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We are Aegea Saneamento e Participações S.A., a Publicly Held Company established in 2010. We manage sanitation assets through concessions and PPPs across various states from North to South Brazil, covering the entire water cycle process – from treated water supply to sewage collection and treatment, tailored to the profile and needs of each municipality. We have operations in more than 500 municipalities across 15 states. We are one of the largest companies in the basic sanitation sector in Brazil. We operate in areas that encompass over 31 million Brazilians, accounting for approximately 15% of the country's population.

Aegea has been calculating its Greenhouse Gas emissions related to its operations for the fourth straight year, reaffirming its commitment to transparency and the disclosure of its carbon footprint.







Aegea opted for the operational control approach, taking responsibility for emissions from sources and activities under its management.

In this inventory, the following scopes and categories were calculated:

- Scope 1 Direct GHG emissions under the company's responsibility and control – Categories: Mobile Combustion, Stationary Combustion, Fugitive Emissions, Land Use Change and Solid Waste and Wastewater.
- Scope 2 Indirect GHG emissions resulting from the generation of electricity or steam purchased by the company – Categories: Location (Location-based) and Acquisition (Market-based) 1



Methodologies used



Estimates of greenhouse gas emissions through Aegea Group operations were made in accordance with the Brazilian GHG Protocol Program. The key references are:

- Specifications of the Brazilian GHG Protocol Program. Quantification and Publication of Corporate Greenhouse Gas Emission Inventories – (Sustainability Study Center -FGVces, 2008) and white papers;
- Updates to the 2024 Cycle Calculation Tool Brazilian GHG Protocol Program (FGVces, 2024);
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2006);
- 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2019);
- Fifth Assessment Report (AR5) IPCC.





Estimate of GHG emission - New Concessions:

As part of Aegea's commitment to acknowledging its emissions, the white paper "Greenhouse gas inventory reporting period – version 1.0" of 06/28/2017 of the GHG Protocol was used to calculate emissions of companies acquired during the inventory year. Therefore, the Ambiental Ceará and Corsan units, acquired in 2023, had their emissions calculated and included in this inventory for all months of 2023.

To reflect the results addressed in the Annual Sustainability Report, the estimate of emission carried out for the Ambiental Paraná Unit was excluded from this version of the Inventory. The full version of the inventory can be accessed at the Public Emissions Registry – PBGHG Protocol.

Emission Factor of the Brazilian Energy Matrix:

The average emission factor of the National Interconnected System (SIN) in 2023 was the lowest since 2020 (0.039 t CO2/MWh), having a positive impact on the reduction of indirect emissions from the generation of purchased electricity.

Acquisition of Renewable Energy Certificate:

In 2023, Aegea acquired International Renewable Energy Certificates (I-RECs) corresponding to 69% of its total electricity consumption, ensuring transparency and commitment to sustainable practices in its energy procurement. This initiative attests to the company's active engagement in promoting clean energy and mitigating its environmental impact.



GHG Emissions Global and Brazilian Scenarios



GHG Emissions Global Scenario

The climate crisis is one of the greatest challenges facing humanity, requiring urgent and coordinated action from nations. The 2015 Paris Agreement sets ambitious targets to limit global warming to a maximum of 2°C, ideally to 1.5°C above pre-industrial levels, and achieve carbon neutrality by 2050, with the adoption of robust policies and measures guided by the principle of equity.

Complementing these efforts, the United Nations 2030 Agenda for Sustainable Development promotes 17 Sustainable Development Goals (SDGs), including climate action (SDG 13) and the improvement of basic sanitation services (SDG 6). In parallel, the Global Methane Pledge seeks to reduce methane emissions by at least 30% by 2030, compared to 2020, which encourages the sanitation sector to adopt advanced technologies and sustainable practices, given that methane is the main GHG emitted by the sector.

Sewage management is an activity that produces greenhouse gas emissions. It is estimated to account for approximately 257 million metric tons of CO₂ equivalent (Mt CO₂e) annually. Although the contribution to global GHG emissions is relatively small, these emissions are expected to increase due to the deficit in sanitation services, as approximately 3.3 billion people still lack access to piped sewage systems (Lambiasi et al. 2022).

To address these challenges, particularly in developing countries, international cooperation and financing mechanisms are crucial. Technology transfer and the sharing of best practices between countries are essential for accelerating the adoption of innovative and sustainable solutions.

Thus, the convergence of national and international efforts, supported by robust policies, adequate financing, and technological innovation, is crucial to addressing the climate crisis and ensuring a more sustainable and equitable future for everyone.



GHG Emissions Brazilian Scenario

In Brazil, greenhouse gas (GHG) emissions from sewage treatment account for approximately 1.6% of net emissions (MCTI, 2022). Considering that only 52.2% of the sewage produced in Brazil is treated (SNIS, 2023), the sector faces the dual challenge of expanding service coverage while simultaneously mitigating GHG emissions.

Appropriate environmental management practices are crucial to ensure that new sanitation projects are both effective and environmentally responsible, while also offering opportunities for enhancements to existing systems.

The sector offers significant possibilities for emission mitigation, ranging from optimizing operations to valuing by-products from sewage treatment, such as nutrients and energy. By promoting the circular economy, the sector can transform waste into valuable resources for the country.

At a time when nations are urged to launch new climate commitments, and Brazil is in the process of studying and defining decarbonization goals and implementing a carbon market, it is important to design innovative financing models that facilitate the expansion of the sector and ensure that this expansion, which is so necessary for the health of Brazilians and ecosystems, can also contribute to the climate goals.

Progress in this direction will be bolder as policies to promote services align with national climate goal, transforming the environmental problem into a sustainable solution.

Aegea is part of this effort by continuously seeking mitigation technologies and practices and leveraging the robustness of any development mechanisms that may be adopted to make its contribution even more ambitious.



Results

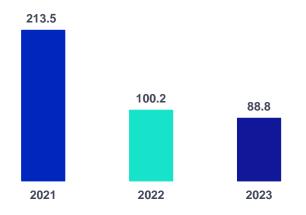
The calculation of GHG emissions for 2023 was verified by ABNT. Aegea's report of emissions is published in the Brazilian GHG Protocol Program, receiving the Gold Seal.



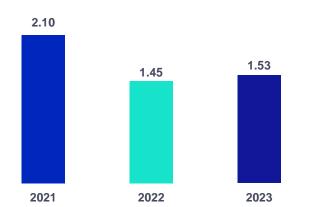


Results Intensity of Emissions

(1) Total Emissions/Net Operating Revenue (t CO₂e/R\$ million)*



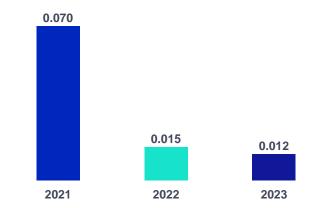
(3) Emissions of Solid Waste and Wastewater/Sewage Treated Vol. (kg CO₂e/m³)



(2) Total Emissions/Billed Water and Sewage Volume (t CO₂e/m³ million)*



(4) Scope 2 Emissions from Purchased Energy/Energy Consumption (t CO₂e/MWh)**



Aegea's key emissions intensity indicators show that the company achieved significant performance improvements between 2021 and 2022 and maintained a relatively steady performance from 2022 to 2023.

- (1) Total Emissions/Net Operating Revenue (t CO₂e/R\$ million): This indicator demonstrates a 11% gain from 2022 to 2023. Aegea Group's total emissions did not increase at the same pace as revenue growth, covering all administrative and operational activities related to water and sewage across the Business Units. In other words, the company generated more revenue with fewer emissions per unit of revenue.
- (2) Total Emissions/Water and Sewage Billed Volume (t CO₂e/million m³): The 8% reduction between 2022 and 2023 indicates that emissions have increased in relation to the volume of services offered.
- (3) Emissions of Solid Waste and Wastewater / Treated Sewage Volume ($kg CO_2e/m^3$): This indicator also decreased by almost 6% between 2022 and 2023, showing that emissions increased per unit of sewage treated.
- (4) Scope 2 Emissions from Purchased Energy/Electricity Consumption (t CO_2e/MWh): This indicator improved by 20% from 2022 to 2023, reflecting the increased share of renewable electricity purchased in the Free Market and the reduced carbon content of the National Interconnected System (SIN) (page 21).



^{*}Total emissions considering Location-based Approach in Scope 2.

^{**} Total emissions considering Market-based Approach in Scope 2.

Results Total Absolute Emissions

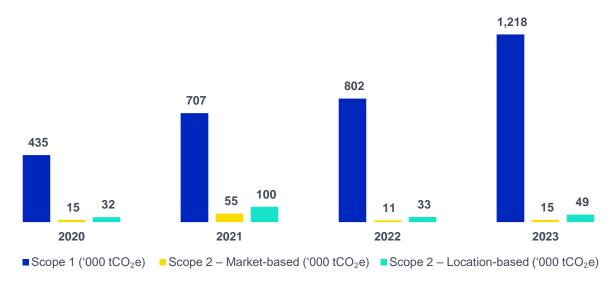
The emissions from sewage treatment account for 97% of the total Scope 1 emissions in the Inventory. In 2023, in addition to the expansion of sewage collection and treatment services in existing systems, Aegea acquired Corsan (RS) and Ambiental Ceará (CE). With these new operational units, the volume of treated sewage increased by 45%, leading to a 53% rise in GHG emissions from this source compared to 2022.

In Scope 2, emissions from electricity purchased by Aegea are included. From 2022 to 2023, electricity consumption grew by 66%. When emissions from electricity generation are accounted for by the Location-based Approach, the increase in emissions from this source was 48%, reflecting the generation sources used in the National Interconnected System (SIN).

Aegea has 100% renewable energy purchase agreements for part of its operations, thereby reducing its carbon emissions in this category. Considering this share of renewable sources, accounted for in the Market-based Approach, emissions in 2023 increased only 34% compared to 2022.

The Águas do Rio unit stands out for operating with 100% renewable electricity, as verified by acquired renewable energy certificates (I-RECs).

Evolution in Aegea's absolute emissions (thousand t CO2e)





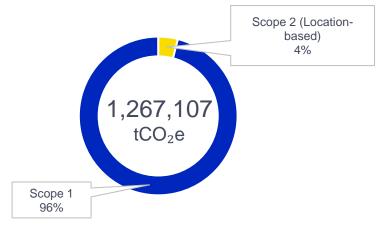
Results Absolute Emissions by Category - 2023

In 2023, Aegea's absolute emissions totaled 1,267 thousand t CO₂e as per the location-based approach and 1,233 thousand t CO₂e as per the market-based approach in Scope 2. With the renewable electricity purchased, Aegea reduced its emissions by 2.7%.

Share of emissions by Scope and Category

	Categories	Emissions (tCO ₂ e) Year: 2023	% of total Location-based	% of total <i>Market-ba</i> sed
	Solid Waste and Wastewater	1,181,523	93%	96%
	Mobile Combustion	29,348	2.3%	2.4%
SCOPE	Stationary Combustion	5,183	0.41%	0.42%
SC	Fugitive Emissions	903	0.07%	0.07%
	Land Use Change	652	0.05%	0.05%
	Total Emissions Scope 1	1,217,609	-	_
PE 2	Electricity Purchase Location-based	49,498	3.9%	-
SCOPE 	Electricity Purchase Market-based	15,221	-	1.2%

Share of scopes in emissions in 2023 (%)







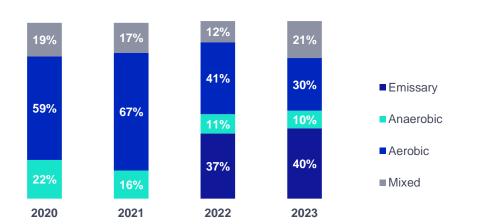
Results - Scope 1 Solid Waste and Wastewater

In 2023, Aegea operated with 50 Business Units, 37 of which were involved in sewage collection and treatment. Of these units, Águas do Rio and Ambiental Ceará were responsible for treating 62% of the Group's entire sewage volume. The treatment of 98% of the sewage was centralized in 13 Business Units. Of the total increase of 45% in the volume treated between 2022 and 2023, mixed treatment grew by 154%, followed by preliminary treatment with ocean dispersal, which grew by 57%. Anaerobic and aerobic treatments increased by 32% and 6%, respectively.

Emissions intensity in 2023 increased by 5.7%, from 1.45 to 1.53 kg CO₂e/m³ treated. On average, the units have the following emission intensities: preliminary treatment with ocean dispersal by submarine outfall, 0.45 kg CO₂e/m³; aerobic treatment, 1.30 kg CO₂e/m³; mixed treatment, 3.40 kg CO₂e/m³; and anaerobic treatment, 3.69 kg CO₂e/m³.

The increase in intensity is largely explained by the 75% increase in the share of mixed treatment in 2023 compared to 2022. On the other hand, the share of aerobic treatment declined 27%.

Evolution of the share of technologies in annual sewage treatment (%)



Evolution of absolute emissions (thousand t CO_2e) and emission intensity (kg CO_2e/m^3)





Results - Scope 1 Solid Waste and Wastewater - CH₄ e N₂20

Emissions from waste and wastewater treatment include emissions of methane (CH_4) and nitrous oxide (N_2O) .

Sewage and sludge produce CH₄ when they degrade anaerobically. The volume of CH₄ generated mainly depends on the quantity of degradable organic material (BOD) in wastewater, the temperature and degree of anaerobiosis of the treatment system, as well as the water body where the treated waste is released.

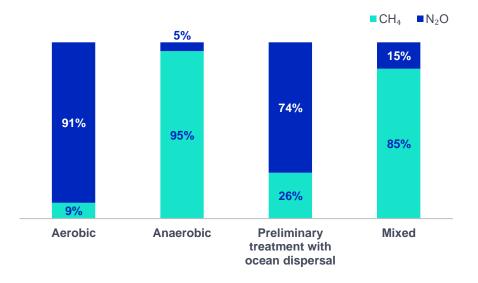
 N_2O is associated with the degradation of the components of nitrogen in wastewater, such as urea, nitrate and protein*.

As for the global warming potential of these gases (GWP), one ton of CH_4 corresponds to 28 tons of CO_2 and one ton of N_2O to 265 tons of CO_2 (GWP of IPCC, 2014). The graph shows the shares of each gas emitted by the treatment systems, calculated in CO_2e (using the GWP of each gas).

CO₂ is also emitted during the sewage treatment process but results in emissions considered neutral in terms of climate impact, since CO₂ is generated through a short biological cycle (and not a geological cycle, as in the case of CO₂ from fossil origin or deforestation).

Therefore, biogenic CO₂ (page 22) is accounted for separately and is not added to the company's total emissions.

Emission by type of GHG and treatment technology in 2023 (% of the total in CO₂e)





Results - Scope 1 Mobile Combustion

The fuel consumption of the company's fleets increased by 8.3%, and emissions rose by 5.9% between 2022 and 2023. Even so, the CO_2 , CH_4 , and N_2O emissions resulting from this consumption made a modest contribution to the company' total volume. In 2023, these total CO_2e emissions accounted for only 2.2%.

The main emitting fuels were commercial diesel oil (a mixture of diesel and biodiesel), accounting for 50% of emissions, and commercial automotive gasoline (a mixture of gasoline and anhydrous ethanol), accounting for 48%. The remaining emissions originate from the consumption of jet fuel, liquefied petroleum gas, natural gas, and hydrous ethanol.

The mandatory percentage of biodiesel blended into fossil diesel increased from 10% to 11.5%, while the ethanol blend in gasoline remained at 27% between 2022 and 2023.

The average carbon content of total fuels in this category, expressed in tCO₂e/toe, decreased 1.5% when compared 2022 to 2023.

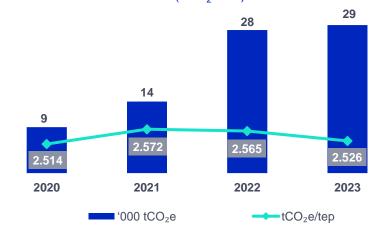
Note²: Calculations of fuel emissions use values converted to the ton of oil equivalent (toe), a unit used to compare different energy sources based on their energy content. It represents the amount of energy released by each source in relation to one metric ton of crude oil.

Note³: CO_2 from biofuels is accounted for separately and is not added to the company's total emissions, as is the case with ethanol and biodiesel. Of these fuels, only emissions of CH_4 and N_2O are accounted for.

Emissions by fuel type in 2023 (%)



Evolution of absolute emissions (thousand t CO₂e) and carbon content of fuels (t CO₂e/toe)



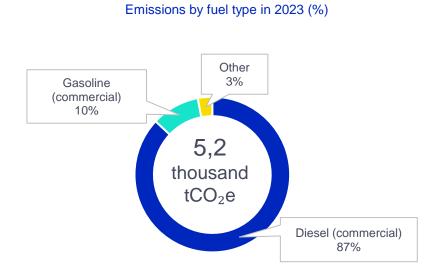


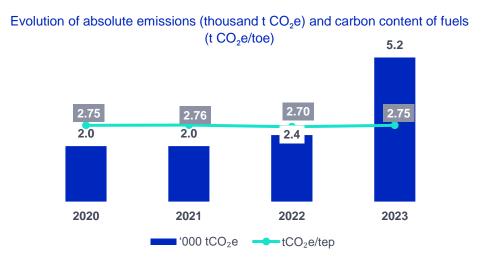
Results - Scope 1 Stationary Combustion

Fuel consumption by machinery and equipment increased by 116% and carbon equivalent emissions by 120% in 2023 compared to 2022. Similar to mobile combustion, the emissions from this category had a marginal contribution to the company's total emissions.

In 2023, the total CO₂e emissions accounted for only 0.38%. The primary emission-contributing fuels were commercial diesel oil, accounting for 87% of emissions, and commercial automotive gasoline, accounting for 9.6%. The other emissions come from the consumption of hydrous ethanol, lubricants, fuel oil, other petroleum products, and solvents.

The average carbon content of total fuels in this category, expressed in tCO₂e/toe, decreased by 1.8% when compared 2023 to 2022.







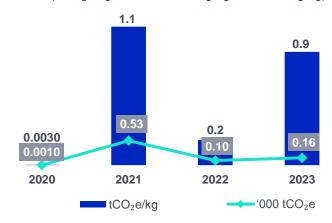
Results - Scope 1 Fugitive Emissions

Fugitive emissions, stemming from the use of gases in air conditioners, refrigeration equipment, fire extinguishers, and other applications, showed significant annual variations. They decreased 80% from 2021 to 2022, followed by a 300% increase from 2022 to 2023. Despite the substantial percentage increase in 2023, fugitive emissions still make up a very small portion of the company's total emissions, accounting for just 0.07%.

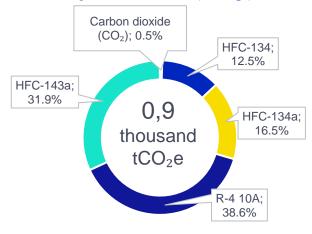
Industrial gas consumption

Fugitive Emissions: Charging and recharging (kg)							
Type of gas or compound	GWP	2020	2021	2022	2023		
CO ₂	1	3,268	1,443	2,206	5,261		
HFC-134	1,120	-	-	-	101		
HFC-134a	1,300	-	174	137	115		
HFC-143a	4,800	-	-	-	60		
R-401A	18	-	39	-	6		
R-402A	1,902	-	-	24	-		
R-410A	1,924	-	353	-	181		
R-422A	2,847	-	70	-	-		
	Total	3,268	2,079	2,366	5,724		

Evolution of absolute emissions (thousand t CO₂e) and average GWP of gases (t CO₂e/kg GHG from charging and recharging)



Share of gases used in 2023 (% CO₂e)





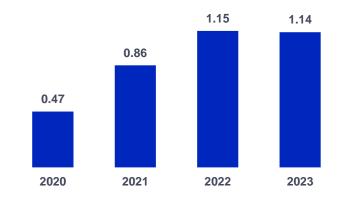
Results - Scope 1 Land Use Change: GHG Emissions and Biogenic CO₂ Removals

CO₂ removals are attributed to the growth of vegetation in reforestation projects developed by Aegea on its own properties. These plantations result from the Degraded Areas Recovery Plan (PRAD) and the Environmental Recovery Commitment Agreement (TCRA). In 2023, 1.01 hectares were planted in the Águas de Timon unit and 1.2 ha in the Prolagos unit. These areas, combined with the areas of previous reforestations in the Águas de Timon, Prolagos, Águas de Matão, and Águas de Guariroba units, amount to 47.24 ha. Of the total reforested area, 44 ha are in the Cerrado biome and 3.24 ha in the Atlantic Forest. It should be noted that the reforested areas in the Holambra unit (2.51 ha) in previous years were not part of the company's control area in 2023.

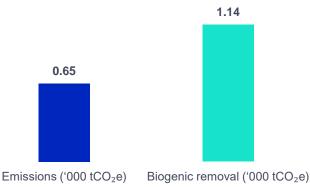
By 2023, reforestation removed approximately 5.0 thousand tons of CO_2 . In 2023, removals were 1.14 thousand t CO_2 and offset Aegea's total emissions by 0.08%.

In this category, on the other hand, the company registered emissions totaling 0.65 thousand t CO₂ e stemming from the suppression of 1.7 ha of native forest located in the Metrosul (RS), Bombinhas (SC), Águas do Rio (RJ), and Ariquemes (AM) units. An additional 0.033 t CO₂e were emitted due to the application of nitrogen fertilizers during the reforestation process. These emissions accounted for 0.05% of Aegea's total.

Evolution of biogenic CO₂ removals (thousand t CO₂)



Emissions from land use change (thousand t CO₂) and biogenic CO₂ removals (thousand t CO₂)





Results - Scope 2 Electricity: Location-based

Aegea had an electricity consumption of 1,285 GWh in 2023, an increase of 66% compared to 2022.

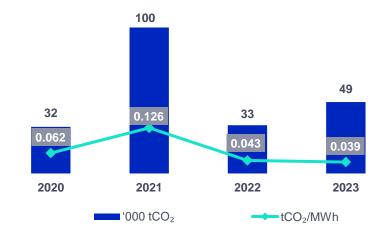
Using the location-based approach, which considers that all electricity consumed comes from the National Interconnected System (SIN), emissions, however, increased by only 53% due to the high share of renewable energy in the SIN, which reached 93% in 2023.

The emissions associated with the generation of this consumed electricity (indirect emissions) represented 3.9% of the company's total.

Electricity consumption (GWh)

Year	Energy consumed (GWh)
2020	516
2021	789
2022	773
2023	1,285

Evolution of absolute emissions (thousand tCO₂) and the SIN emission factor (tCO₂/MWh)





Results - Scope 2 Electricity: Market-based

Aegea has consistently increased the share of electricity acquired from fully renewable sources, such as wind and solar.

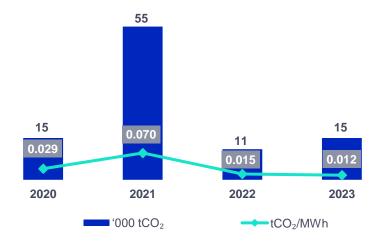
In the market-based approach, the electricity emissions are calculated using a weighted emission factor that reflects the specific carbon content of the purchased energy sources. This method directly links the emission factor to the source of the electricity. Therefore, the estimates of indirect emissions from electricity consumption use the SIN emission factor for the portion of energy sourced from the system, while the electricity obtained from 100% renewable sources is considered to have zero emission.

Evolution of electricity consumption (%)

Approach	2020	2021	2022	2023
Location-based (GRID)	48%	55%	35%	31%
Market-based	52%	45%	65%	69%

The rise in the acquisition of renewable electricity, combined with the reduction in the SIN emission factor in 2023, led to a 20% decrease in the average carbon content of the total electricity purchased, compared to 2022.

Evolution of absolute emissions (thousand t CO₂) and the weighted electricity emission factor (t CO₂/MWh)





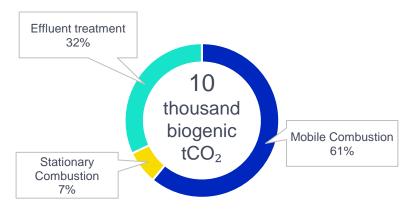
Results - Biogenic CO₂ Emissions

Biogenic CO₂ emissions result from the consumption of biofuels and the methane portion in biogas produced by biological processes in sewage treatment plants, which is burned in flares. In 2023, of the total biogenic CO₂ emitted, 61% comes from mobile combustion, 32% from wastewater treatment, and 7% from stationary combustion.

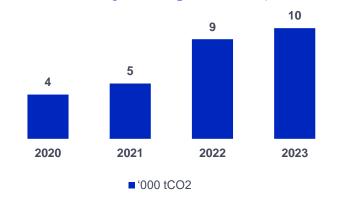
To show the relevance of biofuels, when adding the biogenic CO₂ to the total GHG emissions expressed in CO₂e for each category, we observe that, in mobile combustion, the biogenic CO₂ accounted for 17% of the emissions, while in stationary combustion, it represented 12%. In the case of waste, the methane converted into biogenic CO₂ in the flares represented 4.1% of the total methane generated in the sewage treatment plants.

The use of biofuels and the burning of biogas are sustainable practices because the biogenic CO₂ is part of a natural and renewable carbon cycle, distinguishing it from fossil GHG emissions that contribute to global warming. For this reason, the biogenic CO₂ is not accounted for in the company's total emissions.

Share of sources in emissions in 2023 (%)



Evolution of total biogenic CO₂ emissions (thousand tCO₂)





Results - Gases Not Regulated by the Kyoto Protocol

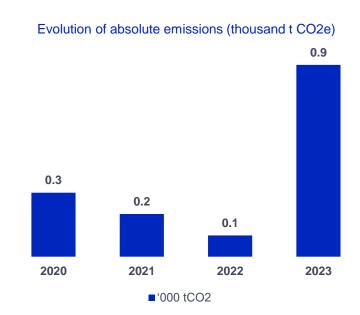
The gases controlled by the Montreal Protocol, which came into effect in 1989 and has been ratified globally, are part of the 1985 Vienna Convention. This international agreement aims to protect the ozone layer by the progressive elimination of certain harmful gases.

Aegea uses HCFCs in its refrigeration and air conditioning equipment, which are part of this group and are scheduled to be phased out from the market.

Although HCFCs are not regulated by the Kyoto Protocol and, therefore, do not contribute to the company's reported total emissions, they still impact global warming and are monitored accordingly.

In 2023, the increase in the emissions of these gases was significant, reaching 1,243%.

Year	Gases or compounds used
2020	HCFC-22 (R22)
2021	HCFC-22 (R22)
2022	HCFC-22 (R22) and HCFC-225cb
2023	HCFC-22 (R22) and HCFC-141b





Summary and Conclusions

Aegea's absolute emissions increased by 171% in the 2020-2023 period, which is expected due to the expansion of operations through the acquisition of new concessions and the expansion of sewage collection and treatment services. Thus, the emissions reflect Aegea's overall operation, as well as the company's growth.

Over the period from 2020 to 2023, the category of solid waste and wastewater accounted for between 96% and 98% of Aegea's total Scope 1 emissions. This level of importance is expected, considering that sewage treatment processes represent Aegea's core activity.

Therefore, the greatest mitigation opportunities lie in this category, where the company endeavors to identify effective technical options. Note that, depending on the type of technology employed, the Sewage Treatment Plants (ETEs) can emit more CH_4 (methane) or N_2O (nitrous oxide). Aegea has been pursuing technologies for methane capture and utilization, improvements in efficiency of ETEs, and advanced waste management practices.

To reduce its carbon footprint, Aegea has been progressively increasing the share of electricity purchased from 100% renewable sources. In 2022, this share was 65% and, in 2023, it came to 69%. This measure reduced the company's total emissions by 2.7% in 2023, despite a year when the emission factor of the National Interconnected System (SIN) was very low due to the high percentage of clean energy sources in the dispatched electricity generation.

These actions not only help mitigate greenhouse gas emissions but also promote more sustainable management of environmental resources, aligning with the company's commitments to sustainability and environmental responsibility.

Evolution of Aegea's absolute emissions (thousand t CO₂e)

	Categories		2021	2022	2023
			'000 t CO2e		
	Solid Waste and Wastewater	424	690	772	1,182
	Mobile Combustion	9.0	14	28	29
SCOPE 1	Stationary Combustion	2.0	2.0	2.4	5.2
	Fugitive Emissions	0.0	1.1	0.2	0.9
	Land use change		-	-	0.7
	Scope 1 Total Emissions	435	707	803	1,218
SCOPE 2	Electricity purchase Electricity purchase Location-based	32	100	33	49
	Electricity purchase Market-based	15	55	11	15
TOTAL	Location-based	467	807	836	1,267
ĭ	Market-based	450	762	814	1,233



Aegea's Contribution to SDGs

The inventory marks another milestone in the company's ongoing efforts to support the United Nations Sustainable Development Goals (SDGs). These goals aim to eradicate poverty, protect the environment and climate, and ensure that all people can enjoy peace and prosperity. By expanding the availability of high-quality basic sanitation services that align with the planet's environmental needs, we are intensifying our commitment to the following

SDGs:



Gender equality

Achieving gender equality and empowering all women and girls.



Affordable and clean and energy

Seeking ways to increase the share of renewable energy in the global energy matrix through the use of biogas.



Responsible consumption and production

Contributing to the reuse of byproducts, such as sludge.



Life below water

Contributing to the conservation and sustainable use of oceans, seas and their marine resources to ensure sustainable development.



Clean water and sanitation

Contributing to providing access to adequate and equitable sanitation and hygiene for all and reducing the proportion of untreated wastewater.



Reduced inequalities

Helping to reduce inequalities within countries and between countries.



Identifying actions to combat climate change and its impacts through mitigation measures.



Life on land

Contributing to the protection, restoration and promotion of the sustainable use of land ecosystems through sustainable management of forests, combating desertification and reversing soil degradation.



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