

CUENCA, Ecuador

City Information

Population: 505,585

Area (km²): 72.27 km²

Climate: Temperate climate.

Main Economic Activities: Wholesale and retail trade.

City website: <http://www.cuenca.gob.ec/>



Author: Xavier Caivinagua

Country Information

Population: 16,451,843

Area (km²): 256,370 km²

Economy and GNI/Capita

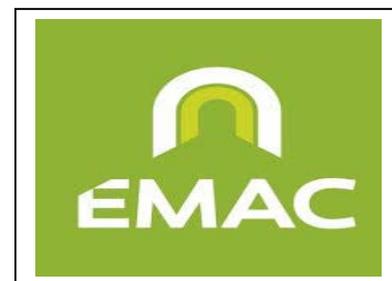
Upper-middle-income economies (\$4,036 To \$12,475) \$ 10,720 per capita in 2013.

Main Economic Activities

Ecuador's economy is the eighth largest in Latin America. It is mainly based on mining, agriculture and fishing. The mining and exporting of oil have played a dominant role in the country's economy since the early 1970's. Recent years have seen Ecuador's economy depend more and more on the export of cocoa and bananas, of which Ecuador is the world's largest exporter and has been for several decades.

Government Agencies responsible for guidance on waste legislation

Ministry of Environment: <http://www.ambiente.gob.ec/>



Classification of MSW

For the integral management of solid waste in Cuenca City, Cuenca's Municipal Waste & Green Management Company (EMAC EP) has classified the MSW into the following groups:

1. Common Generators: Domiciliary, restaurants.
2. Special Generators: Industries
3. Biohazardous generators: Hospitals, clinics, clinics, spa, cosmetic and beauty centers.
4. Organic waste: vegetable waste from markets and food yards
5. Construction Wastes: Debris

MSW Generation

- Urban Area: 198 kg. / year per capita - 0.542 Kg. / day per capita (2015)
- Rural Area: 150 kg. / year per capita - 0.411 Kg. / day per capita (2015)
- Final Disposal in Landfill 142,950.11 Tons/ year, Cuenca Canton 140,913.58 tons/year (2016)

Collection Coverage and Type

98.6% (urban and rural area) Source: INEC /2010

Waste Composition

COMPONENTS	%
Organic Waste	64.39
Paper & Cardboard	6.3
Metals	0.94
Soft Plastic	7.07
Rigid Plastic	3.39
Rubber	0.16
Inert Material	0.26
Glass	2.23
Wood	0.34
Textiles	1.92
Toilet Paper, Diapers	9.61
Tetra pack	1.94
Others	1.46
TOTAL	100

Source: Study "Characterization of household solid waste generated in the canton of Cuenca Year 2015" University of Cuenca.

Waste Management Practice

Solid waste generated by households in the city of Cuenca is collected by the EMAC EP and transferred to Pichacay Landfill for treatment and final disposal, which is done with the highest technical and environmental standards.

Pichacay landfill is located in the parish of Santa Ana, 21 km from Cuenca City. Operations began on September 3rd, 2001 in strict fulfillment with the legal regulations for this type of equipment and it had the Environmental License granted by the Ministry of Environment in December 14th, 2002. Materials such as cardboard, paper, plastic and metals are stored separately before being delivered to the local Association of Recyclers for conditioning and subsequent marketing. Recovery rate 16.05%, 28,000 tons/year (2016).

Organic Waste is processed and converted in to compost and humus. Recovery rate 3.2%, 4,950 tons/year (2016).

Infectious Waste is treated for sterilization and disposed of in the sanitary landfill, 597 tons/year (2016).

Formal Waste Sector

EMAC EP is the public company owned 100% by the city of Cuenca in charge of the integral management of solid waste. It has budget, financial, economic, administrative, and operative and management autonomy; all processes have the International Quality Certification and the final disposition process also has the Environment and Occupational Health and Safety Certification.



EMAC EP provides the following services related to Waste Management:

1. Sanitation Services: sweeping and waste collection system
<https://www.youtube.com/watch?v=eMhHTIKGh3w>
2. Recycling of inorganic materials through the “blue bag” (this bag is collected 1 day per week from all houses in the Canton Cuenca)
https://www.youtube.com/watch?v=WxHX_hwtwEQ
3. Use of organic Waste: Composting Plant “El Valle”
4. Final
5. Disposal Landfill “Pichacay” - <https://www.youtube.com/watch?v=504GUuO7qZs>
6. Bio-Hazardous Waste Sterilization Plant, treatment and final disposal
<https://www.youtube.com/watch?v=DiaozGO4X90>
7. Debris Management for final disposal of construction waste
8. Electricity Generation from Biogas

EMAC EP supports 3 recycling organizations ARUC, AREV and EL CHORRO through the provision of infrastructure and equipment.

Informal Waste Sector

The coverage of the collection service is 98.6% with the remaining 1.4% corresponding to the peripheral areas to which physical access of the collection system (inaccessible roadway) is not available.

According to the studies carried out by INEC 2010 the 1.4% removes their waste by: burning, bury their solid waste, throwing them to a wasteland, ravines, canals or rivers.

Financing of MSW

Since 2001, EMAC EP has had financial autonomy by collecting the income for its normal operation and development based on the "Ordinance that establishes the criteria for the determination and collection of the rate of waste collection and cleaning service".

The rate uses the electric energy consumption as a mechanism for calculating the subsidy of the monthly tariff for each user. This ordinance empowers the EMAC-EP through agreements signed with the Central Electric Company of the South Center (EERCS) to charge the rate of waste collection and cleaning service together with the electric energy service payroll.

The value of the rate is adjusted monthly (Fr) and 80% of the residential sector receives a subsidy from the higher strata and the commercial/industrial sectors.

This mechanism has allowed the company to have no budget deficit. EMAC EP does not receive contributions or economic subsidies from the Central Government or the Municipality of Cuenca.

This situation may change in the near future given a new law for the public service of electric energy, which in general terms prohibits the collection or inclusion in the electric energy bill amounts for other services such as waste collection and cleaning service. This new legal scenario puts at risk the economic and financial sustainability of EMAC EP which is currently analyzed by its administration and board members.

The Budget for EMAC EP for 2017 is \$17 million dollars.

Waste Management Challenges

The main challenge that EMAC faces today is the uncertain economic and financial situation of the company, which has been explained in the previous section.

Other challenges are to maintain the high quality standards that the company currently has and to update it with new processes and technology in waste management.

To face these challenges we have identified the following areas of work:

1. Financial and technical cooperation for the development of projects and initiatives
2. Accompaniment in the development of the master plan for the integral management of solid waste

3. Development of initiatives to increase levels of recovery of organic and inorganic waste
4. Development of operational and managerial personnel skills in waste management

Technical Assistance

- 1) Technical assistance in the Biogas Utilization Plant
- 2) Techniques for the use of organic waste for compost and humus production
- 3) New technologies for the management of solid waste applied to the reality of Cuenca City
- 4) Training to professionals in the area in Solid Waste Management
- 5) Technical Assistance to locate the new landfill
- 6) Identification of hazardous waste that requires special management
- 7) Neutralization of hazardous waste
- 8) Technical Advice for the debris management

General description and overview of common practice

According to the Census of Population and Housing of the year 2010, 77% of households dispose its waste in collecting systems, the remaining 23% dispose of it in various ways, such as throwing them to empty or broken land, burning, burial, dumping into irrigation channels or channels, etc.

In Ecuador, 183 Municipalities manage their solid waste through units or departments, 22 through Joint Public Enterprises (which are those companies where two or more municipalities intervene), 10 with Public Companies and 5 in the Commonwealth.

As many countries in Latin America, the highest percentage of solid waste generated in Ecuador is organic waste which has not been developed yet to its full potential for agro – industrial purposes due the lack of appropriate technologies. (PAHO, 2002 2005)

According to the Census of Environmental information on the Autonomous Decentralized Municipal Governments (2012) household waste composition is mainly covered by 63% organic waste, 12% plastics, 3% glass, 2% metal, 1% wood, 5% paper, 5% cardboard, 1% scrap metal.

Waste Generation (per capita/year)

208 kg / year per capita

Collection Coverage

84.2% of Urban Areas are collected and disposed in approved facilities, and 54.1% in rural areas.

11,203,24 tons collected per day. The uncollected fraction contributes directly to the creation of uncontrolled and informal micro landfills.

Number of Landfills/MSW Disposal rate (tons/year)

Final Disposal	# of Municipalities	%
Open-air dump	52	24%
Controlled dump	57	26%
Popup cell	26	12%
Landfill	85	39%

TOTAL

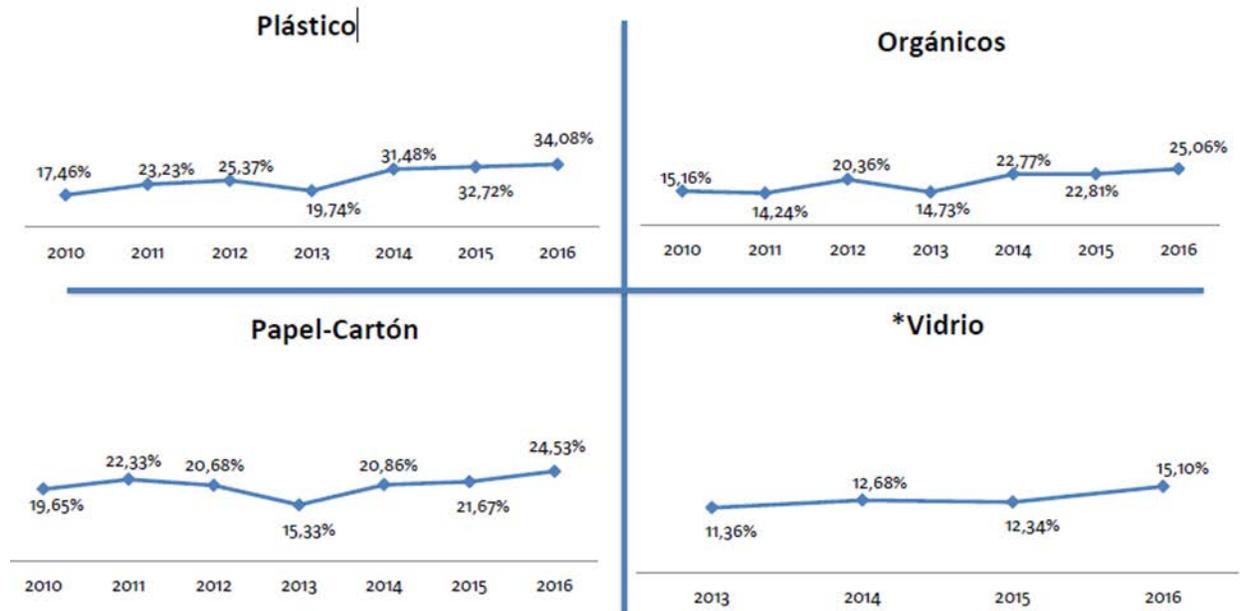
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Recycling Rate

According to the National Program for the Integral Management of Solid Waste - PNGIDS ECUADOR, 25% of the tons produced daily has the potential to be recycled. However, those engaged in this activity barely recover 5% of the waste that could be reused.

In 2016, at the national level, 41.46% of Ecuadorian households classified waste, that is, four out of ten households performed this practice.

At the national level the main waste that is classified is plastic (34.08%), followed by organic waste, paperboard and glass.



At the national level, 58.54% of all households did not classify waste. From 2014 to 2016, it is highlighted that the main reason why these households do not classify waste is due to lack of specific containers or recyclable collection centers

Waste management of Organic fraction (composting, anaerobic digestion)

A national study estimated that in 2014 Ecuador collected about 11,203.24 tons of solid waste per day. Of the total solid waste collected per day, 10% are collected differently between organic and inorganic waste from the source.

Of the 10% that represent 1,135.09 tons collected per day differently in Ecuador, more than 50% is organic waste.

The primary organic treatment is composting. It is implemented by 24 provinces of Ecuador, followed by vermicomposting, bocashi and other unspecified treatments. Cuenca's Municipality has a Composting plant "El Valle" which produces Compost and Humus. Loja City leads the implementation of eight aerobic sites to produce compost.

The composting plant "El Valle" collect 420 tons per month and produce 58 tons of compost and 7 tons of Humus (2016).

Energy Recovery Rate

The municipalities of Quito and Cuenca had implemented anaerobic digestion of organic waste for the production of biogas.

Cuenca's Municipality created the Joint Venture: EMAC - BGP ENERGY CEM, which will capture of 400 m3 biogas per hour, it has a methane concentration of more than 50%.

This Biogas plant will generate MWh in its first phase, 8000 families will benefit from the power supply, resulting in a reduction of 60,000t of CO2 equivalent per year, the equivalent of the emissions of 14,000 vehicles per year.

The Quito Power Generation Plant from Biogas currently operates two generators that produce 40 megawatts of electrical energy per day. During the second phase, 3 additional generators will be implemented with the objective of benefiting 20,000 families with electricity supply, the production of the plant is connected to the national power grid.

City Level

Aimed at improving Waste Management in General

EMAC EP Strategic Plan 2016 – 2021: Presented on December 2016, this document summarizes the objectives, strategies and goals that will allow the development of the institution as a service provider.

<http://www.emac.gob.ec/sites/default/files/Plan%20Estrategico%202016-2021%20%28ok%29.pdf>



Aimed at addressing Climate change and reducing SLCPs through waste related activities

Development and Territorial Planning Plan (PDOT): It is the Municipality's planning instrument that establishes the integral development model, as well as the guidelines and mechanisms necessary to achieve a balanced, equitable and efficient use of the land.

http://www.cuenca.gob.ec/?q=page_planordenamiento

Country Level

Aimed at improving Waste Management in General

NATIONAL PROGRAM FOR INTEGRAL MANAGEMENT OF SOLID WASTE (PNGIDS) created by the National Government, through the Ministry of the Environment, in April 2010. Its objective is to promote the management of solid waste in municipalities of Ecuador, with a comprehensive and sustainable approach; aimed at reducing environmental pollution, improving the quality of life of citizens and promoting the conservation of ecosystems through strategies, plans and activities of training, sensitization and encouragement to the different related actors.

PNGIDS's main goal is to eliminate the open dumps of all the municipalities of the country, and to reduce and use waste in each stage of the value chain.

<http://www.ambiente.gob.ec/programa-pngids-ecuador/>

Aimed at addressing Climate Change and reducing SLCPs through waste related activities

GOOD LIVING NATIONAL PLAN 2013 – 2017 - This plan aligns Ecuador's policies and strategies to ensure the Good Living and Green Economy towards sustainable development. It contains 12 national objectives to achieve the "Sumak Kawsay" – The Good Living.

<http://www.buenvivir.gob.ec/versiones-plan-nacional>

City Level

Legislation governing MSW management

- **ORGANIC CODE OF TERRITORIAL ORGANIZATION, AUTONOMY AND DECENTRALIZATION – COOTAD, October 2010.**

The COOTAD in its article 55 establishes that the Autonomous Municipal Decentralized Governments are the direct responsible of the management of its solid waste.

http://www.oas.org/juridico/pdfs/mesicic4_ecu_org.pdf

- **ORGANIC LAW FOR PUBLIC ENTERPRISES, July 2009.**

This law aims to regulate the constitution, organization, operation, merger, division and liquidation of the Non-financial public enterprises that act in the international, national, regional, provincial or local level.

<http://www.asambleanacional.gov.ec/documentos/Ley-Organica-de-Empresas-Publicas.pdf>

- **ORDINANCE OF CONSTITUTION, ORGANIZATION AND FUNCTIONING OF EMAC EP**

Cuenca's Municipal Waste & Green Management Company (EMAC EP) was established by Municipal Ordinance on December 15th, 1998. It is responsible to provide the public services of: sweeping and cleaning, collection, transportation, treatment and final disposal of solid waste, debris management (construction residuals), recycling of inorganics and organics, production of compost and humus, administration and maintenance of public parks and green areas.

EMAC EP is also responsible to impose administrative sanctions for the violations or breach of the ordinances and regulations related to the provision of services in accordance with the law.

<http://www.emac.gob.ec/?q=content/ordenanza-de-creaci%C3%B3n-emac-ep-0>

- **MUNICIPAL ORDINANCES:**

- Ordinance EMAC EP Creation, December 1998.
- Reform to the Ordinance of EMAC EP Constitution, January 2007.
- Ordinance of Constitution, Organization and Functioning of EMAC EP, March 2010.
- Ordinance that regulates the integral management of wastes and solid waste in Cuenca, April 2003.
- Ordinance that establishes the criteria for the determination of the garbage collection and sanitation rate, April 2001.
- Ordinance for the infectious and special waste, March 2012.

http://www.cuenca.gov.ec/?q=vista_ordenanzas

National Level

Legislation governing MSW management

- **CONSTITUTION OF THE REPUBLIC OF ECUADOR** - Published in the Official Register October 20, 2008

The following articles of the Constitution recognize as a fundamental right of the person to life in a healthy environment, ecologically balanced and free of pollution, also establish the environmental principle of prevention of environmental damage and recovery of natural spaces.

Article 14. *“The right of the population to live in a healthy and ecologically balanced environment that guarantees sustainability and the good way of living (sumak kawsay), is recognized. Environmental conservation, the protection of ecosystems, biodiversity and the integrity of the country’s genetic assets, the prevention of environmental damage, and the recovery of degraded natural spaces are declared matters of public interest.”*

Article 66. *“The following rights of persons are recognized and guaranteed:*

27. The right to live in a healthy environment that is ecologically balanced, pollution-free and in harmony with nature.”

The Ecuadorian Constitution is one of the first in Latin America that recognizes the rights of Nature, that is to say it make nature is subject of rights. The state is obliged to establish effective mechanisms for its restoration, elimination or mitigation of harmful consequences.

Article 72. *“Nature has the right to be restored. This restoration shall be apart from the obligation of the State and natural persons or legal entities to compensate individuals and communities that depend on affected natural systems. In those cases of severe or permanent environmental impact, including those caused by the exploitation of nonrenewable natural resources, the State shall establish the most effective mechanisms to achieve the restoration and shall adopt adequate measures to eliminate or mitigate harmful environmental consequences.”*

It is important to mention the following articles which have direct relation with the MSW management:

Article 83. *“Ecuadorians have the following duties and obligations, without detriment to others provided for by the Constitution or by law:*

6. To respect the rights of nature, preserve a healthy environment and use natural resources rationally, sustainably and durably.”

Article 275. *“The development structure is the organized, sustainable and dynamic group of economic, political, socio-cultural and environmental systems which underpin the achievement of the good way of living (sumak kawsay). The State shall plan the development of the country to assure the exercise of rights, the achievement of the objectives of the development structure and the principles enshrined in the*

Constitution. Planning shall aspire to social and territorial equity, promote cooperation, and be participatory, decentralized, deconcentrated and transparent.

The good way of living shall require persons, communities, peoples and nationalities to effectively exercise their rights and fulfill their responsibilities within the framework of interculturalism, respect for their diversity, and harmonious coexistence with nature.”

Article 276. *“The development structure shall have the following objectives:*

4. To restore and conserve nature and maintain a healthy and sustainable environment ensuring for persons and communities equitable, permanent and quality access to water, air and land, and to the benefits of ground resources and natural assets.”

<https://es.scribd.com/document/33714721/Constitucion-de-la-Republica-del-Ecuador-Version-en-Ingles>

- **GOOD LIVING NATIONAL PLAN 2013 – 2017**

This plan align Ecuador’s policies and strategies to ensure the Good Living and Green Economy towards sustainable development. It contains 12 national objectives to achieve the “Sumak Kawsay” – The Good Living.

Objective 7: To guarantee the rights of Nature and promote environmental sustainability globally. *“With the 2008 Constitution, Ecuador took the lead worldwide in recognizing the rights of Nature, as a decisive response to Nature’s current status, orienting its efforts toward integrated respect for Nature’s existence, it’s maintenance and the regeneration of its life cycles and evolutionary processes.”*

<http://www.buenvivir.gob.ec/versiones-plan-nacional>

- **THE ENVIRONMENTAL MANAGEMENT LAW** - Published in the Official Register July, 2004

The Environmental Management Law is the most important specific legal body pertaining to environmental protection in the country. This law is directly related to the prevention, control and sanctioning of polluting activities to natural resources and establishes environmental policy guidelines, as well as determines the obligations, levels of participation of the public and private sectors in environmental management and permissible limits, controls and sanctions within this field.

<http://suia.ambiente.gob.ec/documents/10179/369324/LEY+DE+GESTION+AMBIENTAL.pdf/be20e96d-f07b-4d31-b8d7-9df8291f5115>

- **PREVENTION AND ENVIRONMENTAL POLLUTION CONTROL LAW**, September 2004

<http://www.ambiente.gob.ec/wp-content/uploads/downloads/2012/09/LEY-DE-PREVENCIÓN-Y-CONTROL-DE-LA-CONTAMINACIÓN-AMBIENTAL.pdf>

- **NATIONAL PROGRAM FOR THE INTEGRAL MANAGEMENT OF SOLID WASTE (MAE – PNGIDS) of the MINISTRY OF ENVIRONMENT OF ECUADOR (MAE)**

The National Government, through the Ministry of the Environment, in April 2010, created the NATIONAL PROGRAM FOR INTEGRAL MANAGEMENT OF SOLID WASTE (PNGIDS), its objective is to promote the management of solid waste in municipalities Of Ecuador, with a comprehensive and sustainable approach with the aim of reducing environmental pollution, improving the quality of life of citizens and promoting

the conservation of ecosystems; Through strategies, plans and activities of training, sensitization and encouragement to the different related actors.

PNGIDS's main goal is to eliminate the open dumps of all the municipalities of the country, and to reduce and use waste in each stage of the value chain.

<http://www.ambiente.gob.ec/programa-pngids-ecuador/>

- **MINISTERIAL AGREEMENTS**

- **061:** Reform of Book VI of the Unified Text of Secondary Legislation, Chapter VI Integral Management of Solid, Non-Hazardous Waste, And Hazardous And / Or Special Waste, May 2015.
- **031:** Reform to the unified text of Secondary Legislation of the Ministry of the Environment of Book VI, Annex 6, Process of Technical Closing and Sanitation of Solid Waste Bottoms and Technical Viability, May 2012.
- **052:** Reform of Ministerial Agreement No. 031 of April 04, 2012, published in Official Gazette No. 705, on May 17, 2012 "Reform of the Unified Text of Secondary Legislation of the Ministry of the Environment of Book VI of Annex 6, *Process of Technical Closing and Sanitation of Solid Waste Bottoms and Technical Viability* ", June 2013
- **020:** Integral Management of Used Tires, Abril 2013.
- **129:** Reform of Ministerial Agreement No. 020, January 2014.
- **098:** Instructions for the Management of Used Tires, August 2015.
- **021:** Integral Management of Plastic Waste for Agricultural Use, April 2013.
- **022:** Instructive for Integral Management of Used Batteries, April 2013.
- **026:** Register of Hazardous Waste Generators, May 2008.
- **048:** Cement Furnace Hazardous Waste Coprocessing Standards, May 2011.
- **142:** List of Hazardous Chemicals, Hazardous and Special Wastes, December 2012.
- **146:** Procedures for the integrated and environmentally sound management of polychlorinated biphenyls (PCBs) in Ecuador, January 2016.
- **190:** National Post-consumption Policy for Disused Electrical and Electronic Equipment, January 2013.
- **191:** Instructive Principle of Responsibility Regulation Control Substances, January 2013.
- **5186:** Interministerial Regulation for the Integral Management of Sanitary Wastes, November 2014.

<http://suia.ambiente.gob.ec/acuerdos-ministeriales>

Guidance for MSW management (after legislation, before inspection activities)

The Ministry of the Environment - MAE, in concordance with the stipulated by the Ecuadorian people in the Political Constitution of the Republic of Ecuador of 2008, will watch for a healthy environment, the respect of the rights of the nature or "*pacha mama*". It will ensure a sustainable model of environmentally balanced development that respects cultural diversity, preserves the biodiversity and natural regeneration capacity of ecosystems, and ensures the satisfaction of the needs of present and future generations.

<http://www.ambiente.gob.ec/>

Inspection activities/supervision and enforcement of legislation

The Ministry of Environment – MAE is the national authority responsible to define a control system and monitoring of norms and parameters, permitting and licensing of potentially polluting and related activities.

Current Projects or Activities Aimed at Reducing SLCP Emissions

- **Use of organic Waste: Composting Plant “El Valle”:** created in 2004 this plant collects 420 tons per month of organic waste from 6 big markets in the Cuenca. It produces 58 tons of compost and 7 tons of Humus.

Objectives:

- Reduce the use of chemical fertilizers in the region, through the promotion and use of compost and humus.
 - Encourage afforestation and reforestation of the Canton Cuenca through the provision of compost as a basic substrate.
 - Contribute to the expansion of cleaner and healthier agricultural production in the region.
- **EBE Biogas Plant:** In 2012, the mixed economy company EMAC-BGP ENERGY CEM was formed for the implementation of the electric power generation plant, based on the biogas generated at the Pichacay landfill. This project will reduce the emission of greenhouse gases that are generated due to the decomposition of the organic matter contained in solid waste collected in the Cuenca canton and arranged in the landfill.

In 2016, the total reduction of methane gas was achieved in an approximate volume of 76,500 m³, since the beginning of the operation of the Bioprocessor in February 2016.

With the operation of the plant is expected to reduce from 60,000 tons. Of CO₂eq per year, equivalent to removing 14,000 vehicles per year.

- **Inclusive Recycling Plan:** it was implemented since 2006, as one of EMAC EP main environmental protection policies, its objective is to extend the life of the “Pichacay” Landfill and improve the socioeconomic conditions of the more than 600 organized and Independent recyclers.

Key Stakeholders

STAKEHOLDERS	WEB LINK
Cuenca's Municipality	www.cuenca.gob.ec
Santa Ana Parish	www.santaana.gob.ec
Economic Development Municipal Public Company – EDEC EP.	www.edec.gob.ec
Vicente Corral Moscoso Hospital	www.hvcm.gob.ec
Politécnica Salesiana University	www.ups.edu.ec
Cuenca University	www.ucuenca.edu.ec
Azuay University	www.uazuay.edu.ec
Environmental Management Commission	http://cga.cuenca.gob.ec/
José Carrasco Arteaga Hospital - IESS	www.iess.gob.ec
Municipal Company for Telecommunications, water, sewerage and sanitation.	www.etapa.net.ec
Ministry of Education	www.educacion.gob.ec
Ministry of Environment	www.ambiente.gob.ec
Citizen Security Council	www.csc.gob.ec

Additional Useful Information

- Ministry of Environment
<http://www.ambiente.gob.ec/programa-pngids-ecuador/>
<http://www.ambiente.gob.ec/hitos-en-la-gestion-integral-de-los-residuos-solidos-en-ecuador/>
- Organic Law of Public Companies
<http://suia.ambiente.gob.ec/documents/10179/185880/ACUERDO+061+REFORMA+LIBRO+VI+TULSMA+-+R.O.316+04+DE+MAYO+2015.pdf/3c02e9cb-0074-4fb0-afbe-0626370fa108>
- Association of Ecuadorian Municipalities
<http://ame.gob.ec/ec/institucion/objetivos-estrategicos/>
- National Secretariat for Planning and Development
<http://www.planificacion.gob.ec/23196-2/>
- Good Living National Plan
<http://www.buenvivir.gob.ec/el-sistema-nacional-de-planificacion>

- Metropolitan Public Company for the Integral Management of Solid Waste - EMGIRS EP
<http://www.emgirs.gob.ec/>
- National Institute of Statistics and Censuses (INEC)
<http://www.ecuadorencifras.gob.ec/los-ecuatorianos-producen-057-kilogramos-de-residuos-solidos-diario/>
- Secretary of environment Metropolitan District of Quito
<http://www.quitoambiente.gob.ec/ambiente/index.php/politicas-y-planeacion-ambiental/residuos-solidos>

Contacts

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