

Lowering Costs in Water Infrastructure through Procurement Reform: A Strategy for State Governments

BY BONNER R. COHEN, PH.D.

Executive Summary

ealing with the aftermath of the 2008–09 housing collapse and the subsequent recession has posed a formidable challenge to governments at all levels—federal, state, and local. Comfortable assumptions about how an ever-expanding economy would provide the requisite revenue stream to allow governments to meet all their obligations have had to give way to the harsh realities of a sluggish recovery and soaring deficits. Many governments still struggle to provide basic services.

Of those basic services, none is more crucial to public health than providing access to clean, affordable water. Unfortunately, America's underground water infrastructure is in a deplorable state of disrepair. Leaking, corroded pipes have come to symbolize the infrastructure crisis beneath our feet. The magnitude of the problem is staggering. In a 2010 report, the U.S. Conference of Mayors projected that, over the next 20 years (2009–28), \$3.8 trillion will have to be spent rehabilitating the nation's water and wastewater systems. According to the U.S. Environmental Protection Agency (EPA), underground pipes ac-

count for some 60 percent, or \$2.28 trillion, of that total.

By far the biggest contributor to the deterioration afflicting America's underground water networks is corrosion, which causes leaks and triggers water main breaks. Leaking pipes lose an estimated 2.6 trillion gallons of drinking water every year, or 17 percent of all water pumped in the United States. Because water systems are capital-intensive operations, when *Continued on next page . . .*

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Fax: 703.373.0927 www.alec.org jurisdictions fail to raise sufficient funds to cover the cost of rehabilitating their underground water networks, repairs and replacements are put off, and decay accelerates.

Until recently, the federal government, through the State Revolving Funds (SRFs), was able to pick up some of the slack by providing capitalization grants to states to upgrade local water systems. However, funding for SRFs has not kept pace with the deterioration of water systems, and, given Washington's own deficit problems, the federal government's "helping hand" will only get smaller and smaller.

"However, despite meeting standards of the American Society for Testing and Materials and the American Water Works Association, some materials are often excluded from consideration. Allowing the consideration of all materials will introduce competition and help states and municipalities make procurement decisions that will provide the best water infrastructure for taxpayer dollars."

Opening up municipal procurement procedures to competitive bidding is the most promising way communities across the country can meet their water-infrastructure challenges. Not only are products and technologies available that can restore the integrity of our nation's underground water networks, thanks to competitive bidding, they can do so at a price that will provide relief to local officials, ratepayers, and taxpayers. However, despite meeting standards of the American Society for Testing and Materials and the American Water Works Association, some materials are often excluded from consideration. Allowing the consideration of all materials will introduce competition and help states and municipalities make procurement decisions that will provide the best water infrastructure for taxpayer dollars.

Across the nation, a growing number of local governments are realizing the severity of the underground infrastructure crisis. Seizing the bull by the horns, these forward-looking jurisdictions—including municipalities as diverse as Charlotte, Cleveland, Dallas, Denver, Fargo, Houston, Indianapolis, Jacksonville, Louisville, Myrtle Beach, San Antonio, and San Diego—are revising outdated procurement policies that effectively exclude innovative and cost-effective products and technologies from the bidding process.

Facing financial constraints every bit as challenging as those confronting state and local governments, the federal government is revising its procurement policies to open the way to competitive bidding in the area of underground water infrastructure. For more than a decade, the U.S. Department of Agriculture's Rural Utilities Service (RUS), which provides funding for water systems in rural areas across the country, stipulates that the projects it funds are subject to "maximum open and free competition."

The rising tide in favor of competitive bidding has been highlighted in the *New York Post* and the *Baltimore Sun* and is the subject of recent reports by the U.S. Conference of Mayors, the National Taxpayers Union, and the Competitive Enterprise Institute.

It is time for state governments to join their counterparts at the federal and local levels in opening up procurement practices to ensure all acceptable and proven materials are considered. The American Legislative Exchange Council's "Open and Fair Competition Act for Water and Wastewater Projects" does just that. By ensuring that open procurement procedures are utilized in the selection of water and wastewater piping materials, projects can be constructed at the best price and best value for system customers and taxpayers.

Across the nation, state legislators are stepping forward and expressing their support for comprehensive procurement reform. According to American Legislative Exchange Council member Rep. Dawn Pettengill of Iowa, "As technology advances, our methods of procurement must accommodate. When we limit consideration to certain products, government is picking winners and losers, and the ultimate losers are the taxpayers." She continued, "Considering all available and appropriate products will help provide sustainable infrastructure at an affordable price by allowing us to consider new technologies and products that better serve our communities' needs."



A Nationwide Corrosion-Driven Crisis

Largely hidden from the public eye, vast underground networks of pipes bring us the water we drink and use for bathing, washing, cleaning, and myriad other purposes. These pipes also serve as pathways for the safe disposal of wastewater. Sophisticated water networks are one of the things that separate modern industrial societies from the underdeveloped world.

Unfortunately, America's underground water infrastructure is in a deplorable state of disrepair. The nation is dotted with towns, large and small alike, that are served by leaking, corroded pipes. The combination of corrosion and acidic gas in sewer pipes is correlated with a high incidence of pipe failure that can lead to water contamination. Similar concerns exist with pipes that convey drinking water. Timothy Ford, a microbiologist and water researcher with Montana State University, argues that, as pipes corrode and break, not only does water escape, but diseases enter the system.¹ These corroded pipes now pose a serious threat to public health. If conditions are allowed to persist, the clean, affordable water that families and businesses have come to take for granted will become a thing of the past. It will be supplanted by dirty, expensive water that can be the breeding ground for bacteria.

The magnitude of the problem is staggering. During the next 20 years, according to a 2010 report by the U.S. Conference of Mayors, the nation will need to spend \$3.8 trillion on its water and wastewater systems.² Underground pipes, EPA points out, account for nearly 60 percent, or \$2.28 trillion, of those costs.³ Because water systems are capital-intensive operations, when jurisdictions fail to raise sufficient funds to cover the costs of rehabilitating their underground water networks, repairs are put off, decay accelerates, and the projects require even more funds. This vicious cycle plays out all across the country.

By far the largest contributor to the deterioration of America's underground water systems is pipe corrosion, which causes leaks and triggers water main breaks. As a result of widespread corrosion in the system, there are more than 300,000 annual water main breaks in North America.⁴ Use of corrosion-prone materials in pipes affects operational and maintenance costs of water and wastewater systems. The longer these materials are in the ground, the more acute the corrosion problems become. "Corrosion [in the water and wastewater sector] is a \$50.7 billion annual drain on our economy—including repairs, lost water, pipe replacements, and implementation of expensive



corrosion mitigation programs," noted Gregory M. Baird, former chief financial officer for Aurora Water, Colorado's third-largest water utility. "Leaking pipes also lose an estimated 2.6 trillion gallons of drinking water every year, or 17 percent of all water pumped in the United States. This represents \$4.1 billion in wasted electricity every year." At a time when our localities, states, and nation face budget shortfalls, we cannot afford to waste these precious resources.

A Situation Spiraling Out of Control

With thousands of miles of corroded pipes already beyond their life expectancy, rehabilitation of the nation's water networks is not an option, it is a necessity. But how can governments, facing ballooning deficits, raise the funds required to maintain the integrity of their water and wastewater systems?

One traditional avenue of financing improvements to water systems is in serious jeopardy. SRFs, authorized under amendments to the Clean Water Act and the Safe Drinking Water Act, have provided water systems with much-needed infusions of cash to replace aging pipes and make other improvements. Under the SRF program, Congress authorizes EPA to make capitalization grants to states. States use these grants, which they match with 20 percent of their own funds, to provide loans and other assistance to public water systems. Communities repay the loans into a fund, which—in principle—replenishes the financing mechanism, thereby making funds available for other communities.⁶

However, funding for SRFs has not kept pace with the deterioration of water systems, and the federal government's



"helping hand" will likely get smaller and smaller. In 2012, Washington provided just \$7.7 billion in SRF support to local communities. At that pace, House Interior and Environment Appropriations Subcommittee Chairman Mike Simpson of Idaho points out, it will take 250 years to rehabilitate the nation's underground water systems. Given the federal government's dire financial straits and projections that the nation's debt will reach 77 percent of GDP by 2020, even this estimate may be too optimistic.

A Way Out: Procurement Reform

The growing financial pressure under which state and local governments will be operating for decades to come will require new ways of doing things. Leaking, rupturing underground pipes are not just a sign of physical decay; their presence is a blemish on the record of those governments that have allowed these conditions to persist for decades.

Just as integrated circuits emerged from, and made obsolete, the simple transistor, today's modern piping technology is vastly superior in performance and life expectancy than what was being put in the ground throughout most of the 20th century. Not only are products and technologies available that can restore the integrity of our underground water networks, thanks to competitive bidding, they can do so at a price that will provide relief to local officials, ratepayers, and taxpayers. While innovative and cost-effective products and technologies are readily available, these products are often excluded from consideration.

Human beings are creatures of habit, and so are governments. Richard F. Anderson, a senior advisor with the U.S. Conference of Mayors' Urban Water Council, noted, "The conventional approach to water pipe replacement decision making has been to merely replace the pipe with roughly the same product regardless of price, and based on manufacturer's recommendations." Anderson went on to warn of the pitfalls of the "habituation factor" and the tendency of government officials to select materials they are comfortable with and have used for years. The habituation factor "renders certain practices in the procurement of goods and services wasteful by virtue of their fundamental, if hidden, flaws." When government procurement practices are guided by the habituation factor, Anderson explained, the public stands to lose:

With regard to government procurement, the habituation factor suggests that government procurement officials exercise their duty without questioning the fundamental factors that may have guided, perhaps dictated, the choice of, the price of, the size of, the color of a good or service. Habituation tendencies associated with procurement of materials, in particular, can pose a real financial danger because as manufacturing and science materials advance, the procurement official may be making spending decisions today based on information from yesterday, last year or last century for that matter.¹¹

While innovative and cost-effective products and technologies are readily available, these products are often excluded from consideration.

Not only does the habituation factor close the eyes of procurement officials to innovations in products and technologies; it also encourages them to ignore the sometimes harsh realities of the physical world surrounding underground pipes. As already noted, corrosion is the driving force behind decaying underground water infrastructure. An April 2012 report by Utah State University's Buried Structures Laboratory found that 75 percent of water utilities in the United States operate in corrosive soil conditions.¹²

EPA physical scientist Michael Royer confirms the effect that corrosion and corrosive soils have on deteriorating water infrastructure. "Leakage from joints, pin holes, cracks, connections and valves can be expected to become worse over time due to the cumulative effects of factors such as corrosion, differential settling of soil, traffic loads, water hammer (a pressure surge from turning on or off a valve too fast, resulting in an enormous wave of pressure that can severely damage pipes), and temperature," he explained. Royer added that water main breaks, the most visible sign of underground pipe deterioration, can result in contaminants entering the water distribution system at the site of the break or through other holes and cracks if the

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water pressure in the pipe falls below the water pressure on the exterior of the pipe.¹³

The evidence is overwhelming that corrosion, more than age, is eating away underground water systems. As a new 2013 U.S. Conference of Mayors Water Council report pointed out, "Corrosion and soil conditions are a major factor in determining the performance of a pipe material." In rehabilitating underground water systems, no decision is more important than the selection of pipe material. Given the considerable costs involved, this procurement decision should be made with a view toward the long-term sustainability of the water system, the initial capital and subsequent maintenance costs, and the ability of the selected material to withstand the demands of the natural environment and to meet the needs of commercial and residential ratepayers.

When an unfunded water and wastewater liability goes hand-in-hand with a lack of open procurement and life-cycle financial analysis practices, the problems for cash-strapped local governments only get worse. "Officials and officers have a fiduciary responsibility to conduct procurement audits—both process audits and financial audits—to ensure that fair and open competition practices are followed," a recent National Taxpayers Union report pointed out. "This reaches to the depths where ... special interests and others dictate design specifications prohibiting materials, technologies or project delivery processes that may benefit or lower overall costs to utilities." ¹⁵

Life-Cycle Costs and Materials Performance: The Keys to Sound Financial Management

The primary cause of premature pipe failure is corrosion, so the choice of piping material is critical to keeping long-term maintenance costs down and minimizing capital-replacement budgets. The best way to ensure that all acceptable materials are considered in pipe-replacement projects is to overhaul outdated procurement specifications. "Procurement habituation in pipe material consideration, combined with the failure to take advantage of the open bidding process, impedes competitive cost savings," the Mayors Water Council report noted. "Closed procurement processes lead to unnecessary costs, and may diminish public confidence in a local government's ability to provide cost-effective services."

Open procurement policies do not mandate the use of a specific product, nor do they attempt to dictate which products are superior. Open procurement and bidding policies simply enable government agencies to consider all viable materials. This allows for the demonstration of the free-market axiom that competition leads to lower prices and higher quality goods. Opening up the bidding process to all proven and accepted materials will lead to lower costs for taxpayers and develop a more sustainable water infrastructure.



The pipes that make up our underground water infrastructure are available in different materials, shapes, sizes, and strengths. Because each locality has its own specific needs, all proven materials should be available for their consideration. As Ben Grumbles of the U.S. Water Alliance noted, "a 'pipes of all types' approach makes sense nationally but locally some choices will prove to be smarter than others." All materials have their advantages and disadvantages, and competitive procurement processes allow states and municipalities to weigh those factors and choose pipes they determine best meet their needs. Local officials and engineers that have the most accurate knowledge of the conditions in which they operate and which materials will be most suitable. However, they first need to be able to consider these materials.

Once the procurement process is open and transparent, the all-important pipe-selection process can unfold in a way that benefits ratepayers, taxpayers, and local governments. "Open procurement policies can actually reduce the staggering costs," the U.S. Conference of Mayors Water Council report pointed out. "If the lion's share of system investment is in the pipes (60 percent), then focusing on pipe material selection is the first step in reducing system capital costs, and, subsequently,



operations and maintenance (O&M) costs."¹⁸ As the report further notes, underground infrastructure projects are primarily funded through the issuance of 30-year bonds, and accounting depreciation schedules assume a 75- to 100-year lifespan for pipes. "When pipes fail prematurely," the report said, "huge long-term generational financial burdens are placed on the utility, unnecessarily increasing user rates."¹⁹ By considering life-cycle costs and the performance of materials in all public projects, including underground water systems, local officials can rid themselves of what are often self-imposed restrictions on how they spend taxpayer money.

Competitive bidding that allows for the consideration of alternative, yet proven and accepted, piping materials can result in enormous savings. For example, according to a recent report by the National Taxpayers Union (NTU), a conservative shift in pipe selection from iron pipe materials to polyvinyl chloride (PVC) piping eight inches or smaller in water systems could generate savings of approximately \$370 billion nationwide.²⁰ States can reap substantial cost-savings by opening up their procurement process to alternative piping materials. Its figures are based on the American Society of Civil Engineers'



2009 estimates of the needs of each state's drinking water infrastructure, the fact that 60 percent of costs will result from the need to replace underground pipes, and a calculated 17.4 percent potential cost savings if alternative materials are considered.²¹ Although the use of a certain material may not be the best choice for all localities, when specific materials are excluded from consideration, the decision to use them is not even an option.

Table 1: Potential Cost Savings for Drinking Water Infrastructure if Competitive Bidding Practices Are Used

State*	Estimated Necessary Investment (over next 20 years)	Potential Cost Savings if Open and Competitive Competition Is Used (over next 20 years)
Georgia	\$9.02 billion	\$940 million
Illinois	\$13.41 billion	\$1.41 billion
Massachusetts	\$8.56 billion	\$894 million
Michigan	\$11.31 billion	\$1.18 billion
New York	\$14.81 billion	\$1.55 billion
Pennsylvania	\$10.99 billion	\$1.15 billion

^{*2009} baseline for initial water investment cost is the estimate for a state's water infrastructure investment "requirements" for a 20-year period. Please see the American Society of Civil Engineer's Infrastructure Report Card: http://www.infrastructurereoprtcard. org/state-page. Please note that many amounts have increased in the 2013 report.

Source: Water Finance Resource Foundation.

Procurement Reform Opens Competition and Lowers Costs Across the Nation

Overcoming the habituation factor and all the other ingrained practices that stand in the way of innovation is essential if state and local governments are serious about rehabilitating their underground water systems. "Any improvement in this area can represent a huge cost saving for ratepayers considering the perpetual high cost of underground infrastructure replacement," the 2013 U.S. Conference of Mayors report pointed out. "Closed procurement processes lead to unnecessary costs, and may diminish the public's confidence in a local government's ability to provide cost-effective services." Jennifer Hosterman, mayor of Pleasantville, Calif., has a simple message about the virtues of competitive bidding. "Giving taxpayers the best bang for the buck should be the chief goal for mayors and elected officials across the country," she explained. 23

At the federal level, one of Washington's largest departments has long recognized the advantages to taxpayers of competitive bidding. For nearly a decade, the U.S. Department of Agriculture (USDA) has been at the forefront in fostering procurement reform in the area of underground water networks. The department's Rural Utilities Service (RUS) program provides funding for water systems in rural areas across the country. As is usual with government programs, the money comes with strings attached, but the strings in this case are specifically designed to foster competition and benefit taxpayers. In an internal memorandum dated March 16, 2002, which was forwarded to state directors for rural development, the USDA stated, "All procurement transactions regardless of whether by sealed bid or negotiation and without regard to dollar value, shall be conducted in a manner that provides maximum open and free competition." The memorandum further specified:

RUS expects the owner and the design engineer to be open to reasonable alternatives during the facility planning and design process. Contractors, manufacturers, and suppliers with acceptable equipment and materials should have a chance to participate in the project. Once the facility requirements have been established that assures good quality, the goal is to construct the project at the best price for the system and the taxpayer.²⁴

At the local level, a growing number of governments have

reformed their procurement policies. Municipalities as diverse in size and location as Charlotte, Cleveland, Dallas, Denver, Fargo, Houston, Indianapolis, Jacksonville, Las Vegas, Louisville, Myrtle Beach, Oakland, San Antonio, and San Diego have joined a host of other cities in allowing the competitive bidding process to decide the future of their water networks.²⁵

Baltimore offers an instructive example of how a deepening financial crisis can beget long-overdue changes in procurement policies. Suffering from declining population and falling property tax revenues, Baltimore has been the scene of spectacular water main breaks in recent years that have wreaked havoc with the city's already depleted budget. City officials estimate that at least \$2 billion will be needed to upgrade corrosion-degraded underground pipes. ²⁶ In a dramatic break with the past, the hard-pressed city has started to open up its bidding procedures by allowing, on a trial basis, pipes made of PVC to replace corroded ductile iron pipes. ²⁷

There remains, however, much work to be done. Some jurisdictions have procurement procedures that are as antiquated as their decaying underground pipes. These cities include Atlanta, Boston, Chicago, Cincinnati, Columbus, Jackson, Los Angeles, Memphis, Miami, New York, Philadelphia, and Phoenix.

Chicago is a prime example of what happens when cities do not change their ways. The city is crisscrossed with 4,300 miles of underground pipes, many of which are more than 100 years old. Chicago plans to replace 29 miles of pipe a year, but, at that rate, it will take 148 years to upgrade its underground water network. Distressed over the decrepit state of Chicago's water system, Mayor Rahm Emanuel announced in late 2011 that water bills would immediately rise by 25 percent, then by 15 percent each year over the next three years. Needless to say, ordinary citizens will pay dearly for their water as a result of Chicago's closed procurement procedures. Chicago's woes are part of a larger problem plaguing debt-ridden Illinois. *The Bond Buyer* reported in October 2012 that Illinois' budget was not sustainable and that the state's decaying infrastructure will require \$300 billion in investments in the decades to come.²⁹

States Can Set the Agenda in Favor of Competitive Bidding

The common fate shared by Illinois and its largest city when it comes to underground water infrastructure underscores the

ties that bind state and local governments. State procurement policies profoundly influence municipal procurement practices. A 2012 survey by the National Association of State Procurement Officials (NASPO) found that more than half of the responding states (25) "allow local governments to use state central contracts; this includes states that do not necessarily have statutory authority over local governments, but extend the use of state contracts to political subdivisions or operate an optional participation cooperative purchasing program for public entities and local units of government ..."³⁰ As such, the procurement of piping by way of competitive bidding through State Revolving Funds is an extension of well-established practices. The key is to set the tone for competitive bidding at the state level. If states set a good example, local jurisdictions are likely to follow.

Local governments are at the point of delivery for water and wastewater, but some of the funding for upgrading their water systems comes from state and federal government agencies. Not only should state and federal agencies embrace competitive bidding in their own right, they should demand that local governments do the same if they receive federal and state funding for underground water infrastructure projects. Only when governments at all levels open up bidding procedures in the spirit of "may the best technology win" can the problems afflicting our nation's underground water networks be addressed. This is where the Exchange Council model legislation can point the way to a future in which people can rely on an affordable, reliable, and safe water system.

"The Fair and Open Competition Act for Water and Wastewater Projects" ensures that open procurement procedures are utilized in the selection of piping materials for water and wastewater projects. It stipulates that "piping material is considered proven and acceptable if it meets current and recognized standards as issued by the American Society of Testing Materials (ASTM) and the American Water Works Association

(AWWA) and other recognized standards and certification agencies." The model policy would restore public trust in the procurement process and can begin the task of rebuilding the nation's water infrastructure to last well into the next century. According to Rep. Andrew Thompson of Ohio, "The Open and Fair Competition Act for Water and Wastewater Projects will ensure that local taxpayers get the best return on every dollar spent."

The key is to set the tone for competitive bidding at the state level. If states set a good example, local jurisdictions are likely to follow.

The challenges facing America's underground water networks are formidable, but they are not insurmountable. By combining the products and technologies of human ingenuity with a willingness to open the procurement process to all qualified participants, state and local leaders can seize the bull by the horns and guide their communities into a future with safe and affordable water.

"With water systems aging and new water infrastructures technologies ever evolving, open procurement and competitive bidding need to be part of a municipality's best management practices."

- Rep. Gary Daniel, New Hampshire

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Dr. Cohen is author of *The Green Wave: Environmentalism and its Consequences*, published by the Capital Research Center in 2006. He received a B.A. from the University of Georgia and his Ph.D.—summa cum laude—from the University of Munich.

The Open and Fair Competition Act for Water and Wastewater Projects

Summary

It is the intention of this Act to ensure that all proven and acceptable piping materials be included in all bids for water and wastewater projects. This promotion of free competition will ensure limited government resources are being used to the greatest advantage. The goal is to construct a project at the best price and best value for system customers and taxpayers.

Model Policy

{Title, Enacting clause, etc.}

Be it enacted by the legislature of the state of [insert state].

Section 1. {Definitions}

- (A) "Governmental Agency" refers to any state agency, state district, county government, municipality, and including a school district, public district, county board of education, joint powers authority, water or sewer district, special district, or any other public or municipal corporation.
- (B) "Acceptable Piping Material" refers to piping material that meets current and recognized standards as issued by the American Society for Testing and Materials (ASTM) and the American Water Works Association (AWWA).

Section 2. {Procurement Procedures for Water and Wastewater Piping}

- (A) Government agencies shall engage in open competitive bidding to study, plan, design, construct, develop, finance, maintain, rebuild, improve, repair, or operate water and wastewater utilities; and
- (B) All procurement transactions for piping material shall be conducted in a manner that provides for open and free competition. All acceptable piping materials shall be considered in the procurement process.
- (C) Government agencies shall consider the quality, sustainability, durability, and corrosion resistance when procuring piping material.
- (D) This Act specifically prohibits government agency employees from participating in the selection process when those employees have a relationship with private entities seeking a contract under this Act or as proscribed by existing state or local contracting law.
- (E) All procurement transactions, regardless of whether by sealed bids or by negotiation and without regard to dollar value, shall be conducted in a manner that provides maximum open and free competition. Procurement procedures shall not restrict or eliminate competition.
- (F) Unlawful restrictions on competition include, but are not limited to:
 - (1) Placing unreasonable requirements on firms in order for them to qualify to do business; noncompetitive practices between firms;
 - (2) Organizational conflicts of interest;
 - (3) And unnecessary experience and bonding requirements.
- (G) In addition, the Government Agency shall consider all materials normally suitable for the project commensurate with sound engineering practices and project requirements.

Section 3. {Severability clause}

Section 4. {Repealer clause}

Section 5. {Effective date}

Approved by the Commerce, Insurance, and Economic Development Task Force on July 27, 2012. Approved by the ALEC Legislative Board on October 18, 2012.

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LOWERING COSTS IN WATER INFRASTRUCTURE

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