

WATER AND SEWER INFRASTRUCTURE: CORRECTING UNDERINVESTMENT WITH SMART SPENDING

Yeon Joo Kang, Lohita Turlapati, Jack Schwab, Junbo Huang

[Issue Brief](#) | [Appendix A: ARPA Plan Analysis](#) | [Appendix B: Case Studies](#)

Purpose

As part of our analysis of ARPA plans for water and sewer investments, we looked at how local governments incorporated equity goals into their plans (Figure 1). We read 93 plans, and through a statistical analysis of our findings, we present a set of best practices to increase the emphasis on equity in ARPA plans for water and sewer infrastructure investments.

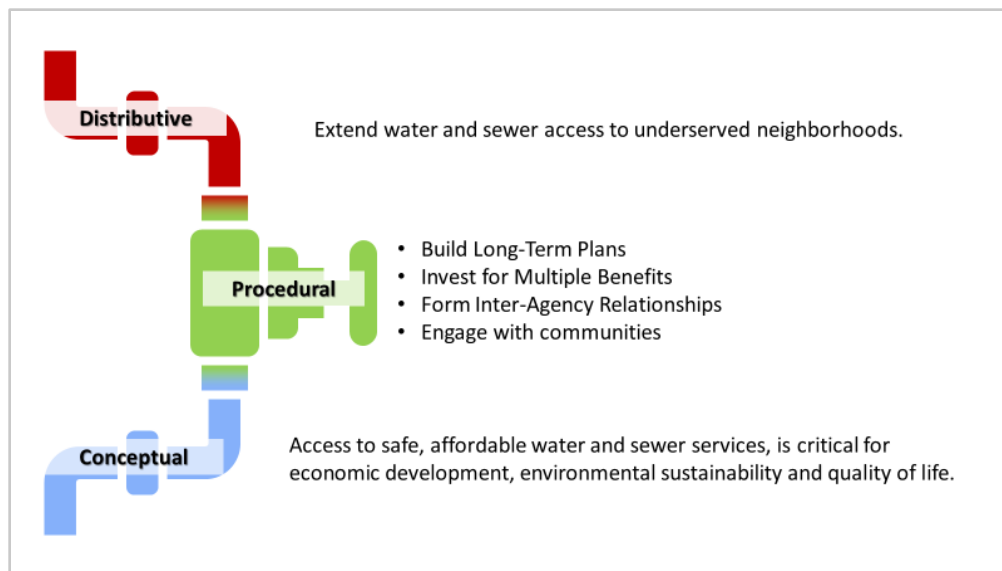


Figure 1: Equity in water and sewer infrastructure

Plan-Content Analysis

We researched 93 ARPA plans from county and city level governments listed by [Results4America](#) as "investing or showing promise to invest in infrastructure (sewage, broadband, and water)." We drew on research that examined equity planning of infrastructural services, to create a rubric to examine plans along key analytical frameworks (O’Neill, 2011; Liao et al, 2019; Loh & Kim, 2020).

Specifically, we create specific 22 sub-categories to review 93 counties’ ARPA planning documents. Then, we conduct a statistical analysis to identify how many equity issues are taken into consideration in these plans (Table 1). Last, we offer four case studies, which have their own certain challenges for water and sewer services, as good practices to show how these local governments address their issues in water and sewer public services.

CRITERIA	QUESTIONS	%
PLAN THOROUGHNESS	Do the words equity/equality/justice appear anywhere in the plan?	90.32
	Does the plan mention any obstacles (technical, political, legal, etc.) to implementing equitable policies?	21.51
	Does the plan answer all the requirements of the treasury plan framework?	54.84
	Does the plan include clear and promising water and sewer investments?	66.67
	Does the plan include at least one specific descriptive statement about future needs for identified communities/ neighborhoods?	36.56
	Does the plan identify communities that are underserved or who have particular social needs?	64.52
DISTRIBUTIVE	Does the plan identify geographic areas that are underserved or that have particular social needs to be addressed?	52.69
	Does the plan link shelter and mobility goals with sewer and water infrastructure?	24.73

CRITERIA	QUESTIONS	%
	Does the plan contain a goal that suggests that economic benefits are equitable, or benefit the entire community?	61.29
	Does the plan talk about protecting communities from negative hazards and extreme events?	24.73
	Does the plan address the citizen’s ability to pay? (debt; affordability; subsidy)	34.41
PROCEDURAL	Did external professional experts write or assist with writing the plan?	10.75
	Did consultants write or assist with engaging the community?	19.35
	Does jurisdictions work with external consultants?	27.96
	Does the plan include a specific team or person for ARPA fund planning and deployment? (i.e. Task Force)	20.43
	Does the plan mention a dedicated team for infrastructure planning?	5.38
	Does the plan encourage collaboration across multiple sectors and agencies?	64.52
	Does the plan mention efforts to engage historically marginalized/ underinvested groups?	46.24
	Does the plan include a demographic/data analysis?	54.84
	Does the plan mention monitoring implementation progress?	44.09
	Does the plan describe the public engagement process for this plan?	82.80
What of the following does the plan include public meetings(In-person visioning sessions)	64.52	

Table 1: Statistical analysis of ARPA plan contents

We culled 6 crucial categories to closely investigate how local governments were promoting equitable outcomes of water and sewer public services (Figure 2). There were four

main findings. First, 60 percent of 93 counties had very specific investment goals in water and sewer infrastructure. In contrast, some counties did not mention water and sewer, but paid more attention to goals in housing, education, and government operation. Second, about 50 ARPA plans claimed to use ‘Qualified Census Tracts’ to identify disproportionately impacted neighborhoods and benefit disadvantaged people, but not all of them took historically

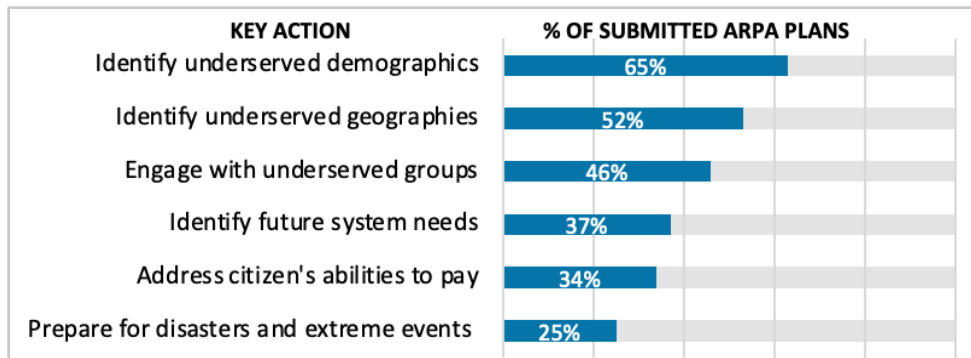


Figure 2: Key actions for bringing equity in ARPA plans

underserved communities into consideration. Third, 46 percent of plans had specific planning for public participation programs, and most of them mentioned inclusive planning and collecting feedback. However, only 17 counties mentioned cooperation among different governmental sectors, and only 1 county explicitly pointed out cross-jurisdiction coordination for investment in stormwater infrastructure. Last, while all counties emphasized forthcoming labor practices brought from ARPA funding, only 25 percent of plans allocate ARPA funding for future climate challenges and concomitant extreme weather events.

Identifying Case Studies

We studied how and to what degree local governments included planning goals that promote equitable outcomes in their ARPA fund usage plans through the first plan content analysis. We drew on statistical analysis to identify a group of plans that plan to implement most sub-categories listed above, assuming that they made great efforts on promoting

equitable outcomes. Their local government plans for water and sewer investments were also reviewed, and the projects that would be implemented were categorized (Table 2).

Furthermore, we chose four of them as our case studies, including Buffalo and Geneva in New York State, Polk County, and St. Augustine in Florida State. We collected background data from these four governments’ official websites to investigate their demographic characteristics and existing water and sewer issues.

CATEGORY	STRATEGY	PLAN OF ACTION	LOCAL GOVERNMENTS
Re-structuring Operations and Processes	Advisory Boards and Committees	<ul style="list-style-type: none"> Stimulus Advisory Board(SAB) was created to ensure that (ARP) funds are invested equally for the greatest possible transformational impact 	St. Louis, MO
		<ul style="list-style-type: none"> Stormwater Technical Advisory Committee (STAC) was established to provide guidance and assistance in matters dealing with stormwater runoff, permit requirements, maximizing best management practice treatment efficiencies and improving surface water quality. The meetings are advertised and open to the public. 	Polk County, FL
	Data-driven approach	<ul style="list-style-type: none"> Open data portal tracking appropriations and expenditures 	Buffalo, NY
	Collaborations	<ul style="list-style-type: none"> Collaborate with the Data Center, Office of Racial Equity, and other departments in the development of data tools and insights to define and deliver budgets and services with a racial equity lens 	Geneva, NY Polk County, FL
Universality	Increasing investment in disadvantaged communities	<ul style="list-style-type: none"> Equity for the entire community to improve the quality of life for future generations through infrastructure development 	St. Louis, MO

		<ul style="list-style-type: none"> • The communities served include census tracts that are predominantly of color, those with the greatest indicated barriers due to historic marginalization. 	Monterey, CA;
	Ensuring access in all circumstances	<ul style="list-style-type: none"> • Providing, repairing and maintaining wastewater and drinking water infrastructure in parks and recreation areas 	Maricopa, AZ Monterey, CA
		<ul style="list-style-type: none"> • Street- based water linkages in homeless encampments 	San Jose, CA
Increasing Climate Resilience	Applying geographically relevant climate information	<ul style="list-style-type: none"> • Creating the most natural landform and geomorphology possible in creek riparian areas to spread and slow flood flows of water 	Hamilton County, OH
		<ul style="list-style-type: none"> • Maximizing flood mitigation and protecting the communities from stormwater using landform and vegetation communities 	Charleston, SC
		<ul style="list-style-type: none"> • Create a corridor of wetland treatments systems, increase flood protection of lands along the canal, improve watershed drainage and enhance water storage . 	Polk County, FL
	Building climate-smart water systems	<ul style="list-style-type: none"> • Drainage enhancements and improvements in areas that routinely flood during heavy or prolonged rains 	Kern County, CA
<ul style="list-style-type: none"> • High-impact water infrastructure projects with a focus on managing or mitigating pollutants, reducing the energy required to treat water, and reusing water where possible. 		El Paso County, CO	
Designing for long-term public health security		<ul style="list-style-type: none"> • Replacing aging infrastructure for quality and reliability 	Maricopa, AZ Corpus Christi, TX
		<ul style="list-style-type: none"> • Surface Water Enhancement/Treatment 	Polk County, FL; Washington, DC

		<ul style="list-style-type: none"> • Lead Pipe Replacement Programs 	Buffalo, NY;
Identifying Citizen Priorities	Identifying and engaging with disadvantaged, historically underinvested communities	<ul style="list-style-type: none"> • Citizen Participation Plan including public meetings, public comment periods, roundtables, workshops, surveys. 	Charleston, SC Buffalo, NY
	Smart Infrastructure	<ul style="list-style-type: none"> • Inserting smart water meters in disadvantaged household to help achieve consistent monthly bills and track leakages immediately 	Buffalo, NY
	Conducting need-oriented assessments	<ul style="list-style-type: none"> • Hazards and Vulnerability Assessment 	Charleston, SC
Addressing Service Affordability and Utility Revenue		<ul style="list-style-type: none"> • Long-term septic to sewer conversion/ Sewer improvements 	St. Augustine, FL Kern County, CA
		<ul style="list-style-type: none"> • Emergency rental assistance 	Bucks County, PA
		<ul style="list-style-type: none"> • Covering revenue shortfalls 	Geneva, NY
		<ul style="list-style-type: none"> • Water and Sewer Debt forgiveness 	Buffalo, NY

Table 2: Categorization of outstanding water and sewer projects with equity orientation, as observed in ARPA plans

Reference

Liao, L., Warner, M. E., & Homsy, G. C. (2019). Sustainability's forgotten third E: what influences local government actions on social equity? *Local Environment*, 24(12), 1197–1208. <https://doi.org/10.1080/13549839.2019.1683725>

Loh, C. G., & Kim, R. (2021). Are We Planning for Equity?: Equity Goals and Recommendations in Local Comprehensive Plans. *Journal of the American Planning Association*, 87(2), 181–196. <https://doi.org/10.1080/01944363.2020.1829498>

O'Neill, P. (2009). Infrastructure Financing and Operation in the Contemporary City. *Geographical Research*, 48, 3–12. <https://doi.org/10.1111/j.1745-5871.2009.00606.x>