UCMR monitoring may include a census of systems serving more than 3,300 persons.

<sup>65</sup> Ideally one would be able to draw out population attributes that might skew benefits high or low within the national distribution appropriate to the specific contaminant under consideration (e.g., with lead, the relative abundance of older homes used as low-income housing in a community, because they are likely to have higher lead risks).

Analysis across incomes could help determine if the regulation is expected to be progressive, regressive, or proportional. The analysis would have embedded in it the consideration of occurrence, treatment cost as a function of size, and other attributes associated with each rule option, but these would not be split out into sub-analyses unless deemed informative.

EPA could use maps and tables to illustrate how many systems in the above “corners” might occur and where they are located. Such maps or tables may also show how the costs and benefits of improvements will be distributed geographically and by degree of concentration of low-income households.

An alternative approach could be to perform risk-risk analysis where the health risks induced by imposition of compliance costs on low-income households (lower-income is riskier) are compared to the health risk reduction accomplished by the new standard, again, potentially differentiated by income quintiles. Thus, instead of a comparison across quintiles being made based on monetized net benefits, the comparison could be made with a health metric such as lives saved/lost, life years saved/lost, or quality adjusted life years saved/lost.<sup>66</sup>

**3. What amount of hypothetical federal subsidy would be required to ensure all target water systems can comply without significantly increasing household level burden on lowest quintile? How can this hypothetical subsidy level be compared to the actual level currently available and how much shortfall is there likely to be?**

This question asks for a projection of the level of subsidy that would be required to offset the fiscal impacts of a proposed policy option on low-income households where they are already facing affordability stresses, thereby reducing any such impacts to an acceptable level. It also provides actionable information that could be used to guide allocation of programs that support policy implementation at the state and federal government. This is done with the understanding that this hypothetical amount of subsidy, an “equity offset,” may not be in most circumstances likely to be met, but it still can be helpful to understand how much gap or shortfall there is towards meeting the need.

Answering this question would entail (1) pivoting from analyzing rule impacts relative to median household income to lowest quintile household incomes; (2) estimating the number of households in aggregate whose financial burden would increase to near or above household stress thresholds as a result of compliance with a new standard; and (3) aggregating the total estimated cost on low-income households that exceed household financial stress thresholds to quantify implicit federal subsidy or surrogate subsidy requirements associated with the proposed rulemaking. We recognize that EPA cannot modify the levels of funding appropriated for subsidies, which requires Congressional action.

EPA frequently points to assistance that is available (for example, through the State Revolving Loan Funds and the Water Infrastructure Finance and Innovation Act) as

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<sup>66</sup> W Kip Viscusi. Risk-risk analysis. *Journal of Risk and Uncertainty*. 8. 1994, 5-17. <https://doi.org/10.1007/BF01064083>.

countering the costs of rules. While these programs are valuable, they are frequently too small to offset the portion of rule costs that could burden households in the lowest income quintile. In addition, the funding from these programs is not directly linked to the costs of new regulations. By providing a thorough analysis of the available subsidy through these programs and comparing it to the need, EPA could identify how much additional hypothetical subsidy would be necessary. This is essential context to the affordability discussion and EPA's decision-making.

**4. Does this rulemaking have consequences that are occurring in a timeframe that overlaps with other water-related regulatory requirements that place an undue burden on financially challenged households (e.g., evaluate single rate payer burden)?**

This question is organized to consider the cumulative impact of multiple policy decisions and, in doing so, to inform the options related to the timing of implementation. This question attempts to evaluate the impact of water policy decisions on a "single rate payer basis" recognizing that a household must pay for multiple policy decisions for multiple water services.

Each of these questions are answerable, and most are answerable by EPA using existing information. Answering one or more of them in future rulemakings would constitute a step forward in improving policymaker's and the public's understanding of the distributional consequences of SDWA rulemakings.

## **Opportunities for Improving Data Collection to Support Affordability Analysis**

Even though many of the above approaches can be taken by EPA using existing information, the Agency could conduct more informative analyses if it collected additional data to support enhanced analyses of affordability. Opportunities for data collection include the following.

### *Unregulated Contaminant Monitoring Rule (UCMR)*

The UCMR is a fundamental component of SDWA rulemakings, providing a national characterization of contaminant occurrence in finished drinking water by sampling drinking water for targeted unregulated contaminants at all systems serving a population over 10,000 (could become 3,300 in future rounds as discussed below) and a subsample of smaller systems. Clearly, UCMR should continue to occur on its statutory five-year cycle. Congress has recognized the value of this data to support decision-making and has encouraged EPA to expand UCMR to obtain a census of contaminant occurrence for systems serving more than 3,300 persons. Unfortunately, adequate funding for this expansion has not been authorized or appropriated.

The UCMR would provide more robust support to the Agency's work if Congress could provide adequate funding for EPA to make the following enhancements, including technical assistance to limit the reporting burden on small systems:

1. Collect data for a census of all systems serving more than 3,300 persons
2. Collect additional data items that support analysis of affordability (e.g., clearer descriptions of installed treatment, wholesale - consecutive system relationships, and water production by point-of-entry).

### *Community Water System Survey*

The CWSS, which gathers information about water systems including size, source, ownership treatment information and others, has not been updated since 2006. As described above, the CWSS is already a primary source of information for EPA's cost analysis. The 2006 CWSS survey design has served to provide central tendency cost of service estimates for potable water service as a function of system size.

The CWSS would provide more robust support to the Agency's work if:

1. The CWSS occurred on a five-year cycle concurrent with the Unregulated Contaminant Monitoring Rule (UCMR).
2. CWSS, like the UCMR, provided a census of all systems serving more than 10,000 persons. Like the UCMR, if funding were to be available to reach a census for systems serving between 3,300 and 10,000 persons, a fuller dataset would allow more complete analysis.
3. The CWSS included collection of data necessary to allow matching of water system service area to readily available household income, as well as included community and household fiscal stress data, such as the lowest quintile household income of the service area, percentage of the population within the service area with incomes below 200% of the federal poverty level, and the average cost of water service as a percentage of the lowest quintile income.
4. The CWSS included characterization of water system rate structure and the nature and extent of available CAPs.

### *Drinking Water Needs Survey*

In 2020, EPA initiated the 7<sup>th</sup> national drinking water needs survey (DWNS), which gathers information about anticipated need for capital expenditures for drinking water SRF eligible activities.<sup>67</sup> The last DWNS was published in 2018, reflecting a total 20-year capital improvement need of \$472.6 billion and capturing DWSRF-eligible infrastructure projects necessary from January 1, 2015 through December 31, 2034.<sup>68</sup> As with the CWSS, there exists the opportunity to collect metadata that allows aggregation of information collected across multiple information collection activities (i.e., CWSS, UCMR, SDWIS, etc.).

At present, the DWNS is structured as a census of all CWSs serving >100,000 persons (n = 708), a sample of 20% of CWSs serving between 3,301 and 100,000 (n = 1,829), and a random sample of 606 smaller systems (i.e., 1.8% of this size class).<sup>69</sup> In the upcoming survey, EPA is collecting data about water sector workforce illustrating that the collection of ancillary information is feasible.

The panel believed that this survey has utility as a resource for analyzing affordability and should be revisited with that focus in mind.

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<sup>67</sup> EPA (August 2020), [Information Collection Request for the 2020 Drinking Water Infrastructure Needs Survey and Assessment \(DWINSA\), Part A](#), EPA-HQ-OW-2020-0017-0007.

<sup>68</sup> EPA (March 2018), [Drinking Water Infrastructure Needs Survey and Assessment](#).

<sup>69</sup> EPA (August 2020), [Information Collection Request for the 2020 Drinking Water Infrastructure Needs Survey and Assessment \(DWINSA\), Part B](#), EPA-HQ-OW-2020-0017-0008.

### *State Annual Reports*

Under SDWA, most states assume primacy for implementation of facets of program implementation including primary standard compliance, capacity development, and revolving loan fund operations. State programs prepare annual reports summarizing program performance over the prior year. These reports currently compile metrics on multiple facets of program implementation, but the reports are not currently organized to inform understanding of either household-level affordability or community financial capacity. They could be better used to collect and store information that would facilitate household-level affordability and community financial capacity analysis through a variety of means including aggregating information developed at the local level.

### *Safe Drinking Water Information System (SDWIS)*

EPA is in the process of modernizing its Safe Drinking Water Information System (SDWIS), a data system through which water systems, laboratories, states, and EPA collect and organize data about water system compliance with SDWA. Although SDWIS incorporates some information characterizing water systems (e.g., population served), neither the current system nor anticipated efforts to modernize SDWIS are geared toward collecting information that could be used to support affordability analysis for low-income households or system-level affordability. Future efforts should take affordability into account and seek to collect information that would enhance the analysis of household-level affordability and system financial capacity. For example, the incorporation into this data system of more granular information about the income distribution of the populations served by water systems (e.g., by linking to Census data across the service territory) would help improve EPA's ability to conduct more meaningful affordability analysis.

EPA's current Enforcement and Compliance History Online (ECHO) database does include information, including households on public assistance, persons below poverty level, racial demographics, household income distribution, age distribution, and education level. ECHO is limited in that the demographic data is based on Census data from a default 3-mile radius around the permitted facility.<sup>70</sup> Even that data will not be available unless facility location data is available from a non-SDWA permit, as water system facilities are treated as sensitive information. ECHO is reliant on SDWA datasets which are updated quarterly; consequently, enhancement of ECHO is reliant on enhancements to SDWIS.

### *Additional Data Collection*

Additional data collection efforts and research studies should be considered as needed to enhance the analysis of drinking water affordability. For example, EPA should consider commissioning or undertaking a study of the relationship between regulatory compliance costs and actual water rates paid by households (recognizing there are other contributors to rates in addition to regulatory compliance costs). This would help in improving both the current understanding of rates in relation to regulatory requirements and better allow EPA to project impacts of future regulations on household affordability.

## **The Need for Better Information on Variances and Exemptions**

At present, little meaningful data exist to suggest that the SDWA's variances and exemption provisions, as currently implemented, are being applied to ameliorate household-level affordability impacts created by SDWA requirements at scale. If EPA and the states provided greater transparency about variances and exemptions this would go some distance toward an improved understanding of drinking water

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<sup>70</sup> EPA (downloaded December 2020), [Enforcement and Compliance History Online Detailed Facility Report Data Dictionary](#).



affordability. It is not currently possible to study how extensively such variances and exemptions are granted under current standards, let alone how frequently they would likely be deployed under any new standards. It is thus not possible to assess what they might reveal about affordability or about any delay in providing water services that meet national drinking water standards.<sup>71</sup> Better information on current use of variances and exemptions would inform discussions around whether they could be more extensively used in the future to assist with affordability concerns.

Current EPA policy is for states to use their own unique community-level financial capability criterion when granting general variances or exemptions. Community-level financial capacity to fund investments needed to support compliance is a decision criterion when issuing a variance or exemption.<sup>72, 73</sup> When providing small systems with variances (e.g., approval to use an alternative compliance strategy for a period of time), the SDWA provides for consideration of “affordability criteria” set by either EPA or individual states.<sup>74</sup> In addition to the national small system technology determination by EPA during a rulemaking, states must use affordability criteria in the granting of variances (e.g., small system variances based solely on affordability are possible absent the national small system variance technology determination).<sup>75</sup> SDWA also provides for exemptions (e.g., an extended compliance schedule) with a clear consideration of both household affordability and a system’s financial capacity.<sup>76</sup> As described in EPA guidance, affordability in these contexts is a function of both the price of water and the ability of customers to pay at a household level.<sup>77</sup>

EPA does not appear to have a complete database of the variances and exemptions in effect in the U.S. under SDWA, nor any recent historic analysis of its use of affordability in issuing such regulatory alleviations.

We did not find any strong evidence, though, that variances or exemptions are frequently used as regulatory compliance strategies. Indeed, available information in SDWIS suggests that they are both infrequently used tools.

Queries of the publicly accessible SDWIS database generated incomplete reports and only include systems “with an associated violation.” Available public facing SDWIS records reflect:

1. Issuance of 130 variances / exemptions in the period 1980 – 2019.
2. Only 9 of 130 records were for systems serving more than 10,000 persons and more than half were for systems serving 500 or fewer persons.

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<sup>71</sup> The limited availability of clear information about SDWA variances and exemptions is not inconsistent with the relative opacity of similar regulatory alleviations across the federal government. Cary Coglianese, Gabriel Sheffler, and Daniel E. Walters, “Unrules,” *Stanford Law Review* (2021).

<sup>72</sup> Variance provisions - [42 USC 300g-4\(a\)\(1\)\(A\)](#), [42 USC 300g-4\(e\)\(3\)\(i\)](#)

<sup>73</sup> Exemption provisions - [42 USC 300g-5\(a\)\(1\)](#)

<sup>74</sup> 42 U.S. Code § 300g-4(e)(3)(A)

<sup>75</sup> EPA (February 1998), [Information for States on Developing Affordability Criteria for Drinking Water](#), EPA 816-R-98-002.

<sup>76</sup> 42 U.S. Code § 300g-5(a)(1) and (b)(2)(B)(ii)

<sup>77</sup> EPA (July 1999), [Handbook for Capacity Development: Developing Water System Capacity Under the Safe Drinking Water Act as Amended in 1996](#), EPA 816-R-99-012.

3. Records for new variances / exemptions appear in 29 of the 39 years in the period 1980 – 2019. Many more were recorded in 1993, 1994, 1998, and 2005 than other years.
4. Variance / exemption records exist for systems in 19 different states, with 8 states having records in period 2006 – 2019.
5. Variance / exemption records are most frequent for nitrates, Total Coliform Rule (TCR), Arsenic, and Stage 1 Disinfection and Disinfection Byproduct Rule. In the period 2006 – 2019, records are limited to nitrate and arsenic. Additional work will be needed to understand why variance / exemptions were allowed for TCR.
6. Slightly more than half of the 130 records identified were for CWSs, and recent CWS records are for arsenic; the balance was almost entirely Transient NCWS (TNCWS) and almost all TNCWS records since 2006 were for nitrate.
7. Records indicate that 98 of the 130 PWSIDs are either no longer active or no longer PWSs

EPA staff confirm that SDWIS does not store records in a manner that will readily facilitate analysis of variances or exemptions. An unrestrained query by EPA staff resulted in 916 records. The 916 records include a significant number of duplicates, but it is not clear, without detailed review of individual systems records, why there are multiple records for the same systems. Simply removing all duplicates reduces the record count to 506.

States have a duty to report all variances and exemptions to EPA. We were not able to identify, however, any reporting vehicle other than SDWIS, and we did not find there or elsewhere any regular compilation of the issuance of variances or exemptions. Thus, it is not clear how the current data on exemptions/variances should be interpreted with respect to affordability – it could mean few affordability problems, or EPA and states are not addressing affordability problems, or it could mean that exemptions/variances are working to address affordability issues but documentation is inadequate.

Improving the data reporting on variances and exemptions would provide another window into affordability. The frequency of such exceptions could provide an indication of the extent to which regulatory standards are creating affordability problems as well as an indication of the need for additional subsidies to ensure that small systems can comply with regulatory standards while still ensuring that low-income households have access to quality water services.

## Conclusion

With expanding inequality in the United States combined with a stark divergence between stagnant wages and ever-increasing costs of water services, the water affordability issue deserves greater attention by federal, state, and local policymakers; it is becoming a crisis for more and more households. Improving the analysis of affordability when crafting SDWA regulations may have its challenges but it is one feasible step forward toward greater understanding of the fiscal pressures on both water systems and low-income households.

The EPA's current approach to the consideration of affordability relies on a clearly inadequate single metric: median household income.

This report suggests that EPA's affordability analyses also consider impacts on low-income households, using the Census-regional 20<sup>th</sup> percentile (lowest quintile) as a surrogate. As a result, both policymakers and members of the public will be equipped with information to:

- Make better decisions in the development of rules (e.g., perhaps deciding whether more compliance time is needed in low-income communities), and
- Better target support for implementation of rules, such as through subsidies for new construction or installation of new technologies.

Recognizing that there is much work that needs to be done, the recommendations of this report aim to help EPA establish an improved framework for understanding the distribution of regulatory impacts on water systems and their customers and for policymakers at all levels to respond appropriately to the serious affordability problem that afflicts the delivery of water services today.

## Appendix A -- Prior Commentary on EPA's Approach to Affordability

EPA has solicited expert advice on how to better address affordability in rulemakings several times since the 1996 SDWA Amendments. Recurring themes in the advice provided:

1. Use of MHI as an affordability metric can continue until a better option is identified in the future.
2. A meaningful policy discussion of the implications of affordability is important in each SDWA rulemaking
3. A key challenge is how to Incorporate variation in affordability across system characteristics and geographic boundaries.

### *Specific Relevant Comments*

The following are comments offered by expert bodies providing advice on incorporating analysis of affordability into SDWA rulemakings (each is quoted directly from its source):

1. Defining affordability by reference to median household income is not well explained. The economic circumstances of lower-income families are not unimportant. More generally, it would seem that without a clear conceptual framework, efforts to determine affordability become highly arbitrary.<sup>78</sup>
2. The reference to household willingness to pay for point-of-use treatment devices and bottled water appears to be relevant, but the underlying data are not adequate to support estimates of willingness to pay for risk reduction from such behaviors.<sup>79</sup>
3. The Agency's assertion that household water costs between 1.5 and 3.5 percent of median (or mean) household income is arbitrary and difficult to defend.<sup>80</sup>
4. Further thought needs to be given to how the concept of affordability is applied to a new MCL. The additional costs to households could force tradeoffs that might not lead to the greatest overall public health improvement. Households with lower incomes will pay a proportionately larger part of their incomes as a result of system compliance with new arsenic control regulations than will those with higher income levels. This would be further exacerbated by additional rules, now under consideration, because each new rule will add its own incremental costs to the overall cost of drinking water for specific households.<sup>81</sup>

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<sup>78</sup> 1998. SAB. [An SAB Advisory on the National-Level Affordability Criteria and Technologies for Small Systems Under the 1996 Amendments to the Safe Drinking Water Act](#). EPA-SAB-DWC-ADV-99-001

<sup>79</sup> Ibid

<sup>80</sup> Ibid

<sup>81</sup> 2000. SAB. [Arsenic Proposed Drinking Water Regulation: A Science Advisory Board Review of Certain Elements of the Proposal](#). EPA-SAB-DWC-01-001

5. The Panel [the Science Advisory Board panel] encourages the Agency to consider the issue of affordability in a broader context than that addressing the limited issue of the use of variance technologies by small systems.<sup>82</sup>
6. Insofar as there is a trend to consolidate small drinking water systems, such consolidation needs to be incorporated into cost analyses for new MCL proposals<sup>83</sup>
7. Lower measures of household income than the median income should be considered to better capture impacts on disadvantaged households, to make it easier to trigger the affordability threshold in appropriate circumstances.<sup>84</sup>
8. To the extent that MHI continues to be used, lower percentages than the current 2.5% threshold should be considered for the national level affordability threshold.<sup>85</sup>
9. In light of heterogeneity among small systems, the use of a national trigger as a screening device for affordability suggests the adoption of a fairly low affordability threshold.<sup>86</sup>
10. If the basic approach is maintained, the Agency should consider measures other than median income that better capture impacts on disadvantaged households.<sup>87</sup>
11. The national-level determination of affordability can serve only a screening function and not to indicate that a rule will be affordable to all households or systems.<sup>88</sup>
12. Regional income measures and expenditure baselines would capture affordability relative to the resources available in a community more accurately than the current national values.<sup>89</sup>
13. The national incremental affordability threshold should be set at a specific percent of MHI (1.0 percent is recommended) that EPA would apply to individual rules for purposes of determining national small system affordability [eliminating need to calculate maximum affordable water bill or baseline expenditure].<sup>90</sup>
14. The possibility that a better metric for determining water system affordability may be available in the future, they agreed that MHI is the most appropriate income metric to use for this purpose at this time.<sup>91</sup>

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<sup>82</sup> Ibid

<sup>83</sup> 2002, SAB. [Affordability Criteria for Small Drinking Water Systems: An EPA Science Advisory Board Report](#). EPA-SAB-EEAC-03-004

<sup>84</sup> Ibid

<sup>85</sup> Ibid

<sup>86</sup> Ibid

<sup>87</sup> Ibid

<sup>88</sup> Ibid

<sup>89</sup> Ibid

<sup>90</sup> 2003. NDWAC Workgroup. [Recommendations of the National Drinking Water Advisory Council to U.S. EPA on Its National Small Systems Affordability Criteria](#)

<sup>91</sup> Ibid

15. If EPA continues its current cumulative affordability threshold analysis, then financial assistance should be incorporated in the calculations.<sup>92</sup>
16. EPA should establish differential regional affordability criteria when sufficient supporting data are available, to recognize that the impacts of rules may be felt differently in different regions.<sup>93</sup>
17. EPA, other federal agencies, and states should advance affordability through financial assistance programs and promoting sustainable water system operations.<sup>94</sup>
18. Affordability-challenged communities should not be denied the same level of health protection that other communities are provided.<sup>95</sup>
19. Include graphical illustration or conceptual map of the contributors and drivers of environmental injustice [including socio-economic factors].<sup>96</sup>
20. Evaluate cumulative impacts quantitatively when numerical data are available and qualitatively when not in risk assessment in order to address environmental justice concerns.<sup>97</sup>

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<sup>92</sup> Ibid (financial support strategies chapter)

<sup>93</sup> Ibid

<sup>94</sup> Ibid

<sup>95</sup> 2009. NDWAC. [NDWAC Letter to Administrator Jackson](#).

<sup>96</sup> 2015. SAB. [SAB Review of the EPA's Draft Technical Guidance for Assessing Environmental Justice in Regulatory Analysis](#). EPA-SAB-15-008

<sup>97</sup> Ibid

## Appendix B – Quick Reference List of Available SDWA EPA Economic Analyses

1. [Arsenic in Drinking Water Rule Economic Analysis](#) (2000)
2. [Economic Analysis for the Final Stage 2 Disinfectants and Disinfection Byproducts Rule](#) (2005)
3. [Economic Analysis for the Ground Water Rule](#) (2006)
4. [Economic and Supporting Analyses: Short-Term Regulatory Changes to the Lead and Copper Rule](#) (2007)
5. [Economic Analysis for the Final Revised Total Coliform Rule](#) (2013)
6. [Health Risk Reduction and Cost Analysis of the Proposed Perchlorate National Primary Drinking Water Regulation](#) (2019)
7. [Economic Analysis for the Proposed Lead and Copper Rule Revisions](#) (2019)

EPA rulemakings not shown include Public Notification Rule, Stage 1 DBPR, ESWTR, LT1ESWTR, LT2ESWTR, Filter Backwash Rule, Variance and Exemption Rule, Radionuclides Rule, Aircraft Water Rule, or any of the UCMR rules. SDWA also includes the Underground Injection Control Program and other programs that may from time-to-time require rulemakings.