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UNBLOCK COMPUTING TURNS FLARE GAS INTO POWER AND PROFIT

Repurposing associated petroleum gas supports decarbonization and drives new revenue streams[1]

Executive summary

Unblock Computing – along with INNIO Group's Jenbacher technology – is turning associated petroleum gas (APG) into computing power. A byproduct of oil exploration, APG traditionally has been flared into the atmosphere, emitting greenhouse gases and representing lost revenues.

With Jenbacher gensets, Unblock is mining Bitcoin-equivalents at Argentina's Los Toldos II Este, where the additional revenue from increased oil production is estimated at $30 million per year. In addition, with the flare-capture scheme, Unblock estimates that annual emissions will be reduced by about 100,000 metric tons of CO_2-equivalent.



Source: Unblock Global

»Jenbacher engines are designed for smooth and reliable operation despite fluctuations in gas composition and impurities – one of the many reasons they were chosen for this project. With INNIO's Jenbacher generators harnessing APG as an energy source, the operators at Los Toldos have turned waste gas into power – delivering both economic and environmental gains.«

Tomas Ocampo,
founder and CEO at Unblock Computing
(unblock.energy)

[1] The following information was sourced from Columbia Center on Sustainable Investment's "Project Case Study: Los Toldos, Este II Field in Argentina" by Andrew Bernstein, Mark Davis, Tom Mitro, and Perrine Toledano. Los Toldos II Este is one of six case studies the group compiled in "Igniting Action to Reduce Gas Flaring: Real Opportunities. Real Projects. Real Results," published in June 2025. Columbia Center on Sustainable Investment is a joint effort of Columbia Law School and Columbia Climate School.

Gas flaring overview

Oil remains essential for both commercial transportation, where it meets more than 80% of demand, and chemical production. It also is used in asphalt, lubricants, and other specialty products.[2] For more than 160 years, oil producers have flared or vented into the atmosphere a by-product of oil exploration known as associated petroleum gas (APG). Up to 1 billion metric tons of CO_2-equivalent greenhouse gases are emitted globally from gas flaring each year.

Over the past two decades, as governments, businesses, and communities recognized the need for resilience and sustainability in the energy industry, promises have been made to cut those emissions. Yet gas flaring remains at roughly 140 to 150 billion cubic meters (BCM) per year, representing as much as $30 billion in lost revenue.

While gas flaring is a relatively simple process, the obstacles to ending it are many. As the Columbia Center notes: "Delivering flare-capture projects at scale requires a thoughtful, integrated, and collaborative approach, supported by strong leadership, aligned incentives, and a relentless focus on delivery over rhetoric … Countries with high flaring levels can make substantial progress – If key commercial, organizational, and political challenges are addressed."

Those countries and companies that make the choice will gain increased revenue, enhanced energy security, reduced emissions, and accelerated progress in the energy transition. Writes the Columbia Center, "Among all decarbonization options, reducing gas flaring is one of the fastest and most cost-effective 'quick wins.'"

[2] www.corporate.exxonmobil.com/energy-and-innovation/outlook-for-energy/energy-supply

Los Toldos II Este, Argentina

Oil and gas production in Argentina

In Latin America, Argentina is second only to Brazil for oil production, with the nation flaring about 1.1 BCM per year[3], according to World Bank estimates. That flaring intensity is close to the global average, as shown in Figure 1.

Argentina has relatively low flaring, with a flaring intensity in line with the global average



Source: Illustration by INNIO Group, based on Columbia Center on Sustainable Investment's Project Case Study: Los Toldos, Este II Field in Argentina (2025), using data from the Energy Information Agency.

Figure 1: Global flaring overview detailing Argentina's absolute position (left) and relative position (right). The relative position also is known as "flaring intensity."

When venting, leaking, and methane emissions from incomplete flare combustion are included, that number rises by 2.3 BCM[4], bringing total annual flaring to 3.4 BCM. The costs are significant: Lost revenues are estimated at $600 million annually, while avoiding gas flaring could reduce carbon dioxide emissions by 130 million CO_2-equivalent metric tons[5].

[3] World Bank Group. (n.d.). Global flaring and methane reduction partnership (GFMR): Global gas flaring data. https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data.
[4] International Energy Agency. (2025). Global methane tracker 2025. https://www.iea.org/reports/global-methane-tracker-2025
[5] Assuming a national gas price of $5 per MMbtu and a global warming potential for methane of 82.5, over a 20-year period.

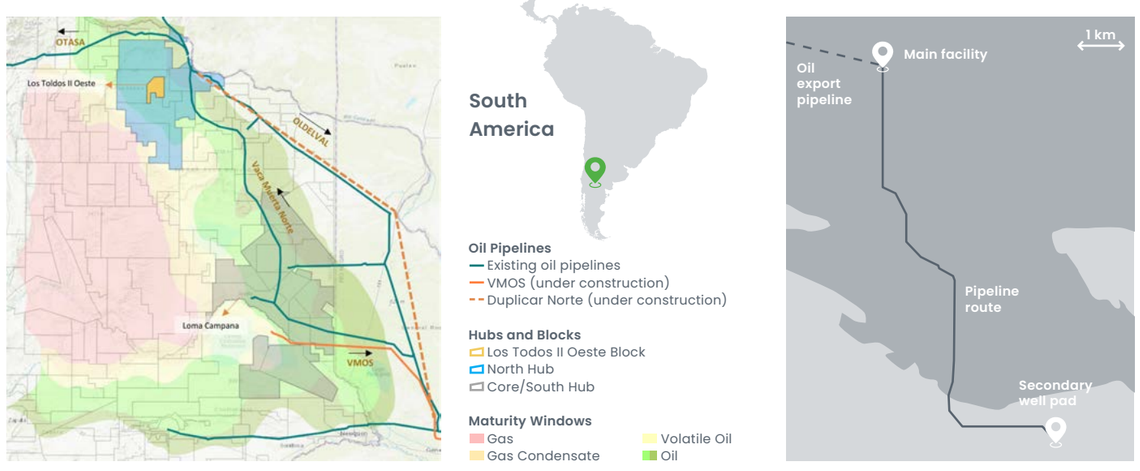
Background: Los Toldos II Este

The Vaca Muerta basin, located in Argentina's Patagonian region, is home to the world's second-largest shale gas reserves and the fourth-largest shale oil deposits. Approved by the government in 2019, Los Toldos II Este is situated at the northern edge of the Vaca Muerta shale development. The 77-square-kilometer area was permitted for unconventional oil production for 35 years.

Los Toldos II Este has two locations. The main facility is in the northern section, where gas processing, power generation, and cryptocurrency mining take place. A secondary well pad and production facility are located eight kilometers south.

The Los Toldos project lies in a remote area of the prolific Vaca Muerta shale basin

Vaca Muerta's North Hub emerges as infrastructure expansions moves forward



Source: Rystad Energy ShaleWellCube

Figure 2: The Vaca Muerta basin is highlighted at left with the flare-capture projects at Los Toldes Este. The facility locations are noted at right.

Los Toldos II Este, Argentina

Flaring reduction: the options

Using extensive flaring, the oil field operator conducted well tests at the northern site ahead of the project's formal start to assess reservoir productivity. A flaring reduction plan then was developed to support and decarbonize the site's operations, based on an expected flare rate of up to 60,000 cubic meters per day (2.1 million standard cubic feet [scf] per day).

Because the associated gas had a high methane content – more than 85% by volume – and no detectable hydrogen sulfide or CO_2, a secondary two-phase separator was added to the plan. Removing additional condensate would help ensure that the combusted gas was lean and clean.

Several options to recover flared gas were evaluated, including:

- **Pipelines.**
  In many countries, off-site transport of APG is economically and logistically challenging. Flare sites often are scattered across large areas, making quick connection from individual sites to their market a demanding task.
- **Gas reinjection.**
  Low reservoir permeability made this option difficult in the Vaca Muerta basin.
- **Supplying gas to the local power grid or demand centers.**
  In rural areas, the grid often is not nearby.
- **Transporting liquefied or compressed natural gas by truck.**
  This can be difficult in mountainous areas.
- **Powering a data center for cloud computing services.**
  This was deemed unfeasible due to the need for highly reliable internet access.

The operator ultimately determined that the best option for using the flared gas was to generate power for cryptocurrency mining, which – unlike data centers – requires only a low-bandwidth satellite connection.

»INNIO's approach and their Jenbacher technology has been key for the success of Los Toldos project. Our oil customers need 100% reliability from our solution and INNIO's competence and support are the key for us to deliver such reliability. The best proof of our trust on this technology is our decision to double down on Jenbacher's gensets in our recent doubling of installed capacity at Los Toldos.«

Tomas Ocampo,
founder and CEO at Unblock Computing
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Demonstrating APG use in practice: Converting a byproduct into on-site power generation at Los Toldos.

Unblock, a company focused on the development of flexible on-site computing infrastructure, has developed a solution that uses Jenbacher gensets running on associated gas. Secco, INNIO Group's solution provider in Argentina, installed eight 1.5 MW Jenbacher generators at the site from June to December 2023. Chosen in part for their ability to run on a range of gas compositions, the Jenbacher generators produce up to 12 MW of power from a total gas volume of 50,000 cubic meters per day (1.8 million scf per day). Installation also included 12 modular data centers equipped with Antminer S19J Pro units, specialized Bitcoin mining computers, which process around 100 terahashes per second[6] at an efficiency of approximately 30 J/TH.

The location hosts eight generators and 12 modular data centres





Source: Unblock Global.

Figure 3: The original flare is shown along with the eight generators and 12 computing units.

[6] 1 TH is 1 trillion hashes per second. A hash is a cryptographic calculation used in mining to solve complex mathematical calculations.

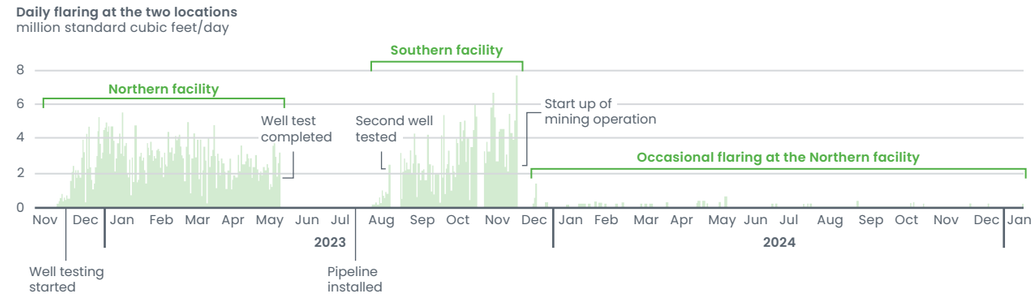
Los Toldos II Este, Argentina

Results

Unblock concluded a shorter well test at the southern site in December 2023 and connected it to the northern site with a 15-kilometer oil and gas pipeline. Bitcoin mining then began later that month.

According to Capterio's FlareIntel platform, very limited flaring was observed after the project began, as shown in Figure 4.

Flaring at the Los Toldos field was dramatically reduced by a crypto mining project

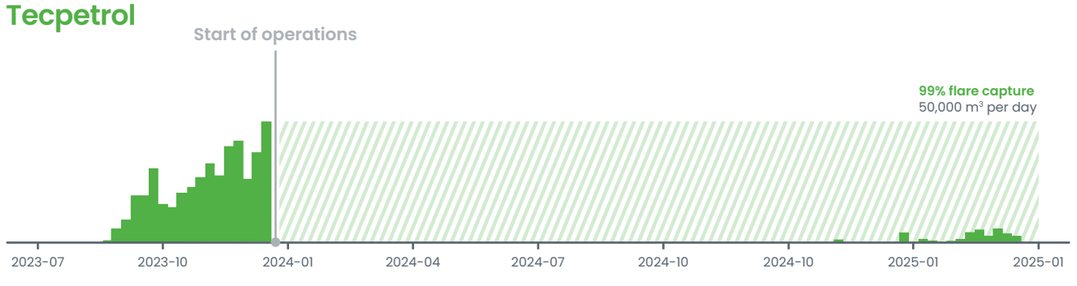


Source: Illustration by INNIO Group, based on Columbia Center on Sustainable Investment's Project Case Study: Los Toldos, Este II Field in Argentina (2025), using data from the Capterio FlareIntel.

Figure 4: This record from FlareIntel Pro details daily flaring at the northern and southern locations. The record shows the extended well test at the northern location from November 2022 to May 2023 and the southern well test in late 2023. After that time, flaring has been very limited.

Unblock expects about 82 Bitcoin-equivalents – roughly seven per month – will be mined each year. That's based on the Jenbacher generators running at full capacity and generating 105 GWh annually. At prices of $100,000 per Bitcoin as seen in 2025, that can generate $8 million in revenue. With power costs of about $4 million per year and including operating expenses, operating cash flow is projected at $3 million, resulting in an expected payback period of four to five years.

By capturing the flared gas, the operator was able to test appraisal wells and increase production from the planned 270 barrels per day to 2,000 barrels per day – with no net increase in Scope 1 and 2 operational emissions. The additional revenue from increased oil production is estimated at $30 million per year.



Source: Unblock Global

Figure 5: Estimates of captured flares

Today, Unblock estimates 99% of flares are captured, reducing annual emissions by about 100,000 metric tons of CO_2-equivalent.

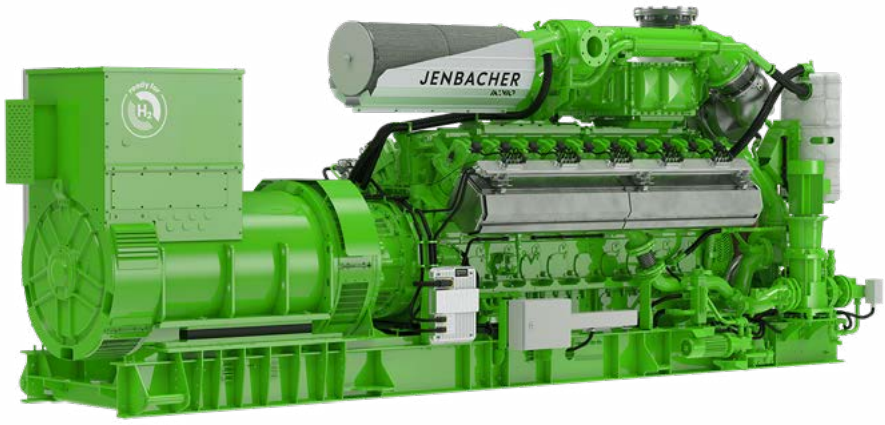
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Customer benefits

- An unwanted byproduct is captured as an energy source, significantly lowering CO_2-equivalent emissions.
- By avoiding gas flaring, the operator was able to test appraisal wells and increase production from 270 to 2,000 barrels per day with no net increase in Scope 1 and 2 operational emissions.
- Additional revenue from increased oil production is estimated at $30 million per year.
- The project contributed to training and employment opportunities, with 80 workers employed during construction and eight full-time staff.

Key technical data

Installed engines	8 x J420 (expanded to 14 units in early 2026)
Electrical output	12 MW (expanded to 20 MW in early 2026)
Energy source	Flare gas
Commissioning	2023



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