Latin America & the Caribbean • Mexico

PETSTAR: Adding value to the chain of recycling and improving the scavengers’ working conditions

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Sector • Waste
Type of company • Large national company
Summary

With about 85,000 tons of waste generated every day, Mexico is the 10th largest garbage producer in the world. At the same time, tens of thousands of scavengers, including children, are making a living by collecting saleable items from open-air dumps in very poor, informal conditions. From this challenging situation, the founders of PETSTAR saw an opportunity: the opportunity to add value to the plastic collected and close the value chain of recycling by making a link between the scavengers and the bottling industry through the construction of the first bottle-to-bottle recycling facility with this sophisticated technology in Latin America. This innovative project will improve the scavengers’ working conditions – including reintegrating them into the formal economy –, reduce child labor, and increase the population’s awareness about the importance of recycling, while at the same time generating a profit for the company through the sale of the recycled material.

The garbage issue in Mexico

In Mexico, approximately 85,000 tons of waste are generated each day, that is 865 grams per capita, an index higher in large cities where each person generates about a kilo and a half, making this country the 10th largest garbage producer in the world and one of the most contaminated by PET\(^1\). Indeed, most of these wastes are inorganic, including reusable plastics such as PET, which represents about 2 percent of the total waste, or 730 thousand tons.

A LACK OF INFRASTRUCTURE AND AWARENESS

According to the Ministry of Environment, there are currently 650 open-air dumps in Mexico and about 200 landfills\(^2\). Out of the 32 states that make up the national territory, 23 are lagging behind in terms of adequate site selection, design, construction, operation and monitoring to manage the final disposal of municipal solid waste. This generates logistical and social conflicts for organizations that promote recycling.

In addition to the problem of the lack of proper infrastructure needed to efficiently separate and recycle garbage, there is also a lack of awareness in the country about the handling and disposal of such waste. Forty-seven percent of waste does not reach controlled dumping (such as open-air dumps or landfills) but is discarded in woods, ravines and water bodies, thus contributing to the environmental and social challenges that already exist.

An analysis on the problem of municipal solid waste in Mexico made by ECOCE\(^3\) reveals three major trends. At the society level, there is a low education and environmental awareness, a custom for the inadequate provision of waste, and a lack of respect for the

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\(^1\) Polyethylene terephthalate, commonly known as PET, is a thermoplastic polymer resin mainly used in synthetic fibers and liquid containers such as plastic bottles.

\(^2\) Contrary to open-air dumps, landfills are sites dedicated to the final disposition of waste where layers of waste are compacted with machinery and covered with layers of land in a way that protects the groundwater.

\(^3\) ECOCE (Ecología y Compromiso Empresarial) is a not-for-profit association of industries in charge of the first national management plan of PET waste that focuses on raising awareness on environmental issues and preventing the contamination of water, air and soil.
authority. At the industry level, the participation is uncoordinated and insufficient due to a lack of regulations and instruments that generate certainty. Finally, at the government level are found inadequate waste management systems, an issue considered as a low priority among municipalities. There is also very little legislation on the subject, no national master plan and a lack of proper coordination between different levels of government.

**THE UNIQUE CHARACTERISTICS OF PET**

Nevertheless, PET has unique properties that make it a very relevant product to recycle:

− It is an internationally approved material for use in foodstuffs;
− It allows minimizing the use of drinking water for washing containers;
− Its production is clean and low in power consumption;
− Manufacturing a package requires few material, thus reducing the amount of waste;
− It allows optimizing transport logistics and distribution, thus decreasing its environmental emissions;
− It has great versatility and its chemical composition is simple;
− PET packaging is of great help in situations of natural disasters given its isolating properties;
− It is 100 percent recyclable.

If managed properly, PET recycling can generate significant profits and jobs. However, it also requires an important investment at both economic and social levels.

**Profile of scavengers (pepenadores)**

In Mexico, people working informally in open-air dumps or landfills are known as *pepenadores*. There are an estimated 25,000 to 30,000 pepenadores (many of them children) in Mexico City alone, separating and selling recyclable material for a living. The work of scavengers, although despised by the Mexican society and overlooked by public authorities, is an important link in the supply chain, for providing almost all raw materials recycled in the paper, plastic, aluminum, iron and glass industries.

“We are a firm believer of the “pepenador” as a very valuable element in the plastic supply chain.” – Ing. Jaime Cámara, CEO, PETSTAR.

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4 Source: ECOCE
The scavengers’ community is very diverse. Many of them are scavengers from generation to generation; others because they saw in the collection business an opportunity to earn more than in the formal sector; others are “travelling scavengers” who have temporarily left their agricultural occupation and have sought scavenging as a means to increase their income. The recyclable materials range in value of 1 peso (US$0.10) for a kilogram of cardboard, 14 pesos (US$1.4) for a kilogram of aluminum and up to 100 pesos (US$10) for a perfume bottle. A typical scavenger can thus earn up to 300 (US$30) pesos a day, i.e. more than the official daily minimum wage of about 50 pesos (US$5). And leaders can even earn up to 30,000 pesos (US$3,000) a week! According to sociologist Hector Castillo Berthier, this market generates about US$50 million a year.

Scavengers usually follow a leader, either imposed or natural. However, there is almost no sense of community identity among scavengers, who operate in a very competitive environment where people live on a day-to-day basis. Life in dumps is characterized by poor and dangerous hygiene conditions (due to burns, smells and toxic gases), violence, drugs and leadership conflicts. Scavengers typically live in the informal economy, where a leader acting as a middleman is in charge of controlling a group of about 100 to 200 people who give him the products they collect against a financial compensation.

An opportunity for PASA and Avangard

Promotora Ambiental S.A.B. de CV (PASA), a publicly listed, leading Mexican environmental services business with operations in 42 cities and revenues of US$193 million in 2005, and Avangard, the largest collector of post-consumer plastic in Mexico, with 800 employees, saw in this challenge an opportunity to add value to the chain of recycling and improve the scavengers’ working conditions.

THE DRIVERS OF PASA’S INVOLVEMENT

PASA began its operations in 1991, offering management services through the disposal of garbage collection, using a model that was successful in other countries, i.e. companies providing the garbage collection services to the private and public sectors more efficiently. The area of garbage collection presents an opportunity for sustained growth due to a favorable environment, created in part by the legislation, which allows companies such as PASA to work in the market of waste management traditionally controlled by public authorities.

As part of its social responsibility, PASA promotes recycling but faces many challenges in its endeavor, especially at the economic level. Indeed, in the case of house trash, the garbage that can be recycled comes in very small quantities, resulting in outputs around 8-12% and thus making recycling an unprofitable business. Another way to operate recycling is by making citizens cooperate by segregating garbage themselves, thus raising the output to 70-80% and making recycling a profitable business. However, this condition is hampered by the lack of environmental awareness of the Mexican citizens.
As a result, Alberto Garza, CEO of PASA, looked for a project through which garbage recycling and processing could generate a product with high added value. Given the informal nature of garbage collection in Mexico, the main obstacle was to obtain a steady flow of recyclable materials. In addition, such a project would require the involvement of willing and complementary business partners.

**AVANGARD AS A NATURAL PARTNER**

With more than 13 years of experience in the market for garbage collection and segregation, Avangard was presented as an important possible trading partner for PASA. Besides being the market leader in the collection and segregation of approximately 100 thousand tons of PET per year in Mexico, Avangard had excellent working relations with scavengers. This relationship was developed over the years through confidence and the ability to generate certainty for the scavengers. Indeed, in the last 10 years, Avangard established a network of four different types of PET suppliers coming from about 1,300 sites in 22 states around the country (see table 1). In the dumps or landfills, for the purpose of scale and efficiency, Avangard buys the material directly from the leaders. It is estimated that about 2,600 people (including 10 to 25 percent of children) contribute to PET collection in 184 sites.

Table 1: Avangard’s suppliers (2006)

<table>
<thead>
<tr>
<th>Type of suppliers</th>
<th>Avangard’s supply sites (%)</th>
<th>Avangard’s supply volume (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers who separate PET at source</td>
<td>67</td>
<td>3</td>
</tr>
<tr>
<td>Suppliers who separate PET during the collection process</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>Informal suppliers who separate PET in dumps or landfills (pepenadores)</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>Intermediaries who collect PET from the three previous groups</td>
<td>12</td>
<td>44</td>
</tr>
</tbody>
</table>

Source: Adapted from IFC’s Environmental and Social Review Summary

Moreover, Jaime Cámara, CEO of Avangard, has been working for 8 years on the launching of a recycling plant, which could convert PET garbage collected by Avangard into reusable grade resin. This would close the cycle of PET in the national territory, providing greater stability to the market in Mexico and reduce the dependence on China, Avangard’s main client (see Figure 1). Such a project would therefore give Avangard a significant competitive advantage compared to its six competitors.
FINDING THE START-UP CAPITAL

After a series of negotiations, PASA and Avangard decided to form the company PETSTAR, with the aim of generating a PET processing plant. To implement this plant, an investment of approximately US$28 million was necessary, of which US$10 million would come from PASA, while Avangard would contribute 100 percent of its own infrastructure and know-how in PET collection. The scheme that emerged was 65 percent of the shares for PASA and 35 percent for Avangard. The remaining capital would be raised through external financing.

In terms of external financing, it was envisioned that debt will be financed by PETSTAR itself once operational. In their search of banks willing to provide this funding, the stakeholders came across the World Bank’s International Finance Corporation (IFC), which showed much interest in the project for its environmental and social perspective, especially the inclusion of the scavengers into the formal economy. However, one concern expressed by IFC was the issue of child labor. To answer this concern, the proposal of PETSTAR included two pilot social projects in the municipality of Chimalhuacán, State of Mexico, and in Ciudad Juarez (see Figure 2) aimed at reducing child labor in collection sites. On May 2007 the IFC came on board and agreed to provide funding (US$18 million) as well as technical assistance to better structure the project.

Because of the devaluation of the dollar and the fact that the technology was of European origin, the cost of the project grew from US$28 to $34 million. Against this situation, the World Bank agreed to increase its funding with a mixed pattern of debt by which about US$15 million would constitute pure debt and about US$8 million would consist in subordinated debt. It is expected that the return on investment will be reached within five years.
Adding value to the recycling chain: PETSTAR

THE PLANT

PETSTAR is located near the city of Toluca, State of Mexico. The plant, currently under construction, is expected to be operational in January 2009. The plant will cover an area of 25,000 square meters and will operate 24 hours a day, 365 days a year. Due to the high-tech automated machinery (imported from Italy and Switzerland) the plant will be operated by only 65 technicians. The plant’s proposed processing capacity will be 32 thousand tons of PET a year, which will be exclusively supplied by Avangard.

The PETSTAR plant will become the third bottle-to-bottle facility with this sophisticated technology in the world and the first one in Latin America. The scheme offered by PETSTAR will create greater stability to the market of PET in Mexico, currently at the mercy of the international market. Therefore, closing the production cycle within the national territory will result in prices being set up in function of the domestic rather than the international market.

5 Toluca was selected for being close to Mexico City, therefore well connected to infrastructure, and for being in the country’s central area where most of the PET is collected.
This not only provides greater certainty to investors, but also to garbage collectors, who operate in an informal economy and do not know at which price they will be able to sell their products. Thus PETSTAR is not only conducive to growth market in Mexico, but also addresses the problem of management and reuse of trash, together with the social issues it implies.

THE RECYCLING PROCESS

The PET will be delivered in bales by Avangard and will be processed by the recycling plant. In the first stage of the process, the PET is washed, segregated and crushed, resulting in a product called “flake”. The segregation consists in extracting from the material the contaminating elements (such as non PET bottles, dirt, labels, caps, etc.), which represent about 20 percent of the original bales. In the second stage, the flake is extruded into a pellet and then through a thermal process to re-polymerize and de-contaminate it, generating a food grade resin called “PCR” with a high value added that will be sold to bottling companies. For every kilogram of PET introduced, about 800 grams of resin is obtained. The whole process, from the introduction of PET to the generation of the resin, lasts about 9 to 12 hours. Each kilogram of PET represents about 35 bottles and requires 1 liter of water in order to be processed. In order to avoid wasting a large amount of water, the plant will include a water treatment facility that will enable to reuse the water in the process.

The business model of PETSTAR is mainly based on two aspects. The first one is the guarantee of raw material supplied, which will be covered by the know-how of Avangard and its capacity of 90 thousand tons of input per year. The second one is the stability and certainty given to the market of PET in Mexico along its supply chain, removing foreign intermediaries traditionally responsible for processing and recycling the raw material (see figure 3).
In addition to contributing to the protection of the environment, the plant also helps reducing the gap between the scavengers and the final product, reallocating the resources traditionally owned by the intermediaries into programs that improve the scavengers’ quality of life.

“The new plant will have an important environmental and social impact in Mexico, while also helping transform PETSTAR into a solid and profitable operation.” – Alberto E. Garza Santos, CEO, PASA

Social and environmental impacts

REDUCING CHILD LABOR
The primary objective of PETSTAR’s social responsibility is reducing – and in the longer term eliminating – the participation of children in the recycling industry’s supply chains.

PETSTAR will start with two community development pilot projects set in an open-air dump in Chimalhuacán (State of Mexico), and in a landfill located in Ciudad Juarez. With a budget of US$670,000 over a two year period, PETSTAR’s idea is to create Centers of Community Education and after-school

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6 Source: IFC 2007
7 The site selected originally was the one of Tijuana but problems of violence and leadership hampered the development of the project.
childcare facilities for scavengers’ children. The objective is to target children under 6-8 years old, because beyond that age many children prefer earning a living by working as scavengers rather than attending school. Within the next 6-7 years, PETSTAR should be able to offer the entire primary education. Once their educational level reaches the State standard, the children will then be reintegrated into the public education system.

PETSTAR also needs to define the age from which a scavenger would be considered a “child” given that the threshold of 16 years old defined by the International Labor Organization is not realistic in this particular context: “at 16 years old, they already have spouse and children!” explains Mónica Cantú, Coordinator of PETSTAR’s CSR project. The first Centers will open their doors in the first semester of 2009 and will also create job opportunities for adult scavengers (e.g. van drivers, cleaning agents, etc.).

**IMPROVING THE SCAVENGERS’ WORKING CONDITIONS**

In order to improve working conditions, efficiency and cleanliness of collected material, PETSTAR is planning to create segregation centers for adult scavengers. These centers will include key elements such as a roof, a cafeteria, restrooms and electricity. Furthermore, adults who will work in those segregation centers will be offered a formal contract, including social security and other benefits that will include them into the formal economy. It is estimated that the project will provide an income to approximately 25,000 people along Avangard’s supply chain.

**RAISING ENVIRONMENTAL AWARENESS**

An important aspect for PETSTAR is raising environmental awareness among society. An important part of the project consists in raising awareness among PETSTAR’s own employees, most of who do not realize that many children are working as PET suppliers.

Together with ECOCE and in partnership with schools, PETSTAR will also engage in a program for children through which each kilogram of PET recycled by the children at school will be rewarded with an “eco-point”, which, once cumulated, can be exchanged for presents such as balloons, blackboards, computers, DVDs and bicycles.

Furthermore, the new plant will include an auditorium where PETSTAR will give conferences and organize guided tours inside the plant to explain the work of the company and the importance of recycling. This auditorium aims to welcome a wide audience, including children, scavengers and public authorities.

**PROTECTING THE ENVIRONMENT**

Being in the recycling business, PETSTAR directly contributes to the protection of the environment. The company whose very vision is, to “recycle plastic for a better world”, is committed from the onset to social, economic and environmental responsibilities.

In addition, PETSTAR is preparing an environmental and social impact assessment of the project that will focus on the potentially negative impacts in its area of influence, identifying any relevant prevention and mitigation measures as required by regulation in order to obtain...
an environmental operating license issued by the Secretariat of Environment and Natural Resources. Monitoring indicators will be established, including water consumption rates, pollutant emissions, and waste generation and disposal volumes. The water treatment plant to be included in the facility is already a guarantee of PETSTAR’s commitment to protect the environment.

**Key challenges faced and solutions found**

**ESTABLISHING A RELATIONSHIP OF TRUST WITH THE LEADERS**

An important aspect of PETSTAR’s success is to build relationships with the scavengers’ leaders, known to be very jealous and distrustful. Taking almost a year, through numerous field visits, patience and human tact, the relationship between PETSTAR and the leaders was established. Through this relationship, PETSTAR was able to obtain important information such as the number of children working and services that the scavengers were lacking. However, those relations are still very fragile and can end promptly if PETSTAR fails to meet its commitments.

**ENSURING THE PARTICIPATION OF THE SCAVENGERS**

One of the first obstacles that Avangard faced was to convince the scavengers that, although a light material and therefore not the focus of the scavengers, collecting PET could be a profitable business mainly because of the large quantities available. Providing them with the guarantee that Avangard will purchase the material and that they will make a profit was the only way to commit the scavengers to collect and supply PET on a regular basis. Avangard also managed to convince them by simplifying the collection process through the building of the appropriate infrastructure, including vans and covered facilities. Avangard also helps scavengers organizing themselves into cooperatives in order to develop a formal link with the company.

In addition, PETSTAR had to convince the families – through compensation mechanisms – to let their children abandon the garbage collection for schools that the company would built. In order to compensate the families for the decrease of income that would result, PETSTAR guaranteed to purchase the PET at a price higher than the market price. However, as the education services are free of charge, the families tend not to value it; therefore PETSTAR made sure teachers are certified by the Secretariat of Public Education. The company also envisioned charging the families a symbolic price for the education services provided so that they would value it more but the lack of information on their financial capacities prevented the company from implementing the idea.

In order to gain the scavengers’ trust, PETSTAR is collaborating with different social and religious organizations that were already working on projects with the scavengers. One such organization PETSTAR is collaborating with in order to increase its impact is the foundation

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8 Source: IFC

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“Dibujando un Mañana” (Drawing a Tomorrow), dedicated to supporting children in critical situations.

**OBTAINING INFORMATION ABOUT SCAVENGERS**

In Mexico, there is no nation-wide study about scavengers, their exact number, their working conditions, their income, etc. In order to understand these issues, PETSTAR, in collaboration with the IFC, which provides half of the funding, commissioned the first survey on scavengers at the country level. For six months, the Institute of Social Research of the Universidad Autónoma de Nuevo León (Instituto de Investigaciones Sociales – IINSO), in collaboration with the NGO “Mundo Sustentable” (Sustainable World), will interview scavengers and help building tools for PETSTAR to being able to monitor on a yearly basis the evolution of child labor and the scavengers’ working conditions. The result of the study will be publicly available in December 2008.

**MAKING UP FOR THE LACK OF REGULATORY FRAMEWORK**

In Mexico, garbage collection is becoming more and more privatized as public authorities do not have the financial and human capacity to answer the needs. Furthermore, despite PETSTAR’s attempts in collaboration, the government did not support PETSTAR in any way. One objective of the pilot projects – if proven successful – is being able to add stakeholders such as the government (at the local, federal or national level) by offering concrete, successful solutions. “At some point, the authorities will have to get involved”, foresees Ing. Jaime Cámara. For instance authorities could get involved at the city level by granting land or at the level of the Ministry of Education by assisting the company in its efforts to offer education to child scavengers.

**OBTAINING ACCESS TO FINANCE**

A project as ambitious as PETSTAR’s requires a significant investment and only large companies such as PASA and Avangard, with the help of external funders, are able to finance such an investment. In this respect, partnering with the IFC proved to be a successful strategy. However, access to finance remains a challenge and PETSTAR is still looking for a sponsor for covering the costs of its auditorium.

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9 In September 2008, 300 adults and 100 children had already been interviewed.

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Anticipated business results and perspectives for the future

PETSTAR is a self-sustainable business expected to make a profit through the sale of the recycled material. From a commercial point of view, PETSTAR has already secured sales contracts with DANONE and PEPSI. Another factor that guarantees the success of PETSTAR is the worldwide, inevitable trend towards recycling, more and more demanded by the consumers themselves even though legislation does not always impose it. Furthermore, the recycling and the reduction of child labor appear as competitive advantages, especially in terms of the company’s image. As a result, the commercial risk is quite limited given the upstream work that has been undertaken.

Expectations that PETSTAR presents for the future depend on two closely related factors. On the one hand, PETSTAR will seek consolidating the market of food grade resin in the world with the launch of its second phase in about two years, which will double the production of the plant. But to do so, it will also be necessary to increase the capacity of collecting the raw material. As a result, PETSTAR sees as a fundamental aspect of its growth the consolidation of the social dimension of its project, especially the organization of the scavengers into cooperatives or formal structures, which will make easier for PETSTAR allocating resources to building infrastructure and thus increasing the efficiency of PET collection. Avangard’s long-term objective – if PETSTAR proves as successful as expected – is to recycle its entire stock of PET collected and to diversify the material collected.

Conclusion

PETSTAR is a very unique project in Latin America and is expected to produce very positive results, for the company itself but also for the scavengers’ community, society at large and the environment. “It’s a win-win, but it’s very complicated”, explains Ing. Jaime Cámara, founder and CEO of PETSTAR. Because the project has been meticulously designed for several years, is well funded and is leaded by very dynamic and committed people, there are all reasons to believe that PETSTAR will achieve its goals. If so, it will prove that the social component can and should become an additional decision-making factor for businesses, together with price and quality. Furthermore, being replicable and scalable, PETSTAR’s business model has the capacity to make a significant difference for the tens of thousands of scavengers and their children in Latin America and around the world.
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September 2008

The information presented in this case study has been reviewed and signed-off by the company to ensure its accuracy. The views expressed in the case study are the ones of the author and do not necessarily reflect those of the UN, UNDP or their Member States.

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