

ENVIRO-PURE FOUNDATION

DEVELOPMENT / CONCEPTUAL DESIGN / INTEGRATION / CONSULTANCY



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WASTE PET BOTTLES

QUESTION: BOTTLERS CHARGE FOR EACH PLASTIC BOTTLE SOLD, WHERE IS THE MONEY GOING?

1. Consumers now pay USD 0.05 to 0.20 per bottle to prevent waste plastic, it is said.
2. Only when they are brought back to the stores in some countries, people get a refund.
3. Do the bottlers (Coke, Pepsi, Nestlé and thousands of others) deposit this in a fund?
4. Who gets paid out of his fund? Governments, UNICEF, NGO's, WHO, WorldAid?
5. Scavengers that pick-up the bottles in parks, rivers, landfills, illegal dumps? I DON'T THINK SO.
6. Do they fund manufacturers of recycling equipment? I DON'T THINK SO.
7. Do they pay municipalities that are supposed to recycle? I DON'T THINK SO.
8. Do they pay research institutes to find better ways? I DON'T THINK SO.

So where does the money of consumers go? The bottom line? Another recycling hoax?

Virgin PET plastic for bottles is mostly produced in India, China, Oman and Canada. Brazil, Taiwan and Korea took over after higher tariffs were levied on the material from the former countries. The market for rPET has been fluctuating in the past years, manipulated by the oil-industry, but public pressure now has led to „commitments“ by bottlers to go for 100% recycling.

The Coca-Cola plant in The Netherlands (population 17 million) pumps-up 10,000-years old pristine mineral water at the rate of 950,000,000 L/year. Coke CEO claims 1 L product means 1.5 L water requirement or 633,333,333 L, average at 1.3 L/bottle: approx. 490,000,000 bottles at average weight of 25 g = 12,250 Tons. So, Coke-Netherlands gets USD 25+ Million from the surcharge on each bottle. WHERE DOES THIS GO? And all the deposits worldwide? Who checks this? Many machines at supermarkets to return bottles are out of order because of fouling by rest-products, under repair/maintenance, and people end-up throwing them in the waste (recycle?) containers anyway. Or maybe does the money go to the waste mafia, for containers with fraud papers to unspecified destinations direction Turkey and SE-Asia?

In the case of The Netherlands, Coke needs 25% rPET by 2025 = 3,060 MT (Metric Ton), by 2030 50-100% or MX12,240 MT. So until 2025 they need approx. 10 MT/day of rPET to make 450,000- 500,000 bottles a day. However, these can be found on the (illegal) dumps in Indonesia, Malaysia, Philippines, Thailand and Vietnam, EXPORTED UNDER FALSE PRETENCE AND PAID WITH TAX-MONEY.

Tap water in The Netherlands and some other European countries is highest quality drinking water, bottled water is just a status or fashionable product, so per capita consumption is much lower than countries where tap water is not really potable such as in ASEAN, hence the huge market for bottled water.

Philippines and Mexico are the largest consumers of Coca-Cola per capita in the world. Estimated demand in Philippines 4 x Netherlands, just CC! Note: Coke and Pepsi also sell „mineral“ water under various brands; these are included in the total bottling capacity.

Worldwide, Coke produces **4,000 bottles per second**, depleting many wells! Just the Coke brands! (Source: Coke VP Michel Goltzman) Causing water shortages for locals: see video of San Christobal de las Casas in Mexico and use. They BUY 3.15 billion Tons/year of PET to be dumped everywhere in the world mostly after 1 time use! JUST COKE!

1/6

Registered in The Netherlands in 1989, ENVIRO-PURE FOUNDATION Operates Worldwide as a Not-For-Profit Consultancy, Designer and Integrator for Provision of Innovative and Robust Technologies for Safe Drinking Water in Rural and Disaster Struck Areas, Wastewater Treatment and Processing of Waste Plastics.

ENVIRO-PURE FOUNDATION is a continuation of Enviro-Pure Environmental Technologies founded in 1977.



SOME MORE NUMBERS:

270-300 scavengers (obviously not in the Netherlands but in SE-Asia where the waste ends-up) could collect 450,000 to 500,000 bottles per day, during 8 h under the tropical sun, 1,500 bottles each or 37,50 Kg, getting between USD 0.10 and USD 0.30 /Kg (30-40 bottles)= USD 11.25 each. 2 persons per family = USD 22.50/day or USD 540.00 /family/month! Just to cover production of 1 bottling/recycling plant. De-capping, de-labelling, color sorting may be done by hand, followed by shredding/flaking for further processing 10 MT/day, another 200 people.

So, worldwide > 345,000 scavengers and plant-workers could make a salary all year around to recycle COKE waste only, in other words, 170,000 of the poorest families could earn 2 x minimum income. To cover all bottlers of PET worldwide, rough estimate: **1.5 million families, or 7,5 million people lifted out of poverty?**

Provisional gross profit for a mostly manual process at 10 MT/day = USD 1.73 million/yr (based on 48 weeks of 6 days), providing approx. 300 jobs for unskilled people.

Approaching the situation as per above, ROI numbers will be more attractive for investors and governments who presently are not showing interest.

Parallel to the pre-sorting/pre-processing of PET, the other 6 waste plastics of the dumps, river banks, beaches etc, combined with 10-20% rejected PET can be collected and transformed into a lower grade plastic, but proven, building material as per examples below to build typhoon and earthquake resistant, durable houses designed by an experienced architect and our Australian partners.

PET is only 8% of the total waste plastic volume, the remaining 92% (PVC, film, LDPE, HDPE, PP) has less value but can be recycled/ upcycled to end-products that will fetch approx. USD 2.88/kg on average, with highs up to > USD 10/kg as demonstrated by various established companies in Europe.

The total amount of dumped waste plastics, complemented by the daily on-going streams provides work for millions of people during 50+ years until a balance has been reached of waste plastic from consumers goods and recycling it.

The dumps exist, technology exists, but unfortunately the political will and commitment doesn't.

A 44 m2 2-bedroom house built of waste plastic bricks needs approx. 1,200 bricks of 1.6-3.3 Kg plus recycled plastic beams. Daily capacity of a small shredder, washer and extruder: >4 MT is approx. 1 house per day. Estimated material costs for skeleton 2-bedroom house including doors, windows, roof, floor: USD 5,500-6,500; incl. labor: 4 man - 5 days

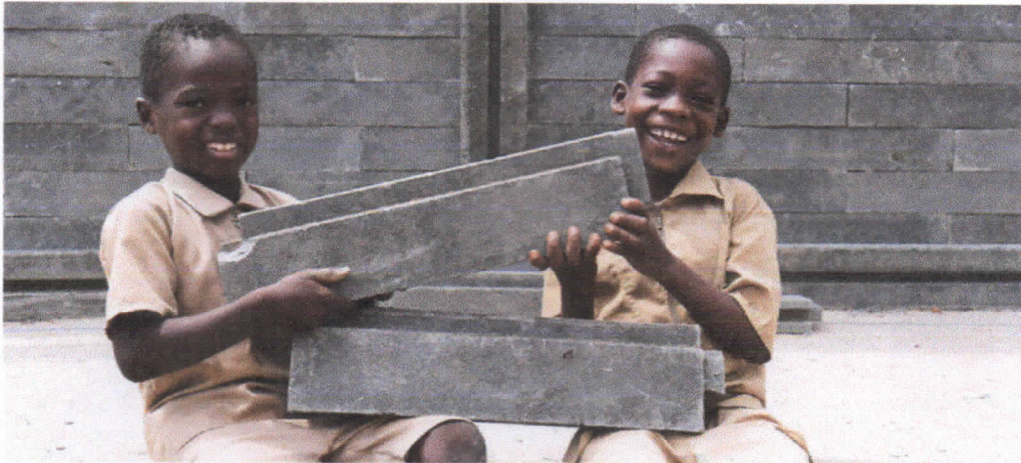
Based on loan at 6% and amortization in 7 years, monthly payment : <USD 90/month for owner or housing corporate. Life cycle material: 50+years and recyclable. Low maintenance, no or limited repair costs after natural disasters, no structural damage due to flexibility. Fire resistant. Good insulation (heat, cold, noise) properties. Better than wood but just as easy to saw, plane, nail, screw; no rotting, not eaten by rodents etc. Scavenging of 4,000 Kg/day means sales of USD 11,520/day, more scavengers means more jobs and bigger total revenues. Collecting 4 MT/day requires 70-100 scavengers at 50 Kg/day at 0.20/ kg is USD 10 or USD 480/month/family with 2 able persons, more than 2 x minimum wage in most SE Asian countries.

Combined with our low cost kiosk based, WHO compliant, potable water provision through PE-refillable 5 USG bottles at USD 0.20, against 0.40-60 in most countries in SE Asia, a real advancement for people at the bottom of the pyramid can be realized, paid for by the bottlers and sale of waste plastic bricks with additional jobs provision.

The positive side-effect of limiting deforestation and reduction of micro-plastics is a bonus but cannot be used in ROI calculations. They may be helpful in getting permits/cooperation from governments and depend on the level of vested interests in writing/getting the permits and political will.



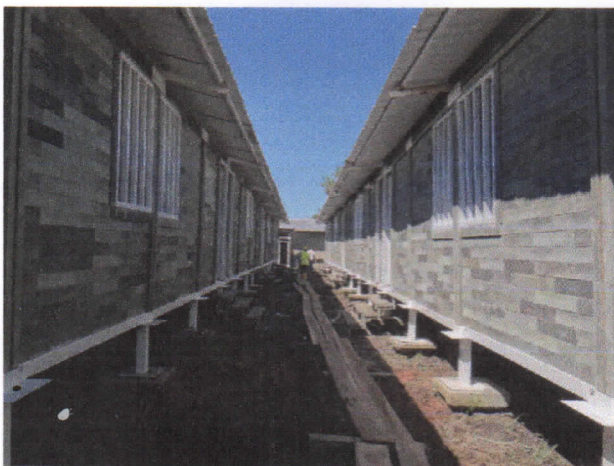
Imagine, 300 solid houses per year from one small local recycling plant near a waste dump.



Project in Ivory Coast – W-Africa



School in S-America





Pictures from projects in S-America and Ivory Coast: Soluciones Plásticas

4 Tons processed waste plastics from landfills are being converted in a house at 30-50% lower cost than traditional houses: USD 5,500, developed in collaboration with Dow Chemicals

In 2019, the inventors partnered with UNICEF to develop a factory to convert plastic waste in Côte d'Ivoire (Ivory Coast) into modular, easy-to-assemble, low-cost plastic bricks for classrooms.

'this project is more than just a waste management and education infrastructure project; it is a functioning metaphor—the growing challenge of plastic waste turned into literal building blocks for a future generation of children,' concluded the UNICEF representative.

„We're working with this organization to help build sustainable classrooms using self-assembling bricks made out of hard-to-recycle plastics, such as potato chip bags. These bricks are fire-retardant, naturally cooling, durable, sustainable and recyclable. Their innovative creation process produces nearly zero waste and tackles two global issues—plastic waste and a lack of adequate classrooms, homes and shelters—while creating a more circular economy". Comment from local official.

Expertise for the recycling process is warranted by the experience of the inventors since 2016, building > 600 houses and schools in S-America and Ivory Coast – W-Africa.

Our Business Development Manager, a leading European waste plastic recycling specialist, and one of our Board Members, a Graduate Polymer Chemist with > 40 years of experience in membrane technology and applications in food-and beverage industry supplement the expertise of ENVIRO-PURE FOUNDATION, started in 1977 as a privately owned pioneer company in industrial wastewater treatment and recycling and novel drinking water treatment in Europe.



3000 

Tons of recycled plastic
A 50 cm brick is 3.3 kg of collected material.

Four days of labor to assemble

3 

Three adults with basic training are enough.

No
decomposition



Do not deal with bacteria or fungi.

Low energy transmission



Natural-conditioned space because of heat and cloud stay outside.

Fire retardant



Our bricks are not firewood.

Modular system

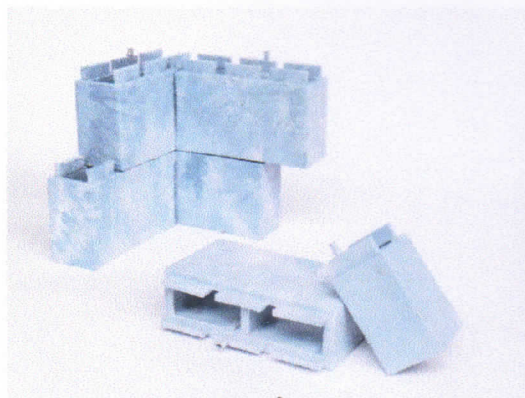
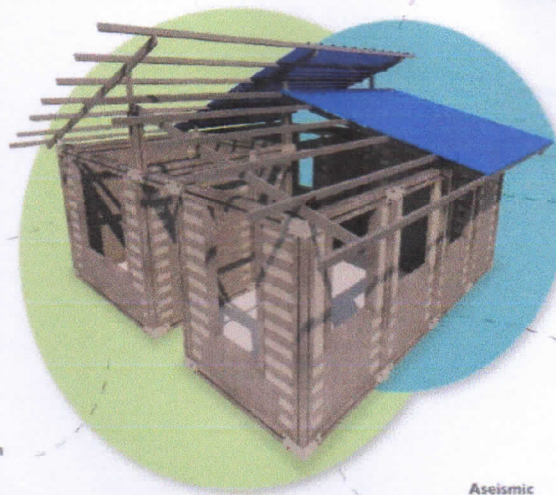


Expand as you wish.

Aseismic



A light and flexible structure



**BUILDING WITH WASTE:
INTERLOCKING BRICKS MADE
FROM WASTE PLASTIC**

View some interesting videos on the subject

https://youtu.be/lqQuG_JUqhq

<https://youtu.be/60O62xoaJno>

https://youtu.be/F55pilg_Xck



THE PROCESS

DESIGNED FOR RECYCLING FACILITIES WITHIN 20 km OF DUMP-SITE OR LANDING-PLACE

1. Scavengers pre-select PET bottles, PE bottles and rest waste plastic such as films, bags, etc. at dumping site and deposit in separate sacks
2. Sacks are delivered by small truck or tri-cycle to processing plant, cost to be estimated. Small truck can haul 2,000 Kg/trip = 5 trips/day at max. 40 km = USD 50-100
3. At processing plant sacks are weighed, labelled and registered for pay-out to scavengers and tracing to prevent fraud by loading rocks in sacks with plastic (it happened!)
4. Estimated weight of scavenged PET 5,000 Kg (no metals, cartons, wood, oil-containers) by 100-150 people/day, 5,000 Kg PE and rest WP by 100-150 people, total pay-out USD 2,500 to 3,750/day
5. PET and PE sacks are loaded to separate conveyor-belts or tables (manually)
6. PET bottles are sorted by color, de-capped and de-labeled manually and deposited in 1 m3 bins
7. Prepared PET bottles are manually fed in shredder, flakes are fed in big-bags separated by color
8. Depending on local situation and market-conditions, initially no further treatment at this site
9. PET flakes are sold to pelletizing processing plant for purification. Revenue for flaked and sorted PET $5,000 \times 1.1 = \text{USD } 5,500/\text{day}$. After (hot) chemical wash, drying, extruding to food-grade pellets to produce new PET bottles at bottling plants. Revenue $5,000 \times \text{USD } 1.75 = \text{USD } 8,750$
10. Net income plant based on PET flaked = $\text{USD } 3,400/\text{day} \times 288 \text{ (48 weeks)} = \text{USD } 979,200/\text{year}$ less CAPEX / OPEX other than salaries. Food grade pellets: USD 2,000,000
11. PET reject, caps and plastic labels to be mixed with PE bottles for separate flaking
12. PE flakes to be sold or processed with mixed plastics (film, bags etc) for production on site of bricks and beams as per Soluciones Plásticas or similar (washing, mixing, coloring, flame-retardant (if required), melting, molding, cutting, palletizing – transport to storage or customers
13. Gross net end-product PE $5,000 \times 0.80 \text{ to } 2.5x = \text{USD } 4,000\text{-}12,500/\text{day}$

"This innovative approach of transforming plastic waste into construction bricks has a potential to turn a plastic waste management challenge into an opportunity, by addressing the right access to education with the construction of schools, empowering these communities and cleaning the environment at the same time," says UNICEF Innovation specialist Norman Muhwezi, who is leading the project. Because of their cost-effectiveness, durability, and ease-of-assembly, bricks made from 100% plastic waste have the potential to disrupt the conventional construction model and catalyze a market for recycled plastic worldwide. Millions of waste pickers working informally in landfills and on city streets around the world could become key waste management partners – elevated out of poverty as they help clean our planet, and provide building blocks for the futures of our children.

Single use plastics now have a new, lasting and meaningful purpose. They can be used to build houses at a cheaper cost. Architects [Conscious Design](#) have invented an interlocking bricks system. The Dutch architectural firm co-founder Frans Taminiau and Rushabh Chheda designed building blocks that can be stacked in a number of ways. This material was used in a housing project in Mexico. The project won the [Clean Energy Challenge](#).

Eco-Blocks Ward used in Lombok originates from Finland where waste plastic is mixed with wood fibers. 77 schools were built in Cambodia, Laos and Myanmar and introduced in Indonesia in 2018 where over 400 schools were destroyed in earthquakes. 23 schools were rebuilt with these blocks at half the price of conventional buildings. The planned factory in Lombok will produce the blocks locally so 200 more schools may be manufactured and built in the coming 5 years. More information is available.

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