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Progress Report Phase 2: A system to regulate E-waste export in the EU

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ABSTRACT

Nowadays society electronics has become a more and more crucial part of our lives. The demand for electronic devices increases and so does the amount of waste we produce with them. E-waste is a

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term used for old electronic devices that are of no use anymore and thus become scrap. This causes serious pollution to our surroundings and other countries since most of the e-waste is being exported to third world countries.

Our goal is to find a solution to this pollution problem. Our plan is to create a trading system similar to the CO2 trading system of the European Union. Countries are allowed to only export a certain amount of e-waste. This amount can be increased if they either buy allowances from other countries or if they invest in recycling of e-waste. Meanwhile, we leverage a model to prove our rationality of the system. The global e-waste export limits will be lowered year by year, thus lowering global pollution created by no longer used electronics.

CCS CONCEPTS

• **Hardware → Power and energy**; *Impact on the environment*;

KEYWORDS

E-waste; Fee-Upon-Disposal Regulation; recycling.

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ACHIEVEMENTS

We have done some researches about how the existing methods [3, 6] contend with E-waste problem, and we put forward a new way to solve E-waste issues and the model are already done. As reference to our proposal description, CO2 trading system will be an appropriate analogy to our system. We find a way to leverage the "cap and trade" principle to solve the reasonable distribution of E-waste. we have an idea about the task how to measure the E-waste and what is the quality criteria. An analysis report will be presented in the final paper.

We collect and analyze more related data. Several diagrams would be plotted to demonstrate what the current situation of E-waste in EU is, and which hazards it has brought into daily citizens life. More specifically, we could find out what the development tendency of E-waste is in respective country, and is there any difference in terms of volume of E-waste among countries.

So now we have a comprehensive understanding regarding the current situation of E-waste: keeping increasing E-waste, rigorous solutions(eg. ship e-waste to third world countries)[7], ineffective solutions

(eg. deposit for producer), recycling and reusing only not long-lasting lower e-waste[2, 4], which gives the benefits for our e-waste measuring analysis report and a system design step.

Since many solutions to the e-waste problems are extreme, it is important for a successful transfer from old plans to efficient e-waste plans to make small adjustments first. For this reason, we introduce an e-waste allowance[8]. This will force countries to slowly but surely reduce their e-waste production.

NEXT STEP

More Researches regarding Measurement

In order to help determine how much e-waste is exactly being wasted we would try to make an ingredients list system similarly to the EU legislation used for food products[1]. Electronics manufacturer would be obligated to hand out a list with each electronic product to show how much and what kinds of raw material they use. Based on this a very precise set of rules and regulations can be created. So the next step we will try to create an ingredients list with specific demands.

Our ingredients list for electronic devices will have a lot in common with those demanded by the European Union. Obviously there have to be some differences since we are dealing with electronic devices. what are the differences and what we should do to redesign the ingredients list, that are in the next steps.

Tiny System Design

The tiny robust system design are initially finished. But we need to think more about the credibility and accuracy of our current system. We will collect and analyze more data to test our system.

We will try to compare our tiny system with some current other E-Waste systems and that will help us to improve our design and to make the final system better. for example, the EWSI is a company that offers customized end-to-end solutions in IT Asset Recovery, E-Waste Management, and Electronics Reverse Logistics. It can provide a variety of containers for onsite collection, audit and asset registration services on pickup, and either dedicated or consolidated routes and storage prior to processing.

Another example is from the U.S. which has already legislated and implemented electronic recycling systems. Several tools including Life Cycle Assessment (LCA), Material Flow Analysis (MFA), Multi Criteria Analysis (MCA) and Extended Producer Responsibility (EPR) have been developed to manage e-wastes especially in developed countries[5].

The âĂIJbottle billâĂİ is a system that encourages consumers to return beverage containers by providing a refund on the deposit, and this system is considered by many stakeholders as a successful recycling program that should be expanded as a federal policy. The refund value of the container provides a monetary incentive to return the container for recycling[4]. This is a very good solution for the design of new E-Waste system.

A mathematical Proof

After some consideration, we dicide to give up the mathematical proof, we will use more data to test the our tiny system.

Optimized resource allocation algorithm will play a important role to implement this model. After that we try to prove its rationality. This part is the most crucial part to justify our system is theoretically positive.

Here we introduce a new concept "certificate" as an impact factor. we could impose the restriction on the distribution of e-waste-shipping by certificate, at the same time, the number of available certificates for each country is supposed to consider as well.

Additional Aspects

It is necessary and useful to make more test for our tiny system and find out the risks our model is going to face. That will help a lot for completing and consummating our system.

The final report, about 8 pages, is almost finished. We will focus on the optimization and improvement of it in the next step.

Deviation from proposal

In phase 1, we shifted our main target from developing a whole trading system to a measuring analysis and theoretical model of a tiny system design, which significantly reduces our actual workload of the huge EU e-waste system topic. As so far, we work on the tiny system design. We canceled the mathematical proof, comparing with phase 1.

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