

THE WORLD

Italy, master of aqueducts, now trying to fix its leaky pipes

BY CHICO HARLAN
AND STEFANO PITRELLI

The nation, expecting an enormous sum of European pandemic recovery money, is directing some of it to plugging ruptures in city water systems that can be 70 years old and brittle

BARI, ITALY — The pure, drinkable water of an underground mountain spring makes an improbable 110-mile journey to the Puglian city of Bari, propelled by gravity along an aqueduct constructed a century ago. But once arriving in the city itself, much of that water is lost, seeping through hidden holes and ruptures on its path through the city pipes.

Almost every country and every utility company in the world loses drinking water before it reaches consumers. But by the standards of developed countries, the leaks are especially severe in Italy, where two millennia ago Romans mastered the art of transporting clean water, and where in modern times water systems have instead come to symbolize underinvestment, mismanagement and economic decline.

“We invented the system, but now we have a lot of holes,” Roberto Cingolani, an Italian minister in charge of making the country more environmentally sustainable, said in an interview.

Across Italy, and especially in the poorer south, pipes that constitute city water systems can be 70 years old, ossified and brittle to the point of breaking. That contributes to a loss rate of 42 percent nationally. In Bari, half the water is lost before it reaches customers.

“If we [lose] water, it’s going to drain the country,” Cingolani said. He called Puglia, in Italy’s southern heel, “one of the most critical” areas.

The Italian government has included leaky pipes on the lengthy list of problems it hopes to address with the historic tranche of money — 191.5 billion euros (\$227.6 billion) — it will soon receive from the European Union, part of a rescue package for countries battered economically by the coronavirus pandemic.

Officials in Puglia say fixing leaks now is essential to head off a down-the-road emergency in a part of the continent where rainfall is projected to continually diminish, reducing the supply to rivers, streams and aquifers that feed potable water networks.

“This is the only way to save water for future generations,” said Francesca Portincasa, industrial coordinator for the water company, Acquedotto Pugliese.

Hunting for leaks, block by block

The work of addressing the leaks is labor-intensive. Puglia’s water network consists of 13,000 miles of pipes. On rare occasions the leaks can knock out service or cause dips in water pressure, and consumers flood complaint lines. But most of the leaks are invisible to the public, and the only way to find them is with teams going block by block through the city.

Antonio Marchitelli removed the street-level cover of a tiny shaft and touched an acoustic pole to an exposed pipe.

“We might have a leak somewhere around here,” said Marchitelli, 52. The sound he heard was a high-pitched gurgle, indicative of a problem nearby.

He and his partner, Lorenzo Lorusso, moved to the next spot, hoping to get closer.

After examining two more pipes, sensing they were on the right path, they hooked up sound frequency devices to two different points of the pipe, enabling the detection of any irregularities between those points.

“We’ll know with 95 percent certainty the location of the rupture,” Marchitelli said.

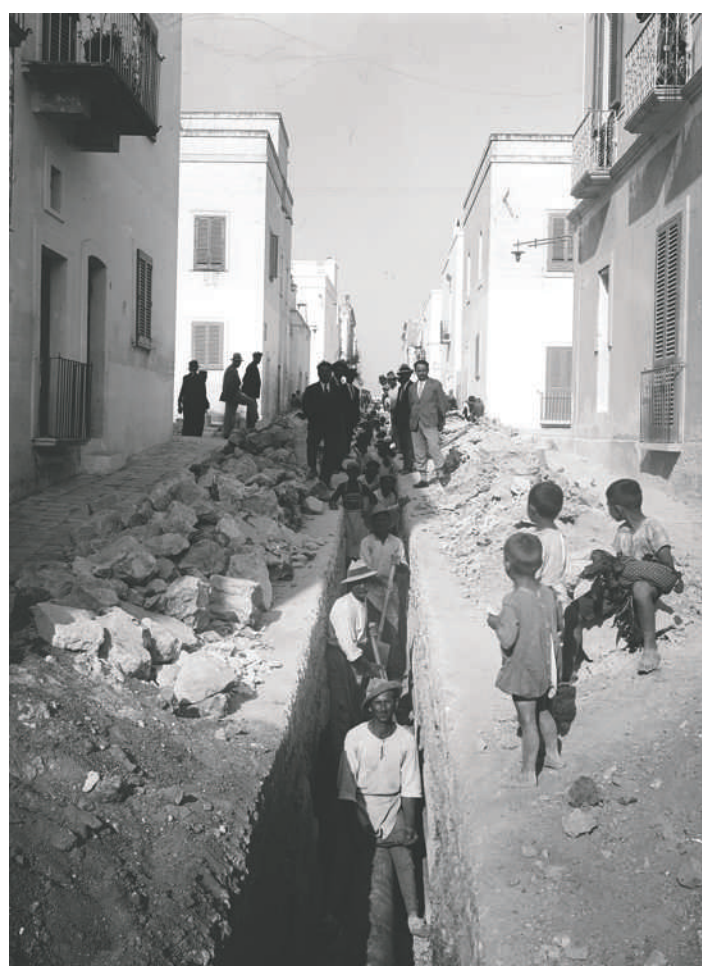
He looked at a tablet-like screen with a readout: The sound



FEDERICA VALABREGA FOR THE WASHINGTON POST



FEDERICA VALABREGA FOR THE WASHINGTON POST



ACQUEDOTTO PUGLIESE

TOP: In Gravina in Puglia, Italy, a 17th-century bridge was adapted as an aqueduct in the 18th century. It appears in a stunt scene of the upcoming James Bond film “No Time to Die.” **ABOVE LEFT:** Workers replace an old water pipe in the center of Bari. **ABOVE RIGHT:** The construction of an aqueduct, one of the largest public works projects of the early 1900s, transformed the Puglia region.

test showed an obvious leak, precisely 18 feet from where Marchitelli was standing, in a spot below the sidewalk where a tourist toted a suitcase.

“Yup, that is where it is,” Lorusso said.

They sent a message to the water company, noting one more leak in need of fixing.

Unfortunate loss could become an emergency

If any area has an incentive to better take care of its resources, it’s Puglia, one of the most water-scarce parts of Europe.

The region is nearly bereft of natural fresh streams and rivers. Its aquifers are vulnerable to contamination by seawater. Into the

early 20th century, people tried to get by with collecting rainwater, but the hazards were abundant: drought, contamination, disease. Puglians had some of the shortest life spans anywhere on the continent.

“You cannot grasp Puglia if you don’t grasp its history as a thirsty region,” said Fabiano Amati, a politician and the region’s former assessor for public works, including water.

What transformed Puglia — reducing disease, modernizing cities, birthing vineyards and fields of tomatoes — was one of the largest public works projects of the time, an engineering attempt, launched in 1906, to tap into a massive, underground

spring more than 100 miles away, in the region of Campania. Some 20,000 men worked on the project at any moment. Construction took nine years. And when it was over, a new aqueduct — relying on little more than stones and gravity — was supplying water to Bari and other cities, having essentially redirected a river 90 degrees.

Puglia has since tapped into other faraway water sources, as well. But it still receives some of its water from that original aqueduct, whose mouth lies nearly incognito in the Campania mountains, behind a gray fence, in an area resembling an overgrown war memorial — nothing but a plaque in a grassy field.

There is only one sign of the

subterranean engineering marvel below: a stone hatch with a flight of stairs. Down those stairs, in a stone passageway, water roars out of the darkness from under the mountains, passing into a man-made world of channels and locks.

This area was chosen to supply Puglia because of its abundant rain and snowfall. But people who operate the Acquedotto Pugliese say they notice even that is changing.

In 2017, so little rain fell in Campania that the surrounding areas, including Puglia, had to announce an official crisis.

Other parts of Italy did, too. Officials now expect similar episodes, and corresponding ration-

ing measures, every few years.

Precipitation has not only become less frequent, but it tends to come in shorter, more intense bursts — a pattern that leads to more evaporation and less water draining into the aquifer that feeds the aqueduct’s springs.

“This is a resource that depends on rainfall,” said Luciano Venditti, an engineer in charge of the aqueduct’s overall network. “We’re seeing a gradual reduction.”

Playing catch-up and paying for old mistakes

Italy says the amount of water lost in its pipes has been increasing “constantly” since 2008. And Puglia, having reduced its own loss rate, is far from the most extreme example. In the province of Frosinone, to the southeast of Rome, the loss rate is 80 percent — calculated as the difference between the amount of water fed into the system and the amount of water that is paid for by consumers.

While there can be other explanations for the losses, including people tapping illegally into the system, Portincasa said most of the problem stems from the daily change in water pressure, as people ramp up usage during the daytime and curb back during the night. This, in turn, puts pressure on pipes — especially if they are old.

In that sense, the Acquedotto Pugliese is paying for mistakes in earlier decades. In the late 1990s, the company was forcibly placed under the control of an external commissioner, amid what the Italian Senate described as “serious managerial insufficiency.” Little maintenance work was done.

“There was no plan, no control,” Portincasa said.

The company is now playing catch-up.

It has already spent 400 million euros since 2009, the majority of it coming from separate E.U. funds, with the hope of improving efficiency. For all that money, it succeeded in reducing its leakage rate by 3.5 percent. The company plans to invest another 2 billion euros (\$2.4 billion) by 2035 to shave the loss rate another 8 percent.

On the same day that Marchitelli and Lorusso were going street-by-street with their sound equipment, a separate crew had fenced off a portion of a block in downtown Bari, laying new, blue pipes of ductile iron. A few 70-year-old pipe pieces had been excavated and tossed aside. The company says it aims to replace 80 percent of its urban network — amounting to some 10,000 miles — over the next 15 years.

Marchitelli and Lorusso, meantime, wrapped up their day having found just one leak, as opposed to the usual three or four. As they finished their shift, they told the story of a leak they’d located the previous day — the rare rupture that caused water pressure to drop in apartment buildings. The break seemed significant, but it was also under asphalt, and Marchitelli and Lorusso spent one day looking for it, then another — no luck. Neighbors were tracking their progress, and when finally they detected something, with repair work quickly done, a resident handed them beers and panzerotti, a local fried dough specialty.

“We were right out on the street with the beers,” Marchitelli said.

He said it was an unusually celebratory moment in the search for leaks.

“Normally, when people are waterless, they are exceedingly angry,” Marchitelli said.

chico.harlan@washpost.com

DIGEST

MYANMAR

Emergency extended; vote in 2 years pledged

Six months after seizing power from the elected government, Myanmar’s military leader on Sunday declared himself prime minister and said he would lead the country under the extended state of emergency until elections are held in about two years.

“We must create conditions to hold a free and fair multiparty general election,” Senior Gen. Min Aung Hlaing said in a recorded televised address. He said the emergency will achieve its objectives by August 2023.

In a separate announcement, the military government named

itself “the caretaker government” and the senior general the prime minister.

The emergency was declared when troops moved against the elected government of Aung San Suu Kyi on Feb. 1. The military claimed that her landslide victory in last year’s national elections was achieved through voter fraud, but it offered no credible evidence.

The military takeover was met with massive protests, which led to a lethal crackdown by security forces. As of Sunday, 939 people had been killed by authorities since Feb. 1, according to a tally kept by the independent Assistance Association for Political Prisoners.

— Associated Press

KOREAN PENINSULA

Kim’s sister warns on South Korea-U.S. drills

The sister of North Korean leader Kim Jong Un warned Sunday that next month’s annual drills between South Korea and U.S. troops will undermine prospects for better ties between the Koreas, just days after the rivals reopened long-dormant communication channels.

Kim Yo Jong’s statement, carried by state media, targets only South Korea, potentially lending credence to a theory that North Korea’s decision to restore the communication lines is mainly aimed at pushing Seoul to persuade Washington to make

concessions while nuclear diplomacy remains deadlocked.

Kim Yo Jong said she viewed the drills as “an undesirable prelude which seriously undermines the will of the top leaders of the North and the South wishing to see a step taken toward restoring mutual trust and which further beclouds the way ahead of the North-South relations.”

The drills have long been a source of animosities on the Korean Peninsula.

— Associated Press

New Zealand apologizes for historic raids on Pacific people: New Zealand Prime Minister Jacinda Ardern has formally apologized for a racially charged part of the nation’s history known

as the Dawn Raids. It refers to when Pasifika people were targeted for deportation in the mid-1970s during aggressive home raids — which occurred very early in the morning or late at night — by authorities to find, convict and deport visa overstayers. Many overstayers at the time were British or American, but only Pacific people were targeted for deportation. Ardern said the government was offering a formal and unreserved apology.

Nearly 450 migrants rescued in Mediterranean: Charity ships rescued nearly 450 migrants from a wooden boat that was taking on water in the Mediterranean Sea, aid groups said. The French group SOS Mediterranee tweeted that its

rescue vessel Ocean Viking and boats operated by German charities were part of the five-hour rescue effort.

Gunmen kill 2 at funeral for Hezbollah commander: At least two people were killed south of the Lebanese capital when gunmen opened fire at the funeral of a Hezbollah commander killed a day earlier, an official from the militant group said. Lebanon’s military said it deployed troops in the coastal town of Khaldeh to contain the tension after heavy fire — including from rocket-propelled grenades — terrorized residents. The gunmen remain at large. The violence is apparently rooted in a personal vendetta.

— From news services