Circular Business Platform

The Long and Winding Road: Implementing the e-Waste Management Policy of Lagos State

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1. Introduction

E-waste is an urgent global regulatory issue. Globally, volumes of e-waste reached 53.6 million metric tons in 2020, with an expectation of the figure to rise to 74 metric tons by 2030[1]. Poor disposal of electronic waste threatens the environment and the health and safety of communities, who are exposed to hazardous chemicals that are released into the air, soil and groundwater. Developing countries are particularly vulnerable to the social, economic and environmental problems caused by e-waste: by some estimates only about 1% of electronic waste in developing countries is recycled safely,[2] often because infrastructure to manage e-waste is weak.[3] In addition to this, many developing countries are recipients of large volumes of second-hand electronic goods that have little or no economic value and so also must manage volumes of e-waste which exceed local consumption.[4]

E-waste has been on the global regulatory agenda for several decades. The Basel Convention, a global agreement to control international trade of hazardous materials including e-waste, entered into enforcement in 1992 and is ratified by 191 countries, including Nigeria. The Basel Convention is domesticated by national and regional regulations to strengthen e-waste collection and recycling infrastructure, most notably through the National Environmental Electrical/Electronics Sector) Regulations, 2022 which defines the Extended Producer Responsibility (EPR) legislation in the EEE sector.[5] Nigeria's approach to e-waste management is consistent with international regulatory approaches. At the Federal level, guidelines for importers of used electronics and regulations for the electronics sector were introduced in 2011.[6] The Guidance Document for the Implementation of the

An Extended Producer Responsibility Programme for the Electrical/Electronics Sector in line with Circular Economy 2020 was developed. The Standards Organization of Nigeria likewise established the Nigerian Industrial Standards on wastes of Electrical and Electronic Equipment EEE) (DNIS 1208:2023EE) for managing e-waste that are based on internationally accepted ISO standards.

As far back as 2009, steps have been taken at the state level to tackle e-waste. For example, Lagos State set up an e-waste unit, housed at the Lagos State Environmental Protection Agency (LASEPA) in 2009 and integrated national guidelines on managing e-waste. Working on behalf of Lagos State, LASEPA also proceeded towards developing a state policy on e-waste management to complement the national framework, working with a consultant in 2014 to draft the policy. The policy sets out

[1] Forti, Vanessa, et al. "The global e-waste monitor 2020." *United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Rotterdam* 120 (2020).
[2] Akuru, U. B., and O. I. Okoro. "Electronic Wastes and the Nigerian Experience." *Proc. 18th International Conference on Domestic Use of Energy, Cape Town/South Africa*. 2010.
[3] Nnorom, Innocent C., and Oladele Osibanjo. "Overview of electronic waste (e-waste) management practices and legislations, and their poor applications in the developing countries." *Resources, conservation and recycling* 52.6 (2008): 843-858.
[4] Perkins, Devin N., et al. "E-waste: a global hazard." *Annals of global health* 80.4 (2014): 286-295.
[5] Widmer, Rolf, et al. "Global perspectives on e-waste." *Environmental impact assessment review* 25.5 (2005): 436-458.
[6] Amachree, Amanda. "Update on e-waste Management in Nigeria". A Presentation made at the 3rd Annual Meeting of the Global E-Waste Management Network. 2013. Available at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.gov/sites/default/files/2014-05/documents/nigeria.pdf

several programmatic areas, including green procurement, standard setting for e-waste recyclers as well as an EPR scheme. However, nearly 10 years passed before the policy was officially implemented. Figuratively, the implementation of the e-Waste Management Policy followed a long and winding road to before it was officially implemented, but as with The Beatle's song of the same name, the policy has reached the door of formal implementation.

This paper is part of a project supported by the Netherlands Enterprise Agency through the Circular Business Platform that studies policy implementation on the circular economy. Strong institutional frameworks that motivate individuals and organizations to recycle and invest in alternatives to hard-to-recycle products is fundamental to building the market for circular goods and services. However, in Nigeria these frameworks are relatively weak, leading us to ask what steps can be taken to strengthen them.

Specifically, the question this paper asks is why policy regimes take time to materialize, even after their key principles are formalized. While adding to a growing volume of research: A simple google scholar search yields over 1.3 million pages with "policy implementation Nigeria" as key words, with 100% of the top 50 samples recognizing or specifically focusing on the puzzle of the absence of implementation, the purpose of asking this question is not merely academic. A great deal of work goes into policy design in Nigeria, however implementation is rarely straightforward: the literature points to important systemic reasons for this including corruption[7], institutional fragmentation[8], politicization of the civil service[9] and budgeting issues[10]. While we do not argue with these diagnoses, we believe they do not necessarily paint an accurate picture of how regulatory agencies work, nor of the administrative complexity of addressing regulatory problems, and hence leave out important ways that more incremental steps can be taken to improve how regulatory principles are mobilized. We follow the gradualist approach of Berman and Fox (2023); We are interested to map processes that may help consultants involved in policy design to take into account the structural nuances of implementation so those nuances may be better integrated into design and planning stages, and to evaluate how organizations and individuals from both the public and private sectors may engage in "policy entrepreneurship" to build implementation structures that support existing policy objectives.

[7] Okoroma, N. S. "Educational policies and problems of implementation in Nigeria." *Australian journal of adult learning* 46.2 (2006): 243-263.; Makinde, Taiwo. "Problems of policy implementation in developing nations: The Nigerian experience." *Journal of Social sciences* 11.1 (2005): 63-69. Ugwuanyi, Bartholomew Ikechukwu, and Emma EO Chukwuemeka. "The obstacles to effective policy implementation by the public bureaucracy in developing nations: the case of Nigeria." *Kuwait Chapter of Arabian Journal of Business and Management Review* 33.856 (2013): 1-10.

[8] Meribole, Emmanuel C., et al. "The Nigerian health information system policy review of 2014: the need, content, expectations and progress." *Health Information & Libraries Journal* 35.4 (2018): 285-297.

[9] Oyedeji, Babatunde. "Politicisation of the civil service: implications for good governance." *International Journal of Innovative Social Sciences & Humanities Research* 4.1 (2016): 1-16.

[10] Ejere, Emmanuel Iriemi. "An Examination of Critical Problems Associated with the Implementation of the Universal Basic Education (UBE) Programme in Nigeria." *International Education Studies* 4.1 (2011): 221-229.

2. Methodology: Regulatory Regimes and Administrative Capacity

A policy that is implemented can be referred to as a regulatory regime. There are multiple definitions of regulatory regimes[11] but a simple one is from Hood et al. (2010) who define regimes as a set of three activities that are linked: standard setting, information gathering and behaviour modification. Hood et al. (2001) are agnostic about how each of these components are operationalized in terms of who is responsible, the activities that are defined and the nature of the linkages, so this model is very useful for studying different regulatory contexts where mandates may be fragmented or overlapping. This is increasingly the case in both international and domestic regulatory environments.[12]

For the e-waste management policy to constitute a regulatory regime, these activities must be present and there must be linkages between them. While clear that the e-waste management policy could not be formally defined as a regulatory regime in its early years, this approach can still be used as a diagnostic to understand the components of the e-waste management policy and their linkages (or lack thereof). According to Hood et al. (2001) regimes are like tubes of toothpaste: with squeezes in one part producing bulges in another. In this respect, a regime perspective is not normative and there is no expectation for a regulatory system to be functional, which makes this approach suitable for evaluating policy at all stages of development.

In the case of the Lagos State E-waste Management Policy, LASEPA is the key coordinating agency responsible for the policy. However, it depends upon coordination and interactions with multiple agencies at the state and federal level to implement the policy. The approach in this paper is therefore to examine the Lagos State e-waste Management Policy as a set of regulatory standards (Section 3) and LASEPA as the key agency responsible for monitoring and enforcing standards (Section 4).

Our lens for exploring policy implementation is focused on the micro-level, specifically administrative capacity. Our rationale for examining the micro-level is that the study of the regulatory agency responsible for implementation gives us a clearer picture of the individuals and organizations that have responsibility to implement complex regulatory programmes, particularly their constraints in terms of resources and authority to deliver upon regulatory objectives. Following the logic of Berman and Fox (2023), we believe that it is possible for institutional change to be gradual and that the greater the empathy and knowledge of policy context, including the likely squeezes and bulges that may emerge in implementation, the higher the likelihood that more innovative approaches to policy design can be deployed. In sections 5 and 6 we therefore evaluate the e-waste management policy as a regime and offer recommendations that we believe can be deployed both in the context of the e-waste policy and in future policy design.

The data gathering component of this paper included a detailed review of the draft e-waste management policy and supporting policies, critically the federal UEEE guidelines, regulation on

[11] A good overview is provided by Windholz, Eric. "Implementing Regulatory policy." The Routledge Handbook of Policy Tools (2022).

[12] Beinisch, Natalie. "Digital Technologies and the Regime Complex for Plastics in Nigeria." Digital Innovations for a Circular Plastic Economy in Africa (2023): 42. For an overview of fragmentation in Nigeria provides an overview of fragmentation in the Nigerian context.

electronics and e-waste and federal standards on e-waste management. An interview with the key architect of the policy as well as multiple site visits to LASEPA to meet with and work with the e-waste team were also carried out. Interviews were triangulated with publicly available information, including news articles and reports on e-waste policy development in Nigeria.

The purpose of this work is to map policy components according to their fit within a regulatory regime and to examine whether and how capacity to implement the regime exists and is distributed. Due to LASEPA's central role in implementing the policy and that the policy was not formally implemented for many years, it is therefore not expedient to carry out data gathering beyond the e-waste unit of LASEPA or the e-waste policy itself. It is logical to study the policy from LASEPA's perspective as the coordinating agency as this provides a holistic picture of the expectations of administrative capacity to implement regulatory standards and to identify gaps and overlaps. The next section turns to describe how the Lagos State e-Waste Management Policy was drafted and it's key policy components.

3. Regulatory Standards: The Lagos State e-Waste Management Policy

While technology and electronic equipment are essential to Nigeria's development, disposing of electronic equipment safely requires both specialist knowledge and resources: most if not all electronic devices are composed of multiple materials, or "fractions". Different fractions have different values and present different types of health and safety hazards if not properly handled. For example, the backbone of most electronic equipment is a Printed Circuit Board (PCB) which has a significantly higher concentration of gold than does gold ore,[13] however PCBs are also made up of hazardous heavy metals, which if burned or disposed of improperly, release harmful chemicals in the air, soil and ground water.[14] For an electronic product to be disposed of safely, it must be dis-assembled into its different fractions, with each one handled according to specified standards, the most recognized of which being the ISO 14001 standards for e-waste management and recycling. It is especially important to ensure that low value and harmful waste fractions are diverted from the environment and this can incur high costs, often making responsible e-waste recycling unprofitable as a purely free-market activity.[15]

Lagos State is the primary entry point for new and second hand electronic goods traded in Nigeria: Between 60,000 – 188,000 metric tons of used electronic equipment are estimated to enter Nigeria via the port of Apapa in Lagos on an annual basis, with a high proportion that is unserviceable.[16] The total value of new and used electronics imported into Nigeria is estimated to be worth 3 billion dollars annually[17], with an estimated 290,000 tons of e-waste generated in the same time frame.[18] Trade of second-hand electronics in particular is clustered around "computer villages" in Lagos, where specialized workers repair and refurbish secondhand equipment. There are only three formal e-waste recyclers operating in Nigeria; two of them are licensed by the State to dismantle electronic equipment. Together, they handle just a fraction of waste electronic goods, with the majority of waste handled through informal channels that do not necessarily identify as handlers of e-waste and do not follow responsible e-waste management protocols.[19]

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[13] Sahan M, Kucuker MA, Demirel B, Kuchta K, Hursthouse A. Determination of Metal Content of Waste Mobile Phones and Estimation of Their Recovery Potential in Turkey. Int J Environ Res Public Health. 2019 Mar 11;16(5):887. doi: 10.3390/ijerph16050887. PMID: 30862075; PMCID: PMC6427248.

[14] Manikkampatti Palanisamy, Murugesan, et al. "Toxic Metal Recovery from Waste Printed Circuit Boards: A Review of Advanced Approaches for Sustainable Treatment Methodology." *Advances in Materials Science and Engineering* 2022 (2022).

[15] Ahmed, Syed Faraz. "The global cost of electronic waste." *The Atlantic* 29 (2016).

[16] Odeyingbo, A. O., I. C. Nnorom, and O. K. Deubzer. "Used and waste electronics flows into Nigeria: assessment of the quantities, types, sources, and functionality status." *Science of the Total Environment* 666 (2019): 103-113 – estimate 60,000 tons. An later but scientifically less sound estimate is by Valentine, I (2019). Nigeria's E-waste mountain. https://resource.co/article/nigerias-e-wastemountain.

[17] Trading Economics. "Nigeria Imports of Electrical, electronic equipment". Retrieved from: https://tradingeconomics.com/nigeria/imports/electrical-electronic-equipment#:~:text=Nigeria%20Imports%20of%20Electrical%2C%20electronic%20equipment%20was%20US%243.08%20Billion,updated%20on%20June%20of%202023.

[18] Miner, Kangyang Josiah, et al. "Survey on household awareness and willingness to participate in e-waste management in Jos, Plateau State, Nigeria." *Sustainability* 12.3 (2020): 1047.

[19] Manhart, Andreas, et al. "Informal e-waste management in Lagos, Nigeria–socio-economic impacts and feasibility of international recycling co-operations." *Final report of component* 3 (2011): 1-129.

The problem of poor e-waste disposal in Nigeria is severe: soil and water studies of dumpsite effluent and household groundwater near electronics trading markets have found high concentrations of heavy metals such as lead, which damage the brain and nervous system of those who are exposed[20]. Studies of waterways around Lagos have furthermore found concentrations of cadmium, lead, mercury and copper that are thousands of times higher than areas that do not trade or dispose of electronic goods in high volumes,[21] affecting not only humans but marine life and local ecosystems.[22]

In summary, three key regulatory issues concerning the management of electronic waste in Nigeria:

Control of Trade: While the second-hand market offers benefits such as making digital technology more accessible to low-income populations and has led to a dynamic market of professional refurbishers, a high percentage of second-hand electronics goods that enter Nigerian ports is beyond repair. Customs authorities for both exporting and importing countries must control the outflow and inflow of electronics goods to limit entry of unserviceable goods that are likely to create disproportionate harm to receiving communities.

Poor e-waste disposal and recycling practices: The e-waste management system is, for the most part, fragmented and informal. Knowledge about proper e-waste disposal among the general public is limited.[23] There is also limited knowledge and motivation among informal e-waste collectors and traders to handle e-waste according to international e-waste management standards.

Responsibility for Costs: There is no efficient market solution to dispose of e-waste responsibly in Nigeria. It is very costly in financial and administrative terms to properly disassemble and ship material fractions to the places where they will be processed in an environmentally friendly way.

Articulation of these problems began to emerge in 2005 when the Basel Action Network, a Seattle-based NGO, released a documentary titled *The Digital Dump: Exporting Re-use and Abuse to Africa*, which tracked shipments of second-hand electronics from developed countries into Nigeria. The documentary claimed that approximately half a million second-hand computers were entering into Nigeria each year, with an eye-watering 75% of electronic goods entering into Nigeria destined directly to the dumpsite. The documentary helped to trigger action from development agencies, spearheaded by the United Nations Environmental Programme (UNEP), who sponsored the "E-waste Africa Project",[24] which was designed to build the foundations for a regulatory programme in Nigeria.

Formal policy activity was also initiated by Nigerian Environmental Standards and Enforcement Agency (NESREA), beginning with the National Environmental Regulations for the Electrical and Electronics Sector in 2011 and guidelines for WEEE Importers in 2013. Both the regulation and guidelines set requirements for electronics importers to register with the agency and banned

[20] Popoola, Lekan Taofeek, Adeyinka Sikiru Yusuff, and Tajudeen Adejare Aderibigbe. "Assessment of natural groundwater physico-chemical properties in major industrial and residential locations of Lagos metropolis." *Applied Water Science* 9.8 (2019): 191.
[21] Aderinola, O. J., et al. "Heavy metals in surface water, sediments, fish and Periwinkles of Lagos Lagoon." *Am.-Eurasian J. Agric. Environ. Sci* 5.5 (2009): 609-617.
[22] Sullivan, Jack. "Trash or Treasure: Global Trade and the Accumulation of E-Waste in Lagos, Nigeria." *Africa Today* 61, no. 1 (2014): 89–112. https://doi.org/10.2979/africatoday.61.1.89.
[23] Miner, Kangyang Josiah, et al. "Survey on household awareness and willingness to participate in e-waste management in Jos, Plateau State, Nigeria." *Sustainability* 12.3 (2020): 1047.
[24] Schluep, Mathias. "e-Waste Country Assessment Nigeria-e-Waste Africa project of the Secretariat of the Basel Convention." BCCC: Basel Convention Co-Ordinating Centre, 2012.

importation of hazardous electronic materials, including unserviceable second-hand products. The regulation also introduced Extended Producer Responsibility as a principle for paying for the responsible disposal of e-waste.

However, as a national agency with limited jurisdiction within states, NESREA, in conjunction with the Nigerian Customs Service could control permitting and international trade but had less oversight over intra and inter-state trade, which were the primary sites for electronics assembly, distribution, waste disposal and recycling. NESREA needed to work closely with state level organizations to fully address all three regulatory challenges. Given the critical role that Lagos State played in the new and second-hand electronics market, UNEP, along with NESREA and Lagos State recognized the latter's role to enable the principles embedded at the federal level to be translated into state policy frameworks.

A key moment signaling the commitment of Lagos State to complement Federal efforts to manage e-waste was a summit on e-waste regulation in 2011 hosted by Lagos State in partnership with UNEP and Federal Ministry of Environment. Through this summit, broad consensus between state, national and international organizations about the regulatory issues and pathways was reached.

One of the action items was for Lagos State to adopt guidelines on e-waste management and revamp its e-waste unit, which had been established in 2009. A consultant was engaged to draft an e-waste management policy, which was finalized in 2014. The policy built upon the work carried through initiatives such as the Africa e-waste project and federal regulations, focusing on four areas:

Procurement scheme at State level to motivate green purchasing: Sets out principles of green procurement for State agencies, specifically related to setting procurement standards on materials efficiency and toxic reduction.

Standards for informal and formal WEEE recyclers including to safely dis-assemble and dispose of e-waste materials and for staff and facility management: Set the expectation that the State carry out e-waste quantification and characterization studies, develop standards for formal recycling facilities and accreditation processes that fit within a state-level legal framework. The policy also specified for a knowledge development programme for SMEs, with a graduated certification framework, which could be delivered by the State or the private sector.

Producer Take Back Programme and EPR Scheme: Sets out principles of Extended Producer Responsibility (EPR), defines expansive role of the State in respect to assuring that waste is disposed properly by all actors in the value chain, including consumers, manufacturers, importers and recyclers. This includes the direct role of the State in setting up collection centres, standardizing collection systems and monitoring them. The policy also outlines responsibilities for participants in the value chain. This includes producers/assemblers, retailers and Lagos State Waste Management Authority (LAWMA), where expectations are set for them to fund or run collection centres or programmes.

Financing and Governance: Recognizes that the framework to finance the activities under the policy are not established, that costs beyond administration and set-up should be borne by the private sector and defines LASEPA as the coordinating agency to implement the policy. Within the policy, the State is expected to allocate resources towards initiatives reducing e-waste risks, however other types of resource mobilization are less well defined, such as reference to an e-waste fund.

As substantial work had already been undertaken to identify the policy issues through international and national level interventions there was broad consensus about the goals of the policy. At no stage in the research process was there evidence of any conflicts about the core principles of the policy: to steer state purchasing behaviour towards greener equipment, to enforce internationally accepted standards on e-waste management and to acknowledge the dominant role of producers to finance collection and proper end of life disposal.

However, while there was no conflict in respect to broad principles, the policy was not drafted as a set of detailed rules and the responsibilities of state and non-state organizations overlapped. For example, the general principles of an EPR scheme were outlined, but there was no specificity in respect to how a state-based scheme might interact with one at the federal level, and the operational structure of collection centers, a key component of EPR was suggestive but not defined, offering many different pathways to institutionalize collection, including the private sector acting collectively or on its own.

There are multiple explanations for this ambiguity. Firstly, at the time the policy was drafted, there was conflict about role definitions in respect to regulatory mandates over electronic waste. While LASEPA was assigned the role of coordinator, responsible to implement and oversee the policy, the mandate of Lagos State Waste Management Authority (LAWMA) was directly over waste collection within the state, calling into question the role that LASEPA could play in respect to orchestrating collection of e-waste. This question was resolved through the Lagos State Environmental Management and Protection Law in 2017, which defined the role of LAWMA (collection, disposal and waste management services) and LASEPA (pollution and environmental control) in respect to waste management.

Secondly, at the time the policy was drafted, not enough was known about the problem of e-waste management for targets to be set or have meaning. While the policy set targets related to reduction of e-waste and in terms of household collection, these were not based upon benchmarks around which there was consensus about methodology or data sharing.

Thirdly, there were two administrative paths for the policy. The first was non-legislative, in other words, it was mandate to LASEPA to organize around it, but did not provide budget or additional enforcement powers. The second path was legislative, that provides more resources for enforcement but the process is longer and more uncertain as it requires judicial review and approval by the House of Assembly. At the time of writing, the policy followed the route of the former but the agency was focused on moving towards the latter with the goal of improving e-waste oversight in Lagos.

Finally, the requirements that LASEPA is meant to fulfill to implement the policy are extensive, but there is limited clarity as to how these activities are funded or how private sector participation might reduce the administrative responsibilities of the agency. This has the potential to increase both the burden and uncertainty of implementing the policy. The next section examines how the e-waste department organized around these challenges.

4. LASEPA's E-Waste Management Unit

State oversight of e-waste involves collection and disposal, which is the mandate of Lagos State Waste Management Authority, and control of chemicals and hazardous substances, which is the mandate of LASEPA. LASEPA set up a dedicated e-waste dept in 2009. At its inception, the role of the unit covered both e-waste, spent oil and waste petroleum products. A "renewed" e-waste management unit was established in 2011 as an outcome of the e-waste summit. The responsibilities of e-waste unit in respect to monitoring and regulating e-waste materials are:

- Permitting the formal and monitoring informal recycling sector. The formal sector is fairly small, including only two companies that have permits to dismantle e-waste. The informal sector, in contrast, includes a large number of traders and collectors operating in a range of scrap markets that are not licensed to disassemble but may be licensed to collect.
- Training formal and informal sector traders and collectors on proper collection and dangers of dismantling waste and providing certification and subsidies to collectors and recyclers.
- Formulating remediative action plans for traders and collectors and following up on them.
- Mapping the size of the electronics sector and monitoring the flow of electronics goods into Lagos, in partnership with NESREA.
- Letter writing to manufacturers and retailers on e-waste guidelines to encourage adoption of take-back programmes and encouraging set-up of waste inventories for e-waste.
- Sensitizing other state agencies on e-waste including supporting waste management inventories.
- Overseeing set up and management of collection centres for formal and informal recyclers, including liaising with LAWMA for collection and dismantling. There are also two e-waste collection centres at LASEPA's zonal offices.
- Liaising with recyclers on e-waste collection volumes, based upon a quarterly report. Liaising large organizations to facilitate responsible disposal (ie banks, manufacturing companies).

The unit is made up of twelve staff, who have access to agency vehicles to carry out its monitoring and engagement activities. The unit's budget is funded in part through the State, however it also carries out partnership activities to complement this. For example, training and outreach may be supported via international partners and work to set up collection centres is supported by the Global Environmental Facility. Another source of funding is through fines that are issued for violations related to improper disposal or dismantling by traders. Increasingly, the agency is also providing licenses to e-waste collectors: only licensed organizations are able to collect e-waste products from large suppliers, who must pay licensed collectors for their work.

As outlined in Table One, the structure of the unit's work is compatible with the E-waste Management Policy. Interestingly, as a coordinating agency, the unit has limited authority from an enforcement standpoint to implement the guidelines but has creatively used the tools at its disposal, which have served to increase the capacity of the agency to set, monitor and enforce standards.

Table 1 LASEPA E-waste Management Unit Activities

Department Activities	Relevance to 2014 Policy	Regulatory Target	Enforcement Tools
Monitoring Formal and Informal Recyclers	High	e-waste recylers (formal) and e-waste collectors (formal and informal)	Fines, isuance and revocation of licenses
Training Formal and Informal Collectors and Recyclers	High	e-waste recylers (formal) and e-waste collectors (formal and informal)	Fines, isuance and revocation of licenses
Formulating Remediative Action Plans	High	e-waste recylers (formal) and e-waste collectors (formal and informal)	Fines, revocation of licenses
Inventory Mapping	High	OEMs, high volume users of electronics materials (offices etc..), retailers	N/A
Letter-writing	High	OEMs, high volume users of electronics materials (offices etc..), retailers	N/A
Sensitization of other State Agencies	High	State ministries and regulatory agencies	N/A
Monitoring collection volumes of e-waste from LAWMA	High	N/A	N/A
Setting up collection centres	High	Collectors, consumers	N/A

This is illustrated most clearly in respect to LASEPA's work in permitting and licensing the informal recycling sector. Recognizing the challenges to directly monitor the activities of informal recyclers, the agency has invested in liaising with large companies, which dispose of e-waste in the highest volumes, to remind them of their obligations to schedule collection with only licensed collectors, who are paid for removal and transport to a licensed dismantler. As licensed collectors are aware of these obligations and large companies are important sources of revenue generation due to their volumes, licensed collectors are motivated to monitor and report to LASEPA when companies fail to comply. This reduces the need for members of the e-waste unit to monitor directly.

LASEPA has more broadly demonstrated creativity in respect to sensitizing other agencies. It is approach to fulfilling the goals of green procurement is a case in point. While the e-waste policy set the target for a state-wide green procurement scheme, the agency responsible for setting procurement standards in Lagos is the Lagos State Procurement Agency. The mandate of this agency is focused on processes that improve transparency and competition in respect to public procurement but not on environmental or other technical standards. Procurement activities are furthermore executed by each office independently, meaning that the diffusion of green procurement is not hierarchical. In this respect, beyond e-waste LASEPA has worked as a "model" office,demonstrating how green processes including recycling of wastewater and elimination of single use plastic can be integrated into administration. This approach recognizes the structural limitations to enforce green procurement practices across other public offices while also setting visible standards and demonstrating that they are achievable, which makes the diffusion of these practices more feasible.

In short, we see that while LASEPA's position as a coordinating agency for the Lagos State e-Waste Management Policy did not necessarily give it strong monitoring or enforcement powers, it organized creatively to meet the ambitions of the policy.

However, as we will evaluate in the next section, even though LASEPA worked in a way that was both consistent with the e-waste policy and produced novel forms of standard setting, information

gathering and behaviour change, there were regardless of some gaps and overlaps across the components of the policy.

5. Analysis

This paper asks why the Lagos State E-waste Management Policy took time to materialize, even after its key principles were formalized. We address this question by examining the development of the policy and LASEPA's role as the coordinating agency responsible for implementation. Our focus is specifically on mapping how administrative capacity to implement the policy is organized and how capacity to set standards, monitor and enforce them is distributed and linked. Table 2 on the following page outlines the observed presence and distribution of administrative capacity to implement the Lagos State E-waste Management Policy.

Table 2: Lagos State e-The E-Waste Management Policy and Administrative Capacity

Policy Area	LASEPA Administrative Capacity		
	Standard Setting	**Information Gathering**	**Behaviour Modification**
Procurement scheme for State Level to motivate green purchasing	General procurement criteria included in policy outlining purchasing, equipment installation and management criteria for state. E-waste unit has drafted more additional procurement guidelines which can be used by the procurement officers at state agencies.	Lagos State Procurement Agency has authority to set procurement standards for ministries, however each agency has its own procurement department and they have discretion to implement standards. There is no central mechanism to monitor procurement tenders and contracts	The Lagos State Procurement Law governs procurement processes in Lagos and is administered by Lagos State Procurement Agency. The law is primarily focused on centralizing information about contractors, increasing transparency and standardizing procurement processes. Procurement is not a centralized activitiy and is carried out independently by ministries and agencies. Beyond e-waste, LASEPA is uses a "demonstration" method to encourage green procurement and management practices
Standards for informal and formal WEEE recyclers including to safely dis-assemble and dispose of e-waste materials	There are internationally established standards for collection, processing, recycling, disposal and trade of e-waste. The ISO 14000 Core Performance Elements are the reference standards in the 2014 policy. Processes to set up standards for SMEs and the informal sector are not defined in the 2014 policy . The Standards Organization of NIgeria has since introduced standards for informal collectors. Target for reduction of waste inventories is defined however,methodological guidelines are not defined. Linkage between e-waste management standards and waste management inventories is defined but weak.	Low number of formal recyclers (2) allows LASEPA to regularly monitor formal e-waste recyclers. LASEPA engages informal sector collectors through training and licensing programmes. Licensed collectors report cases of non-compliance when it is material to them. Additional organizations participating in information gathering about collection include NESREA, Nigeria Customs Service, EPRON (National Producer Responsibility Organization) , LAWMA. They are carrying out information gathering under separate policy frameworks. No identified links between waste characterization studies and infrastructure planning.	LASEPA may issue fines for improper disposal and may issue or revoke licenses of registered collectors and recyclers. However, the agency beleieves it is unproductive to penalize informal sector workers and businesses that are generating employment and who are failing to comply to standards due to lack of knowledge or resources. This is also recognized in 2014 policy (Section 3.2.4). Smaller informal sector businesses and workers may continue to trade without permits.
Producer Take Back Programme and EPR Scheme	Principles of take-back and EPR are outlined in the 2014 policy. Scope of EPR and state responsibility is extensive, covering oversight over private households, retailers, collectors, recyclers and equipment manufacturers. State mandate to develop EPR is indicative. Some targets are included such as a 10 year waste reduction target of 50% against an undefined benchmark and a per capita collection target of 4kg per year within 5 years. The way the state-based policy is intended to interact with the national policy are not defined and potentially overlap.	Key organizations gathering information on private investment into e-waste management infrastructure at the federal level are NESREA and EPRON, based on federal guidelines for manufacturers to register with EPRON.	No sanctions at the state level for non-participation in EPR schemes. Federal level regulation requires OEMs to register with EPRON and to pay a fee to the PRO, for importers to pay fees for ESM and for importers, manufacturers and retailers to set up collection centres. NESREA may issue enforcement notices and fines of 2million naira plus 50k per day for non-compliance to regulation.
Financing and Governance	LASEPA e-waste unit defined as coordinating body for policy. State role in financing policy ring-fenced to "administrative costs and costs for construction and operation of municipal collection points (without containers). All other costs of implementation expected to be borne by the private sector and the private sector (polluter pays principle). Concept of a fund introduced but policy recognizes that funding structures are not yet defined.	No known public processes set up to evaluate progress on funding structures. An M&E framework is recommended in the policy.	Institutionalized channel funding towards e-waste management infrastructure at the state level is the training and licensing system.

Promotion of green procurement is the first policy goal of the policy. While the substantive details of this goal are outlined in the policy and LASEPA has established procurement standards, as discussed in the previous section, it is more complex to administer a state-wide green procurement programme. This is because the architecture which governs green procurement is limited to controlling how public offices issue and award tenders but does not set specific criteria for technical standards. This means there is limited authority within the existing framework to mandate green procurement across the state. LASEPA's approach in this respect has been to demonstrate how green

administrative policies can work. However, it is an approach that depends upon non-hierarchical forms of diffusion, which is more time consuming and complex to administer.

In respect to WEEE recycling standards, there are two policy goals. The first is to set standards for recyclers and the second is setting targets for waste reduction. Standards for formal recyclers are also well defined, owing to very detailed guidelines that are set and regularly reviewed at the international level, by the International Standards Organization. However, standards for SMEs and the informal sector, which are the hardest to monitor and enforce, are not defined in the document. As SMEs and the informal sector make up the largest number of recyclers in Nigeria this absence is significant. Fortunately, since the policy was introduced standards for informal collectors have been developed for the Nigerian market and adopted by the Standards Organization of Nigeria, making it possible to integrate these standards into future iterations of the policy.

The objective of setting standards for waste inventory and categorization is to plan for waste management infrastructure. However, details, including the definition of sampling methodologies, cooperation with NESREA and other relevant organizations as well as the rationale for waste reduction targets is not included in the policy document. Clearer definitions of methodologies and processes may improve information sharing and coordination with organizations such as EPRON, which shares the same objectives to eliminate volumes of e-waste that are improperly disposed of.

An important aspect of the policy is that it recognizes that its implementation cannot be the responsibility of a single agency or organization, that responsibilities are diffuse and LASEPA's key role is as a coordinating agency. However, it also outlines a very ambitious regulatory agenda, including the set-up of a producer responsibility programme, which is also a component of federal policy. The text of the Lagos State policy does not make clear whether a state-based EPR is an addition to federal requirements or intended to strengthen federal law and the capabilities of EPRON, the industry PRO. The E-waste unit team at LASEPA points out that at the time the policy was drafted, the institutionalization of EPR was not a given. Consequently, it is through the evolution of federal-level policy and institutions that EPR goals at the state level have become ambiguous. This is an ambiguity that should be addressed as it has implications for private markets, which are weakened by uncertain regulatory regimes. The mandate to exercise a state-based EPR regime when a national one is operational creates possibilities of double taxation which must be resolved. This is especially important because the role of the private sector to finance implementation of the policy is underscored and EPR is one of several mechanisms outlined in the E-waste Management Policy to channel funding from the private sector to support collection activities. We observe that as implementation has evolved, the licensing structure combined that with requirements for large waste generators has produced a stable method to finance collection activities. Reviewing and adjusting the policy to further institutionalize these practices would strengthen the linkages between the components of the E-waste Management Policy and improve certainty for private sector participants in respect to how and when collection will be paid for.

From the point of view of administrative capacity, the long and winding road of the implementation of the E-waste Management Policy can be explained by the level of the ambition of the 2014 policy document at a time when regulatory processes were not yet institutionalized. The 2014 policy in other words, outlined many roads for LASEPA to follow. For some of these roads, such as the green procurement policy, structural limitations constrained how LASEPA and other regulatory organizations were in a position to influence the diffusion of standards. For others, such as setting up

a licensing regime, LASEPA successfully developed a framework but this was an iterative process that was developed over several years. Finally, some roads were travelled by other organizations, as is the case with EPR, which was implemented at the federal level. The way that each road has been pursued reveals gaps (in the case of green procurement), potential overlaps (in the case of EPR) and developing forms of institutionalization (in the case of licensing). Reviewing the E-Waste policy to close these gaps, reduce overlaps and deepen institutionalization will make it possible for LASEPA to continue down a more straightforward road of implementation.

6. Recommendations

Our interest in asking why the E-waste policy took significant time to implement is to explore how administrative systems are developed in contexts of uncertainty and ambiguity. While there was consensus about standards for managing e-waste when the Lagos State E-waste Management Policy was introduced, there was less certainty in respect to *how* standards may be monitored and enforced. As LASEPA has worked to implement the policy, linkages between standard setting, information gathering and behaviour modification became more clear in some domains while in others it became less so. In this respect, our analysis points to two key recommendations:

1. **Conduct a multistakeholder review of the E-waste Management Policy.** This review should involve all key stakeholders that can influence standard setting, information gathering and behaviour modification across all components of the policy and should assess structural challenges (such as those related to green procurement) and issues of regulatory overlap (such as EPR). The goal of such a review would be to further define common objectives, define roles and strengthen information sharing.
2. **Development of knowledge networks to support policy innovation.** This case demonstrates that even where policy is ambiguous and regulatory agencies have limited monitoring and enforcement tools, regulatory agencies display high levels of creativity to meet policy objectives. In a context of growing economic uncertainty lean forms of monitoring and enforcement are critical to reduce public spending. Improving knowledge sharing within Lagos State and across other jurisdictions can improve the rate at which regulatory agencies experiment with new forms of implementation that can reduce the costs of enforcement. Tools such as the "Engaging stakeholders with evidence and uncertainty" toolkit published by the Africa Centre for Evidence[25] serve as a template to map knowledge and build evidence and consensus about policy effectiveness across all types of policy domains and could thus be a strong building block to support policy innovation.

[25] https://eppi.ioe.ac.uk/EvidenceAndUncertaintyToolkit/Engaging_stakeholders_with_evidence_and_uncertainty.html

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