

# The role of the ABREN and WtERT- Brazil association in advancing sustainable waste management in Brazil

**WtERT World Congress - China, 2023**

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# Brazilian Association for Energy Recovery from Waste – ABREN

ABREN WtERT as a tool to improve the waste management sector in Brazil

- Non-profit Brazilian Association for Energy Recovery from Waste (ABREN);
- Created in May 2019;
- In 2020 started to officially represent the Waste-to-Energy Research and Technology Council – WtERT Brasil;
- 41 members with total annual gross revenue of approx. US\$ 54 billion per year;
- ABREN WtERT is currently one of the largest associations in the waste sector in Brazil and Latin America.
- Companies from all environmental ecosystem required to implement Waste-to-Energy (WtE) projects are part of ABREN:
  - ✓ machine and equipment manufacturers;
  - ✓ construction companies (EPC);
  - ✓ operators;
  - ✓ concessionaire operators;
  - ✓ trading companies;
  - ✓ engineering and specialized consulting companies.

# ABREN PARTICIPATION

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# ABREN MEMBERS



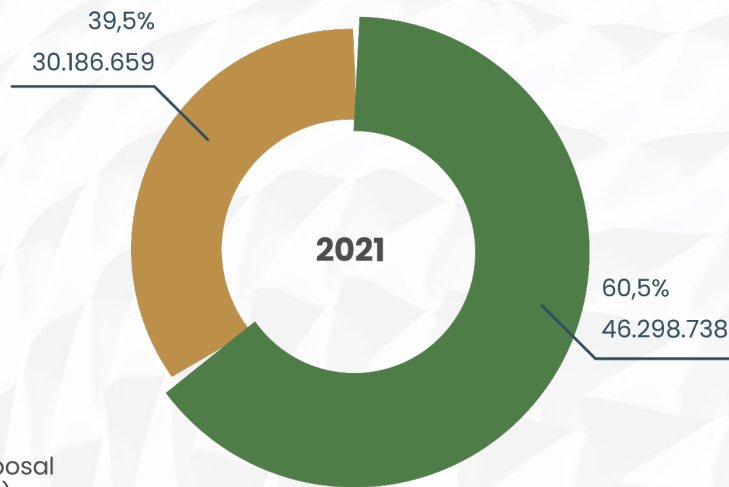
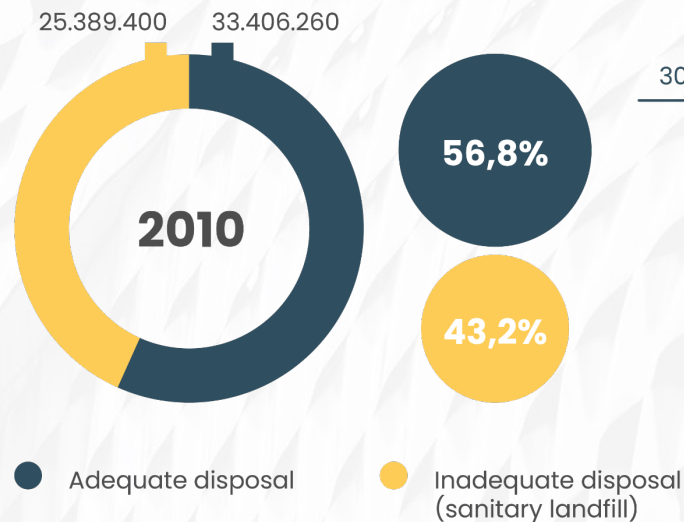
# ABREN PARTNERS



# Current status of Waste Management in Brazil

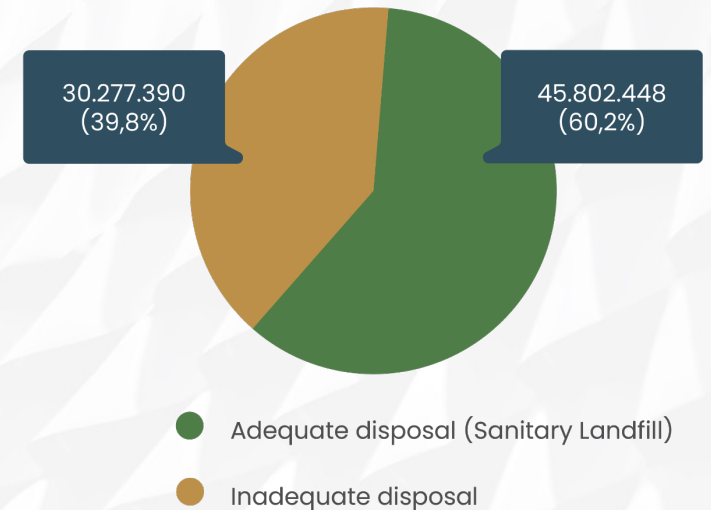
After 2 decades of discussion in Congress and 1 decade since approval of the “National Solid Waste Policy (PNRS)”, the amount of MSW disposed of in dumps and Unsanitary landfills (which should have been extinguished by 2014), remains at same level

**Destination of MSW 2010 and 2021**



**30Mt/y - 39,5% dump and non-sanitary landfills**

**Destination of MSW 2021**  
(76 M Tons Collected)



## NEW SANITATION LAW

Approval of the new legal framework for Sanitation in July 2020, **imposing long term contracts for all municipalities**, and the possibility for concessionaires to collect waste management tariffs directly from inhabitants through consumption bills (water, electricity...)

### LAW N. 14.026, 15 JULY OF 2020:

- **All the municipalities must contract with concession:** PPPs or administrative concession;
- **Prohibition of short-term contracts**, still widely used in Brazil;
- **Tariff through consumption bills:** water or electricity;
- Creation of **regional blocks** or **consortium of municipalities**;

The screenshot shows a news article from G1. At the top, it says 'PROJETO DE LEI Nº ... DE 2019 (Do Sr. ARNALDO JARDIM e outros)'. The article title is 'Bolsonaro sanciona com vetos novo marco legal do saneamento básico'. The text mentions that the new law facilitates private participation in the sector and aims to universalize access to basic sanitation. It also notes that the Ministry of Economy expects investments of up to R\$ 700 billion. The article is attributed to Guilherme Mazui and Paloma Rodrigues, G1 — Brasília, dated 15/07/2020 13h12. There are social media sharing icons for Facebook, Twitter, WhatsApp, and LinkedIn. A small text box at the bottom right contains technical details about energy recovery from waste.

PROJETO DE LEI Nº ... DE 2019  
(Do Sr. ARNALDO JARDIM e outros)

PL n. 513/2020

G1 POLÍTICA

### Bolsonaro sanciona com vetos novo marco legal do saneamento básico

Nova lei facilita participação da iniciativa privada no setor e tem como meta universalizar acesso ao saneamento básico. Ministério da Economia espera investimentos de até R\$ 700 bilhões.

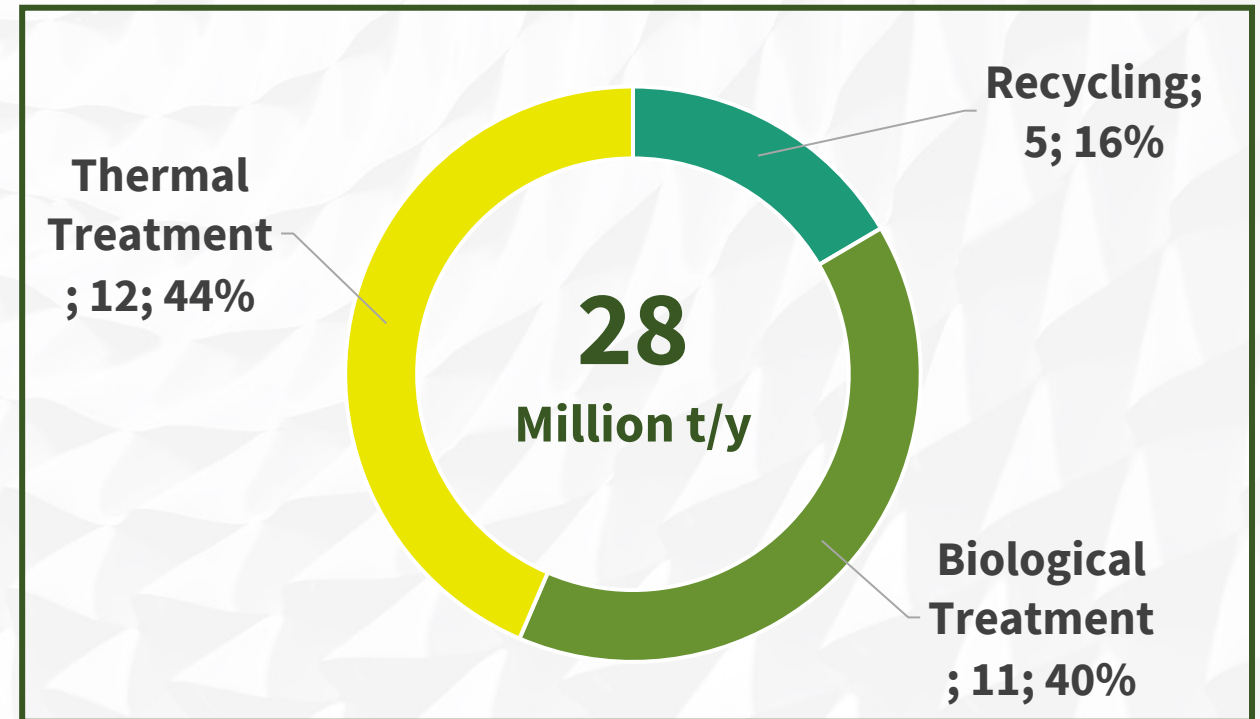
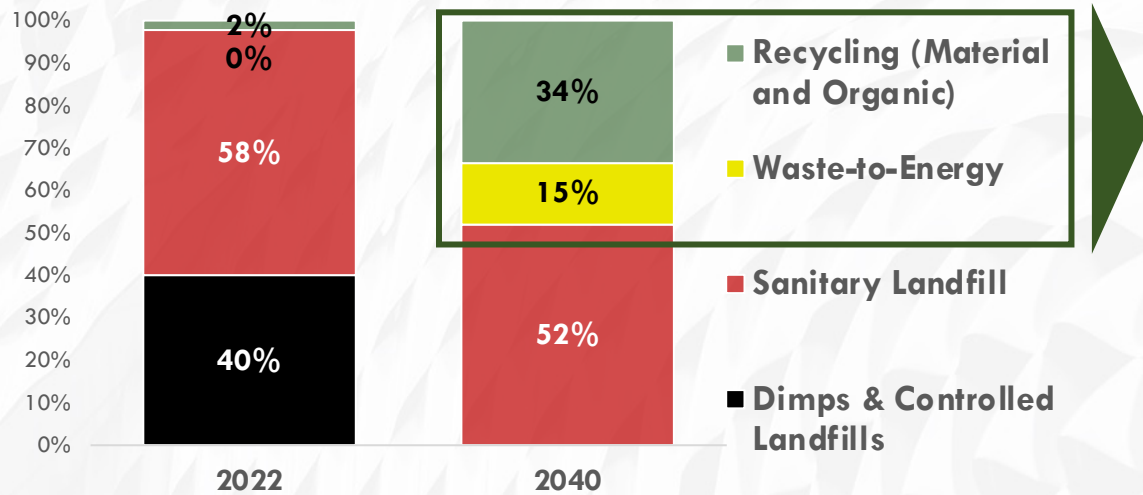
Por Guilherme Mazui e Paloma Rodrigues, G1 — Brasília  
15/07/2020 13h12 · Atualizado há 15 horas

XXI – recuperação energética de resíduos sólidos: utilização de gases provenientes da biodigestão anaeróbica ou aeróbica da fração biodegradável dos RSU, incineração, gaseificação, pirólise, coprocessamento para produção de cimento ou outras aplicações energéticas industriais, captação de biogás de aterro sanitário ou do lodo de estações de tratamento de esgoto, ou outras tecnologias que tenham como objetivo a recuperação energética e de insumos dos resíduos sólidos urbanos, hospitalares, comerciais, industriais, agrosilvopastoris e do esgotamento sanitário, para a geração de energia elétrica,

# National Waste Management Targets (Planares)

## PLANARES 2022 (TARGETS 2040)

Evolution of MSW Destination in Brazil, according to Planares Targets, % MSW Collected



Source: Data from Planares and SNIS)



# National Waste Management Targets (Planares)

Specific target of 994 MWe for MSW thermal treatment (WtE) by 2040.

- Approved by Federal Decree No. 11,043, of April 13, 2022
- Global indicator 9 : **Increase energy recovery and utilization from MSW through thermal treatment.**
- TARGET 9: By 2040, the country will have an installed capacity of 994 MW, which would be enough to supply 27 million homes with electricity.

	2020	2024	2028	2032	2036	2040
Brasil	0	311	462	626	804	994

**Equivalent to 50 WTE plants of 20 MWe  
or ~3 WTE plants of 20 MWe per year)**

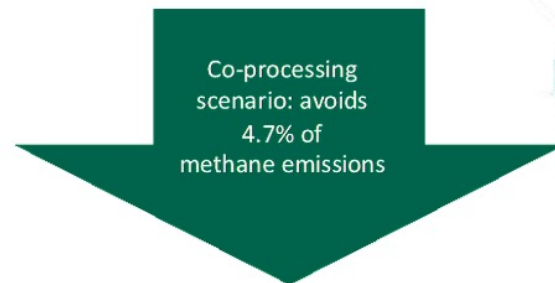
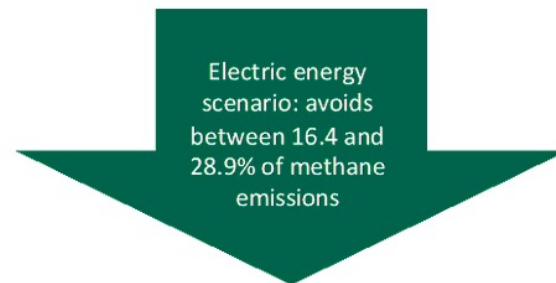
# GHG Emissions reductions

Decarbonization study in Brazil with WTE and RDF (BEP/UK, 2022)

Scenarios	Potential quantity of MSW used for energy generation	Decarbonisation potential through the use of MSW energy	% of NDC 2030 target	NDC - COP26 GWP-SAR	NDC - COP26 GWP-AR5
For the electricity generation scenario <sup>1</sup>	21,80 a 31,06 million t/year	23,83 a 59,39 MtCO <sub>2</sub> eq./year	1,98 to 4,84%	1,99 to 4,95%	1,83 to 4,57%
Co-processing + biodigestion scenario <sup>2</sup>	4,96 million t/year	14,08 MtCO <sub>2</sub> eq./year	0,82% and 1,17%	0,83% and 1,17%	0,76% and 1,08%

Target assumed by Brazil in the "Global Methane Commitment" at COP 26:  
30% reduction

Global Methane Commitment	
Emissions 2020	20,2 million t CH <sub>4</sub>
Reduction	6 million t CH <sub>4</sub>



# GHG Emissions reductions

- For each ton of waste treated in a WtE plant, approximately 1.5 to 1.7 kg of CO<sub>2</sub> equivalent can be avoided from landfills in Brazil (BEP/UK, 2022).
- Methane is today considered the second biggest driver of anthropogenic climate change, contributing to the formation of ground-level ozone, a toxic air pollutant (IPCC, 2021);
- Some countries consider methane to be a dangerous pollutant from the point of view of health and safety (UNECE/UN);
- 1 million people die prematurely every year due to exposure to ground-level ozone;
- UNECE/ONU: Brazil and another countries signed a commitment at COP 26 to reduce methane emissions by 30% by 2030;
- Landfills are an important source of methane, a powerful greenhouse gas that, according to the IPCC, has a global warming potential 86 times greater than CO<sub>2</sub> over a 20-year horizon (GWP20);
- WtE in the 28 Brazilian metropolitan regions with more than 1 million inhabitants have the potential to avoid the emission of about 60 million tons of CO<sub>2</sub> equivalent annually, or 1.8 billion CO<sub>2</sub> equivalent during 30 years of operation (ABREN WtERT, 2021).

(source: <https://www.thecable.ng/report-solid-waste-contributes-to-12-of-global-methane-emissions>)

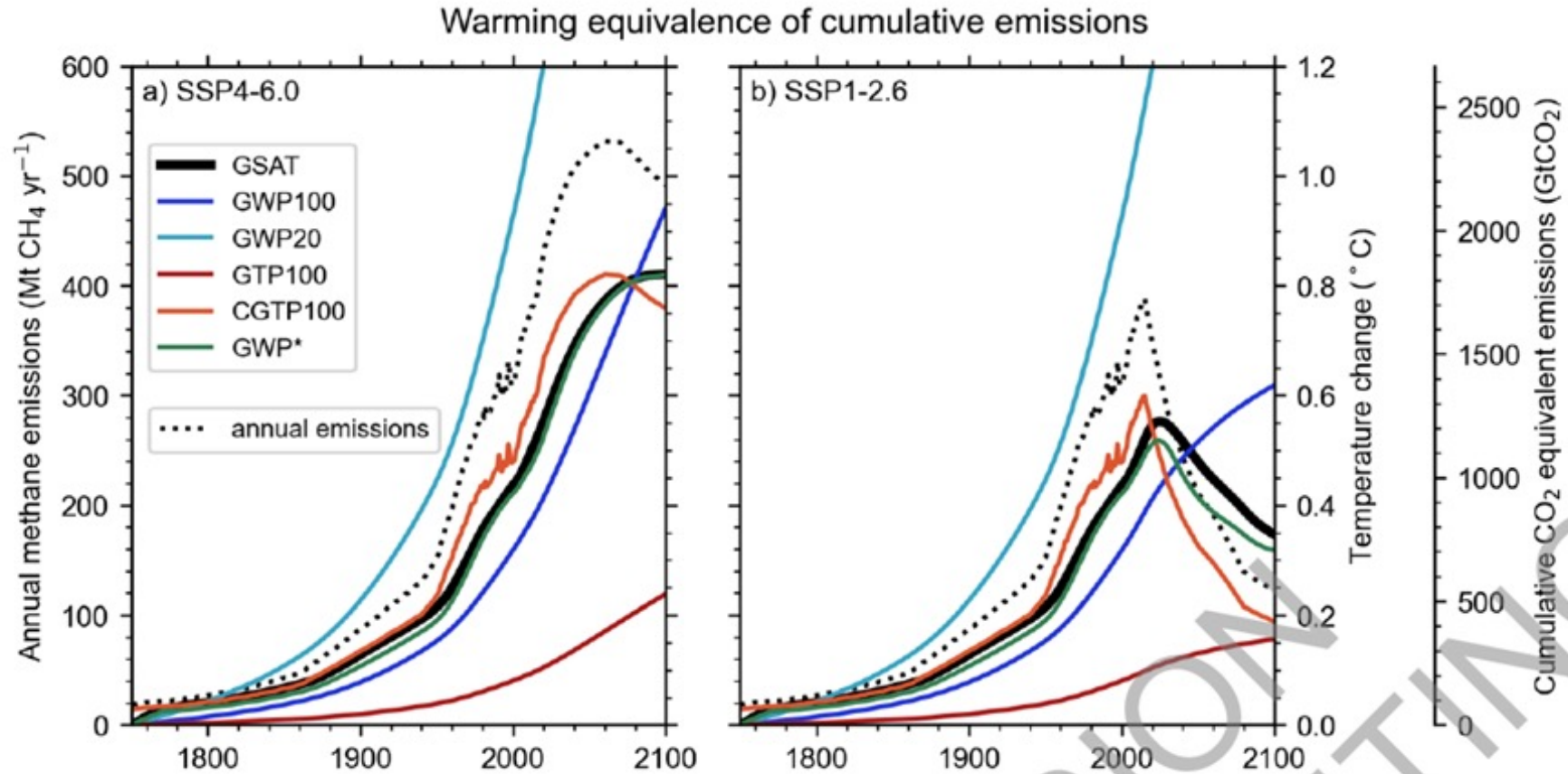
# 6<sup>th</sup> Report of IPCC

Annual methane emissions (Mt CH<sub>4</sub>yr<sup>-1</sup>) vs Temperature change (°C)

Final Government Draft

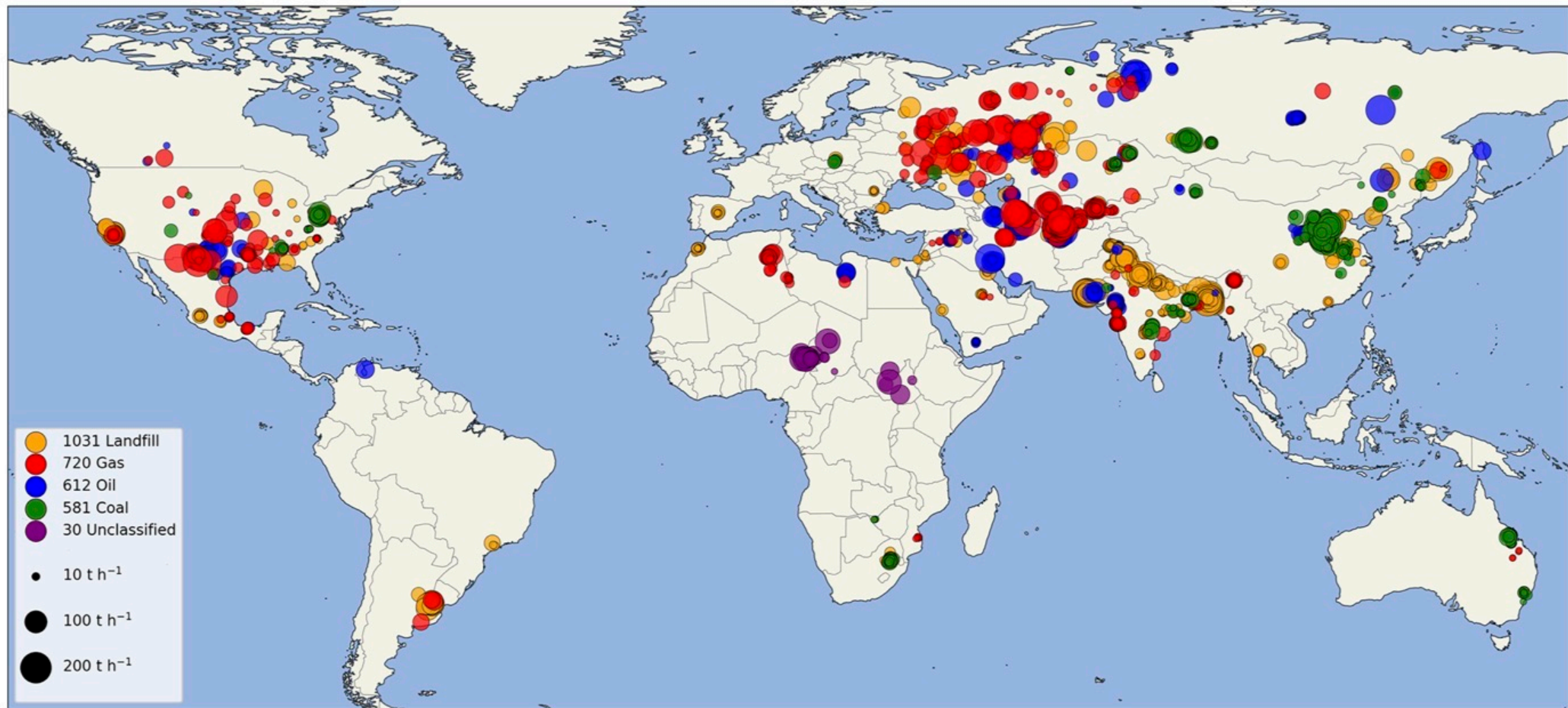
Chapter 7

IPCC AR6 WG1



Source: AR6. Climate Change 2022: Impacts, Adaption and Vulnerability, Summary for Policy Makers. IPCC, 2022.

# Global methane super-emitters using satellite data

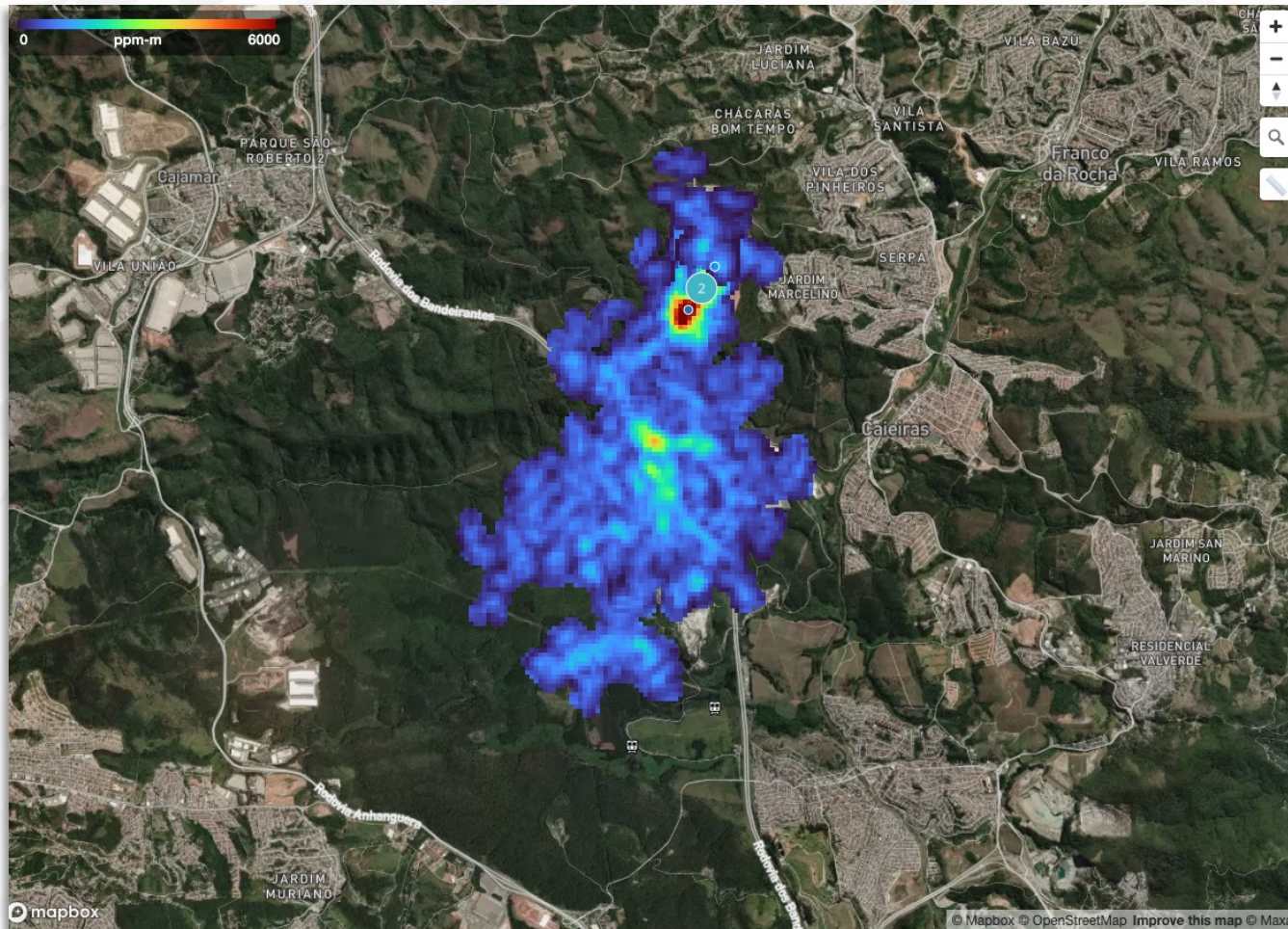


**Figure 6.** All 2974 confident plume detections for 2021, grouped into one of four dominant anthropogenic source types and sized by source rate, capped at 200 t h<sup>-1</sup>. There are 30 detections in central Africa that are labeled as “unclassified”.

Source: Automated detection and monitoring of methane super-emitters using satellite data. EGU, Set. 2023. <https://acp.copernicus.org/articles/23/9071/2023/>

# Methane emissions from landfill using satellite data

Satellite images of the methane plume from the Caieiras/SP with measurements of around 7,7 ton/h of CH<sub>4</sub> (even with biogas collection)

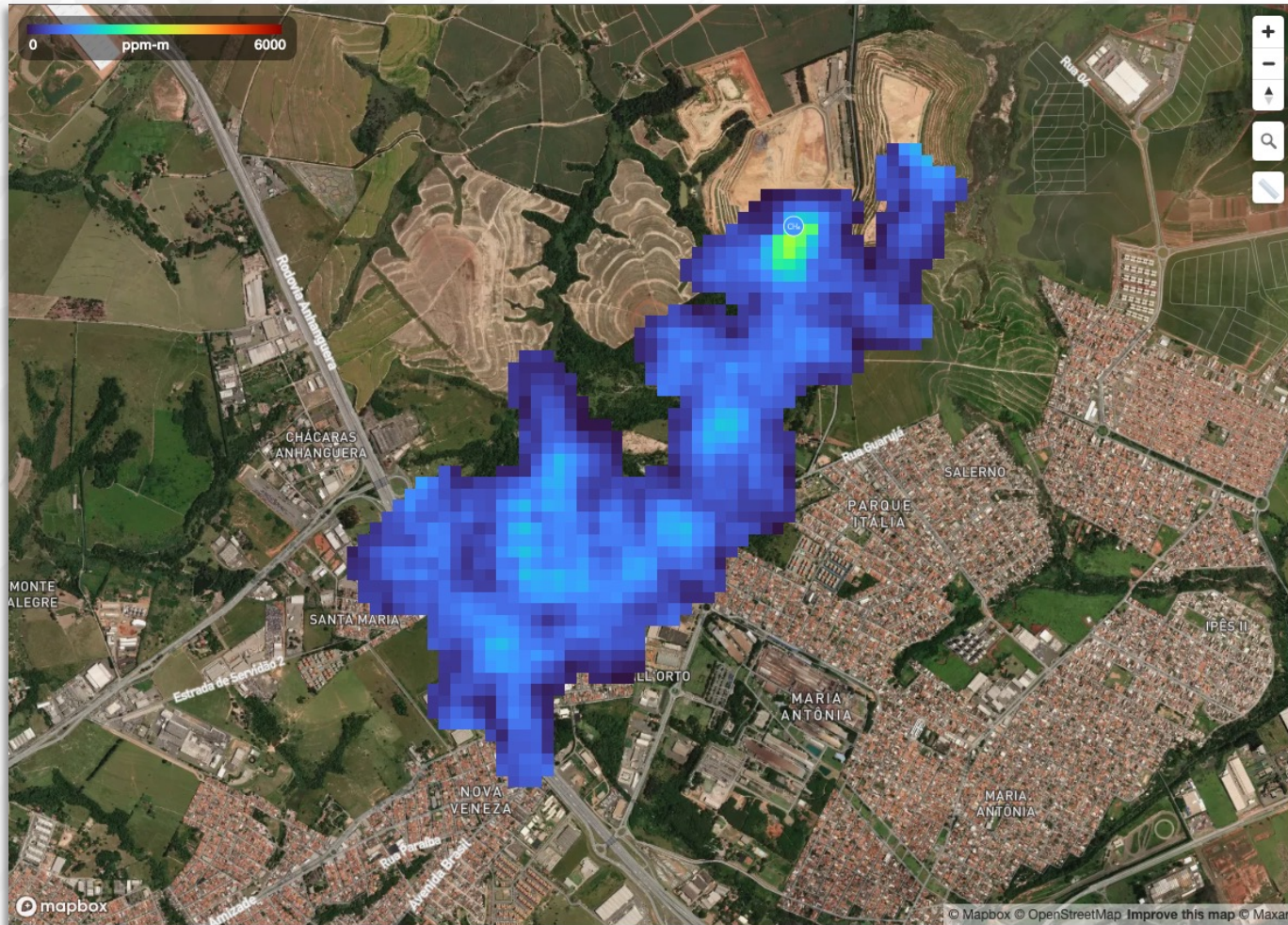


Date	May 4, 2023 13:54
Published	Jun 13, 2023 18:18
Emission	7798 ± 2214 kg/hr
Lat/Lon (Decimal)	-23.350266, -46.775292
Lat/Lon (DMS)	23°21'0"S, 46°46'31"W
Source ID	N/A
Plume ID	emi20230504t135454p09002-B
Instrument	emi
Platform	ISS
Data Provider	NASA-JPL EMIT

Source: <https://carbonmapper.org/>

# Methane emissions from landfill using satellite data

Satellite images of the methane plume from the Paulínia Landfill/SP with measurements of around 1,2 ton/h (even with biogas collection)

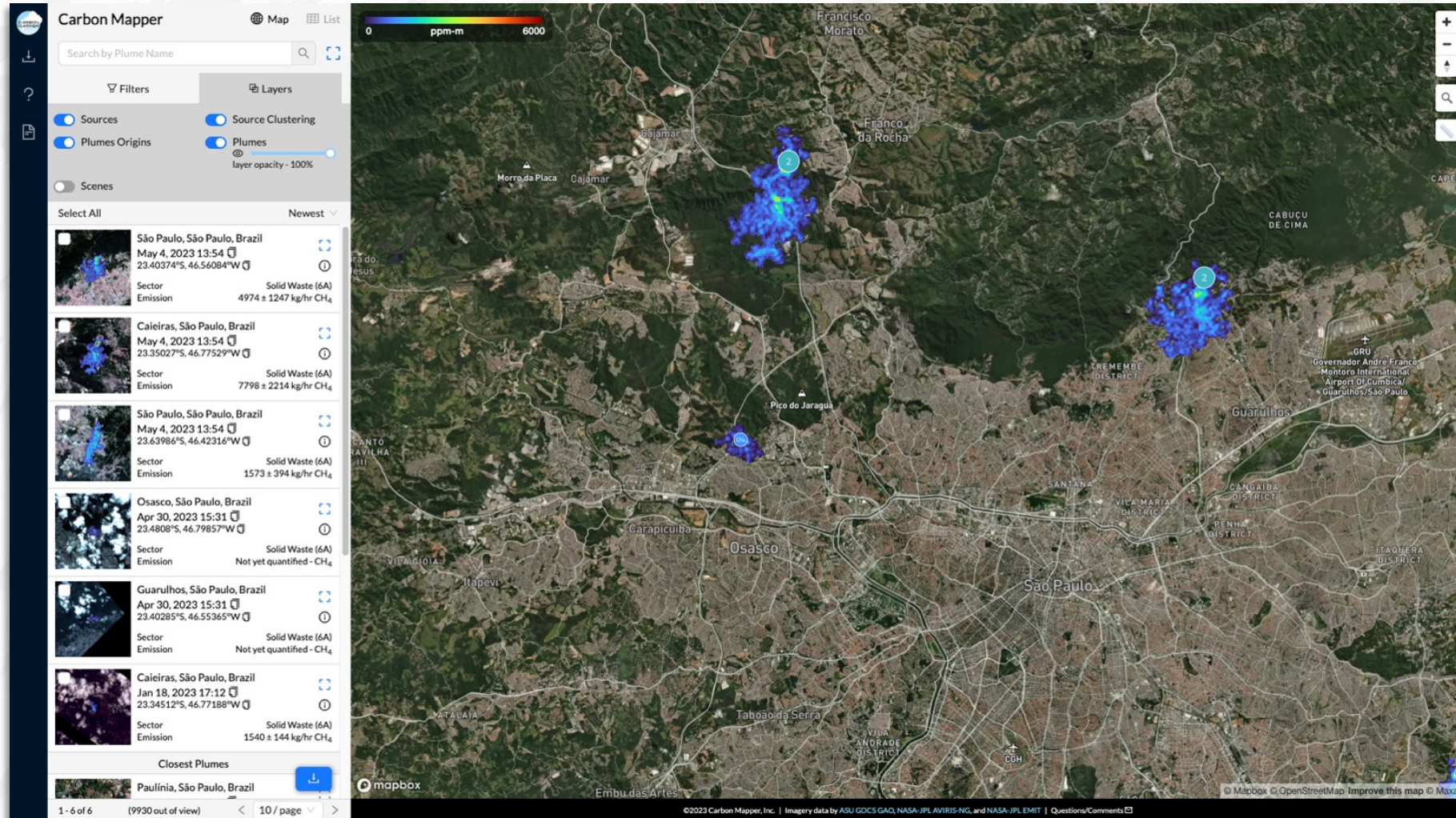


Date	May 4, 2023 13:54
Published	Jun 16, 2023 17:50
Emission	1240 ± 162 kg/hr
Lat/Lon (Decimal)	-22.780796, -47.205816
Lat/Lon (DMS)	22°46'50"S, 47°12'20"W
Source ID	N/A
Plume ID	emi20230504t135442p09001-A
Instrument	emi
Platform	ISS
Data Provider	NASA-JPL EMIT

Source: <https://carbonmapper.org/>

# Methane emissions from landfill using satellite data

Landfill in São Paulo City: 20 million inhabitants in the metropolitan area

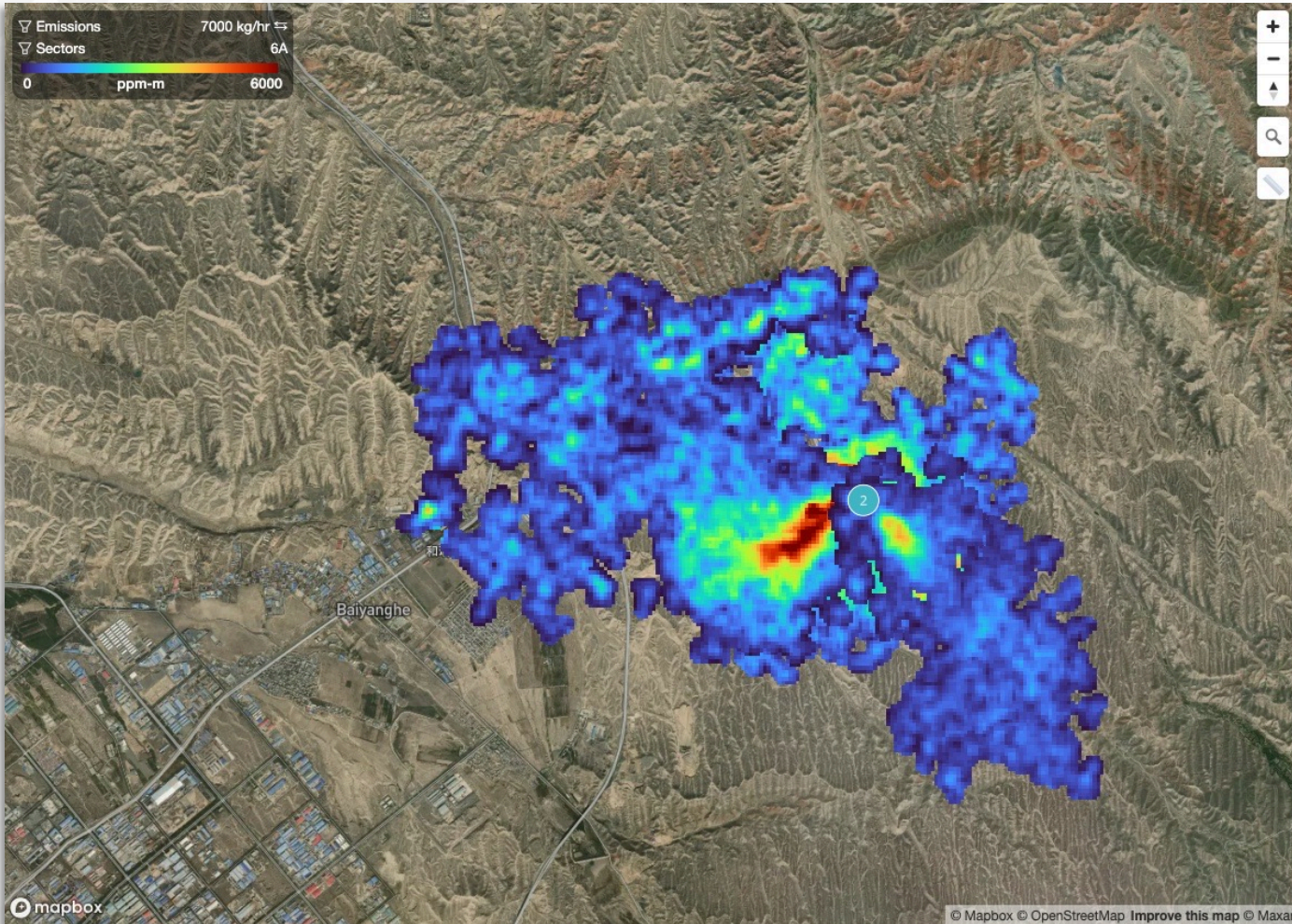


Source: <https://carbonmapper.org/>



# Methane emissions from landfill using satellite images

Satellite images of the methane plume from the Urumqi Shi Landfill, Xinjiang, China: 15,4 ton/h of CH<sub>4</sub>

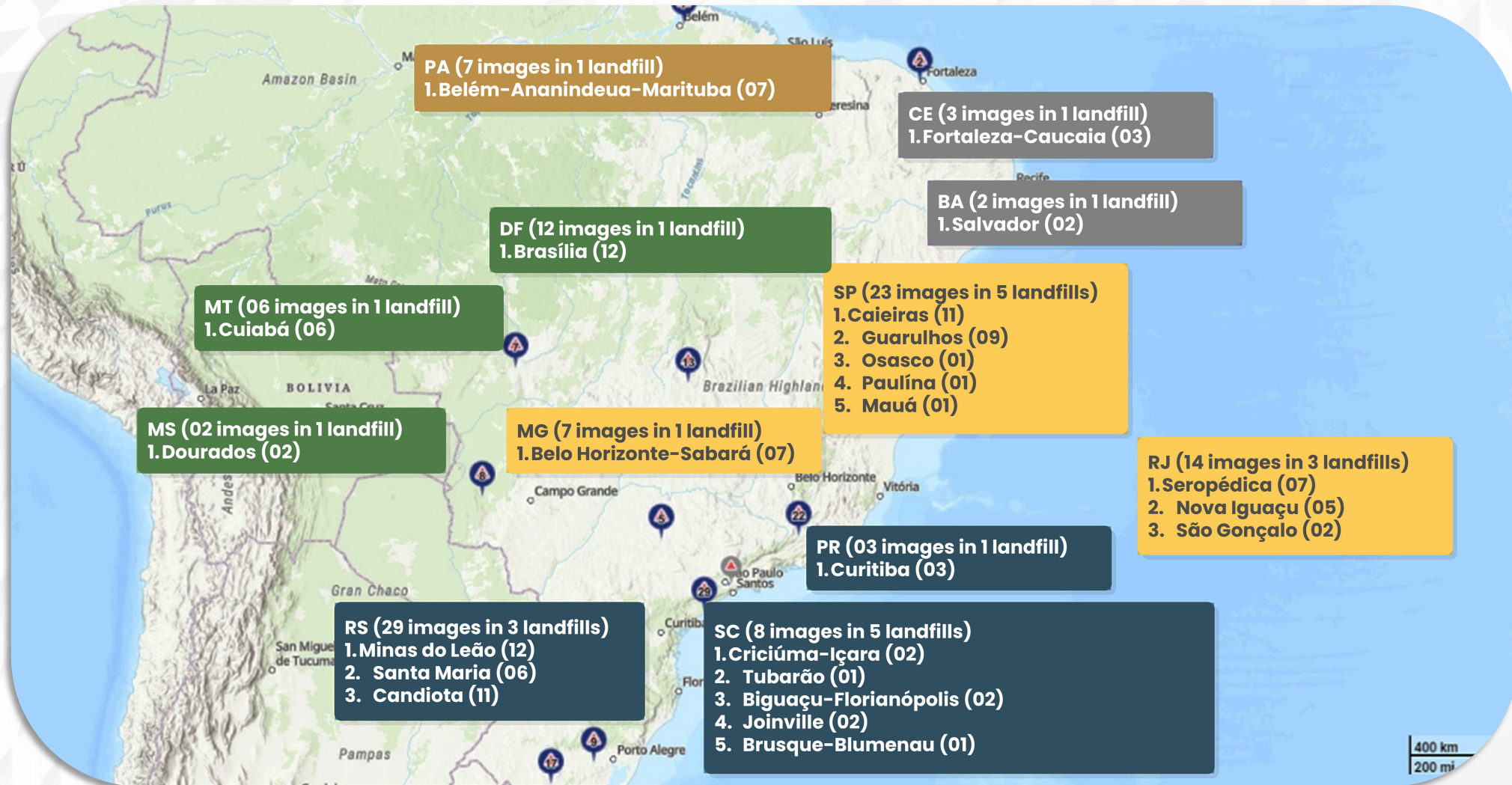


Date	Feb 17, 2023 6:32
Published	Jun 22, 2023 17:15
Emission	15344 ± 1474 kg/hr
Lat/Lon (Decimal)	44.041599, 87.862678
Lat/Lon (DMS)	44°2'29"N, 87°51'45"E
Source ID	N/A
Plume ID	emi20230217t063221p04014-A
Instrument	emi
Platform	ISS
Data Provider	NASA-JPL EMIT

Source: <https://carbonmapper.org/>

# Methane emissions from landfill using satellite data

113 Measurements via Satellite in 22 Landfills in 12 Brazilian States (ABREN WtERT study with GHG Sat)

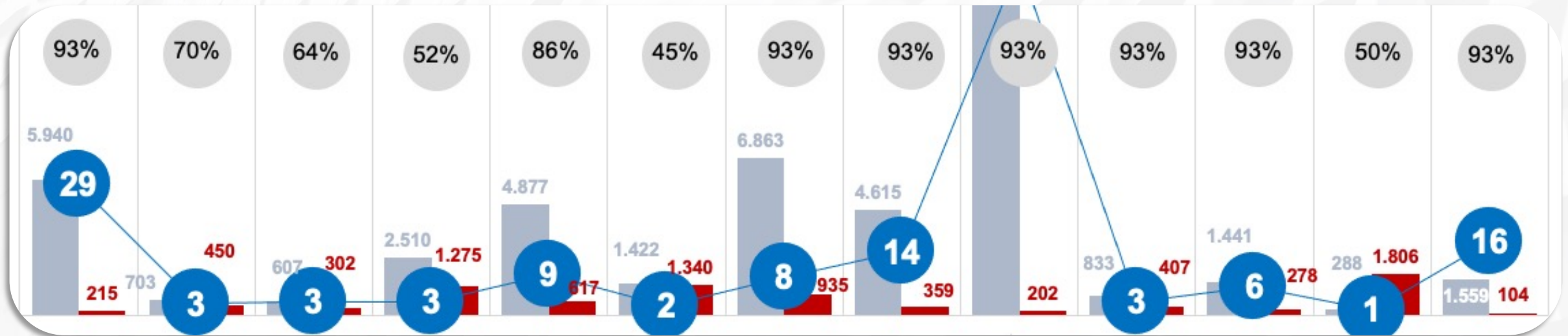
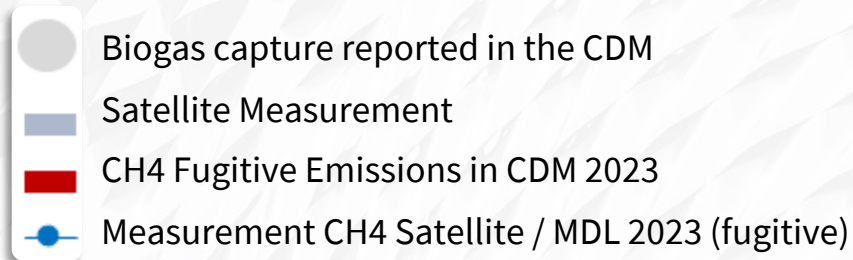


# Methane emissions from landfill using satellite data

113 measurements via Satellite in 22 Landfills in 12 Brazilian States (ABREN WtERT study with GHG Sat)

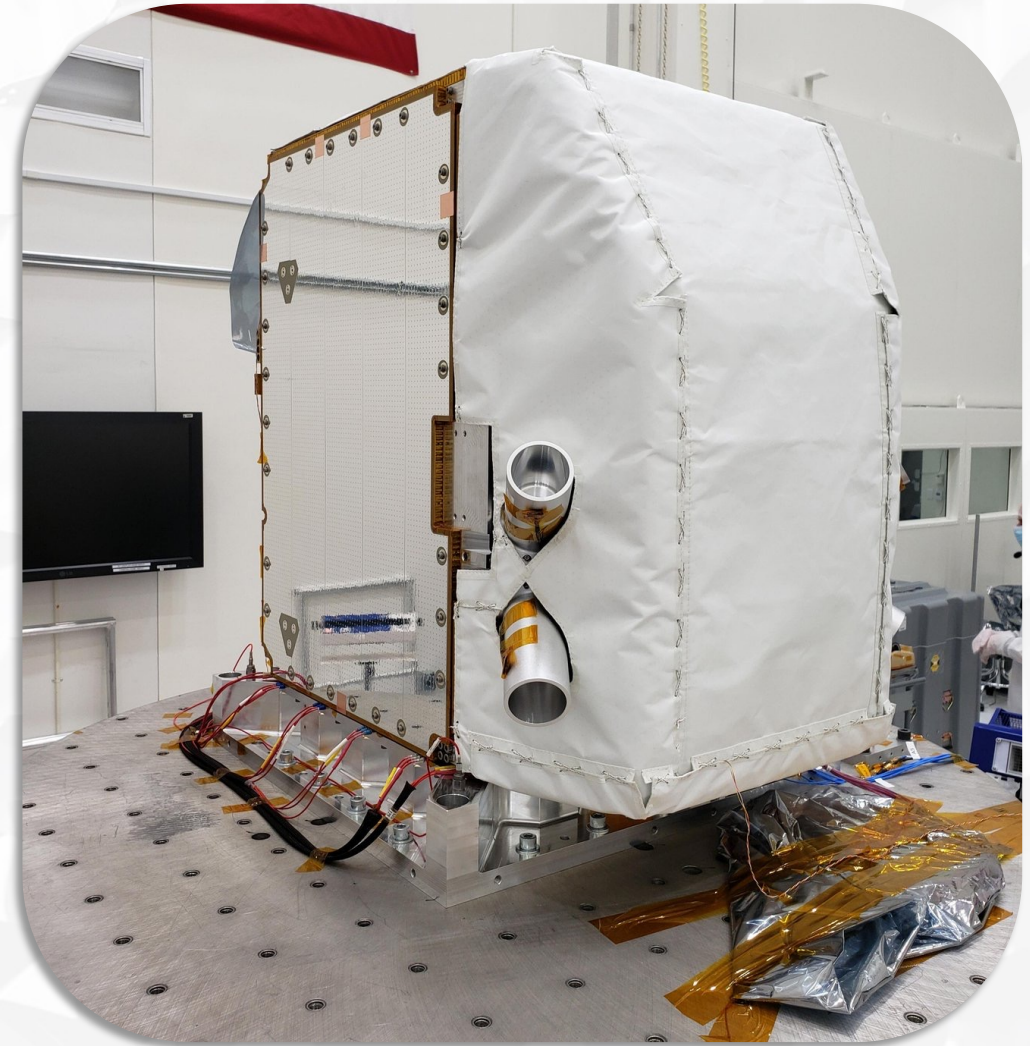
Comparison of GHG Sat and Carbon Mapper Satellites (Nasa) vs MDL UNFCC (base 2023)

**Conclusion: MDL on average 7 times lower than satellite measurements**



# NASA-Built Greenhouse Gas Detector Moves Closer to Launch

- Satellite designed and built by NASA's Jet Propulsion Laboratory in Southern California;
- State-of-the-art imaging spectrometer: will measure the greenhouse gases **methane** and **carbon dioxide** from space;
- Different compounds – including methane and carbon dioxide – absorb different wavelengths of light, leaving a spectral “fingerprint” that the imaging spectrometer can identify;
- These infrared fingerprints, invisible to the human eye, can pinpoint and quantify strong greenhouse gas emissions and accelerate potential mitigation efforts.



**Launch is planned for 2024!**

## WTE projects in Brazil

WTE projects registered for the A-5 auction from 2021 (to deliver in 2026). Only seller was 'URE Barueri' (after 10 years of development).

**WTE projects total around 10 000 t/d of MSW and 256 MWe**

#	Project	Development Stage	Treatment Capacity t/d	Gross Power
1	Maua	Preliminary Permit obtained	3.000 t/d	80 MWe
2	Barueri	Under construction (2026)	875 t/d	20 MWe
3	Rio de Janeiro	Preliminary Permit obtained	1.300 t/d	31 MWe
4	Santos	Preliminary Permit obtained	2.000 t/d	50 MWe
5	Brasilia	Study phase	1.740 t/d	55 MWe
6	Consimares	Preliminary Permit obtained	700 t/d	20 MWe
			<b>9.615 t/d</b>	<b>256 MWe</b>

# WTE projects in Brazil

Federal fund to support the structuring of Waste Management PPP projects through the state bank Caixa (FEP). 16 Municipalities have projects in progress and another 80 have already had approvals to hire consultants for project structuring (2023)

Resultado do Edital de Chamada Pública nº 001/2020 - Setor de Resíduos Sólidos Urbanos - 01/10/2020

Relação dos entes públicos habilitados				
Ordem	Protocolo	UF	Ente Público	Situação
1	706648	SP	CMM Consorcio de Municípios da Mogiana	Habilitado
2	104832	MG	Consorcio Intermunicipal de Aterro Sanitario do Centro Oeste Mineiro - Cias Centro Oeste	Habilitado
3	288603	RS	CONSORCIO INTERMUNICIPAL DE DESENVOLVIMENTO DO PAMPA GAÚCHO	Habilitado
4	638251	SP	CONSÓRCIO INTERMUNICIPAL DE RESÍDUOS SÓLIDOS DO OESTE PAULISTA	Habilitado
5	685659	MG	ECOTRES- Consórcio Intermunicipal de Tratamento de Resíduos Sólidos	Habilitado
6	977754	SP	CONSORCIO INTERMUNICIPAL CEMMIL - SANEAMENTO AMBIENTAL	Habilitado
7	135968	RS	CONSÓRCIO INTERMUNICIPAL DA REGIÃO CENTRO DO ESTADO DO RIO GRANDE DO SUL - CI/CENTRO	Habilitado
8	800816	SP	Consórcio Intermunicipal de Saúde do Vale do Ribeira e Litoral Sul - Consaúde	Habilitado
9	615062	RS	Consórcio Público de Saneamento da Bacia Hidrográfica do Rio dos Sinos	Habilitado
10	394740	BA	CONSTESF	Habilitado
11	268959	MT	Consórcio Público de Saúde Vale do Teles Pires	Habilitado
12	123492	MG	Consórcio Público Intermun. de Desenv. Sustentável do Triângulo Mineiro e Alto Paranaíba	Habilitado
13	933415	BA	CONSORCIO INTERMUNICIPAL DO OESTE DA BAHIA	Habilitado
14	634408	SC	CONSÓRCIO INTERMUNICIPAL MULTIFINALITÁRIO DOS MUNICÍPIOS DA AMUREL - CIM AMUREL	Habilitado
15	148376	ES	Consórcio Público Prod Norte	Habilitado
16	440783	PE	CONSÓRCIO PÚBLICO INTERMUNICIPAL DO AGRESTE PE E FRONTEIRAS (CONIAPE)	Habilitado
17	944443	RS	Consórcio Intermunicipal de Desenvolvimento Sustentável da Serra Gaúcha - CISGA	Habilitado
18	441984	BA	Consórcio Intermunicipal do Semiárido Nordeste II	Habilitado
19	612022*	BA	CONSORCIO INTERMUNICIPAL DE DESENVOLVIMENTO DO CIRCUITO DO DIAMANTE	Habilitado
20	151830	BA	Consórcio De Desenvolvimento Sustentável do Alto Sertão	Habilitado
21	855001	BA	consorcio de desenvolvimento sustentável do território de Irecê	Habilitado
22	932819	BA	Consórcio do Território do Recôncavo	Habilitado
23	347062	BA	Consórcio Público de Desenvolvimento Sustentável Portal do Sertão	Habilitado

\* Número de protocolo corrigido - antiga proposta 577315.



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# WTE potential in Brazil

Potential of 130 WTE plants, requiring (private) investments in the RM of around U\$ 28,6 billion

**28 Metropolitan Regions  
> 1 million inhab.**

Municipalities / Regions

28 RM

MSW Generation

39 M t/y (47%)

**Potential number of WTE units of avg. size 20 MWe**

**130**

**Potential Investment**

**28,6 U\$ billion**

*Source: Own calculation based on IBGE, SNIS data, and assumption investment equivalent to 1.5m€/Mwthermal (input)*

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