Reverse Logistics Credits

Section 1: Summary

<table>
<tr><td colspan="4" align="center">Use Case Summary</td></tr>
<tr><td>Use Case ID:</td><td>IND-003</td><td>Use Case Type:</td><td>Vertical</td></tr>
<tr><td>Submission Date:</td><td>January 4, 2019</td><td>Is Use Case supporting SDGs</td><td>Yes</td></tr>
<tr><td>Use Case Title:</td><td>Reverse Logistics Credits</td><td>Domain:</td><td>3</td></tr>
<tr><td>Status of Case</td><td>Pilot</td><td>Sub-Domain</td><td>g</td></tr>
<tr><td>Contact information of person submitting/ managing the use-case</td><td colspan="3">Full Name: Lucas Farias de Moraes Sarmento
Job Title: COO
E-mail address: lucas.sarmento@brpolen.com.br
Telephone number:+55 21 991686899
Social media: https://www.linkedin.com/in/lucas-farias-de-moraes-sarmento-82206490/

Web site: www.brpolen.com.br</td></tr>
<tr><td>Proposing Organization</td><td colspan="3">Legal Name: POLEN CONSULTORIA E INTERMEDIACAO DE NEGOCIOS EM SUSTENTABILIDADE LTDA - EPP

Country: Brazil

CNPJ: 28.038.406/0001-82</td></tr>
<tr><td>Short Description</td><td colspan="3">Post-consumption waste Reverse logistics compensation scheme using DLT as infrastructure to issue Reverse Logistics Credits, which can be used by companies wishing to offset and incentivise the recycling of the waste generated by the consumption of the products they sell to the public.</td></tr>
<tr><td>Long description</td><td colspan="3">Companies in Brazil that manufacture packaged goods are required by law to provide proof that a percentage of said packaging is recycled, post-consumption. Also, in Brazil, a crucial part of the reverse logistics chain lies on street waste pickers associations, they collect, sort and sell post-consumption urban solid waste to the recycling industry. In short, waste pickers do the job that these manufacturers were supposed to do. Regulators, auditors and legislators are aware of this scheme and allow for companies to finance the operations of waste pickers associations (proportionally to the amount of waste the association collects and sell) as a way to prove that the packaging of the products they sell to the public is returned to recycling industry, what constitutes basically a credit or offsetting scheme. Currently the scheme works as follows:

- Waste Pickers collect, sort and sell post-consumption waste to recycling industry

- Packaged goods manufacturers 'buy' the invoices from the</td></tr>
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	transactions described above from the association paying in the form of improvements in the association's infrastructure and machinery. - Packaged goods manufacturers use these invoices to prove to authorities that they were financially responsible for the recycling of the post-consumption waste. The main concern about the current process is that companies are paying for duplicate credits, Reverse Logistics Operators (waste pickers associations and similar organizations) have been selling invoices of the same commercial transaction for more than one packaged goods manufacturer, effectively incurring in 'double-spending' of the Reverse Logistic Credit they generated. Another concern about the current process is that to rule out any chance of an employment bond between the associations and the manufacturers the waste pickers associations can only receive the payments from the manufacturers in the form of improvements in the association's infrastructure and machinery. Being that most of these waste pickers live in extreme conditions of poverty, their, totally fair, claim is to be able to receive these payments in actual sound money instead of improvements and machinery. Using a DLT to record, issue and transact those credits solve both above mentioned problems. Double spending is made impossible by the very characteristics of the system and employment bonds between associations and manufacturers will be never be formed because manufacturers will only buy the fungible tokens issued by the smart contract not knowing which association was responsible for the actual process of returning the post-consumption waste to the recycling industry.

SDG in Focus (when applicable)	GOAL 8: DECENT WORK AND ECONOMIC GROWTH GOAL 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE GOAL 12: RESPONSIBLE PRODUCTION AND CONSUMPTION GOAL 14: LIFE BELOW WATER

Value Transfer:	*Users transact tokens that represent the collection and recycling of 1 ton of post-consumption packaging waste*	**Number of Users:**	*TBA*
Types of Users:	*Reverse Logistics Operator (company or association that is responsible for collecting and selling post-consumption packaging waste to the recycling*		

	industry) *Packaged Goods Manufacturers (company that sells packaged goods to the general public and is required by law to provide proof that a percentage of said packaging was recycled)* *Auditors (Brazilian Government body that is responsible for overseeing the compliance of such legislation)* *System Operator (company that develops and maintain the online platform and infrastructure where tokens are issued, bought and sold)*
Stakeholders	*General society: is benefited by the increase in recycling rates and the environmental consequences that come from said increase.* *Waste Pickers Associations: is benefited by the extra income earned due to the selling of the Reverse Logistics Credits.* *Packaged Goods Manufacturers: are provided with a simple and secure mechanism to comply with legislation and offset environmental impact of their activities.* *Government bodies responsible for overseeing compliance of such legislations: are provided with an easy and secure way to audit the compliance of such legislation*
Data:	The DLT will store data about commercial transactions that complete the reverse logistics process (Reverse Logistics Operator selling post-consumption waste to Recycling Industry). Invoices of such transactions officially issued by the Brazilian fiscal authorities will be parsed and tokenized if adherent to the requisites above. The information to be stored is: Seller's CNPJ, Buyer's CNPJ, NCM Code (MERCOSUL common denomination code), amount, type of material transacted, date of issuance.
Identification:	*Identity of participants will be available only for the marketplace provider and government authorities*
Predicted Outcomes:	Increase in packaging recycling rates; increase in Waste Pickers income and overall work conditions; increase in compliance by packaged goods

|	manufacturers; decrease in the amount of landfilled recyclable material; decrease in the amount of waste mishandled and wrongly disposed in the environment.

Overview of the Business Problem or Opportunity

Business opportunities lies on the intermediation of the buying and selling of the token, collecting transaction fees for every transaction made on the platform.

Why Distributed Ledger Technology?

Using a DLT to record, issue and transact Reverse Logistics solve the two more sensible problems of this compensation scheme. Double spending is made impossible by the very characteristics of the system and employment bonds between associations and manufacturers will be never be formed because manufacturers will only buy the fungible tokens issued by the smart contract not knowing which association was responsible for the actual process of returning the post-consumption waste to the recycling industry. Also, auditing the system becomes extremely easy due to the immutability and traceability of the transactions recorded on the ledger.

Section 2: Current process

Current Solutions

Current solutions are based on the model mentioned above, with the vulnerabilities mentioned above, on the 'long description' section.

	Existing Flow (as-is)		
	Step	**User Actions**	**System Actions**
	1.	Reverse logistic operator collects, sort and sell post-consumption packaging waste to the recycling industry.	Brazilian fiscal authority keeps a digital version of every invoice issued.
	2.	Packaged goods manufacturer contacts Reverse Logistics Operator and buy the invoices of those transactions from them.	System has currently no way of keeping track of these transactions.
	3.	Packaged goods manufacturer compensate associations via improvements in infrastructure and machinery.	System has currently no way of keeping track of these transactions.
	4.	Packaged goods manufacturers use the bought invoices to prove to the responsible government body	Invoices are handed to the responsible government body in physical form, making it very hard for the auditors to validate the information.

	that they have met the recycling requirements	

Process scheme (as-is)
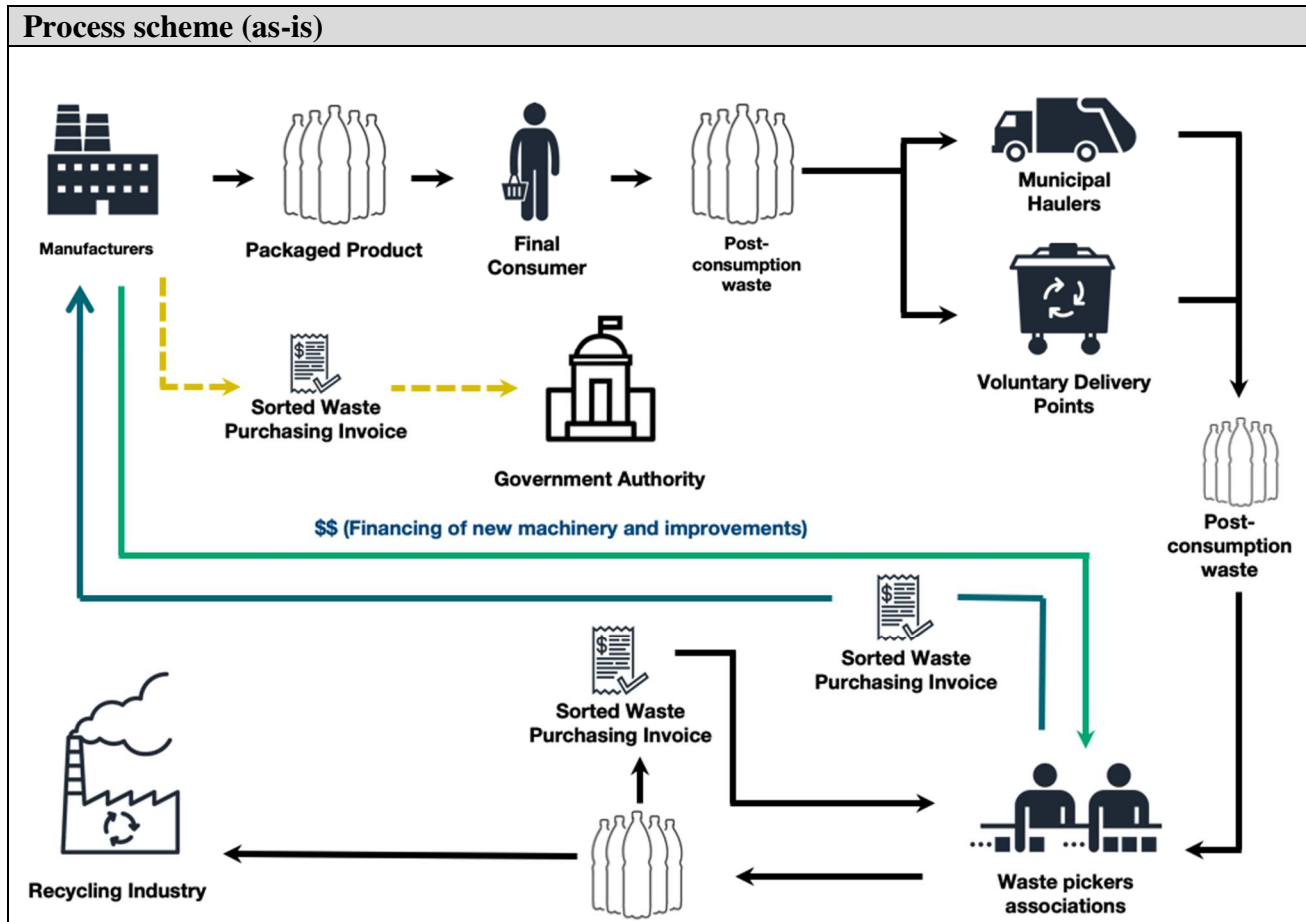
Data and information (as-is)

Data	Type	Description
1	*Invoices*	Invoices issued by the official Brazilian fiscal authority.

Participants and their roles (as-is)

Actor	Type/Role	Description
1	*Packaged good manufacturers*	Buys invoices (representation of a commercial transacation) from waste pickers associations to provide evidence that they have funded the recycling of a certain amount of post-consumption packaging waste.
2	*Reverse Logistic Operators/Waste Pickers Association*	Collect, sort and sell post-consumption packaging waste to the recycling industry & Sell the invoices (representation of the process of returning a certain amount of waste to the recycling industry.
3	*Auditors*	Brazilian Government body that is responsible for overseeing the compliance of such legislation.

Other Notes
Any assumptions, issues

Section 3: Expected process

Expected Flow (to-be)		
Step	User Actions	System Actions
1.	**Reverse logistic operator** collects, sort and sell post-consumption packaging waste to the recycling industry.	Brazilian fiscal authority issues and keeps a digital version of every invoice issued.
2.	**Reverse Logistic Operator** and **Packaged Goods Manufacturer** creates an account in the platform providing legal and official information.	System Generates keys pair an assign to user accounts.
3.	**Reverse Logistic Operator** uploads the electronic invoice to the platform	System parse the electronic invoice and feeds a smart contract running on the EOS blockchain with the information of which kinds and how many tokens (Reverse Logistics Credits) are to be issued and transferred to user account.
4.	**Users** transact the tokens between each other accounts in exchange for payments made online.	System records this transactions between users.
5.	**Packaged Goods Manufacturer** 'burn' the tokens under their possession	System records the burning of the tokens and the accounts that did it
6.	**Government Authority**	Audits the system by checking the amount of 'burnt' tokens under each participants accounts and the provenance of these tokens.

Process scheme (to-be)
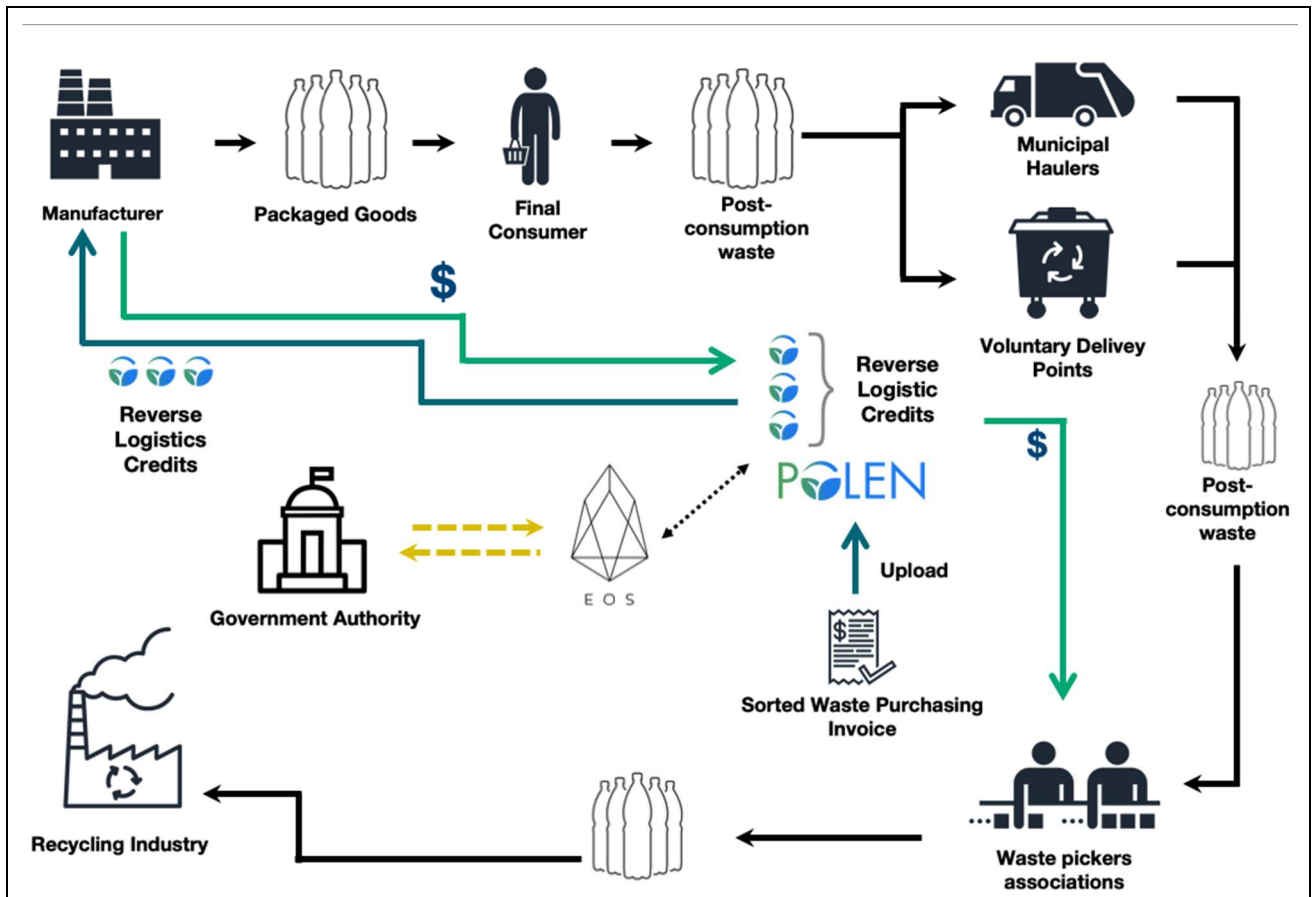
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3	*Auditors*	Brazilian Government body that is responsible for overseeing the compliance of such legislation.
4	*System Operator*	Company that builds and operates the online platform where tokens are issued, bought and sold.
5	*Multi-purpose blockchain*	Computer network in charge of maintaining the DLT.

Data and information		
Data	**Type**	**Description**

1	*Electronic Invoices*	Electronic invoices issued by the official Brazilian fiscal authority. Tells the system the amount of each kind of post-consumption waste (plastic, metal, glass or paper) was sold to the recycling industry
2	*User Profile*	User profile on Polen's database for public-key and CNPJ syncing.
3	*Reverse Logistics Credits (cryptographic tokens)*	Digital and unique representation of the process of returning of 1T of packaging material to the recycling industry. Four different kinds of tokens can be issued, one for each category of packaging material (plastic, metal, glass or paper)
4	*'Burnt' tokens balance*	Balance of consumed tokens under each account. This means the token was used by the Packaged Goods Manufacturer as evidence of the reverse logistics process and can no longer be transacted.

Security and privacy

1. All information on the blockchain is public

Main Success Scenario + expected time line

The DApp functions are basically:

Register Invoice and mint tokens - The contract owner (can evolve to registered auditors) register a given invoice, for a recyclable waste sold to a registered recycler, generating Reverse Logistics Credit to the seller, and also tokens to buyer and seller for the transaction.

Trade tokens - Polen tokens are free tradable.

Certify - tokens can only be certified for a period of time defined according to the legislation. Any wallet is able to certify tokens, this means the token will be foverer frozen on beahalf of a given CNPJ (brazilian company registry)

Conditions (pre- or post-)

1.

Performance needs

The application will perform according to the Jungle EOS Testnet, and later on to the EOS Main Net, that have proved to be able to process more than 4.000 transactions per second. This will depend on network capacity, usage and staked resources (CPU and bandwidht). The irrevesibility happens when 15/21 BPs build on top of a block, which happens in up to 90 seconds.

Legal considerations

There's no legal barriers to the implementation of such system

Risks

Legal, business and technical risks related to use case

Special Requirements

Business and technical requirements of use case

External References and Miscellaneous

National Solid Waste Policy (Brazil) - http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm

Federal Reverse Logistics Obligation Decree - http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2017/decreto/D9177.htm

State Level Reverse Logistics Obligation Decree - https://www.legisweb.com.br/legislacao/?id=368998

Other Notes

Any assumptions, issues

Appendix 1:
Domains and subdomains for use cases categorization

Vertical:

1. Finance
   a. Financial management & accounting
   b. International & interbank payments
   c. Clearing and settlement
   d. Reduction of Fraud
   e. Financial messaging
   f. Asset lifecycles and history
   g. Trade finance
   h. Regulatory compliance & audit
   i. AML/KYC
   j. Insurance
   k. Peer-to-peer transactions
2. Healthcare
   a. Pharma
   b. Biotechnology
   c. Medicine
3. Industries
   a. Manufacturing
   b. Energy
   c. Chemical
   d. Retail
   e. Real estate
   f. IT and telco
   g. Supply chain management
   h. Transportation
   i. Agriculture
4. Government and public sector
   a. Taxes
   b. Government and non-profit transparency
   c. Legislation, compliance & regulatory oversight
   d. Voting
   e. Taxation and customs
   f. Intellectual property management
   g. Land Registries

Horizontal:

1. Identity management
2. Security management
   a. Public Key Infrastructure
3. Internet of Things

4. Data processing, storage and management
   a. Data Validation (includes provenance)

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