Water in Demand amid Gold, Oil, Gas Rush

ALEXANDER WILSON, Associated Press

BUENOS AIRES, Argentina (AP) — Argentina is promoting a new era of mining and energy production, welcoming billions of dollars in foreign investment to unlock huge new reserves of natural gas, oil, gold, lithium and other metals once thought to be unprofitable or out of reach.

But there's one factor threatening this resource boom, something politicians and energy executives rarely mention: Huge amounts of fresh water will be required for these operations in a country where water scarcity holds back development and 16 percent of households still lack connections to publicly treated drinking water.

To make good on the promised energy wealth from one large Argentine shale oil and gas deposit announced this year, experts say it could take an estimated 38 billion gallons (144 billion liters) of water — equal to the total daily amount of water supplied by public systems to the entire United States.

Other major projects include Pascua Lama, the world's highest-altitude gold mine, which is poised to open along the spine of the Andes and produce precious metals for 25 years. The rock will be processed on the Argentine side of the Chilean border with a mix of cyanide and 14 billion gallons of water, says the Canadian mining giant Barrick Gold Corp.

The company says it uses less than 1 percent of available river water for its gold mines.

But downstream in San Juan province, people already face water-use restrictions and must pay 99 times more for water than what Barrick Gold pays under a deal with provincial officials, said lawmaker Miguel Bonasso, who leads the Argentine congress's natural resources commission and sponsored a controversial Glacier Law that promises to create a scientific inventory of the nation's water resources.

"If Barrick Gold had to pay for this water, it wouldn't invest in the mine — it wouldn't be profitable," Bonasso said Friday.

Argentina's mining ministry, meanwhile, estimates that $50 billion worth of lithium can be harvested from the salt flats of Jujuy province alone, roughly equal to the nation's entire foreign reserves. Extracting lithium for use in batteries that power cellphones, laptops and electric cars requires water to create a dirty brine, which indigenous groups fear will spoil their traditional salt-collecting livelihood.

But most of the attention recently has focused on the discovery of a huge deposit of gas and oil trapped in shale rock deep under the "Vaca Muerta" ("Dead Cow" in English) basin of Neuquen province. While 90 percent of its key deposits are unexplored, Vaca Muerta could increase Argentina's oil reserves by at least 750 million barrels, and probably three times that much, said Michael Lynch, an oil analyst and president of Strategic Energy and Economic Research.

Vaca Muerta also has an estimated 4.5 trillion cubic feet of natural gas, according to Spain's Repsol-YPF energy company.

The discovery boosts the country's "technically recoverable" shale gas reserves to 774 trillion cubic feet, according to U.S. Department of Energy estimates, potentially making Argentina the world's third-largest provider of shale gas, behind China and the United States.

"It's more than important, because it will enable us to keep sustaining and promoting even more development for all Argentines," President Cristina Fernandez said when she announced the discovery earlier this year. She followed up in New York last week by securing $1.15 billion in promised investments from executives with Exxon Mobile Corp., AES Corp. and Apache Corp.

Long thought worthless, such deposits are now accessible through what is known as "slick-water hydraulic fracturing and horizontal drilling," or "fracking," for short. This U.S. technology involves drilling deep down and then horizontally through the shale, setting off explosions, and then injecting a mixture of fresh water, sand and chemicals at high pressure to force the fuel to the surface.

Fracking takes between 5 million and 6 million gallons (19 million and 23 million liters) of water per well, and it would take many thousands of wells to extract what they're hoping to produce, said Cornell University engineering professor Anthony R. Ingraffea, an expert on the complex mechanics of fracturing rock deep underground.

In arid western Argentina, the water would have to be drawn from underground

aquifers or from reservoirs and rivers fed by Andean snows and glaciers.

Once used for fracking, it is usually too contaminated to be recycled for drinking water or agriculture. In the U.S., this wastewater is often injected deep underground, where environmentalists say there are no guarantees it won't contaminate groundwater.

"It's about to get a lot drier" in these parts of Argentina, said Ingraffea, who advocates limiting fracking due to complaints of water contamination.

Fracking varies based on each site's geology, but the Barnett Shale deposit in similarly dry north Texas has used more than 15,000 wells to produce more than 8.8 trillion cubic feet of gas over 18 years, Texas said. So if Vaca Muerta needs roughly half that number of wells for roughly half the gas, it could take 38 billion gallons of water to extract it all, based on what Ingraffea calls a conservative industry standard of 5 million gallons per well.

"Clearly, that's a hell of a lot of water," said Daniel Talliant, who runs Argentina's Center for Human Rights and the Environment. "I would also stress the importance and risk posed to subterranean aquifers, which are a critical and delicate resource."

The oil and gas industry maintains that it can keep nearby groundwater supplies clean, but environmentalists are increasingly challenging this claim, citing poisoned wells and fish die-offs in nearby waterways. So if the United States hasn't resolved this debate through its relatively swift justice system and extensive environmental regulations, is Argentina — or any country in the developing world — prepared to do any better?

Talliant doesn't think so: "We've been doing these things for years without social conscience," he said. "It's only recently that we've begun to realize that we're placing our critical environmental resources at risk."

Argentina's Glacier Law, passed last November, bans virtually all human activity on glaciers and adjacent areas of rocky permafrost that were recently covered in ice and still hold water. It requires an inventory of water from glacial runoff, data that could build support for downstream protections as well. Most of the water in the western Andean foothills flows down from glacial peaks, just where most mining activity is planned.

Fernandez vetoed an earlier Glacier Law under pressure from pro-mining provincial allies before allowing the latest version to pass, but it was immediately blocked in court by mining companies and provincial officials, and the president hasn't supported it since then, Bonasso said.

Indigenous groups, meanwhile, have alleged that the provinces are allowing their water to become contaminated. In 2001, Mapuches in Neuquen got clean drinking water trucked into their community by going to the Inter-American Commission on Human Rights. Several dozen other indigenous communities also sued, accusing their provincial governments of exploiting minerals and ruining their water without

consulting them.

Most of these cases are now before the Supreme Court, which must weigh environmental protections against provincial mining rights under the constitution.

Associated Press writer Michael Warren contributed to this report.

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