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DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT SYSTEM FOR AN ELECTRONICS INDUSTRY ENTERPRISE

Gubaidullina D.V. (ITMO University), **Kolpikova V.O.** (ITMO)
Supervisor – lecturer of the Faculty of Ecotechnologies, Sergienko O.V. (ITMO University)
Supervisor – associate professor of the Faculty of Ecotechnologies, Daniluk M.A. (ITMO University)

Introduction. Electronic industry enterprises generate substantial environmental impacts, including energy and water consumption, use of hazardous chemicals, and solid/liquid waste generation. However, most lack comprehensive environmental management systems (EMS) to measure and mitigate these impacts. For example, only around 25% of electronics companies in the European Union have ISO 14001 certified EMS [1]. Implementing customized EMS represents an opportunity to improve eco-efficiency, comply with tightening regulations, and meet customer expectations.

Main Body. As the most widely-used international EMS standard, ISO 14001 provides a practical framework that will structure this initiative to build an customized environmental management system (EMS) for an electronics manufacturer [2]. The first phase focuses on conducting an environmental review assessing current impacts in energy, water, waste, biodiversity, regulatory compliance, etc. Quantitative flow mapping of operational inputs/outputs will provide baseline measurements, while a life cycle screening spots hotspots across product lifecycles. Comparing against established electronics industry benchmarks highlights relative consumption and emission levels in various areas. Regulatory analysis determines appropriate indicators and performance targets, alongside stakeholder consultation identifying their priorities.

These activities feed into an electronics-sector specific environmental policy guiding continual environmental improvement. As the cornerstone of the EMS, this policy establishes commitments aligned to business objectives across focus areas like greenhouse gas reduction, water conservation, circular economy transition pathways, sustainable supply chain codes, energy efficiency, alternative material use, etc. The policy connects high-level aspirations about climate action, zero waste, lowering footprint, entering green markets etc. with specific, measurable goals for different operational aspects [3]. For example, setting timebound targets on the percentage of renewable energy used, quantity of waste diverted from landfills, share of recycled resins purchased, reduction in solvent usage per production volume etc.

After defining policy ambitions, subsequent EMS components enact detailed roadmaps, roles, resources, monitoring capabilities etc. to actually manifest change. Opportunities to prevent pollution, modify processes, introduce circular designs, or transition supply chains provide means of turning policy aims into on-ground outcomes. An electronics EMS can leverage emerging techniques like sensors and analytics to drive evidence-based decisions, automated controls and predictive action. However, simplicity and standardization remains essential for effective implementation rather than over-engineering systems [4]. Piloting simplified processes delivers impact faster while allowing incremental expansions later. The finalized EMS must balance comprehensive environment coverage and stakeholder needs with accessible, easy-to-operationalize processes that seamlessly integrate into existing electronics manufacturing operations.

Conclusions. The EMS developed through this applied research provides the partnering electronics firm an organized roadmap for shrinking its environmental footprint. If proven effective, the learnings, templates and metrics can be replicated across similar manufacturers struggling with eco-efficiency. With customized adjustments, the modular EMS presents a tested model for coordinated, achievable, data-backed sustainability initiatives industry-wide. Practical demonstration is essential for convincing business leadership on embedding environmental stewardship within normal operations.

Literature review

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Gubaidullina D.V. (author) Sign

Daniluk M.A. (supervisor) Sign

Sergienko O.I (supervisor) Sing