



## HEAVY-METAL INDUSTRIAL ARCHITECTURE

*Posted on July 25, 2025 by urban*



---

**Categories:** [Contributors](#), [Essay](#), [expanding design practices](#), [Formats](#), [Kurt Hollander](#), [Politics and economics](#), [Topics](#)

**Tags:** [air pollution](#), [Authentic Architectures of Colombia](#), [biodiversity loss](#), [climate policy](#), [Colombia](#), [energy transition](#), [Environmental degradation](#), [extractive economies](#), [Fair Energy Transition](#), [Fossil fuels](#), [indigenous displacement](#), [industrial heritage](#), [infrastructure reuse](#), [Kurt Hollander](#), [oil refinery](#), [petrochemicals](#), [Renewable energy](#), [riverfront development](#), [rural Colombia](#), [stilt architecture](#), [urban heat island effect](#)

With his 2023 Fair Energy Transition Plan, President Petro has pledged to transform Colombia's energy industry, heavily dependent upon hydrocarbons, and to move towards cleaner, renewable sources. Lowering and eventually ending the country's dependence on petroleum, however, won't be easy.

The Colombian government owns a majority (88.5%) of Ecopetrol, the company that controls most of the country's oil and gas extraction, refining and transport. Ecopetrol not only supplies 80% of all fuel to Colombia, it is also responsible for half of all of the country's exports and provides up to ten percent of the country's GDP.

As part of President Petro's new plan, Ecopetrol has pledged 40% of its 2023 budget to develop clean energy and to lower by 25% their Greenhouse effect gases. Almost one-quarter of this budget is slotted for renewable energies (including solar panels to provide electricity to the plants), energy efficiency and carbon capture, but most of the funds will go to improve energy security and transportation, designed to actually increase the amount of petroleum or gas that can be extracted, refined and exported.

To truly transition Colombia's energy industry away from oil and towards renewables, however, President Petro will have to confront the huge Barrancabermeja refinery, in existence for over a century and currently responsible for providing 60% of the country's energy needs. This industrial complex refines crude oil into gasoline for cars, diesel for trucks, jet fuel for airplanes, and propane gas for cooking. It also houses the country's largest petrochemical plant that produces plastics, paint, pesticides, pharmaceuticals, asphalt and explosives, all petroleum derivatives that represent a greater profit margin than oil. It is the very productivity and profit of this refinery that stands in the way of President Petro's plan to phase out fossil fuels.

# urbanNext Lexicon

Heavy-Metal Industrial Architecture  
<https://urbannext.net/heavy-metal-industrial-architecture/>



The Refinery from the Authentic Architectures of Colombia © Kurt Hollander

Located in the northeastern state of Santander, a huge industrial complex the size of 600 soccer fields, with 49 processing plants and 290 storage tanks, and with 1,500 direct and 3,000 sub-contracted workers, the Barrancabermeja refinery is a world unto itself. The refinery occupies miles of riverfront property on the Rio Magdalena, one of the country's largest rivers, and has been the beating heart of Barrancabermeja for over a century. The city's main church and the National Palace are located just a block away and the city's largest police station stands right next to the entrance. The soccer stadium for the city's team Alianza petrolero is located so close that the heat generated from the machinery can be felt within the stadium by fans and players.

The eternal flame (with tongues of fire 20 meters long) atop the 90 meter-high iron tower, burning

ISSN : 2575-5374

off residual gas, lights up the sky at night and can be seen from all points of the city. The ear-shattering steam-powered whistle that blew every day to mark the different shifts from 1922 was terminated in 2003, but the metallic vibration of the huge machines within this giant industrial complex, which have been working nonstop for the past 100 years, provides a constant rumbling noise throughout the city.

Before the arrival of Europeans, the local indigenous people (Yaraguiés and Motilón Bari) would use the black muck that bubbled up from the ground to rub on their bodies to reduce tiredness and strengthen muscles, and also to waterproof their canoes. Until crude oil began to be extracted from the earth by foreign companies, there were no settlements of European-descendants in the region, mostly because of the intense heat and humidity of the region. When an initial refinery was first built, the town had only a few hundred inhabitants living in rustic homes. With the widespread deforestation of the area for the construction of the refinery, the local indigenous communities, as well as much of the flora and fauna, soon disappeared, and a city grew in their place.



# urbanNext Lexicon

Heavy-Metal Industrial Architecture

<https://urbannext.net/heavy-metal-industrial-architecture/>



The Refinery from the Authentic Architectures of Colombia © Kurt Hollander

At the start of the 20th century, over 5,000 square kilometers of land in and around Barrancabermeja, was acquired by Standard Oil, Rockefeller's oil empire, for \$33 million dollars. The oil company town, with large California-style homes, well-equipped schools, paved streets, electric lighting and imported food and alcohols, and with English serving as the official language, soon became the most modern city in all of Colombia. The town of Barrancabermeja itself grew rapidly, haphazardly outside the high barbed wire fence surrounding the refinery, and has enjoyed high rates of poverty, unemployment, violence and urban chaos ever since. Barrancabermeja has been plagued by what some call the Dutch Disease, that is, the curse of regions rich in natural resources (such as petroleum) in which its environment is exploited while its surrounding towns and cities

ISSN : 2575-5374

suffer from economic underdevelopment.

In 1952, when the hugely profitable 30-year concession to Standard Oil ended, the company was nationalized and became Ecopetrol. While oil profits passed through the refinery, the city of Barrancabermeja was left to its own devices. In the 1980s, the presence of guerrillas grew in the region, controlling as much as one-fifth of the city. To enter the parts of the city, people needed a special pass, and snipers located on the rooftops of buildings kept the police out of the area. At the end of the 1990s, through a strategy of selective assassination of guerrillas and massacres in the guerrilla-controlled parts of the city, paramilitaries wrested control of most of the city and the surrounding region away from them. By 2005, oil production was booming in the region, but so were criminal organizations, paramilitary groups and drug trafficking along the Rio Magdalena. Oil towns tend to attract criminal organizations that tap into the company profits through extortion and kidnapping, and take advantage of their river routes to transport drugs. At the beginning of the 21st century, the city had three times the homicide rate of the rest of the country. In late 2023, the US government included the area in northern Santander where the refinery is located amongst four areas that it advised US citizens to avoid.

The oil and gas ducts in and around Barrancabermeja are still targets for guerrillas, with eleven attacks over the past couple of years. When the ducts aren't being bombed they are siphoned off with illegally installed valves into large trucks capable of carrying up to 12,000 gallons at a time, a common practice known as barbacheo. In addition, a group of prominent Colombian businessmen have recently been accused of buying cheap, poor-quality oil in Venezuela to sell illegally to Ecopetrol, using the Barrancabermeja refinery to mix it, transport it and to ship it out to other countries.

# urbanNext Lexicon

Heavy-Metal Industrial Architecture

<https://urbannext.net/heavy-metal-industrial-architecture/>



The Refinery from the Authentic Architectures of Colombia © Kurt Hollander

Living inside or near such a giant industrial complex means being exposed to health risks. Due to the emission of microparticles, especially those coming from a catalyzer used to refine crude oil, Barrancabermeja has a high rate of chronic lung illnesses and respiratory infections, especially amongst the youngest population (including the children who attend the workers' school located inside the complex).

Up until a little over a decade ago, the refinery processed only light crude oil, but due to the discovery of a huge oil field nearby, the refinery now processes heavy and extra heavy crude oil. Being that it is was not designed to handle this kinds of crude oil, the process is less efficient and there are greater toxic substances released into the air, including a fine white powder that covers all

ISSN : 2575-5374



surfaces and leads to nasal congestion, irritation of the eyes and throat, and coughing. The effects on humans from these emissions is especially toxic during heat waves and increasingly severe dry seasons.

A government watchdog reported that the Barrancabermeja refinery had been lax in its treatment of chemical residues and was responsible for 27 oil spills in 2020, while a local environmental group claims that there have been over 300 oil and gas spills in the area over the years. These spills have directly affected Rio Magdalena as well as several cienagas surrounding the refinery which act as nature sanctuaries. The cienaga located right in front of the refinery, crawling with alligators, iguanas, kingfishers, has had its water go from crystal clear to a nearly phosphorescent green.

Rio Magdalena has some of the most productive fishing areas of any river in Colombia, but since 1975 there has been a decrease in the harvest by as much as 90%, and currently nearly 20 different species of fish are at risk of extinction. The river downstream from the refinery has been the site of several mass events of fish death. Barrancabermeja depends in large part upon its fishing industry, with fish markets and dozens of restaurants located on the riverfront just a mere block from the refinery. The fear of the contamination is a constant worry by those whose livelihood depend upon the fish.

Besides the global warming created by refining and burning fossil fuels, there is also a problem of local warming, that is, a micro climate change within the city. Barrancabermeja is one of the hottest and most humid cities in Colombia, but in and around the refinery the heat is even more intense, with the industrial complex acting as a huge radiator. Thousands of people work in the refinery in extreme heat conditions for hours on end, which directly affects their health and wellbeing. The more the city grows, the more it kills off the forests around it, and the greater the increase in construction and motorized vehicles, the hotter the city becomes. Higher levels of heat year round also affect the water levels of the river and the levels of precipitation, both of which increase the likelihood of extreme climate conditions such as flooding and drought.

In 2014, the Colombian Congress approved a law to promote the construction of clean energy projects, (mainly solar and wind) by means of tax breaks and other fiscal incentives. In the years that followed, only a tiny fraction of the electricity in the country came from renewable sources, and up until the end of his term ex-President Duque actively promoted fracking, auctioned off new oil, gas and coal projects, and looked to fossil fuels as the way out of the economic hole the Covid pandemic had created.



# urbanNext Lexicon

Heavy-Metal Industrial Architecture

<https://urbannext.net/heavy-metal-industrial-architecture/>



The Refinery from the Authentic Architectures of Colombia © Kurt Hollander

Over the past few decades, the right-wing governments in Colombia, under constant pressure from the US, did everything they could to privatize the oil industry. Ex-president Duque sold off 2.6% of Ecopetrol to JP Morgan and other minority stockholders, and sold 51% of the refinery in Cartagena, the second largest in the country, to Glencore, the owner of the largest coal mine in Colombia (the refinery was soon embroiled in one of the biggest cases of corruption ever). The Barrancabermeja refinery would have been sold too if it were not for massive protest.

ISSN : 2575-5374

President Petro is currently caught between expanding drilling in newly discovered fields and modernizing the existing fossil fuel industry, or scaling the oil industry back to allow for the rise of renewables and the meet levels of greenhouse gas emissions that are part of international climate crisis treaties Colombia has signed. To fully disinvest from the oil industry, however, the government would have to find a way to recoup the economic loss of half of all its exports, money which pays most of the bills for the federal and state government, and to relocate over 100,000 workers. In addition, the government would have to help the cities and regions that have been dependent upon the petroleum and gas industry for over one hundred years to clean up the huge environmental damage the industry has caused the environment in those areas, no small feat when faced with an industrial complex as large and as old as the Barrancabermeja refinery.

One possible future scenario for Barrancabermeja would be to convert the city into a tourist and cultural destination, using the refinery (operating or abandoned) as an attraction. There is currently a plan underway to transform the riverfront in the city into a promenade by relocating the restaurants and fish market that are housed in an open-air, concrete structures into a modern building one block away. The need to employ riot police to protect the construction of this new building doesn't bode well for the project, and the current level of insecurity, wide-spread poverty and social inequality, added to the constant heat, noise and contamination caused by the refinery, makes the successful conversion to a tourist destination improbable.

The success that President Petro has in transforming the oil industry in general, and the Barrancabermeja refinery in particular, into a more modern, efficient and environmentally clean industry, one that equitably shares the wealth with indigenous and campesino communities and the inhabitants of Barrancabermeja, will be a good measure of his Fair Energy Transition.

# urbanNext Lexicon

Heavy-Metal Industrial Architecture  
<https://urbannext.net/heavy-metal-industrial-architecture/>

ISSN : 2575-5374