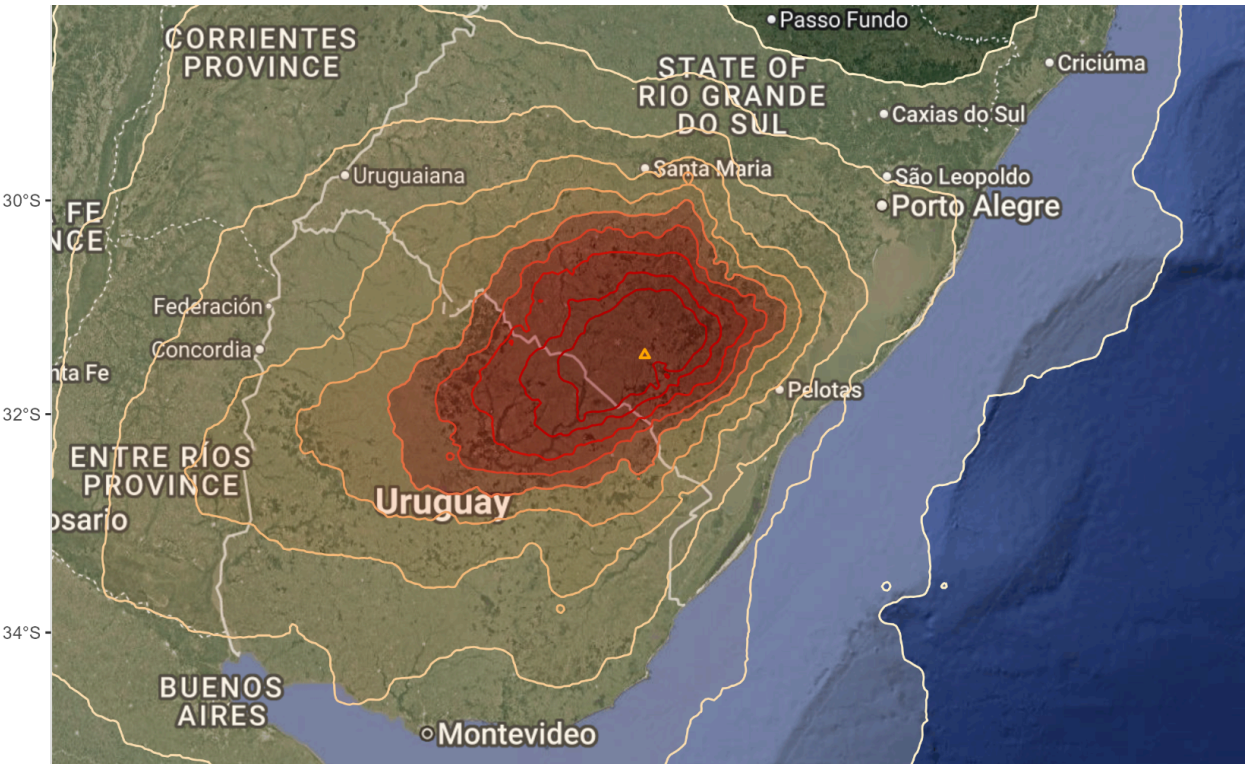

April 2026

REPORT FACT SHEET

COAL CLUSTER IN CANDIOTA, BRAZIL

TRANSBOUNDARY IMPACTS:
ARGENTINA, URUGUAY, PARAGUAY

Background

While most of Brazil's electricity is produced from hydropower and renewable sources, coal continues to receive governmental support (Discovery Alert, 2025). In Candiota, in the state of Rio Grande do Sul, a cluster of coal mines and power plants burns low-quality coal, generates a small share of electricity, and remains eligible for subsidies and contract extensions that could keep it operating until 2040 or beyond (GEM, 2026).

In 2026, Candiota is at the centre of Brazil's coal mining and coal-fired power

generation. Four interdependent coal projects operate in the wider Candiota municipality: the Candiota (1.46 MTPA) and Seival Sul (1.6 MTPA) coal mines, and the Candiota III (350 MW) and Pampa Sul (345 MW) coal-fired power plants (Figure 1). These four projects function as a single operational cluster of almost 700 MW and more than 3 MTPA, in which the coal extracted from the mines is almost entirely combusted in the associated power plants: the Seival Sul coal mine feeds the Pampa Sul coal-fired power plant, and the Candiota coal mine feeds the Candiota III coal-fired power plant.

Figure 1 — The locations of the two coal mines and power plants in Candiota

Rio Grande do Sul accounts for 53% of the country's coal production and 89% of its coal reserves (USGS, 2006). The continued operation of coal in Candiota could have implications for local communities and public health. Brazilian coal is characterised by low calorific value and high ash content (USGS, 2006), resulting in elevated emissions of fine particulate matter ($PM_{2.5}$) and precursor gases when burned. Emissions arise not only from combustion at power plants, but also from coal extraction, handling, and transport, leading to cumulative exposure for surrounding populations. At the global level, air pollution from coal is a well-established risk factor for premature mortality (McDuffie et al., 2021).

Candiota's location near the borders and big cities of three other countries, Argentina, Uruguay, and Paraguay, make the health impacts relevant not only to Brazilian people, but people from the above-mentioned countries as well. Brazil effectively pushes the responsibility of people's lives and health, and the subsequent impact on the economy, to other countries as the pollution is transboundary, which can easily go unnoticed.

About CREA's study

The study has been carried out in collaboration between the Centre for Research on Energy and Clean Air (CREA) and the *Instituto Internacional* ARAYARA, in order to fulfil the need for research on the Candiota coal projects' impact on the public health of the local people. The continuation of the licensing of the operations beyond 2040 is currently under discussion, and the results of this health impact assessment indicate evidence of the harms of the operations

and why their licences should be discontinued.

CREA and the *Instituto Internacional* ARAYARA call on the federal government of Brazil to uphold Brazilian constitutional principles for the right to health, and immediately cease the contracting of coal-fired power plants until 2040 and beyond, as presented in Law No. 15,269 that was approved on 24 November 2025 (gov.br, 2025), one day after COP30, and guarantees the contracting of coal-fired power plants until 2040. Continuing to support Candiota coal projects through subsidies despite evidence of critical health impacts, including deaths, may expose public authorities to constitutional challenges, especially given the availability of less expensive renewable energy sources. CREA and ARAYARA therefore propose the federal government immediately cease the contracting of coal-fired power plants and adopt a legally binding timeline to retire the Candiota III and Pampa Sul coal-fired power plants, with no extensions beyond existing contracts.

Report findings

Historical coal use in Candiota from 2017 to 2025 has already contributed to an estimated 430 (330–550) deaths and BRL 5.1 (3.5–6.3) billion in health-related economic damages.

If the four coal operations continue to operate until 2040, they will contribute to an additional estimated 870 (670–1,110) deaths and BRL 6.6 (5.3–8.9) billion in health-related economic damages, reaching an estimated cumulative total of 1,300 deaths and BRL 11.7 billion from 2017 to 2040, much of which would be avoidable through an earlier phase-out.

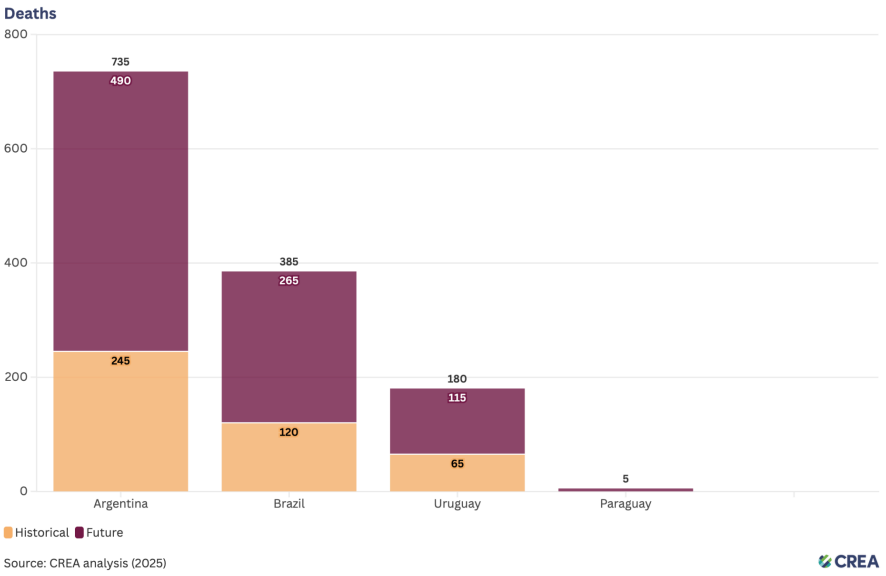

Figure 2 — Historical (2017–2025, yellow) and future (2026–2040, red) deaths in different countries, caused by the four coal operations in Candiota

Health impacts in other countries

Coal use in Candiota has large-scale impacts on public health, both for local communities as well as the wider region, including domestically in Brazil but also in neighbouring countries (Figure 2 and Table 1). Many of the toxic pollutants released from coal can persist in the atmosphere for several weeks, and they can travel hundreds of kilometres due to the transboundary nature of pollution.

Outside of Brazil, the largest cities with the most affected populations are concentrated in Argentina and Uruguay. The most impacted cities are Buenos Aires, Rosario, and Santa Fe in Argentina, and Montevideo in Uruguay. For these transboundary regions, the countries bearing the greatest burden from coal-related emissions in Candiota are Argentina, followed by populations in Brazil, Uruguay, and Paraguay. The Argentinian population bears the greatest burden from coal-related emissions in Candiota, followed by populations in Brazil, Uruguay, and Paraguay.

Table 1 — Health impacts due to the projects in Candiota in Argentina, Uruguay and Paraguay

Health outcome	Argentina	Uruguay	Paraguay
New cases of asthma in children	75 (15–170)	15 (5–40)	0 (0–0)
Asthma emergency room visits	890 (530–1,240)	180 (110–245)	10 (5–20)
Low birthweight births	160 (50–280)	25 (10–45)	5 (0–5)
Preterm births	265 (130–280)	40 (20–40)	5 (0–5)
Work absence (sick leave days)	274,500 (233,500–315,200)	54,800 (46,600–62,900)	4,300 (3,600–4,900)
Years lived with disability			
Chronic obstructive pulmonary disease	235 (75–475)	60 (20–120)	0 (0–0)
Diabetes	525 (305–740)	90 (40–120)	5 (0–5)
Stroke	160 (50–320)	45 (15–85)	0 (0–5)
Deaths			
$PM_{2.5}$	715 (550–890)	165 (130–205)	5 (5–10)
NO_2	25 (10–45)	10 (5–15)	0 (0–0)
All	735 (560–9359	180 (135–220)	5 (5–10)

Note: The ranges represent the 95% upper and lower confidence intervals of the pollutant dose-response functions.

Methodology

For this study, CREA created a health impact assessment (HIA) that evaluated the air pollution, health, and economic burden caused by the two largest coal mines and power plants operating in Candiota, Rio Grande do Sul, Brazil. The Candiota and Seival Sul coal mines, along with the Pampa Sul and Candiota III power plants, were selected for analysis due to their scale and interdependence. Nearly 100% of the coal extracted from the Seival Sul mine is used to generate electricity at the Pampa Sul power plant, while the Candiota mine supplies the Candiota III plant in a similar arrangement. Because the mines and plants are mutually dependent, reducing or retiring the operation of one would directly affect the operation of its corresponding facility.

The report considers atmospheric emissions of sulfur dioxide (SO_2), nitrogen oxides (NOX), and fine particulate matter ($PM_{2.5}$). From the coal plants, we retrieve their hourly flue gas concentrations from Continuous Emission Monitoring System (CEMS) data from 2021–2023, reported by Ambar Energia. These values are scaled to the study timeline from 2017 to 2040 by multiplying the yearly values by 30. For the coal mines, we estimate emissions by using emission factors from IPCC, EEA, and individual studies on these mines to obtain the most accurate emission factors with activity data, based on the mines' production capacities.

References

DiscoveryAlert. (2025). Brazil's Coal Dependency Despite Leading Renewable Energy Production.
https://discoveryalert.com.au/brazil-coal-paradox-regulatory-challenges-2025/

GEM. (2026). Presidente Médici Candiota power station.
https://www.gem.wiki/Presidente_M%C3%A9dici_Candiota_power_station

gov.br. (2025). Lei nº 15.269 de 24 de novembro de 2025.
https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=15269&ano=2025&ato=8f7QzZU9UNZpWTc28

McDuffie, E. E., Martin, R. V., Spadaro, J. V., Burnett, R., Smith, S. J., Hammer, M. S., Van Donkelaar, A., Bindle, L., Shah, V., Jaeglé, L., Luo, G., Yu, F., Adeniran, J. A., Lin, J., & Brauer, M. (2021). Source sector and fuel contributions to ambient PM2.5 and attributable mortality across multiple spatial scales. *Nature Communications*, *12*(1), 1-12.
https://doi.org/10.1038/s41467-021-23853-y

USGS. (2006). World coal quality inventory: Brazil. U.S. Geological Survey Open-file Report 2006-1241. https://pubs.usgs.gov/of/2006/1241/Chapter%203-Brazil.pdf

This fact sheet draws from the '*Coal in Candiota: Health impacts of a coal mining and power generation cluster in Rio Grande do Sul, Brazil*' health impact assessment (HIA) published by the Centre for Research on Energy and Clean Air (CREA) and the *Instituto Internacional* ARAYARA in March 2026.

Find the full methodology and complete reference list in the report, which is available here.

The Centre for Research on Energy and Clean Air (CREA) is an independent research

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