

Rio's Sustainable Agenda for the Waste Management

The search for environmental and economic sustainability with social responsibility

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COMLURB – Cia. Municipal de Limpeza Urbana



Global
Methane
Forum



28-30 March 2016 • Washington, DC, USA

1. CARACTERÍSTICAS NACIONAIS



Brasil - um país de dimensões continentais

**Área – 8,5 milhões de km²
186 milhões de habitantes**

**26 Estados e Distrito Federal
5.565 municípios**

**Maior e menor municípios:
São Paulo/SP – 11 milhões habitantes
Borá/SP – 856 habitantes**

The City of Rio de Janeiro and COMLURB

The Municipal Waste Management Company

- Rio: territory and population:
- 1,100 km² and 6,2 million inhabitants
- **COMLURB:**
 - **21.000 employees; Annual budget: US\$ 500 million**
 - **Services under its responsibility:**
 - Household collection and street cleansing (10,000t/day)
 - Collection on islands of the Jacarepagua lagoon
 - Free collection of bulk goods and household debris
 - Collection and street cleansing in low-income communities with special equipment
 - Transfer and final disposal of waste
 - Treatment: composting and RDF production

The City of Rio de Janeiro and COMLURB

The Municipal Waste Management Company

- Services under its responsibility, not related to regular waste management services:
 - Cleaning and disinfection of 5 main hospitals of the municipal network
 - Final disposal of hospital waste from the municipal public network (incineration and autoclave)
 - Internal and external cleaning of 1,051 municipal schools
 - Meal preparation for 350 municipal public schools
 - Cleaning of the water surface of lakes and lagoons
 - Cleaning of 58 km of beaches
 - Trimming of 600.000 public trees
 - Maintenance of the 1,200 public squares and parks
 - Cleaning of public buildings (City Hall)
 - Vectors Control (rodents and African snail)
 - Manufacture of sweepers, tools and urban equipment (toys, slides, seesaws, comfort station, etc.)



HOUSEHOLD COLLECTION AND STREET CLEANSING



FREE COLLECTION FOR HOUSEHOLD DEBRIS AND BULK MATERIALS



**WATER SURFACE CLEANING AND
HOUSEHOLD COLLECTION ON ISLANDS**



STREET MARKET CLEANING



BEACH CLEANING



SPECIAL EVENTS (CARNIVAL AND NEW YEAR'S EVE)



EMERGENCIAS



**TRIMMING AND
STUMP REMOVAL**



CURBSIDE COLLECTION AND URBAN FURNITURE MAINTENANCE



WASTE MANAGEMENT IN LOW-INCOME COMMUNITIES

... para colorir !!



Pise no pedal para abrir a tampa.

Deposite o resíduo e retire o pé para fechar.



O caminhão compactador realiza a coleta. Depois recoloca o contêiner no mesmo lugar.



Maré limpa um lugar melhor pra se viver



AWARENESS CAMPAIGN



Alternative systems





SCHOOLS AND HOSPITALS CLEANING



CURBSIDE COLLECTION



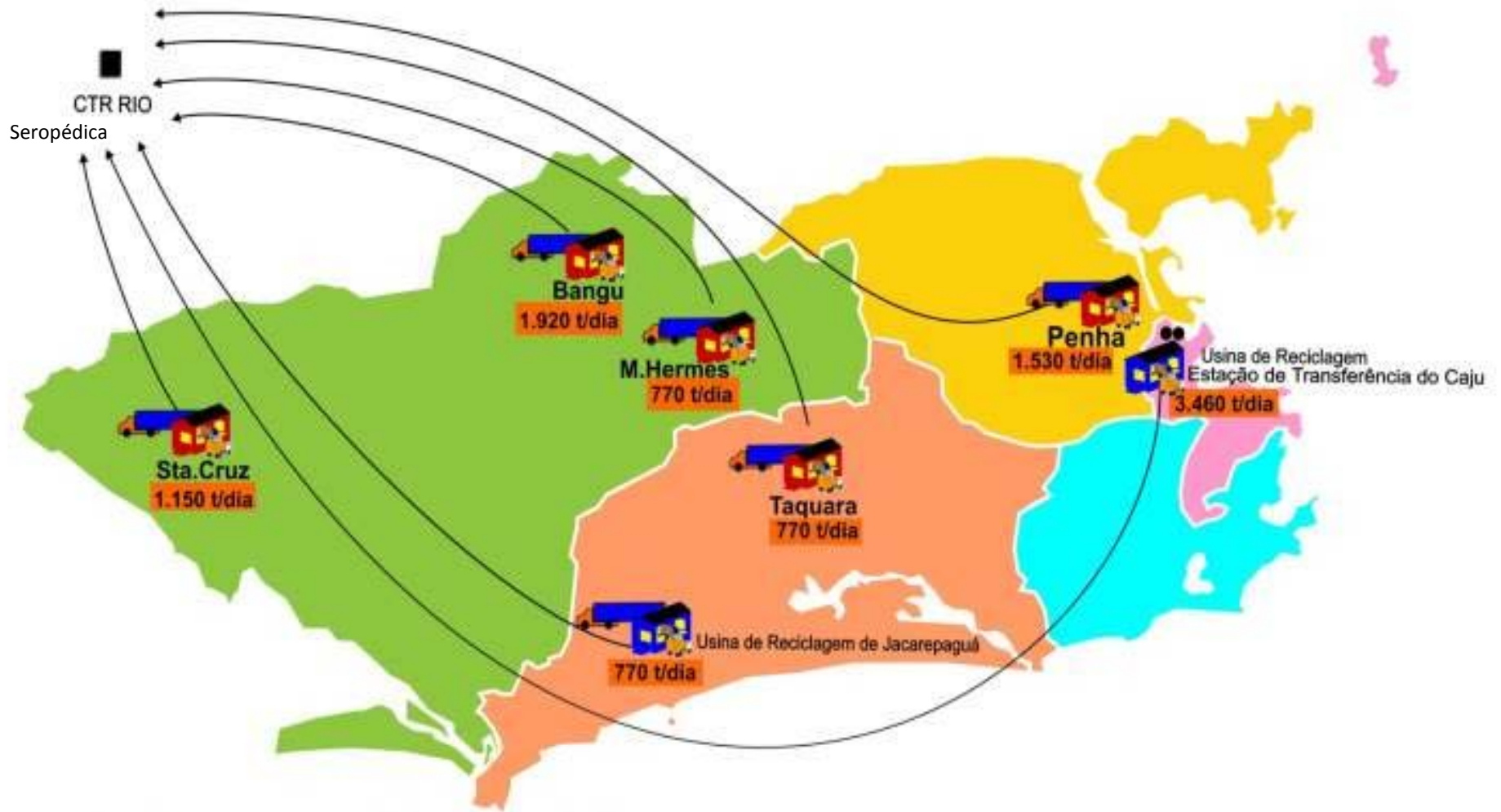
Fabricação de ferramentas e mobiliário



MAINTENANCE OF URBAN FURNITURE

Fluxo do Lixo - CTR Rio (t/dia)

Município do Rio de Janeiro



Tonelada / Dia :

 Transferência Conlurb	 Área de Planejamento 1	 Área de Planejamento 4
 Futuras Estações	 Área de Planejamento 2	 Área de Planejamento 5
 Estações Existentes	 Área de Planejamento 3	



ETR – Santa Cruz



ETR – Marechal Hermes



ETR – Caju



ETR – Jacarepaguá



7 Transfer Stations

COMLURB'S SUSTAINABLE AGENDA

- **Legal Framework**
- **Studies and Projects being implemented**
- **Projects in Operation**

COMLURB's Sustainable Agenda

• Legal Framework

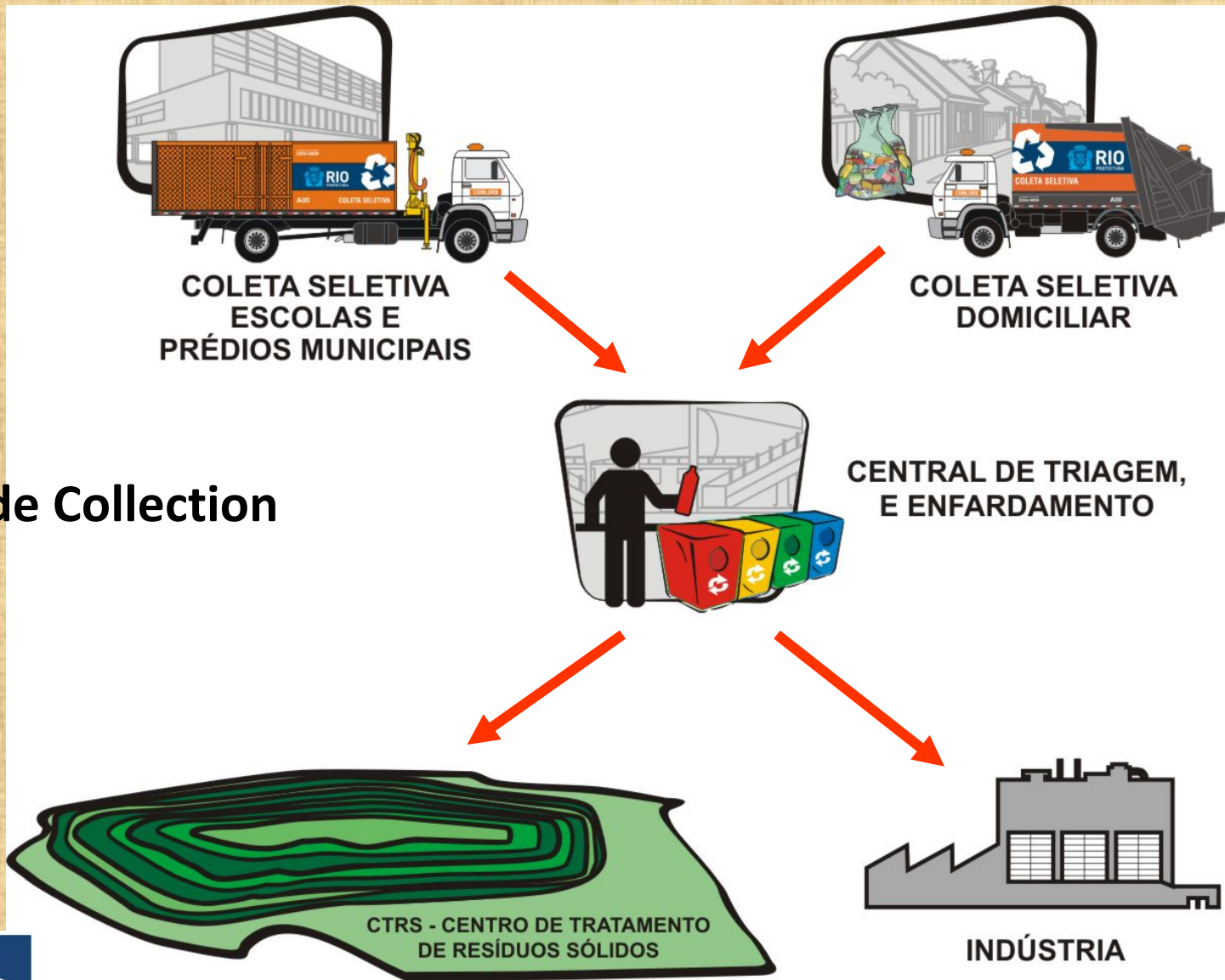
- NACIONAL POLITICS OF WASTE MANAGEMENT
- MUNICIPAL SUSTAINABILITY FOR THE CITY
- INTEGRATED MUNICIPAL WASTE MANAGEMENT PLAN
- MUNICIPAL DECREE FOR C&D REGULATION
- MUNICIPAL DECREE CREATING THE CARIOCA GROUP FOR CLIMATE CHANGES
- JOINT RESOLUTION BETWEEN SMAC-COMLURB ABOUT COMPOST

COMLURB'S SUSTAINABLE AGENDA

Studies and Implemented Projects



Curbside Collection



RECYCLING CENTERS



STUDIES

ENERGETIC EFFICIENCY IN ALL COMLURB BUILDINGS

- a) Study of consumer units**
- b) Draw the consumption profile**
- c) Check the adequacy of electricity fares**
- d) Make an inventory of installed equipment and their operating regimes (Procel)**
- e) Check the consumption habits of users**
- f) Adequate actions and targets for energy savings**

PAPER BINS AND CARTS MADE OUT OF COCONUT FIBER



For the manufacturing of this cart, 100 coconut shells were used.

Street cleansing carts made from coconut fiber



**BROOMS MADE OF
CANULATED PET AND
COCONUT FIBER**



**MECHANICAL SWEEPERS
MADE OF PET**



Technological Development EVAPORATOR FOR SMALL LANDFILLS



EMISSION REDUCTIONS AND FLEET OPTIMIZATION MEASURES

(In collaboration with C40)

- **Alternative Fuels (10% minimum renewable fuels)**
 - Biodiesel
 - Sugar Cane Diesel
 - Ethanol from organic fraction of household waste
 - Natural Gas
- **Non Power Train Measures**
 - Euro V compliance
 - Hybrid Hydraulic (MAN and Parker)
 - Eco-driving (C40)
 - Green Tires
 - Logistic Optimization (fleet control)

Emission Reductions through Biodiesel B20 from used cooking oil



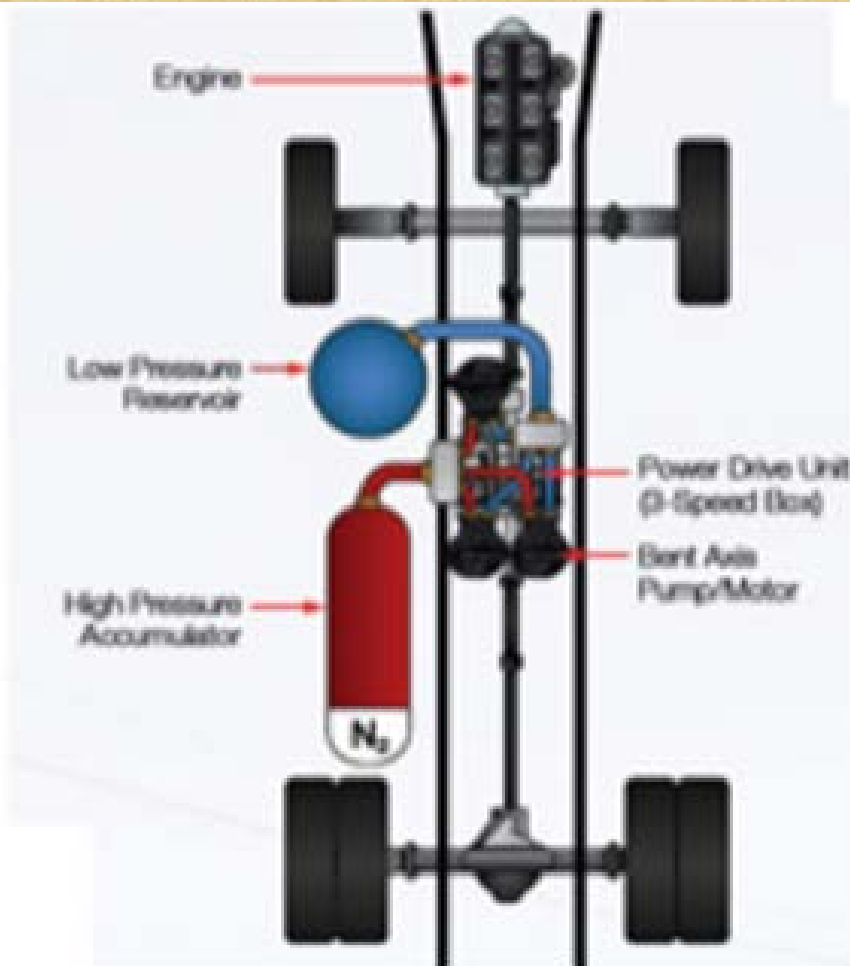
Near-Term Fuel Options

- **Renewable diesel from sugar cane (“cane diesel”)**
- **Biodiesel – B20**
- **Ethanol from waste**
- **Methane (compressed natural gas)**

Hybrid Refuse Truck on the Trail

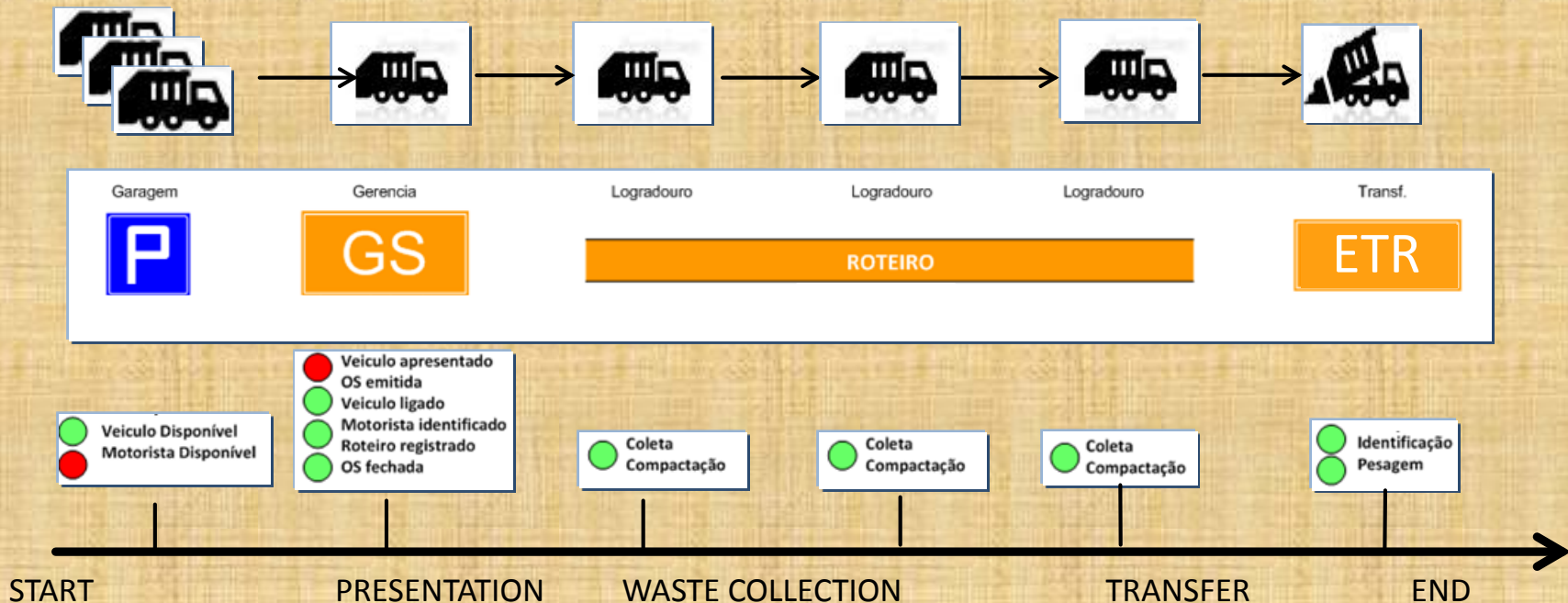


RunWise from Parker



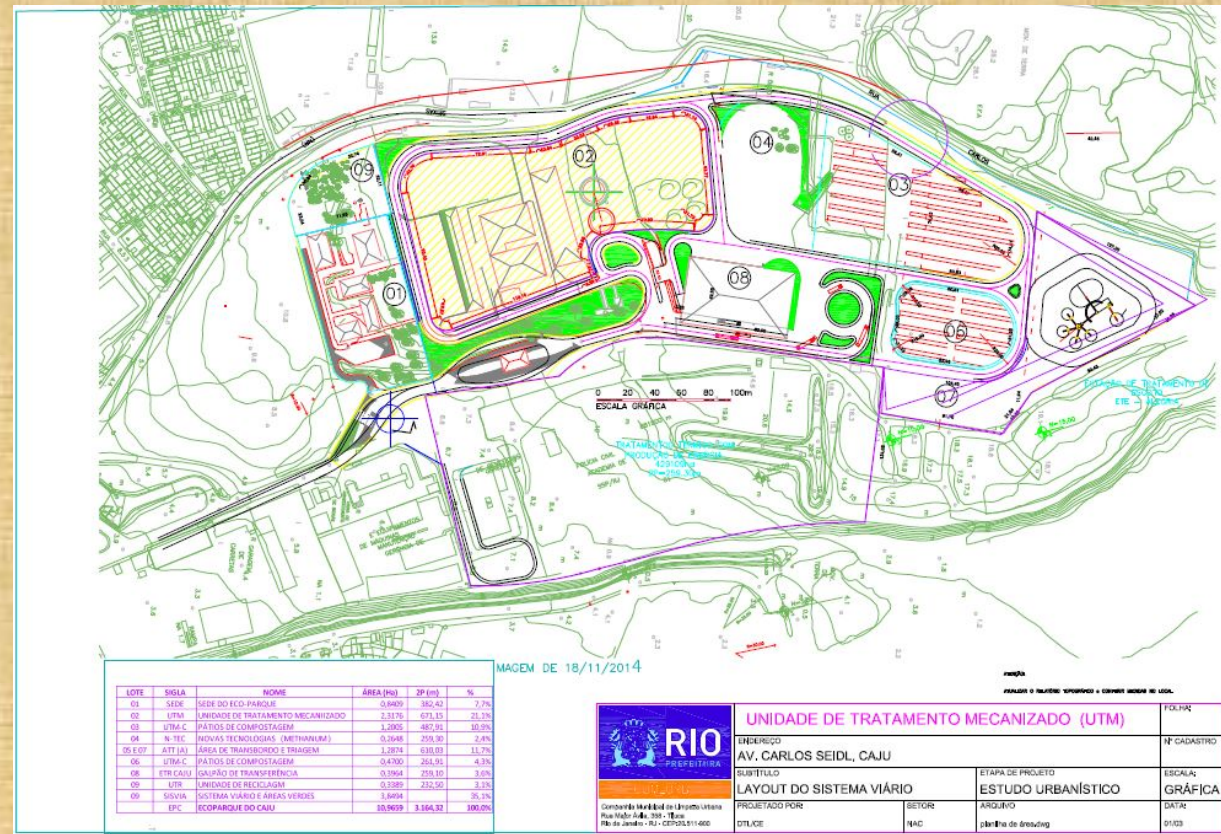
Sistema RunWise já equipa diversos caminhões nos Estados Unidos

LOGISTIC CONTROL



TECHNOLOGICAL PARK AT CAJU

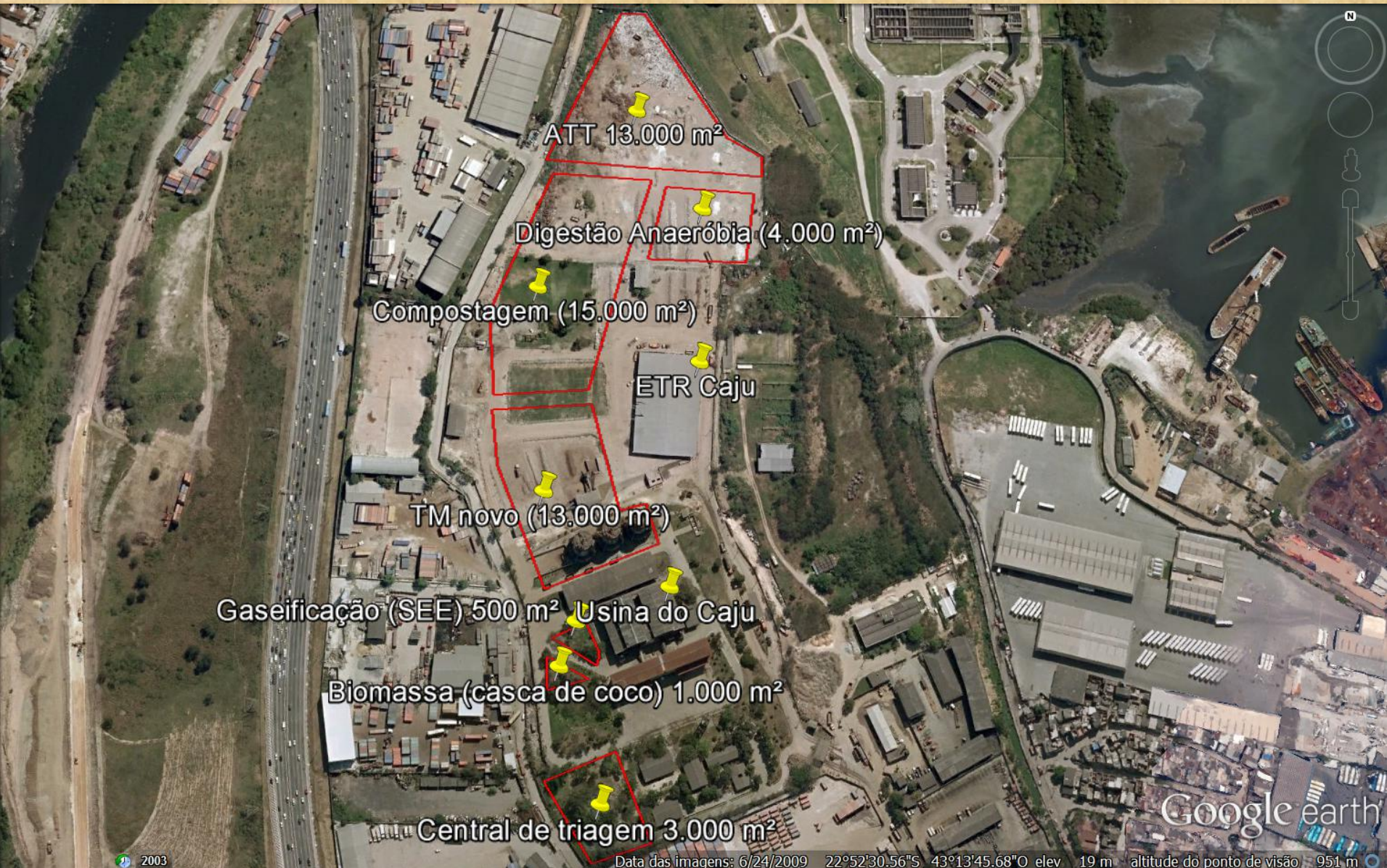
- MRF
- Biomethanization
- Trimming residues treatment
- Aerobic Composting
- Carbonization Plant
- And more.....



CAJU RECYCLING PLANT



TECHNOLOGICAL PARK AT CAJU RECYCLING PLANT



A MRF – advantages to the City

MAXIMIZING HOUSEHOLD RECYCLING

ONE BIN CURBSIDE COLLECTION: COMMINGLED WASTE

- Traffic reduction;
- Emissions reduction (GHG);
- Compliance with the National Plan for Integrated Waste Management and with the Municipal Program for Emissions Reduction
- Employment generation (130 workers)
- Stimulating the local recycling industry

Optic separation



COLLECTION OF ORGANIC WASTE IN SELECTED GENERATORS FOR BIOMETHANIZATION AND COMPOSTING



USE OF COMPOST IN THE CITY FORESTATION PROGRAM

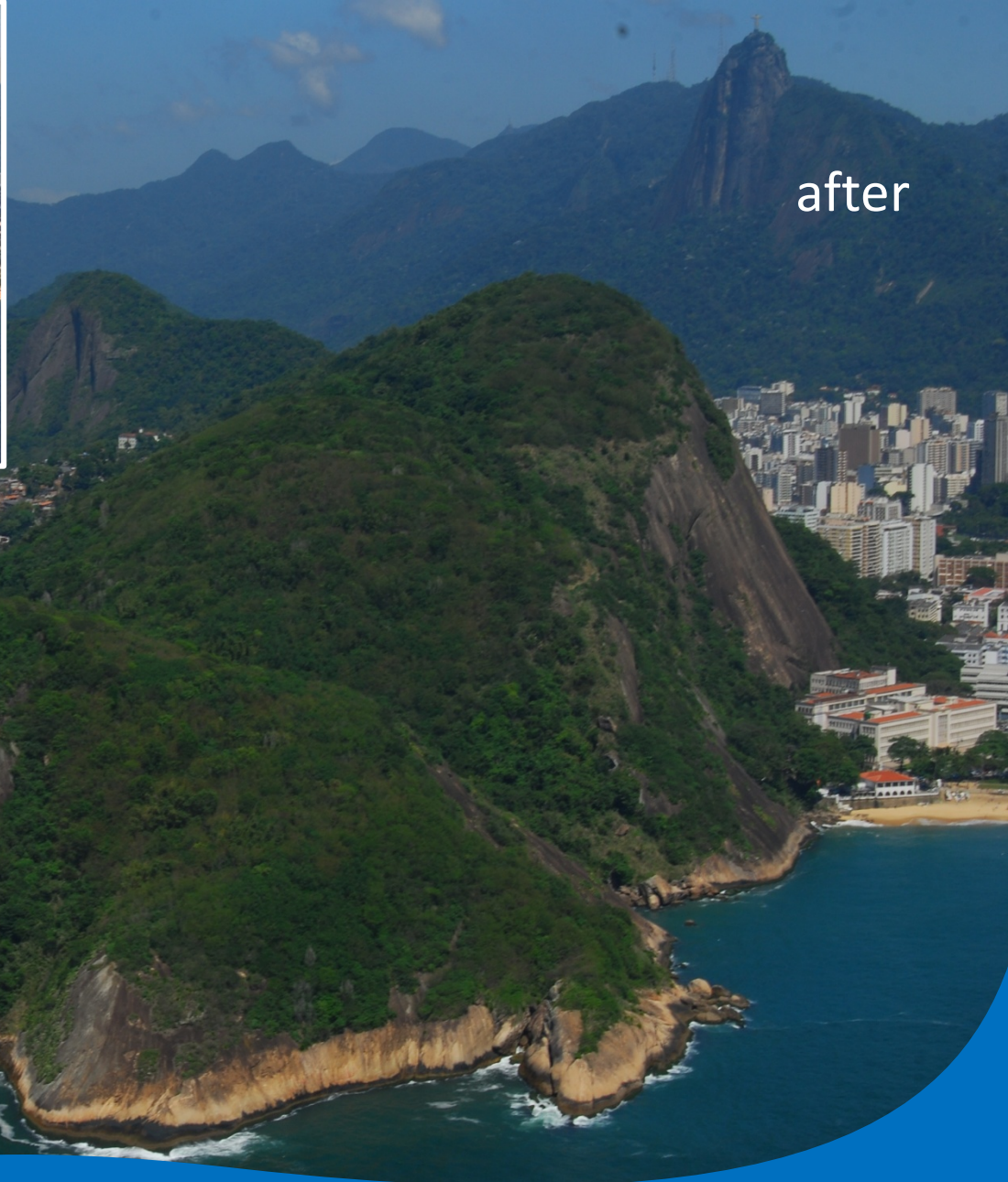


USE OF COMPOST IN THE CITY FORESTATION PROGRAM





before



after



Urubu / Babilônia - 23,4 ha / 74.200 young plants

Methar TMO®

Tecnologia Nacional



- 1 – Galpão de armazenamento
- 2 – Alimentação dos digestores
- 3 – Túneis de Metanização
- 4 – Reator de líquidos
- 5 – Sistema de desarenação
- 6 – Condicionamento do biogás
- 7 – Gasômetro
- 8 – Unidade de cogeração
- 9 – Galpão de pós-tratamento

METHANIZATION TUNNELS



Allendorf, Germany
Bioferm Plant
February, 2011.

RDF PRODUCTION FOR A PILOT WTE PLANT

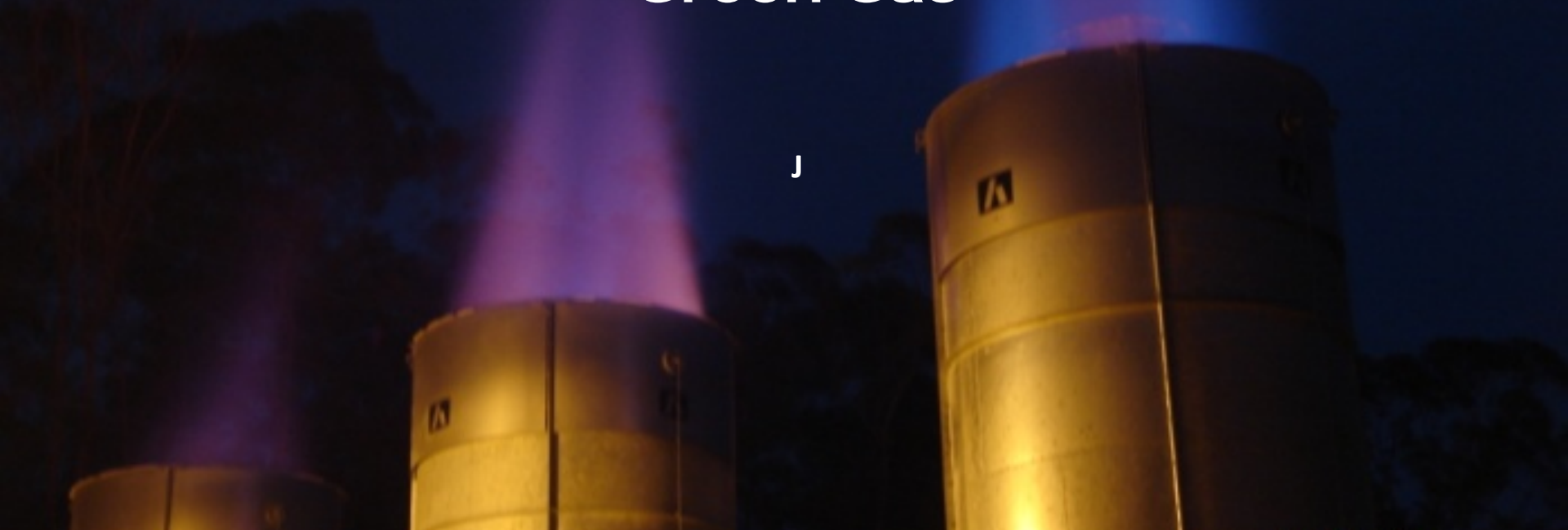


Biogas in the network

Project Novo Gramacho

First purification plant in South America

Green Gas



Biogás





NOVO GRAMACHO & GÁS VERDE

Gramacho landfill

- Landfill area: aprox. 200 hectares;
- Operation Period: from 1978 until 2012 ;
- 9,000 mil tons per day;
- 70 millions tons
- Income: CER + sale of BIOGAS to Petrobras / REDUC (contract take or pay de 20 anos).

GRAMACHO Landfill - 1980

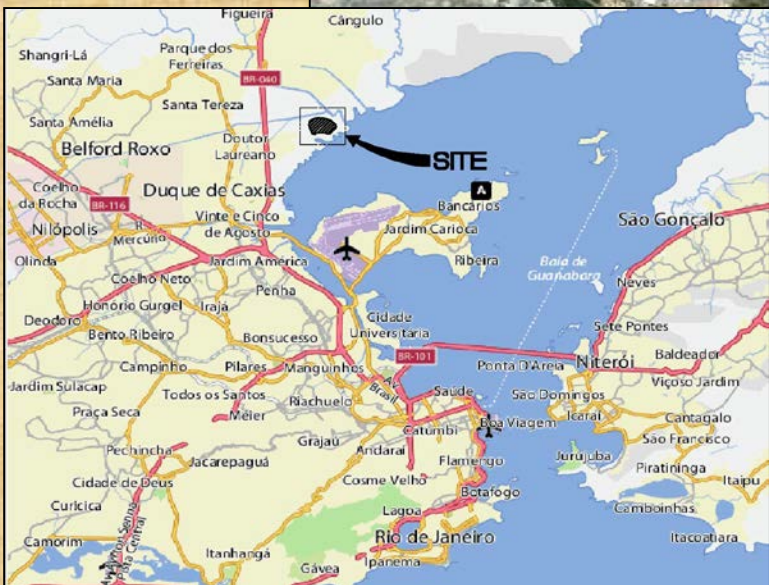
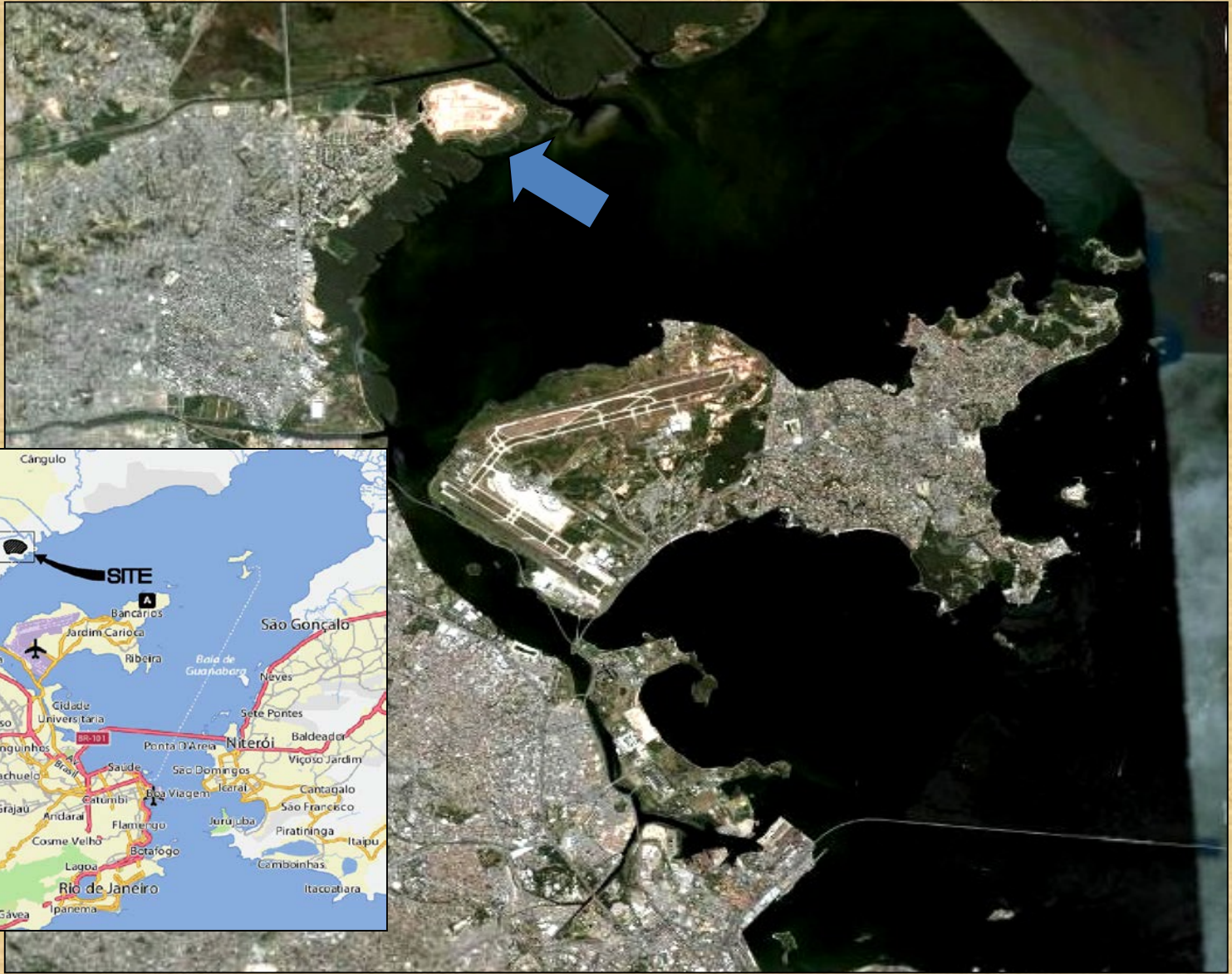


Gramacho Landfill (View January 2012)

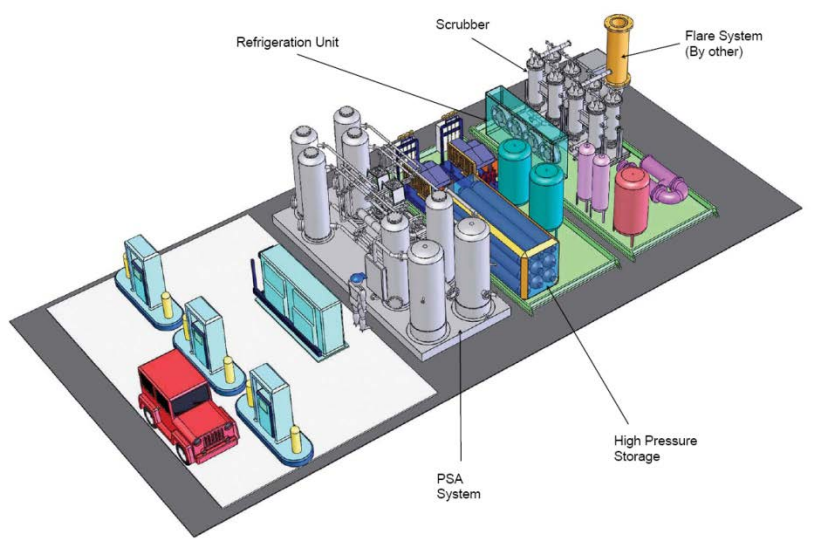




LOCAL



GRAMACHO LANDFILL



Changing the Natural Gas to Green Gas (purified biogas to 95% CH₄)

BIOGAS RECOVER AND PURIFICATION GRAMACHO LANDFILL



BIOGAS RECOVER AND PURIFICATION - GRAMACHO LANDFILL



BIOGAS RECOVER AND PURIFICATION GRAMACHO LANDFILL





Sale of 100,000 to 200,000 m³ /day of purified gas (>92% CH₄) to Petrobras/REDUC



© 2010 MapLink/Tele Atlas

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Pointer 22°44'11.04" S 43°15'25.25" W elev 6 m Streaming ||||| 100%

Eye alt 4.93 km

100 HECTARS OF RECOVERED MANGROVE



NEW SANITARY LANDFILL

- **Environmental protection**
- **Recovery of biogas**
- **Recycling of the C&D**
- **Utilization of waste from trimming**
- **Power generation - 30MW**

NEW SANITARY LANDFILL



NEW SANITARY LANDFILL



UTILIZATION OF TREATED WASTEWATER IN THE STREET CLEANING



ALTERNATIVE EQUIPMENT FOR COLLECTION IN LOW-INCOME COMMUNITIES



ALTERNATIVE EQUIPMENT FOR COLLECTION IN LOW-INCOME COMMUNITIES



ELECTRIC CARS

COLLECTION OF WASTE FROM CLEANSING STREETS



50,000 GREEN MADE (BIOPLASTIC) CONTAINERS FOR HOUSEHOLD COLLECTION



URBAN EQUIPMENT MADE OUT OF PLASTIC WOOD



URBAN EQUIPMENT MADE OUT OF PLASTIC WOOD



WASTE IS ALSO CULTURE





PREFEITURA

Comurb

Galpão
de Artes
Recicladas
Helio G. Pellegrino

Prefeitura da Cidade
RIO
COMLURB

Relações

Prefeitura da Cidade
RIO
COMLURB

For more information on
Environment and Solid Waste Management:

<http://www.rio.rj.gov.br/web/comlurb/>

www.web-resol.org

jpenido@web-resol.org

